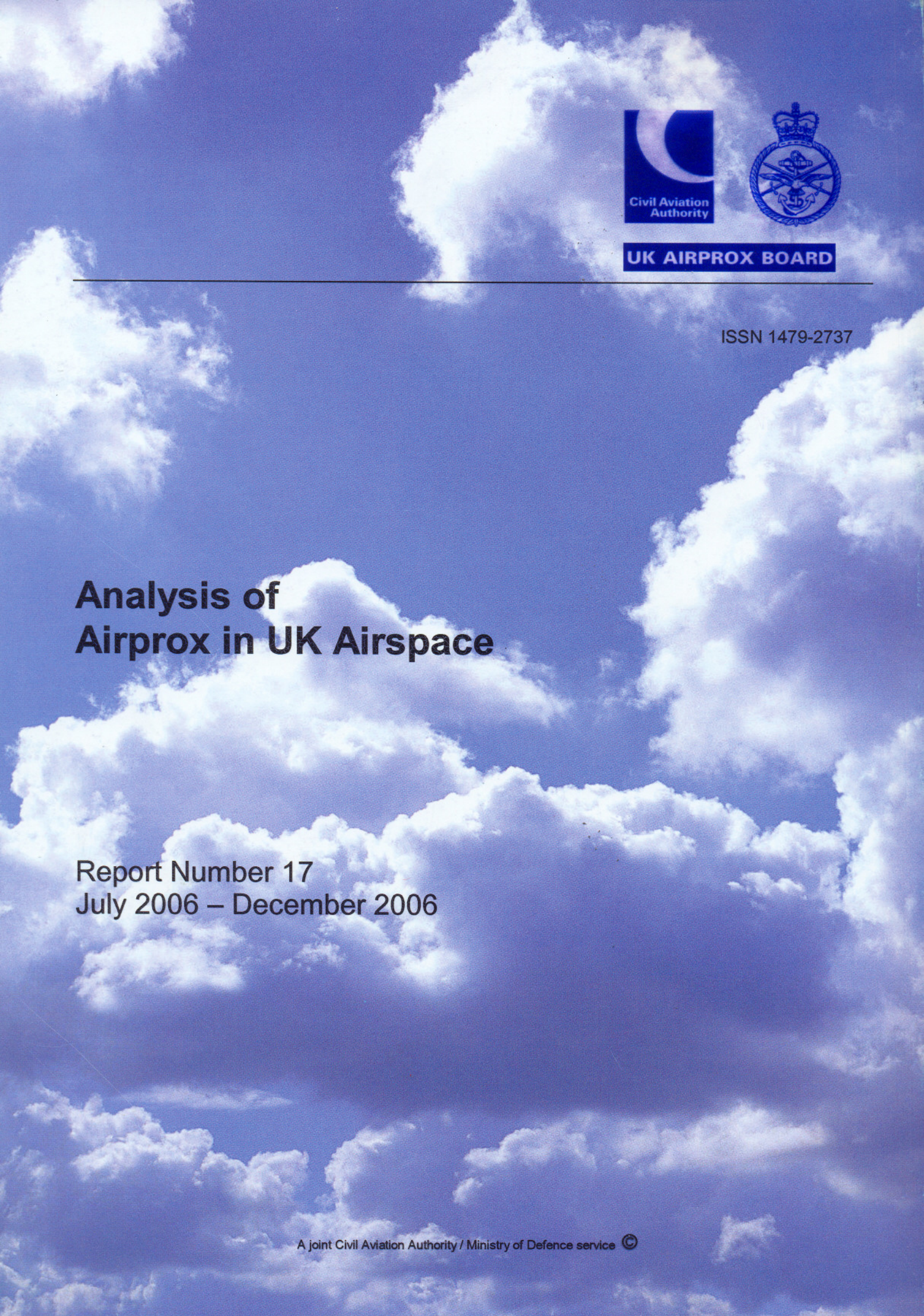

UK AIRPROX BOARD

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Analysis of Airprox in UK Airspace

Report Number 17
July 2006 – December 2006

Seventeenth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(July 2006 to December 2006)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

The primary purpose of this, the seventeenth Report from the UK Airprox Board, is to promote air safety awareness and understanding of Airprox. “Book 17” covers the second half of 2006 in detail, containing findings on almost* all of the Airprox which were reported as occurring within UK airspace in that period and which were fully investigated. In addition to the individual Airprox reports, almost all of which have already been published on the UK Airprox Board website - www.airproxboard.org.uk - this Report contains a range of graphs and tables highlighting many of the key statistics from UK Airprox throughout the whole of 2006.

As regards the second half of 2006, 81 Airprox were fully investigated having been reported as occurring in UK airspace during that period, this being 22 less than the average of comparable figures in each of the previous five years. Indeed, as Figure 1 (page 6) illustrates, the total number of Airprox in 2006 as a whole was 159 against a ‘prior five year’ average of 198. This reduction in numbers is spread predominantly over three areas: Airprox involving a commercial air transport (CAT) aircraft with either a ‘general aviation’ or a military aircraft and Airprox involving a ‘general aviation’ aircraft and a military aircraft. Details are given later in this Report.

With regard to ‘risk bearing Airprox’ (i.e. Risk A plus Risk B), the broad figures for the second six months of 2006 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. In this regard, the number of risk bearing Airprox in 2006 as a whole and which involve at least one CAT aircraft is the lowest in the period 1997-2006: there were no Risk Category A occurrences and six Risk Category B. 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 the identification of valuable lessons for the benefit of others. I am pleased to report that this spirit of openness is alive and well, people being keen to ensure that others learn from the unfortunate situations in which they have found themselves and therefore being willing to cooperate fully with UKAB’s investigations.

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 a copy of this book available for people to read.

Peter Hunt

Director
UK Airprox Board

* The one exception is Airprox 147/06, this Airprox occurring within a portion of the UK’s oceanic airspace within which, by ‘standing agreement’, ATS (including radar service) is provided by the Irish Aviation Authority. Again by agreement, this Airprox is being investigated by our colleagues in Ireland.

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 2006 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 regarding 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 supplied by the UK Civil Aviation Authority and 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. General Aviation utilisation data is derived from the Aircraft Register and is formulated from the submissions provided by aircraft owners when Certificates of Airworthiness or Permits to Fly are renewed. Because Certificates of Airworthiness are normally renewed every three years, the hours flown by many aircraft will not yet have been reported. Utilisation figures for the last two-three years, as used in this publication, are therefore 'best estimates'. Each year, past utilisation figures are reviewed and amended as appropriate with this revised data being reflected into the calculation of GA Airprox rates.

(3) Military flying hours are supplied by the Ministry of Defence and its Contractors undertaking production and flight test activities 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'.

AIRPROX REPORTS - PROCESSING TIMES

Although not part of the 'technical' aspects of Airprox investigation and assessment, Board Members and the Secretariat are keen to ensure that the time period between first report of an Airprox, completion of the investigation and subsequent assessment by the Board be kept to a minimum. Over the past two years, the average 'turnround time' from first receipt of an Airprox report form to assessment by the Airprox Board has reduced from six to four months. It is accepted that in 2006 this reduction is in part due to fewer Airprox reports but that is not the full story - all involved in Airprox investigation, assessment and reporting have made a concerted effort to reduce the time taken to process Airprox reports. The one-third reduction in 'processing time' has facilitated both more timely feedback to those who were involved in any given occurrence and dissemination to the wider aviation community of any lessons identified. It is important to say that the thoroughness of the investigation and the quality of the subsequent report were never compromised when achieving the reduced processing time.

AIRPROX RESULTS FOR 2006

Numbers of Airprox - 2006

Figure 1 shows the cumulative distribution of Airprox by month during 2006 compared with a 'prior-five-year average' of the progressive totals. From January to March 2006, the cumulative number of Airprox was in line with past history. Thereafter, the cumulative number was below average, the year as a whole ending with a total of 159 compared with the prior-five-year average of 198 Airprox, a drop equivalent to 20%.

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

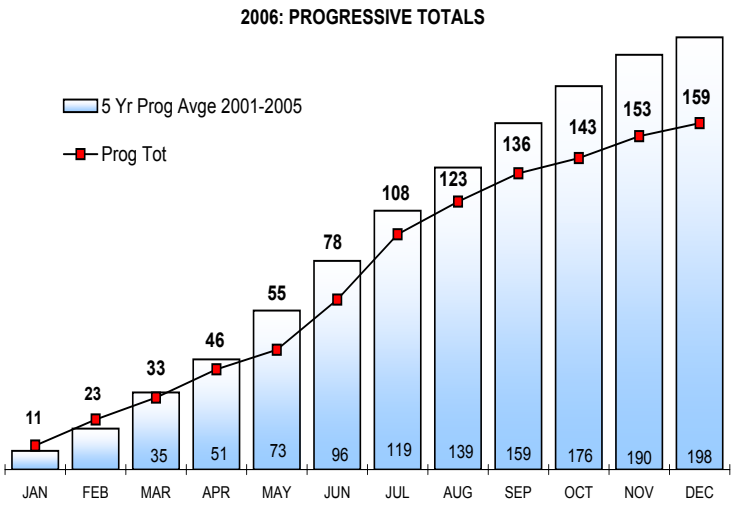


Figure 1: Numbers of Airprox during 2006

Trends by User Groups

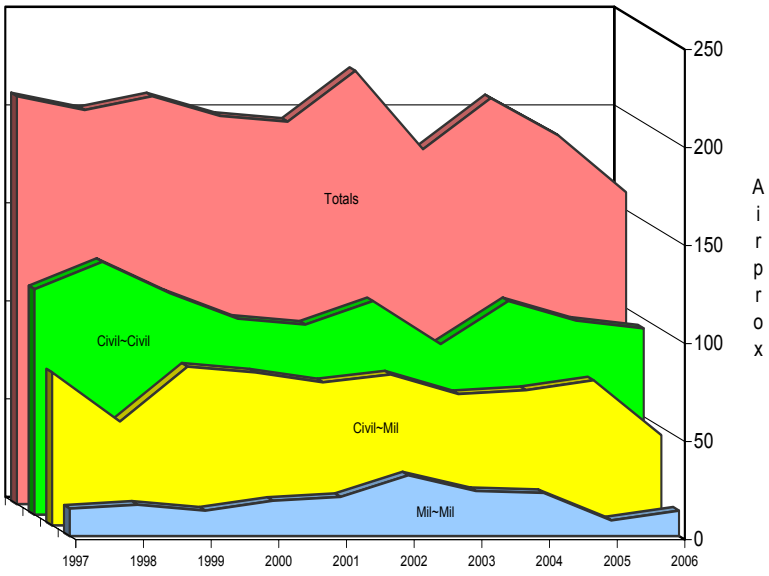


Figure 2: Airprox totals by main user groups

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 are the end-of-year 'Total' for 2006 and the reduction in the number of Civil~Military encounters: 46 in year 2006 vs a 'prior years' average of 72.

The overview in Figure 2 does not bring out one of the features of Airprox data for 2006, that the number of CAT~MIL events has returned to the historical level after an upward 'spike' in 2005. As will be seen later, the number of CAT~CAT Airprox is up, year on year, albeit that the outturn for 2006 is still just two-thirds of the historical level.

Table 1: Airprox totals by main user groups

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Civil~Civil	115	129	113	100	97	109	87	109	99	95
Civil~Mil	78	53	81	78	73	77	67	69	74	46
Mil~Mil	14	16	13	18	20	31	23	22	8	13
Other	1	3	1	2	5	4	4	7	7	5
Totals:	208	201	208	198	195	221	181	207	188	159

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 2006 occurred in Class G airspace: around 70% of the total to be precise, substantially the same as in previous years.

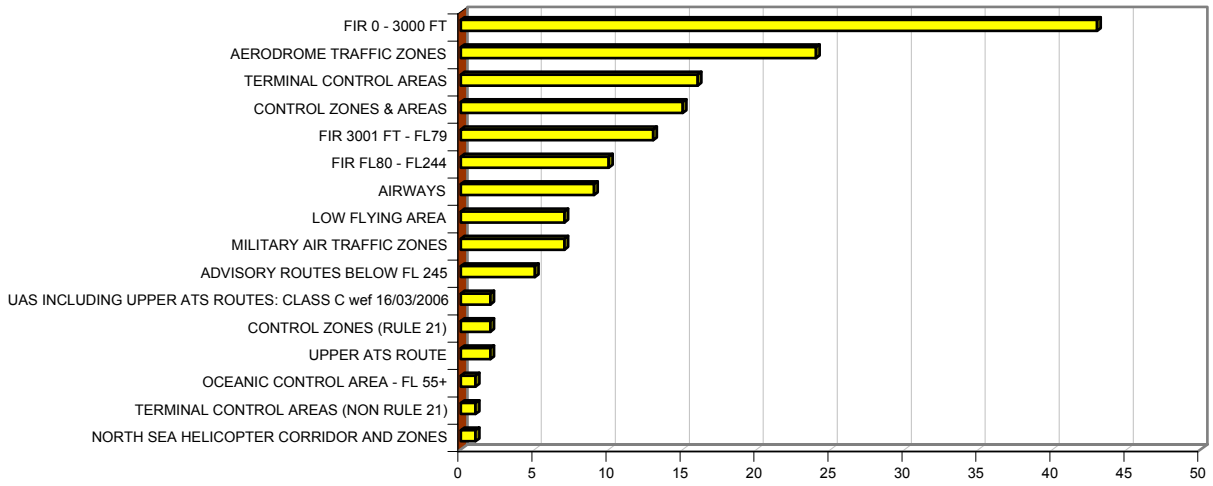


Figure 3: Types of airspace - all Airprox in 2006

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 1997-2006 inclusive. Also shown - in both the Table and Figure - are figures for 'Hours flown', computed from data provided by the Civil Aviation Authority and using long-established formulae which facilitate direct comparisons from year to year.

CAT Risk	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
CAT Risk A	9	1	4	6	0	1	0	1	1	0
CAT Risk B	20	14	12	8	14	7	12	7	7	6
CAT Risk C	67	82	83	85	65	70	54	67	78	68
CAT Risk D	0	1	0	1	4	4	0	4	1	0
CAT Total Airprox	96	98	99	100	83	82	66	79	87	74
Hours x 10K	117.9	125.9	133.2	138.9	139.5	136.6	139.8	148.5	154.6	160.2
All Airprox	208	201	208	198	195	221	181	207	188	159

Table 2: CAT Risk data 1997 - 2006

CAT Risk Results (cont.)

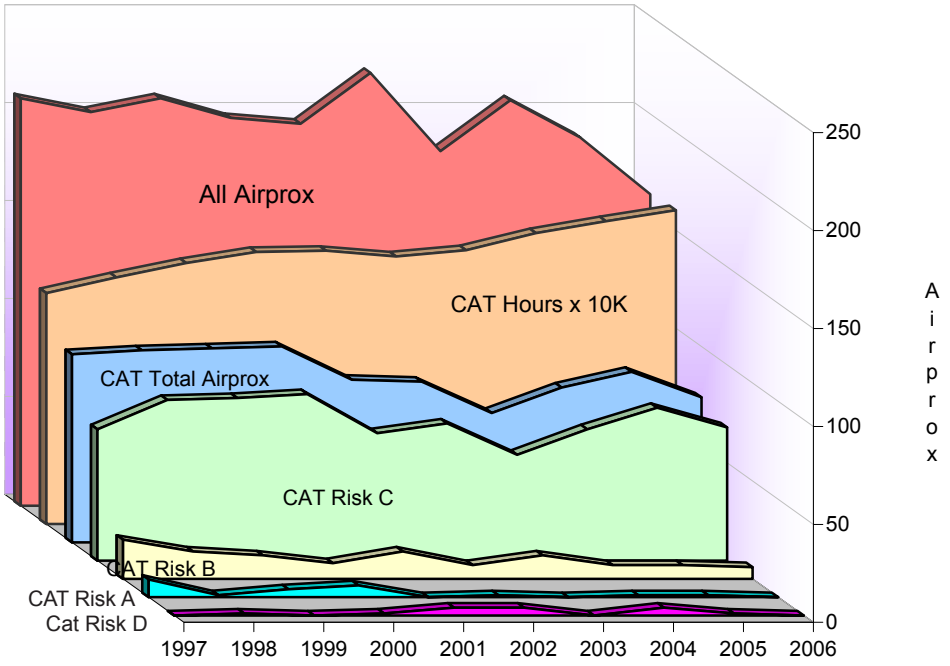


Figure 4: CAT Risk distribution 1997 - 2006

The most noteworthy conclusion from Table 2/Figure 4 is that in 2006 the number of Risk Bearing Airprox involving at least one CAT aircraft was the lowest in the dataset: no Risk A and six Risk B events making a total of six for the year as a whole. This is very pleasing and is a fitting tribute to all in the 'CAT' segment of the aviation industry - particularly the professional pilots, air traffic controllers and engineers - who continue to strive hard for ever-improving flight safety.

Examination of the figures in Table 2 reveals that whilst the proportion of 'CAT vs All Airprox' in 2006 has remained at the 2005 level, the proportion of CAT Risk C 'no risk of a collision' events has increased. To be more specific, in 2006, of those Airprox involving at least one CAT aircraft, 92% were assessed by the Board as Risk Cat C, the highest such percentage in the dataset.

Turning now to the other six events, those where the Airprox Board assessed the degree of Risk as 'B', there is nothing to suggest a common thread. One event occurred over Scotland and the other five over England. Of those five, one Airprox occurred in the North East of the country; one in the Midlands; one over Southern England and two in the South East. In airspace terms, two of the six Airprox occurred in Terminal Control Areas and one each on an airway; an ADR; in Class D and Class G airspace. By definition, all six events involved at least one CAT aircraft: what was the category of the 'other' aircraft? Three civilian, non-CAT, aircraft; two military and one CAT. Stepping back from all of the data in this paragraph, the conclusion is that such wide variablity does not point to a common theme with the need for concerted action in a particular area of operations.

Table 3 overleaf shows CAT Airprox rate information. Figures are derived by taking the 'raw data' in Table 2 and dividing by flying hours - also in Table 2 - to obtain rates. This information is plotted in Figure 5 with (logarithmic) trend lines added. The increase in the number of CAT Airprox reports in 2005 has reversed, the trend rate for 'all CAT Airprox' continuing downwards. Similarly, the downward trend in the CAT 'risk bearing' rate continues, the year-on-year improvement being from 0.52 to 0.37, the 'CAT Airprox Rate per 100,000 hrs flown' in 2006. Accepting that all other things being equal, an increase in flying hours reduces the Rate, nonetheless the percentage improvement in the risk bearing rate is 29% which is very pleasing.

CAT Airprox Rates

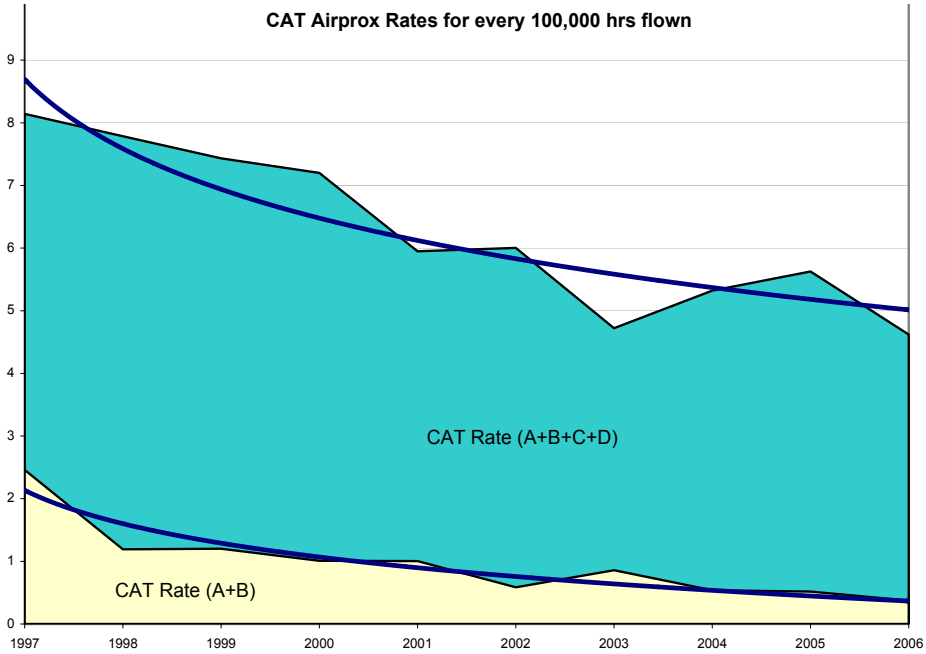


Figure 5: CAT Risk rates 1997 - 2006

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

CAT Rates	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
CAT Rate (A+B)	2.46	1.19	1.20	1.01	1.00	0.59	0.86	0.54	0.52	0.37
CAT Rate (A+B+C+D)	8.14	7.78	7.43	7.20	5.95	6.00	4.72	5.32	5.63	4.62
Hours x K	1,179	1,259	1,332	1,389	1,395	1,366	1,398	1,485	1,546	1,602

CAT Causal Factors

Table 4 below lists the predominant Causes behind the 74 Airprox involving at least one CAT aircraft. One Airprox can have more than one causal factor, 126 such factors being allocated in toto to the 74 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'. Serials 3 and 5 in Table 4, 'Penetration of CAS...' and 'Climbed/descended through assigned level', reflect - in an Airprox context - industry concern regarding 'infringements' and 'level busts', both the subject of vigorous safety improvement action.

Table 4: Most common causal factors in Airprox during 2006 having a CAT aircraft involvement

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	19	CONTROLLER
2	SIGHTING REPORT	9	OTHER
3	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	8	PILOT
4	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	7	PILOT
5	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	7	PILOT
6	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	6	PILOT
7	DID NOT ADHERE TO PRESCRIBED PROCEDURES	4	PILOT
8	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	4	CONTROLLER
9	CONTROLLER PERCEIVED CONFLICTION	4	CONTROLLER

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 student pilots through to the very experienced professional, 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, the 'All Airprox' trend is essentially downwards, the 'GA Totals' upward trend having reversed in 2006. Looking at the data in Figure 6 to form an overall impresssion, it seems that the 2006 datapoint has reversed the upward trend which began in year 2000: indeed, as can be seen from Table 5, the year 2006 numbers are similar to those in year 2000. It is noteworthy - and pleasing - that the GA Risk data for 2006 show improvements in all categories when contrasted with similar figures for year 2005.

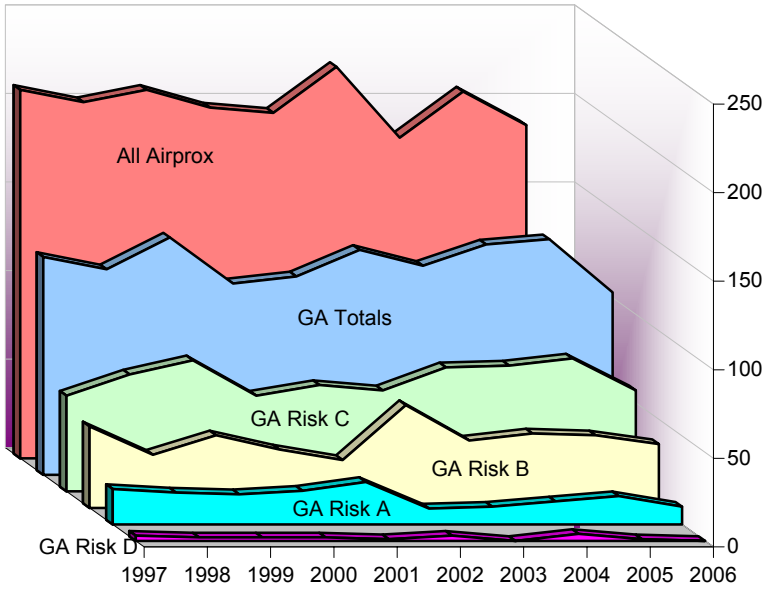


Figure 6: GA Risk distribution 1997 - 2006

Figure 6 is based on the data in Table 5 below. Further visual inspection of the Figure shows that the steady downward trend in Risk Category A and B events over the last two/three years is continuing, it being in the Risk Category C area that we find a sharper decline.

Table 5: GA Risk data 1997 - 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GA Risk A	20	18	17	19	24	9	10	13	16	10
GA Risk B	46	30	41	33	27	58	38	42	41	36
GA Risk C	54	66	74	54	60	57	70	71	75	57
GA Risk D	3	2	2	2	1	3	0	4	1	0
GA Totals	123	116	134	108	112	127	118	130	133	103
All Airprox	208	201	208	198	195	221	181	207	188	159

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. The 'best estimate' of GA hours flown in 2006 is 1,363,000 hours, some 1.8% up on 2005 (but see Note 2, in ***Notes regarding the calculation of rates of occurrence*** on page 5 above). 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 continues to be roughly half of that for all GA Airprox.

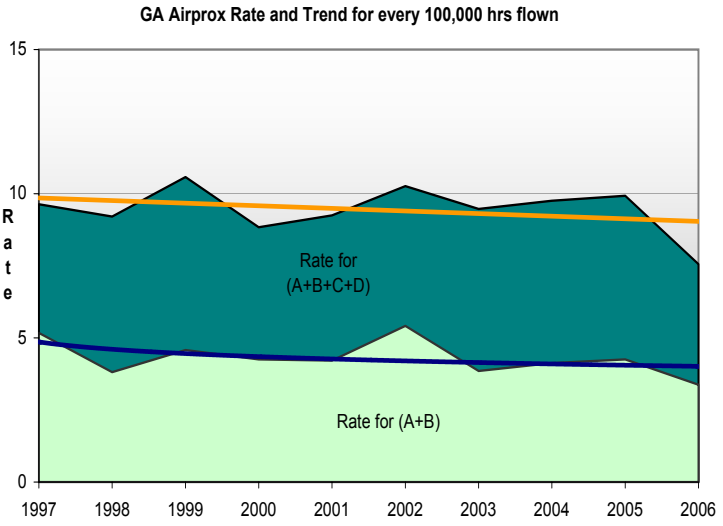


Figure 7: GA Risk rates 1997 - 2006

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

GA Rates	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Rate for (A+B)	5.17	3.81	4.58	4.26	4.21	5.41	3.85	4.13	4.26	3.37
Rate for (A+B+C+D)	9.64	9.21	10.58	8.84	9.25	10.26	9.47	9.75	9.93	7.56
Hours flown in K	1,276	1,260	1,267	1,222	1,211	1,237	1,246	1,333	1,339	1,363

GA Causal Factors

Table 7 below gives the most common causal factors assigned to Airprox involving GA pilots. A total of 202 factors were assigned to the 103 '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 27 times in 2006, again serving to emphasise the importance of good lookout. As noted in the CAT section above, 'Penetration of CAS...' and 'Climbed/descended through assigned level' reflect, in an Airprox context, industry concern regarding 'infringements' and 'level busts', both the subject of vigorous safety improvement action.

Table 7: Most common causal factors in Airprox during 2006 having a GA aircraft involvement

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	27
2	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	23
3	LATE SIGHTING OF CONFLICTING TRAFFIC	23
4	DID NOT ADHERE TO PRESCRIBED PROCEDURES	16
5	SIGHTING REPORT	9
6	PENETRATION OF CAS/ATZ WITHOUT CLEARANCE	9
7	POOR AIRMANSHIP	8
8	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	7
9	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	7
10	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	6

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 number of Airprox in 2006 involving Military pilots has fallen across all Risk Categories when compared with year 2005. Some preliminary 'hours flown' data, obtained before the end of 2006, suggested that perhaps there had been less flying: this, as is shown in Table 9 overleaf, is true - but not in proportion to the drop in number of Airprox involving at least one Military aircraft. Another possible reason is that more Military flying in UK airspace is believed now to be conducted at medium, rather than low-level. Military aircraft would then be flying well above the majority of the GA fleet, reducing the likelihood of encounters. It will be interesting to monitor these issues in 2007 and beyond, it being too soon to draw conciusions.

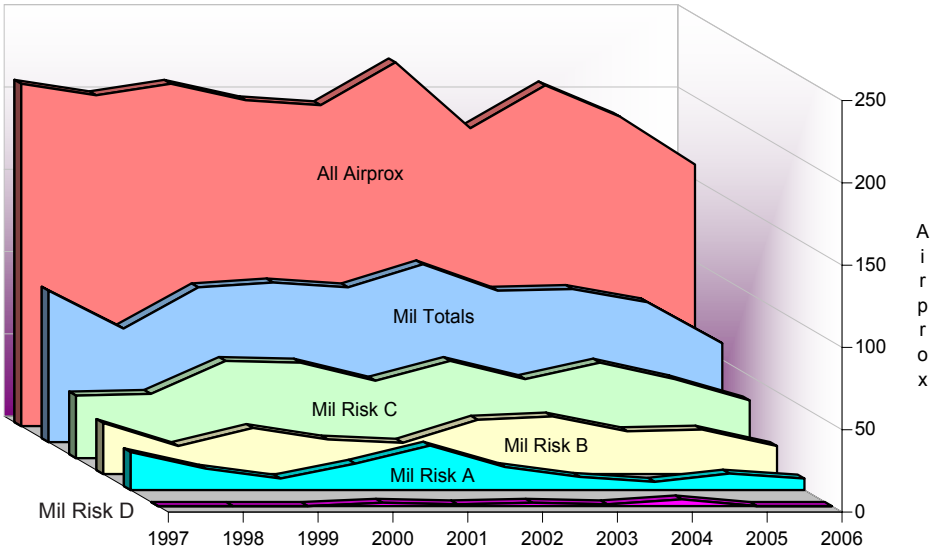


Figure 8: Military Risk distribution 1997 - 2006

Table 8: Military Risk data 1997 - 2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Mil Risk A	23	13	7	16	27	14	8	5	10	7
Mil Risk B	31	17	28	21	19	33	35	26	27	17
Mil Risk C	38	39	59	58	47	59	48	58	48	35
Mil Risk D	0	0	0	2	1	2	1	4	0	0
To be assessed	0	0	0	0	0	0	0	0	0	1
Mil Totals	92	69	94	97	94	108	92	93	85	60
All Airprox	208	201	208	198	195	221	181	207	188	159

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 2006. (Note: MOD have recently adjusted the total hours flown by UK Forces in UK airspace during year 2005).

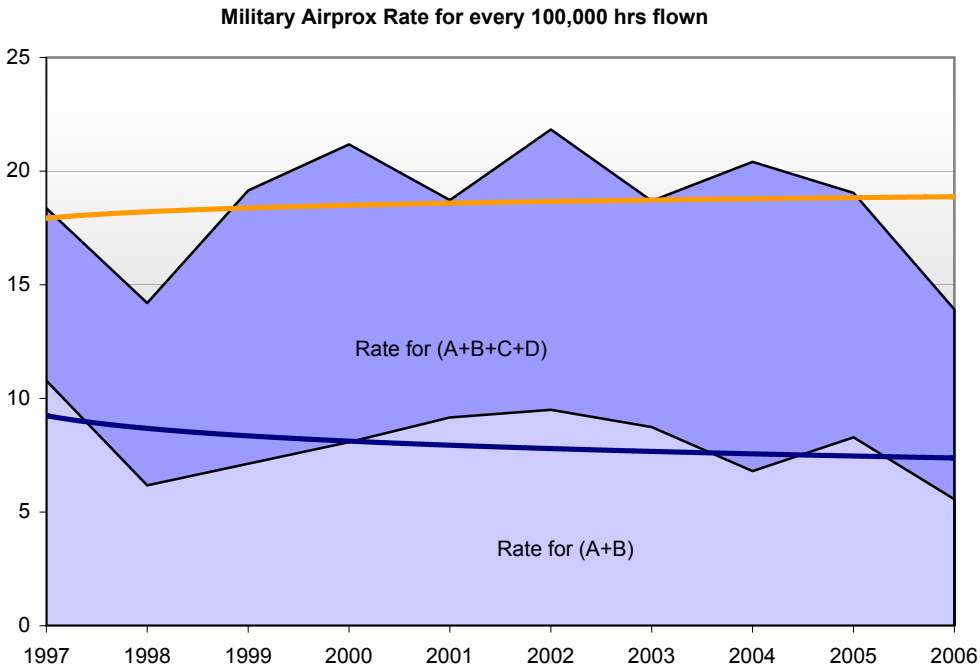


Figure 9: MIL Risk rates 1997 - 2006

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

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Rate for (A+B)	10.78	6.17	7.13	8.08	9.16	9.50	8.74	6.80	8.29	5.56
Rate for (A+B+C+D)	18.36	14.20	19.14	21.18	18.73	21.83	18.69	20.41	19.04	13.91
Hours flown in K	501	486	491	458	502	495	492	456	446	431

MIL Causal Factors

A look at Table 10 shows that the main causal factors assigned to the set of risk bearing Military Airprox in 2006 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.

Table 10: Most common causal factors in Airprox during 2006 having a MIL aircraft involvement

Ser.	Cause	Totals:
1	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	14
2	DID NOT SEE CONFLICTING TRAFFIC	14
3	LATE SIGHTING OF CONFLICTING TRAFFIC	11
4	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	6
5	SIGHTING REPORT	5
6	POOR AIRMANSHIP	4
7	DID NOT SEPARATE/POOR JUDGEMENT	4
8	CONFLICT IN OTHER TYPE OF AIRSPACE	3
9	INADEQUATE AVOIDING ACTION/LACK OF POSITIVE CONTROL	3
10	TCAS TRIGGERED BY FIR TRAFFIC	3

Airprox Trends

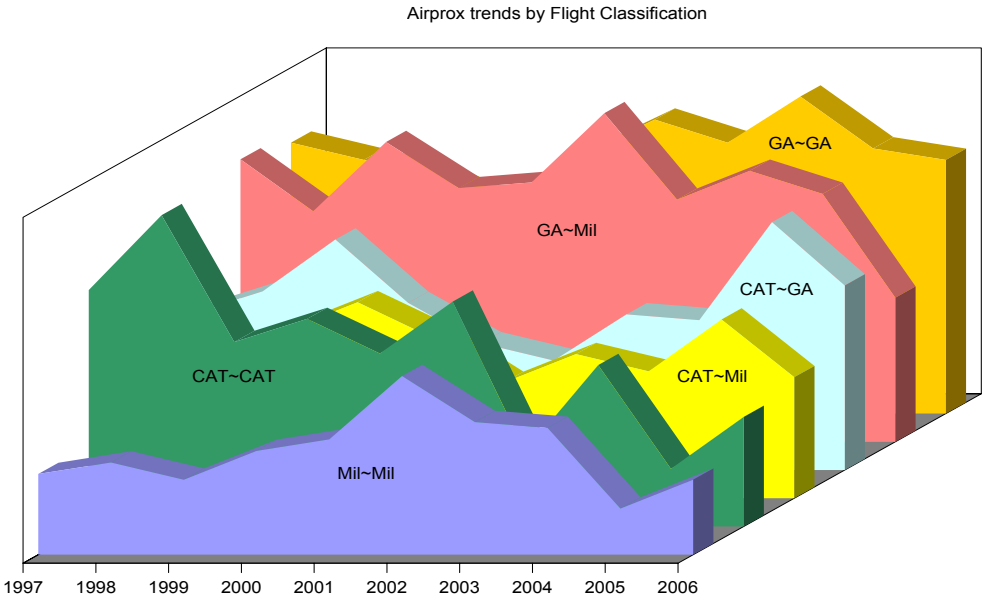


Figure 10: Airprox trends by Flight Classification

Figure 10, derived from data in Table 10 below, is arguably one of the quickest ways to obtain a snapshot of the UK's Airprox 'scene'. From 1997 until 2002, the underlying trend in MIL~MIL encounters was upwards - from the 2002 peak, the trend has been downwards. CAT~CAT Airprox data is shaped like a sawtooth - but the trend is downwards over the decade. CAT~MIL and CAT~GA data reveals an upward trend in recent years until peaks were reached in 2005 since when there has been a reduction. GA~MIL data indicates a peak in 2002 followed by an increasingly downward trend whilst GA~GA data shows a peak in 2004 with a downward trend thereafter. The three areas where 2006 figures show a decrease relative to 2005 are CAT~MIL; CAT~GA and GA~MIL but these numbers reflect totals, not Risk Bearing vs "The Rest" where Figures and Tables earlier in this Report show that there continue to be challenges: for trainers; for 'safety promoters'; for engineers and technologists and most importantly, for all who fly and for all who provide ATC services.

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

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GA~Mil	49	40	52	44	45	57	42	47	43	25
GA~GA	47	44	41	35	45	51	47	55	46	44
CAT~CAT	41	54	32	36	30	39	13	28	10	19
CAT~GA	27	31	40	29	22	19	27	26	43	32
CAT~Mil	29	13	29	34	28	20	25	22	31	21
Mil~Mil	14	16	13	18	20	31	23	22	8	13

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

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

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

UPDATE AT JUN 2007: The 8000fpm rate of climb and descent restriction in UK Controlled Airspace within the London and Scottish FIR/UIR will come into effect on 5 July 2007.

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.

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

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

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

UPDATE AT JUN 2007: Work has continued on this complex issue and has now reached completion. CAA Safety Regulation Group issued an Air Traffic Services Information Notice (ATSIN) detailing the Procedures for Verbal Co-ordination Between Air Traffic Services Personnel on 17 May 2007 giving advance notice of the procedures pending their publication in the MATS Part 1 amendment 74 on 5 July 2007. On the military side the JSP 552 regulations were amended to incorporate the relevant information and phraseology in support of this work on 15 March 2007.

STATUS – ACCEPTED – CLOSED

186/05-1 06 Oct 05 involving a Duo Discus T Glider and a Tornado F3 Risk A

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

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

UPDATE DEC 2006: The MOD considers that progress made is very positive, this workstream being continued as a matter of priority. The BGA 'roadshow' continues to make presentations to increase the knowledge about where to find gliders and in what conditions. HQ STC have investigated a simple notification system through the Low Flying Booking Cell indicating where gliding conditions have resulted in a concentration of aircraft. An initial successful meeting was

held between the parties in the Summer to outline the issues and establish a way forward. It was agreed that the two likely interfaces would be the Low Flying Booking Cell and the AWACs unit at Waddington. It is planned to define a simple process and then run a trial with a limited number of participants (probably two in Scotland and one in Wales). The key areas being considered are a simple way of signalling a potential wave day, probably using the existing scale system of '0' to '5' with zero being nil chance of wave to five being optimum conditions, and how these activities can in practice be signalled. The BGA website; Low Flying Booking Cell and on occasion AWACs are all possibilities for exchanging information and advice.

UPDATE AT JUN 2007: The improved liaison between HQ Air and the BGA continues and includes work to generate a 'late warning' of gliding activity by the Low Flying Operations Cell at RAF Wittering via a BGA 'trusted' Scottish site, this work should enable a trial to be in place for the autumn wave season. Leuchars have received the excellent brief provided by Mr Hugh Woodsend the UKAB Gliding Member and it will be provided at Lossiemouth and for key personnel of the Defence Aviation Safety Centre in the near future. Arrangements have been made with meteorological staff at RAF Lossiemouth to highlight to military crews days when waves are being generated that are likely to be utilised by the gliding community.

STATUS – ACCEPTED – CLOSED

186/05-2 06 Oct 05 involving a Duo Discus T Glider and a Tornado F3 Risk A

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

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

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

UPDATE JUN 2007: A draft European Concept of Operations is being prepared by the CAA for submission into Eurocontrol and a EUROCAE meeting has been arranged for 29 June 2007 to discuss the associated technical issues.

STATUS – ACCEPTED - OPEN

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

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

ACTION: The CAA accepts this Recommendation. The pertinent procedures have been further developed to ensure that, during notified UK air exercises, integration of exercise traffic and passenger-carrying aircraft is improved. Specifically, specialist advice to military exercise planners has been increased and CAA now provides a Liaison Officer at Norwich, in addition to Newcastle, when required.

The MOD accepts this Recommendation. Although failure of exercise planning was not cited as a contributing factor in this Airprox it is nevertheless an on-going concern within UK airspace. This concern is reflected by the fact that the issue is captured within the Airspace and Safety Initiative and this important area of work will be overseen and progressed by that process.

STATUS – ACCEPTED – CLOSED

136/06 22 Aug 06 involving a PA38 and a C172 Risk C

RECOMMENDATION: The CAA should review the procedures applicable to flight in the Manchester Special Low Level Route in the light of this Airprox.

ACTION: The CAA accepts this Recommendation. The CAA will undertake a review of the airspace and associated procedures applicable to the Manchester Special Low Level Route. It is anticipated that the review will be complete by the end of July 2007, which will be followed by the implementation of any recommended changes.

UPDATE AT JUN 2007: Work continues with a target completion date of end of July 2007.

STATUS – ACCEPTED – OPEN

143/06 17 Sept 06 involving a Tornado formation and a PA28 Risk B

RECOMMENDATION: The MOD and CAA should jointly review the arrangements, safety provisions and notification procedures for formation flights in Class G airspace such as these, so as to minimise the risk of a conflict arising between formations of ac and non-participating flights.

ACTION: The MOD and CAA accept this Recommendation. Working with appropriate military personnel, the CAA has completed a review of the arrangements, safety provisions and notification procedures for such formation flights in Class G airspace. The CAA's conclusion, supported by MOD, is that whilst the system overall is robust and does not require change, the following detailed amendments are appropriate:

- the Airspace Co-ordination Notice wording related to weather minima is to be removed;
- the route that small formations of aircraft follow for over-flight of London has been modified to remain outside the Stapleford ATZ; and
- flights of multi-element formations will continue to follow the previous route but will be afforded the additional protection of a Restricted Area (Temporary) (RA(T)).

STATUS - ACCEPTED - CLOSED

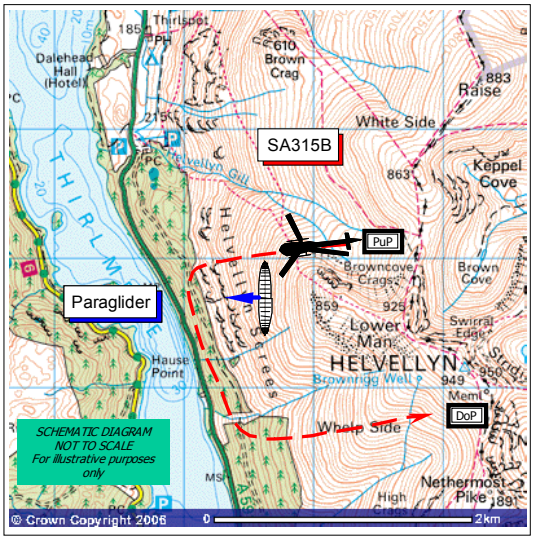
List of Abbreviations

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
RW	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 071/06

Date/Time:	6 Jun 1245	
Position:	Vicinity of 5432N 00302W (Helvellyn Screes Cumbria)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Paraglider	Lama SA315B
Operator:	Civ Pte	Civ Comm
Alt/FL:	~600m (amsl)	300ft (agl)
Weather	VMC CLBC	VMC NK
Visibility:	~40nm	>10km
Reported Separation:	Nil V/100m H	nil V/100m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARAGLIDER PILOT provided a very full account reporting that his 10m canopy is coloured red, white & blue. At about 1145 UTC he took-off on his paraglider from Clough Head at the N end of Helvellyn range. His intention was to ridge soar/thermal 10km S to Helvellyn Screes and then back to Clough Head. After take-off he saw what initially looked, he thought, like a black military Gazelle helicopter performing a mountain rescue on Helvellyn. Whilst still about 3km away to the N of the helicopter he was able to determine that it was operating as part of the path build/repair programme for the Lake District National Park. [UKAB Note 1: The helicopter described by the paraglider pilot as a Gazelle was in fact an SA315B Lama.] Fully aware that the helicopter pilot would need to be concentrating on his task, he continuously monitored its activity from that point on. The helicopter – the SA315B Lama - was collecting rock from below the summit and then transporting it to the top, as an under-slung load (USL).

Arriving at Helvellyn Screes at about 600m amsl (1968ft amsl) - i.e. below the summit [925m] - he proceeded to fly close in to ridge soar (facing west) at the NW end of the slope. With a low ground speed he was effectively soaring in a small area – about 100m - without gaining height. About 1 hour after he took-off - 12:45 UTC - he then saw the SA315B Lama transition/climb from the slopes behind, below and to the E of his location and head towards him slightly to his R - he was in the Lama pilot's 11 o'clock and above the horizon at that time and in his opinion easily visible. Frantically, he waved the helicopter away from that point on. As his paraglider was soaring W about 50m off the slope at 15kt the Lama passed within 10 wingspans - 100m on his starboard side. Much to his alarm, the helicopter then turned across in front of him passing from R- L within 100m ahead, upwind at the same height. With the Screes behind, there was no option for him to do anything to help the situation and no avoiding action was possible. With the wind and up draught onto the slope from the NW, the helicopter's down-wash would drift the short distance towards him. At the time he believed that there was no way he could avoid a fatal accident and he remembered actually being surprised that he did not encounter significant downwash. He then started to shake with the shock of what had happened.

Assessing the risk as *"very high",* he assumed that the helicopter pilot had seen him and also assumed that as "a military pilot he had knowledge of what helicopter wash could do to a paraglider". He could only conclude that the helicopter pilot chose to ignore his frantic waving and flew unbelievably close by choice in order to fly in the direction he required.

THE LAMA SA315B PILOT provided a very comprehensive account including a map fragment of his operating area. He reports that his helicopter has a dark colour-scheme and that the 3 HISLs were on whilst operating in VMC in CAVOK conditions. He was carrying out a USL lifting detail in the vicinity of Helvellyn above Thirlmere,

lifting bags of stone from the pick-up point (PuP) on the scree slope to the N of Browncove Crags (N54°32' W003°02') up to the drop-site (DoP) on the summit of Helvellyn. He commenced his task at approximately 0845UTC and continued through the day with a 'lift cycle' time of around 4min per lift until completion of the detail in the middle of the afternoon.

Take-off from the PuP was to the W - into wind and parallel to the slope - before turning S and continuing the climb following the E side of the Thirlmere valley until sufficient height was gained to permit a L turn in towards the summit of Helvellyn. The climb-out from the PuP whilst heading S through the Thirlmere valley, was restricted by the A591 - Ambleside to Keswick - main road which he was not prepared to over fly whilst carrying an USL.

Around midday his PuP ground crew, who were hooking-on the bags at Browncove Crags, warned him on the radio of the approach of a multi-coloured paraglider from the N. He made visual contact with this paraglider who over the course of the next 20-30min approached the northern and western slopes of Helvellyn and commenced soaring in this vicinity - this position was directly in his climb out route from the PuP. During the next few climb-out cycles he modified his routeing to pass behind, in front of, or alongside the paraglider, and his climb-out track was extended to achieve the maximum possible horizontal separation. At no time did he consider that an Airprox had occurred as both ac were in visual contact and the relative speeds were extremely slow. The closest that he passed was when the paraglider was soaring the W slope of Helvellyn Screes and he was heading S through the valley at 50kt as they passed at the same height with a horizontal separation of approximately 100m. It was not possible for him to allow further horizontal separation without having to cross the A591. In his view there was absolutely no risk of collision or of the wake turbulence from his Lama helicopter affecting the paraglider. He added that the paraglider pilot had displayed a complete lack of airmanship and deliberately commenced soaring directly in the climb-out path of a helicopter undertaking an ongoing USL operation.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar. Both pilots provided diagrams which illustrated the encounter and concurred on the overall geometry of the Airprox.

UKAB Note (2): AIS NOTAM Office report that no helicopter USL tasks were promulgated by NOTAM for the day of 6 June 2006 in the Lake District area or anywhere else in the UK. Although the SA315B pilot reports that a CANP was filed for this task, Low-Flying Ops have no record of any USL tasks in Cumbria submitted under the CANP by the Company.

THE BHPA comments that it would appear that the paraglider pilot had ample opportunity to ascertain the Lama pilot's pattern of operations and that he was aware of both the risks posed by helicopter downwash and the need for the Lama pilot to be concentrating upon his task. Therefore it would have made sense not to enter the area of the Lama pilot's operations other than to transit through it to beyond the far side. However the paraglider pilot did soar within the Lama pilot's area of operations. What is then at question is the extent to which the Lama's downwash could have affected the paraglider. Over the years there have been a number of helicopter/paraglider incidents the common feature of which has been the helicopter pilot's insistence that their downwash could not affect the paraglider. What pilots of powered aircraft of all sorts seem to be unaware of is that what they feel as a mild bump when crossing the wake of another aircraft (something most pilots have probably experienced) is sufficient to cause the total collapse of a paraglider - at sub 200ft agl it would probably be fatal through insufficient time to deploy the reserve parachute.

FOI (H) comments that from the comprehensive reports submitted by both pilots, we would conclude that the paraglider pilot watched the helicopter pilot's activity and then placed himself in what, for the helicopter pilot, was an awkward position. The helicopter pilot had to continually amend his flight path to avoid the paraglider and was constrained in such action by the USL, wind, and commercial considerations. Though 100m is not far, as the paraglider pilot reports, he felt minimal downwash, so it would appear that the helicopter pilot gave him sufficient berth, and had had him in sight from beginning to end. The helicopter operation was not a military one, neither is there any reason why the helicopter pilot should have been a military pilot, as is stated in the paraglider's report. Normally, the operator files a CANP for such operations but in this case apparently this did not happen. In any case, however, CANP information is not available to civilian enquirers and since no NOTAM was issued for the helicopter's operation there was no 'protection' of the airspace. Nevertheless, it is felt that the helicopter pilot did everything reasonable to avoid the paraglider, the pilot of which should not have chosen to soar in the helicopter's climb-out path.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac.

Although not strictly relevant here because the SA315B was not a military helicopter, one helicopter pilot Member was concerned that its pilot's company had not filed a CANP with Low-Flying Ops. Thus any military crews operating in the military LFS would have been denied any advance notice of the USL activity. Similarly the lack of any NOTAM promulgating the activity to other airspace users was unfortunate, and consequently, the paraglider pilot would have been unaware of the presence of the planned USL operation before his departure. Nevertheless, it was clear from the paraglider pilot's comprehensive report that he had detected the presence of the helicopter after take-off from Clough Head 10km N of Helvellyn Screes, and he was able to determine that it was operating as part of the path build/repair programme for the Lake District National Park whilst some distance away – he quoted about 3km away to the N. However, with this awareness of the nature of the helicopter pilot's task at Helvellyn Screes he commenced soaring off the NW face of Helvellyn. From the helicopter pilot's perspective he had been warned of the paraglider's approach by his groundcrew and had spotted it. Thereafter, he reports he had modified his routeing to pass around the paraglider and had extended his climb-out track to achieve the maximum horizontal separation that he could afford without overflying the main road. Helicopter pilot Members agreed that overflight of the A591 - Ambleside to Keswick - main road whilst carrying an USL would have been extremely unwise and the Board recognised the constraints that were place on the helicopter pilot's ability to manoeuvre. Whilst clearly the paraglider pilot, engaged in his air sport, and the commercial helicopter pilot were both quite legitimately entitled to fly in this area of Class G airspace where 'see and avoid' prevails, it seemed to the Board from the paraglider pilot's report, that he had pressed on to his desired soaring location off the Screes even though he was aware it was directly in the path of the helicopter pilot's USL operations. In effect, one Member observed, he had flown into conflict with the helicopter. Conversely, the SA315B pilot had also continued his sortie in the presence of the paraglider and one view was that he had flown close enough to cause concern to the paraglider pilot. The only other option available to the helicopter pilot it seemed was to have stayed on the ground during the period that the paraglider was operating on the Screes. The gliding Member considered that with the soaring conditions apparent within the paraglider pilot's report coupled with the conflicting task being undertaken at this location, it seemed it might have been better to have moved to another spot to continue soaring. Indeed the BHPA's opinion was that it would have made sense not to enter the area of the Lama pilot's operations other than to transit through it to beyond the far side. Additionally the BHPA observed that it was apparent that the paraglider pilot had ample opportunity to ascertain the Lama pilot's pattern of operations and was aware both of the risks posed by helicopter downwash and of the need for the Lama pilot to be concentrating upon his task. These views were supported by a helicopter pilot Member and were also the overwhelming views of the other Members. The lesson here was that as the paraglider pilot was aware of what the helicopter pilot was doing beforehand it would have been preferable not to enter the area of the SA315B pilot's operations at all and to go and soar somewhere else. The Board concluded, therefore, that this Airprox had resulted because the paraglider pilot had entered the area of the SA315B pilot's operations and was subsequently concerned by the helicopter's proximity to his paraglider.

Turning to the issue of the risk, it was clear that both pilots' reports agreed on the relative geometry of the encounter: the helicopter pilot had afforded what he considered to be safe separation – both agreed it was about 100m upwind - and in the helicopter pilot's view the wake turbulence from his Lama would not have adversely affected the paraglider at these distances. Whereas the paraglider pilot felt that he was unable to avoid a fatal accident at the time, it was evident from his own report that he did not encounter significant downwash at this distance. Clearly, therefore, the effect of the helicopters downdraught had not been sufficient to cause a significant detrimental aerodynamic effect on the paraglider's wing in the circumstances pertaining here. Members were keenly aware that the Board was charged with assessing the risk of a collision between the two ac and not the risk associated with the impact of the helicopter's downwash on the paraglider. This was not in any way meant to diminish the important safety lessons on this aspect - and indeed the Board noted the BHPA's sage advice on this topic - but it was not strictly within the Board's remit when assessing the inherent risk of a collision. Moreover, the Board only considered what had actually occurred and not what might have happened if circumstances had been slightly different. Members concurred that there was no actual risk of a collision between these two ac but some pilot Members were concerned that safety had not been assured because of the limited scope for manoeuvre by either pilot in this terrain. Other Members opined that there was no risk at all. The Board seemed fairly evenly divided on this issue so the Chairman called for a vote: by a majority it was concluded that no risk of a collision had existed in the circumstances conscientiously reported here.

AIRPROX REPORT No 071/06

PART C: ASSESSMENT OF CAUSE AND RISK

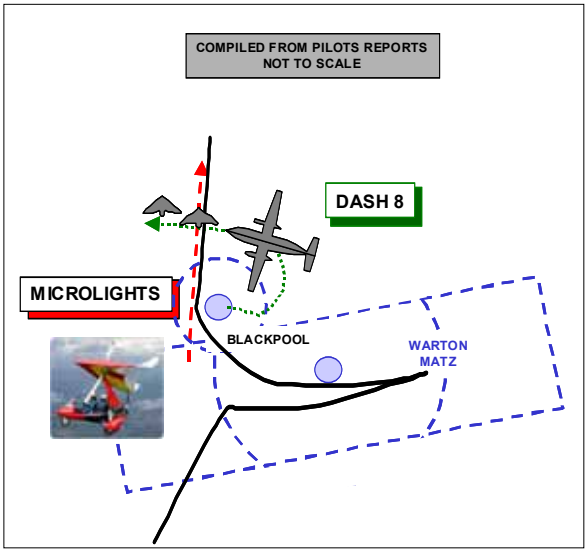
Cause: The Paraglider pilot entered the area of the SA315B pilot's operations and was subsequently concerned by the helicopter's proximity.

Degree of Risk: C.

Post Meeting Note: Having been advised of the outcome of the investigation and the Board's assessment, the paraglider pilot wrote that whilst risk of collision was not a factor, he hoped that other lessons could be learned and flying made safer. There has been at least one fatal accident to a hang glider, a less susceptible aircraft, as a result of helicopter wake turbulence. The paraglider pilot therefore considered it timely to remind pilots, in particular of helicopters, of the danger to paragliders of wake and/or downwash. The importance of notification of helicopter activity; use of NOTAM and recommended safe distances is also stressed. The paraglider pilot believes that to fly 100 metres upwind of a soaring paraglider is unsafe and recommends a much wider berth. This is especially so when account is taken of the width of the wake turbulence and the influence of the wind. The BHPA Advisor to the UKAB added that they will be raising the need for a study into the possible effects of helicopter wake turbulence upon lightweight aircraft with the CAA's Safety Regulation Group, particularly as these two forms of GA have expanded over the past few years and continue to do so.

AIRPROX REPORT NO 087/06

Date/Time:	2 Jul 1040 (Sunday)	
Position:	5348 00306W (4nm NW Blackpool)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DHC-8	Microlight GT450
Operator:	CAT	Civ Trg
Alt/FL:	3500ft↑ (QNH 1019mb)	4000ft (QFE NR)
Weather	VMC HAZE	VMC HAZE
Visibility:	7km	6nm
Reported Separation:	500ft V/½nm H	200ft V/600m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT reports that he was flying a scheduled passenger flight to Jersey. His departure clearance from Blackpool was to turn left after take off heading 280° and to climb to FL70. On passing 2000ft in the left hand turn, in good weather, ATC advised him of a Cherokee, not above 1000ft 4nm N of Blackpool Tower on the coast and heading S; the traffic was identified on the TCAS but not visually. However on passing 3500ft, 2xMicrolights in loose echelon formation were seen in their 1 o'clock about ½nm away and slightly low, heading N. He informed ATC but the Microlights were not in radio contact with Blackpool and apparently not squawking. He continued his left turn and the climb but did not assess the risk.

THE MICROLIGHT GT450 PILOT reports that he was flying in loose formation with another Microlight on his left in the 10 o'clock position, heading 360° at 60kt and in contact with Ince Radio but with no transponder fitted. They were flying at 4000ft, heading N following the Flyde Coast near Blackpool, when he saw a Dash 8 taking off from RW10 at Blackpool Airport. The other ac headed E initially and disappeared in haze but a short time later he saw the same ac again in his right 4 o'clock and about 1000m away, closing towards him. He realised the Dash 8 would pass behind both Microlights and watched it pass and climb disappearing into the haze in his left 8 o'clock position.

UKAB Note (1): Blackpool APR provided a report that verified the DHC-8 pilot's report.

UKAB Note (2): Although the DHC-8 and the Cherokee are seen on the recording of the Clee Hill radar, the Microlights are not.

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 controller involved and reports from the appropriate ATC authorities.

The Board noted that the DHC8 and Microlight pilots had seen the opposing ac in reasonable time considering the reduced visibility and neither had deemed avoiding action to be necessary, suggesting that the ac had not been on conflicting flightpaths. It was felt however, that although they were not in ATZ but above it, it would have been sensible for one of the Microlight pilots [both radio equipped] to call Blackpool APR and notify them of their position and intentions, thereby allowing them in turn to warn other ac in communication with them. Further, it was pointed out that had one of the Microlights been squawking, the DASH 8's TCAS and ATC radars would have been able to 'see' their ac and ensure that they were avoided by others.

The Board determined that, since the ac tracks had not at any time been in conflict, this incident had been a sighting report with no risk attached.

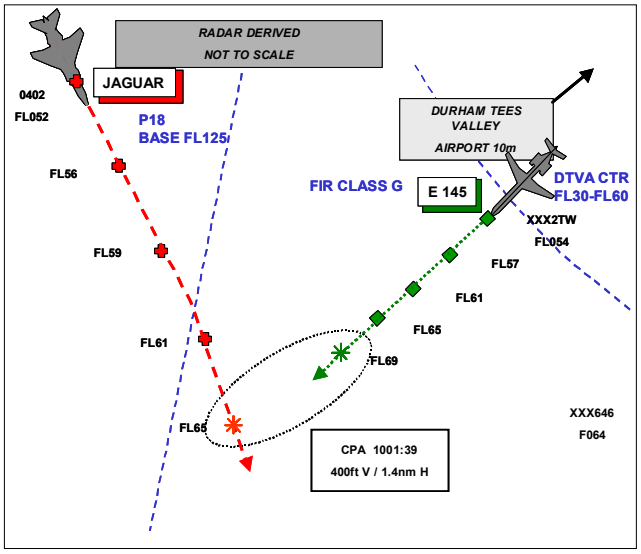
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT NO 089/06

Date/Time:	04 Jul 1056	
Position:	5425N 00135W(12 nm SW Teesside)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	E145	Jaguar
Operator:	CAT	HQ STC
Alt/FL:	FL075↑	FL50↑
Weather	VMC CLAC	VMC CLAC
Visibility:	8km	>10km
Reported Separation:	0ft V/1nm H	NR
Recorded Separation:	400ft V/1.4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE E145 PILOT reports flying a scheduled passenger flight from Durham Tees Valley Airport (DTVA). After departure from RW23 and climbing ahead to GASKO, at 220-240kt and passing FL075, traffic was observed on the TCAS to the R which was quickly followed by a TCAS RA with an aural message to maintain vertical speed. A vertical speed in excess of 3000ft/min was required to maintain the green band. The First Officer (FO) became visual with a military ac at very close proximity passing at high speed directly from R to L; it was also climbing past them with no vertical separation. The military ac remained at their level, within –100ft to +100ft relative altitude. The horizontal distance was difficult to judge but was less than 2nm – the First Officer was virtually able to see the other pilot. The FO reported the conflict to ATC who identified the ac as a Jaguar from RAF Leeming. After passing, the Jaguar climbed steeply. He assessed the risk as being medium/high and added that a contributory factor had been the 'excessive speed of the military ac in civil airspace'.

THE JAGUAR PILOT reports flying a tactical training sortie from Coningsby in a 2-seat ac with another pilot. HISLs were on but TCAS was not fitted. He was climbing out from Low Level to the NW of Leeming heading 160° at 470kt under control of Leeming ATC, squawking initially 7001 with Mode C then as directed, and at 1000:15 was cleared to climb to FL120. Leeming passed them TI at 1000:29 on a civil ac in the climb-out from DTVA at 2800ft. At the time they were heading 160° passing FL40 and they visually acquired the traffic; there was no need to take any action as no collision risk existed.

ATSI reports that the DTVA APR described his workload as light at the time of the Airprox. In accordance with the LOA between DTVA and RAF Leeming, the former unit advised the latter about the departure of the E145. Although the RW in use was promulgated as 05, the E145 was to depart RW23 and Leeming was advised accordingly.

The E145 pilot established communication with DTVA APR at 0959, reporting passing 1700ft climbing to FL130, on track to GASKO. The pilot was advised that he would be provided with a RAS outside CAS. (It is necessary for flights routeing from DTVA to GASKO to leave CAS as the upper limit of the CTA, Class D airspace, is 6000ft and the lower limit of Airway P18, in the vicinity of GASKO, is FL125). At the time there was no conflicting traffic visible on the radar display. However, an ac, subsequently established to be the subject Jaguar, showed as a 7000 squawk, indicating FL24, tracking E, approximately 20nm W of DTVA. APR said that he then turned his attention to other traffic, including an IFR flight inbound to DTVA from the S. The Jaguar's squawk changed to 0402 (RAF Leeming) at 1000:09 when the E145 was in its one o'clock, at a range of 13.4nm. The APR Controller confirmed that he did not notice the Jaguar approaching the E145 and was unaware of the situation until the latter's pilot reported a *"TCAS RA"*, at 1001:27. No mention was made whether the ac was climbing or descending as a result of the alert, but the radar recordings showed that it continued to climb throughout the period. At the time of the RA, the radar recording showed the E145 passing FL62 with the Jaguar passing FL60, 2.3nm to its W. Because

the groundspeed of the Jaguar was over 200kts faster than the E145 it passed ahead by 1.4nm while it was 500ft below. It then started to climb and as it passed through the E145's level (FL74), it was 1.5nm south of the E145. The two tracks then diverged.

APR agreed that he had not complied with MATS Part 1 instructions for providing a RAS (Section 1, Chapter 5, Pages 2/3). It was possible that he had been distracted by other traffic and additionally, as the ac approached each other; the radar recording shows a high level flight in the vicinity. The APR could not confirm whether this ac would have been displayed on his radar but its SSR return may have overlapped with the subject ac. Additionally, the LOA with Leeming states that 'the ATSU at Leeming is to notify the ATSU at DTVA of any arriving, departing or transit traffic which, due to routing and traffic information already received, is likely to affect ac operations at DTVA'. On this occasion, as Leeming had been notified about the E145's departure, the APR commented that he would have expected to be informed about the Jaguar's routeing. Had he had advance warning of its presence, he could have taken appropriate action to control the situation.

MIL ATC OPS reports that Leeming Zone (Zone) was providing a RIS to a Jaguar while an E145 was departing DTVA RW23, direct to GASKO and in receipt of a service from DTVA. At 0952:59 DTVA Assistant notified Zone of a RW23 departure, climbing FL130 direct to GASKO. The Jaguar pilot free-called Zone at 0959:22 and after initial contact he passed his details as, *"Good morning it's Jaguar C/S, we're currently 30 miles North West at 2000 feet on 1017. Looking for radar service for a climb through your overhead and handover to London Mil, er, rtb Colt via Donna Nook."* After instructing the ac to squawk and establishing type of service required, Zone states, *"Jaguar C/S, Leeming Zone identified, below, currently below my sector safe height, you're responsible for clearance, for your own terrain clearance, climb at your discretion FL 120 initially."* The Jaguar pilot acknowledged the climb instruction and Zone passed TI at 1000:18, *"Jaguar C/S, er, traffic, er right one o'clock, 12 miles, crossing left right, indicating 3800 feet, climbing."* The TI was acknowledged and Zone added that it was a pre-notified Durham outbound, reminding the Jaguar pilot to remain clear of DTVA airspace. Subsequently Zone updated the TI at 1001:11, *"Jaguar C/S, previously reported traffic now, er, left 11 o'clock, 3 miles, crossing left to right, indicating 5600 feet."* The Jaguar pilot acknowledged the TI and reported visual. Zone checked the Jaguar's level passing at 10.02:20, which was passed as FL100 and 30sec later handed the ac over to London Mil.

Analysis of the Great Dun Fell radar shows the E145 at Leeming 005° 12nm at 0959:22, tracking 225° and climbing through FL16. Meanwhile the Jaguar is at Leeming 305° 23nm, tracking 100° with NMC. This places the Jaguar in the E145ís R 2 oíclock at 22nm. Three seconds later the Jaguar indicates FL24. The Jaguar commenced a turn at 09.59:51 and rolled out on a track of 0°. Five seconds later the Jaguar commenced a climb. The Jaguar was indicating 025C and was in the E145ís R 2 oíclock at 15nm with the E145 indicating FL27. At 1000:18 the Jaguar was passing FL29 in the E145ís R 2 oíclock 12.5nm and the E145 was passing FL34. The Jaguar commenced a R turn onto° at 1000:36. The Jaguar was passing FL52 at 1001:11and was in the E145ís right 3 oíclock, at 4.5nm, as the E145 was passing FL54. At 1001:39 the Jaguar passed through the E145ís 12 oíclock at 1.4nm, indicating FL65, whilst the E145 was passing FL69. Eight seconds, later the Jaguar was is in the E145ís L 11 oíclock at 1.4nm indicating FL70 whilst the E145 indicated FL73. Once clear to the E of the E145 (FL77) at 1001:55, the Jaguarís Mode C disappears for one sweep and 8sec later indicated FL91, indicating a rapid climb. The ac then continued to diverge. 16590

The Zone controller fulfilled his responsibilities for the passing and updating of TI to the Jaguar crew under a RIS thus enabling the Jaguar pilot to acquire the E145 visually and take his own separation appropriate to the airspace classification. However, the LOA between Leeming and DTVA states at Para 15 that "*the ATSU at Leeming is to notify the ATSU at Teesside of any arriving, departing or transit traffic which due to routeing and traffic information already received, is likely to affect aircraft operations at Teesside*". DTVA had already passed TI to Zone pertaining to the departing E145 and as such Zone should have passed TI to DTVA on the Jaguar to allow co-ordination to be effected.

HQ STC comments that had the Jaguar been notified to DTVA, the DTVA controller may well have been able to provide the E145 pilot with an avoidance heading. However, both ac were in Class G airspace and the Jaguar saw and avoided the E145.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was concerned that this incident was another case where a military pilot had flown his ac close enough to a civilian airliner to cause a TCAS RA although in his opinion avoiding it by a sufficient margin not to compromise safety. In this case, fortunately it was a passive RA ['monitor vertical speed'] and did not result in any aggressive compliance manoeuvre but rather a continued high rate of climb for the E145: this however, was by accident rather than design.

The Board was assured by the HQ STC Member that they were acutely aware of the problem of military ac triggering TCAS RAs while conducting visual avoidance of civil ac and Members were informed that an extensive Service-wide education programme was under way and that DASC were also involved.

Both ac had been operating legitimately in Class G airspace that is neither civil nor military but is open to all users. Both pilots are therefore obligated to see other airspace users and avoid them by a reasonable margin, with whatever assistance they choose. In this case, although the Jaguar pilot had seen the airliner, it was the unanimous opinion of the Board that he had not given it a wide enough berth. In order to assist him with his avoidance responsibility, the E145 pilot had opted for a RAS from DTVA APR. This however, for whatever reason, had been lacking and did not provide him, as it should have done, with any warning of the Jaguar. Members considered that although the radar recording did not show the same picture as that seen by the DTVA controller, the Jaguar would also have been visible on his picture as it was displaying a Mode A/C indication for some time before the incident. Further the recording showed it to be squawking 7001, not 7000 as reported, thus identifying it as being low-level, high-speed traffic. Although such traffic has the option to continue through the 'gap' at low-level, ac frequently pull out from the LFS before the 'gap' just as the Jaguar did. In the event however, the first warning provided to the E145 pilot of the Jaguar's presence (it was already talking to Leeming) and subsequently a course of avoidance came from the ac's TCAS.

Although the Leeming Zone controller had given the Jaguar pilot accurate and timely TI regarding the E145, he had not warned DTVA of the former's presence as is required by the LoA. While time was limited, this action, as it is designed to do, might have prompted DTVA APR to provide the E145 with avoidance or, in the unlikely event that time permitted, co-ordination.

Since however, the Jaguar pilot saw the E145 and its pilot in turn was reacting correctly to a TCAS RA, the Board determined that there had not been any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

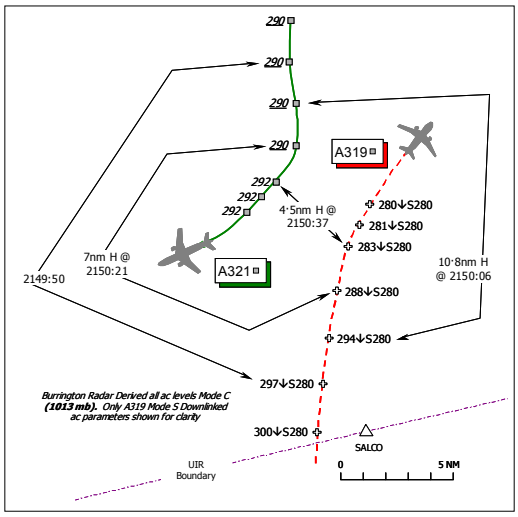
Cause: The Jaguar pilot flew close enough to the E145 to cause a TCAS RA.

Degree of Risk: C.

Contributory Factors: 1. Durham Tees Valley APR did not provide avoiding action to the E145 iaw the MATS Part
2. Leeming Zone did not provide TI to Durham Tees Valley in accordance with the LoA.

AIRPROX REPORT NO 090/06

Date/Time:	4 Jul 2150 NIGHT	
Position:	4954N 00336W (10nm NNW of SALCO)	
Airspace:	UAR UN26	(Class: C)
	Reporting Ac	*Reported Ac*
Type:	A321	A319
Operator:	CAT	CAT
Alt/FL:	FL290	↓FL280
Weather	VMC NR	VMC NR
Visibility:	10km+	10km+
Reported Separation:		
	400ft V/4·5nm H	400ft V/4·5nm H
Recorded Separation:		
	900ft V/4·5nm H [Burrington Radar]	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports that he was outbound from Bristol and was executing an en-route climb S of BERRY HEAD VOR (BHD), approaching SALCO on the UIR boundary, whilst in receipt of a RCS from LACC on 126·075MHz. A squawk of A2210 was selected with altitude reporting; Mode S is fitted.

Flying at 310kt level at FL290 in VMC, London CONTROL had instructed him to maintain this level because of opposite direction traffic descending to FL300 entering the London UIR from French airspace [UKAB Note (1): This was another ac inbound Cardiff that was following a short distance astern of the subject A319]. The conflicting traffic [the A319] did not appear to be in radio contact with LACC on their frequency but was displayed on TCAS 20nm ahead and slightly R of their intended track, when ATC issued an immediate avoiding action R turn onto 270°. The autopilot was disconnected and a 30° AoB level R turn was selected to increase the turn rate whereupon London CONTROL instructed them to increase their rate of turn, which they acknowledged was in progress. Only a TA was enunciated by TCAS and the other ac - the A319 – whilst descending passed about 4½nm away to port separated vertically by about 400ft at the closest point with a *"low"* risk of collision, whilst his ac was still turning R. The traffic continued to descend through their level to FL280 and they were subsequently cleared to resume their flight-planned route. The pilot of the conflicting ac was questioned by London CONTROL on RT about the previous clearance issued by BREST ACC.

THE A319 PILOT reports he was in receipt of a RCS from BREST ACC on 133·48MHz inbound to Bristol whilst northbound at 240kt towards a position about 50nm S of BHD. Having been cleared direct to BHD and to descend to FL280, a TA was enunciated by TCAS followed by an instruction from BREST ACC to "turn immediate right" by 40° for avoiding action. Conflicting traffic – the A321 - passed 4½nm to port at a similar level before they were redirected to fly to BHD. He added that although the other ac was seen it was too dark and far away to identify. The risk was not assessed.

THE BANDBOXED SECTOR 5/6/8/9/23/35/36 TACTICAL CONTROLLER (WEST TAC) reports that whilst operating as the WEST (night bandboxed) TACTICAL controller he climbed the A321 under a RCS to FL290 – the ac was now in level flight and the ACT [Auto Acceptance] message had gone to BREST. After issuing radar vectors to the outbound A321 crew because of other traffic, he instructed them to resume their own navigation to LARIM. Then he became aware that the inbound A319, not yet on frequency and with an ACT level from BREST of FL280, was approximately 10nm opposite direction to the A321 with its Mode C indicating it was descending through FL300. Aware that his PLANNER had rung BREST and was instructing them to turn the A319 hard R, an avoiding action R turn was issued to the A321 crew and traffic information was passed about the A319. The two ac passed approximately 4nm apart some 5nm N of the UIR boundary.

LACC ATCI reports that the A321 was southbound on UN26 and planned out of the sector at FL290 with the A319 from Faro to Bristol, northbound on UN864, and planned into the sector at FL280. An ACT message on the A319

was sent from BREST ACC at 2137 as follows: fix – SALCO; time – 2150; level – FL280. The Auto Acceptance (ACT) message [which automatically activates the flight data] on the A321 was sent to BREST ACC at 2143, as follows: fix – MANIG; time – 2153; level – FL290. At 2143:54, the BREST ACC QS controller instructed *the A319 crew to "..start descent level 280".* At 2148:17 he instructed the aircraft to route to BHD.

When the A321 reached its cleared level of FL290 at 2148:35, it was about 25nm from the UIR boundary. At this point the A319 was 7·5nm S of the UIR boundary indicating FL310. WEST TAC had vectored the A321 to allow the descent of another ac inbound to Cardiff from the S and when clear of that traffic he approved the A321 crew's turn direct to LARIM at 2149:00. The A319 was still not on his frequency and was now indicating FL306, 4·5nm S of the FIR boundary on a reciprocal heading, the A319 crossing the FIR boundary at 2149:29 descending through FL301. WEST TAC then detected that the A319 was still descending to FL280 and therefore in confliction with the A321. At 2149:46 WEST TAC instructed the A321 crew to *"…avoiding action turn right now head 2-7-0 degrees, turn right head 2-7-0 degrees"* and then passed traffic information to them. Simultaneously, his PLANNER telephoned BREST and instructed them *"…you need to go right 40 degrees on the* [A319 C/S] *because of the* [A321 C/S] *coming in the other direction….Turn right immediately please…".* At 2149:50 the BREST QS controller instructed the A319 crew to *"…expedite descent, please"*, and then 17sec later to *"…turn immediately right for…40 degrees".* STCA activated at 2150:10, when the two ac were 10·8nm and 400ft apart. The A321 was observed to climb to FL292. Jersey NODE-L data indicates that minimum separation was recorded at 2150:35, as 4·6nm and 800ft vertically. [UKAB Note (2): The Burrington Radar recording gives a CPA of 4·5nm H/900ft V at 2150:37].

WEST TAC said that he had been aware of the Cardiff and Bristol inbounds arriving at around the same time but could not recall whether he was consciously aware that the A319 would be at FL280. He had however noted that as the A321 would be level at FL290 well before the boundary then Northbound traffic would not be a factor. He became aware that the A319 would not be at the ACT level when he observed STCA activate between it and another northbound ac. He immediately issued avoiding action to the A321 crew.

The WEST PLANNER had just plugged in on the Sector having recently arrived for the night shift. He was acting as an OJTI to a relatively inexperienced pre Sector Validation Course (SVC) student. Due to his U/T's relative inexperience he explained that his input into the training was fairly involved. He had allocated FL290 for the southbound A321, which is the normal level as it removes the need to climb above the inbounds which normally enter the sector at FL300. As there were two inbounds, one had been sent by BREST at the usual FL300 and the other at FL280. [LACC ATCI Note: It is the responsibility of the transferring sector controller to ensure that aircraft are at the allocated levels by the sector boundary.] He noticed that A319 was not [level] at the ACT level [before it entered the Sector] at approximately the same time as WEST TAC. He immediately telephoned Brest to instruct them to turn the A321 right.

BREST ACC reported that when their controller cleared the A319 to FL280, he had not seen the situation with the A321 because the fps came late. Just after the clearance, [an]other controller took the frequency. For the first controller, it was obvious that he would have had to give [FL]280 [to be level] at the UIR boundary. For the second controller, he thought the LACC controller had seen the conflict with the A321 and was maintaining a heading West of the [normal] track. However, on our side the controller requested [the A319 crew to] expedite descent just before the [WEST PLANNER's] phone call thinking the conflict was not resolved. On our side both controllers recognized that the first error was the clearance to [FL]280 without limit at UIR boundary.

ATSI reports with RT transcript that the A321 crew had departed from Bristol International and had contacted the LACC WEST TAC controller at 2137:30, reporting that they were climbing to FL150 on track for EXMOR. WEST TAC placed the flight under a RAS, cleared it to climb to FL290 and to route direct to BHD. The controller did not inform the pilot he was identified nor was the crew informed of their position, as required by MATS Part 1. Later, when the ac entered CAS no change of service [to a RCS] was specified: however, it is considered that this did not contribute to the Airprox.

At 2137, an ACT message was received from BREST ACC, in respect of the A319, advising that its estimate for SALCO was 2150, at FL280. The ACT message on the A321 was sent to BREST at 2143 advising an estimate for MANIG of 2153, at FL290. At 2143:54, the BREST controller instructed the crew of the A319 to descend to FL280 and cleared the flight to route direct to BHD. Soon afterwards the southbound A321 levelled at FL290 when it was about 25nm N of the UIR boundary whilst the A319 was some 32½nm away, 7½nm S of the UIR boundary passing FL310 in descent for FL280. WEST TAC had vectored the A321 to remain W of northbound traffic inbound

to Cardiff and, once past that traffic, the A321 crew was cleared to route direct to LARIM. By now, the A319 was descending through FL305 and in the A321's 11 o'clock position at a range of 27nm. At 2149:50, WEST TAC transmitted "[A321 callsign] *avoiding action turn right now head 2-7-0 degrees turn right head 2-7-0 degrees*". The A321 crew acknowledged the heading instruction and the controller immediately passed traffic information, *"Traffic is due south range 6 miles opposite direction descending through your level".* The A319 was now 12 o'clock at a range of 15nm and passing FL297. [UKAB Note (3): Just after 2150:10, WEST TAC instructed the A321 crew to *"tighten the turn the traffic is now due south 4 miles opposite direction".* Whereupon, just after 2150:20, the A321 crew reported *"er visual with that..contact as well."*] Simultaneously, the WEST PLANNER telephoned Brest and advised them to turn the A319 R 40° due to the opposite direction A321. The BREST ACC controller requested that the A319 crew expedite their descent and then to turn R 40°. The subject ac continued to close but soon the avoiding action turns took effect so separation only reduced to a minimum of 4·6nm and 800ft on the Jersey Radar recording. [UKAB Note (4): the Burrington Radar recording available to the UKAB reveals that horizontal separation reduced to a minimum of 4·5nm at 2150:37, as the A319 descended through FL283 – some 900ft below the A321 which had climbed during the avoiding action turn to FL292.]

When the A319 crew reported on WEST TAC's frequency [at 2151:20 – in the order of 1min after the Airprox] they were asked what level restriction the BREST ACC controller had specified. The A319 crew replied that they had simply been told to descend to FL280 and shortly afterwards to expedite descent. The BREST ACC controller had not applied any 'level by' restriction.

UKAB Note (5): The Burrington Radar recording illustrates this Airprox relatively clearly. The A319 is shown at 2149:33, after crossing the UIR boundary, some 2·3nm W abeam SALCO descending through FL300 with the Mode S DAP (Downlinked Ac Parameter) of selected level clearly evident at FL280, whilst the A321 is southbound at FL290. However, it should be noted that Mode S is not available at LACC and this DAP would not have been evident to the WEST Sector controllers. Just as WEST TAC issued avoiding action at 2149:50, the A319 is descending through FL297, some 700ft above the A321. The avoiding action R turn issued to the A321 crew becomes apparent at 2150:21 when the A319 is some 7nm distant and already some 200ft below the A321, the A319 just commencing a R turn in conformity with the avoiding action prompted by WEST Planner and effected by BREST ACC. The southbound A321 climbs to FL292 for a few sweeps in the turn as the two ac pass port-to-port at the CPA of 4·5nm at 2150:37, whence 900ft of vertical separation is evident. The A319 levels at the selected level of FL280 at 2150:53, just under 30sec before the crew first called LACC WEST TAC.

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, the ATSU and reports from the UK ATC authority.

Both the thorough LACC Unit report and the analysis of this Airprox conducted by ATSI had provided the Board with a comprehensive understanding of what had occurred. The Board's NATS Advisor stressed that Mode S was not available, as yet, to the en-route controllers at LACC: thus WEST TAC would not have had the benefit of being able to identify from his display what level the A319 crew had set in their FMS beforehand. Nevertheless, it was clear that the respective acs' crews had no influence on the cause of this Airprox, the crux of which was that Brest ACC had not ensured that the A319 was at its co-ordinated level when it entered UK airspace. Both ACT messages relating to the respective flights had been sent to the receiving ACCs and these 'co-ordinated' levels should have been clearly evident to the controllers involved. It was clear from the comprehensive report provided by LACC, which included elements of Brest ACC's account, that the WEST TAC and PLANNER controllers had ensured that the A321 was at the assigned level before the UIR crossing point. It was also plain that the A319 should have been in level cruise at FL280 before crossing the boundary abeam SALCO. However, the Brest ACC QS controller, despite initiating the A319's descent to the correct level, had neither communicated this to the A319 crew nor ensured that their ac was level at FL280 by the UIR boundary. The Brest report had explained that the fps had arrived on the French ACC's Sector late and that the first QS Sector controller had not detected the confliction with the A321 when the initial descent instruction was issued to the A319 crew. Whilst a controller Member opined that this late arrival of the fps on the Sector might have been a factor here, it appeared that the oncoming Brest QS controller had surmised – incorrectly - that WEST TAC might be applying horizontal separation between these two flights [this was to permit the descent of the other Cardiff inbound WEST TAC reports], but when the confliction was eventually detected he requested the A319 crew to expedite their descent. CAT pilot Members stressed that there would have been no urgency on the A319 crew's part to expedite their descent if the Brest ACC controller had not instructed the A319 crew beforehand that it was necessary to be level at FL280

before the boundary - the co-ordinated level in this instance for crossing the UIR boundary from Brest ACC's area of responsibility into that of LACC's. Whilst a civil controller Member who was familiar with the operation of this Sector opined that it was not uncommon for Brest ACC to descend ac late, it was certainly intrinsic to what had occurred here. The Board agreed unanimously that this Airprox had resulted because the Brest ACC QS controller did not ensure that the A319 had reached its co-ordinated level before the UIR boundary.

Turning to the inherent risk within this Airprox it was clear that West TAC had acted promptly and correctly by passing an avoiding action turn instruction that was swiftly complied with by the A321 crew. This had ensured that the situation did not deteriorate further but the Board recognised that this was not a close encounter. The Unit reports that STCA had activated when the ac were 10·8nm apart and highlighted the conflict. Furthermore, TCAS worked 'as advertised' and alerted both crews to the presence of each other's ac 4·5nm away. It was clear that no RA was enunciated, because minimum horizontal separation was not less than 4·5nm due to the action taken by both controllers – 5nm being the stipulated minima. Military and civilian controller Members alike commended WEST TAC for his quick appreciation of what was happening, prompt reaction and sound resolution of the conflict. Similarly, the WEST PLANNER's attempts to simultaneously highlight the situation to his French Brest QS colleague were laudable and showed sound appreciation and fine teamwork. Thus the overall resolution of this conflict was a good example of CRM – perhaps better termed Team Resource Management - in the ATC environment. As it was, the Brest ACC account reflected that their controller had instructed the A319 crew to expedite their descent just before WEST PLANNER convinced him to apply a 40° R turn some 17sec later. Whilst one controller Member questioned if the Brest QS controller was late in applying this R turn advice, two sweeps later when horizontal separation was still 7nm the A319 had already descended through the level of the A321. Taking all these factors into account the Board concluded unanimously that the actions taken by the respective controllers had ensured that safety was not compromised and that no risk of a collision existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

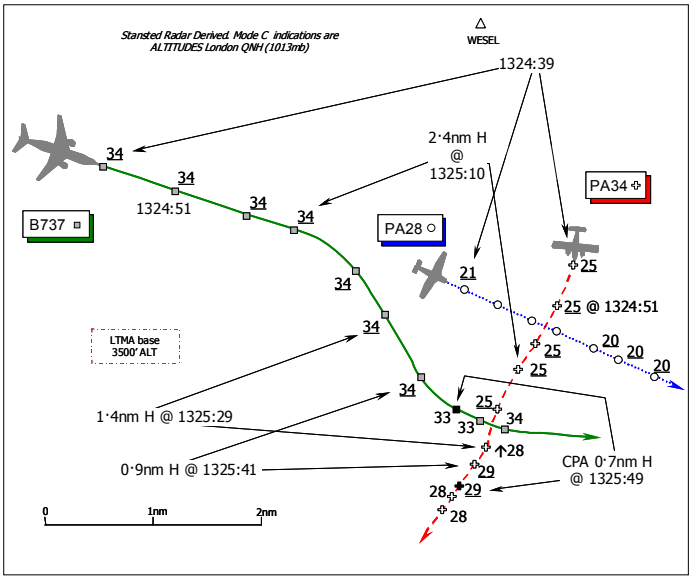
Cause: The Brest ACC QS controller did not ensure that the A319 had reached its co-ordinated level before the UIR boundary.

Degree of Risk: C.

AIRPROX REPORT No 091/06

AIRPROX REPORT NO 091/06

Date/Time:	4 Jul 1325	
Position:	5136N 00026E (10nm WNW of Southend-on-Sea)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-300	PA34
Operator:	CAT	Civ Club
Alt/FL:	↓3400ft (QNH 1014mb)	NR (N/K)
Weather	NK CAVOK	VMC CAVOK
Visibility:	>10km	NR
Reported Separation:	800ft V/2-2½nm H	Not seen
Recorded Separation:	400ft V/0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-300 PILOT reports that he was inbound on an IFR FPL to Southend Airport for maintenance on a 'gear-down' ferry flight and was in receipt of a RIS from Southend ATC whilst positioning left hand downwind for RW06 at 210kt. Heading 190°, he thought, descending to an altitude of 3400ft (1014mb), RADAR advised of a PA28 Cherokee that was 1400ft below them some 3nm away and of another ac. The other ac, which had showed as a contact on TCAS from a range of 5-6nm commenced a climbing wing-over directly in front of them – this was actually the PA34. Avoiding action was taken immediately. As the Captain of the ac, he took control from the 1st Officer PF and initiated a L turn at which point TCAS enunciated an RA 'CLIMB' instruction. The climb was initiated whereupon TCAS then enunciated 'CLEAR OF CONFLICT' almost immediately. Visual contact was maintained with the PA28 Cherokee at all times which passed about 2 – 2½nm away at the closest point some 800ft below his ac. By then, however, they had turned 90° to the L in a slight climb and the other ac was in their 3 o'clock being watched by his 1st Officer. Southend APPROACH was informed of the TCAS RA on RT. He added that it was only as they were being vectored by Southend that the PA34 started his manoeuvres which triggered their avoidance and the TCAS RA.

THE PA34 PILOT provided a very brief report stating that he had departed Stapleford for a general handling training sortie and was operating VFR in CAVOK conditions and in communication with Stapleford RADIO A/G Station on 122·8MHz. A squawk of A7000 was selected with Mode C. No narrative was provided but it was stated that the B737 was not seen.

THE SOUTHEND APPROACH SURVEILLANCE CONTROLLER (APS) reported this as a TCAS event and states that the B737 crew was inbound to Southend under their own navigation tracking 110°, maintaining 3400ft QNH. About 5nm ahead of the B737 two unknown contacts were observed; one tracking SE believed to be inbound to Southend at 2000ft, and upon which the B737 pilot reported visual contact, with another unknown ac – the PA34 - manoeuvring. At a position about 290° SND 12nm, the manoeuvring contact turned SW to cross ahead of the B737 from L to R. The B737 crew reported a TCAS RA and turning L. After about 15sec the B737 crew accepted a R turn onto 170°. He added that his workload was "normal" and the TCAS RA was not disruptive to the provision of an ATS.

UKAB Note (1): Southend is not equipped with SSR.

ATSI reports that the B737-300 was inbound from Birmingham and approaching Southend from the NW having routed through the airways system. At 1324:40 the B737 crew contacted the Southend APS having been released by London *"..just levelling 3400 feet 1-0-1-4 15 miles toward SPEAR".* The APS advised that the flight had been identified on a radar handover and queried the B737's level. On receiving a report of *"we're level 3400 feet.."*, just

after 1324:50, the APS issued a radar heading of 160° and advised the crew that it would be vectoring for a surveillance radar approach to RW06, placed the flight under a RIS and at the same time passed traffic information on traffic 3nm ahead – the PA28 - *"…there is unknown traffic ahead of you by 3 miles similar track believed to be a Cherokee last reported at 2000 feet"*. The reported PA28 Cherokee is not the ac involved in this Airprox and this transmission ended at 1325. The B737 crew responded to the APS's transmission by advising *"That's copied..* [C/S] *got the Cherokee on TCAS a 1-6-0 radar heading"*. The APS then advised at 1325:10 *"Affirm further traffic in..1 o'clock at 3 and a ½miles manoeuvring slow moving level unknown"* - this is the subject PA34. The B737 crew replied *"Okay thanks for that call on that and we've got visual with the Cherokee* [C/S]". Just after 1325:20, the APS reported to the B737 crew *"… previously mentioned traffic* [-the PA34-] *just passing through your..11 o'clock now at..2 miles crossing ahead left to right"*. This transmission ended at 1325:30 and was responded to immediately by the B737 crew saying "[C/S] *we're turning* [left]*"* and then added 10sec later at 1325:40 "[C/S] *we have a resolution advisory"*. The APS asked to be advised when the B737 crew could make a turn back. The B737 pilot quickly responded to the APS, at 1326:00, *"turn back now"* so the APS issued a R turn onto 170°. A normal radar circuit followed. From the time that the B737 crew contacted the APS at 1324:40 till the time they stated that they can take a turn back at 1326:00, the RT exchange between the APS and pilot is virtually continuous.

MATS Part 1 Section 1 Chapter 5 Page 3 1.5 Radar Information Service States:

"A Radar Information Service (RIS) is an air traffic radar service in which the controller shall inform the pilot of the bearing, distance and, if known, the level of the conflicting traffic. No avoiding action shall be offered. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information".

The Southend APS complied with the requirements for the provision of a RIS.

[UKAB Note (2): The Stansted 10cm Radar recording shows the B737 – squawking A7000 level at 3400ft London QNH (1013mb) - at a position 293° Southend 13·7nm at 1324:40, the time the crew first called the APS, with a group of four contacts manoeuvring (only two are shown for clarity – the PA28 and the subject PA34) some 3-6nm to the E and ESE of the B737's position. The PA28 is shown squawking A7000 and maintaining initially 2100ft then 2000ft. (Some PA28 Mode C indications are omitted for clarity.) At 1324:51, when traffic information was passed on the PA28, the subject PA34 is shown at 12 o'clock to the B737 at a range of 3·6nm also squawking A7000. The B737 is maintaining an altitude of 3400ft Mode C London QNH (1013mb) and the PA34 - unknown to the APS - is indicating 2500ft QNH unverified Mode C (1013mb). At 1325:14, as the B737 crew's compliance with the APS's R turn instruction onto 160° becomes apparent, the PA34 is 2·2nm to the SE at 2500ft QNH. Some 15sec later at 1325:29, the unknown PA34 is in the B737's 12 o'clock at 1·4nm - to the SE - climbing through 2800ft, which is just as traffic information was being passed again about the unknown PA34 by the APS. It was at this point - just after the B737 crew reported turning – having reversed into a L turn - that the transmission was interrupted and the RA reported at 1325:40. According to the pilot's report, this was a brief CLIMB RA before 'CLEAR OF CONFLICT' was enunciated almost immediately. Horizontal separation had now reduced to 0·9nm. However, no climb is evinced by the radar recording which shows a slight descent of 100ft to an altitude of 3300ft on the next return. The B737 is shown in a L turn through SE at the CPA, timed at 1325:49, some 400ft above the PA34 that is 0·7nm to the S, still indicating 2900ft London QNH. On the next sweep the PA34 has descended slightly to 2800ft and the B737 is still turning easterly at a horizontal separation of 0·7nm, but now level at 3400ft and drawing astern of the PA34, some 600ft above the latter. Vectoring back into the pattern is resumed thereafter.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

As Southend ATC is not equipped with SSR, in the absence of any Mode C data the APS would have been completely unaware of the level of the unknown PA34 and thus could not have provided any more detailed traffic information than he did. The ATSI report had explained that under the RIS that was provided to the B737 crew, no radar separation would be afforded against other observed radar contacts and only traffic information is given even though the flight was operating IFR. So if the crew required ATC to provide avoiding action advice for separation then a RAS would have to be agreed. Therefore, having descended out of the LTMA into the 'see and

avoid' environment of Class G airspace, it was up to the B737 crew to effect whatever separation was appropriate by making best use of the traffic information provided by ATC coupled with that displayed on their TCAS whilst also taking account of traffic detected visually - especially other non-squawking ac that remained 'invisible' to TCAS. If the B737 had maintained its course then it would have passed clear astern of the PA34 but the APS's turn instruction, onto a heading of 160°, brought the PA34 back into close quarters in azimuth and thus into confliction when it subsequently climbed – unbeknown to the APS at the time. Here the Board recognised that the APS had provided a comprehensive service based on the primary radar data displayed to him, issuing timely and accurate traffic information as soon as he could. This, coupled with the displayed TCAS information beforehand, enabled the B737 crew to visually acquire both the PA28 below them to port and the PA34 when, according to the B737 pilot's account, it subsequently climbed up toward them into a 'wing-over'. This climb also understandably generated the fleeting TCAS CLIMB RA in the B737. As, in general, TCAS is seeking to effect in the order of 300ft of vertical separation against an 'intruder' at these altitudes, the RA fortunately moderated very quickly when the PA34 crew stopped their climb at 2900ft, some 400ft below their altitude the radar recording had evinced.

The PA34 pilot reports he was conducting a general handling training sortie under VFR and from his perspective both the PA28 and the B737 were each closing from his R initially. Thus in this situation when converging at a similar altitude, it was the PA34 crew's responsibility under the 'Rules of the Air' to sight the B737 and give way. However, the recorded radar data showed clearly that the PA28 was below the PA34 by 400ft or so and the B737 was some 900ft above the PA34 until the final stages of the encounter when the PA34 crew initiated a climb up into close quarters with the unseen B737. Whether it was a wing-over or some other aerobatic manoeuvre was not apparent from the radar recording and the PA34 had not made this clear. In the view of the GA pilot Member, if the PA34 crew was conducting such manoeuvres in the confined airspace below the LTMA without any Air Traffic Control Service to assist their lookout then this was perhaps somewhat unwise. The PA34 instructor pilot should have been very familiar with this area and the Member stressed the difficulties associated with operating in this vicinity. In another Member's opinion, had the PA34 pilot seen the B737 beforehand, he would probably not have climbed when he did: the 'Rules' can only work if pilots detect the other ac in time to enable them to take the appropriate action. Nonetheless, it was clear that the B737 was there to be seen but, in the Member's opinion, the PA34 crew's scan was not as effective as it might have been as the PA34 pilot reports that the airliner was not seen.

So it was left entirely to the B737 crew to take action in this situation as the PA34 climbed up into confliction. Thus forewarned and prepared to take avoiding action, the B737 crew did so by turning to the L to leave the PA34 to starboard – no closer than 0·7nm away - whilst also complying with the enunciated RA. Thus the Board decided that this Airprox had resulted from a conflict in Class G airspace resolved by the B737 crew. Notwithstanding, the minimum separation of 400ft vertically and 0·7nm at the CPA, this was as the B737 was passing clear astern and the Board agreed, unanimously, that the B737 crew's early TCAS acquisition, visual sighting and prompt avoiding action had effectively removed any risk of a collision in the circumstances reported here.

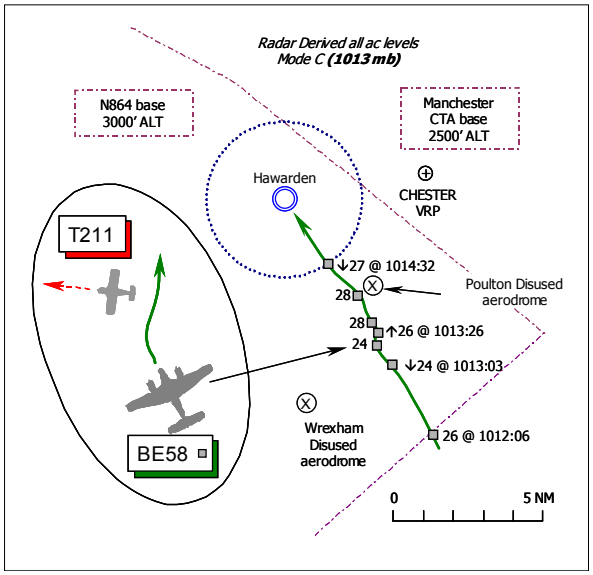
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the B737 crew.

Degree of Risk: C.

AIRPROX REPORT NO 093/06

Date/Time:	6 Jul 1013	
Position:	5306N 00253W (6nm SSE of Harwarden - elev 45ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	BE58	T211
Operator:	Civ Pte	Civ Pte
Alt/FL:	2300ft↓	2000ft
	QNH (1014mb)	RPS (1009mb)
Weather	VMC NR	VMC HAZE
Visibility:	20nm	5nm
Reported Separation:		
	30ft V/100m H	50ft V/50ft H
Recorded Separation:		
	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BEECH BE58 PILOT reports his ac has a white/blue colour scheme and the HISLS were on whilst inbound to Woodvale from Blackbushe flying solo under VFR. TCAS is fitted.

After passing Shawbury he had switched to Hawarden APPROACH (APR), on 123·35MHz, as his route was through their overhead with a planned descent from a transit altitude of 2500ft to 1400ft to avoid Liverpool's CAS N of Hawarden. He was flying his ac manually, having recently disengaged the auto-pilot, and flight conditions were very good. Hawarden placed him under a FIS, gave him clearance to transit their ATZ and informed him of unknown traffic to his R some 4nm away [UKAB Note (1): it was reported as R 1 o'clock – 4nm slow moving] but no height information was given and the traffic was expected to be crossing from R - L. His aeroplane was trimmed nose down in a slow descent with a TAS of 170-180kt heading 330°. Whilst maintaining a regular scan to his R, he could see no other ac; he also monitored his TCAS display but no other ac was showing within 6nm. Descending through 2300ft Harwarden QNH (1014mb), he momentarily moved his gaze inside the cockpit to set the next ATSU's frequency, but the instant he raised his eyes to scan once again to the R he saw out of the right-hand side of the cockpit window a yellow low-wing single engine aeroplane "immediately below, slightly right and extremely close". His reactions at this instant were "pure survival and instinctive" so to avoid the other ac he rammed the throttles forward pulled the yoke fully back hard into a full power steep climbing turn to the R. At the instant he saw the other ac he thought they were going to collide. His avoidance manoeuvre increased his altitude at a rate of 2000ft/min as the other ac passed some 30ft below and 100m away with a *"high"* risk of a collision. Neither a TA nor an RA was enunciated and he presumed [correctly] that the other aeroplane was not squawking. It appeared to him that the other aeroplane was fabric covered and he was concerned that his propellers might have caught the other aircraft, although there was no indication of any contact. They were that close that he kept asking Hawarden to confirm they still had a radar contact on the other ac.

He added that he had not seen the other aeroplane until the last second, despite trying to locate it prior to that point. In his opinion, given the speed that the ac suddenly appeared so close, low and to his right, perhaps the other ac was climbing and altering direction.

THE THORP T211 PILOT reports that his aeroplane is coloured overall yellow with narrow blue stripes and the HISLs were on whilst conducting a general handling sortie from Liverpool Airport and in receipt of a FIS from Liverpool APPROACH. Both Mode A & C SSR, although fitted, were selected off. He was flying in VMC some 2000ft clear below cloud with an in-flight visibility of 5nm in haze but no cloud was present at his altitude.

AIRPROX REPORT No 093/06

Whilst flying straight and level at 2000ft BARNSLEY RPS (1009mb), he thought in a position about 9nm SW of Chester VRP, heading 270° towards Wrexham at 80kt a shadow went over his ac. He turned his head over his R shoulder to see in his 5 o'clock position about 50ft above him a white low-wing twin engined aeroplane – the BE58 - in a gentle banked R turn heading away - no avoiding action was taken. Liverpool APPROACH asked him his position whereupon he told them over Wrexham. The controller then asked if he had seen any traffic and he said he had been "buzzed on his rear" by a twin-engined aeroplane. Some 15min later they told him that the other pilot had submitted an Airprox report. He reports the minimum horizontal separation was 50ft and the risk of collision was assessed as *"high"*.

THE HARWARDEN APPROACH RADAR CONTROLLER (HAWARDEN APR) reports that the BE58 pilot called APPROACH on 123.35MHz for a FIS and ATZ transit. Details of the ac were taken and a FIS provided. The BE58 pilot was given the Hawarden QNH of 1014mb and traffic information was passed on an unknown slow moving ac at right 1 o'clock range 4nm crossing right to left but with no height information. A minute or so passed before the BE58 pilot declared that an ac had passed very close to him and that he wondered whether it was still showing on the radar, which it was with a faint indication. When asked if he wanted to land at Hawarden the BE58 pilot declined, but was then asked if he wanted to file an Airprox, which he wanted to think about, so he phoned Hawarden once he had landed at Woodvale. It was established that the conflicting ac was in communication with Liverpool. The BE58 pilot reported on RT that the minimum vertical separation was 10-20ft above the other ac and some 100yd from the T211.

UKAB Note (2): Hawarden reported their 0950UTC weather as surface wind: 010°/5kt, variable 320-040°; FEW @ 3500ft; QNH 1014mb. The Meteorological office reports the visibility was omitted from the 0950 observation, but the 1050UTC gave surface wind: variable 3kt; visibility: >10km; FEW @ 4000ft; QNH: 1014mb.

THE LIVERPOOL APPROACH RADAR CONTROLLER (LIVERPOOL APR) reports that he received a call from Hawarden APPROACH asking if he had any traffic S of Hawarden, as a transiting pilot had reported an Airprox. He had three ac on local flights to the S of Liverpool carrying out general handling under a FIS. The other ac was identified as a T211, whose pilot, when prompted, reported seeing - albeit late - a twin-engine ac pass from L - R astern and although surprised was not apparently concerned.

ATSI reports that the BE58 pilot, routeing from Blackbushe to Woodvale, established contact with Hawarden APPROACH at 1009, was given the QNH - 1014mb - and placed under a FIS. There was a continuous RT dialogue during which, just before 1011:20, the BE58 pilot was advised of unknown traffic observed on the Hawarden radar that was 6nm to the E of Hawarden transiting SW at an unknown height. This was acknowledged by the BE58 pilot. At 1012:00, the APR advised "…*you're not identified but traffic I believe to be you has that unknown traffic in his right 1 o'clock range 4 miles right to left slow moving height unknown".* The BE58 replied *"and we'll keep a good lookout* [C/S]*".* At 1013:30, the BE58 pilot advised Hawarden *"…that aircraft we were very very close to each other I I climbed above him is he still on your radar".* The APR advised he could still see a faint primary radar contact less than ½nm to the S of the BE58, whose pilot advised *"okay well I er he just came right out of the right and I pulled up by I didn't feel anything but it was very close".* The BE58 pilot voiced continued concern about the other ac and only appeared to stop being anxious when it was identified as receiving a FIS on a Liverpool APPROACH frequency having departed Liverpool for a local flight.

Although the BE58's SSR return is observed on the Clee Hill radar recording, the other ac was not transponding. The Hawarden APR provided a service above that required by a FIS and there were no apparent ATC causal factors.

UKAB Note (3): The Hawarden APPROACH transcript records a transmission from the BE58 pilot to the APR at 1018 - after the event – the BE58 pilot stating that *"…I must of cleared him by…50 – 20 feet no more".*

UKAB Note (4): The Liverpool APPROACH transcript records that the T211 pilot reported *"..Chester outbound"*, at 1007:30, was placed under a FIS and issued the BARNSLEY RPS (1009mb). No further significant transmissions were made until after the Airprox occurred when the controller queried the T211 pilot's location, which at 1017:10, was reported as Wrexham. In response to a question from the controller as to whether the T211 pilot had seen any traffic in his position he responded at 1017:30, *"…a twin-engined aircraft went close by me…rear end about 5 minutes ago looked like he was tracking northwest towards WALLASEY"*.

UKAB Note (5): The Clee Hill radar recording does not illustrate this Airprox, as the T211 is not evident at all either as a primary or secondary contact. The BE58 is shown approaching the area of the Airprox, as reported, squawking A7000 with Mode C and, at 1013:03, is shown descending through 2400ft unverified Mode C (1013mb) – in the order of 2430ft QNH (1014mb). Subsequently, a sharp R turn is evident together with a climb through 2600ft Mode C at 1013:26 in conformity with the reported avoiding action executed by the BE58 pilot in a position some 6nm SSE of Hawarden. The BE58 levels at 2800ft – 2830ft QNH – clear beneath the lower limit of the Class A airway N864, before regaining track and commencing a descent once more at 1014:32.

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 a report from the appropriate ATC authority.

The BE58 pilot had provided a very comprehensive and detailed report of this encounter, a very experienced GA pilot Member observing that the BE58 Baron twin was a fast aeroplane with generally good visibility from the cockpit. It was evident that the T211 was there to be seen by the BE58 pilot in the generally good weather conditions that prevailed but the lack of any SSR or recorded primary radar data prevented accurate assessment of the geometry that pertained. However, it seemed from the diagrams provided that in this situation the BE58 pilot was required to give way under the 'Rules of the Air' to the other ac on his right. Whilst the BE58 pilot had pointed out that he had not seen the other aeroplane until the last second, despite trying to locate it prior to that point, it was reported he was exercising a regular scan. Nevertheless, it was evident that the BE58 pilot's lookout had been defeated by the small yellow ac that was apparently in straight and level flight and was not apparently climbing or altering direction as he had thought. The difficulties of visually acquiring small light coloured ac at similar levels closing on a steady bearing with little relative movement to draw attention to them were well known to the Board and only the most rigorous and conscientious of lookout regimes will reveal such threats. A Member observed that the BE58 pilot had apparently elected to fly his ac manually, undoubtedly for the best of intentions, but in the Member's opinion maximum use of the autopilot might have been advantageous with the intrinsic benefit of allowing the BE58 pilot more time to concentrate on lookout whilst he navigated the more confined reaches of the FIR below CAS where 'see and avoid' prevails. The Board noted that the BE58 pilot had been given a warning of the presence of the unknown ac by the conscientious Hawarden APR who had detected the presence of the unknown T211 and then passed traffic information under the FIS that pertained at a range of 4nm. It was clear that despite looking for the other ac the BE58 pilot had not spotted it as early as he might have done. Whilst there was no compunction to provide this traffic information under the FIS, the APR had astutely determined that the T211 would pose a hazard, warning the other pilot accordingly. A controller Member was keen to point out that if pilots are unable to acquire other reported ac then they should ask for an update of the traffic information because a controller will not necessarily update the traffic information unless so requested – a salutary point to be borne in mind. A CAT pilot Member suggested that the T211 might have been difficult to spot from the BE58's LH seat with the starboard engine nacelle potentially causing obscuration to the R abaft the twin-engined ac's 2 o'clock, but then pilots should be prepared to move their ac so that blind-spots are covered by their lookout routine. Whilst obliged to give way under the 'Rules of the Air', it was clear the rules can only work if the other ac is spotted in time to enable the 'giving way' pilot to do so. The BE58 pilot reports he had not spotted the other aeroplane until the last second so the Board agreed that this was a very late sighting on his part and one element of the cause of the Airprox.

From the other pilot's perspective, in his small T211 monoplane, it was evident that he had not spotted the larger twin-engined BE58 until after it had passed over his ac and was climbing to avoid his aeroplane and opening out into his 5 o'clock position. Clearly the same difficulties of visual detection would have beset the T211 pilot; hence he had not seen the BE58 until after the confliction had passed.

Some thought it might have been more appropriate if the T211 pilot had called Hawarden for an ATS. There seemed little point in operating under a FIS from Liverpool who could do little for the T211 pilot. Indeed, traffic information might have been proffered by the Hawarden APR in a similar fashion to that given to the BE58 pilot but the T211 pilot might in any event have gleaned a warning about the presence of the BE58 from the RT. The Board concluded, therefore, that this was effectively a non-sighting of the BE58 by the T211 pilot and the other part of the cause.

The Board were unable to accurately assess the geometry that pertained here because the small T211 ac was not shown on the radar recording at all but Members commented that the T211 pilot's decision to switch off his SSR was most unwise. The Board reaffirmed the importance of selecting the appropriate conspicuity code with Mode C in accordance with the promulgated national guidelines when operating in Class G airspace. Here, if it had been switched 'on', there seemed little doubt that the T211's squawk with Mode C altitude reporting would have been detected by the BE58's TCAS, providing its pilot with a warning of the other ac's presence - possibly enabling him to spot it earlier - thereby enhancing his situational awareness in this close quarters situation and potentially allowing him to afford it a greater margin of separation. Whilst this was indeed speculation, the lack of SSR data was unfortunate, clearly denying both ATC and the BE58's TCAS altitude data about the light ac because TCAS was effectively rendered blind to the T211 and thus unable to generate a TA or an RA. Moreover, it also prevented any determination of the minimum vertical separation that pertained here which was apparently no more than 50ft according to the T211 pilot's own report and possibly as low as 30ft from the BE58 pilot's account. Thus at these distances, it was the unanimous view of the Members that this was clearly a close call: with one pilot unsighted until after the event and the other only spotting the T211 100m away to his R, safety was indeed compromised. Whilst the BE58 pilot's robust avoiding action had apparently averted a collision it was only by the narrowest of margins and effected only "at the last second". This was enough to convince the Members that an actual risk of collision had existed in the circumstances conscientiously reported here.

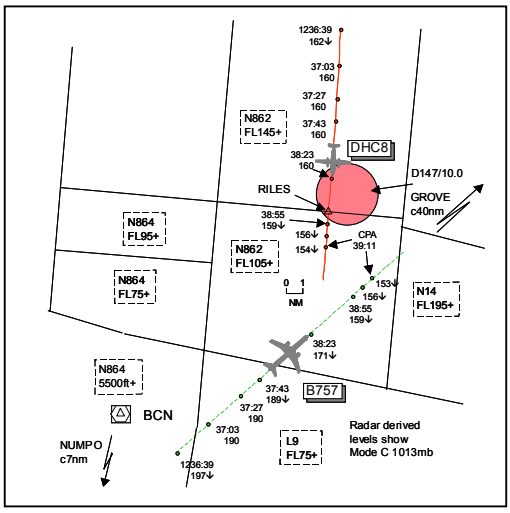
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Thorp T211 pilot and a very late sighting by the BE58 pilot

Degree of Risk: A.

AIRPROX REPORT NO 094/06

Date/Time:	8 Jul 1239 (Saturday)	
Position:	5153N 00253W (17nm NE BCN)	
Airspace:	AWY N862	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B757	DHC8
Operator:	CAT	CAT
Alt/FL:	FL158↓	NR
Weather	IMC CLOC	NR
Visibility:	5nm	NR
Reported Separation:		
	100ft V/2·5nm H	Not seen
Recorded Separation:		
	100ft V/3·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports heading 060° at 300kt inbound to Birmingham IFR routeing NUMPO to GROVE under a RAS, he thought, from Swanwick (Mil) and squawking 6402 with Mode C. Passing FL158 descending, with a moderately high ROD - they had been kept high earlier - to FL70 to be level 15nm before GROVE, a TCAS 'traffic, traffic' aural alert was heard with TCAS displaying traffic on the VSI, off-scale in their 10 o'clock and 300ft below. Whilst looking for this traffic and when passing FL155, Swanwick (Mil) called *"B757 c/s stop descent FL160"*. They replied *"...unable passing FL155"*. TCAS now displayed the traffic 9 o'clock 3nm and 100ft above. As Swanwick (Mil) gave them TI, they saw the traffic, a white coloured twin turboprop, passing 2·5nm away just above their level. No TCAS RA was received during the encounter and their descent was continued towards GROVE. He assessed the risk as medium.

THE DHC8 PILOT reports that he was totally unaware of any incident and did not recall anything. No TCAS alerts or warnings were received nor did the crew see any ac visually.

THE SWANWICK MIL CENTRAL CONTROLLER reports taking control of the B757 off BCN towards GROVE for Birmingham at an agreed level of FL190. After initial contact, the B757 flight requested descent and, at the time, he believed that he was liaising with a civil sector regarding another ac he was working. After checking the immediate vicinity around the B757, he cleared the flight to FL70 as its track would remain clear of Danger Area D147 which normally requires the ac to level-off at FL110. In addition to his workload and that of the SW Mil controller, a third controller was dealing with a 'no-RT' ac and liaising with Boulmer. He turned his attention back to the B757 and saw another ac, the subject DHC8, also descending through FL160 at the same time as the B757. He attempted to stop the B757 flight at FL160 but it was already passing that level so he told the flight to turn R for lateral separation and gave TI. The B757 crew reported having the other ac on TCAS, which he acknowledged, and continued to provide a service to the B757 flight before transferring it enroute. The pilot telephoned later advising that he was filing an Airprox.

THE CARDIFF RADAR CONTROLLER was not aware of the incident and his recollections of the scenario are included in the NATS Cardiff Unit Report (see below).

MIL ATC OPS reports that the Swanwick Mil Central Controller (LJAOC) was controlling a B757 whilst the DHC8 was under control of civil ATC. The B757 flight contacted LJAOC at 1236:25 and 12sec later was placed under a RCS with the instruction, *"B757 c/s Swanwick ah, good afternoon, identified in descent to FL190, Radar Control."* The type of service was acknowledged and the B757 crew requested further descent. After asking the flight to standby, at 1237:22, LJAOC instructed the flight, *"Er, B757 c/s descend er FL70, be level 15 before Grove."* The B757 crew correctly read back the clearance. LJAOC stated at 1238:55, *"B757 c/s stop descent FL160."* Four seconds later, the B757 crew replied, *"Er, yeah, we are er, 155 c/s co prefix, er."* LJAOC then stated at 1239:04, *"Turn right heading 090,*

traffic was left 10 o'clock 5 miles, passing down left hand side." The B757 flight responded, *"Yeah we are looking, have him on TCAS."* Then after 5sec the B757 crew stated, *"Visual with that traffic, B757 c/s."* LJAOC acknowledged.

[UKAB Note (1): Analysis of the Clee Hill radar at 1236:39, the time the LJAOC placed the B757 under a RCS, shows the B757 4·4nm SE of BCN tracking 045° descending through FL197 with the DHC8 28nm to its NNE tracking 185° descending through FL162. Twenty-four seconds later, both ac level-off, the B757 at FL190 and the DHC8 at FL160. The subject ac continue to converge on steady tracks, the B757 indicates commencing a descent (FL189,) at 1237:43 with the DHC8 in level flight at FL160 in its 11 o'clock range 17nm. Forty seconds later the B757 crosses 10nm ahead of the DHC8, 1100ft above and descending with an average ROD 2250fpm. At 1238:55, the DHC8 is seen to have commenced a descent in the B757's L 10 o'clock range 5nm; both ac indicate FL159. The next sweep 8sec later shows the DHC8 is in the B757's L 9 o'clock range 4·4nm, both ac are indicating FL156. The CPA is on the next sweep at 1239:11, the DHC8 passing 3·6nm NW of and 100ft above the B757. Thereafter the ac continue to diverge whilst continuing their descent profiles. Throughout the incident neither ac deviates from its original track.]

This incident occurred during a weekend watch when the Swanwick Mil team were relatively busy. In addition to normal weekend traffic, the team were also dealing with a civil 'no RT' ac which was creating a significant amount of high priority liaison calls between LJAO and other agencies. Whilst the controller concerned had only 1 ac on frequency, there was a considerable amount of distraction around him. During the investigation when he was asked if he was rested, the controller concerned stated that he was and that he was also current on the sector concerned. He could not state why he had not seen the DHC8 before issuing descent clearance to the B757 especially as he had avoided this very ac some 10min earlier with another CAS joiner.

THE NATS CARDIFF UNIT INVESTIGATION reports the DHC8 flight was enroute to Exeter and had called on frequency descending to FL160 to be level 10nm before RILES in accordance with the standing agreement. The flight was placed on a radar heading of 190° to position the ac along N90. The Cardiff Radar controller had seen the B757 N'bound on N864 descending through approximately FL210 and watched the squawk change to an LJAO code. He had mentally disregarded this ac, assuming that it would either stop at FL170 above his airspace as no coordination had been effected or that LJAO would 'take5' on any traffic in his sector. At 1238 the DHC8 passed RILES and the flight was given descent to FL140. At the time the subject ac were at their closest, the Radar controller was giving his attention to a parachute drop ac requesting to penetrate CAS about 60nm to the S and he was not aware of the confliction which occurred towards the NE edge of his radar display area. He reported that traffic loading was medium at the time. Later that afternoon at 1530Z, the Unit were informed that an Airprox had been filed.

ATSI made no comment.

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 incident. The B757 had been correctly placed under a RCS within Class A CAS by the Swanwick Mil Central Controller (LJAOC) on initial contact whilst the flight had been released at FL190. When the B757 crew requested descent, the LJAOC had two options open to him – coordinate descent with the appropriate ATC sector or to 'take 5'. He did not attempt coordination, electing to exercise his radar autonomous status and provide 5nm lateral separation on traffic observed in potential confliction. From his report it appears that the LJAOC may have been distracted by events taking place on adjacent positions when he cleared the B757 to FL70. For whatever reason, the LJAOC did not see the S'bound DHC8 on radar and did not take it into account when descending the B757. This had caused the Airprox.

The B757 crew had already been given the 'heads up' as TCAS issued a TA alert on the DHC8 away to their L and 300ft above. The LJAOC, on noticing the DHC8, told the B757 crew to stop descent at FL160 but by this time they were descending through FL155. A R turn and TI on the DHC8 was given to the B757 crew who watched the other ac on TCAS and then visually pass an estimated 2·5nm clear to their L and just above. The DHC8 crew were unaware of the crossing B757 which the Cardiff Radar Controller had seen earlier but mentally disregarded from his traffic picture. The radar recording shows the B757 crossing 10nm ahead of the DHC8 about 1000ft above and descending with the DHC8 commencing descent as the ac approach the CPA (100ft V/3·6nm H).

Although this had had the potential for being a more serious incident, the combination of all these elements had resulted in the ac passing with separation reduced but with flight paths already deconflicted and diverging which was enough to persuade the Board that safety had been assured during the encounter.

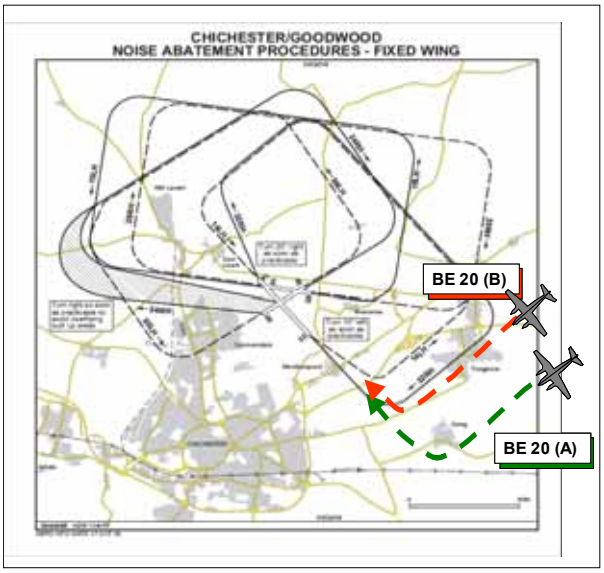
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Swanwick Mil Central Controller did not take the DHC8 into account when descending the B757.

Degree of Risk: C.

AIRPROX REPORT NO 095/06

Date/Time:	7 Jul 0756	
Position:	5152N 00045W (Goodwood Circuit - elev 110ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BE20	BE20
Operator:	Civ Com	Civ Exec
Alt/FL:	700ft↓ (QNH 1017mb)	700ft↓ (QNH 1014mb)
Weather	VMC CLBC	VFR CLBC
Visibility:	>10km	10km
Reported Separation:	0 V/ 100ft H	300ft V/ 1-2nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE20 (A) PILOT reports flying a non-scheduled passenger flight into Goodwood and in receipt of an AFIS from them. All lights were switched on and they were squawking 7000, he thought, but with Mode C selected off. They and another BE20 were joining the traffic pattern for RW32. They joined right base and heard a call from the other ac reporting wide left base; on hearing this call they turned onto a 2nm final. At 1.8nm the other ac called *'2nm final 32'*. Their TCAS alert at this time began flashing red with an associated audio warning. There was no traffic seen on their left but they then saw the other ac in their 2.30 position at about 100ft horizontal separation so he initiated a go around. Goodwood radio called the other ac to ask why he had called left base when actually he was on right base. Its pilot then apologised. He assessed the risk as being very high.

THE BE20 (B) PILOT reports flying a non-scheduled passenger flight into Goodwood, squawking 7000 with Mode C and in receipt of an A/G service from them. He did not consider the event to be an Airprox: simply two ac joining the Goodwood circuit under VFR. They were good VMC at the time and the other ac was called at 5 miles final while they were at 2 miles final. He apologised to the other pilot simply out of good manners because the other ac had to go-around. He considered that there was no risk of collision.

UKAB Note (1): Goodwood is a licensed aerodrome with a 2nm ATZ and an AFIS.

UKAB Note (2): Pooley's Flight Guide, Chichester Goodwood Noise Abatement Procedures states:

"Fixed Wing:

Standard join is overhead at 2000ft. Straight–in and base joins are strongly discouraged when the circuit is active. Outside ATC hours and after sunset overhead join is mandatory."

UKAB Note (3): BE20 (A) can be seen squawking 7000 with Mode C approaching Goodwood from the NE and descending to 2000ft. At 0751:53 the SSR seems to have been switched off as the ac then disappears from the radar recording. BE20 (B) paints throughout the event squawking 7000 with Mode C and is first seen at 5400ft descending and approaching Goodwood from the N. It then tracks towards the centreline for RW32, about 2nm behind BE20 (A) and continuing its descent from above (A). It then turns right by about 20° appearing to close the gap on (A). A primary-only contact presumed to be BE20 (A) paints for 1 sweep only at about 2nm on the centreline for RW 32 in BE20 (B)'s 10 o'clock at about 2nm. The CPA is therefore not recorded.

ATSI reports that both subject ac were inbound to Goodwood from the N.

The actual incident took place below/outside recorded radar cover. The SSR return of BE20 (B) is not seen until quite late in the sequence, while BE20 (A), the closest to the airfield, disappears from radar approximately 6nm NE. The second aircraft (BE20 (B)) can be seen joining for a right base for RW32.

The pilot of the second ac (BE20 (B)), advised the FISO that we would be joining ***left*** base for RW32 and TI was passed to all relevant ac on other known ac. BE20 (B) pilot advised the FISO that he would be extending downwind and just after this BE20 (A) reported *"C/S ?????? Establish*" and was given TI on BE20 (B) which was believed to be joining left base. Shortly after this BE20 (B) pilot advised *"C/S we're turning finals now at 2 miles"*, was advised of the wind and advised that he could land at his discretion. He was further advised there was one on right base, BE20 (A), and asked if he had it in sight. A negative report was received together with the information that he (BE20 (B)) was at 1.5nm. At that point the FISO asked BE20 (A) whether he had contact with BE20 (B) but the pilot of (A) replied *"Going around haven't got the traffic in sight we're at one and a half mile final".*

The FISO then advised BE20 (B) pilot *"I think you've turned from right base and you've got one just er behind you and to the left".* At this point BE20 (A) pilot advised he had contact with traffic on his right.

There were apparently no ATS 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board noted that neither pilot had conducted an overhead join as recommended in Pooley's and that had they done so, it is likely that the pilots would have seen each other's ac and integrated correctly into the visual circuit. As it was, the incorrect joining call by BE20 (B) pilot had confused the situation and both the FISO and BE20 (A) pilot would have been looking in the wrong area for the former ac; it was therefore not surprising that neither saw it. It would seem also that there was confusion in the mind of the BE20 (B) pilot regarding the range of (A) from the threshold. The RT transcript had shown that the BE20 (A) pilot called at *"one point five miles"* but the BE20 (B) pilot thought him to be at 5 miles; therefore pilot (B) would have expected the other ac to be in a position well behind him and he did not see it almost abeam him. Notwithstanding the incorrect perceptions of the positions of both ac held by the pilots, specialist Members thought that there must have been lapses in the lookout of both pilots for them both to arrive on finals with neither seeing the other ac.

Fortunately, BE20 (B) pilot had not switched off his transponder so that his ac was detected by BE20 (A)'s TCAS, its pilot initiating a go-around. This action removed the risk of a collision but not until after there had, in the view of the Board, been a compromise to the safety of both ac.

PART C: ASSESSMENT OF CAUSE AND RISK

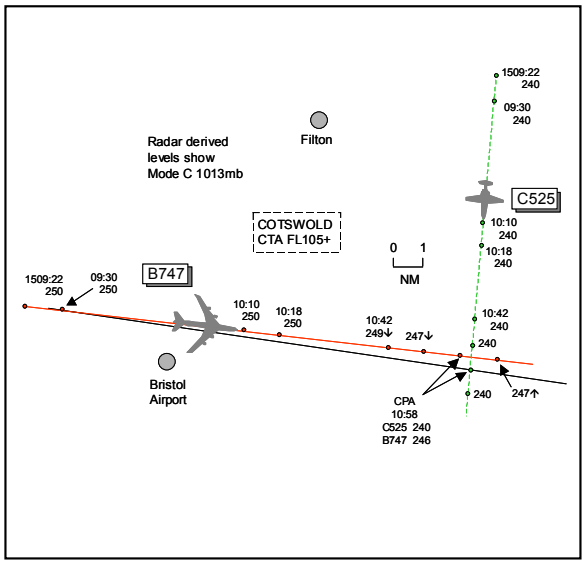
Cause: While both pilots were conducting non-standard joins, the pilot of BE20 (B) incorrectly reported his position and flew into conflict with BE20 (A).

Degree of Risk: B.

AIRPROX REPORT No 097/06

AIRPROX REPORT NO 097/06

Date/Time:	9 Jul 1511 (Sunday)	
Position:	5123N 00227W (3nm W Bath)	
Airspace:	Cotswold CTA/UP2 (Class: A/C)	
	Reporting Ac	*Reported Ac*
Type:	C525 Citation	B747-400F
Operator:	Civ Pte	CAT
Alt/FL:	FL240	↓FL180
Weather	VMC CLAC	VMC NR
Visibility:	>100km	NR
Reported Separation:	500ft V/nil H	500ft V
Recorded Separation:	600ft V/0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C525 PILOT reports heading 185° at 380kt and FL240 en route to the Channel Islands and in receipt of a RCS from Swanwick Mil squawking 6401 with Mode C. The visibility was >100km flying 10000ft above cloud in VMC and TCAS 1 was fitted (no RA warnings). ATC told him about other traffic, the B747, descending to FL250 to pass 1000ft O/H: it was clearly visible at 10nm range in his 1 o'clock. TCAS sounded a TA alert as the B747 moved to his 2 o'clock position showing +700 on his display. The B747 was seen to continue its descent to +500 before climbing again. No avoiding action was taken as he only realised that the B747 was not levelling at FL250 when O/H and the risk of collision had passed. ATC gave him an 'avoiding action' descent but this was as the B747 was just behind his tail and diverging. The time between the TA alert and the B747 crossing O/H was 1-2sec. He assessed the risk as medium.

THE B747 CAPTAIN reports heading 100° at 320kt inbound to Stansted and in receipt of an ATS from London squawking 7747 with Mode C. Before the computed Top Of Descent (TOD) an initial ATC clearance was received to descend to FL250 to expect FL180 15nm before NIGIT, as per LOREL 1S STAR. The ac was descended to FL250 and this level was selected in the FMC cruise page 2 to give a new required TOD. During this short cruise phase, he needed to briefly leave the cockpit and foresaw no problem, as the FO was extremely experienced. On leaving the flight deck with 13nm to go to the new TOD, the FO was briefed *"we will need descent clearance in 13 miles"* which he acknowledged. On his return to the cockpit and on sitting down, the FO was observed to set '18000' in the altitude window and press the selector button. As he was about to ask *"have we got descent clearance?"* TCAS annunciated *"traffic-traffic, monitor v/s, climb-climb"*. He carried out the manoeuvre whilst the FO advised ATC of the TCAS climb, the controller replying *"you were not given descent clearance, at no time did I clear you down as you had traffic 1000ft below. I'll have to write that one up"*. The FO apologised that he had misunderstood the clearance and believed it had been *"descend FL250 and cross 15nm before NIGIT at FL180"*. The other ac was not seen visually but minimum vertical separation was 500ft during the TCAS manoeuvre. The risk was assessed as medium.

THE B747 FIRST OFFICER reports upon handover to London they were cleared to Stansted via the LOREL 1S 'expect to be FL180 15 miles before (Pos X)'. On handover to the next controller they were given an early descent to FL250 and at the same time given what he thought was a clearance '*to be at FL180 15 miles before (Pos X)'*. When the flight profile indicated further descent was necessary he called ATC *"leaving FL250"* and started down. He heard no response from ATC and, before another call could be made, they received a TCAS 'reduce ROD'. He informed ATC and was told that no clearance below FL250 had been given and that this would be flagged up as an event. He went on to say that he felt that this was an event which, if it hasn't already occurred, was one waiting to happen. He could see no reason why, once given the arrival STAR, ATC should feel it was necessary to inform flights what level to expect by a certain point when this is quite clearly written down on the STAR plate.

He opined that this event would not have taken place if the controller had only given instructions about one FL (FL250) and not mentioned FL180 in the same transmission. The frequency was very busy at the time and therefore instructions, especially regarding level changes, should be clear and unambiguous. In this case it all hinged on the word "expect".

MIL ATC OPS reports that the Swanwick (Mil) Central Tactical Controller (CTAC) was controlling a C525, under a RCS on a Cleared Flight Path (CFP) across airway L9, tracking S at FL240. LACC Sector 23 was controlling a B747 under a RCS tracking E at FL250. At 1510:19 CTAC gave TI to the C525 flight on the B747, stating, "*C525 c/s. traffic right 2 o'clock, 3 miles, right left, civil traffic, coordinated 1000 feet on top.*" The C525 pilot acknowledged the TI and stated that it was showing on TCAS. Subsequently at 1510:46 the C525 pilot queried, "*C525 c/s is that traffic descending? He's 700ft on TCAS!*" CTAC responded immediately, "*C525 c/s avoiding action, turn left heading 160, previously called traffic now west 1 mile eastbound, but has descended on top of you, now indicating FL246 in the descent.*" The C525 pilot replied *"...we've passed him visual but he was descending"*. The controller explained that the ac had broken co-ordination without permission from Sector 23.

Analysis of the Clee Hill Radar shows the C525 14²5nm NE of Bristol International indicating FL240C, tracking S at 1509:22. The B747 is in the C525ís R 2 oíclock 17²5nm, indicating FL250C, tracking E. The C525 maintains level and track throughout the incident. At 1510:18, the B747 is in the C525ís R 2 oíclock, 7²4nm. The B747 continues on track and maintains FL250 Mode C until indicating a descent to FL249C at 1510:42, whilst in the C525ís R 3 oíclock 3nm. The B747 continues descent to FL247C at 1510:50 and is now in the C525ís R 3 oíclock, 1²6nm. The CPA is 0²6nm and 600ft Mode C which is at 1510.58, with the B747 in the C525ís R 5 oíclock. Thereafter the B747 passes behind the C525 and climbs back to FL250C.

The CTAC had given relevant TI to the C525 prior to the incident although the initial range estimate appeared to be inaccurate. There was insufficient time for any instructions given by the controller to take effect prior to the subject ac crossing. There are no military ATC factors disclosed in this incident.

THE LACC SECTOR 23 TACTICAL CONTROLLER reports the B747 flight called on frequency at 1507 descending to FL270 in the vicinity of NUMPO. His Planner had alerted him to military crossing traffic at FL240 in the vicinity of WOTAN from N to S. He cleared the B747 flight to FL250 with the expectation of FL180 15nm before NIGIT (standing agreement). At approximately 1510 and after the B747 had been in level flight at FL250 for some 20nm, he passed TI to the B747 flight on the crossing traffic 1000ft below. About 60sec later he observed a flashing alert and a Mode C readout of FL247 on the B747. He told the B747 flight to maintain FL250 whilst the crew simultaneously reported a TCAS RA. The B747 was again told to maintain FL250 until the crossing traffic cleared the airspace to the S.

ATSI reports that the B747 was inbound to Stansted and contacted the Sector 23 Tactical controller at 1506, reporting that they were descending to FL270 and heading 100°. At this time the B747 was 22nm SW of Brecon and passing FL300. The controller transmitted "*B747 c/s roger descend when ready flight level two five zero you can expect flight level one eight zero fifteen miles before NIGIT*". The crew replied "*Okay when ready down to two five zero to expect one eight zero one five before NIGIT and could you confirm we are on a radar heading*". The controller cleared the flight to route direct to NIGIT. At 1509:35, the controller instructed the crew to continue on their heading as a radar heading and then, at 1510, the controller transmitted *"B747 c/s crossing left right one thousand feet below once clear of that traffic I'll give you further descent*". The crew acknowledged this with "*Thank you*". At this time (1510:10) the C525 was in the 10 o'clock position of the B747 at a range of 8·8nm and maintaining FL240. It is noteworthy that the recorded radar for this time shows FL180 as the selected level on Mode S for the B747 [UKAB Note (1): selected since 1509:00 and about 15nm before the B747's TOD but this Mode S selected FL information is not displayed on LACC displays] and at 1510:42, the B747's Mode C indicates a descent when the C525 was in the 11 o'clock position of the B747 at a range of 3nm. At 1510:50, the B747's Mode C indicated FL247 with the C525 just L of its 12 o'clock at a range of 1·6nm crossing from L to R. The controller instructed the B747 to maintain FL250 and the crew replied that they had just had a TCAS RA. Separation reduced to a minimum of 0·6nm and 600ft (1510:58) as the B747 passed behind the C525. The controller reiterated that the flight had only been cleared to FL250 and the crew replied that they thought they would be descending to FL180 by 15nm before NIGIT. The unit's MATS Part 2, GEN 2.10, para 2.12 (Use of 'Expect Level' clearances) specifies the conditions for using such clearances and these were fully complied with by the Tactical controller.

UKAB Note (2): The ATCI (NATS Unit) report recommended a review be carried out by the Head of Operational Policy regarding the use of 'expect levels' at NATS units and of the guidance given in relation to these in MATS Part 2. The review should include input from NATS Human Factors, operational staff and ac operators with revised guidance/instructions being issued to controllers if necessary.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Looking at the piloting aspects of the incident first, the B747 Captain had left the flightdeck at a critical stage of the flight profile which meant that the flight had for a short while reverted to single pilot operation. Although the Captain was clear in his mind of the plan and had briefed the FO on the impending descent, it appeared to pilot Members that the FO was not fully aware of what was required. From his report, the FO had misunderstood the situation with respect to the ATC 'expect' level clearance such that he had commenced descent when the FMS had shown the ac had reached its TOD point, just as the Captain returned. In doing so, the FO had descended the B747 below their cleared level and into conflict with the C525 which had caused the Airprox.

The discussion moved swiftly onto an ATC aspect. It was noted that the use of 'expect level' clearances by ATC was only promulgated within the Unit MATS Part 2, not in MATS Part 1. The use of these clearances by controllers reinforces the information contained within the STAR charts so that acs' crews are fully aware of the future requirements that ATC will desire in order to comply with ATC standing agreements. This is of particular importance where airspace is sectorised vertically and when flights are unable to be given climb/descent by ATC, owing to traffic, but are then required to manoeuvre vertically away from the ideal flight profile. Pilot Members were fully aware that the airline industry had requested that 'expected levels' be shown on arrival charts to assist with advance planning by crews. Not knowing what to expect may cause significant flight profile management problems if ac speed and/or configuration are working against achievement of a necessary profile without further delay, and in turn congestion on the RT. One ATCO Member opined that using the 'expect' phraseology makes the pilot aware of an intention but the inclusion of two levels in one transmission could induce a 'mindset' leading to the pilot to acting on it, as shown in this case. The planning aspect was agreed to be a useful element but the Human Factors (HF) implications lead to an opportunity to make a mistake.

The NATS Advisor briefed Members that a policy review was carried out on the use of 'expect levels' which were introduced because ac were regularly not making newly-introduced target levels required for airspace re-sectorisation. It was found that although more of these levels have appeared on charts, ac continue not to make the target levels. Some input from HF specialists suggested changing the order of the words but discussions were inconclusive. NATS has concluded that the use of 'expect levels' is still required for safety reasons but that further work needs to be done on the confusion which on occasion they are found to cause.

The ATSI Advisor informed the Board that at a recent pilot/controller forum, there had been a 50-50% split on the matter of using 'expect levels'. A few Members believed that this phrase has 'had its day' and with the increase in airspace complexity it does not work. Combined with the HF element, this led to a proposal for the Board as a whole to recommend that a review of the 'expect' usage should take place. However, this view was not shared by the majority of Members who agreed no Board action was needed at the present time in view of the ongoing review by NATS being 'in hand'. Overall, it was agreed that the procedure was of more benefit being used than being withdrawn and that it had not been a contributory factor in the incident. NATS proffered statistics that revealed that in the period 2005-2006, eight MOR reports were filed involving the use of 'expect levels' in some way.

Turning to risk, the CTAC had given TI to the C525 pilot who had acquired the B747 on TCAS and then visually. After querying the B747's descent, the CTAC gave an avoiding action turn whilst a TCAS alert was generated but by then the C525 had passed ahead of the B747. The S23T had also passed TI to the B747 flight on the crossing C525 1000ft below but the crew commenced descent which quickly generated TCAS TA then RA warnings which were followed. The S23T also saw the erroneous descent of the B747 and told its crew to maintain FL250. The radar recording had shown the B747 descent to FL246 before an immediate climb is seen as it passes behind the C525. Although singularly untidy, all of these elements combined allowed the Board to conclude that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

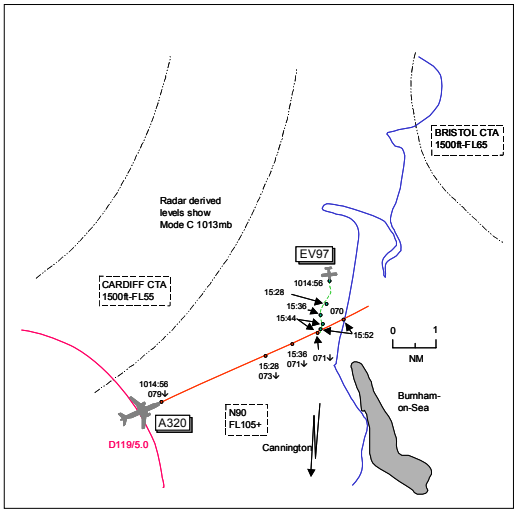
Cause: The B747 crew descended below their cleared level and into conflict with the C525.

Degree of Risk: C.

AIRPROX REPORT No 098/06

AIRPROX REPORT NO 098/06

Date/Time:	11 Jul 1016	
Position:	5117N 00303W (13nm SE Cardiff)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	EV97 Eurostar	A320
Operator:	Civ Pte	CAT
Alt/FL:	FL74↓	FL70↓
Weather	VMC CLAC	VMC CLAC
Visibility:	>20km	'excellent'
Reported Separation:	200ft V/200m H	500ft V/200m H
Recorded Separation:	0·2nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EV97 EUROSTAR PILOT reports flying solo heading 189° at 76kt en route from Derby to Dunkeswell VFR and not in communication with any ATSU; no lighting or transponder was fitted. The visibility was >20km flying clear above cloud in VMC and the ac was metallic coloured with red wing tips. About 7nm N of Cannington, Somerset, whilst tracking from Newport in an en-route descent from his cruising level FL80 and passing through FL74, he first saw a light-coloured medium sized passenger jet in his 2 o'clock about 300m away very shortly before it passed 200m in front and 200ft below from R to L tracking 060°. It appeared to be banking to the L. No wake turbulence was felt and no avoiding action was taken, owing to the lack of time, but it was evident at first sighting that no collision would result. He assessed the risk as high.

THE A320 PILOT reports heading 060° at 250kt inbound to Bristol IFR and in receipt of a RAS from Cardiff on 125·85MHz squawking 5321 with Mode C. The incident occurred about 18nm SW of Bristol whilst tracking from EXMOR towards the BRI at FL70 and awaiting further descent. Just on a hand-over to Bristol, the FO, PNF, noticed a low wing single engined ac coloured red/white in his 10 o'clock range 2nm flying straight and level heading S approximately 500ft above. No avoiding action was taken for, although it was seen late, it was judged that the other ac would pass clear, which it did, 500ft above and 200m to their L and behind. No TCAS alerts were received. It was assumed that the other ac was under radar control. After initial contact with Bristol, the crew told ATC of the other ac. The FO contacted Cardiff ATC on No 2 VHF for further details who told them that only a faint radar trace was seen and that the other ac was not receiving a radar service, was not in contact with Cardiff or Bristol ATSUs nor was it transponding. They reported the Airprox to both Cardiff and Bristol ATSUs by telephone after landing with Cardiff tracing the unknown ac to the vicinity of Dunkeswell/Exeter. He assessed the risk as medium.

THE CARDIFF RADAR 1 CONTROLLER reports workload was medium/high when the A320 was descending to FL90 on its own navigation EXMOR-BRI as per the standing agreements between Cardiff and Bristol. As the A320 turned at EXMOR the flight was issued further descent and, after checking there were no conflictions outside CAS, was then transferred to Bristol. About 2min after this, Bristol Radar called to advise that the A320 flight had reported being close to traffic, approximately 300ft above them; he told Bristol that he was not aware of anything. Shortly after this the A320 flight called on frequency also advising of their proximity to traffic and he told the flight to telephone ATC after landing. He checked where the A320 had routed and saw a slow moving primary contact just coasting-in on the English side of the Severn estuary near Burnham-on-Sea. He believed that this radar return was a potential candidate for the unknown ac so he monitored its progress Southbound and telephoned Exeter Radar to see if they were working the traffic. Exeter ATC was not and he lost his ident on the ac as it passed through the Dunkeswell O/H.

The A320 Captain subsequently telephoned and reported the unknown traffic was probably 500ft above and probably passed behind them and that it was flying at the correct quadrantal. The Captain then advised that he would be filing an Airprox. Yeovilton, Filton, Bristol and Plymouth Mil were contacted to see if they had worked or knew the identity of unknown ac. He reiterated that at the time there was no confliction seen on radar between the A320 and any unknown traffic in the Bristol Channel at the time of transfer to Bristol ATC.

THE BRISTOL RADAR 1 CONTROLLER reports that traffic loading was moderate when the A320 flight called descending to FL70 inbound from EXMOR after being transferred from Cardiff in the vicinity of Burnham-on-Sea (BOS). The crew reported flying close to a light ac prior to calling and, after asking if they wished to file an Airprox, they replied that they would telephone ATC after landing. The flight was vectored to RW27. The A320 had flown through an area in the vicinity of 2 Yeovil squawks operating as per LoA and their squawks may have hidden any primary returns. Subsequently he saw a faint radar return off the coast SW of BOS tracking S but was unable to track this return as he was busy.

ATSI reports that the A320 flight was descending to FL90 and on its own navigation, routing EXMOR-BRI as per the standing agreements between Cardiff and Bristol. The ac turned at EXMOR and was given further descent. After checking there were no conflictions outside CAS, the A320 flight was transferred to Bristol Radar at 1015:30. Approximately 2min after the transfer, Bristol Radar called Cardiff to advise that the A320 crew had reported being close to traffic, approximately 300ft above them. There was nothing seen on radar at the time of transfer. Shortly after this the A320 flight recalled Cardiff on the ac's Box 2, advising that they had been in proximity with traffic. The Cardiff Radar 1 controller's workload was assessed as medium.

There is a possibility that radar performance was contributory to this incident and that aspect was passed to the Cardiff Engineering Manager for further investigation. The performance of the Cardiff radar was checked on the day and appeared to be normal. Controllers were also asked to report any perceived fading problems to Engineering; to date there have been no reported fade problems. The lack of any recording facility for the Cardiff Radar makes any specific finding on whether the unknown ac was displayed to the Controller impossible to confirm. A review by the Cardiff Engineering team the next morning found no coverage problems and there have been no further reports of radar coverage issues from staff.

Investigations have shown that the unknown ac was showing on Burrington primary radar but not on the Clee Hill primary radar. (Clee Hill radar feed was selected on the Cardiff controller's planning display located on the adjacent position but would have been showing SSR returns only.)

The Bristol Radar Controller reports that the A320 flight contacted him (at 1515:30) and advised *"and er A320 c/s we've just had light traffic go er down the left hand side"*. He subsequently looked at the radar and observed a faint return on the coast SW of BOS tracking S but had not observed any contacts prior to that.

At 1018:30 the A320 flight also advised Cardiff, on RT, of the event and was invited to discuss the incident when on the ground.

Analysis of the Burrington radar, the only recorded radar on which the Eurostar can be seen, shows a primary radar only contact at time 1007:28 10·9nm NW of Bristol. This return tracks S down the Bristol Channel passing W of Bristol at 1011:56. A S'ly track is maintained until at 1014:56 the contact is 12·7nm WSW of Bristol and in the A320's 1130 position at 4·8nm. For some 3nm there is considerable track jitter. At 1015:30 the A320 is 14·6nm SW of Bristol and being transferred to and establishing contact with Bristol and at 1015:36 the Eurostar appears to be in the A320's 11 o'clock at 1nm. Track jitter continues but at 1015:44 the Eurostar is showing in the A320's 11 o'clock at 0·25nm until at 1015:52 the A320 has passed the Eurostar. The CPA occurred sometime between 1015:44 and 1015:52 as the A320 passes ahead of the Eurostar and is interpolated to have been less than 0·2nm.

As the Eurostar did not have a transponder and both Bristol and Cardiff ATSUs were working with Clee Hill SSR they could not have seen the Eurostar on the 'piped in' radar. For some considerable distance the Eurostar would have been tangential to both the Cardiff and Bristol airfield radars.

This incident is unlikely to occur again as the Airprox took place in an area that is now within the new Cardiff CAS.

AIRPROX REPORT No 098/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Pilot Members wondered why the EV97 pilot did not contact either Cardiff or Bristol ATSUs for a service. He had planned to fly VFR clear of CAS in Class G airspace but with the chosen route passing between the two airports he should have realised that there was a greater chance of meeting an airliner whilst transiting through that area, particularly when cruising at relatively high level. Although the EV97 was not readily visible to either controller on primary radar and did not carry a transponder, an RT call to either ATSU would have made the ac 'known traffic' to ATC thereby assisting a controller with fulfilling the responsibilities to traffic receiving a service. That aside, it was clear that 'see and avoid' pertained at the time of the Airprox and, from the geometry of the encounter, the onus was on the EV97 pilot to give way under the Rules of the Air Regulations. Both crews reported good visibility and although the opportunity to see the airliner earlier was there, the EV97 pilot had visually acquired the A320 late and Members agreed that this late sighting had caused the Airprox. Whilst undoubtedly being surprised at first seeing the A320 in his 2 o'clock just 300m away, the EV97 pilot quickly judged that they were not going to collide before the airliner passed 200m in front and an estimated 200ft below. Members commended the A320 crew's actions as they had fortunately seen the EV97 about 2nm away during their lookout scan and, judging that it would pass clear, they had watched it do so, 200m to their L and 500ft above. These visual sightings when combined with the actual flight paths flown shown on radar were enough to persuade the Board that safety had been ensured during the encounter.

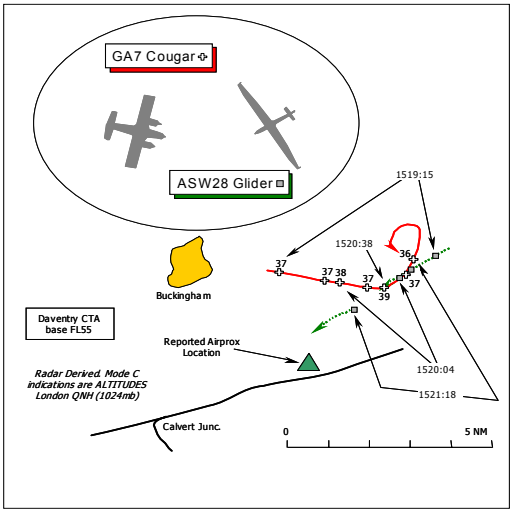
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the EV97 pilot in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT NO 099/06

Date/Time:	11 Jul 1520	
Position:	5159N 00051W (4nm E of Buckingham)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	ASW28 Glider	GA7 Cougar
Operator:	Civ Pte	Civ Trg
Alt/FL:	3800ft	NR
	(QFE NR)	(NR)
Weather	VMC CLEAR	VMC NR
Visibility:	40km	NR
Reported Separation:		
	50ft V/nil H	NR
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASW 28 GLIDER PILOT reports that she had departed from Dunstable Down in her white/red glider and was flying towards Bicester Airfield from Milton Keynes. Her last climb had enabled her to ascend to a height of 4700ft Dunstable QFE (unspecified) – Dunstable Down Glide Site elevation 500ft amsl - and she was now descending slowly through about 3800ft QFE – about 4300ft amsl. A white low-wing twin with red markings was first seen 10nm away to starboard flying at the same level and closing rapidly. She waggled her glider's wings in an attempt to make her glider more conspicuous as she was at the same level, but without any response from the other aircraft. Then she put a wing down so that her glider presented a 'plan-form' and could be seen, but still with no reaction. Approaching a position about 4nm SE of Buckingham (51°57'N 000°54'W) heading 256° at 95kt, she realised that the other pilot had not seen her glider so she opened the airbrakes and executed an avoiding action dive, bottoming out at an altitude of about 1200ft. It seemed to her that the pilot of the other ac noticed her glider only as she passed directly beneath his ac, as only then did the other ac climb suddenly, but it never changed course. Minimum vertical separation was 50ft and the risk assessed as *"high"*. After climbing back to an altitude of 3000ft, she set course for Calvert junction and then returned to Dunstable Down. She added that she had been visual with the other ac for a good 2min in a visibility of 40km+ with no cloud, albeit that she was flying into the sun.

THE GULFSTREAM GA7 COUGAR PILOT reports some 2 months after the Airprox occurred that he was flying a VFR instructional sortie from Cranfield in VMC. Whilst advised that he was involved in a close encounter with a glider on 11 Jul 2006 near Milton Keynes, he is afraid that he has experienced at least one or two close encounters around this time. He has taken avoiding action countless times but he cannot say with any degree of certainty whether this encounter on the 11th was with the ac he was flying and he was unable to ascertain whether the other ac was seen.

The ac is predominately white with red markings and red/blue stripes. He was unable to give an account of his route, or whether he was in receipt of an ATS, but he added that a squawk of A7000 was selected with Mode C on.

UKAB Note (1): The radar recordings of the Heathrow and other radar sources reviewed are inconclusive and do not illustrate this Airprox clearly as only the GA7 Cougar is shown continuously throughout the period. Moreover, the recording suggests some potential anomalies regarding the position/time of the Airprox. The GA7 Cougar – squawking A7000 with Mode C – is shown approaching a position 4nm E of Buckingham at 1519:15, tracking ESE and indicating 3700ft Mode C London QNH (1024mb). A primary radar return is also shown tracking SW, which might or might not be the ASW28 glider flown by the reporting pilot. The two contacts converge maintaining steady courses, but the primary contact, which might be the ASW28, is lost at 1520:04. The GA7 Cougar turns L NE'ly and simultaneously climbs to 3900ft QNH at 1520:38, before descending once more to 3700ft QNH. A primary contact which might be the ASW28 glider is shown again at 1521:18, but some 2nm NE of the position given by the glider pilot in her report for the location of the Airprox, as the GA7 turns about in a L orbit. Thus the radar

recording suggests that if the primary contact shown was indeed the subject glider, the Airprox occurred some 3-4nm NE of the reported location and some 10min later than originally reported.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed that the GA7 pilot had included within his report comment about the routeing of gliders that appeared to have caused him some difficulty when conducting IFR training flights at Cranfield. However, as this GA7 flight was a VFR instructional sortie and this Airprox occurred some distance from Cranfield, where each pilot was flying legitimately where they were quite reasonably entitled to do so, it was readily apparent to the Members that this Airprox was strictly an issue of lookout in the 'see and avoid' environment of the 'Open FIR'.

It was unfortunate that the GA7 pilot was not able to provide a more detailed account of his flight for it seemed most improbable that the GA7 instructor would have allowed his ac to pass a mere 50ft directly above the glider if he had seen it in time to afford it a wider berth. The Board was briefed that the radar recording did not reveal any other ac flying in this vicinity over the period in question except the GA7, so Members were reasonably sure - given the glider pilot's report of the colour-scheme - that the subject GA7 was the other ac involved. However, the anomalies over the ASW28 pilot's reported time and position of the Airprox coupled with the paucity of recorded radar data on the glider did not allow a complete picture of the event to be reconstructed with absolute certainty. The radar recording did evince a 200ft climb by the GA7 in the vicinity of the perceived track of the ASW28, at 1520:38, which is probably when the Airprox occurred, this being in accord with the glider pilot's account that the other ac climbed at the last moment. But then the radar shows that the GA7 executed a LHD orbit, which was contrary to the ASW28 pilot's assertion that it maintained its course. Nevertheless, the tasks of opening the glider's airbrakes and executing an avoiding action dive might well have focused the glider pilot's attention at that critical moment. Clearly the GA7 pilot was required to 'give way' to the glider in the normal course of events, a controller Member observed, but given the GA7 pilot's incomplete account the Board could only conclude that this was an apparent non-sighting on his part, which was but one element of the cause.

If the glider pilot's recollection was correct and she had seen the GA7 Cougar approaching from 10nm away for some 2mins before the Airprox occurred, the gliding Member was surprised that the ASW28 pilot had allowed the other ac to fly into such close quarters before herself initiating any avoiding action. The Member explained to the Board the unusually high performance capabilities of this type of glider which potentially, in the right circumstances, would have the speed to run away from an ac such as a GA7. Moreover, the agility of the glider in a climb was significant, insofar as any control input 'pull' could have resulted in a rapid climb through 500ft, thereby giving the approaching powered ac a wider berth. The gliding Member was keen to point out the importance of taking early action if there is any doubt that the other pilot has not seen your glider and is not going to afford what you consider to be a sufficient margin. There was no apparent difficulty of being squeezed by the CAS immediately above [with a base level FL55] as, given the London QNH of 1024mb, even a 500ft climb to avoid the GA7 would have enabled the glider pilot to remain well clear below the base level of Class A CAS at some 5830ft amsl. A controller Member agreed with the gliding Member and opined that it seemed that the ASW28 pilot had waited so long to the point of being forced into taking violent avoiding action at the last moment. The Board agreed that this was the other part of the cause and concluded that this Airprox had resulted from an apparent non-sighting by the GA7 Cougar pilot and, despite the ASW28 pilot seeing the Cougar in plenty of time, she took late avoiding action.

Turning to the risk inherent here, the ASW28 pilot's use of the air brake to effect an avoiding action dive reinforced the Members' view that urgent action was needed at this late stage as the GA7 flew into close quarters. The gliding Member reaffirmed that a descent to an altitude of 1200ft from about 4300ft by use of the glider's air brakes was certainly a violent manoeuvre and almost placed the glider, in his view, in a landing situation. During this close encounter only the glider pilot was able to gauge the separation and she reported that the minimum vertical separation was 50ft. This coupled with the fierce avoiding action necessary to achieve even this separation convinced the Board that in the circumstances reported here the safety of the ac involved had indeed been compromised.

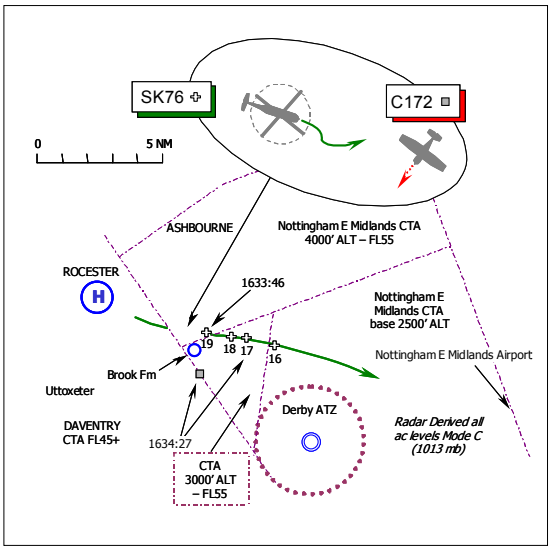
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An apparent non-sighting by the GA7 Cougar pilot and despite the ASW28 pilot seeing the Cougar in plenty of time she took late avoiding action.

Degree of Risk: B.

AIRPROX REPORT NO 100/06

Date/Time:	7 Jul 1633	
Position:	5257N 00145W (14nm WNW East Midlands Airport)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	SK-76 Helicopter	Cessna 172
Operator:	Civ Exec	Civ Pte
Alt/FL:	1600ft↑	NR
	QNH (1016mb)	(N/K)
Weather	VMC NIL	VMC NR
Visibility:	10+km	40km
Reported Separation:		
	50ft V/75m H	Not seen
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SK76 HELICOPTER PILOT provided a very comprehensive account reporting that his ac has a white & yellow/red striped colour-scheme and the HISLs were on. He was outbound VFR from a company HLS at Rocester, some 5nm N of Uttoxeter, to Nottingham East Midlands Airport (EMA) at 130kt and had just contacted E Midlands ATC on 134·175MHz although they were not yet identified on radar. A squawk of A7000 was selected, he thought, with Mode C; Mode S and TCAS 1 are fitted.

Whilst in a gentle climb passing about 1600ft QNH (1016mb), heading 100°(M) some 14nm WNW of EMA, his co-pilot - sitting in the LHS and who was in the process of obtaining their ATC clearance to join E Midlands - suddenly called: "break right, break right". As he responded and began to roll the helicopter to the R he caught a glimpse of another ac "close in" – and flying toward them in their L 10 o'clock about 100m away, slightly above them, but descending and crossing from L to R. The other ac – a high-wing C172 - was in a wings level descent, crossing at 90° to their track and converging rapidly. To avoid the other ac he instinctively lowered his helicopter's nose and reduced power to increase the vertical separation and then rolled level, which was a better course of action because turning further R would have kept the ac on a collision course and put the C172 out of sight astern. Having got the C172 fully in view, he reduced power further, lowered the nose again and turned slightly L to pass beneath and behind it. He was able to read the registration of the other ac very clearly, as it crossed L to R with a *"high"* risk of a collision about 50ft above and some 75m close ahead as it maintained wings level.

After any risk of a collision had passed, looking to his R he watched the C172 continue on its original flight path, in a straight descent, until it levelled some way below them, approximately 1½ - 2nm away in their 4 o'clock when it began a L turn. He does not believe the other pilot saw his helicopter, as no avoiding action was apparent. The Airprox was reported to E Midlands ATC on RT and he added that his helicopter's TCAS 1 did not detect the other ac.

THE CESSNA 172 PILOT reports that he had departed Derby aerodrome for an engineering shakedown flight following some extensive maintenance on the ac, albeit that no "extensive manoeuvres" were to be executed because of a new engine. The flight was conducted between 1500 – 3000ft Derby QFE, at 90-100kt, within an area bounded by Derby, Uttoxeter and Ashbourne and he was operating VFR in "superb" visibility whilst in communication with Derby RADIO A/G Station on 118·35MHz throughout the flight. A squawk of A7000 was selected with Mode C, he thought.

Whilst he reports he is "aware of his lookout obligations", the helicopter flown by the reporting pilot was not seen nor heard over the radio, albeit that the Derby Cct was busy with 3 ac. Accordingly he comments that his report is less than full. For his own part he is familiar with the local area and established CAS; was operating within Class G airspace the whole time and his flight was conducted within their training area, which has been in continuous

use for over 12 years. The C172 pilot stressed that a track from Rocester to E Midlands Airport is very close to Derby and it appeared that the SK76 crew had requested an ATS from EMA ATC whilst still well to the NW of Derby. In his experience, helicopters frequently fly direct from Rocester to EMA but seldom call Derby RADIO for details of local traffic and there was no radio contact on this occasion by the SK76 crew. His ac has an overall white colour-scheme with blue trim; the wingtip HISLs, flashing fin tip beacon and landing lamp were all illuminated.

He requested that the following points be made to the Board in conjunction with his report:

Apparently the SK76 was climbing and the crew belatedly saw his C172 passing L - R before breaking R in the vicinity of Brook Farm at approximately 1600ft. He was at all times keeping a good lookout forwards and sideways particularly in view of the other Derby traffic. Such lookout would have involved deliberate manoeuvring to ensure there were no conflicts, which was hardly necessary for a gentle descent at about 90-100 knots that was certainly not an “extreme” manoeuvre at either high or low speed.

He was in a routine, “standard position” preparatory to joining the cct pattern with which he is fully familiar. There was no distraction from any source. But it seems that the SK76 helicopter crew could have had his ac in view for some time since its 2 pilots had unobstructed vision forwards and upwards. Perhaps the pilots were “heads down” making the frequency adjustment, but their TCAS did not see him either.

This incident was in the open FIR but close to a busy cct and its preferred joining pattern. The procedures maximise the use of airspace to the W because of CAS above and to the E. He lamented the fact that in his experience transiting pilots do not talk to Derby RADIO on a routine basis.

THE EAST MIDLAND AIRPORT APPROACH SURVEILLANCE CONTROLLER (APS) reports that when the SK76 crew called on frequency they passed details of the flight inbound from Rocester, some 20nm NW of E Midlands Airport, and requested joining instructions. The SK76 crew was issued a squawk of A4551 and given the runway in use and QNH. No service was requested by the pilot nor did he ask him what service was required as at this point the identity of the ac was not known. After correcting an incomplete read-back from the SK76 pilot, he turned his attention to inbound scheduled IFR traffic. A few seconds later the SK76 pilot requested that he fix the helicopter’s position as he reported that he had just had an Airprox. To this point the A4551 squawk was still not showing, appearing as he started the transmission. He confirmed the SK76’s position, the time of the incident and reported that he believed the ac to be a Cessna type and gave the registration. Derby airfield was subsequently contacted. The pilot of the SK76 subsequently reported that the Cessna missed him by less than 75m.

ATSI reports that analysis of the E Midlands APS RT, Clee Hill and Claxby Radar recordings indicates that this Airprox occurred at a time when the SK76 crew was establishing communications with the E Midlands APS [the first call was at about 1632]. Furthermore, it occurred before or during the time that an E Midlands assigned squawk was being selected by the helicopter’s crew.

Whilst there is intermittent primary contact evident from the helicopter for a very short period prior to the Airprox, at the time the SK76 squawk is shown on the radar recordings, there is no radar indication of any other ac.

Consequently, as the helicopter crew was in the process of establishing RT communications with the E Midlands APS, the ac was not identified nor the flight placed under any ATS at the time of the event. There are no ATC causal factors apparent.

UKAB Note (1): A primary radar contact subsequently identified as the SK76 is shown on recorded radar just before the reported time of the Airprox – 1633:00 – for a short while before fading. Contact is then re-established at 1633:46 as the assigned squawk of A4551 is selected with Mode C indicating 1900ft (1013mb) – in the order of 2000ft (1016mb). The SK76 maintains a steady track towards E Midlands and no significant deviation is apparent as the Mode C indicates a very gradual descent. A solitary primary contact is shown at 1634:27, which may or may not be the reported C172 but there is no other data to support such an assertion. No A7000 squawk which could be associated with the C172 is shown at all. Consequently, this Airprox is not shown on recorded radar.

AIRPROX REPORT No 100/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident to the Board that the E Midlands APS had little opportunity to intervene and forestall this close quarters situation in the 'see and avoid' environment of Class G airspace. The SK76 crew was only just establishing RT contact and the flight was neither identified on radar nor under a radar service at the time; moreover, the crew had not asked for one at that point. Whilst it was not clear here if the SK76 crew were wanting a radar service at this early stage, crews must be careful to include in RT calls the type of ATS they required outside CAS so that both the crew and controller are in no doubt what is subsequently expected of ATC. An experienced helicopter pilot Member emphasised the importance of obtaining radar assistance as early as possible to supplement a pilot's own lookout. The Member also broadly concurred with the C172 pilot's comment about transit traffic calling A/G Stations so that other pilots in the vicinity might glean information about the transiting ac from that pilot's transmissions as they flew by. However, pilots should bear in mind the extremely limited nature of any information that might be obtained from an Air/Ground RADIO Operator when compared to that from a TOWER controller or an APPROACH Control facility.

For his part, the SK76 co-pilot in the LHS was busily engaged in establishing communications with EMA and obtaining his CAS joining clearance and from the SK76 pilot's account it was clear that the co-pilot had not seen the C172 approaching from the port side until a very late stage. This point gave rise to a discussion about the visibility out from the flightdeck of the SK76 and helicopters in general. The C172 pilot had perceived that the SK76 pilots' visibility was good forwards and upwards but a helicopter pilot Member who flies the SK76 said that whilst it was fairly good forward and around it is not good 'upwards' or down. Another helicopter Member reinforced this point and said that although helicopters have large 'glass' areas surrounding the flightdeck, cockpit coamings etc can impede vision significantly. Whilst it was clear that the co-pilot had spotted the C172 in time to warn the PF who was then able to acquire the C172 and take robust avoiding action it was a very late spot nonetheless and, in the Board's view, part of the cause.

From the other cockpit the C172 pilot reports he was completely unaware of the presence of the SK76. Whilst the radar recording had not provided any data on the exact geometry of the encounter, from the SK76 pilot's report it was clear that the C172 was approaching the helicopter from the port side. As such it was the responsibility of the C172 pilot - who had the helicopter on his right - to give way to the other ac appropriately if converging at approximately the same altitude in accordance with the 'Rules of the Air'. However, the 'Rules' can only work if the other ac is seen in time to take appropriate action. Notwithstanding that the C172 pilot reports he was keeping a good lookout at all times the presence of the light-coloured helicopter had defeated his scan in the moments leading up to the Airprox and the C172 pilot reports he did not see the helicopter at all. The Board agreed, therefore, that a non-sighting by the C172 pilot was the other part of the cause.

In assessing the inherent Risk, a helicopter pilot Member commented that 'see and avoid' worked here but only just. The complete absence of SSR data from the C172 – the transponder's Mode C was selected 'on' but apparently not working here - prevented the helicopter's TCAS from detecting the light ac beforehand and denied the SK76 pilots any early warning of the presence of the C172. The lack of Mode C altitude reporting would also have denied ATC any altitude data about the light ac. Moreover, it also prevented any determination of the minimum vertical separation that pertained here, which was apparently no more than 50ft according to the SK76 pilot's own account. Nevertheless, the SK76 co-pilot had spotted the C172 in time to warn the PF who was able to effect his own robust avoiding action. Fortunately, this was entirely effective in preventing an actual collision. However, with the C172 a mere 50ft above their helicopter and descending as the SK76 PF descended and turned whilst the C172 crossed only 75m away with its pilot oblivious to their presence at the time, safety was not assured by any means. The Board concluded unanimously, therefore, that the safety of the ac involved had been compromised.

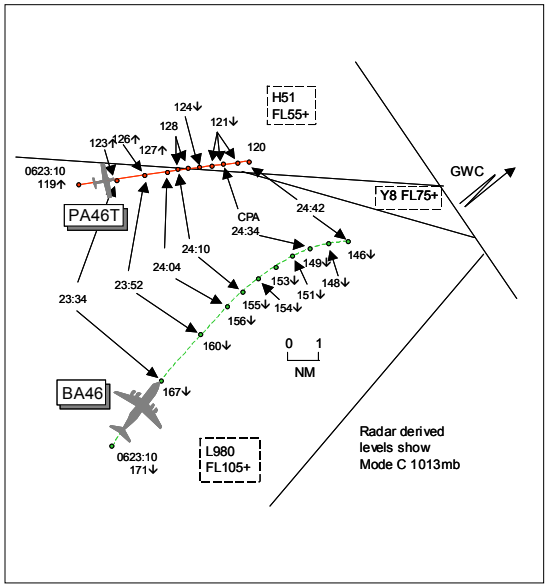
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the C172 pilot and a very late sighting by the SK76 crew.

Degree of Risk: B.

AIRPROX REPORT NO 101/06

Date/Time:	12 Jul 0625	
Position:	5048N 00101W (10nm WSW GWC)	
Airspace:	L980/Y8	(Class: A)
Reporter:	LACC S19/20/21T +LTCC WILLO SC	
	First Ac	*Second Ac*
Type:	BA46	PA46T
Operator:	CAT	Civ Pte
Alt/FL:	↓FL140	FL127↑
Weather Visibility:	VMC CLOC	VMC NR
Reported Separation:	Not seen	Not seen
Recorded Separation:	2800ft V/3·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LACC S19/20/21T reports descending two BA46s (the subject BA46 is 8nm ahead of the second BA46) to FL130 to be level by GWC when she noticed a PA46T at FL126. She immediately stopped both BA46s at FL140 and turned the subject BA46 R onto heading 100°. Her Planner telephoned LTCC SW to find out what they were doing with the PA46T and inform them of her actions. TC informed them that the PA46T flight was a 'level bust' and that they were happy to take her traffic at FL140. The PA46T was seen to descend to FL120 and she transferred both BA46 flights to LTCC.

THE LTCC WILLO SC reports that the PA46T flight was cleared to climb to FL120 whilst traffic inbound from S19, the subject BA46, was expected descending to FL130. His Coordinator alerted him to the Mode C on the PA46T which was showing FL127 and that it was in conflict with the subject BA46. He initiated avoiding action by giving a descent instruction to the PA46T flight, whose pilot reacted quickly and returned to FL120.

THE BA46 PILOT reports inbound to Gatwick from the Channel Islands and in receipt of a RCS from London squawking 1201 with Mode C. The crew were unaware of any Airprox until informed by their company's Flight Safety Dept. From the information provided, at the time of the incident the flight was descending to FL130 but they were given a very late level change (within 1000ft) to FL140. Nothing else untoward occurred and no TCAS alerts/ warnings were received and no conflicting traffic was seen.

THE PA46T PILOT reports heading 120° at 150kt outbound from Bournemouth IFR and in receipt of a RCS from London squawking 2207 with Mode C; TCAS was fitted. He was cleared to climb to FL120 but an intermittent fault with his NAV/EFIS system caused the A/P to disengage during the climb from FL100 to FL120. The NAV/EFIS was brought back on line after approximately 5sec but he erroneously reset the A/P altitude pre-select to FL130. He did not detect his error until the controller told him as he climbed through FL127 and instructed him to descend. He admitted that it was his fault entirely and had allowed himself to be distracted by the A/P disengagement and subsequent incorrect reset. The intermittent fault with the NAV/EFIS had occurred on previous flights and had been reported to maintenance but being intermittent, ground checks did not reveal any fault. It was under ongoing investigation with a view to replacing the pilot's NAV/EFIS display. After landing he had telephoned the ATC Supervisor as he was concerned that his ac may have caused danger to another flight and to pass on his thanks to the controller whose rapid recognition of his 'level bust' at a time when many flights were on frequency. He did not see any conflicting traffic and no TCAS alerts or warnings were received during the encounter.

ATSI reports that the PA46T pilot contacted the TC WILLO controller, at 0618:30, and reported maintaining FL70 tracking towards Goodwood. The controller acknowledged this and instructed the pilot to climb to FL90. At this time the subject BA46 was 32nm due S of the PA46T, cruising at FL190 and tracking NE towards Goodwood. At

0620:10, the WILLO controller instructed the PA46T to climb to FL120 and to turn R heading 120° which the pilot correctly read back. The LACC S19 Tactical (S19T) instructed the BA46 to descend to FL170 and shortly afterwards (0623:10) to FL150 as it continued tracking towards GWC (Goodwood). The PA46T, which in the mean time had been instructed to turn L heading 080° (0622:10), was now in the 10 o'clock position of the BA46 at a range of 8·4nm with the BA46 passing FL171 for FL150 and the PA46T passing FL119 for FL120. At 0623:34 the radar recording shows the Mode C of the PA46T indicating FL123 whilst the BA46, which was 6·6nm away, was passing FL167. At 0623:50, the S19T instructed the BA46 to descend to the agreed level, FL130, to be level by Goodwood. As the BA46 crew was acknowledging this instruction (0624:04), the WILLO controller saw that the PA46T flight had bust its level and the Mode C was indicating FL127. The WILLO controller transmitted at 0624:10: *"(PA46T c/s) your cleared level is one two zero avoiding action descend immediately descend immediately flight level one two zero"*. The pilot replied: "*Descending (PA46T c/s) sorry about that*" and the controller responded with "*Avoiding action descend descend descend* ". Whilst this was taking place the S19T could see the developing confliction and so she instructed the BA46 crew to stop their descent at FL140 and turn R heading 100°. At 0624:10, the PA46T was in the 10 o'clock position of the BA46 at a range of 4·4nm with the PA46T indicating FL128 and the BA46 FL155. The PA46T quickly descended to FL120, levelling just under 40sec after the avoiding action had been passed. No ATC errors detected.

UKAB Note (1): The CPA occurs at 0624:34, the PA46T descending through FL121 as the BA46 passes 3·8nm to its SE turning R and descending through FL149. Thereafter the lateral separation slowly increases, the PA46T shows FL120 at 0624:46 as the BA46 descends through FL146 in its 0130 position range 4·1nm on an almost parallel heading.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members wondered why the LACC and LTCC controllers had filed this incident as an Airprox. The PA46T pilot had openly reported erroneously setting FL130 on the A/P and climbing above his cleared level, which had started the chain of events. Although the subject ac were converging on conflicting tracks, both controllers had spotted the 'level bust' whilst there was plenty of vertical separation and taken action to resolve the deteriorating situation. As it was, the LTCC controller saw the level deviation and immediately gave the PA46T pilot an avoiding action descent which was executed very quickly. The LACC S19/20/21T also saw the PA46T climbing above FL120 and gave the BA46 flight a stop-off at FL140, whilst it was passing FL155 and overhauling the PA46T, as well as a R turn to ensure that the ac tracks did not cross. It may have been that as the ac closed their labels began to overlap so that Mode C readouts were garbled and whilst horizontal separation reduced below 5nm, the vertical separation was not apparent to either controller. The radar recording shows the separation as 2800ft and 3·8nm at the CPA. At the end of the day, following the PA46T pilot's initial climb above FL120, which had caused them concern, the timely actions taken by the LACC and LTCC controllers had adverted a potentially more serious encounter and had quickly and effectively removed any risk of collision.

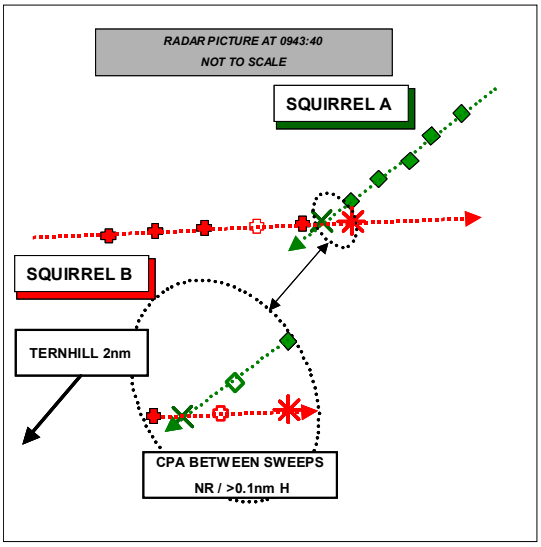
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA46T pilot climbed above his cleared level causing the LACC and LTCC controllers concern.

Degree of Risk: C.

AIRPROX REPORT NO 102/06

Date/Time:	11 Jul 0944	
Position:	5254N 00230W (2nm NE of Ternhill - elev 272ft)	
Airspace:	Ternhill MATZ	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Squirrel	Squirrel
Operator:	HQ PTC	HQ PTC
Alt/FL:	1250ft (QFE 1014mb)	1500ft (QFE 1014mb)
Weather	VMC NR	VMC NR
Visibility:	25km	999km
Reported Separation:	250ft V/100m H	50ft V/100m H
Recorded Separation:	NR V/<0.1nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

SQUIRREL A PILOT reports flying a training flight with 2 students squawking with Mode C and in receipt of a FIS from Ternhill Tower. On completion of 2 advanced engine-off landing sorties, he took off from Ternhill with one student in the front left hand seat and one in the back. He departed on RW heading of 280° before turning downwind at 400ft, rolling out downwind at 700ft, heading 100° at 90kt. As he climbed to 1000ft he noted an ac approximately 2km away in his 1030 position. He assessed that this ac would pass astern of him as he continued on a downwind leg. At the end of the downwind leg he informed Ternhill Tower that he was departing *'Area Right of Eastern'* and changed to the Shawbury Low Level frequency. He initiated a climb and whilst briefing the student he looked to where he thought the other ac would be, initially saw nothing but as he moved his head the other ac appeared behind the left hand door jamb in his 11 o'clock about 300ft above. He checked on the [collective] to reduce the rate of climb and ensure that the other ac passed overhead and slightly astern. He continued into Eastern area climbing to 3000ft to demonstrate an extended range autorotation. Due to his action he assessed the risk as being low and reported the event on landing.

SQUIRREL B PILOT reports that they were conducting IF training to the East of Shawbury and squawking with Mode C while under Radar Control [see Mil ATC Ops report]. They were in the final stages of radar homing to start a PAR to RW23 at Shawbury. They had just levelled at 1500ft on the Shawbury QFE, heading 235°, and had been told to change frequency to Talkdown when the other Squirrel appeared in their 2 o'clock at about 100m and 50ft below them and passing into their 7 o'clock position. It is the closest he has ever been to another ac travelling in the opposite direction and he assessed the risk of collision as high. They were approximately 1nm from the Relief Landing Ground at Ternhill and he assumed that this ac was circuit traffic from Ternhill. He immediately informed Shawbury Approach of the proximity of the ac to which they replied that the ac had been circuit traffic at Ternhill. The IF approach was completed and an Airprox declared.

MIL ATC OPS reports that the Shawbury Director (DIR) was providing a RIS to a Squirrel (Squirrel B), recovering for a PAR to RW 23 at Shawbury. The Ternhill Tower Controller (ADC) was controlling a Squirrel (Squirrel A). Squirrel B called DIR at 0936:48, *"Shawbury Approach, Squirrel B C/S, in box Charlie, request recovery back to Shawbury for a PAR."* Over the next 5min, DIR vectored the ac for RW23 finals, descended the ac to 1600ft Shawbury QFE, established the crew's decision height and instructed the crew to complete cockpit checks. Squirrel A called for taxi at 0941:02 and was instructed by ADC, *"Squirrel A C/S, Ternhill, taxi, surface wind two nine zero at six knots, three in area right"*, and the pilot acknowledged. When Squirrel B pilot reported checks complete at 0942:35, DIR replied, *"Squirrel B C/S roger, turn left heading two five zero."* and the pilot acknowledged the instruction. DIR passed TI at 0942:47 stating, *"Squirrel B C/S caution pop up 2 tracks, 12 o'clock, about 1 mile, right hand turn, believed to be both in the Ternhill circuit rotaries."* Squirrel B pilot reported

visual 9sec later. Squirrel A pilot reported, *"Squirrel A C/S is departing area right for eastern to stud 4."* at 0942:54 and the ADC acknowledged. At 09.43:18 DIR instructed, *"Squirrel B C/S continue descent down to 1500ft, 8½ miles, contact Shawbury Talkdown stud 12."* The pilot replied, *"1500ft and contact Talkdown, Squirrel B C/S."* Sixteen sec later, at 0943:53, Squirrel B pilot said, *"Squirrel B C/S, just confirm that Ternhill aren't working at 1500ft. We have just been passed about 100 yards to the left, an aircraft about 50ft below us."* DIR requested that the call sign be repeated, which it was, and at 0944:01 replied, *"Squirrel B C/S roger, we have just noticed there has been one just went underneath you which should have been suppressed in the Ternhill circuit, we have the slot."* Squirrel B pilot then stated at 0944:09, *"Squirrel B C/S roger, he missed us by 100 metres and about 50 to 100ft."* and DIR replied, *"Yeah we have just noticed that, we are about making a comment on it, in fact are you happy to go to stud 12 now."* Squirrel B pilot acknowledged and changed frequency while DIR undertook to raise the matter with Ternhill.

Analysis of the Clee Hill Radar shows Squirrel B, Shawbury 053^{o} 10nm, tracking 250^{o}, and indicating 016C. Squirrel A is in Squirrel B's 12 o'clock 3.3nm, in a right hand turn passing 340^{o}, indicating 008C. Squirrel B continues steady and level and at 0942:47 Squirrel A is in Squirrel B's 12 o'clock 2.9nm passing 360^{o}, indicating 009C. Nine sec later, Squirrel B has not changed heading or level but Squirrel A is now in B's 12 o'clock 2.5nm passing 050^{o}, indicating 011C. Squirrel B descends to 015C at 0943:18, whilst Squirrel A now in B's right 1 o'clock 1.2nm tracking 090^{o}, indicating 012C. Squirrel A maintains track and climbs to 013C at 0943:34, it is now in B's 12 o'clock 0.3nm, Squirrel B indicates 015C. Squirrel A passes through Squirrel B's 12 o'clock and at 0943:40 is in B's left 7 o'clock 0.2nm, there is no Mode C on A and B indicates 014C. The ac indicate co-altitude at 015C at 0943:48 with Squirrel A in Squirrel B's left 7 o'clock 0.7nm. Thereafter the aircraft continue to diverge.

The DIR fulfilled his responsibilities for the passing of TI to Squirrel B under a RIS. Historically, traffic within the visual circuit should have remained at or below 1000ft QFE until clear of the Ternhill ATZ (this used to be a requirement in the Shawbury Flying Order Book (FOB)); this would have ensured vertical separation between the conflicting ac. However, as part of a recent FOB rewrite, this order was erroneously removed. Since this incident, local action is underway to close this loophole. Squirrel A had departed the visual circuit and was therefore no longer bound to remain below 1000ft QFE. This action eroded the vertical separation that DIR believed to exist and placed Squirrel B in confliction with Squirrel A.

UKAB Note (1): The recording of the Clee Hill Radar shows the incident, but at CPA the Mode C of Squirrel B has dropped out.

HQ PTC comments that there were many strands to this incident, which were thoroughly aired during a formal F765B Flight Safety Investigation carried out by RAF Shawbury following the Airprox. This investigation reported that although both ac were operating under the see-and-avoid principle, a number of factors caused separation to be eroded. Ternhill is 6.5nm on the extended centre-line of RW23 at Shawbury, which is very close to the feed-in point for PARs (6nm finals) and the position where handover from Approach to Talkdown frequencies takes place. It was not practicable to move the feed-in point for the PAR and still achieve the required 3° glidepath. Moving it closer to Shawbury would make the glidepath too steep and not allow sufficient time for handover and moving it further away would make the handover to Talkdown occur outside the, albeit limited, protection of the MATZ. There was an assumption that ac in the Ternhill circuit would not climb above 1000ft, but Squirrel A had departed the circuit from the end of the downwind leg (but not the ATZ) and changed frequency. Although the pilot of Squirrel A had seen Squirrel B, he temporarily lost contact and was then distracted by other tasks in his ac and did not regain sight of Squirrel B until the Airprox had or was occurring. After a thorough review, the investigation recommended no changes to RW23 instrument approach procedures but did recommend that all traffic within the Ternhill ATZ be not above 1000ft Shawbury QFE when RW23 instrument approaches are in operation. Also, ac must be in R/T contact with Ternhill Tower when inside the ATZ and remain below 1000ft QFE during join, circuits, departure and any other operation within the ATZ. These recommendations have already been adopted and a full review of the Flying Order Book is underway to ensure that no other possible conflictions exist. This Airprox serves as a timely reminder that even in a familiar but busy local environment, no relaxation of lookout and airmanship is permissible and that it is ultimately the pilots' responsibility to maintain appropriate clearance from other ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted the HQ PTC comments and that a full internal inquiry into this incident had already been conducted, its recommendations implemented. Members also noted that the Ternhill ATZ RT procedures had been aligned with the civilian rules at the Rules of the Air, Rule 39.

There was discussion among specialist controller Members regarding the 'ownership' of the airspace above 1000ft overhead Ternhill and of handover/takeover procedures. The Board was informed that there are several military aerodromes that have helicopter RLGs under the approach to their main instrument RW. Provided that there are robust procedures in place, there is no reason why such an arrangement should not work satisfactorily. The Mil ATC Ops Advisor assured the Board that there is a satisfactory procedure in place for safe separation when the airspace is required by GCA traffic. Even allowing for this, one Member thought that it would have been good practise for Ternhill ATC to remind/inform circuit traffic with an RT call when GCA traffic is passing overhead at 1500ft.

Since Squirrel (A) pilot had seen Squirrel (B), albeit late on the second occasion, and was able to take effective avoiding action, Members considered that he had successfully prevented there being any risk that the ac would have collided. Due to the proximity however, the Board considered that there had been a substantial reduction in the normally accepted safety margins.

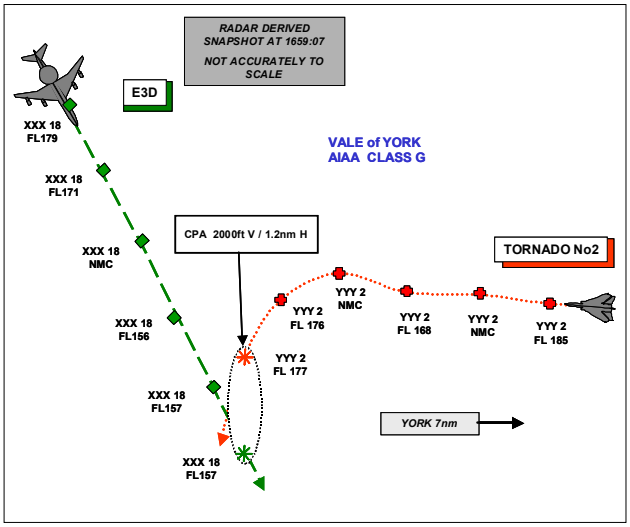
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the Shawbury CMATZ resolved by Squirrel (A) pilot.

Degree of Risk: B.

AIRPROX REPORT NO 103/06

Date/Time:	13 Jul 1659	
Position:	5400N 00054W (7nm E York)	
Airspace:	Vale of York AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sentry AEW Mk1	Tornado GR4
Operator:	HQ STC	HQ STC
Alt/FL:	FL160↓	14000ft (RPS)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	50km	20km
Reported Separation:	0ft V/½nm H	1000ft V/3nm H
Recorded Separation:	2000ft V/1.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SENTRY AEW MK1 (E3D) PILOT reports recovering to RAF Waddington through Class G airspace, heading 155° at 340kt and descending through FL160, in receipt of a RIS from London Mil, squawking as directed with Mode C and TCAS fitted. ATC provided TI on a manoeuvring ac in their 11 o'clock and he identified the contact on TCAS at 10nm. An update was provided by ATC at the same time as TA was given on TCAS. The traffic was in a rapid descent and was called visual [at about 4nm] by the left hand seat pilot. As the traffic approached their level, TCAS gave an RA to descend with a high ROD of 4000ft/min. The RHS pilot obeyed the RA and increased the ROD while being reassured by the LHS pilot who maintained visual throughout and deemed there was no immediate confliction. As the traffic descended through their level, also with a high ROD, the TCAS changed its command to a climb of 4000ft/min. As this manoeuvre would have severely overstressed the ac and as the other ac was visual their descent was slowed. The traffic passed behind and below their ac by about 2-3nm. At no time during the RA was their visual contact broken but there was no indication that the other pilot had seen them. He assessed the risk as being medium.

UKAB Note (1): The E3D pilot reported the other ac as being a black Tucano. There were no Tucanos in the area at the time and tracing action revealed the other ac to be one of 2 grey Tornado GR4s. The UKAB attempted, unsuccessfully, on several occasions to contact the E3D pilot to get further information and clarification of the distances as they appeared to be markedly different to those seen on the radar recording. The other ac was, however, positively identified as the Tornado below but due to the uncertainties it was not identified positively until some time after the event.

THE TORNADO GR4 PILOT reports that they were the No2 of a pair of ac conducting Strike Co-ordination and Reconnaissance (SCAR) training in the Yorkshire area. At the time of the incident they were orbiting at medium level in a left hand turn talking their lead ac onto a simulated target on the ground. At about 1645 the pilot spotted an ac just to the right of their nose at about 5nm. Shortly after this they received a call from London Mil advising them of the traffic to which they replied with a *"tally"* call. They continued on through a NW heading in a left hand turn and passed approximately 3nm behind the E3D and slightly above it. They remained visual with the ac throughout and at no time did the pilot consider there to be any risk of collision. Unfortunately the cockpit video for the event was no longer available so the evolution described is as the crew recalled it.

THE TORNADO PILOT'S UNIT comments that although the captain of the Tornado was informed of this Airprox by telephone shortly after landing he was advised not to complete a report until further clarification from the UKAB. This was not forthcoming at the time [See UKAB Note 1] so after two weeks he assumed the Airprox had been withdrawn: consequently, the maps and recordings of the sortie were no longer available for examination.

Having debriefed the crew, the SFSO was satisfied that their sortie was planned, authorised and flown to the required professional standard expected. Their recollection of the event suggests that the Tornado presented no threat to the E3D since the pilot maintained visual contact throughout and there was no risk of collision.

MIL ATC OPS reports that LATCC (Mil) CON11 was controlling an E3D under a RIS while it was descending from high level to FL100, routeing Southbound through the Vale of York. LATCC (Mil) CON14 was controlling 2xGR4s manoeuvring in the Vale of York area but neither tape transcripts nor incident reports were filed by the unit regarding the GR4s.

At 1655:22, CON11 gave the E3D crew the instruction, "*E3D C/S, Radar Information, turn right own navigation for Waddington, report steady*" and they acknowledged. At 1656:50 CON11 passed TI on GR4 No2, "*E3D C/S, traffic SE 15 miles manoeuvring, a pair of fast jets, indicating between flight level 100 and flight level 180, I'll keep you updated as you get closer*" and the E3D crew replied, "*That's copied, we are now steady heading 155.*" The TI was updated at 1657:55, "*E3D C/S, that previously called traffic indicating left 11 o'clock 6 miles crossing, left right, indicating 1000ft above you.*" The TI was updated 7sec later "*500ft above, now left 11 o'clock 4 miles*" and again the E3D crew acknowledged the TI. CON11 passed TI on GR4 No1 at 1658:40, "*E3D C/S, there is a further aircraft left 10 o'clock at 3 miles, but indicating well below at the moment, but he is part of the formation general handling.*" The E3D crew replied "*That's copied and the previously reported traffic turned into our 6 o'clock, but not convinced he saw us, but now clear*" and CON11 answered at 1658:55, "*That's copied, he's in your 6 o'clock at the moment, his number 2 is left 9 o'clock at 2 miles indicating flight level 100 at the moment*" and the E3D crew acknowledged.

Analysis of Claxby Radar showed at 1657:15 the E3D 12nm NE Church Fenton, indicating FL213, tracking 150o and it maintained this track throughout the incident. The GR4 formation was manoeuvring 10nm NE of Church Fenton with No1 indicating NMC and No2 FL200 with No2 in the E3D's 11 o'clock at 23nm. GR4 No2 then takes up a NW track and at 1657:55 was tracking 330o at FL198 and at the same time the E3D was passing FL193 and GR4 No2 was in its 11 o'clock at 13nm. GR4 No2 entered a gentle left turn and was tracking 300o at 1658:17, indicating FL191 and the E3D was indicating FL185, with the GR4 No2 in its 10 o'clock at 8nm. GR4 No2 steadies on a W track until briefly turning R onto 300o at 1658:49 indicating NMC while the E3D indicated FL156 with the GR4 in its 9 o'clock at 2nm. GR4 No2 then turns left again and passed through 270o at 1658:57 indicating FL176 while the E3D indicated FL157 with the GR4 is in its 7 o'clock at 1.3nm. While passing through 200o, indicating FL177, the GR4 was in the E3D's 7 o'clock at 1.2nm as the latter was indicating FL157. Vertical and lateral separation then increased as the tracks start to diverge.

CON11 fulfilled his responsibilities to pass and update TI to the E3D as required under a RIS although the ranges passed in this TI were underestimated and could have given a false impression of the proximity of the GR4 to the E3D crew; however in such circumstances, range errors at close distances are easily made.

The GR4 No2 was receiving a RIS from CON14 and was passed TI and the crew reported that they were visual with E3D.

UKAB Note (2): At the request of the UKAB Secretariat, a full simulation of the E3D TCAS was conducted by NATS which showed that the system performed as expected. However the initial high rate of descent of the E3D and the horizontal and vertical manoeuvring of the Tornado combined were such that 'TA' converted after 25 sec to an RA 'Limit Descent to 2000fpm' and then in rapid succession over a 15sec period to a 'Crossing Climb (2000fpm)', 'RA Climb', 'Maintain Crossing Descent' and 'Clear of conflict' indications/warnings. At the time this happened the E3 was descending at about 6000fpm and continued to do so until the time that the warnings had terminated.

HQ STC comments that both crews would appear to have seen each other but the GR4's manoeuvring, and proximity, caused the TCAS RA.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

To address any concern that might be raised regarding the E3D pilot's TCAS indications as reported by the E3D pilot, a full TCAS analysis had been performed at UKAB's request by NATS. The results are summarised at Note (2) above and the full report was sent to HQ STC who in turn forwarded it to the E3D station. The TCAS analysis also verified the radar-derived CPA distances above.

The Board noted that the ranges passed by CON11 to the E3D in the TI were significantly underestimated and could have given the pilots an incorrect impression of the closeness of the Tornado to their ac. In addition, visually the E3D pilots thought that the GR4 was closer than it actually was, initially thinking it to be a Tucano which is a significantly smaller ac.

The GR4 pilot had also seen and fully accounted for the E3D throughout his manoeuvre and for the most part the E3D pilot(s) had seen the Tornado. Despite the (apparently) correct TCAS warnings, the ac flightpaths had never been in conflict so the Board determined that this incident had been a sighting report and consequently there had been no risk attached.

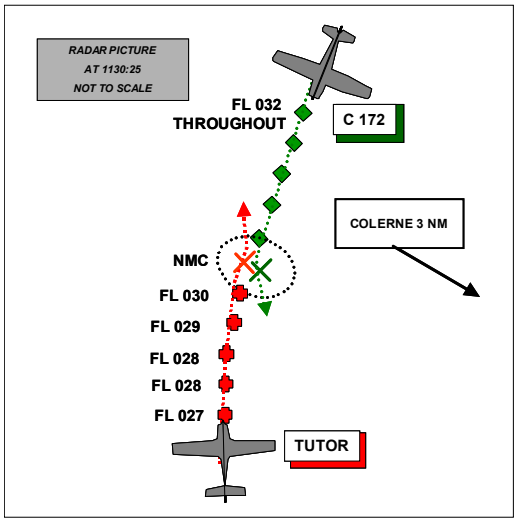
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 104/06

Date/Time:	11 Jul 1133	
Position:	5126N 00222W (3nm West of Colerne)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Cessna 172	Grob Tutor
Operator:	Civ Pte	HQ PTC
Alt/FL:	3200ft (RPS 1020mb)	FL33
Weather	VMC CLBC	VMC NR
Visibility:	>10km	>10km
Reported Separation:	0ft V/300m H	100ft V/100ft H
Recorded Separation:	NR V/0.1nm H (See UKAB Note 3).	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 172 PILOT reports flying a purple and white ac, squawking a Bristol code and in receipt of a FIS from them while heading 210° Magnetic at 94kt en-route from Gloucestershire to Old Sarum via Bath and Warminster. He had previously been in receipt of a LARS from Filton Radar. They had instructed him to transfer to Bristol Radar who gave him a squawk, offered a FIS and informed him that Colerne was active. He had Colerne in view and checked that his track would keep him to the W of the Colerne ATZ and was then advised that traffic had taken off from Colerne; he acknowledged this, but could not see the traffic. He was then advised that the traffic was in his 12 o'clock, at his level, and he then saw an ac about 1nm away and approaching him. In assessing the immediate situation, it appeared that the ac was on a path passing slightly to his right but they were very likely to collide so he banked to his left. Very shortly afterwards the other ac banked sharply to its left and passed on his starboard side.

As they were converging, he thought that he had heard the radar controller talking to the other ac but he did not hear the other pilot reply. He thought that he heard the radar controller instruct the ac to make a heading change.

The radar controller then informed him that the other pilot was filing an Airprox report [UKAB Note (1)] and he remarked that they had made visual contact and had thereby avoided a collision.

Bristol then advised him to route to the Bath VRP and free call Boscombe Down.

UKAB Note (1): The Grob pilot subsequently decided not to report the incident but, when contacted by the UKAB, the Cessna pilot wished the investigation to be continued.

UKAB Note (2): The C172 pilot provided a GPS Log of his position and height.

THE GROB TUTOR PILOT reports flying with another pilot in a white ac with HISLs selected on, on a local flight from Colerne squawking as directed with Mode C and in communication with Colerne APP. While heading 360° at 80kt he saw white light ac in his 1 o'clock position, stationary in his windscreen about 200m away. He took immediate avoiding action away from the other ac just as he saw it also take avoiding action. He assessed the risk as being Medium and reported the event on the radio.

UKAB Note (3): The incident can be seen clearly on the recording of the Clee Hill Radar. Unfortunately, and possibly due to the avoiding action, the Tutor indicates 0000 (unreliable) at the CPA; the indicated position of the ac seems to be correct however and the horizontal separation was measured at 0.1nm (185m). On the approach to and at the CPA, the Cessna indicated a steady FL032. At the same time the Grob was climbing very slowly and indicated FL030 8sec before the CPA. (It had been climbing at about 100ft on every 8 sec sweep of the radar).

AIRPROX REPORT No 104/06

THE GROB TUTOR UNIT comments that in Class G airspace, it is inevitable that events such as this will occur on occasion. All pilots have been reminded of the importance of good look out but it is nevertheless a fact that ac that are stationary in the windscreen will not be seen until late.

MIL ATC OPS did not comment.

ATSI reports that their report was based on the Unit Report. An RTF transcript was not obtained. At the time of the incident an OJTI was monitoring an experienced APP/APR U/T controller and the traffic situation was light to moderate.

At 1128:19 the Clee Hill radar recording shows a track, subsequently identified as the Cessna, wearing a Bristol Filton Squawk, 18.3nm NE the airport at FL033. There is a Colerne squawk visible in the Cessna's 12 o'clock at 5.8nm indicating FL015. At 1129:19 this contact disappears and another contact appears in the Cessna's 11 o'clock at 4.8nm indicating FL009 but its track is not consistent with the ac involved in the incident. At 1129:38 another Colerne squawk appears in the Cessna's 12 o'clock at 2.2nm. This return is consistent with the track observed previously at 1128:19 and is indicating FL026. This contact is climbing and at 1129:46 the Cessna, still wearing a Filton squawk, has the contact in his 12 o'clock at 1.8nm showing FL027 and on a reciprocal track. The contact indicates FL028 at 1129:55 and is in the Cessna's 12 o'clock at 1.5nm. Although there is some track jitter on the recording, at 1130:10 the contact can be seen in the Cessna's 12:30 position at 0.7nm indicating FL029 and at 1130:18 is in the 12 o'clock at 0.4nm indicating FL030. At 1130:25 the contacts virtually merge with the Cessna indicating FL032 and no height read out from the other ac which is indicating 0000 (SSR information unreliable) but the contacts are 0.1nm apart. When the traffic is in the Cessna's 5 o'clock at 0.4nm the Colerne code is visible but still with no height read out. At 1130:58 when the traffic is in the Cessna's 6 o'clock at 1.6nm a height indication of FL031 is seen with the Cessna also indicating FL031. A squawk change can be observed at this time which eventually stabilises as 4626, a Bristol International code, at 1131:05 when the Cessna is 15.2nm NNE of Bristol International.

Colerne was notified as active to Filton. Shortly after reporting on frequency the Grob was seen on radar as a primary-only contact believed to be climbing out of Colerne and TI was passed. The unknown then selected a 4576 squawk with unverified Mode C and further TI was passed together with that on further unknown traffic departing Colerne. As it was apparent that the first ac presented a probable confliction with the Cessna, TI was passed again. At this point it is apparent from the radar recordings that the Cessna had not been positively identified since it was not until 1130:05 that it changed to a Bristol International SSR code.

The Cessna was in receipt of a FIS and no ATC errors were disclosed.

HQ PTC did not comment.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that accurate and timely TI from Bristol helped the C172 pilot to see the Grob which was small, light in colour, head-on and therefore very difficult to see. Although later than optimum, both pilots did see the opposing ac in time to initiate effective avoidance, resulting in about 200m separation. Since both pilots acted very promptly when they saw and avoided the other ac, the Board determined that safety had not been compromised.

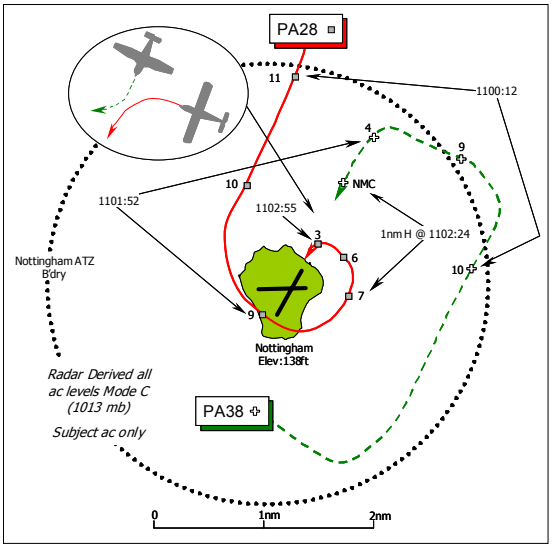
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by both pilots.

Degree of Risk: C.

AIRPROX REPORT NO 105/06

Date/Time:	8 Jul 1112 (Saturday)	
Position:	5256N 00104W (Finals RW21 Nottingham - elev 138ft)	
Airspace:	Nottingham ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA38-112	PA28
Operator:	Civ Trg	Civ Club
Alt/FL:	200ft↓	NR
	QFE (1011mb)	(NR)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:		
	50ft V/nil H	NR
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA38-112 PILOT provided a very comprehensive account reporting that he was instructing a student pilot on a circuit training detail at Nottingham in CAVOK conditions and was in communication with Nottingham RADIO A/G Station on 134·875MHz. Whilst flying on the downwind leg [in the LHD cct] for RW21 there were 2 other PA38 ac in the circuit ahead of him, additionally another that had departed after his ac and yet another – the subject PA28 - approaching the ATZ from the N calling for airfield information to join the cct to land. With one of the preceding ac in the traffic sequence in view he instructed his student to extend the downwind leg to improve the cct spacing until they had visual contact with, or heard RT transmissions from, the 2nd ac on FINAL. His student called "late downwind", and seeing the 2nd ac ahead, they then turned onto BASE-LEG. Their turn onto FINAL approach was normal and not unusually far from the airfield (i.e. it was within the ATZ) and he did not recall hearing any further transmissions from the ac joining the cct from the N. After checking that the normal approach funnel was clear himself and satisfied that the approach was clear they continued inbound at 75kt as usual. Both he and his 'low-hours' student were concentrating on maintaining an accurate FINAL approach to 'the numbers' of RW21 and he was "pattering" to the student and concentrating on "picture/speed" in slightly turbulent conditions. Heading 210°(M) passing 200ft QFE he was about to call FINAL and as he looked across the cockpit to check the ASI he was startled to see a steeply banked PA28 some 20yd to port and descending almost above and slightly to port of his ac. At the same moment the PA28 pilot called "FINAL". To avoid the PA28 he took control of his ac from the student and immediately turned to starboard, clearing the final approach path for the PA28 – which passed 50ft above his ac at the closest point - and he initiated a GO-AROUND. When they were established on the CROSSWIND leg he called Nottingham RADIO and requested to speak, after he had landed, with the PA28 pilot. The A/G Operator called the pilot of the PA28 asking him to report to the Control Tower building when he had parked his ac. The training detail was continued for a further 3 ccts in order not to disturb his student - who had remained calm throughout - before landing and speaking briefly with the pilot of the PA28. The PA28 pilot apologised, admitting that he had not seen him on FINAL but had earlier seen an ac late downwind and heard the radio call to that effect.

THE PILOT-IN-COMMAND OF THE PA28 reports that she was inbound to Nottingham from Sherburn-in-Elmet and was in communication with Nottingham RADIO on 134·875MHz. Another very experienced pilot from her club occupied the RHS. After letting down deadside they joined the LHD cct for RW21, which was acknowledged by the A/G Operator. A single engine low-wing ac was sighted on a course parallel to the DOWNWIND leg but wide, well outside the cct area. The turn onto BASE-LEG and thence onto FINAL was executed by her colleague who took control of the ac and handed it back for the landing. Heading 210° at 80kt just before touchdown, another pilot – flying the subject PA38 - who had not called FINAL called "going around".

When they had stopped in the parking area they were asked to report to the Tower. She went to pay the landing fee and her passenger/co-pilot went to the Tower so she was not in attendance at the subsequent discussion. She

assessed the risk as *"nil"* but did not quantify the minimum separation. As far as she was concerned, there was not an Airprox.

THE PA28 PASSENGER/CO-PILOT helpfully provided an account stating that he went up to the Tower where he was met by 2 individuals, who said, "…you like to do tight circuits". He explained it was a normal cct avoiding built up areas surrounding Nottingham airfield. He was then told, that "we do big circuits here [at Nottingham] because we do flying training". He explained that he knew all about flying training, as he had over 20 years and thousands of hours of instructing and examining. He was then asked to see the pilot instructor in the other ac who was very pleasant. He pointed out he had called "FINAL 21 to land", which they then acknowledged he had. As a current RT examiner, he would like to point out that the correct call that the other ac should have made was "(callsign) FINAL 21, land/touch & go, contact one ahead." Then if the pilot felt the ac landing ahead would not clear the runway prior to his own landing, that's the time to call "going round".

THE NOTTINGHAM AIR/GROUND STATION OPERATOR reports that he had just returned to the Control Tower when the PA28 called requesting joining and landing information: he was passed the active - RW21 LHD cct - and QFE (1011mb) with circuit traffic. The PA28 descended DEADSIDE and crossed over the RW03 'numbers' but did not join the cct traffic; instead he cut inside the downwind traffic and did a tight cct. At the end of his downwind leg he banked L and descended with his wings at an angle of approx 45° aob. In the A/G Operator's opinion, at no time could the PA28 pilot see any traffic on FINAL and he called FINAL while still banking, causing the PA38 who was about 200ft on FINAL to bank sharp R and to GO-AROUND on the DEADSIDE.

The PA38 pilot called to have a word with the pilot of the PA28. After vacating and parking, the PA28 pilot was asked to report to the Control Tower: his reply over the radio was "…what have I done wrong". When the PA28 pilot reported to the Tower he was told the PA38 pilot would like a word with him. He stated that he had 20,000 hrs, was an instructor and an examiner. When told he should have known better and followed the cct traffic, his reply was "well they are doing bomber circuits". At that point he left the Tower.

UKAB Note (1): The UK AIP at AD2-EGBN-1-3 notifies the Nottingham ATZ as a radius of 2nm centred on RW09/27, extending from the surface to 2000ft above the aerodrome elevation of 138ft amsl. The ATZ is active on Saturdays in Summer 0800-1800 UTC during which an A/G Service is provided. The cct height is promulgated as 800ft QFE.

UKAB Note (2): The Claxby Radar recording shows the PA28 approaching Nottingham from the N and identified from the Waddington assigned squawk, which was erroneously retained after the ATS was terminated. The PA28 is shown crossing the Nottingham ATZ boundary at 1100:12, indicating 1100ft verified Mode C (1013mb) – which equates to about 1040ft Nottingham QFE (1011mb). Simultaneously, the PA38 is shown circuiting LHD DOWNWIND within the ATZ – at a parallel track displacement of about 1¾nm - squawking A7000 and indicating 1000ft unverified Mode C (1013mb) – in the order of 940ft QFE (1011mb) before making the BASE-LEG turn just outside the ATZ. The PA38 is shown steady on FINALS at 1101:52, having re-entered the ATZ and descended to 400ft – about 340ft QFE –the last Mode C data evident from the ac just before the PA28 crosses the upwind threshold indicating 900ft (1013mb). Turning in LHD DOWNWIND at a parallel track displacement of slightly less than about ½nm, the PA28 descends through 700ft Mode C at 1102:24, with the PA38 1nm to the N inbound before the ac's contact fades below coverage. The PA28 makes a virtually continuous turn onto FINALS for RW21 and is last shown indicating 300ft Mode C – about 240ft QFE at 1102:55, which is probably just as the Airprox occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, and a report from the A/G Station operator involved.

A very experienced GA pilot Member was concerned at the standards of training especially on the topic of operations in 'uncontrolled' aerodrome ccts as here. In his view, there is a widespread inconsistency in the teaching of visual ccts and instructors at some civilian training aerodromes do operate a somewhat large cct pattern. Moreover, he was concerned at the standards of lookout in the cct, which was clearly a factor here, and also that of RT.

A military fast-jet Member – also a QFI highly experienced at elementary flying training – was of the opinion that a wide cct cannot benefit a student. Ccts should be kept compact and not allowed to become overly large. In his

view it was unwise to extend downwind and, to avoid bunching in the cct, it was preferable to fly upwind if anything to ensure that the DOWNWIND leg did not become overly extended, going around if needs be. Ideally, the same pattern should be flown over the ground all the time and in his view variations of extending downwind or widening outwith the regular pattern as here do not help students. Indeed, this might be more of a hindrance because if differing patterns are flown then a different 'picture' is presented to the student on FINALS which could confuse 'tyro' pilots in the early stages of their training. An Advisor commented that this topic, amongst others, had been covered extensively at a recent CAA Safety evening but it seemed that the basics of cct work were still subject to wide inconsistencies across the different aerodromes where GA training takes place.

It was evident from the radar recording that the PA38 flown by the reporting instructor pilot was flying a fairly wide cct at a track displacement of 1¾nm from the aerodrome whilst flying DOWNWIND. Indeed, it was evident that the BASE LEG turn at the end of the DOWNWIND leg was executed outside the 2nm boundary of the Nottingham ATZ, which in the view of several Members was excessive. This seemed contrary to the very purpose for which the ATZ was established, which was to provide a measure of 'protection' to cct traffic in the critical stages of take-off and final approach/landing. Nevertheless, the PA38 instructor pilot had reported that the DOWNWIND leg was extended as it was necessary to improve the cct spacing, which given the very low hours of his student might have been quite reasonable under the circumstances and it seemed this was also the established pattern formed by the other ac circuiting at Nottingham.

It appeared from her report that the PA28 P-i-C saw the subject PA38 as this point was reached and believed that it was well outside the cct area. She might have thought it was departing from the DOWNWIND and would thus not be a factor to their cct to land. However it was clear that the PA28 P-i-C was mistaken in her view as the PA38 plainly continued in the cct and was shown on the radar recording on FINALS at 1102:24, 1nm to the N of the PA28 just before the latter turned inbound and apparently unseen by both the PA28 P-i-C and her colleague who from this point took control of her aeroplane. It was not until moments later that the PA38 instructor by chance himself saw the PA28 turning in 'belly-up' to his ac when he glanced across the cockpit at the ASI. For his part the PA38 instructor should also have been aware of where the other ac were in the cct from their pilot's RT calls - if they were made - but at aerodromes where only an A/G Station or Aerodrome Flight Information Service is provided RT recording is not obligatory and in the absence of an RT transcript the Board was unable to resolve what was actually said on RT. A commercial pilot Member was also critical of the PA28 pilots' tight join into the existing cct pattern and for not taking more account of the potential presence of extremely inexperienced student pilots flying in the cct. A military controller Member observed that the PA28 had flown down from Sherburn-in-Elmet, which is situated in the Linton-on-Ouse MATZ and where the ccts were necessarily tight because of the adjacent military training airfield. Consequently, such ccts might be the norm for the PA28 P-i-C. Whilst the PA28 passenger/co-pilot might have many hours instructing and examining, in the view of the experienced pilot Members, this was an unnecessary and avoidable Airprox. Some considered whether the P-i-C should have allowed him to take control at this stage but their appeared to be a significant CRM issue here and the P-i-C might well have been loath to countermand her more experienced colleague, especially if she had not seen the PA38 either. Nevertheless, the radar recording evinced that the PA38 was plainly there to be seen before the PA28 pilots turned in toward FINALs. Safe integration of the PA28 into the established pattern was the crux of this Airprox. The overwhelming view of the Members was that the PA28 pilots had not taken account of the subject PA38 when their ac was turned onto FINALs because they had not seen it. Irrespective of the size of the pattern or whether the PA38 instructor had called FINALs or not, the visiting PA28 pilots should have integrated their arrival safely with the other traffic which was plainly there to be seen in the prevailing CAVOK conditions and in accord with the principles enshrined in Rule 17 of the Rules of the Air Regulations 1996. Specifically, Rule 17 (5) - *Flight in the vicinity of an aerodrome* – which required the PA28 pilots *"Without prejudice to the provisions of Rule 39, a flying machine…while flying in the vicinity of what the commander…ought reasonably to know to be an aerodrome…shall …:*

(a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome...;

and at Rule 17 (6) - Order of landing

(a) An aircraft while landing or on final approach to land shall have the right-of-way over other aircraft in flight....

(b) (i) ... in the case of two or more flying machines approaching any place for the purpose of landing, the aircraft at the lower altitude shall have the right-of-way, but it shall not cut in front of another aircraft which is on final approach to land or overtake that aircraft

In the view of the Board, the PA28 pilots did not join the Nottingham cct in a safe manner and concluded that this Airprox had been caused because the PA28 pilots did not integrate safely into the Nottingham A/D cct in accordance with Rules 17 (5) & (6) of the Rules of the Air Regulations 1996 and flew into conflict with the PA38 on final approach, which they did not see.

Turning to the inherent risk and notwithstanding that the PA28 P-i-C opined that there was "not an Airprox", none of the pilots involved here were aware of the proximity of the other's ac until a very late stage indeed. The PA28 pilots were apparently oblivious to the PA38 below them on FINALS as they turned onto FINALs themselves in a tight L bank belly-up to the latter. A Member pointed out that it was only fortuitous that the PA38 instructor had spotted the PA28 when he did and was able to take robust action to turn away and execute his go-around. The radar recording had not revealed the exact geometry at the CPA, but it seemed that it was only the PA38 pilot who could see what was happening at this point and who reported that the PA28 passed 50ft above his ac before he managed to turn out of the way. There was no reason to doubt the veracity of the PA38 instructor's report and this was clearly a close quarters situation. Whilst his robust avoiding action had ensured that the two ac did not collide the Board concluded, unanimously, that the safety of these two ac had certainly been compromised in the circumstances reported here.

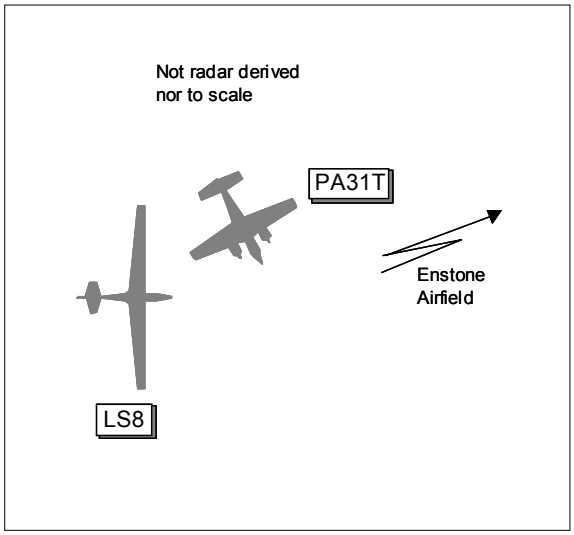
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilots did not integrate safely into the Nottingham A/D cct in accordance with Rules 17 (5) & (6) of the Rules of the Air Regulations 1996 and flew into conflict with the PA38 on final approach, which they did not see.

Degree of Risk: B.

AIRPROX REPORT NO 106/06

Date/Time:	14 Jul 1616	
Position:	5156N 00128W (1·5nm WSW Enstone - elev 550ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	LS8 Glider	PA31T2
Operator:	Civ Club	Civ Comm
Alt/FL:	3000ft↓ (amsl)	2800ft↓ (QNH 1032mb)
Weather	VMC CLNC	VMC SKC
Visibility:	35km	>40km
Reported Separation:	5ft V/5m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS8 GLIDER PILOT reports participating in the Standard Class National Championships from Bicester and in communication with Bicester on 130·1MHz. The visibility was 35km in VMC and the ac was coloured white; no lighting was fitted. At the time of the Airprox he was heading 092° about 3nm W of the Enstone RW threshold in straight and level flight (normal descent rate for a glider) cruising at 80kt and flying towards a group of thermalling gliders overhead (O/H) Enstone airfield at approximately 3000ft amsl. Whilst scanning the horizon ahead he suddenly heard a very loud engine noise. Before he had time to react, a medium sized twin-engined ac, the subject PA31T, flashed by in front, travelling from his 7 o'clock position across his nose and heading off to the SE through his 2 o'clock. Vertical separation was 5-10ft and horizontal separation no more than 5m. The PA31T appeared to be in a slow descent but fast moving, 200kt. He immediately noticed the turbulence behind the other ac; its white with maroon decal fuselage and tail markings and registration were clearly visible. No avoiding action was taken as it was too late and the PA31T was flying away from his glider. Unfortunately his radio had 'died' so that he could not call Oxford Kidlington to report the incident, later doing so when he eventually reached Bicester. His workload at the time had been low and, as is normal on a blue thermalling day, his scanning of the sky for other gliders circling had greater significance. When contacted by RAC Mil during the tracing phase, he had confirmed that there had been another glider, an LS7 with a red nose, close-by during his Airprox.

THE PA31T2 PILOT reports flying solo positioning enroute from Liverpool to Oxford VFR and in receipt of a FIS from Oxford Tower on 133·42MHz squawking 7000 with Mode C; TCAS was u/s. The visibility was >40km in sky clear VMC and the ac was coloured white with green/orange/black stripes with anti-collision, recognition and strobe lights all switched on. As Pilot in Command he was seated in the LHS with a colleague pilot seated in the cabin, row 3 on the RHS, who wanted to assess the noise level in the cabin coming from the ac's environmental control system. About 15nm to run to Oxford/Kidlington he noticed a group of gliders on his port side spiralling above Enstone airfield. His intention was to position for a crosswind join for RW01 at Oxford/Kidlington by way of a RH cct and aiming for the RW19 threshold. About 8nm from Oxford heading 130° at 200kt when passing 2nm SW abeam of Enstone in a shallow descent (500fpm) at 2800ft QNH he made a slight heading alteration to the R. As he did so a red-nosed glider appeared from his port wing tip-tank slightly lower (50ft down) some 200m away on a converging heading. He then devoted his lookout to make sure he kept clear of its flight path. After landing at Oxford he discussed with his colleague the gliders he had seen. The other pilot said that he saw a white glider fairly close to their ac on a flight path perpendicular to their trajectory when passing SW of Enstone. This did not match his sighting of the red nosed glider and he therefore concluded that he had not seen this other glider.

UKAB Note (1): Analysis of Clee Hill and Heathrow recorded radars revealed that the Airprox is not captured. The PA31T is seen tracking 150° G/S 230kt in a descent passing 3000ft (London QNH 1030mb) 4·5nm NW of Enstone at 1614:37. A single primary only return, believed to be a glider, is seen manoeuvring O/H Enstone. The PA31T arrests its descent at 2700ft QNH at 1615:25 when 1·9nm WNW of Enstone and its track has altered about 10° to

the R (the PA31T pilot reports turning slightly R and then seeing a red nosed glider to his L). The next sweep at 1615:33 reveals the PA31T at 2800ft 1·6nm W of Enstone before its descent is resumed on the next sweep 8sec later as the ac passes 1·4nm SW of Enstone. No other radar contacts are seen in its immediate vicinity, the previous glider contact remaining at all times at least 1·25nm to the PA31T's E and NE.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

With the benefit of hindsight and acknowledging that the ac is certificated for single-pilot operation, Members thought that the PA31T flight would have been better placed had both pilots been in the cockpit 'looking out' as the flight transited Class G airspace through an area of NOTAM'd glider activity. The PA31T pilot had seen gliders O/H Enstone and, whilst altering course, had visually acquired a red-nosed glider close to his L. However, it appears that in focussing his attention on this glider he had not seen the LS8 converging from his R and was unaware of its presence as it passed unsighted. The LS8 pilot had not seen the approaching PA31T, which was quite understandable as it closed from his rear L quarter, only hearing it at the last minute before it quickly flashed across about 5m in front and 5ft above and descending, too late to take any action, with its wake turbulence being felt immediately. Undoubtedly this had been a very close encounter, with both acs' flight paths crossing by luck without any intervention from either pilot which left the Board in no doubt that there had been an actual risk of collision during this Airprox.

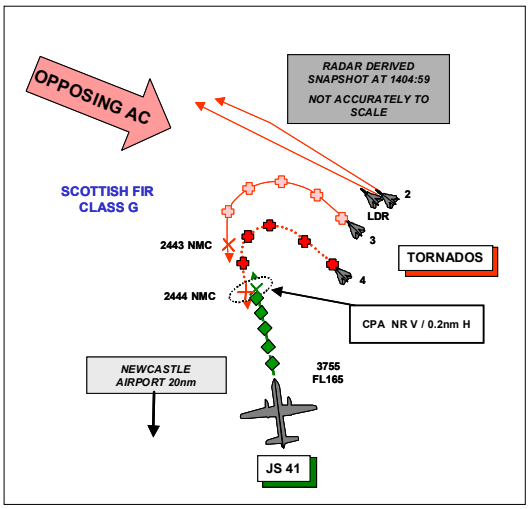
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA31T pilot and an effective non-sighting by the LS8 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 107/06

Date/Time:	17 Jul 1405	
Position:	5520N 00135W (16nm N NEW)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Jetstream 41	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL165	16000ft (RPS 1020mb)
Weather	VMC NR	VMC NR
Visibility:	50km	50km
Reported Separation:	500ft V/500ft H	800ft V/30m H
Recorded Separation:	NR V/0.2nm (370m) H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 (JS41) PILOT reports flying a scheduled passenger flight IFR from Teesside to Aberdeen and at the time they were about 10nm S of Point ALASO heading 350°, level at FL165 and at 270kt, squawking as directed with Mode C and operating under a RAS from Newcastle APR. The ac was TCAS equipped. The controller initially advised them of 4 military ac in their half past two/three o'clock position at levels 190 and above. They had the 4 contacts on TCAS and were also visual. The controller then advised them that the traffic was moving from right to left and would be passing through their twelve o'clock. Again they were visual. When the 4 ac were in approximately their eleven o'clock, the lead pair [actually Nos 3&4] turned towards them. The time between the fast jets turning and them having to take avoiding action was estimated at between 3 and 5sec. The first officer disengaged the autopilot and put the ac into a climbing right turn, climbing approximately 800ft. At the same time as the JS41 turned and climbed, the Tornado rolled inverted and dived away to their left hand side. Their light workload situation allowed them to maintain visual contact with all the F3s throughout the incident. He assessed the risk as being very high but reported that he did not receive any TCAS alerts.

UKAB Note (1): ALASO is a reporting point on CDR P18 that was not active at the time of the incident. This incident therefore occurred in the Scottish FIR.

THE TORNADO F3 PILOT reports that he was flying as No4 of a 4-ship of grey Tornado F3s conducting an OCA [Offensive Counter Air] sweep mission for 2 GR4s which were being defended by a further 3 F3s. They were squawking a Boulmer squawk with Mode C and were in receipt of a RIS from Boulmer. Although he was an experienced pilot and supervisor, he and his navigator were in a high workload situation with another 8 ac participating in the mission. They marshalled in the area to the NE of the Newcastle Zone between 14000ft and 24000ft on the RPS of 1020. They commenced that part of the mission at 1403, pushing to the NW, heading 320° in a 4-ship wall [4 ac line abreast] with himself on the SW end of the wall and he climbed to 21000ft. Boulmer had given them various stranger warnings and asked if they could accept co-ordination not above 15000ft. The formation leader rejected the offered co-ordination as it would not have allowed them to execute the mission and would have precluded safe internal separation in the event of poor weather or an emergency. At 1403:50 Boulmer gave them information on traffic 220/7nm from the formation at FL165 tracking N. He noted that, at the time, this was behind them and they were pulling away. He also incorrectly believed it to be displaced to the W of them. He then concentrated on the radar picture and the tactical situation in front of him. At 1404:20 his leader instructed them (Nos.3 and 4) to *'pump'* [he thought] – a hard descending turn to the left through about 180°. After approx 120° of turn he looked over his shoulder to regain visual on No3 as he was responsible for collision avoidance in the turn. He then looked forward as he rolled out heading 150° to search for the previously called traffic expecting it to be in his 1-2 o'clock at 3nm but saw it at about 1nm on his nose at the same time as No3 called it on the radio. He judged that they would miss but not by much so he rolled to 150° angle of bank and pulled hard, passing below and to the left of the other ac. As they passed his altimeter indicated 16000ft and he was about 25° nose down. He opined that 'see and avoid' worked again but it had not provided a large amount of separation.

As previously stated No3 had also been visual and passed further away, left to left, at 17000ft.

All the ac tapes (HUD, Radar, Nav and RT) were retained and analysed but nothing can be seen on the HUD recording. He assessed the risk as being medium.

THE TORNADO F3 UNIT COMMENTS that the Squadron commander discussed the incident with the crew and commended the captain for his open and honest report. While robust VFR procedures and a good lookout in a highly dynamic situation averted a more serious outcome, this Airprox highlighted an important lesson about Human Factors, specifically that the Captain's situational awareness regarding the position of the JS41 was in error. Details of this incident have been widely publicised by the SFSO.

MIL ATC OPS reports that the Boulmer Weapons Controller 4 (WC4) position was manned by a controller/trainee combination and was controlling 4 x F3's under a RIS in a Combat Air Patrol (CAP) to the NE of the Newcastle Zone, between surface and 24000ft on the TYNE RPS of 1020mb. Meanwhile Newcastle APR was controlling a JS41 at FL165, routing from Durham Tees Valley Airport to Aberdeen direct, under a RAS. WC4 passed TI at 1401:08, "*F3 C/S 1& 2, stranger BRA 260/15 tracks N, climbs through 16 thousand.*" F3 leader replied, "*F3 Formation looking. F3 Formation climbing.*" F3 No2 reports the traffic at 1402:06 stating, "*F3 No2, shows group bull 136/34, 6 thousand south,* WC4 replies "*F3 Formation, Boulmer, that was previous advisory route traffic.*" [UKAB Note (1): The JS41 was at FL165 not 6000ft and the ADR referred to was the CDR P18 that was not active at the time]. Eight seconds later the leader requested an update of the traffic situation and subsequently he instructed the formation to execute a pre-planned manoeuvre with the word, "*Push*" at 1403:00. Further TI was passed at 1403:44 as "*F3 formation previous stranger BRA 220/7 miles tracks N, FL165 maintaining*" and the leader acknowledged this. There followed a period of tactical conversation that terminated with F3 leader instructing 3&4 to "*Spin cold*" at 1404:17. (This phrase means that Nos.3 and 4 should execute a normal rate turn onto reciprocal track, normally without any altitude change. The instruction *'pump'* means a maximum rate turn onto a reciprocal heading and may involve a change of altitude). F3 No3 called traffic to No4 at 1404:45 as "*F3 No4, tally one on your nose, 1 mile, low*" and No4 acknowledged.

Analysis of the Great Dun Fell Radar at 1401:25 showed the formation 23nm NE of NEW indicating FL145 and tracking 330^{o}. Meanwhile the JS41 was 7nm E of Newcastle indicating FL160 and tracking 350^{o} the JS41 maintained this track throughout the incident. This placed the JS41 in the F3sí 9 oíclock at 16.5nm. The F3s were tracking 30^{o} at 1401:38 with NMC and the JS41 was in their 9 oíclock at 15nm and indicating FL163. At 1402:06 F3 No4 was indicating FL161 and tracking 30^{o} with the JS41 in its 10 oíclock at 13nm and indicating FL165. At 1403:00 No4 was indicating FL190, tracking 34^{o} and was in the JS41ís 3 oíclock at 13nm and indicating FL165. No4 then continued its climb and indicated FL208 and was tracking 3^{o} while the JS indicated FL165 and was in its 9 oíclock at 4.5nm. F3 No4 began a left turn at 1404:36 when it was in the JS41ís 12 oíclock 3.8nm with the F3 indicating FL200 and the JS41 FL165. Nine seconds later F3 No4 was tracking ^{o} displaying NMC with the JS41 in its 12 oíclock, 2.7nm and still showing FL165. At 1404:51 F3 No4 was tracking 17^{o}, with NMC with the JS41, still indicating FL165, in its 12 oíclock at 1.0nm. The ac cross and on the next radar sweep at 1404:49 with the JS41 in the F3ís 6 oíclock at 0.5nm and neither ac showed any Mode C indication. The ac then continued to diverge and at 1405:07 they were 1.9nm apart with the F3 indicating FL142 and JS41 indicating FL16

Despite being an inexperienced controller and working in a busy operational environment, WC4 fulfilled the requirements to pass and update TI to ac as required when providing a RIS. All ac concerned were operating in Class G airspace. Until the instruction to "Spin cold" there was no confliction and there was both lateral and vertical separation between the ac. However, the change of flight path while the F3 No4 was in close proximity to the JS41 led to a rapid reduction in separation.

ATSI report was based on the Unit Investigation that stated that the workload of the APR was medium with both inbound and outbound [ATSI note – and transit] traffic.

At 1350 the formation of 4 Tornado ac called APR and advised that they *"would be capping ten miles east of your zone for the next er four zero er three zero ?????"* The APR advised *"Roger at the moment I've got no known traffic to affect"*. Shortly after this at 1354:30 the JS41 called on frequency climbing to FL165 and was identified 20nm S of Newcastle and placed under a RAS. At this time the Tornados were off the coast to the E of Newcastle indicating between FL138 and FL178.

At 1400:08 as the JS41 passed E abeam Newcastle, the Tornados were in the JS41's 2:30 o'clock at 19.6nm in a left turn towards the N indicating between F135 and FL139. The Tornados steadied on a NW'ly track at 1402:31

and were in the JS41's 2:30 o'clock at 10.6nm indicating between FL158 and FL175. One of the targets was showing 0000 (SSR unreliable) with no height read out and another was showing 0000 and indicating FL158; one was squawking 2433 with no Mode C and the fourth ac was squawking 2444 and indicating FL175. The JS41 was indicating FL166.

At 1403 the APR advised the JS41 *"there's a group of four Tornados on your right hand side now in your three o'clock at range seven and a half miles slowly converging they're indicating er one nine zero at the moment climbing"*. The JS41 pilot replied *"That's copied we're visual with one of those C/S".* The radar recording at that time showed the closest ac to be in the JS41's 3 o'clock indicating FL189 with the other ac to the ENE indicating between FL164, FL165 and FL186. At 1403:28 the Tornados are in the JS41's 2:30 indicating between FL168 and FL204 with the closest 6.9nm from the JS41. The Tornados steadied on and maintained a NW track form 1402:31 and at 1403:58 were in the JS41's 2 o'clock with only 2 ac showing SSR returns, both indicating FL194. The closest ac, squawking 2444 but with no height read out, was 5.2nm from the JS41 with tracks that would pass ahead of it. At 1404 APR advised the JS41 pilot: *"Those er military contacts now they are er just about to cross your twelve o'clock right to left four and a half miles ahead they're indicating various levels from one eight five to flight two zero five"* and the pilot replied immediately *"er that's copied we're visual with three now C/S"* and almost straight after *"and C/S we're visual with all four now"*. APR then responded immediately in a tone of some alarm with: *"roger er now turning southbound in descent the nearest one to you just going one seven zero over the top of you sir"* to which the pilot replied: *"C/S just taken avoiding action there"* and APR replied *"roger"*. There was then a short pause in the RT exchange followed by the JS41 pilot stating *" C/S we'll be filing a near miss on that one"*.

HQ STC comments that this was a close encounter but one which was resolved by 'See and Avoid'. The F3s were operating in Class G airspace in conjunction with a number of other ac in the OTA C area which is one of the most frequently utilized areas for this type of training. Although the F3 pilot had been made aware of the JS41, his Mental Air Picture of its position relative to him was flawed. When he did see it, his ac's performance allowed him to manoeuvre away rapidly; a capability not available to the JS41 crew.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed the Board that since this incident the airline concerned does not use direct routeings through this area if large military exercises are NOTAMed.

The Board noted that the incident occurred in Class G airspace where both ac had an equal right to operate and where 'see and avoid' is the prime means of collision avoidance. To assist them with this responsibility, the JS41 captain opted for a RAS from Newcastle and the F3 Leader a RIS from Boulmer.

Several Controller Members were concerned that the RAS given by Newcastle had not complied with the requirements of MATS Part 1.; under a RAS, controllers are required to attempt to provide 5nm or 3000ft separation. Although the JS41 pilot was given accurate TI on more than one occasion, starting when the formation was some 7½ nm from the airliner (which was too late in some Members' view), no avoiding action was given and the service did not result in any noticeable increase in the separation that would otherwise have existed. Members accepted however, that the 4 Tornados were on a steady course and although the farthest pair were showing NMC, the closest had already climbed over 1000ft above the JS41, were continuing to climb and were on a track which would take them about 4nm ahead of it. Members also acknowledged that the JS41 pilot had called visual, which might have caused the controller to relax a little, and that the aggressive manoeuvre by the No4 Tornado was what led to the rapid reduction of the existing separation. Perhaps taken by surprise when this occurred, the controller did not give avoiding action, leaving the JS41 crew to take the initiative. It was noted that if a situation is deemed too busy or complex for a controller to afford effective avoiding action then the service should be downgraded or limited.

Both the Tornado No4 and his formation leader had been aware of the presence of the JS41 and the positions passed by Boulmer had been accurate, albeit with an incorrect level passed on one occasion. Arguably therefore, both the F3 pilot and his formation leader had sufficient information to ensure that the JS41 was avoided by a

reasonable margin. There was discussion by Members as to why the No4 had descended since this was considered to be the main reason that the confliction had occurred. Although the Board was unable to determine precisely the reason, on the basis of explanation from an Advisor with experience of F3 operations, Members thought that the No4 crew had been in a very high workload situation, concentrating on their mission objectives, and simply had not had the time to assimilate correctly the significance of the TI passed by Boulmer. Members agreed with the F3 Unit's comment that there are good Human Factors lessons in this Airprox.

In determining the cause, the Board noted that both pilots had taken avoiding action. There was no doubt that the manoeuvre by the Tornado pilot had been effective; however, since the avoidance taken by the JS41pilot was necessarily late, it was questionable whether that ac's flightpath would have changed materially before the Tornado passed below it. Nonetheless, the JS41 crew had reacted promptly to the changing situation and the Board decided that this had helped to resolve the confliction.

In view of the manoeuvres initiated by both pilots and the separation achieved, the Board decided that normally accepted safety levels had been eroded.

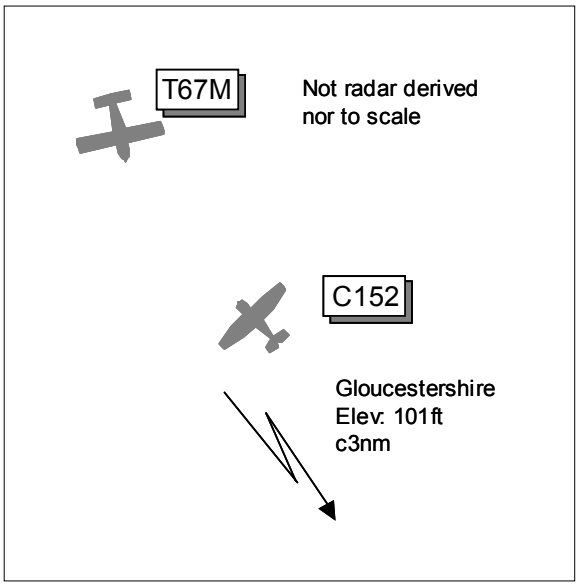
PART C: ASSESSMENT OF CAUSE AND RISK

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

Degree of Risk: B.

AIRPROX REPORT NO 108/06

Date/Time:	19 Jul 1318	
Position:	5156N 00212W (3nm NW Gloucestershire - elev 101ft)	
Airspace:	LFIR/ATZ	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	C152	Slingsby T67M Firefly
Operator:	Civ Trg	Civ Trg
Alt/FL:	2200ft↑ (QNH 1014mb)	2100ft (QNH)
Weather	VMC NR	VMC CLNC
Visibility:	NR	>30km
Reported Separation:	30ft V/100m H	'above' V/200m H
Recorded Separation:	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying a dual training sortie outbound from Gloucestershire VFR and in receipt of a FIS from 'Gloster' on 128·55MHZ squawking 7000, he thought, with Mode C. The weather was VMC and the ac was coloured white with red/blue stripes and a checkerboard logo on the tail. Whilst in the climb through 2200ft QNH 1014mb heading 310° at 70kt, on-coming traffic was sighted 30ft below and 100m ahead. The student was flying the ac but did not see the other ac whilst he, the instructor, saw the tail-fin and top of its cockpit: he took control, turning hard R (>60°AoB). The student then saw the opposing ac passing 100m clear down the LHS and 30ft below. ATC had transferred them to the Approach frequency and on initial contact TI was passed on inbound traffic at the same time that he was taking avoiding action. The other ac was a low wing single engine type coloured yellow. He assessed the risk as very high.

THE SLINGSBY T67M FIREFLY PILOT reports flying a dual local training sortie from Gloucestershire and in receipt of a FIS from 'Gloster' Tower on 122·9MHz squawking with NMC fitted. The visibility was >30km in VMC and the ac fuselage was coloured yellow on top and black underneath with strobe lights switched on. Rejoining to the O/H at 2100ft QNH heading 180° and 85kt prior to descending on the dead-side to join the traffic pattern, she, the instructor, saw a Cessna approaching, 500-600m ahead and slightly from the L. It was climbing towards them so she had not seen it as soon as would probably have been the case had it been in level flight. She dived her ac and turned R to avoid the Cessna: it was seen to pass 'above' and 200m clear to her L. She assessed the risk as medium.

THE GLOUCESTERSHIRE APPROACH CONTROLLER reports the C152 flight was transferred from Tower after departure and established communications just over 1min later. The pilot was given the RPS, asked to report passing Ledbury and was then given TI on two inbound ac, one of which was the subject T67M Firefly. The C152 pilot responded immediately saying that he 'had a near miss' with an ac. Several further transmissions were made confirming the identity of the other ac and the pilot's intention to file an Airprox.

The Gloucester METAR was EGBJ1320Z 12008KT 9999 CAVOK 34/12 Q1014=

ATSI reports that the RT recording (CD) reveals the RT lacks clarity and is very difficult to interpret. The sequence of events was as follows:

ADC:

Marginally before 1314 the C152 flight was cleared for take off and then transferred to the APP at 1316:30 which was acknowledged by the C152 pilot with a transmission end time of 1316:45. Between 1317:30 and 1318 the inbound Firefly flight, transferred from APP, called ADC and was told to report downwind. This transmission from the ADC ended at 1318. Just after 1319:30 there is an unintelligible transmission which is believed to be the Firefly pilot calling ADC and querying the C152 traffic since the Firefly flight calls again and states *"????? ?????(2-3 unintelligible words) about the Cessna that's at twentyone hundred feet going outbound south to north".* To which at 1320 the ADC replies *"T67 c/s negative".* The Firefly pilot then reports *"interesting just came straight at us er and I ducked to miss him..."*.

APP:

Between 1314 and 1314:30 the Firefly flight contacted the APP to rejoin, was given rejoin instructions and advised of other rejoining traffic and a transit helicopter but not the departing C152. At 1317:30 the Firefly reported at 3 miles and was transferred to ADC with a transmission end time of 1317:51. The C152 contacted the APP at 1317:55 and, after establishing communications, being advised it was a FIS and given the Regional QNH, was provided with TI on a C152 and the Firefly joining. Almost immediately the instructor reported the Airprox as having occurred.

[UKAB Note (1): The RT transcript reveals the APP passing TI to the C152 flight as *"C152 c/s VFR traffic joining from the North an RF six and a Cessna one five two both routeing to the overhead to join from two thousand feet"*. The subject C152 pilot replies *"Yeah we've just had a near miss a real near miss with that T er is it a Slingsby inbound"*.

The cross would appear to have occurred during the RT time in transferring the Firefly to ADC and whilst the C152 was waiting to call the APP.

Whilst ADC and APP could recall having passed basic information to each other (controller to controller) on the subject ac, the off-mike coordination in the side-by-side VCR positions is not recorded. APP certainly used this information to provide TI to the C152: unfortunately, it was too late to draw the pilots' attention to the other ac.

The MATS Part 1, Section 1 Chapter 2 Page 1 Classification of Airspace does not require TI to be passed on VFR flights in Class G airspace. However, MATS Part 1, Section 1 Chapter 1 Page 2 Para 6 Flight Information Service states at Para 6.2 *'…controllers 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 ADC Controller did not pass TI on the inbound Firefly to the departing C152 and whilst the APP Controller did pass traffic, albeit too late, to the outbound C152 he did not pass traffic on the departing C152 to the Firefly prior to transfer.

The Unit comments that MATS Pt 2 also requires that such information is passed, if traffic permits, and in this respect both Controllers had fulfilled their obligations.

However not withstanding the above, MATS Part 1 Section 1 Chapter 1 Page 1 Para 4.1, 4.2, provision of Air Traffic Control Service and specifically Section 1 Chapter 2 Page 4 Para 6.3 "*Controllers are to provide an air traffic control service to aircraft within an aerodrome traffic zone and to aircraft under their jurisdiction in the vicinity of the aerodrome."* require the provision of an Aerodrome (and Approach) Control Service.

A similar non-Airprox situation in 2002 prompted a review of transfer of control procedures for O/H joining traffic. APP would normally retain control of the joining traffic until 2nm, i.e. entering the ATZ. However, RT congestion often meant that flights were unable to change frequency or request descent. The optimum transfer of control point was subsequently published in MATS Pt 2 as *'at not less than 3NM'*. A shared data display (strip board) between both positions was trialled around this time with a view to improving the awareness of each position for the controllers. It was not successful, distracting the controllers from the primary task.

The Unit made further comments that the delay in the C152 pilot being able to call the APP (70sec) would have eroded the distance between the ac. Earlier, or more robust coordination may have facilitated earlier information to each pilot, which, in turn may have prompted better lookout and acquisition of the confliction. The Airprox occurred in the FIR, in close proximity to the ATZ. At the time of the confliction, both flights were transferring

between ADC & APP frequencies. Earlier TI from ADC or APP may have improved situational awareness. Follow-up action may be considered by the ATSU after publication of the UKAB report.

UKAB Note (2): The UK AIP at AD 2-EGBJ-1-6 para 2.7 promulgates Gloucestershire ATZ as a circle radius 2nm centred on the longest notified RW (09/27) 515339N 0021002W from SFC to 2000ft aal.

UKAB Note (3): The Airprox is not shown on recorded radar. The T67M is seen at 1308:32 having departed Gloucestershire RW09 with a L turn to the N squawking 7000 NMC. The squawk changes to 7004 (aerobatic conspicuity code) 3·5min later as the flight manoeuvres generally N-NW'ly before turning about at 1314 when 8nm N of the aerodrome. The ac tracks about 160° towards Gloucestershire and the squawk changes back to 7000 NMC 2·5min later when the ac has 5·5nm to run. As the T67M reaches 3nm to run at 1318:16, about the time the C152 pilot reports the Airprox, it is seen to turn R onto a S'ly track to pass just W of the aerodrome. The departing C152 is not seen on recorded radar until possibly appearing as a primary-only return, 7min post incident, about 13nm NW of Gloucestershire tracking NW'ly towards Shobdon.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted the comments made by ATSI with respect to the provision of timely TI to both flights. In a 'non-radar' environment, as in this incident, any TI given by ATC, although 'generic' in nature, would have given the subject pilots a 'heads-up' on the potential confliction. The information on both flights was available to both the ADC and APP but for whatever reason the T67 pilot did not receive TI on the C152 and the C152 pilot received TI on the T67 only as he was taking avoiding action on it. That said, in this case Members thought that the TI was only a supplementary element to the subject pilots' primary means of collision avoidance whilst flying VFR outside CAS through 'see and avoid'.

Both pilots reported seeing each other late during the incident. From the C152 cockpit, it is known that a pilot's view straight ahead is reduced owing the nose-high attitude flown and this is normally ameliorated by weaving the ac's nose to clear the area; as this was not mentioned by the C152 pilot, a GA Member opined that this technique was not being applied. On seeing the T67M, the C152 instructor had taken rapid avoiding action by turning steeply R to avoid, as it was seen to pass just 30ft above and 100m clear to the L. Similarly, the T67M instructor reported clearing her descent path as the ac was being positioned towards the O/H prior to descending and, on seeing the C152 apparently slightly before its pilot saw her ac, executed a dive to pass under it, which she did as well passing some 200m clear laterally. Some Members thought that a latent problem existed, a 'cross over' occurring between departing ac climbing on track against inbound ac routeing to the O/H for a standard rejoin with no element of deconfliction taking place. Whilst this scenario is not uncommon at airfields/aerodromes with GA operations, it is often addressed at busy airfields through establishing aerodrome procedures such as published departure routes. Such action is ultimately down to the aerodrome authority to decide if deemed necessary to mitigate a safety risk. In the circumstances, Members believed that the subject pilots had attempted to discharge their responsibilities and that the flight paths flown had resulted in a conflict in Class G. Although the pilots' combined actions were felt to have been just enough to remove an actual collision risk, the ac had passed in such close proximity, with separation margins severely reduced, to leave the Board in no doubt that safety had not been assured during the encounter.

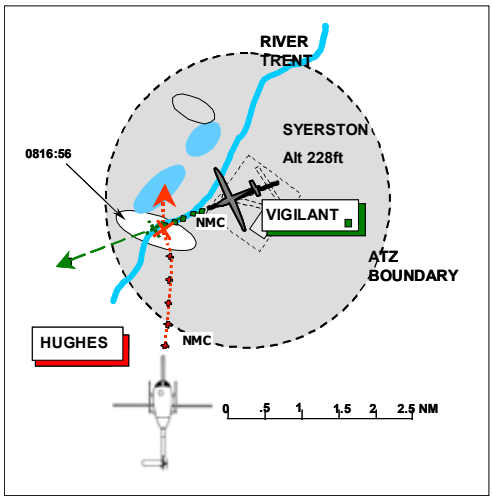
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by both pilots.

Degree of Risk: B.

AIRPROX REPORT NO 109/06

Date/Time:	21 Jul 0817	
Position:	5301N 00056W (1nm SW Syerston - elev 228ft ft)	
Airspace:	Syerston ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Vigilant Glider	Untraced Helicopter
Operator:	HQ PTC	NR
Alt/FL:	800ft↑ (QFE)	NR (NR)
Weather	VMC CLBC	NR
Visibility:	8km	NR
Reported Separation:	0ft V/150m H	NR
Recorded Separation:	NR V/ approx 150m H (from projected position	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT GLIDER PILOT reported that he was conducting an instructional flight in a red and white ac with HISLs selected on, in contact with Syerston Radio squawking 7000 but with no Mode C fitted. During the climb after take off passing 800ft and heading 250° at 55kt, the student in the right hand seat indicated left at 9 o'clock and said *"Look!"*. He saw a dark coloured Hughes 500 helicopter carrying out a braking manoeuvre at the same height about 200m away off the left wing tip. The helicopter slowed and turned right, passing behind by about 100-150m remaining at their height. Their ability to manoeuvre was constrained by the circuit procedure so they continued the climb to 2000ft straight ahead by which time the helicopter had gone from sight. He reported the incident to Syerston on the radio and assessed the risk as being high.

UKAB Note (1): Both the helicopter and the Vigilant are seen on the recording of the Claxby radar. The helicopter was reported as a Hughes 500 or NOTAR by the Vigilant pilot and this was later verified by the Radar Analysis Cell (RAC). All mainland based Hughes 369/500 operators registered in UK were contacted by the RAC. Of 46 registered at the time, 7 were not contactable and none of the others were in the area of the incident at the reported time. In addition all known local aerodromes/HLS were contacted; none had any record of a Hughes movement. It is likely therefore that the helicopter was not a Hughes 500/NOTAR. Tracing action was ceased 2 months after the event since even if the pilot was found, it was thought unlikely that (s)he would remember any detail of the flight. The Airprox was also recorded by the CAA as an Airspace Infringement.

HQ PTC comments that there are a number of prominent line features in the Syerston area tempting unwary VFR traffic to infringe the ATZ. Unfortunately, there have been similar incidents of gliding ATZs being infringed resulting in Airprox against aircraft taking off or in the circuit. However, the late brief sighting by the Vigilant and lack of helicopter report makes it difficult to definitely assess the gravity of this Airprox. It does seem that the helicopter pilot flew an avoiding action on the Vigilant so presumably saw the glider at some stage during the encounter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the Vigilant, a radar video recording, and a report from the Vigilant operating authority.

The Board noted that Syerston lies in the middle of a very busy VFR flying area and suffers many infringements and that this is not the first that has resulted in an Airprox. Seemingly, GA pilots tend to follow the easily visible line features to the W but this does not route them clear of the 2nm ATZ.

In this case, due to his/her avoiding action as seen by the Vigilant crew, the helicopter pilot probably saw and avoided their ac but (s)he had not complied with Rule 39 of the Rules of the Air as regards calling on the RT before

flying into an ATZ. This incident again amply demonstrates the importance of maintaining a thorough lookout even when operating within the limited protection offered by an ATZ.

Although it is possible that the helicopter pilot had avoided the Vigilant by what (s)he considered to be a reasonable margin, it was the view of the Board that the unannounced penetration of the ATZ had brought the helicopter into conflict with the Vigilant, degrading the safety of both ac below normally acceptable levels.

PART C: ASSESSMENT OF CAUSE AND RISK

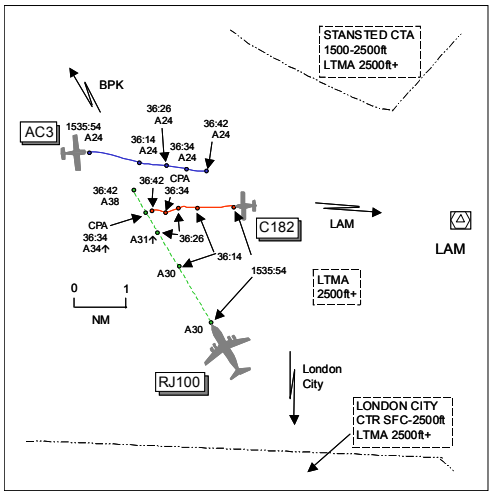
Cause: The helicopter pilot entered the Syerston ATZ without complying with Rule 39 of the Rules of the Air and flew into conflict with the Vigilant whose pilot saw it late.

Degree of Risk: B.

AIRPROX REPORT No 110/06

AIRPROX REPORT NO 110/06

Date/Time:	21 Jul 1536	
Position:	5139N 00001W (6nm W LAM)	
Airspace:	LTMA/FIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	RJ100	C182
Operator:	CAT	Civ Club
Alt/FL:	↑6000ft (QNH)	2200ft (QNH)
Weather	VMC CLOC	VMC CLOC
Visibility:	20km	>10km
Reported Separation:	200ft V/0·5nm H	Not seen
Recorded Separation:	0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RJ100 PILOT reports whilst on departure from London/City flying a BPK 3T SID level at 3000ft QNH approaching BPK the RT was busy on 118·825MHz. Heading 333° at 210kt, traffic was noticed on TCAS 5nm ahead on a reciprocal heading only 500ft below [AC3, not the subject ac]. Owing to the RT congestion their call to radar to enquire about the traffic was delayed. Climb was issued immediately to 6000ft with AC3 reported as level at 2400ft. As they climbed, AC3 passed to their 3 o'clock position separated by about 1nm and 500ft at closest with TCAS issuing a TA alert but no RA warning. At the time the FO was visually acquiring this traffic (AC3), to their amazement he saw further traffic, believed to be a Cessna 172 or similar, on a heading of 240° laterally between their ac and AC3. No squawk was received by them on TCAS or by ATC. They estimated the closest the Cessna passed was 0·5nm away to their R and behind and 200ft below. They informed ATC that they would be filing an Airprox. After landing and speaking to the Group Supervisor, the crew agreed that ATC would report on the first encounter (filed as an observation). Without any information on the second ac, ATC accepted that the RJ100 crew would file on that ac. The crew opined the RT overloading did not help with the first occurrence.

THE C182 PILOT reports that he was unaware of any Airprox. He had been flying to Halton from France and, in the area of LAM, had been talking to Stapleford Radio cruising at a maximum altitude of 2200ft heading 260° at 120kt; no transponder was fitted. Owing to a dislike of flying 100ft below CAS, he deliberately flies well below that level which leads to more work in talking to aerodromes (with ATZs) which he is more than happy to do. He did not see the reporting ac but from the geometry of the incident described to him by RAC Mil with the other ac crossing ahead close to and above, the visibility above is rather poor from a C182. He could not resolve the anomaly of the miss distance reported by the RJ100 crew but wishes he had seen it so that he could view the separation distance.

UKAB Note (1): The pilot of AC3 (a Columbia 400 type) submitted a report and stated that he saw the RJ100 visually climbing out and on TCAS as well. Whilst tracking E under a RIS from Thames Radar at 2400ft at 160kt, he was twice passed TI on *"...unknown traffic...one o'clock westbound no height or type"* by the Thames Radar controller at ranges 3nm and 1·5nm but the traffic, (the C182) was not seen.

THE LTCC NE DEPS SC reports the RJ100 was just W of LAM when she cleared the flight to climb to altitude 6000ft. The crew informed her that if they hadn't been given climb there would have been an incident as a light ac went just behind by 1nm at the same altitude. She gave TI on unverified traffic (AC3) in their 4 o'clock at 2400ft and the crew replied that they had seen that ac but there was another ac not squawking which was the one involved. She saw nothing on radar and the RJ100 crew told her that they would be filing a report.

ATSI reports that there are no apparent civil ATC implications in this Airprox. It took place close to the base of the LTMA, Class A CAS, where its base is 2500ft amsl. The RJ100 had recently departed from London City Airport on an IFR flight to Edinburgh and was following a BPK 3T SID. When the pilot made his first call to the LTCC NE

DEPS SC, just after 1535:50, the flight had just established on the BPK R153 (333ºM) and reached 3000ft, the final level of the BPK 3T SID. The SC responded with "*RJ100 c/s squawk ident climb altitude six thousand feet and just report your passing altitude again please".* The pilot read back the climb clearance and reported *"…now passing three thousand in the climb…".* The radar recording shows that 20sec later at 1536:30, the RJ100 is passing 3300ft altitude, Mode C.

At 1536:45, the pilot reported *"Er RJ100 c/s just for your information we've just had a light aircraft go er in our six o'clock at about one mile and if we hadn't got that climb from you we'd have been on the same level",* to which the SC replied *"RJ100 c/s roger I can see something unverified showing two point four underneath controlled airspace".* The pilot responded *"We've got that one there is another one as well we got visually which was above him not squawking"*. The SC replied *"Okay and that was actually a mile behind you at the same level"* with which the pilot concurred. Shortly after this, the flight was transferred to the next Sector with the crew stating *"...we'll have to file on that"*.

In her written report, the SC stated that she did not see on her radar the 'other' traffic referred to by the RJ100 pilot and this is confirmed in a review of the radar recording of the TC NE DEPS position. Debden Radar is the default service for this Sector; however, at the time, the SC was using the Pease Pottage radar service as Debden had been withdrawn for long-term maintenance. The LTCC MATS Part 2, Section GEN 2.3 provides a table showing the alternative services for such an event. While it shows Pease Pottage as a legitimate default stand-by, it is the least preferred of three for this Sector because of its limited cover at lower levels. The preferred service is the Heathrow 23cm and an examination of this radar's recording does reveal the presence of a primary-only radar contact, the C182, tracking W between the RJ100 and AC3, the latter observed on Mode C unverified 2400ft. At 1536:30, the primary contact is on a converging track with that of the RJ100, initially in the latter's 2 o'clock position at a range of 1·2nm with the RJ100 at 3000ft Mode C; then (1536:26) in the 0230 position at 0·6nm by which time the RJ100 is showing a climb, indicating at 3100ft Mode C. Closest point is reached at 1536:34 when the primary target is 0·4nm in the RJ100's 4 o'clock position with the latter now passing 3400ft Mode C. Finally the target passes 0·5nm astern of the RJ100 at 1536:42, which is now passing 3800ft Mode C.

The 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 4.2 describes the action to be taken by controllers to avoid *'unknown aircraft'* in various types of airspace. For Class A airspace, it states that *"If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information passed".* The Pease Pottage radar was the least preferred choice for the Sector concerned: nevertheless, had the TC NE DEPS controller been using the Heathrow 23cm radar and had seen the unknown primary target, there was no information to indicate that this target fell into any of the categories that would have required her to take 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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members agreed with the ATSI findings that although the C182 was not showing on the selected Pease Pottage source, even if it had been displayed as a primary-only return, the controller would have assumed that it was below CAS and therefore no action need be taken. However, Members could not reconcile the disparate differences between reported and sighted levels in this Airprox. The C182 pilot had reported flying at a maximum altitude of 2200ft, well below the LTMA base level of 2500ft, whereas the RJ100 crew had seen the Cessna after visually acquiring AC3 following a heads-up from TCAS. The RJ100 crew judged that the Cessna was passing laterally between their ac and AC3 and apparently above AC3's level, 2400ft. One Member wondered whether the Cessna pilot had set an incorrect altimeter subscale value which could have led to the ac actually flying at a level higher than indicated. That said, even a 10mb error (i.e. setting 1008mb instead of 1018mb, the actual QNH) equates to 300ft difference so a gross altimetry error was thought unlikely to have been causal in this incident. Also noteworthy, the pilot of AC3 was twice given TI on the C182 but did not see it, even though it passed about 1nm away, but did see the RJ100 above and to his R. It was thought that if the Cessna was flying at a level higher than AC3 then its pilot would have seen the Cessna as it passed between his ac and the RJ100.

AIRPROX REPORT No 110/06

The RJ100 crew were undoubtedly surprised to see the Cessna, having initially received a TCAS TA alert on AC3 as it crossed ahead from L to R and 500ft below. During this phase and when the RJ100 commenced its climb from 3000ft, the C182 appeared in the crew's field of view without warning on a crossing track from R to L and appearing to be above 2400ft, about 200ft below the RJ100's previously vacated level. It was surprising to Members that the RJ100 went unsighted to the C182 pilot as it crossed just ahead and above, even allowing for the Cessna pilot's reported restricted visibility above. In the heat of the moment, this surprise sighting of the C182 by the FO when combined with the RJ100's climbing attitude may have given a false impression of the Cessna's vertical proximity as it passed 0·4nm to the R and behind. Without the benefit of SSR Mode C radar data from the C182 it was not possible to resolve the two differing reports of its altitude. However, on the information provided and on the balance of probability, Members believed that the Cessna was flying below the base level of CAS with the RJ100 at least 500ft above and deemed to be separated. On this premise, the Board concluded that this encounter had been no more than a sighting report where safety had been ensured throughout.

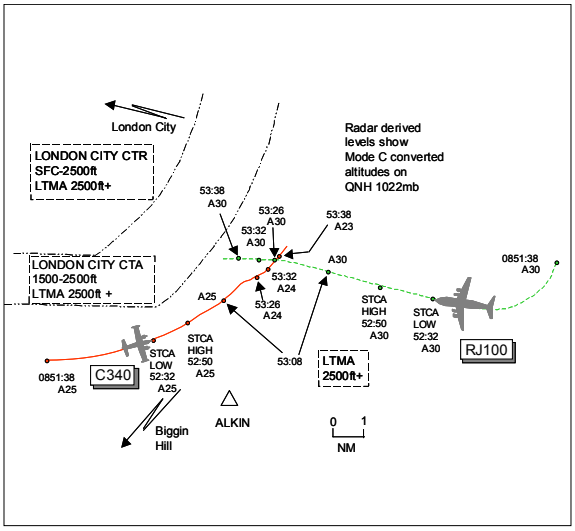
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 111/06

Date/Time:	24 Jul 0854	
Position	5126N 00013E (7nm SE London/City - elev 19ft)	
Airspace:	LTMA/FIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	RJ100	C340
Operator:	CAT	Civ Pte
Alt/FL:	3000ft (QNH)	2300ft (QNH 1022mb)
Weather	VMC NR	VMC CAVK
Visibility:	NR	>25km
Reported Separation:	400ft V/nil H	500ft V/nil H
Recorded Separation:	600ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RJ100 PILOT reports inbound to London/City level at 3000ft QNH and 190kt and in receipt of a RCS from London/City Approach on 128·025MHz squawking an assigned code with Mode C. During their approach, 'proximate' traffic was seen on TCAS whilst ATC gave them a L turn onto heading 275° as well as advice that traffic may be seen in their 10 o'clock which was believed to be outside CAS. Simultaneously, TCAS issued an RA 'monitor v/s' and the other ac was visually acquired, a Cessna light twin, about 400ft below heading 060°. The Cessna passed directly beneath their ac and TCAS gave 'clear of conflict' shortly afterwards. London/City ATC was not controlling the traffic.

THE C340 PILOT reports heading 030° at 160kt en-route to North Weald on an exceptionally clear morning squawking 7000 with Mode C. Routeing N of Gatwick Zone with the intention of routeing through the London/City Zone, he tried to contact Thames Radar but they were too busy to respond. He then spoke to Biggin Hill Approach whilst keeping outside their ATZ and maintaining 2300-2400ft to cross the Biggin Hill RW21 approach safely and tracking to avoid the new Thames 1500-2500ft CTA airspace. He saw a BA46 (RJ100) a long way out, >25km, and identified it as a commercial flight probably destined for London/City and assumed that it would overfly his ac and that it would be advised of his ac's position by City Radar. He maintained visual contact with the RJ100 at all times and whilst he did not assess that there was any risk, he thought the RJ100 might be lower than it should, possibly owing to an early descent. No avoiding action was necessary but he elected to descend to increase vertical separation which he estimated to be 500ft. He went on to say that the RJ100 crew should have been able to judge their descent in relation to his ac but his ac may not have been sighted by the RJ100 crew against the sun. Also, he made comments that the Thames frequency was often too busy to enable a clearance to be obtained to cross the London/City Zone and that the clarity of transmissions on 132·7MHz were a problem – if it were easier to contact Thames he would.

THE LONDON/CITY RADAR CONTROLLER reports the RJ100 was being vectored for a RH Cct onto RW10 whilst an unknown 7000 squawk was observed, initially 8nm S of London/City, tracking ENE indicating 2500ft unverified and whose track she decided to monitor. As the RJ100 turned downwind about 6nm SE of London/City at 3000ft, she warned its crew of the unknown traffic outside CAS

ATSI reports that the incident took place 7nm SE of London City Airport, near the base of the LTMA, Class A CAS.

At 0845:20, the C340 flight made an initial call to Thames Radar. The controller responded by instructing the pilot to 'stand-by', advising that he would call back shortly. Forty seconds later, the RJ100 flight also called Thames, reporting levelling at 4000ft and turning onto a heading of 170°. This was acknowledged and the flight instructed to reduce speed to 190kt. The RJ100 was inbound to London City Airport from the N and was being vectored

under an Approach Radar Service to eventually pass to the E of the Airport before being turned W to position downwind RH for an ILS approach to RW10 at London City.

At 0847:35 and unbeknown to the Thames controller, the C340 flight had left the Thames frequency and was now making an initial call to Biggin Hill Approach. The controller, providing an Approach Control Service (no radar is available) established after a few exchanges that the flight was a C340, operating VFR from Southampton to North Weald at 2400ft altitude. The pilot reported he would shortly be passing to the W and N of Biggin Hill Airport. The controller issued the current 'Biggin' QNH, 1021mb, which the pilot read back. He also reminded the pilot to remain clear of the London City CTR to the N and gave approval for the flight to pass E'bound through the FAT for Biggin Hill's RW21. The radar recording shows the flight passing to the W of Biggin Hill Airport on a NE'ly track. It is displaying the conspicuity code 7000 and indicating at 2500ft unverified Mode C. Over the next few minutes the flight continues on the same track until, at 0851:21, it turns E, a mile or so S of the London City CTA boundary. At 0851:30, after clearing the RJ100 for descent to 3000ft, the flight was transferred to City Radar. After doing so, the controller attempted, without success, to establish contact with the C340 flight, that had made its initial call on the frequency some 6min earlier. At 0851:40, the RJ100 flight established communications with City Radar, reporting level at 3000ft and in a R turn onto radar heading of 270° at 190kt. The report is acknowledged and the flight was instructed to continue the turn onto 290°. The RJ100 was now in an area of the LTMA where the base of CAS is 2500ft amsl. The radar recording shows the RJ100 to the SE of London City having just commenced a turn to the R. A little under a minute later when the RJ100 is established on 290°, the C340 has meanwhile turned L to the NE, having now passed clear of the southern boundary of the London City CTA. At this point (0853:30), STCA produces a low severity warning between the two flights which are now 5nm apart converging, the C340 being 'unknown' to the City Radar controller and in the RJ100's 11 o'clock position. Moments later the RJ100 is given a further heading adjustment onto 270° and then at 0853:10, the controller transmits to the flight *"RJ100 c/s you might get TCAS on traffic er indicating outside controlled airspace er just in your left two* (sic) *o'clock range of two miles"*, the pilot replying *"er RJ100 c/s we just got a TCAS RA er and we are visual now he's only four hundred feet below us indicating"*.

[UKAB Note (1): By the end of this message (0853:26), the RJ100's heading adjustment onto 270° is beginning to take effect and the C340 is seen to have made a slight course deviation to the R, placing the C340 in the RJ100's 1030 position, now at a range of 0·5nm. At this point, the C340's Mode C shows a descent to 2400ft unverified while that of the RJ100 remains at 3000ft. The C340 then appears to be turning L onto its original track when the CPA occurs 6sec later as the C340 moves into the RJ100's 7 o'clock separated by 0·2nm and 600ft. The next sweep shows the Mode C of the C340 indicating 2300ft as it passes 0·7nm behind the RJ100 with tracks diverging.]

The RJ100 continued its flight without further incident. Meanwhile, the C340 pilot made no comment to the Biggin Hill controller about either having seen the RJ100 or being involved in an incident and left the frequency at 0854:20.

At 3000ft, the RJ100 was being provided with 500ft vertical separation above the base of CAS, the minimum recommended in MATS Part 1, 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 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, 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 4.2 describes the action to be taken by controllers to avoid *'unknown aircraft'* in various types of airspace. For Class A airspace, it states that *"If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information passed".* On this occasion, the City Radar controller had no information to indicate that the 'unknown' ac fell into any of the categories that would require action on his part. In the event, she did provide a timely warning that a TCAS event may occur and provided TI.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that there had been no reports filed relating to transmission quality on 132·7MHz or any problems mentioned. Also noteworthy, NATS's statistical traffic data reveals that the busiest morning period for London City traffic was between the hours of 0830-0900 so that requests for transit of City CAS or for a service were less likely to be fruitful. Even though the controller was busy, pilot Members thought that the Thames controller could have called the C340 flight after the pilot's initial call 6mins earlier: an interim 'holding' call to the pilot would have indicated to the pilot that he had not been forgotten. Similarly, the C340 pilot only tried calling once and had left the frequency after 2min without trying again to establish 2-way contact. Putting these issues aside, both crews were following SOPs and were flying in accordance with the Rules and Regulations. The RJ100 was descended to 3000ft to remain 500ft above the base level of CAS (2500ft) whilst the C340 was flying just below CAS at 2300-2400ft and, as such, the ac are deemed to be separated. Additionally, after the Thames controller had seen the C340 closing towards the RJ100 with separation of 500ft, he had informed the RJ100 crew of the traffic which may be shown on the RJ100's TCAS. Pilot Members could not understand why TCAS gave a 'passive' RA warning (monitor v/s) when both ac were in level flight separated by 500ft. The RJ100 crew visually acquired the C340 and stated that it was indicating (on TCAS) 400ft below, which may have reinforced their 'mindset' estimate of the visual separation. The C340 pilot had seen the RJ100 well before the ac crossed and had thought that it looked lower/closer than it should and had elected to descend slightly to increase the separation which he estimated to be 500ft. The radar recording had revealed that vertical separation was never less than 500ft and in fact increased to 600ft at the CPA and further still immediately thereafter. This under-estimation of separation by both crews may have been owing to the very clear weather conditions, which can make objects that are sharply focussed appear closer than they really are. On the information available, the Board believed that the incident had been little more than a sighting report and that all of the elements combined had ensured that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

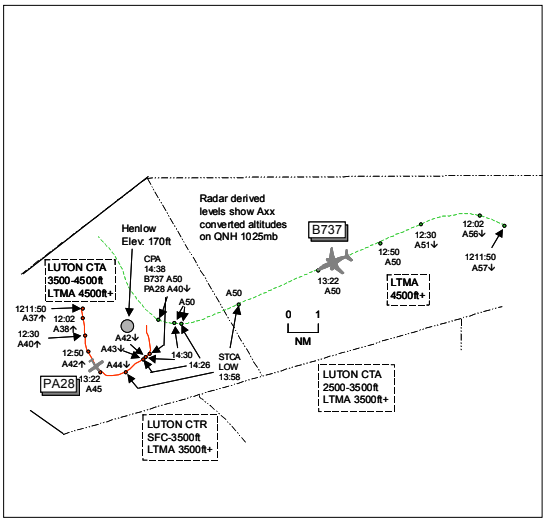
Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 112/06

AIRPROX REPORT NO 112/06

Date/Time:	17 Jul 1215	
Position:	5201N 00016W (1nm SE Henlow - elev 170ft)	
Airspace:	LTMA/FIR	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	B737-700	PA28
Operator:	CAT	Civ Trg
Alt/FL:	5000ft (QNH)	3400ft (QNH)
Weather	VMC CLNC	VMC CLOC
Visibility:	30km	>10km
Reported Separation:	300ft V/3000m H	1500ft V/250m H
Recorded Separation:	1·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Luton IFR and in receipt of a RCS from Luton on 129·55MHz squawking an assigned code with Mode C. Approximately 8nm N of Luton heading 260° at 5000ft QNH and 250kt, Luton Approach gave immediate avoiding action onto heading 355° owing to unknown pop-up traffic at 11 o'clock and 3nm. The traffic appeared on TCAS and generated a TA alert. The A/P was disconnected and an immediate level R turn was flown. The traffic was not sighted but estimated to be within 2nm and 300ft from the TCAS display. He assessed the risk as medium.

THE PA28 PILOT reports flying a dual training sortie from Cranfield to Henlow VFR, not in receipt of an ATS and squawking 7000 with Mode C. Initially practicing forced landings SW of Old Warden from 3000-3500ft to 800ft, he observed a large transport jet (B767 or B737-800, not the reporting ac) heading W in a slow cruise most probably downwind LH RW08 for Luton. Tracking S at 3400ft QNH he elected to descend to 2500ft to avoid wake turbulence by which time he estimated the other ac's position as being O/H Henlow. Continuing on S, he climbed to 3400ft and when 1nm S of Henlow he initiated a L turn through East onto a N'ly heading. He noticed traffic, the subject B737, about 15nm to the East and remembered it being relatively low, 4000-5000ft, and what appeared to be nose-on, possibly either an outbound climbing from Stansted or an inbound to Luton. As he had planned a PFL onto RW02/20 at Henlow and was heading N away from the potential threat and initiating a descent he took no further action. He next saw the B737 in his 2 o'clock high (4000-4500ft) in a climbing R turn passing about 1500ft above and 250m clear to the N - he was aware that traffic can be at 4000ft in the area with 500ft separation, often observing ac close-by proceeding downwind LH for RW08 when conditions are VMC. He assessed the risk as medium.

THE PA28 OPERATOR'S CFI comments that following a discussion with LTCC concerning the ac's transponder, he rendered the equipment as inoperative in the Tech Log and requested engineering to check the output of the Mode C encoder. Later, confirmation was received that the 'new' encoder (approx 9 months old) was unserviceable.

THE PA28 OPERATOR reports the transponder encoder was tested 'in situ' by a local avionics engineer, when requested by the CFI, and was found to have a gross error which changed when the unit was vibrated. The AR580 Encoder was subsequently bench tested by the operator's Engineering Company which provided a Workshop Test Report dated 3rd August stating that the unit was faulty and beyond economical repair; it was subsequently replaced.

THE LUTON APR reports operating with a trainee who was positioning the B737 downwind LH for RW08 whilst expecting an ac on an OLNEY departure. They both observed an intermittent unknown 7000 squawk manoeuvring in the vicinity of Henlow – 10nm N of Luton – with Mode C of approximately 4000ft where the base

of CAS is 3500ft. He took control from the trainee and issued avoiding action to the B737 flight, repeating the instruction as he believed the original may have been blocked by another transmission. The unknown ac achieved a maximum height readout of about 4600ft based on the QNH of 1026mb but it was not sighted by the B737 crew despite updated TI. As his workload increased considerably whilst he dealt with other traffic, his Essex Radar colleague called the Group Supervisor for help and the unknown ac was traced, appearing to land at Henlow correlating to the subject PA28's landing.

UKAB Note (1): Met Office archive data shows the Luton METAR as EGGW 1150Z 07004KT CAVOK 29/09 Q1026= EGGW 1220Z 07004KT CAVOK 29/09 Q1026=

ATSI reports the incident took place 8nm NNE of Luton Airport where the base of CAS is 3500ft ALT. In the area concerned, the airspace from 3500ft to 4500ft ALT is Class D, the Luton CTA. Above this, from 4500ft ALT to FL245, the airspace is Class A of the LTMA.

Inbound to Luton, the B737 was being vectored LH downwind for a landing on RW08. At 1211:30, the flight made its first call to the LTCC Luton INT Director. The pilot reported descending to altitude 5000ft on QNH 1026mb and turning L onto a (radar) heading of 270° at speed 250kt. The INT Director, a trainee being supervised by a mentor, responded by instructing the flight to continue the turn onto a heading of 250°, advising its range from touchdown and number in traffic. The instruction was correctly readback.

The INT Director then returned his attention to traffic already on the frequency and over the next 2min was engaged with other inbounds for the ILS; an outbound and GA traffic. The radar recording shows that during this period a slow moving 'unknown' ac wearing code 7000 is tracking S towards the B737's predicted track. Its unverified Mode C readout is indicating a climb and by the time the B737 is at a range of 11·8nm, the 'unknown' ac is passing altitude 4000ft, Mode C and indicating an unauthorised entry into Class D CAS of the Luton CTA where the base is 3500ft. It continues to climb, reaching 4500ft Mode C, by then at the base of Class A CAS of the LTMA. Shortly after reaching 4500ft it turns L onto a near reciprocal track to that of the B737 and by 1213:58 has commenced a descent.

In his written report the mentor controller states that both he and the trainee observed the unknown traffic at approximately 4000ft Mode C; he then took control of the frequency from the trainee. The RT and radar recordings show that, at 1214:02 and co-incident with the activation of low-severity STCA, the INT mentor transmitted *"B737 c/s avoiding action turn right heading er three five five break break B737 c/s right heading three five five avoiding action against unknown traffic in-er-side controlled airspace without a clearance south west of you by three miles before your turn indicating seven hundred feet below you".* The pilot readback the instruction and reported looking out. Further TI then followed *"…he's off your lefthand side now by two miles indicating seven hundred feet low"* which, again, was acknowledged. Moments later the flight was informed *"…coming clear of previously mentioned traffic…"* and instructed to turn L onto 270°.

The radar recording shows that, at the start of the INT mentor's transmission, the two ac are 4nm apart, with the B737 level at 5000ft Mode C, while the unknown is descending through 4400ft Mode C unverified. Twenty four seconds later, the B737's turn to the R is just beginning to show. By this time the range has reduced to 1·8nm and the unknown is at 4300ft Mode C and has turned L about 20°, so perpetuating convergence of the 2 tracks. Thereafter, when 1·6nm apart, the unverified vertical separation is 800ft as the unknown is passing 4200ft Mode C. Minimum horizontal separation is reached at 1214:38 when the B737 passes north of the unknown by 1·3nm. At this point the latter is indicating at 4000ft Mode C unverified. A little over a minute later the B737 is at a range of 4·7nm increasing and just establishing on the new heading of 270°. By this time the unknown ac is indicating below CAS again, at 3000ft Mode C unverified. Subsequently the B737 was re-integrated into the circuit pattern without further incident.

Once the INT mentor had detected the presence of the unknown traffic in CAS, he acted promptly, issuing avoiding action instructions and providing traffic information. This was in accordance with the guidance provided by MATS Part 1 in Section 1, Chapter 5, Page 13, Para 14.2, which describes the action to be taken by controllers to avoid *'unknown aircraft'* in various types of airspace. For Classes A and D airspace, it states that *"If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information passed".*

Additional guidance, in Para 14.3, states that *"Controllers providing a Radar Control Service are required to provide standard separation between aircraft in accordance with the table at Section 1, Chapter 2, Page 1. When avoiding action is issued to an aircraft under a Radar Control Service, controllers must seek to achieve the required minima and pilots **must** comply with the instructions given. In these circumstances, pilots must comply with avoiding action even if they report visual with the other aircraft."* A Radar Control Service was being provided to the B737 on this occasion, consequently the 'required minima' to be aimed for was 5000ft vertically and/or 5nm horizontally from the unknown. Attempting a climb of this magnitude in the LTMA would clearly have been impractical and potentially unsafe. Consequently, a solution in the horizontal plane was adopted and though the minimum was initially eroded it was subsequently regained with least delay.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

ATCO Members agreed that it was unusual to observe a Mode C error of this magnitude (>1000ft). Occasionally, small errors are detected by controllers during the verification phase, where a displayed Mode C has to be within 200ft of the ac's reported level, although these are few in number owing to equipment accuracy/reliability.

During the subject Airprox, the options open to the Luton APR for avoiding action were very limited, both laterally and vertically, owing to airspace constraints and the flight profiles of adjacent traffic SID and STAR traffic. Although the PA28's radar response presented itself to the APR as an unknown ac penetrating CAS and a potential threat to the B737, from the information furnished during the investigation it was clear that the unverified Mode C height readout was erroneous and that the PA28 pilot was operating below the CAS base of 3500ft and close to Henlow. This was unbeknown to the APR and, having seen the PA28's Mode C, he took avoiding action with the B737 in the lateral plane to resolve the perceived confliction, passing TI to its crew. During this manoeuvre the B737 crew saw the PA28 on their TCAS display and, owing to the encoder's erroneous output, a TA alert was generated. However, the PA28 was not seen visually, possibly because it was actually flying well below their ac's level and the avoidance R turn had placed the PA28 outside of the B737 crew's field of view. Members unanimously agreed that the cause of this Airprox had been faulty equipment (height readout encoder) in the PA28 giving erroneous Mode C indications of a penetration of CAS. The appropriate safety nets had worked (TCAS and STCA) and the combination of the Luton APR's avoiding turn and a prompt reaction by the B737 crew had swiftly removed any risk of collision during this perceived confliction. The PA28 pilot had seen the approaching B737 and had watched it pass well above during its manoeuvring. The Board were therefore able to conclude that safety had been assured throughout the encounter.

Members commented that AOC commercial ac have their transponders verified usually during every flight whereas GA operators may only have their SSR equipment validated/verified infrequently which could lead to a transponder fault going undetected for a considerable time. Members agreed that pilots/operators should make a conscious effort to carry out regular transponder confidence checks with a suitably equipped ATSU, when an opportunity arises, to ensure that any degradation in equipment performance and/or fault is captured at the earliest opportunity. It was agreed that the Chairman would follow this up outwith the Meeting.

PART C: ASSESSMENT OF CAUSE AND RISK

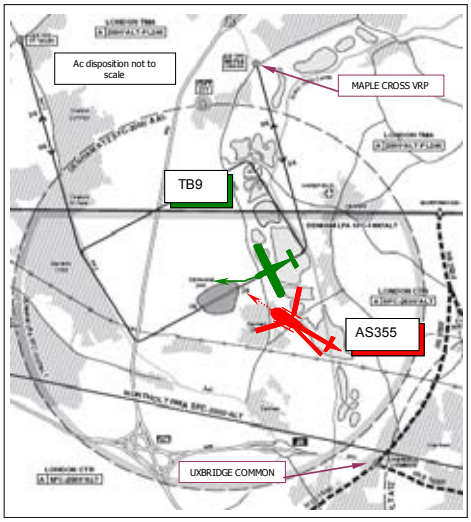
Cause: An equipment fault in the PA28 gave an erroneous Mode C indication of a penetration of CAS.

Degree of Risk: C.

Post Meeting Note: The Chairman has discussed with CAA-SRG and NATS the matter of regular transponder confidence checks.

AIRPROX REPORT NO 113/06

Date/Time:	23 Jul 1230 (Sunday)	
Position:	5135N 00031W (Final approach RW24 Denham - elev 249ft)	
Airspace:	Denham ATZ	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	TB9	AS355
Operator:	Civ Pte	Civ Comm
Alt/FL:	350ft (QFE 1011mb)	50ft↓ (QFE 1011mb)
Weather Visibility:	VMC CLBC >10km	VMC CAVOK 10km+
Reported Separation:	Nil V/30m H	Nil V/60m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB9 PILOT reports that his ac has a white/blue colour-scheme and the HISLs were on whilst flying circuits to RW24 at Denham, which has a fixed direction - RHD. He was in receipt of an AFIS from DENHAM INFORMATION on 130·725MHz and SSR was selected off in the Cct.

The helicopter was joining Denham from the S and the pilot had been "instructed" by the FISO to report downwind for RW24. He observed the AS355 continue directly towards the airfield and so he turned on his TB9's landing lights to make the ac more visible. Turning onto final approach for RW24RH, heading 240° at 80kt passing 350ft QFE (1011mb), the helicopter flew directly into the cct from his L as its pilot announced he was on FINAL to land. He was compelled to take action to avoid the helicopter which passed some 30m to port at the same height as he banked R and executed a GO-AROUND. The risk was assessed as *"high"*.

THE AS355F1 HELICOPTER PILOT provided an extensive and comprehensive account reporting that he was flying single pilot from the RHS pilot position. He was engaged in a photographic sortie of the mainline railway from Maidenhead to the marshalling yard NE of Acton, with the camera operator sitting directly behind him operating the specialist camera fitted to the underside of the helicopter. At about 1300 he elected to depart the area of the marshalling yard and proceed to Denham for fuel.

He had been under the 'control' of Heathrow APPROACH for about 2 hours before the Airprox and in order to proceed to Denham was cleared by APPROACH to transit W along H10, passing S of Northolt towards UXBRIDGE COMMON reporting point.

At UXBRIDGE COMMON he requested a frequency change to Denham which was approved by Heathrow APPROACH who instructed him to maintain his SSR code until on the ground at Denham. Descending to 1000ft London QNH he contacted Denham, clearly stated his position at UXBRIDGE COMMON and requested a join from this position giving all the "normal" information.

Denham - erroneously he thought that it was an A/G Service from Denham RADIO at the time - responded by telling him to report at MAPLE CROSS and gave him the runway and circuit direction. It was "immediately obvious to him" that the A/G Operator – actually the AFISO - was inexperienced and had "no idea where he was". In his view a join at MAPLE CROSS was not the best thing to do for the following reasons:

He would have to cross the extended centre line thus passing through the cct traffic and those ac on approach;

Aware of the delay that this would cause, he considered that the requirements of his sortie would best be served by joining from his current position;

He considered that this was the safest approach as traffic was circuiting to RW24RH and he would be remaining to the S of RW24.

He still thought that Denham had no idea what he was asking for and no real idea of where he was so he entered an orbit just NW of UXBRIDGE COMMON and repeated his full joining call emphasising his current position. He does not recall the exact response from Denham but it was "approved" and he felt that the "radio operator" had a clearer picture of where he was. Proceeding to make ground towards Denham, aiming to join L BASE-LEG for RW24, he made another call to Denham advising that he was going to join left BASE-LEG RW24. This was clear and unambiguous. He does not recall the exact response from Denham but there was a delay and he remembered commenting to his camera operator because of the lack of immediate response. Whilst starting to descend L BASE-LEG for RW24 he called FINALS, and he believed that the "radio operator" responded "roger" or something like that, but he still felt at this point that she didn't have a "full grip" of what was going on. Within his FINALS call he pointed out that he was visual with the ac that had just landed on RW24 that was about 2/3 of the way along the runway. He chose to continue knowing that he was making an approach to the threshold of RW24 and not requiring the runway surface at all. At this point neither himself nor his camera-operator passenger had heard any 'FINALS' call from any other ac nor did he see any other ac on FINALS, "assuming" there would be none as there was an ac still on the runway. Some 50yd SE of the threshold to RW24 descending through 50ft heading 300° at 30kt, just before reaching the hover at the threshold he saw another ac – the TB9 - pass down his starboard side about 60m away at about the same height or possibly a little (10ft) lower, which called overshooting: this was the first time that he had heard this callsign. Evidently both were on an approach at the same time, his helicopter from slightly S of the extended centreline and the TB9 lined up on the centreline of RW24.

The risk was assessed as *"high*". He added that in his view the Denham RADIO operator [FISO] had "no spatial awareness of what ac were where in the circuit and could not grasp that he was not following the fixed wing procedure even though he made his intentions clear and she agreed to these alternative arrangements".

THE DENHAM FLIGHT INFORMATION SERVICE OFFICER (FISO) reports that the AS355 pilot called to join from a position at UXBRIDGE COMMON. The AS355 pilot was told to report DOWNWIND RW24 RIGHT HAND if visual with the two ac downwind. This message was acknowledged by the AS355 pilot who proceeded to report for L BASE for RW24 with an ac on FINAL and one on BASE-LEG. The ac on FINAL landed as the TB9 on BASE established on FINALs. The AS355 pilot was "corrected" by being informed that the runway in use was RW24RH, whereupon the AS355 pilot reported FINAL in front of the TB9 established on FINAL, with an ac on the landing rollout on RW24. Thus the AS355 pilot was told to use the grass on the north-side to RW24 at his discretion and the TB9 on FINAL behind him went around.

UKAB Note (1): The UK AIP at AD2-EGLD-1-1 notifies the Denham ATZ as a radius of 2nm centred on RW06/24, extending from the surface to 2000ft above the aerodrome elevation of 249ft amsl. An AFIS or A/G Station operates variously during 0700-1900 in Summer on 130·725MHz.

UKAB Note (2): The UK AIP at AD 2.22 – Flight Procedures specifies that:

There is no overhead joining procedure. All aircraft in the Denham Local Flying Area (LFA) are restricted to a maximum altitude of 1000 ft amsl.

Circuit joining is achieved by establishing a long base leg and giving a position report at Chalfont St Giles for left hand circuits or Maple Cross for right hand circuits. The ATZ should be entered at a height of 750ft agl (1000ft amsl). Joining traffic should give way to circuit traffic.

Helicopters should follow fixed-wing procedures unless alternative arrangements have been made.

Denham LFA is that part of the Denham ATZ which lies within the London Control Zone (Class A). Flights without compliance with IFR requirements may take place in the LFA subject to the following conditions:

i Aircraft to remain below cloud and in sight of the ground;

ii Maximum altitude: 1000ft QNH;

iii Minimum flight visibility: 3 km.

Pilots of aircraft flying in the ATZ are responsible for providing their own separation from other aircraft.

UKAB Note (3): This Airprox occurred outwith the coverage of recorded radar.

FOI (H) reports that the TB9 was flying RHD circuits to RW24 at Denham when an AS355 joined from the S, the pilot of which was "instructed" to report downwind for RW24. The AS355 pilot continued directly towards the aerodrome and as the TB9 turned onto FINAL the AS355 flew directly into the cct and announced he was on FINAL to land, whereupon the TB9 carried out a GO-AROUND. Subsequent discussions with the AS355 pilot established that he had not flown regularly for some time and had only recently gained his commercial licence. The pilot accepts that he did not comply with the published joining procedures for Denham and that it would have been more appropriate to have left the London CTR at NORTHWOOD reporting point and joined via MAPLE CROSS. Had he done so, the conflict with the TB9 would probably have been avoided.

ATSI comments that the Manual of Flight Information Services (CAP410) – Part B Aerodromes contains information for the guidance of FISOs. Chapter 1 Para 2.1 RESPONSIBILITY OF FISO describes the specific responsibilities, the first two of which are:-

a) issuing information to aircraft flying in the aerodrome traffic zone to assist the pilots in preventing collisions; (and)

b) issuing instructions and information to aircraft on the manoeuvring area to assist pilots in preventing collisions between aircraft and vehicles and obstructions on the manoeuvring area or between aircraft moving on the apron."

In addition, Para 7.4 Joining circuit states:-

"Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly. Although there is a legal requirement for pilots to report entering and leaving the ATZ (Rule 39 of the Rules of the Air Regulations), this is not the case for other reports in the circuit. Any requests for position reports downwind, final etc., for the purposes of passing traffic information, only have the status of a request although it is expected that most pilots will comply."

Denham Aerodrome does not record the RTF and is not required to do so. As a result it is not possible to establish without doubt the timings and contents of the messages issued by the parties involved. Consequently, reliance has to be placed on the available written reports and for the Denham FISO's part it would appear that she fulfilled her responsibilities in the provision of a FIS to the respective flights operating within the Denham ATZ.

The overarching principle in the provision of FIS at an aerodrome, is stated in CAP410 in the introduction…*"A Flight Information Service (FIS) provided at an aerodrome is a service provided to give information useful for the safe and efficient conduct of flights in the Aerodrome Traffic Zone*." Faced with the helicopter reporting approaching from a direction which did not readily give safe access to the published entry VRP, MAPLE CROSS, the FISO's decision to request the helicopter to report downwind for RW24RH was prudent because she was acquitting both her overall and specific FISO responsibilities. Requesting a report at MAPLE CROSS may have induced the pilot to adopt a route that could have placed his helicopter into direct conflict with RW24RH cct traffic, particularly those on a R BASE-LEG.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a report from the aerodrome Flight Information Service Officer and a report from the appropriate ATC authority.

A very experienced pilot Member commented that many of the small GA aerodromes around the periphery or within the confines of the London CTR boundary - such as Denham - have special rules for visiting ac joining their visual cct which enables them to operate safely in the very confined airspace available to them and also coexist in harmony with the local inhabitants. A controller Member who is also a GA pilot and operates from this

aerodrome opined that this is one of the "tightest" ccts in southern England and he stressed that strict compliance with the promulgated procedures is essential. With Denham aerodrome itself and the majority of the ATZ situated within the boundary of the London CTR, the ATZ is notified as Class A airspace. Therefore, a Local Flying Area (LFA) is established to enable pilots to operate into this aerodrome under VFR following strict procedures.

It was evident from the information promulgated in the UK AIP and reproduced at UKAB Note (2) that helicopters *"should"* comply with the same procedures as those specified for fixed-wing ac – but this was unless *"alternative arrangements"* have been made. It was also clear that at this aerodrome either an A/G RADIO operator or a FISO are provided, neither of whom are empowered to issue 'instructions' to pilots in the air. With a FISO on duty this day, the helpful report from ATSI had explained that from the information provided by the FISO the pilot must assess the situation himself, make his own decision as to whether it is safe to proceed into the ATZ and taking account of other cct traffic has to integrate his own ac into the established pattern. The AS355 pilot's report implied to some a lack of understanding on his part of the intrinsic differences between a full aerodrome control service provided by an Air Traffic Controller, who can issue instructions using callsign TOWER; a FISO - as here, using the callsign INFORMATION - and at the other end of the scale an A/G Station using the callsign RADIO. Whilst it might seem odd to have merely a FIS available in Class A airspace, procedures have been established for the safe operation of the aerodrome and a Member commented that if they are complied with it does work well. It was important to recognize here that the Denham FISO only provided 'INFORMATION' about the aerodrome and cct traffic and none of these transmissions to ac in the air should be construed as being an 'instruction'. Transmissions from FISOs are therefore couched in the form of 'advice' or 'requests' and not 'instructions' that demand obligatory compliance. Thus it would appear that the 'request' imparted by the FISO to the AS355 pilot was, according to the latter's report, to join initially via MAPLE CROSS. But this was not mentioned in the FISO's report, although this was in compliance with the promulgated procedure for fixed wing ac which the AIP specified helicopters *"should"* follow. But *"should"* is not mandatory and could be termed *"strongly advisable"* albeit that FISOs could reasonably expect pilots to conform.

The lack of an RT transcript severely limited the ability of the Board to resolve such anomalies over exactly what was said but a join via MAPLE CROSS would have necessitated the AS355 continuing along 'H5' outside the ATZ, northbound to NORTHWOOD and thence via MAPLE CROSS onto a long R BASE LEG for RW24RH. Whilst this might have given the AS355 pilot the impression that the FISO had not understood that he was approaching the aerodrome from the SE, this was clearly the promulgated procedure and for this very 'noise sensitive' area would have been strongly advisable unless the AS355 pilot had an overriding reason for not doing so. Those points stated in his report, in the Board's view, did not seem suitable grounds. Subsequently, it would appear that the FISO 'requested' the AS355 pilot to report DOWNWIND for RW24RH and both the FISO and the TB9 pilot had mentioned this in their accounts, although significantly not the AS355 pilot. A join DOWNWIND for 24RH, whilst it would have necessitated crossing the climb-out to RW24 and entering the RH cct from a crosswind leg, would have enabled the AS355 to sight traffic in the cct on his R or departing, integrate easily into the established traffic pattern formed by the other ac already in the cct and comply with the 'Rules of the Air'. Whereas this was not a promulgated joining procedure, a military pilot Member could see little difficulty with that but another military pilot said it could be construed as the FISO offering an "alternative arrangement". It was not clear if the FISO was empowered to make "alternative arrangements" and the AS355 pilot does not seem from his account to have recalled this transmission. However, as it turned out he did not do this; the helicopter pilot reports that instead he announced in his joining call that he intended to continue inbound from UXBRIDGE COMMON to join left BASE-LEG for RW24RH. He said he advised what he was going to do twice and perceived that this was agreed by the FISO. Members debated whether the AS355 pilot had indeed sought an "alternative arrangement" himself as his account had suggested. But whether the Denham FISO was empowered to agree to this "alternative arrangement" was not clear. In the Board's view, whilst a CAT pilot Member believed the procedures to be robust they were evidently not comprehensive as they did not seem to cater for helicopters joining from the London Helicopter routes SE of Denham and other Members believed that a review would be beneficial. Having obtained the aerodrome & cct information, irrespective of whether the FISO "agreed" to the AS355 pilot's request to join L BASE for RW24 or whether it was an "acknowledgement" of the helicopter pilot's stated intention, it was solely the AS355 pilot's responsibility to enter the ATZ safely and then integrate with the traffic already established in the RW24RH cct. The FISO was not empowered to refuse entry into the ATZ nor to decline the AS355 pilot's request. From his account the helicopter pilot believed joining L BASE was the best course of action, but it was clear that flying direct to the threshold of RW24 was perhaps unwise as it gave him less of an opportunity to sight other circuiting ac and integrate his arrival into the pattern already formed. Compliance with the procedure would, in the view of FOI(H) and, reportedly with the benefit of hindsight, now that of the AS355 pilot, have permitted him to avoid the conflict that developed on FINALS. Moreover, his decision to fly direct toward the threshold for RW24

seemingly denied the AS355 pilot the ability to spot the TB9 turning in from the opposite direction and the helicopter's arrival ahead of the TB9 subsequently triggered the latter pilot's GO-AROUND. As it turned out the AS355 pilot had not detected the presence of the TB9 at all until he saw it pass down his helicopter's starboard side during the GO-AROUND. Again the absence of an RT recording of the Denham frequency did not allow the Board to determine what was actually said by the pilots at the time. The AS355 pilot reports that he had not heard any calls from the TB9 pilot at all before he called FINALs. Whilst it seemed extremely unlikely that the TB9 pilot was not making appropriate cct RT calls, it was not feasible to resolve this anomaly. For whatever reason, it was clear that whilst the TB9 pilot was established in the cct and had seen the AS355 approaching from the S, the latter's pilot had not seen the TB9 and called FINALs unaware of the aeroplane closing in rapidly from his starboard quarter because he had not integrated his ac's cct join safely. This was the crux of the issue and the Board concluded that this Airprox had resulted because the AS355 pilot did not join the Denham RW24RH cct in accordance with published procedures and flew into conflict with the TB9 on final approach, which he saw too late.

From his perspective, the TB9 pilot was clearly aware of the approaching helicopter from the outset. He had spotted the AS355 flying directly towards FINALs, had it fully in view and was prepared to avoid it when the AS355 pilot turned in ahead of his ac. As the TB9 pilot said that this was only 30m away at the closest point this suggested to some that safety was not assured. However other Members contended that the TB9 pilot had forestalled any risk of a collision because he was able to take appropriate action and initiate a GO-AROUND. The Board was fairly evenly divided in this issue so the Chairman called for a vote; in the end by a significant majority the Board concluded that no risk of a collision had existed in these circumstances.

The Board was apprehensive over the absence of any defined procedure for helicopters joining the Denham cct from the S via the London Helicopter routes. Whilst it was clearly stated in the UK AIP that *"Circuit joining is achieved by establishing a long base leg and giving a position report at…Maple Cross for right hand circuits"*, this by necessity required helicopters following the London Helicopter routes to fly out of the London CTR via NORTHWOOD and thence to MAPLE CROSS, which, although a helicopter pilot Member opined, was the recognized Denham joining point, it was clearly open to mis-interpretation and required approval from HEATHROW SPECIAL VFR. Notwithstanding that it seemed to some Members that the AS355 pilot might have met all published requirements and made an "alternative arrangement", the Director was charged with writing to the Denham aerodrome operator to seek a review of procedures, specifically for helicopters joining the Denham cct from the S inbound along the London Helicopter routes.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AS355 pilot did not join the Denham RW24RH cct in accordance with published procedures and flew into conflict with the TB9 on final approach, which he saw too late.

Degree of Risk: C.

Post Meeting Note: Clarification was sought from ATSI regarding the issues surrounding *"alternative arrangements"* as related to this Airprox. ATSI concluded that a FISO is not empowered to make *"alternative arrangements"*. For ac in the air the extent of the FISO's remit is the passing of traffic and essential aerodrome *information* and making requests. Consequently, it does not extend to making an 'arrangement' because an 'arrangement' could not be made without agreement and neither a FISO nor an A/G Operator can be a party to any agreement or indeed any approval.

In the context of operations at Denham, the notion of *"unless alternative arrangements have been made"* means something that has been pre-arranged beforehand and it is clear that such arrangements as may be made are not intended to be 'tactical' in nature. In his letter to the aerodrome operator, the Director will ask that these issues be reviewed and clarified.

AIRPROX REPORT No 114/06

AIRPROX REPORT NO 114/06

Date/Time:	25 Jul 1624	
Position:	5150N 00153W (12nm NE of Aston Down- elev 600ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	LS8 Std Glider	VC10
Operator:	Civ Pte	HQ STC
Alt/FL:	1600ft (QNH)	3000ft↓ (QFE 1006mb)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>20km	>10km
Reported Separation:	½ - 1km H	500ft V/ ½nm H
Recorded Separation:	NR V/ ~2½ nm H	

It was not possible to construct a diagram of this incident.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS8 STANDARD GLIDER PILOT provided a brief report stating that she was in a high workload situation recovering to Aston Down after a long cross-country competition flight. She was heading SE at 65kt when she first sighted a grey VC10 5-8km away, tracking S past Kemble and near Aston Down's 15m National Championship NOTAM area while 33 gliders were recovering from their cross-country competition. She turned L to fly parallel until it had passed and assessed the risk as being medium.

THE VC10 PILOT reports recovering from a Lichfield Corridor transit at FL140 to self-position for an ILS approach to RW08 at Brize Norton and in receipt of a RIS from them. He was heading 170° at 230kt, tracking towards a position 10nm on the final approach with the captain as the handling pilot. In the latter stages of recovery, Brize Norton APR called several contacts ahead of them but, although the visibility was >10k, due to some haze and flying into sun the ac was slowed to 220kt (normally 250 KIAS) to assist with lookout and ease any possible avoiding action.

ATC called a glider several times. While they were in a slow descent to 2500ft QFE, the navigator saw a glider in their 11 o'clock range 2nm about 1000ft below them on a parallel course. It was slightly L wing low as if it were turning away. The navigator watched the glider continuously and gave the crew a continuous commentary. When the glider reached their 1030 position at a range of 1½nm, its wings were seen to bank R. An immediate R turn through 20° was made and the ac - which was descending through 2800ft QFE - was climbed 300ft to 3100ft QFE; the navigator was visual with the glider for about 30sec before the turn away. When the glider was in the 9 o'clock position it was seen to turn R behind them, still well below. He waggled the wings to show that they had seen the glider, estimating the closest proximity to be ½nm horizontally and 500ft min below.

The VC10 landed at 1625 (the NAV log was retained by the Station).

The closest the VC10 came to Aston Down was 9nm horizontally and 7nm from Kemble.

UKAB Note (1): The incident was originally reported by telephone to the Lyneham Supervisor as occurring with a C130. It has been established that there were no C130s airborne from Lyneham at the time.

UKAB Note (2): The VC10 reported the incident as commencing on the Brize Norton TACAN bearing 320(M) at 12nm. This is 10nm from the position reported by the glider pilot. Also, the glider pilot reported the incident as taking place at 1624 and the VC10 was recorded as landing at 1625. It was therefore initially thought that the responding VC10 was not the one involved but it was subsequently found to be the only one airborne in the UK FIRs at the time. It was therefore thought that the position and time reported by the glider pilot were inaccurate so a second evaluation of the radar recording was conducted. This showed the VC10 conducting a normal

recovery to Brize Norton, descending and tracking 160° to intercept the centreline at 10nm at FL22. The 20° R turn and climb referred to by the VC10 captain can be seen commencing on the radar recording at 1620:06 while he is 5nm NNE of the position reported by the glider pilot. The separation distances from Aston Down and Kemble are verified by the radar recording. At that time 2 primary returns appear 3½ nm to the E (port) of the VC10 for each for 2 sweeps. The W'ly of the 2 contacts appears to be the one seen by the VC10 pilot but was 6½ nm NNE and 4 min earlier than the position/time reported by the glider pilot.

UKAB Note (3): Due to the discrepancy between the route of the VC10 as verified by the radar recording and the position reported by the glider pilot, the UKAB secretariat contacted the glider pilot for clarification. She was in a high workload situation on a marginal glide at the end of a long cross-country competition. Even after consulting the data logger immediately after the flight she was not certain of the exact position of the incident. It could have been several miles further to the N and a few minutes earlier. If that were the case, it was thought most likely that the TI passed to the VC10 had been in respect of the subject glider and that was the one seen by the navigator and which showed briefly on the radar recording. Assuming that to be the case the horizontal separation was of the order of 2½ nm.

VC10 STATION COMMENTS After discussing this incident with the VC10 captain and navigator, the acting Squadron Commander considered that although he was maintaining VMC the captain sensibly slowed down from 250 KIAS to 220 KIAS to allow greater margin to see and avoid other ac. Further, Brize Norton ATC gave a clear and concise commentary on other contacts which allowed the crew to pick up the glider in the haze. The navigator gave an excellent commentary enabling the captain to acquire the glider and subsequently, when the glider turned towards the VC10, to take appropriate avoiding action. He considered that this very experienced crew handled this incident in a thoroughly professional manner.

MIL ATC OPS reports that a VC10 ac was recovering to RAF Brize Norton under a RIS from Brize Norton APR in the descent to 2500ft Brize Norton QFE 1006mb. At 1617:05 APR passed TI to the VC10 crew as "*VC10 C/S, traffic 12 o'clock, 6 miles manoeuvring slow moving, no height information believed to be a glider*". The VC10 crew reported "*looking*". 30sec later the VC10 crew requested an update on the position of the glider, APR reported it as "*left 11 o'clock 5 miles, north east bound, no height information".* APR limited TI available to the VC10 crew at 1617:51 "*from ahead as you approach an area of high traffic density, further traffic 12 o'clock, 6 miles manoeuvring, no height information and left 11 o'clock 10 miles, four contacts all manoeuvring no height".* Further TI was passed at 1618:26 "*VC10 C/S, closest contact now slightly left of your 12 o'clock at 4 miles manoeuvring no height*". Further TI was passed to the VC10 crew at 1619:04 on "*traffic 12 o'clock, 2 miles, left/right, no height information*" and 30sec later "*Traffic 10 o'clock, four miles, left/right, no height information".* At 1620:38, APR informed the VC10 crew "*you've passed through all the gliders now to the north and north east of you going away".* The VC10 crew continued inbound with no further mention of glider activity by APR.

A British Gliding Association competition was being held at Aston Down Gliding Site, the activity being detailed in a NOTAM:

AUS 06-07-0081/2305/AS2

MAJOR BRITISH GLIDING ASSOCIATION (BGA) COMPETITION INCLUDING

CROSS-COUNTRY RTE. INTENSE ACTIVITY WI 5NM RAD 5142N 00208W (ASTON DOWN AD, GLOUCESTERSHIRE). UP TO 50 GLIDERS AND 8 TUG ACFT MAY PARTICIPATE. GLIDERS WILL NORMALLY OPR BLW THE INVERSION LEVEL OR BTN THE TOPS OF ANY CUMULUS CLOUDS AND 500FT AGL. REGULATED AIRSPACE WILL BE AVOIDED UNLESS PRIOR ATC CLEARANCE HAS BEEN OBTAINED. AFTER LAUNCH ACFT MAY BE CONCENTRATED IN THE AIRSPACE AROUND AND JUST DOWNWIND OF THE SITE OR ON THE FIRST LEG OF THE CROSS-COUNTRY RTE.

FOR INFORMATION ON RTE FOR THE DAY AND LIKELY TAKE OFF TIMES CONTACT GLIDER CONTEST CONTROL TEL xxxxxxxxxx

F)SFC G)10000 FT AGL

HQ STC comments that although the VC10 crew's recovery required them to pass close to the competition NOTAM, the TI passed by the Brize APR helped them to see and avoid the glider by a sufficient margin.

AIRPROX REPORT No 114/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended the VC10 pilot for his detailed report and for his sensible action to mitigate the risk while he was obliged to fly through an area of high glider activity on recovery to his base. The Board was informed that a similar incident had occurred last year and that it had been widely publicised and discussed at Brize Norton which might have influenced that Captain's chosen course of action.

The Board noted that when contacted by the Secretariat, the glider pilot accepted that the position and time she had originally provided could have been inaccurate (the incident could have occurred earlier and further NE). The glider pilot added that she had been on a marginal glide and was the second to last ac to land which provided further corroboration that the glider identified on the radar recording, and most likely the one seen by the VC10 crew, was the reporting ac. That being the case, the incident had most likely occurred in the position reported by the VC10 pilot which was 10nm NE of the position reported by the glider pilot and 12nm NE of Aston Down. The Board accepted this explanation of the incident but could not be certain that the radar contact was that of the reporting glider since both pilots reported it as being closer than the 2nm (approx) measured from the last known position on the radar recording (Clee Hill not Brize Norton). There were however, only 2 very intermittent primary contact displayed and those had been in the correct geometrical location to fit the respective pilots reports and the TI passed by Brize Norton APR.

In accepting that explanation the Board determined that this incident had been a sighting report.

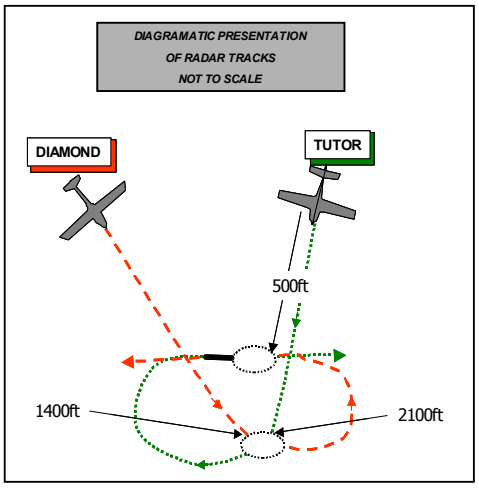
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT NO 115/06

Date/Time:	26 Jul 0940	
Position:	5224N 00017W(10nm W Wyton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Grob Tutor	Diamond DA40
Operator:	HQ PTC	Civ Trg
Alt/FL:	500ft↓	1000ft↓
	(RPS 1013mb)	(QNH 1017mb)
Weather	VMC CLBC	VMC HAZE
Visibility:	20km	5-6km
Reported Separation:		
	50ft V/0 H	250ft V/150-200m H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR PILOT reports flying a training flight with a student pilot in a white ac with HISLs selected on, squawking 7000 with Mode C and in receipt of a FIS from Wyton. While his student was performing a PFL to a grass field 1nm SE of the village of Hamerton at a height of 2500ft agl and heading S, a white single engined propeller ac passed about 500ft below them heading in an E direction. The right-hand PFL was continued and at about 500ft agl the same aircraft appeared from behind the nose of his aircraft. It was heading directly towards them and appeared to be in a slight left turn. He took control, applied full power and pitched up sharply to avoid the other ac but he observed no avoiding action from the other ac as it emerged behind his wing. He reported that his concentration was divided between lookout and teaching the PFL manoeuvre. He briefly continued the PFL before curtailing the sortie and returning to RAF Wyton. He assessed the risk of collision as being high.

THE DIAMOND DA40 PILOT reports that he was flying a white ac with strobes selected on as an instructor with a student flying in the local training area N of Cranfield. He was squawking 7000 with Mode C and was in receipt of a FIS from Cranfield APP. He was conducting a PFL exercise without power, which had been fully briefed, and the student held a PPL and was in the early stages of training for his ATPL. The conditions were stable and although quite hazy were sufficient for the exercise; the surface wind at Cranfield was 120/04. The area selected was about 4nm N of Grafham Water and after a good lookout which did not reveal any other ac, the power level was set to idle and the student commenced a PFL from 3000ft on the QNH of 1017. The student set the attitude for best glide - which equated to a speed 75kts IAS - and carried out a standard pattern intending to be able to land in a field into the wind. Towards the end of the standard pattern and about 1/3 of the way around the cone section in a descending turn to the left to position towards a short final he saw a Grob Tutor about 150-200m away. It was climbing from their 3 o'clock position, from right to left; and was initially about 300ft above their height then it passed over their ac. At that point there was no risk of collision. He took control of the ac and continued to descend through 1000ft QNH to about 800ft with wings level. With the other ac in sight and clear he commenced a climb in a SE direction and then returned to Cranfield. He assessed the risk as being low.

UKAB Note (1): The tracks of both ac can be seen of the recording of the Claxby Radar. Both ac are seen to make opposing circuits to the same area/field (calculated to 0.1nm) as shown on the diagram above. At the CPA however, both ac are below recorded radar cover.

UKAB Note (2): From the pilots' reports above it would appear that the Diamond pilot only saw the Tutor on the second pass.

HQ PTC comments that this occurrence happened in Class G airspace between 2 training ac from different units flying PFLs to the same field at the same time but in opposite directions. The severity of this Airprox was reduced by the lookout and action by one of the pilots involved. Although a distraction from training, instructors and

students need to remain vigilant at all times and expect the unexpected especially when conducting capacity-intense training exercises.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This incident was a most improbable occurrence where two instructors independently decided to conduct a PFL in the same place at the same time, their students selecting the same field but approaching it in opposing directions. Both ac had an equal right to be in their respective positions in the Class G airspace and both students had complied with their respective procedures in the light (and, most likely, variable) wind conditions.

PFLs are always high workload situations for instructors (and their students) with the conflicting requirements of lookout and instructing their student in an unusual situation requiring their time. While most if not all instructors are very aware of this, this incident again amply demonstrates the absolute necessity for a good all-round lookout in these circumstances.

Since the Grob pilot saw and initiated effective action to avoid the Diamond, the Board determined that there had been no risk of collision.

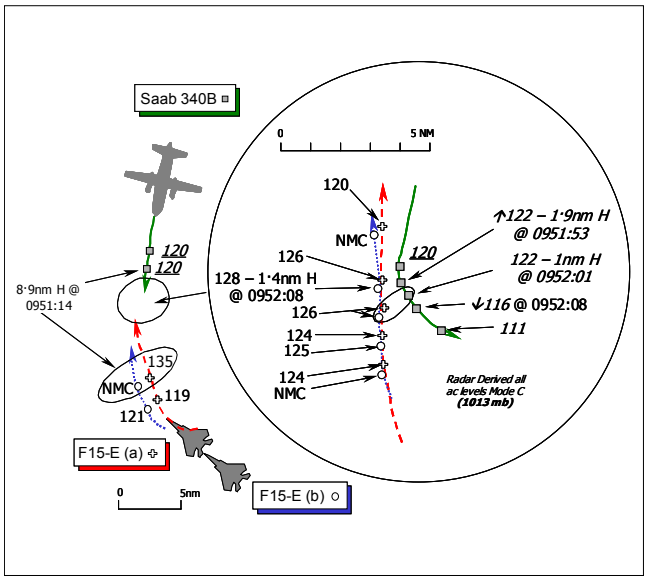
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G Airspace resolved by the Grob Tutor pilot.

Degree of Risk: C.

AIRPROX REPORT NO 116/06

Date/Time:	31 Jul 0952	
Position:	5653N 00412W (11nm N by E of RANOK)	
Airspace:	ADR W3D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	Saab 340B	F-15E x2
Operator:	CAT	Foreign Mil
Alt/FL:	FL120	FL120
Weather	IMC	VMC CLOC
Visibility:	6nm	10-15km
Reported Separation:	Minimal V/1-2nm H	>1000ft V/2-3nm H
Recorded Separation:	200ft V @ 1·9nm H 1nm H @ 400ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB SF340B PILOT provided a very comprehensive account reporting that the Airprox involved two military ac – light grey F15s flying in formation - and occurred some 15nm N of RANOK whilst his airliner was in transit southbound from Inverness to Edinburgh on W3D under IFR. He was in receipt of a RAS from ScACC on 127·275MHz, flying in IMC level at FL120, some 500ft above cloud with an in-flight visibility of 6nm.

Heading 193°(M) at 220kt, ATC advised of traffic at 12 o'clock at about 10nm. TCAS proximate traffic was observed 10nm away indicating 1000ft above and then a second TCAS contact emerged also in their 12 o'clock at 10nm indicating 800ft above. As both contacts closed towards his Saab, initially 1000ft separation was maintained but vertical separation then started to reduce and a TCAS TA was enunciated; the traffic also appeared to be passing slightly to the R of his ac. The autopilot was disengaged and an avoiding action L turn commenced onto 090° [UKAB Note (1): Following his request to the ScACC W COAST controller for an avoiding action turn.] As the turn was initiated a TCAS 'CLIMB' RA was enunciated commanding a 3000ft/min RoC with which they complied. The 'CLIMB' RA then changed to a 'DESCEND DESCEND NOW' RA that was complied with until TCAS enunciated 'CLEAR OF CONFLICT'. The conflicting F15 formation was visually acquired at a range of approximately 5nm and visual contact maintained until they had passed down the starboard side of his Saab 340B and the conflict was resolved. Minimum observed horizontal separation was between 1-2nm, with negligible vertical separation. His ac was then returned to level flight at FL120 whereupon ATC cleared them to resume their own navigation to RANOK. ATC was notified about the RA manoeuvres. He assessed the risk as *"high"* before the avoiding action was taken but *"low"* thereafter.

THE F-15E PILOT reports that he was leading a flight of two twin-seat F-15E ac flying under VFR in VMC northbound, some 2000ft above and below cloud with an in-flight visibility of 10-15km. A squawk of A7001 was selected, he thought [the radar recording shows that A7000 was displayed by both jets] with Mode C; Mode S is not fitted. They were not in receipt of an ATS. Operating in conjunction with another flight of 2 similar ac that were flying in the LFS system they were descending down towards them as they proceeded N at 360kt. The ADR was crossed to a place where they could descend lower because of weather in the area and they were using their ac's radar to scan for traffic. They established radar contact with the airliner at a range of 12nm. Heading NNW flying straight and level at FL120, with both ac of the formation within 4000ft horizontally of one another, the white airliner was visually acquired at 8nm off its right hand side and it appeared to be in a *"shallow"* L turn. It did not appear to him that there was a *"flight-path conflict"* with the airliner, which, he believed passed by some 2-3nm away and vertically separated by 1000ft or more. He assessed the risk as *"low"*.

THE ScACC WEST COAST COMBINED TACTICAL & PLANNER CONTROLLER (W COAST) reports that whilst performing the duties of both TACTICAL and PLANNER his workload was light to moderate although there

was interference on his RT frequency due to weather. The Saab 340B was tracking southbound on the advisory route maintaining FL120 to the N of RANOK when he noticed 2 contacts tracking SW about 25-30 miles SE of the Saab 340B passing at least 10nm ahead.

After dealing with other traffic on the Sector he noticed the 2 contacts – the subject F15 flight - had turned northbound at FL130 and so he immediately called the traffic to the Saab 340B crew at 12nm range. The Saab 340B crew reported the traffic was shown on TCAS and so he asked the pilot if he wanted an avoiding action turn. This was requested so he turned the Saab 340B L onto 090°. Shortly afterwards the Saab 340B crew reported "TCAS avoidance" - a climb, followed by a descent. The 2 contacts [the subject F15 flight] passed about 1nm down the right-hand side of the Saab 340B.

Once the other traffic was clear of the Saab 340B, the crew resumed their course towards RANOK and climbed back up to FL120. The Saab 340B pilot reported that he would be filing an Airprox.

ATSI reports that at the time of the Airprox, one controller was fulfilling both the TACTICAL and PLANNER roles whilst operating the W COAST Sector. The traffic loading was reported as 'light' but there was considerable co-ordination required. The Saab 340B crew contacted the W COAST controller at 0944:30 and reported passing FL90 for FL120, bound for Edinburgh. The controller acknowledged the call and instructed the crew to squawk ident. At 0946:50, the controller informed the Saab 340B crew that they were now in receipt of a RAS and, later at 0948:45, W COAST advised the crew that they could route via RANOK and then STIRA for Edinburgh. At this time the Saab 340B was still following the centreline of ADR W3D and level at FL120 with the subject F15 flight 24nm SE of the Saab 340B, both F15s squawking A7000 [UKAB Note (2): At this point the F15 flight was steady SW'ly indicating on Mode C vertical manoeuvres up to the Saab's level before descending to about FL103/104. A climb through FL108 then FL115 is evident before, at 0950:32, the radar recording shows that the F15s made a R turn onto a NW'ly then N'ly heading towards the Saab 340B which was now 18nm N of RANOK. The F15s continued to manoeuvre vertically at a range of 11·7nm, indicating FL119 & FL121 respectively at 0950:59.] At 0951:00, the W COAST controller transmitted to the Saab 340B crew "…*there's traffic in your 12 o'clock range 10 miles tracking northbound, indicating unverified 1-2-8 and 1-2-3, traffic in your 12 o'clock passing left to right*". Whilst he was transmitting, STCA activated and then the Saab 340B crew reported *"Roger..TCAS contact TCAS contact* [C/S] *we're looking"*. The controller replied [just before 0951:20], "*Roger, they've both just started to climb it's unverified one indicating 1-3-8 now and the other indicating 1-3-2 and he's maintaining level*". The controller then transmitted [moments later] "…*if you wish an avoiding action turn let me know please*". [UKAB Note (3): The ScACC unit investigation found there was 7nm between the conflicting traffic and the Saab 340B at this point.]

MATS Part 1, Section 1, Chapter 5, page 3, para 1.4.1 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 3000 feet, except when specified otherwise by the CAA*".

In this case, the controller did not comply as he was required to pass avoiding action as it was clear that the prescribed separation would not be achieved. At 0951:30, the crew of the Saab 340B requested *"Yes turn left please"* but the controller asked for this to be repeated due to weather interference on his frequency making the crew's transmission garbled. [UKAB Note (4): The ScACC unit investigation found weather interference on the frequency was not contributory to the incident but did break up communication on occasions and may have delayed the avoiding action.] The crew repeated *"er request left turn* [C/S]" and the controller transmitted [just before 0951:40], "[C/S] *turn left heading 0-9-0 degrees*". The words 'avoiding action' were not used in this transmission. At this time, the Great Dun Fell Radar (GDF) recording shows the two F15s in the Saab 340B's 12 o'clock - 5nm slowly crossing from L to R with one indicating FL127 and the other FL140 whilst the Saab 340B maintained FL120. The Saab 340B crew read back the instruction to turn L and advised that they were now *"..visual with the traffic"* – the F15s - which passed down the Saab 340B's right hand side. Shortly afterwards at 0952:00, the crew advised that they were following a TCAS descent. [UKAB Note (5): Which W COAST acknowledged; just after 0952:30, when the controller advised the Saab 340B crew that *"…you're just clear of the traffic now..still tracking northbound behind you…in your..6 o'clock range of 5 miles as you wish you can climb back to 1-2-0".* Moments later at 0952:40, the Saab 340B crew advised that *"roger we're..clear of traffic now climbing back to..1-2-0.*]

UKAB Note (6): In addition to the ScACC radar recording and due to label overlap, prints of the Great Dun Fell radar recording helpfully provided by ATSI were also reviewed and the analysis in this note uses data from both sources. After departing from a NE/SW racetrack the pair of F-15Es – the leader believed to be F-15E (a) and the No2 F-15E (b) – are shown squawking A7000, steadying northbound climbing through FL119/121 unverified Mode C. At 0951:14, F-15E (a) closes to a range from the Saab 340B of 8·9nm climbing through FL135. The wingman's Mode C is not evident, the Saab 340B itself maintaining a level cruise at FL120. After ascending to about FL144 with the No2 following to FL129, the pair then descends, F-15E (a) indicating FL124 at 0951:47 with the No2 NMC. On the next sweep the Saab 340B's climb to FL122 is evident in response to the reported TCAS 'CLIMB' RA with the closest of the F-15E pair 1·9nm away 200ft above the airliner at the point of minimum vertical separation. Minimum horizontal separation of 1nm (GDF) – 0·9nm ScACC - is achieved at 0952:01, with 400ft vertical separation evident on Mode C. At a range of 1·4nm from F-15E (b), the Saab 340B reversed into a descent through FL116 and in accord with the reported TCAS descent. Bottoming out at FL111 on the next sweep the Saab 340B then commenced a climb to regain the assigned level of FL120 as the F-15E pair clear to the N.

HQ 3AF comments that the F-15E pilot acquired the Saab SF340B at 12nm on radar and then at 8nm visually when he noted that it appeared to be turning left and out of confliction with his formation; it was, therefore, unfortunate that he then passed sufficiently close to the Saab to cause its pilot to file an Airprox. That said, both pilots assessed the risk as "low" and had either the F-15s routed further to the W or the Saab received timely avoiding action the potential for an Airprox may well have been eliminated altogether.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear from the F-15E formation leader's report that he was actively engaged in joining up with another flight of similar ac at the time of this Airprox. This point was reinforced by the HQ 3AF Advisor who suggested that the planned rendezvous might have been focusing the minds of the crews involved unduly. The lead F-15E pilot adjudged that they had afforded the Saab 340 as sufficient clearance as necessary at the time - a range of 2-3nm had been reported by him as the minimum horizontal separation with greater than 1000ft of vertical separation – and in his view it did not appear that there was a *"flight-path conflict"* with the airliner. In the Board's view, this was evidently not the case as the radar recording had shown that the distances reported by the F-15E lead pilot were somewhat optimistic and more than actually obtained. Despite the F-15 crew acquiring the Saab 340 at a range of 12nm on AI radar and then visually spotting the airliner from 8nm, the jets still flew closer than their leader thought.

The Board then discussed at length the effect of the fighter's proximity to the Saab 340, the HQ 3AF Advisor reaffirming that the crews should have been cognisant of the potential for inducing a TCAS RA as they flew towards the Saab 340's TCAS surveillance envelope. But the fast-jet crews seemed entirely unaware that their manoeuvres in the vertical plane - as they approached from the S - had generated the two RAs. Fast-jet pilots should be in no doubt that if they point their ac towards an ac fitted with TCAS II and fly towards it or its projected track within the TCAS envelope, then an RA will invariably be triggered. A CAT pilot Member pointed out that the commanded RoC was 3000ft/min, demanding a significant response from the Saab 340 crew. Here, it seemed the jets' own descent below the Saab 340's cruising level of FL120 triggered the initial TCAS CLIMB RA, before the F-15's climbed and subsequently descended to within 400ft of the airliner which had induced the corresponding RA reversal into a descent. However, the Saab crew's prompt compliance then effectively increased the vertical separation below the F-15 pair.

In a different vein, the Board was also briefed that 3AF crews do receive the same flight safety briefing material as their UK military colleagues. RAF En Route Charts clearly show the nominal 5nm boundary of W3D and the pertinent guidance previously promulgated by HQ STC regarding crossing ADRs still held sway. That guidance is to cross preferably under a radar service; expeditiously in level flight at the appropriate quadrantal level; and perpendicular to the ADR wherever possible. This advice had been passed to UK based F-15E crews, the Board was briefed. Whilst it was clear these ac were legitimately crossing the ADR to join up with another flight, the leader had not apparently taken as much notice of the STC advice as he might have done, but weather had been cited as a factor in this vicinity. Further to promulgate best practice, the HQ 3AF Advisor in consultation with the HQ STC Member had undertaken to reiterate this advice to 3AF crews.

Controller Members questioned why the Saab 340 crew was placed in this position in the first instance. Members debated why avoiding action had not been proffered by the ScACC W COAST Controller earlier. The ATSI report had shown that the controller was required to pass avoiding action as it should have been clear that the prescribed separation would not be achieved. That the controller did not do so until the Saab 340 crew requested it was of concern. Members contended that if positive action has been taken at an earlier stage to avoid the F-15 pair and an attempt made to maintain horizontal separation against the unknown traffic, TCAS might not have been called upon to act. The first specific traffic information transmission passed by W COAST on the subject F-15 contacts between 0951:00 and 0951:10 - about 1 min before the CPA - advised the Saab 340B crew that the fighters were at a range of 10nm: no avoiding action was proffered at this stage. Controller Members recognised that positive action needed to be taken at that point whilst seeking to achieve separation against the F-15s here, and, when faced with fast moving ac, even earlier wherever possible. A controller Member suggested that as soon as the conflict was detected, W COAST should have acted by offering an avoiding action turn to get the Saab 340 expeditiously out of the way of the jets, rather than waiting for the crew to reaffirm this. The radar recording had shown that at an earlier stage this F-15 pair had been operating in a NE/SW direction, which might have caused the controller to delay any corrective action until it became more apparent as to what the unknown ac were doing. Nevertheless, the F-15 pair was there to be seen on radar heading toward the Saab 340 and delaying the avoiding action turn even by a few seconds at these closing speeds allowed horizontal separation to be eroded still further with the result that TCAS subsequently enunciated an RA. A highly experienced 'area' controller Member suggested that there might well be a 'Human Factors' (HF) issue here as the very mention of TCAS by civil crews on RT sometimes made controllers wary of issuing further control instructions that might be contrary to any potential RA - even though here the Saab 340 crew reported "*..TCAS contact TCAS contact…we're looking".* This did not imply here that the crew were following an RA, which from the controller's own report he seemed to have recognised himself at that point. Whilst the majority view was that a 'hands-off' approach was not appropriate here, these HF concerns were supported by the Mil ATC Ops Advisor. Stressing that it was not in the same context as the case reported here, she pointed out that some confusion had been exhibited by military controllers over ambiguous RT transmissions from crews about TCAS that necessitated the issuing of further guidance to controllers on this topic. The Board took note of these comments but controller Members were convinced that at these rates of closure avoiding action should have been issued more promptly; one Member suggested that any inherent delay was contributory to the subsequent closeness of the encounter with the jets as there seemed no reason not to have proffered an avoiding action turn earlier in conjunction with the traffic information. Some Members were convinced that if this action had occurred more promptly then a TCAS RA might not have ensued and the apparent reticence to give prompt avoiding action to ADR traffic was a concern to the Members. The ATSI Advisor noted that controllers are reluctant to take GAT off the ADR if at all possible. Nevertheless, Class F airspace does extend 5nm either side of the ADR centreline and controllers can legitimately manoeuvre traffic within that for the purposes of providing an ATS. The NATS Ltd Advisor explained to the Board that a Supplementary Instruction had been issued reinforcing the requirements for avoiding action to be proffered, which seemed a timely and helpful reminder. The Board considered whether the fundamental cause of this Airprox was that the F-15E formation flew close enough to the Saab 340B to cause a TCAS RA. But Members contended the Saab crew could reasonably have expected to be proffered timely avoiding action advice under the provisions of the RAS being provided by the W COAST controller who was seeking to achieve separation against other displayed non-ADR traffic that might be encountered. It was concluded that the F-15E formation, in flying close enough to the Saab 340B to cause a TCAS RA, had been a contributory factor to the overall outcome. However, following a very comprehensive debate, the Board agreed by a very significant majority that this Airprox had resulted because the ScACC West Coast controller did not fulfil the provisions of a RAS.

In assessing the inherent risk within an Airprox, the Board only ever considers what had actually occurred and not what might have happened if circumstances had been slightly different. In this Airprox and whilst not discounting the seriousness of the Saab 340 crew's subsequent RA manoeuvres in any way, particularly as successive RA's were enunciated in the opposite sense, it is the risk of an actual collision between the ac involved that is of the essence. The radar data had showed that minimum vertical separation of 200ft existed when the ac were 1·9nm apart which then increased to 400ft as horizontal separation reduced to 1nm. Furthermore, unbeknown to either the Saab 340 crew or their controller, the F-15E crews had the Saab 340B in full view throughout from 8nm; had subsequently seen the Saab turning L away from their flight path and notwithstanding the leader's erroneously over optimistic estimate of the separation after the event, the F-15E crews were always in a position to be able to turn away in their nimble jets if needs be. Weighing all these factors carefully the Board agreed, unanimously, that no risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

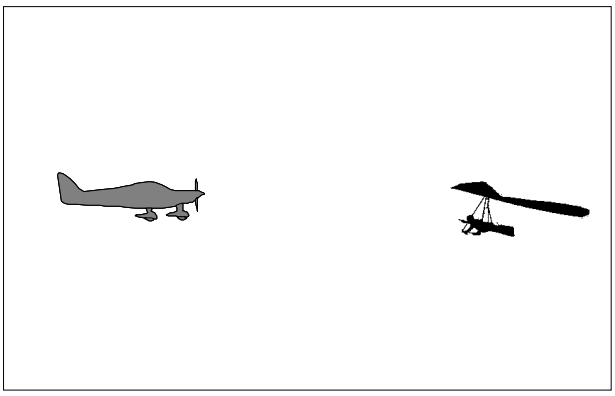
Cause: The ScACC West Coast controller did not fulfil the provisions of a RAS.

Degree of Risk: C.

Contributory Factor: The F-15E formation flew close enough to the Saab 340B to cause a TCAS RA.

AIRPROX REPORT NO 118/06

Date/Time:	27 Jul 1435	
Position:	5455.8N 00651.8W (12 SE Eglington)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hang Glider	Untraced
Operator:	Civ Club	NR
Alt/FL:	2700ft	NR
	(NR)	NR
Weather	VMC CAVOK	NR NR
Visibility:	>20nm	NR
Reported Separation:		
	Nil V/150-200ft H	NR
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HANG GLIDER PILOT reports flying a hang glider on a local soaring sortie from Dungiven West. This was his second flight of the day and he switched on his GPS when he became confident that he could conduct a cross-country flight. He established himself in a thermal and was climbing at about 200fpm. His altimeter had been set to zero at take off and it was reading 1450ft above take off when he became aware of the noise of an ac. He was facing generally SE at the time and continued the turn as the noise came from behind him but his own wing blanked off that sector of the sky. The noise increased very rapidly and when he came round to a generally NW heading he was confronted by a low winged monoplane flying directly at him. He increased the rate of turn hoping to induce a tip stall, which would result in a sideslip and rapid dive. As he did so the other ac also banked to the right, from a SE heading to a S heading. His avoidance was not very successful and he was still in a very strong thermal. His glider continued to climb and he estimated that the avoiding action of the light ac was the main reason that a collision or very near miss was avoided. The other ac did not loiter in the area but continued on a S course so he was unable to get a number or any identifying marks. He then returned to the landing area close to his take-off point.

Several people on the ground witnessed the incident but they too were not able to get the other ac's number nor any identifying markings. He called Eglinton ATC but they were not able to identify the ac. The controller he spoke to said it might have been a pilot who came from Liverpool and who was returning there. The controller invited him to file an Airprox but he refused at that time. After discussion with other free flyers and the BHPA, he decided that an Airprox might help to ensure a similar incident is less likely in the future.

His estimate of the range was very approximate as he was quite shaken at the time and he considered that the risk of collision had been medium.

UKAB Note (1): The incident did not show on recorded radar and despite extensive tracing action the light ac could not be located.

THE BHPA comments that both ac were operating legitimately in Class G airspace. Without information from the powered pilot it is difficult to see what might have been changed to prevent this close encounter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included only the report from the hang glider pilot.

A summary of the unsuccessful action taken to try to trace the light ac involved was given to the Board. With no report from that ac's pilot, at least some of the discussion was speculation. Some items were however

indisputable; firstly, the incident took place in Class G airspace where both pilots had a responsibility to 'see and avoid'. Secondly, the hang glider pilot did all he reasonably could to avoid the light ac but, due to the limited manoeuvrability of the hang glider, it appeared to be the avoidance taken by the light ac (seen by the hang glider pilot) that had resolved the conflict and prevented there being any actual risk that the ac would have collided. Nevertheless it appeared to the Board that, due to the lateness of this avoidance, the safety of the ac involved was reduced below the level normally accepted as being appropriate.

PART C: ASSESSMENT OF CAUSE AND RISK

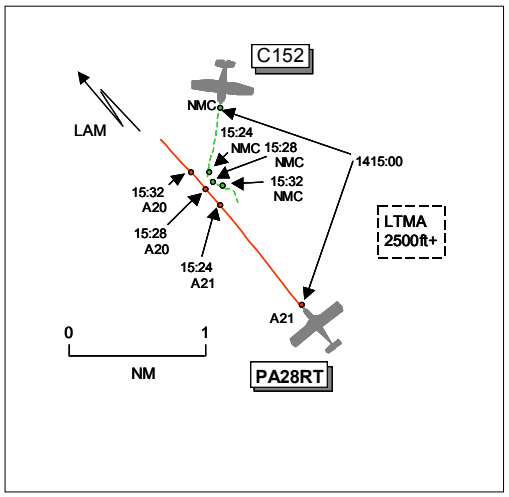
Cause: Conflict in Class G airspace apparently resolved by the pilot of the untraced light ac.

Degree of Risk: B.

AIRPROX REPORT No 119/06

AIRPROX REPORT NO 119/06

Date/Time:	25 Jul 1415	
Position:	5135N 00016E (6nm SE LAM)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C152	PA28RT
Operator:	Civ Pte	Civ Pte
Alt/FL:	2100ft	2000ft
	(QNH 1016mb)	NR
Weather	VMC CAVOK	VMC
Visibility:	8km	NR
Reported Separation:		
	Nil V/50m H	'v. close'
Recorded Separation:		
	<0·1nm	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying with another PPL holder, VFR from Nottingham to Shoreham and was working Thames Radar under a FIS on 132·7MHz squawking 7000 with Mode C. The visibility was 8km in CAVOK, he thought, and the ac was coloured white with red/blue stripes; anti collision light was on. The incident occurred 7nm SE LAM on the leg between Brentwood and Brands Hatch, flying outside CAS whilst he was navigating and working the radio in the RH seat whilst the other pilot was PF. When about mid-way between Brentwood and the QE2 Bridge at 2100ft QNH 1016mb and 90kt, the PF spotted an ac on a crossing track in their 11 o'clock [UKAB Note: radar shows this ac tracking SE bound about 1nm away] at the same level. He leaned forward and looked around to sweep the area from their 10 o'clock (this area is normally hidden behind the door/front screen pillar from the RH seat) and immediately saw a low wing 'T' tailed single engined Piper coloured white with a blue stripe with retractable gear about 400m away on a collision course with a shallow closing angle. He reacted by pulling the C152 into a very steeply banked turn to port with 'up' elevator applied as he instinctively estimated that a turn to starboard would not clear them out of the other ac's flight path; this action allowed him to keep sight of the other ac. The Piper pilot appeared to start a roll to his starboard which stopped almost before it had started before it seemed to continue on its original track passing 50m down their RHS at the same level. By the time they resumed heading it was out of sight and after regaining their composure they notified Thames Radar of the incident. He assessed the risk as high.

THE PA28RT PILOT provided a brief report stating that he was flying from Lydd to Coventry VFR and in receipt of a FIS from Stapleford Information squawking 7000 with Mode C. The weather was VMC and the ac was coloured white/blue; no lighting was mentioned. When S of LAM at 2000ft he suddenly saw a C152 in his 2 o'clock, it was turning away but very close so he immediately pushed hard on the control column, descending to avoid collision. He assessed the risk as very high.

ATSI comments there are no apparent ATC implications in this Airprox. From information provided and a review of the radar recording, the incident took place at 1415:28, approximately 6nm SE of the 'LAM' VOR in Class G airspace.

At 1410, the C152 established communications with the Thames Radar controller. The pilot reported *"C152 c/s is charlie one five two out of Nottingham for Shoreham currently overhead Stapleford one thousand eight hundred feet on one zero one eight routeing via Brentwood Town QEB er Brands Hatch*…(route details)… *to er Shoreham request a er Flight Information Service".* The controller responded *"C152 abbreviated c/s Flight Information Service report crossing the Thames London QNH one zero one six"*, the pilot reading back the request and the QNH. (Note: QEB is the Queen Elizabeth II bridge which crosses the Thames near Dartford).

No relevant calls were made until almost 7min later when, just before leaving the frequency, the pilot of the C152 said, at 1417:22, *"…before doing so I wish to report an Airprox",* the controller responding *"Er Roger you outside controlled airspace?"* to which the pilot reported that he was. The controller then advised the pilot *"…you'll have to file that once you're on the ground but er it is the open FIR".* The pilot stated that he would do that and then reported transferring to Biggin Hill. It would have been helpful to the subsequent investigation if the controller had obtained at least the brief details of the other aircraft: however, the MATS Part 1, Section 1, Chapter 2, Page 8, Para 15.2, states *"If the pilot wishes to file the* (Airprox) *report by radio telephone the controller should, whenever possible, accept the relevant details, particularly when the flight is bound for a foreign destination. If, due to the controller's high workload, this cannot be done, the pilot is to be requested to file the details after landing".*

UKAB Note (1): The radar recording timed at 1415:00 shows an ac, believed to be the C152, 6nm SE LAM tracking S GS 82kt squawking conspicuity code 7000 with NMC with converging traffic in its 10:30 position range 1·6nm, NW bound with a GS of 140kt. This other traffic, believed to be the PA28RT, is squawking 7000 tracking 320° and indicating at altitude 2100ft Mode C QNH 1016mb. The subject ac continue to converge on almost steady tracks with separation reducing to 0·2nm 24sec later. The CPA occurs on the next radar sweep at 1415:28, the PA28RT now indicating 2000ft with the C152 passing <0·1nm to its NE and now in a L turn passing through a SE'ly heading. The ac quickly diverge with the next sweep showing the PA28RT at altitude 2000ft and the C152 now tracking ESE'ly after which the PA28RT climbs back to 2100ft and the C152 turns R to regain track.

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 agreed that the crux of this Airprox was a sighting issue where 'see and avoid' was the primary means of deconfliction. Both crews were on different RT frequencies so that each other's presence and intentions were unknown prior to visual acquisition. The opportunity to see each other earlier was there but for whatever reason both crews saw each other very late which had caused the Airprox. The radar recording shows the ac converging with a high speed differential and almost on a line of constant bearing, a known casual factor where conflicting traffic remains stationary in the pilot's field of view until the cycle is broken by a pilot changing the aspect/perspective either by moving his head or the ac's heading after which the target moves within/across the scanned area. The C152 LH seat pilot had seen another ac and whilst the RH seat pilot scanned the area to their L he saw the PA28RT in their 10 o'clock 400m away close at the same level. He instinctively took control and turned the C152 hard L to avoid which allowed him to keep visual contact with the PA28RT as it passed 50m clear to his R. It seems the turning/rolling action taken was seen by the PA28RT pilot who responded by diving his ac to increase separation. Although this had been undoubtedly a very serious incident, the Board believed that the combined actions taken by both crews were just sufficient to remove the actual collision risk. The ac had however passed in very close proximity such that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

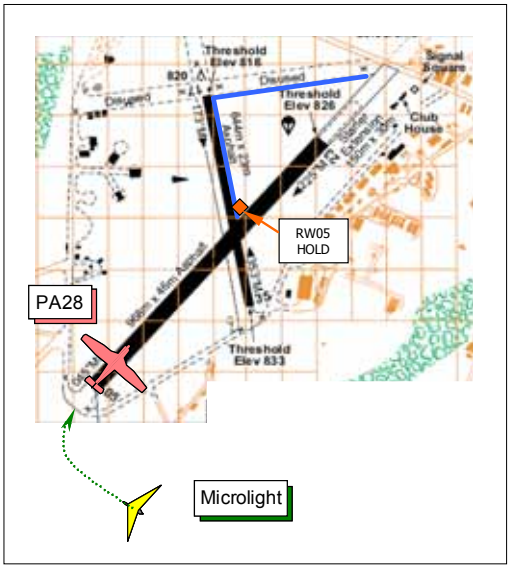
Cause: Very late sightings by both crews.

Degree of Risk: B.

AIRPROX REPORT No 120/06

AIRPROX REPORT NO 120/06

Date/Time:	16 Jul 1330 (Sunday)	
Position:	5051N 00314W (Dunkeswell Aerodrome - elev 839ft)	
Airspace:	Dunkeswell ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Pegasus Quantum 912 ML	PA28
Operator:	Civ Trg	Civ Pte
Alt/FL:	100ft↓ QFE (997mb)	Nil (aal)
Weather	VMC NR	VMC CAVOK
Visibility:	7km	10+km
Reported Separation:	50ft V/10m H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PEGASUS QUANTUM 912 MICROLIGHT PILOT reports his ML is blue in colour with a white/yellow wing. He was in communication with DUNKESWELL RADIO A/G Station on his dash-mounted radio (operated by headset) whilst inbound after a local sortie in VMC. He was re-joining the cct following an instructional sortie with a student and as the PF had called on RT for "joining instructions": thereafter he had joined on a R BASE-LEG for RW05RH. Whilst on BASE-LEG he called his position on RT and heard the subject PA28 pilot call "backtracking 05". Another ac - a Tiger Moth - was also backtracking and its pilot (whom he knew) said that he would clear at the runway intersection. Upon turning FINAL, heading 050°(M) at 50kt, he again called his position to find the PA28 lining-up to depart on RW05. He opined that the PA28 pilot had not turned to look up the approach and had begun rolling. The ML pilot called again stating his intentions and asked the PA28 to hold but the PA28 then began to roll. The Tiger Moth was still backtracking RW05 and also called. He was now very close - less than 50ft - and began a GO-AROUND in the LIVESIDE. At this point the PA28 pilot aborted his take-off roll. He flew a tight cct pattern and was quite quickly on FINAL again for RW05. [UKAB Note (1): In a subsequent telephone call the ML pilot stated that no DOWNWIND call was made on RT for this second cct.] The PA28 had now backtracked to the threshold for RW05 as he – the ML pilot - called FINAL for RW05. The PA28 now began his take-off roll and took-off despite apparently not looking up the approach and ignoring both of his RT calls.

UKAB Note (2): In a telephone conversation with the UKAB about the Airprox, the ML pilot stated that in his opinion the surface to the SW of the threshold of RW05 [that part not coloured black on the diagram above and within the crosses delineating the disused taxiway] was not technically part of the RW and he was able to land over ac situated there.

THE PA28 WARRIOR II PILOT reports his ac is coloured white and the HISLs and landing lamps were all on whilst operating on a local VFR sortie from Dunkeswell before returning to his home aerodrome. His ac was initially parked on the grass behind the pumps at the Aero Club end of RW05. With two passengers on board and following initial start up and pre-flight checks, he made an RT call to DUNKESWELL RADIO A/G Station requesting the airfield information for a local VFR flight. He noted the information and that the runway in use was RW05 with a right hand circuit (RHC). Subsequently, he requested to taxy to RW05 by backtracking along the paved runway surface, which he noted was the procedure adopted by some other ac that day and also one he had executed during a previous visit to the airfield. [UKAB Note (1): Enquiries with the aerodrome concerned confirmed that the normal taxi pattern for RW05RH is to enter and backtrack to the RW intersection and hold clear to the N, off the runway surface.] However, the A/G operator requested that he taxi via the grass taxiway to the hold at the intersection of RW17/35 and thence to 05/23. This was initially a little difficult to identify, but runs E - W adjacent

to the S of the disused runway; joins RW17 at its northern end and allows taxying via RW17 to the intersection - presumably the safer option given the airfield activity at that time. Having taxyed to the RW05 hold, he completed his power and take-off checks, then radioed to inform the A/G operator that he was ready for departure. The operator requested him to remain at the hold with one ac on FINALS and another 'in turn'. He waited at the hold for both ac to land - in excess of 5min - then radioed the operator to commence a backtrack along RW05 to the threshold, which was acknowledged with a "take off at my discretion" call. He made an RT call advising that he was 'LINING-UP' on RW 05 as he commenced to backtrack to the threshold. He took a good look out into FINALs that proved clear and had noted no other RT calls from any other ac joining the cct whilst at the hold. Having lined up on the threshold he commenced his take-off run and radioed "[C/S] rolling". Almost immediately, he heard the ML pilot call FINALS for RW05 followed shortly by another call to state that he was directly overhead his ac and appeared to be considering landing on RW05 over the top of him. During this confusion he noted that a Tiger Moth had also commenced a backtrack of RW05 from the Aero Club end and not via the grass as he had been previously requested so to do. The ML pilot then made a very unnecessary radio call to him that was particularly unhelpful given the situation, which he did not acknowledge. He recalls his thought process at the time was: firstly, where had the ML come from? Secondly, whilst he was not visual with the ML as it was above and behind his PA28, the ML pilot had good visibility of the situation himself, was flying a highly manoeuvrable ac and "good airmanship would dictate" that he would simply GO-AROUND thereby avoiding the situation. However given the backtracking Tiger Moth, he elected that the safest course of action was to abort the TAKE-OFF and brought his ac to a stop, having now travelled about 100m from the RW05 threshold. With no further communication from the ML and after taking another good all round look out, he radioed that he was re-commencing his backtrack and returning to the RW05 threshold. On returning to the threshold he again made a good lookout into finals, which again proved clear and he heard no subsequent RT calls from either the A/G Operator, ML pilot or any other ac in the cct. He assumed that the ML pilot must have executed a GO-AROUND and was making another right hand cct, allowing time for the runway to be cleared and for him to re-position and depart. He noted that during the incident there had been no intervention from the A/G Operator. On lining-up it was clear that the Tiger Moth had now fully vacated the runway at the intersection and there was nothing further to conflict: he therefore radioed "C/S rolling" and recommenced his TAKE-OFF run. Shortly after commencing his run, the ML pilot made another RT call that he was back on FINALS and stating that he had allegedly done it to him again! He concluded that the ML pilot, rather than flying a full cct and making subsequent radio calls, must have simply made a low level orbit back onto FINALS for another landing. As there was no obstruction on the runway and again bearing in mind that the ML was a highly manoeuvrable ac with its pilot having the advantage of full visibility of the situation from above and the ability to simply GO-AROUND, he decided that the safest course of action was to continue his departure and get clear of the runway in order to avoid any further potential conflicts. On returning to the airfield later he had discussed the incident with one of the A/G Operators on duty at the time. He also hoped to find the pilot of the ML to further determine the circumstances but to no avail.

UKAB Note (3): In a telephone conversation about the Airprox, the PA28 pilot stated that he had not spotted the ML at all throughout the period of the occurrence nor had he been informed about the ML joining by the A/G Operator.

UKAB Note (4): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (5): The UK AIP at AD-2-EGTU-1-3 notifies the Dunkeswell ATZ as a radius of 2nm centred on RW05/23, extending from the surface to 2000ft above the aerodrome elevation of 839ft amsl. The ATZ is active in Summer 0830-1700 and an A/G Service is provided. At AD2.22. the cct direction on RW05 is specified as RHD.

UKAB Note (6): The Rules of the Air Regulations 1996, specify:Rules for avoiding aerial collisions

Rule 17

(6) Order of landing

(a) An aircraft while landing or on final approach to land shall have the right-of-way over other aircraft in flight or on the ground...

(7) Landing and take-off

(b) A flying machine…shall not land on a runway at an aerodrome if the runway is not clear of other aircraft unless, in the case of an aerodrome having an air traffic control unit, that unit otherwise authorises.

Flight within Aerodrome Traffic Zones

Rule 39

(2) An aircraft shall not fly, take off or land within the aerodrome traffic zone of an aerodrome…unless the commander of the aircraft has…obtained information from the air/ground radio station at that aerodrome to enable the flight to be conducted with safety.

(3) The commander of an aircraft flying within the aerodrome traffic zone…shall:

(a) cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome or, if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means;

(b) where the aircraft is fitted with means of communication by radio with the ground, communicate his position and height to the air traffic control unit, the aerodrome flight information service unit or the air/ground radio station at the aerodrome (as the case may be), on entering the zone and immediately prior to leaving it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac.

Members were keenly aware that the RT calls transmitted by the pilots and the information given by the A/G Station Operator involved here at this 'uncontrolled aerodrome' would have had a significant influence on their subsequent actions. It was also important to recognise here that the Dunkeswell A/G Operator could only provide scant information about the aerodrome and no transmissions from an A/G Station to a pilot, either in the air or on the ground, should be construed as being an 'instruction'. Furthermore, at aerodromes where only an A/G Station is provided RT recording is not obligatory and in the absence of an RT transcript the Board was unable to resolve what was actually said on RT. This made assessment of the Airprox very difficult as the Board could only go on what the pilots themselves had reported, Members attaching equal weight to the two reports.

When operating in a visual cct without ATC it was essential that pilots not only lookout to see what else is going on but they also monitor each other's RT calls very carefully. From the ML pilot's report it was clear that he had requested "joining instructions" and communicated his position when on a R BASE-LEG for RW05RH. For his part, the PA28 pilot should have been aware of where other ac were in the aerodrome cct from their pilots' RT calls - where made – and from any transmissions made by the A/G Operator. In this regard, the PA28 pilot reports that whilst at the RW05 HOLD he had not noted any other RT calls from any other ac joining the cct. The ML pilot's BASE-LEG join would have reduced the time available for him to assimilate what other pilots were doing on the manoeuvring area as he approached the aerodrome. Whilst such a join clearly obviated the need for a DOWNWIND call it also had the unwelcome effect of denying the PA28 an opportunity to hear that there was a ML in the cct, the PA28 pilot saying that he had not noted any other RT calls from any other ac joining the cct whilst at the RW05 HOLD. The ML pilot reports he made a BASE-LEG call before he heard the PA28 call BACKTRACKING down to the threshold of RW05. Whilst this was his understanding of the chronology, this could not be independently confirmed. This BASE-LEG call should have been heard by the PA28 pilot but it seems that he had not registered that the ML was in the cct at this point. The ML pilot's reference to the BACKTRACKING call might have been the 'LINING-UP' on RW05 call referred to by the PA28 pilot and with no information from the A/G Operator about the presence of the ML, despite his reported "good look out into FINALs" the Board noted that the PA28 pilot did not see the ML as he turned about at the end of the RW prior to take-off. Significantly, the PA28 reports that he did not see the ML at any point at all. Therefore, still unaware of the ML at this stage and having lined-up and commenced his take-off run after reporting "ROLLING", it was clear from the PA28 pilot's report that the first occasion that he became aware of the ML was when he heard the ML pilot call FINALS for RW05 on RT. He heard the ML pilot state that he was directly overhead his ac and it appeared to the PA28 pilot that the ML pilot was considering landing on RW05, over the top of his ac. As this was occurring, the PA28 pilot reports that he also discovered "during this confusion" that the Tiger Moth was backtracking along RW05, apparently to clear at

the intersection. The PA28 pilot therefore rejected his take-off, after rolling about 100m, there being little else that he could do in the circumstances. Members agreed that to take-off knowing there was an ac in close proximity astern would have been very unwise.

There was an anomaly here between the two pilots' reports which, in the absence of an RT recording and transcript Members could not resolve. The anomaly relates to the precise sequence of the RT calls in that the ML pilot said that he had already called FINALs before the PA28 commenced his take-off roll so he then called again stating his intentions, asked the PA28 to hold but the PA28 then "began to roll" i.e. after his request for the PA28 to hold was made. From the PA28 cockpit, its pilot had said that he was rolling before he heard the ML pilot's FINALs call. It was clear to the Members from his report that the ML pilot had asked the PA28 pilot to hold whilst he continued inbound with the intention of landing on RW05 over the top of the PA28. Furthermore, it was also clear from the ML pilot's report that the Tiger Moth was still on the RW albeit with the intention of clearing at the intersection. Fortunately, it seems the added presence of the Tiger Moth convinced the ML pilot that it was unwise to continue with the landing and he elected to GO-AROUND at this point, but he himself says that he was by now very close - less than 50ft away from the PA28 – before he began the GO-AROUND in the liveside.

Turning to another aspect of this Airprox, it was unclear to Members why the PA28 had not recognised that the Tiger Moth was on the RW before he initiated his take-off. The ML pilot reports that an RT call was made by the pilot of the Tiger Moth - which should have been heard by the PA28 pilot - but this it seems might have been after the latter reported rolling and had begun his take-off. It seemed to Members that it would have been more prudent for the Tiger Moth pilot either to have waited until the PA28 took-off or himself taxyed via an alternative route. However, Members were surprised that the PA28 pilot had not seen the Tiger Moth before he initiated the take-off, wondering if perhaps it was not possible to achieve a clear view along the full length of the runway.

Although the ML pilot then flew a tight pattern to get back to FINALs expeditiously this was apparently too quick to allow the PA28 pilot to either vacate the RW by taxying off the manoeuvring area or by launching into the cct. This should have been apparent to the ML pilot as he turned R in the cct but apparently no DOWNWIND call was made on RT for this second cct providing that vital warning to other pilots. Having backtracked again to the RW05 threshold and in the absence of any further communication heard from the ML, the PA28 pilot was clearly unable to spot the ML even after taking another good all round look. But although a small ac it was evidently there to be seen because the ML pilot reports that when again on FINALs for his second attempt at a landing the PA28 took-off in front of him. The PA28 pilot had explained why he had done so but in a pilot Member's view as he could not see where the ML was this was unwise and he should have stayed on the RW.

A very experienced GA pilot Member considered that this whole string of events was indicative of the difficulties that can arise in uncontrolled ccts where good RT discipline and the application of sound airmanship are essential to allow pilots to integrate their flights safely. It was clear to the Board that the crux of all of this revolved around the ML pilot's intention to land whilst the PA28 was on the RW and it seemed that he had continued inbound from the second cct leaving little opportunity for the PA28 to clear the RW. One of the difficulties here it seemed was the constrained manoeuvring area at Dunkeswell and the necessity of having to backtrack down RW05 to the threshold with no other taxying options. Notwithstanding that Rule 17 (6) (a) gives the pilot of an ac landing or on final approach to land the right-of-way over other ac on the ground - in this case the ML - if the pilot on the ground is not aware of that ac - as perhaps the PA28 pilot should have been from the RT transmissions given - then he cannot do so. But it was plain that the ML pilot was intending to land over the PA28 by asking its pilot to hold on the RW in the first instance, much to the concern of the latter's pilot. Despite the manoeuvrability of the ML pilot's machine and his contention that he was allowed to do this, Rule 17 (7) b to the 'Rules of the Air' does not allow a pilot to land on the RW at an aerodrome where there is no ATC when the RW is occupied by another ac. Therefore, the Board concluded unanimously that this Airprox had resulted because the ML pilot attempted to land over the PA28 causing both pilots concern.

In consideration of the inherent risk of collision, it was clear that as he had not sighted the ML at all the PA28 pilot had little or no awareness of what the ML pilot was attempting to do. Having chosen to fly so close to the PA28 it was the ML pilot that chose the separation distance here. Only he could see how close he was to the PA28. However, it was plain that the sensible option was to GO-AROUND, which is exactly what the ML pilot did from his first approach. The Board was conscious that in his highly maneuverable machine this was readily achievable and in so doing the Members concluded that by their respective actions - the ML executing a go-around from his first approach and the PA28 pilot rejecting his take off - both pilots ensured that safety was not compromised.

AIRPROX REPORT No 120/06

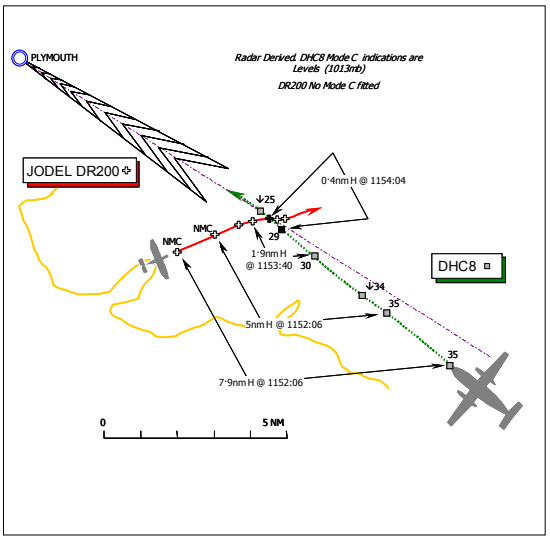
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Microlight pilot attempted to land over the PA28 causing both pilots concern.

Degree of Risk: C.

AIRPROX REPORT NO 121/06

Date/Time:	6 Aug 1154 (Sunday)	
Position:	5021N 00355W (8nm Finals RW31 at Plymouth - elev 476ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DHC8	Jodel DR200
Operator:	CAT	Civ Pte
Alt/FL:	2500ft↓ (QNH 1023mb)	3800ft (QNH 1022mb)
Weather	VMC CLOC	VMC Sky Clear
Visibility:	25km	20km
Reported Separation:	300ft V/nil H	150ft V/1000m H
Recorded Separation:	0·19nm [380yd] by interpolation	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports they were inbound to Plymouth from Jersey under IFR for a visual approach to RW31 and in receipt of an APPROACH CONTROL service from Plymouth APPROACH (APP) on 133·55MHz. The pilot–in-command was the PF. A squawk of A7000 was selected with Mode C; TCAS is fitted.

Heading 310° approaching 8nm FINALS in VMC at 170kt on centreline for RW31 and slightly below the glidepath descending through about 2500ft Plymouth QNH (1023mb), they thought, TCAS enunciated a TA upon traffic displayed in their 12 o'clock at 2nm range. The other aeroplane – a Robin or Jodel type - white in colour with red wingtips [a partial registration was specified] - was visually acquired at approximately the same altitude crossing obliquely from L – R. To maintain separation on the other aeroplane their ac's rate of descent was increased and it passed approximately 300ft directly overhead. No RA was triggered. The risk was not assessed.

THE JODEL DR200 PILOT reports his aeroplane has a white/red colour-scheme and the HISLs and nav lights were on whilst in transit under VFR from Bodmin to Enstone aerodrome at 100kt, flying in clear air with an in-flight visibility of 20km out of sun. SSR was selected on, however, he reports Mode C is not fitted.

Upon coasting out at Looe on a course of 091° for Dartmouth he called Plymouth ATC on 118·15MHz initially. He was then switched to 133·55MHz for a FIS. [UKAB Note (1): Given the absence of either fpss or an RT transcript from Plymouth APPROACH the Jodel pilot reaffirmed that he had spoken to Plymouth ATC on RT and was given traffic information about another ac but not the subject DHC8.]

Maintaining a level cruise of 3800ft QNH (1022mb). The high wing twin was first spotted in his 2 o'clock - low - at a range of not less than ¼ nm and upon seeing the other ac he increased power and initiated a climb to increase the vertical separation. The other ac – the DHC8 – passed about 150ft below his aeroplane as he monitored its progress and about 1000m away with a *"low"* risk of a collision. When queried, he opined that he would have liked to have spotted the DHC8 a bit earlier but at no time did he consider that there was any danger of a collision.

THE PLYMOUTH APPROACH CONTROLLER (PLY APP) reports that he was operating as the combined APP & AERODROME controller when, at about 1150UTC, he cleared the DHC8 to carry out an ILS approach to RW31. About 5min later the DHC8 pilot asked if there was any other traffic in the vicinity of Ivybridge being given a service by APP. After replying negative to this question the pilot of the DHC8 advised of opposite direction traffic, a Jodel type. He was subsequently advised by telephone that the P-i-C of the DHC8 intended to file an Airprox, as the other ac involved came close enough to the DHC8 for the crew to be able to read part of its registration.

ATSI reports that although standard procedures were followed by the SRG Transcription Unit for requesting RTF recordings from Plymouth, the appropriate RTF tape was not impounded by the unit. Consequently, it has not

been possible to determine the RT calls made on the Plymouth frequencies at the time of the Airprox. Plymouth ATC is reviewing its procedures to ensure that any requests to impound RTF tapes are carried out in future.

The SATCO, in discussion with the APP Controller on duty at the time, commented that on a Sunday it is usual for TOWER and APP to be bandboxed on the latter frequency, albeit that the TOWER frequency would be monitored. The PLY APP controller had no recollection, either at the time of the Airprox or subsequently, of the Jodel DR200 contacting him. The fps for the day of the Airprox were checked and there was no record of the Jodel DR200 making contact with Plymouth. Apparently, there had been problems with the Plymouth frequencies around this period whereby pilots were not being able to establish communication. This deficiency has been addressed. No further input was possible.

UKAB Note (2): The Burrington radar recording illustrates the geometry of this Airprox relatively clearly with the exception of the minimum separation at the CPA. The DHC8 is shown squawking A7000 level at 3500ft Mode C (1013mb) closing the centreline to RW31 at Plymouth from the L at 1152:06 at a GS of about 180kt. At this point the Jodel DR200 is shown approaching the centreline at a GS of about 78kt on a ENE'ly track squawking A7000 with the DHC8 at 2 o'clock at a range of 7·9nm - No Mode C (NMC) is displayed at all throughout the encounter by the Jodel as the pilot reports it is not fitted. The ac close at a constant relative bearing as the DHC8 indicates 3000ft (1013mb). On the radar returns shown at 1154:04 - just before the projected CPA - the DHC8 indicates a descent through 2900ft (1013mb) – about 3200ft Plymouth QNH (1023mb) - with the Jodel shown crossing through the airliner's 12 o'clock at a range of 0·4nm. Given the Jodel pilot's reported transit altitude of 3800ft, it would suggest that vertical separation was in the order of 600ft at this point. On the next sweep neither a secondary nor a primary return is evident from the DHC8. As the DHC8 intercepts the RW centreline at about 8nm finals on the subsequent sweep, it is shown passing 2500ft (1013mb) – about 2800ft QNH (1023mb) as the Jodel opens astern of the DHC8 to a range of 0·7nm. By interpolation, horizontal separation was in the order of 0·19nm – 380yd - after the Jodel crossed ahead into the 4 o'clock of the airliner at the moment that the latter is not displayed. The absence of Mode C from the Jodel precludes any accurate assessment of the vertical separation that pertained.

UKAB Note (3): Meteorological Office Archive data gives the 1150UTC Plymouth weather as: Surface Wind: 340°/ 7kt, variable 240°-060°; Visibility >10km nil weather; Cloud: FEW @ 2500ft; QNH1023mb; The Wessex RPS for 1100-1200 UTC was 1018mb.

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 ATC authority.

Members noted the absence of the combined Plymouth APP/TOWER RT recordings, agreeing that it was unfortunate the Unit had not ensured that they were impounded for the investigation. Clearly this was a most unsatisfactory omission and the Board accepted the reassurances from the ATSI Advisor that this issue was being adequately addressed by the Unit thereby reducing any potential for a recurrence. Thus it was not possible to resolve the obvious anomaly between the Jodel pilot's account and that of the Plymouth controller, the pilot having reported that he had called Plymouth ATC on the TOWER frequency - 118·15MHz - initially and was then switched to the APP frequency - 133·55MHz - for a FIS, whereas Plymouth ATC reports that they had no record that the Jodel pilot had called Plymouth ATC at all. The absence of a fps for the Jodel added weight to the Unit's contention. However, the pilot's report of calling on TOWER and then being switched to APP seemed to gel, in a controller Member's opinion, with the fact that both positions were bandboxed this day - a point that would probably have been unapparent to the pilot at the time or even subsequently. Thus controller Members could see that the Jodel pilot's account was not implausible at all.

This Airprox plainly illustrated the intrinsic benefit of TCAS information when operating in the 'see and avoid' environment of Class G airspace where it provided a warning about the presence of small light ac – that might be difficult to spot visually even in good weather – and the resultant increased situational awareness that can accrue. Whilst the TCAS II traffic display is provided for the purpose of assisting crews in the visual acquisition of ac in their vicinity, pilots operating in the open FIR should not be tempted to use TCAS azimuth data if attempting avoidance manoeuvres in the horizontal plane as it can be misinterpreted. Here the DHC8 pilot, although operating IFR, was inbound in good weather for a visual approach and had acquired the small Jodel closing from the L on TCAS when it was some 2nm away which then enabled him to spot it visually and effect his own visual

resolution of the conflict. Although an RA would not be triggered because of the absence of Mode C data from the Jodel (not fitted) it had enabled the DHC8 pilot to wisely increase his ac's RoD to effect increased separation beneath the light ac.

Even though the Jodel pilot's route had crossed the approach to RW31, the track taken had been outside that of the promulgated approach 'feather' on CAA VFR charts and whilst this might not have been ideal, he was in transit at a reasonable crossing altitude and the Jodel pilot had taken the precaution of calling the responsible ATSU, he reports. Thus he seems to have benefited from traffic information about another ac but unfortunately not the ac flown by the reporting pilot. This was not an unreasonable course through the area and it was unfortunate that the Jodel pilot had not seen the DHC8 earlier - a point he expounded himself. Certainly he had seen it in time to initiate a climb to increase the vertical separation above the twin turbo-prop. Whilst the resultant reported separation might not have been ideal – the radar recording suggests that vertical separation was in the order of 600ft just before the CPA, given the Jodel pilot's reported transit altitude of 3800ft QNH - both pilots had seen each other's ac in time to take effective action. The Board agreed unanimously, therefore, that the cause of this Airprox was a conflict in Class G airspace which had been resolved by both pilots and that their combined actions had effectively removed any risk of a collision in the circumstances reported here.

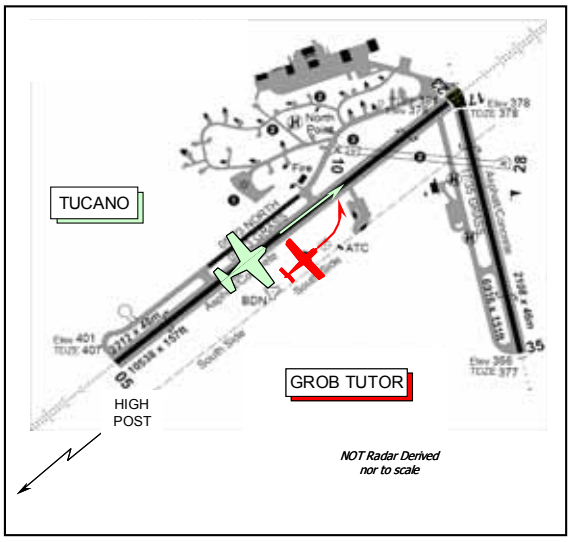
PART C: ASSESSMENT OF CAUSE AND RISK

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

Degree of Risk: C.

AIRPROX REPORT NO 122/06

Date/Time:	3 Aug 1039	
Position:	5109N 00144W (Overhead Boscombe Down - elev 407ft)	
Airspace:	Boscombe MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tucano T1	Grob Tutor
Operator:	HQ DPA	HQ PTC
Alt/FL:	800ft↑ (QFE 1000mb)	800ft (QFE 1000mb)
Weather	VMC NR	VMC NR
Visibility:	30km	40km
Reported Separation:	100ft V/nil H	200ft V/nil H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO T1 PILOT reports he was departing from Boscombe Down and in receipt of an aerodrome control service from Boscombe TOWER on 338·475MHz. A squawk of A2604 was selected with Mode C and the HISLs and landing lights were on. Cleared for take-off from RW05, his initial climb-out was on runway track – a heading of 053°(M). Aware that a Grob Tutor was joining the cct at 800ft Boscombe QFE (1000mb) for the same runway and tracking about 200ft to the right (south) of the runway centre-line, he was visual with the Tutor and, knowing that it was the responsibility of the pilot of the Tutor joining the cct to ensure safe separation from traffic taking-off, he commenced his take-off roll. Once airborne, with landing gear and flaps retracted, it became apparent that there would be a vertical confliction between his flightpath and that of the Grob Tutor if he accelerated to the normal climb speed of 170kt IAS. Therefore, he decided to climb at his Tucano's maximum rate-of-climb speed of 126kt IAS which, he reasoned, would result in a flightpath that would enable him to climb through the level of the Tutor before passing abeam the light ac. As he started to rotate into a climbing attitude the Tutor pilot then commenced a L turn into the cct resulting in their flightpaths being on a collision course. To avoid the Tutor, he pushed over wings level at approximately 0g and thus passed 100ft vertically, directly below the Tutor with a *"moderate"* risk of a collision. The incident was reported to TOWER on RT and he continued the climb when clear of the Tutor.

THE GROB TUTOR PILOT reports he was conducting an air experience sortie with a cadet [in the LHS] and was inbound to Boscombe whilst in communication with TOWER on 338·475MHz. HISLs were on. Flying a standard VFR join from Wilton inbound for RW05NORTH, in accordance with the procedures promulgated in the Boscombe Down Flying Order Book [FOB], he heard the Tucano pilot receive take-off clearance from TOWER whilst his own ac was abeam the landing threshold for RW05. At this point he saw the Tucano begin to line-up for take-off from RW05. Flying level at 800ft QFE (1000mb) heading 053°(M) at 100kt, he continued to track parallel and to the S of the runway but was no longer able to maintain visual contact with the Tucano. He judged that it was safe to commence his L turn onto the DOWNWIND leg, but as he applied L bank and called "crossing" he saw the red & white Tucano climbing towards him. The Tucano pilot expressed concern at the proximity of his Tutor over the RT to TOWER and he saw the other pilot lower the nose of the Tucano to fly beneath his Tutor. No avoiding action was taken by himself and he elected to continue his L turn and thereby maintain a predictable flight path as the Tucano passed about 200ft directly below his Tutor. He did not consider that they were in danger of colliding and assessed the risk of a collision as *"low"*.

After he spoke to the Tucano pilot by telephone he apologised for what he considered to be an error of judgement on his part, having misjudged the climb performance of the Tucano. The Tucano pilot accepted this and informed him that he would be filing an Airprox report.

THE TUCANO T1 PILOT'S UNIT comments that this Airprox occurred in a busy aerodrome cct when both pilots decided on courses of action based on an assumption of what the other ac's pilot would be doing. The Tucano

pilot assumed that the Tutor pilot would not turn across the runway from the DEADSIDE to DOWNWIND until the Tucano was clear and therefore elected to climb as quickly as possible to get out of the way sooner. Meanwhile, the Tutor pilot assumed that the Tucano would be following a more normal climb gradient and that he would therefore be clear to turn to DOWNWIND over the top of the departing Tucano. Both pilots were aware of the other ac, and watching for each other, thus there was little actual risk of collision although it is accepted that the situation was extremely uncomfortable and that positive avoiding action was required on the part of the Tucano pilot.

After much discussion it has been decided not to change any procedures. All Tutor pilots have been reminded of the need for great care in deciding when to cross the runway from DEADSIDE to DOWNWIND and all pilots on the unit have been reminded of the need for constant vigilance when presuming that another ac will follow a particular course of action.

THE BOSCOMBE DOWN AERODROME CONTROLLER (TOWER) reports that he was about to hand-over the position with another controller waiting to take the frequency once traffic levels had subsided. Three Tutors were joining through a Standard WILTON arrival; one BAC1-11 was in the main cct and 2 helicopters were operating on the S side. The subject Tutor was given traffic information as he passed HIGH POST, as per normal SOPs, and he then lined up the subject Tucano prior to issuing a take-off clearance. He called the Radar Approach controller to obtain a 'release' for the Tucano and subsequently issued the pilot with clearance to take-off. At this time, the Tutor was just S of the active RW and called "[Tutor C/S] *crossing*" to denote to other pilots in the cct that he was turning L across the active RW to position into the live-side DOWNWIND, as per SOPs. The ADC does not give traffic information calls regarding Tutors joining via the Standard WILTON arrival: the traffic calls that are made are accepted as adequate for the task of providing situational awareness for all, including the "crossing" call. Very shortly after this, the Tucano called to the effect that the Tutor that was crossing was very dangerous and that he had come very close to it; he subsequently said that he would be considering filing an Airprox and then switched to RADAR. He opined that during this incident, he was *"extremely busy"*.

MIL ATC OPS reports that the Tutor ac was joining the visual cct for RW05 at Boscombe Down under the control of Boscombe TOWER. Simultaneously, a Tucano ac was preparing to depart. At 1035:03, TOWER passed joining instructions to the Tutor pilot "[C/S] *Boscombe TOWER join runway 05 QFE 1000* [mb] *1* [ac] *in, 1* [ac] *south side, 1* [ac] *joining standard Wilton.*" The Tutor pilot replied, "*QFE 1000, visual 1 ahead,* [C/S]." Following RT traffic with other ac, at 1037:20 the Tucano pilot requested departure "*Tower,* [Tucano C/S] *is ready for departure*." TOWER instructed the Tucano to hold which was acknowledged. Shortly thereafter, at 1037:30, the Tutor pilot reported at *"… High Post",* which is a visual reporting point for Tutor ac, about 2nm from the airfield on the DEAD-SIDE [to the S of RW05] of the extended centreline. In reply to the Tutor pilot, TOWER stated, "[C/S] *1 in, and 1 Tutor ahead, 1 south side and 1 joining south side.*" The Tutor pilot acknowledged the cct information. At 1037:51, TOWER instructed the Tucano pilot to *"… line-up*" on RW05 which he acknowledged. After another ac was given instructions for another runway, TOWER instructed the Tucano pilot at 1038:27, "[Tucano C/S] *clear take-off surface wind northerly 15 knots, barrier down*"; the clearance was acknowledged. A period of RT with other ac followed until, at 1039:18, the Tutor pilot stated "[C/S] *crossing.*" At Boscombe Down this crossing call indicates that the ac is on the 'BREAK' from the DEAD-SIDE to the LIVE-SIDE [as described in the Boscombe Down FOB.] TOWER acknowledged the Tutor pilot's call. Thereafter, the Tucano pilot stated - at 1039:22 - "*…that was very dangerous a Tutor turning over us.*" TOWER replied, "[Tucano C/S] *copied*", whereupon the Tucano pilot said, "*We'll discuss that when we get down I may consider an Airprox.*" TOWER answered, "*Roger.*" During the Tutor's integration into the visual cct, TOWER had given accurate and standard traffic information regarding other ac in the visual cct. The "crossing" call was a newly introduced procedure, aimed at increasing the situational awareness of crews in the visual circuit. However, it played no part in this incident; both pilots were aware of the other ac's presence throughout and the close proximity was a matter of crew judgement.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (2): The UK MIL AIP at AD-2-EGDM-1-14 promulgates the fixed wing cct height of 1200ft QFE, and that for light ac as 800ft QFE by day. Helicopters operate to the S side up to 500ft QFE.

TESD MOD DPA/DLO comments that the root cause appears to be the assumptions that both pilots made in the intentions of the other. Having determined that there existed a potential confliction the Tucano Pilot took an action to attempt to resolve the problem. Sadly, this action was not anticipated by the Grob Pilot who had already resolved that no confliction would exist if he turned across the path of the departing Tucano.

As usual a salutary lesson regarding assumptions. This Airprox might have been avoided if any party had intervened in some way. The Tucano pilot in electing to climb at maximum rate could have transmitted that fact to the pilot of the Grob. The Grob pilot could have reported, when 'crossing' that the Tucano had been seen and that he was crossing to turn downwind with Tucano 'in sight'.

Further work must be conducted on the procedures to ensure some words to this effect are included under similar circumstances.

HQ PTC comments that the loss of visual contact by the Tutor was a major factor in this Airprox. The decision by the Tucano pilot to expedite his climb and clear the Tutor's level was not unreasonable but it did rely on the Tutor maintaining visual contact and not turning before the Tucano was clear. As the Tucano pilot maintained visual contact with the Tutor throughout this incident avoiding action was possible thus reducing the risk of an actual collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was reminded of a fundamental tenet of visual cct flying at military aerodromes that pilots joining the visual cct were required to give-way to those already in the cct or departing. Here, the Grob Tutor pilot was cognisant of the departing Tucano but he himself reports that he misjudged the climb performance of the Tucano. However, it was clear from the Tucano pilot's report that he had taken action to increase his initial ROC in an attempt to forestall a confliction with the Tutor, of which he was aware and could see throughout his climb. The HQ PTC Member emphasised the Command's view that the Tutor had not maintained visual contact on the departing Tucano. However, the HQ STC Member – himself a very experienced Tutor pilot and QFI - opined that he would not have acted as the Tucano pilot did here. The Member stressed that he would not have increased the ROC and climbed through the Tutor's level as he accelerated away from take-off. Far better to stay low, watch the Tutor turn over the RW where he knew he would be crossing, before further climbing his Tucano in compliance with the departure instructions. The Army pilot Member agreed and reinforced his colleague's view that it would have been preferable to 'stay low'. Thus the Tucano's flight path would have been more 'predictable' and in the HQ STC Member's view this was key for other pilots operating in the cct. Whilst this was all said with the clarity of hindsight it was evident that the Tutor pilot was unaware of how close below him the Tucano was before he initiated his L turn and called *"crossing"*. The Board was aware of the Tutor instructor pilot's potential sighting difficulties spotting other ac below on the port side when seated 'side-by-side' in the RH seat with a cadet passenger in the LH seat. Nevertheless, it remained the Tutor pilot's responsibility to sight other ac and take appropriate action to stay clear of them.

The Member from CinC FLEET was concerned that ATC had not intervened and questioned whether the ADC should have issued take-off clearance when he did. But in another controller Member's view, with a busy visual cct where pilots are responsible for their own visual separation, there was no reason to delay the Tucano's departure or to believe that the Tucano would climb at a high rate and that a conflict might ensue. Nevertheless, the CinC FLEET Member stressed his opinion that ATC should be prepared to take a more proactive stance and that a call to the Tutor pilot might well have alerted him and caused him to delay his turn DOWNWIND until he could pass clear astern of the departing Tucano. The Board was briefed on concerns that had been expressed about the LA joining procedure at Boscombe Down as alluded to in the Unit's candid comments. With the Grob Tutors crossing the RW climb-out onto the LIVESIDE and virtually no DEADSIDE, it had been suggested that the RW05 fast-jet cct – and that used by Tucanos - should be RH, thus opposite to the Grobs flying a LH cct to RW05NORTH. However, there was a contrary view that there was insufficient airspace to permit a RH cct. The DASC Advisor to the Board stressed that the operation of this fixed-wing cct is no different to any other military aerodrome where ac joining on the DEADSIDE cross the RW climb-out onto the LIVESIDE. It was clear that much debate about cct procedures had been engendered at the Unit by this Airprox. The Board was encouraged to learn that the Unit had investigated and trialled alternative methods of integrating the Tutor ac into the visual cct and has introduced new procedures with effect from 18 Jan 2007. Members were briefed that the new procedures for Tutor ac joining the visual cct do not require them to cross any active runways or climb out lanes which should forestall any further potential for such as happened here. Following a wide-ranging debate, the Board agreed unanimously that this Airprox had been caused when the Tutor pilot turned into conflict with the departing Tucano.

But with the Tucano pilot sighted throughout thereby enabling him to take action to avoid the Tutor himself, this led the Board to conclude, again unanimously, that no risk of a collision had existed in these circumstances.

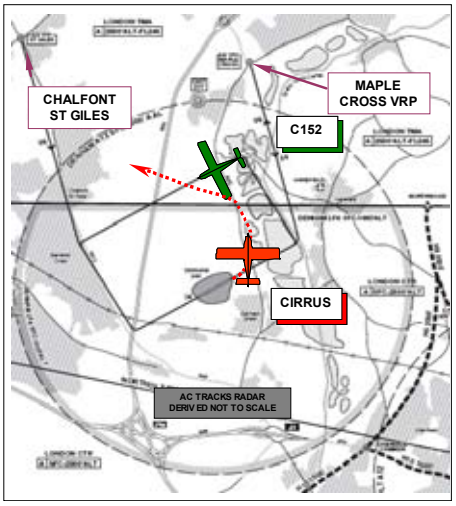
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tutor pilot turned into conflict with the departing Tucano.

Degree of Risk: C.

AIRPROX REPORT NO 123/06

Date/Time:	6 Aug 1502 (Sunday)	
Position:	5135N 00031W (Denham Airfield - elev 249ft)	
Airspace:	Denham ATZ	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	Cessna 152	Cirrus SR22
Operator:	Civ Trg	Civ Pte
Alt/FL:	750ft agl (QNH 1022mb)	1000ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	25km	10km
Reported Separation:	Nil V/100m H	500ft V/1000m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports flying with a student in a white and red ac in receipt of a FIS from Denham. He had taken off from RW 06 at Denham with a 150hrs PPL holder to conduct a local area/circuit familiarisation flight. A Cirrus SR22 was the next ac to take off behind them and he had heard its pilot calling Denham Info stating that he was flying solo to France. After take off his student turned left onto crosswind and climbed to 1000ft QNH where he levelled off. The student then turned downwind onto a heading of 240°. Just after completing the turn onto heading 240°, at 85kt and before he made the 'downwind' call (he was operating the radio), the Cirrus appeared 100m in front of them in a level LH turn.

Denham Aerodrome is situated within the Northern boundary of the London CTR and there are strict entry/exit routes; the exit route from RW 06 is via Maple Cross. [2.5nm due N of the Aerodrome]

The Cirrus SR22 initiated a turn well before Maple Cross and not only caused conflict with circuit traffic but would potentially conflict with ac joining in accordance with the published procedures for RW06 from Chalfont St. Giles [3nm NW].

Because the Cirrus flew from behind his ac and because of the high wing design, he had no opportunity to see the other ac and take any avoiding action before it appeared in front of him; he assessed that had they been 100m further downwind the incident would have resulted in a mid-air-collision.

THE CIRRUS SR22 PILOT provided a report that was very difficult to interpret. It is understood that he was on a private VFR flight to France squawking 7000 with Mode C and TCAS was fitted. He was at 1000ft QNH heading 360° at 130kt, and was overtaking the reporting ac as he was faster. He was tracking towards Bovingdon to avoid flying over the houses and a hospital; the SR22 is known to be noisy on takeoff. He thought that the Cessna seemed to be heading to Maple Cross and he did not know that it was in the circuit. At a position 1.2nm of upwind and 1000ft QNH - according to his GPS track log - he turned left heading N to avoid being too close to the Cessna. As the Cessna turned left for downwind it was on his right side and 200ft below. As the Cessna pilot saw him and called on the radio, he was at 1200ft and outside Heathrow Airspace and, according to his log, at 1.4nm from Denham.

UKAB Note (1): The UK AIP at AD2-EGLD-1-1 notifies the Denham ATZ as a radius of 2nm centred on RW06/24, extending from the surface to 2000ft above the aerodrome elevation of 249ft amsl. An AFIS or A/G Station operates variously during 0700-1900 in Summer.

UKAB Note (2): Relevant extracts of the UK AIP at AD 2.22 – Flight Procedures state:

Circuit directions are to the N but variable for runways 12/30.

There is no overhead joining procedure. All aircraft in the Denham Local Flying Area (LFA) are restricted to a maximum altitude of 1000 ft amsl.

Circuit joining is achieved by establishing a long base leg and giving a position report at Chalfont St Giles for left hand circuits or Maple Cross for right hand circuits. The ATZ should be entered at a height of 750ft agl (1000ft amsl). Joining traffic should give way to circuit traffic.

Aircraft leaving the circuit should extend the crosswind leg, fly northward and start a climb to cruising altitude before turning on course.

Denham LFA is that part of the Denham ATZ which lies within the London Control Zone (Class A). Flights without compliance with IFR requirements may take place in the LFA subject to the following conditions:

i Aircraft to remain below cloud and in sight of the ground;

ii Maximum altitude: 1000ft QNH;

iii Minimum flight visibility: 3 km.

Pilots of aircraft flying in the ATZ are responsible for providing their own separation from other aircraft.

UKAB Note (3): As a result of Airprox 113/06, the operator of Denham Aerodrome has reviewed the Aerodrome Rules, which include the arrival and departure procedures, clarifying and updating as necessary.

ATSI reports that there is no R/T recording facility at Denham. The FISO stated: *"C152 C/S departed RW06 LH in the visual circuit. SR22 C/S departed after C152 C/S. While C152 C/S was turning downwind, SR22 C/S cut across in front of C152 C/S on a NW heading en route for Deauville".* Despite requests for an amplifying report from the duty FISO, none has been forthcoming.

Analysis of the radar recording, although limited due to coverage and one a/c not having a transponder, shows what is believed to be the sequence of events.

A primary-only radar return, believed to be the C152, is first observed at approximately 1501:27; at 1501:35 a primary and secondary return, believed to be the SR22 appears and at this point the first ac appears to be turning crosswind. The radar return of this first ac is however intermittent throughout. At 1501:09 the SR22 can be seen in a left turn inside the C152 which fades at 1502:06 and reappears 24sec later very close to the SR22 with the tracks diverging marginally; it is estimated that at this point the ac are 0.1nm apart. At 1502:52 the C152 return can be seen to the S of the SR22 and the tracks have crossed. The tracks are calculated by interpolation to be 0.2nm apart at crossover.

As far as can be determined there were no ATS causal factors.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, a brief report from the FISO involved and reports from the appropriate ATC authorities.

Specialist GA Members were amazed at the scant regard apparently paid by the Cirrus pilot to the Rules of the Air; to Denham published procedures and to other airspace users; the Board considered this to be, at best, poor airmanship. One Member offered that the Cirrus SR22 is a very high performance light ac and perhaps the pilot had not kept on top of the situation as it developed and simply got 'behind the ac'.

It was pointed out to Members that Denham is in an almost unique situation being partly located in Class A CAS, in a largely residential area and with a major hospital close by. It is most important therefore, that operational procedures reflect accurately the local situation and that all pilots using the aerodrome adhere rigidly to these procedures as any deviation will not only cause a nuisance to local residents but could hazard other ac operating

to/from Denham, Northolt and/or Heathrow. Partly as a result of an earlier Airprox, the management at Denham conducted a full review of the Aerodrome Rules. The revised procedures were published after this, the second Airprox had occurred but as the RW06 departure procedure was clarified rather than changed, Members were satisfied that the procedure extant at the time of the subject Airprox, if adhered to, was sound. In any case, it is always the responsibility of a pilot departing an airfield to be aware of and maintain adequate separation from circuit traffic. The procedures (rules) are all promulgated clearly at the various sub-paragraphs of Rule 17 of the Rules of the Air.

By not adhering to the Rules of the Air and to Denham published procedures, the Cirrus pilot created an unsafe situation by flying into conflict with the Cessna 152 that was following the correct circuit pattern in the approved manner, the instructor making the recommended RT calls so that other users could be aware of the Cessna's position and its pilot's intentions. Having due regard to the respective pilots' reports, the Board felt that safety had not been assured.

At the request of the Members, the Director undertook not only to include this incident in UKAB publications but to attempt to ensure that this incident was widely publicised within the GA community so that others might benefit from the lessons identified.

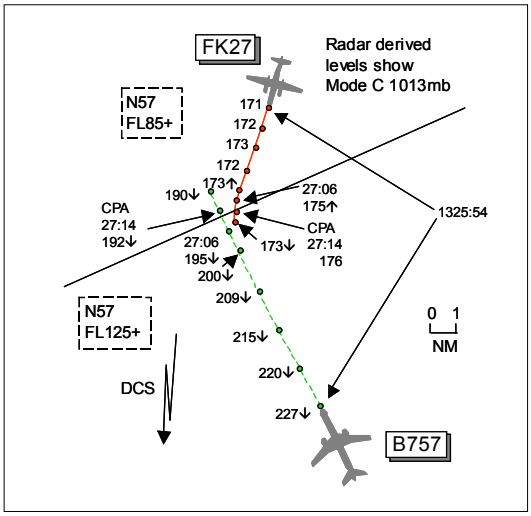
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The departing Cirrus SR22 did not clear the circuit safely and flew into conflict with the Cessna 152.

Degree of Risk: B.

AIRPROX REPORT NO 124/06

Date/Time:	6 Aug 1327 (Sunday)	
Position:	5504N 00317W (21nm N DCS)	
Airspace:	AWY N57	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B757-200	FK27
Operator:	CAT	CAT
Alt/FL:	FL190↓	FL174↑
Weather Visibility:	IMC IICL	IMC KLWD
Reported Separation:	1500ft V/nil H	NR
Recorded Separation:	1600ft V/0·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports heading 335° at 300kt inbound to Glasgow IFR and in receipt of a RCS from Scottish on 126·3MHz squawking 5115 with Mode C. Descending to FL180 TCAS gave a TA alert on traffic ahead which was displayed 3000ft below so the ROD was reduced. When passing FL190 TCAS indicated the other ac was 1500ft below and climbing – the traffic was not seen visually owing to IMC. ATC told them that the traffic had bust its cleared level and it was seen on TCAS to descend back to FL170. The horizontal separation had been almost zero (too small to measure from TCAS) as they crossed. However, if they had not received a TA alert the vertical separation would have been 400ft and if the controller had not realised the other ac had bust its level the vertical separation would have been zero.

THE FK27 PILOT reports flying en route to Filton IFR and in receipt of a RCS from Scottish squawking an assigned code with Mode C. During level cruise in cloud in IMC at FL170 on course for DCS and under A/P control, the A/P Altitude Hold Mode disengaged due to an unknown reason. The ac commenced a climb and when reaching FL174 he took control immediately and initiated a descent to FL170. Simultaneously, TCAS announced a 'traffic' alert and Scottish ATC warned him about his altitude. He did not notice the other traffic on the TCAS screen owing to him concentrating on descending his ac back to FL170.

THE TALLA TACTICAL CONTROLLER reports that the FK27 was outbound from Edinburgh IFR and cleared to FL170 which was maintained on reaching. At 1328 when the FK27 was 25nm N of DCS it was seen to be climbing through FL173 and then FL174. He asked the crew to confirm that they were maintaining FL170 and they responded 'affirm' after which the flight was seen descending back to FL170. The crew were again questioned as to the climb and responded 'maintaining FL170' – the [foreign] pilot appeared to struggle when answering his request for clarification of the events, only repeating that they were maintaining FL170. The B757 was flying in the opposite direction directly O/H the FK27 at the time of its 'level bust' and the B757 crew confirmed that they had observed the FK27 climb above FL170.

ATSI comments that the crew of the FK27 established communication with the Talla sector controller at 1308:50, and reported following a Talla 6C SID. The controller, having identified the flight and verified its level, issued climb instructions first to FL130 and then FL170. At 1319:25, the crew were instructed to fly a heading of 205°. At 1322:55, the B757 flight reported on frequency descending to FL260 and the controller immediately issued further descent clearance to FL180. At that time the two ac were 41nm apart on near-reciprocal tracks. At 1326, the controller instructed the crew of the FK27 to resume their own navigation to SUBUK. At this point the FK27 was level at FL171 with the B757, which was passing FL227, in its 10 o'clock at 13nm. The crew of the FK27 had some difficultly in understanding this instruction and shortly afterwards the controller cleared the flight to route direct to DCS which they acknowledged. As the two ac converged the Mode C of the FK27 indicated FL173 and so, at 1327:10, the controller asked them to confirm they were maintaining FL170 to which they replied *"Maintaining one seven zero FK27 c/s"*. The Great Dun Fell radar recording shows, at 1327:14, that the FK27's Mode C was

indicating FL176 and that of the B757 FL192. The controller transmitted *"FK27 c/s just confirm your altimeter setting please you showed there flight level one seven four in the climb"*. There was no immediate answer and so the controller called them again and this time the crew replied *"FK27 c/s now one seven zero one seven zero remaining one seven zero okay"*. The controller asked the crew if they had passed through their cleared level but there was no reply. A short time later he called the crew again but the crew did not answer the question posed. The crew of B757 advised that they received a TCAS on the traffic and *"...we can verify the flight level as well"*. The radar timed at 1327:06, shows the B757 in the 12 o'clock position of the FK27, at a range of 1·3nm when the FK27 was indicating FL175 and the B757 FL195. The next frame, timed at 1327:14, shows the B757 having crossed from L to R and now in the 2 o'clock position of the FK27 at a range of 0·7nm when the FK27 was showing FL176 and the B757 FL192. No ATC errors disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add little to this incident. The FK27 crew had levelled the ac at FL170 shortly before the Airprox but not ensured that the A/P Alt Hold had maintained the required FL which then led to the ac climbing. CRM should, through cross-cockpit checking, have picked up this A/P malfunction but this was not done and as a consequence the FK27 crew climbed above their cleared level which caused the Airprox. Although this had the potential for a more serious incident, the deteriorating situation was quickly recognised by the TALLA controller and the B757 crew. The controller had alerted the FK27 flight to the 'level bust' simultaneously with the crew receiving a TCAS TA alert which resulted in the crew descending back down to FL170 very shortly afterwards. A TCAS TA alert had given the B757 crew the heads-up and they had reduced the ROD which had effectively negated the generation of an RA warning. All of these combined actions had resulted in the subject ac passing with 1600ft of vertical separation at the CPA, with a slight increase on the next radar sweep as the robust corrective actions of the FK27 crew took effect. The Board were thus able to conclude that in this incident safety had been assured throughout.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FK27 crew climbed above their cleared level.

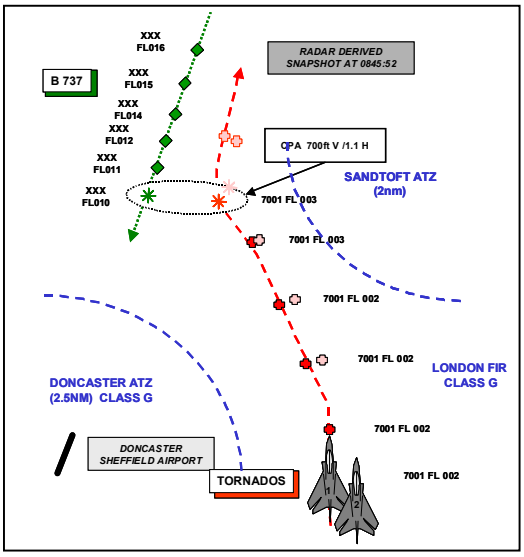
Degree of Risk: C.

AIRPROX REPORT NO 126/06

Date/Time:	10 Aug 0846	
Position:	5332N 00056W (4nm Doncaster Sheffield - elev 55ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-300	Tornado GR4 x2
Operator:	CAT	HQ STC
Alt/FL:	1350ft↓ (QNH 1014mb)	250ft (RPS 1006mb)
Weather	VMC NR	VMC NR
Visibility:	20km	30km

Reported Separation:
600-800ft V/0.5-1.0nmH
1000ft V/1.3nm H

Recorded Separation:
700ft V/ 1.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying a non-scheduled passenger flight heading 210° at 155kt joining the final approach to Doncaster Sheffield (DSA) with HISLs selected on in receipt of an approach service [see ATSI report below] from them and squawking as directed with the First Officer as PF. Two low-flying military ac contacted DSA APR and confirmed they would remain clear of the airfield and at that time no indications on TCAS were observed.

Once established on the ILS at approximately 4nm and 1350ft on the QNH, two 'pop up' TCAS contacts were observed, followed by a TCAS RA *"Climb Climb"* command. This all happened in a very short time frame: from recollection the TCAS indicated the ac to be 600-800ft below, approximately 0.5-1.0nm on a bearing of 330° converging with their position and the final approach. No visual contact was made. The First Officer followed the RA and continued with the go-around and then joined the visual circuit left hand for RW20. ATC confirmed that prior to the TCAS Climb no observations of the military ac had been made but afterwards they appeared on radar, crossing the final approach at 4nm.

Due to the reaction to TCAS, he assessed the risk of collision as being low to moderate, reporting the incident by radio to DSA.

THE TORNADO GR4 PILOT reports leading a pair of ac on a tactical sortie and they were conducting a low level transit through LFA 11. Tornado 2 was tasked with contacting the relevant ATC APR agencies as the formation progressed northwards, heading 330° at 400kt, reporting back on the second radio that was set to the formation's tactical frequency; lead was monitoring the low flying frequency throughout. The route had been selected to allow near overflight of a recce point of interest, believed to be a Bloodhound missile site, to the E of the DSA ATZ and it was planned to get no closer than 1nm from the edge of the ATZ nor to cross the approach lane. The proximity to Doncaster was deemed adequately mitigated by the comm-plan and was not considered to constitute a risk or nuisance to their operations. .

At 0844z Tornado 2 contacted DSA APR informing them of the formation's transit but, with the benefit of hindsight, this call may not have been explicit enough about the formation's intentions (military low flying traffic normally routes through the flow arrow to the E of Sandtoft) and could have led to an incorrect assumption by the controller that the ac were routing further to the E. Tornado 2 was however informed that there was no traffic to affect, reported this to lead and they continued N. Shortly afterwards both Tornado pilots became visual with a Boeing passenger ac at 4nm, and bearing in mind the 'nothing to affect you' call by DSA APR were surprised at its proximity. The relative vectors were however divergent and they estimated that there was about 1000ft height separation, albeit with the Boeing in a slight descent. Their imminent planned right turn onto 035° would further

increase the separation; this turn was conducted as soon as safely possible (slightly earlier than planned), bearing in mind the proximity of the Sandtoft ATZ.

Evidently the ac passed close enough to trigger a TCAS alert but at no point did either Tornado crew feel the need to take additional avoiding action to prevent a collision based on visual assessment. Nevertheless the eventual proximity to the Boeing was recognised as being less than ideal and greater separation would have been given if the airspace had permitted. He assessed the risk as being low.

A photocopy of the formation's map covering the area of the Airprox was provided in addition to a section of the recording of the HUD Visual, FLIR and navigation display; the B737 does not show at any time, verifying the assessment of the collision risk as low.

ATSI reports that at the time of the Airprox, the B737 pilot was in communication with the DSA ADC, having just being transferred from the DSA APR. The APR described his workload as 'High' and the traffic loading as 'Medium'.

APR was providing an Approach Radar service from Liverpool Airport which utilises the Waddington primary radar together with the Scampton SSR. The APR is the only controller who holds current Certificates of Competence for both aerodrome control as well as approach / approach radar control for Doncaster Sheffield airport. He undertakes an average of 3 days per month at Liverpool airport for this purpose, which amounts to 8 hours for each of the approach (i.e. radar and non-radar) Certificates of Competence.

The B737 pilot established communications with the APR at 0835:50, when it was 34nm ESE of DSA and reported descending to FL90 routeing to VEGUS. The controller correctly identified the flight, informing the crew accordingly, and placed it under a RAS. The controller issued descent instructions, in stages, to 3500ft and placed the ac on a heading of 310º. A short time later the controller instructed the crew to descend to 2500ft and then to turn left heading 290º for base leg. At that time the ac was 10nm NE of the airport. Further descent was given to 2000ft before the crew were instructed to turn left heading 230º and report established on the localiser for RW20.

At 0844:00, when the B737 was 9.3nm NE of DSA passing 2700ft for 2000ft and closing the localiser, Tornado 2 called, the pilot transmitting "*Doncaster xxx a flight of two Tornados currently ten miles south of the field northbound to pass six miles east abeam your field looking for any traffic you have to affect*". The controller replied "*C/S no known traffic to affect you low level the Barnsley regional one zero zero eight*". The crew of Tornado 2 read back the Barnsley setting before advising that they were going en-route.

APR instructed the B737 crew to descend to 1500ft and then further descent would be on the glide slope; this was correctly acknowledged. The B737 crew reported established at 0844:55 and APR then transferred the flight to the Tower frequency. On contacting the Tower, the ADC cleared the flight to land at 0845:30, but 20sec later the crew reported going around due to a TCAS climb. Following coordination with the APR the ac carried out a visual left hand circuit and landed at 0853.

APR advised that the primary radar cover was poor and within 5nm of the airport SSR coverage below 500 feet was patchy. The range selected on the radar was typically 30–35nm and that was what he had selected on the day. Military flights did take place, usually 2 or 3 a day, and the 'normal' route was northbound following the course of the River Trent, passing some 8nm E of the airport and E of the Sandtoft ATZ before crossing the Humber Estuary. Most of these flights called on the DSA approach frequency and continued with their en-route frequency when they were in the vicinity of the River Ouse (approximately 18nm NE of the airport).

APR reported that when Tornado 2 called he could see a 7001 squawk some 10nm S of the airport, with an unverified Mode C readout of, he believed, 300ft. Given the intention of the crew to pass 6nm E, the APR believed that the ac were probably following the 'typical' low-level route, and would be passing E of the Sandtoft ATZ and so would pose no threat to the inbound B737. When asked why he did not pass any TI on the flights to either the Tornados or the B737 he reiterated that assessing the position of the ac at the time and their intended flight paths he saw no potential confliction.

Although it was stated on the RTF that the Tornados would pass 6nm E of DSA, from the pilot's subsequent narrative it is clear that this was not their intention. The formation planned to route via a location 1nm E of the Doncaster Sheffield ATZ and so would be passing 3.5 nm E of the airport and not 6nm. Additionally, the Tornado

pilot stated that they did not intend to 'cross the approach lane' which the radar recording confirms did not happen. Tornado 2 left the frequency at 0844:25, when the formation was 8.2nm SE of DSA and in the 12 o'clock position of the B737 at a range of 14.6nm. The location of the formation at this time was commensurate with a route following the River Trent and, unfortunately, the formation disappeared from radar at around the time they left the APR's frequency.

[UKAB Note (1): On a northerly track a routeing of 6nm E of DSA would have taken the Tornados through the centre of the Sandtoft ATZ. The route map provided shows that their intention was to track equidistant from the DSA and Sandtoft ATZs, clearing each by 1.5nm. The track also remains to the E of the DSA RW20 approach by just under 1nm.]

Having reported established on the localiser, the APR transferred the B737 to the ADC. When the crew called the ADC, at 0845:20, the ac was on a 5nm final passing 1500ft whilst the formation was passing 3.4nm E of the airport showing a Mode C readout of 200ft. The Tornados were on a track of almost due N and in the 10 o'clock position of the B737 at a range of 4.9nm. At 0845:41, the radar recording shows that the formation commenced a left turn towards the B737, which was passing 1200ft. The B737 was crossing through the 12 o'clock position of the formation, from right to left, at a range of 2.6nm.

The two flights continued to converge and the B737 crew reported receiving a TCAS climb and that they were going around, when the formation was in its 8 o'clock at a range of 1.1nm. The Mode C readout of the two Tornados indicated 200 and 300ft and they continued on their new track of approximately 330º until they reached a point equating to a 5.4nm NNE of DSA when the formation turned right and tracked away on a NE course.

It is clear that the poor radar coverage was a contributory factor to this incident. APR advised that the installation of a new radar at DSA was well advanced and that it was expected that this would become operational by the end of 2006. The SSR feed would be obtained from Claxby.

With the benefit of hindsight the APR could have passed TI to the B737 crew about the presence of the Tornado formation but he assessed there to be no risk of confliction. The poor radar coverage prevented the APR from recognising that the formation were going to pass much closer to the airport than stated and so the first indication that there was a problem was when he was informed that the B737 was following a TCAS climb.

HQ STC comments that the Tornado crew had planned to fly past DSA and then depart to the NE avoiding the approach track. Although the APR advised them that there was no traffic to affect they were heading N towards the descending B737 and information on the approaching ac would have been of value.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that this incident had taken place in Class G Airspace where the ac had an equal right to operate and all pilots a shared responsibility for collision avoidance. Members also noted that the acs' flightpaths were such that there was never any risk that they would have collided; indeed they were separated by a significant distance.

The Board noted that the Tornado leader had planned to avoid the Doncaster Sheffield ATZ and final approach by a sizable margin but that that had not been enough to prevent the B737 TCAS from generating a warning to which the Captain had to react and this he did in the approved manner by executing a go-around. Members determined therefore that the closeness of the flightpath of the lead Tornado to the final approach triggered a TCAS RA.

Having reached this conclusion there were however two aspects of this incident that caused Members some concern; namely the information call to Doncaster by the Tornado No 2 crew and the Controller's subsequent incorrect assumption that the ac were not in such proximity that a warning of each other's presence was required. Members were informed that it was possible that the No 2 crew were relatively inexperienced and that their leader had subsequently recognised that the position call was not accurate and that this had led to an incorrect assumption by the controller. In cases such as this it was pointed out that an incorrect (voluntary) position report

could, on some occasions, be worse than no call at all. The Board was informed by a controller Member very familiar with low level operations in the immediate area of the incident that, in his experience, the route between Doncaster and Sandtoft is often used by military traffic and that about half the ac go E of Sandtoft while the other half track to the W; his view therefore was that the controller should have anticipated a transit to the W and possibly should have requested clarification since it was most unlikely that the ac would track 6nm to the E and straight through the Sandtoft ATZ. In any case, the information that a B737 was on the approach would have been of considerable use to the Tornado crews and the likelihood of a low-level military transit may have assisted the B737 crew. Whether or not accurate TI would have prevented the incident remains a matter of debate and speculation.

ATSI advised the Board that the new radar at Doncaster Sheffield was expected to be flight checked in the near future and was hoped to be in service in February 2007.

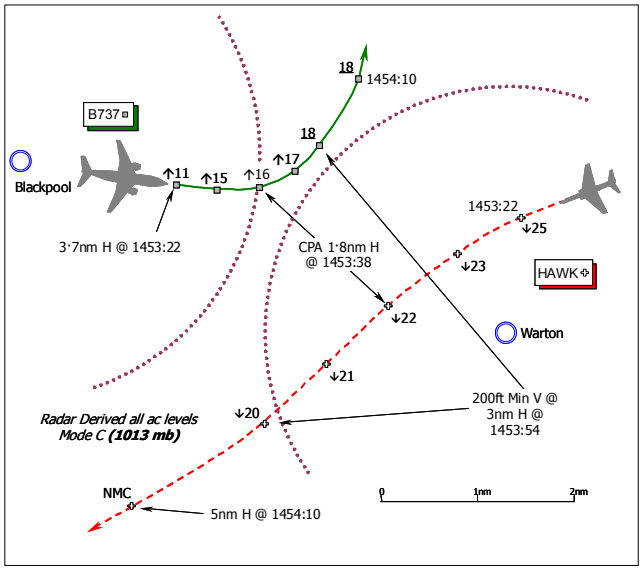
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado formation's chosen flightpath caused a TCAS RA.

Degree of Risk: C.

AIRPROX REPORT NO 127/06

Date/Time:	6 Aug 1453 (Sunday)	
Position:	5345N 00257W (3½nm ESE of Blackpool - elev 34ft)	
Airspace:	ATZ/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737	Hawk
Operator:	CAT	HQ STC
Alt/FL:	1500ft↑ (N/K)	3000ft↓ (N/K)
Weather	VMC NR	VMC CAVOK
Visibility:	+10km	>10km
Reported Separation:	400ft V/3nm H	Not seen
Recorded Separation:	600ft V @ 1·8nm Min H 200ft Min V @ 3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports he was departing from Blackpool outbound for Belfast Aldergrove. The departure clearance from Blackpool was after take-off from RW10 to climb straight ahead to 1500ft Blackpool QNH then to turn R direct to the ISLE-OF-MAN VOR (IOM), climbing to FL120. As they passed 1500ft QNH and started the R turn at 150kt, TCAS enunciated a TA. At the same time Blackpool ATC told them to turn L to stay clear of unknown traffic. They levelled out and reversed the turn as the other ac passed about 3nm to their R and 400ft above his ac - from the TCAS display - and flew astern. As they were banking to the L, the other ac could not be seen.

Some 5 days later on 11 August 2006 he talked with ATC and they informed him [erroneously] that the other ac was an unknown Hunter *"attacking"* Blackpool at very high speed and with a very high RoD. ATC asked him to file a report *"in order to get it stopped"*. Allegedly the same thing happened the day before.

THE HAWK PILOT reports his ac has a black high-conspicuity colour-scheme and the HISLs were on whilst en-route to the Wirral for an air display. After working SWANWICK MILITARY in transit through CAS, he free-called Liverpool RADAR direct for this VFR portion of the flight and elected not to speak to Blackpool ATC as their ATZ was being avoided and he was flying in VMC. An accurate altitude, heading and speed for this part of the flight was not available. The other ac was not seen and he was unable to provide any further detail about the encounter.

He understood this Airprox was raised by Blackpool ATC and questioned why they released an ac on an IFR departure with unknown traffic, which in his opinion was a factor.

UKAB Note (1): Meteorological Office archive data gives the 1450UTC Blackpool Weather as: Surface Wind: 280/9kt; Visibility >10km in Rain Showers; Cloud: FEW @ 3000ft; QNH1021mb.

THE BLACKPOOL APPROACH RADAR CONTROLLER (BLACKPOOL APR) reports that the B737 was flying IFR to Belfast Aldergrove and was released for departure under a RAS on RW10 with a R turn towards the IOM VOR climbing to FL120. A fast moving contact was observed inside CAS, westbound towards the boundary of CAS, to the E of Blackpool and its Mode C indicated that it was descending rapidly. The B737 was rolling but the crew was instructed to stop their climb at an altitude of 3000ft as the unknown had stopped its descent at FL50, he thought. As the B737 got airborne, the unknown ac continued its descent towards Blackpool Airport so the B737 crew was given an avoiding action L turn onto a heading of 040°. The B737 passed clear of the unknown ac by about 2nm at a similar altitude and the latter's track was observed to also change sharply to the L. The unknown ac was believed to be en-route to an air display at the Wirral.

He added that the Blackpool AR15 SRE was in use and although the St Annes Watchman radar is displayed it is not yet approved for use.

THE LIVERPOOL APPROACH RADAR CONTROLLER (LIVERPOOL APR) comments that he was informed by his Management that an Airprox had been filed, involving the Hawk that had displayed at the Wirral airshow at New Brighton. However, he had very little recollection of the event and could remember only a few details. The Hawk pilot called on the Liverpool APPROACH frequency of 119.85 when N of the Liverpool CTR. The radar display was set at a displayed range of 20nm. A squawk of A7004 was allocated to the Hawk, which held to the NW of CAS until the airshow commenced whence the Hawk operated VFR not above 2000ft. After the completion of the display the Hawk departed VFR at low level, its pilot making no reference to any confliction.

THE HAWK PILOT'S UNIT comments that this Airprox was initiated by the airline in response to a request from Blackpool ATC – indeed, the TCAS alert was a TA. The Hawk was operating VMC in Class G airspace and at no stage, on either day, had the pilot been "attacking" Blackpool, but was following legitimate procedures en-route to nominated air display sites. While the manoeuvre of the Hawk may have played a part in the proceedings, it would seem to be important to identify whether the release of the CAT on an IFR departure by the Blackpool controller was appropriate given the potential conflict with the Hawk. The pilot concerned had transited the same geographic area on the previous day and had contacted Blackpool ATC. He was unable to do so on the day of the Airprox owing to the location of the display site and the pressing requirement to penetrate the Liverpool CTR.

ATSI reports with RT transcript that the B737 was planned to depart from RW10 at Blackpool and route via the IOM VOR. Shortly after 1446, the crew requested taxi clearance and this was granted. A departure clearance of a climb on track IOM to FL120, further climb to FL220 with radar and a squawk of A5063 was all passed and read back. The B737 crew reported ready for departure and at 1450:50, they were instructed to LINE-UP on RW10. Some 30 sec later at 1451:20, the radar recording shows the subject Hawk, 20nm due E of Blackpool, descending through FL189 Mode C and tracking approximately 245º. The B737 crew was cleared for TAKE-OFF by TOWER at 1451:50, and instructed to climb straight ahead *"…runway heading to 1500 feet before turning right I say again right turn please".* The Blackpool APR could see a fast moving target within CAS E of Blackpool westbound – the Hawk - which was descending rapidly. The radar print, taken at 1452:06, shows the Hawk 14nm E of Blackpool but having turned R and tracking 275º, now squawking A7000 but with NMC. The Blackpool APR reported that it was too late to stop the B737's departure and so the ADC was requested to stop the B737's climb at 3000ft. This request was complied with and the B737 crew was instructed by TOWER [at 1453:08 to *"…stop climb 3000…"*] and to contact the APR. The radar recording shows the Hawk at 1452:40, continuing on its westerly track with the Mode C readout indicating FL48. At 1453:20, the Hawk was passing 2600ft Mode C (1013mb) and now squawking A7004 [Conspicuity aerobatics and display] whilst the B737 is in its 1 o'clock at a range of 4·3nm passing 900ft Mode C (1013mb). As soon as the B737 crew contacted the APR he transmitted just before 1453:30, "[C/S] *avoiding action turn left now heading 0-4-0 degrees*". The B737 crew did not acknowledge this immediately and so the APR called them again. This time they replied and reported turning onto 040º and that they had the traffic – the Hawk - on TCAS. At around the same time, the radar recording shows that the Hawk had turned L onto a SW'ly heading and continued its descent.

Investigations revealed that the Hawk had been working Swanwick Military in transit to the Wirral for an air display and called Liverpool at 1452:20. An analysis of the radar recording shows that at the time the Hawk pilot contacted the Liverpool APR he was E of Blackpool and heading W. The normal range displayed on the Liverpool SRE is 20 or 25nm and Blackpool is, at 26nm N, outside of this displayed coverage. On the initial call, no ATS was requested by the pilot or offered by the controller neither was any position or level given; the Liverpool APR replied "[Hawk C/S] *good afternoon I have your route towards your site and just hold over the water not above 2000 feet initially QNH 1-0-2-0*". The Hawk pilot read back the level restriction and was requested to squawk A7004. At the time that separation between the Hawk and the B737 reached a minimum, there were no exchanges between the Hawk pilot and the Liverpool APR. The Hawk pilot made no mention of any close encounter on the RTF. The Hawk pilot remained outside the Blackpool ATZ and was in Class G airspace at the time of the Airprox.

Note (2): The Clee Hill Radar recording shows the Hawk descending through 2500ft Mode C (1013mb) – about 2740ft altitude Blackpool QNH (1021mb) - at 1453:22 as it passes 1nm to the N of Warton and above its ATZ in a L turn SW'ly. Meanwhile the B737 is first shown climbing through 1100ft Mode C (1013mb) – about 1340ft altitude Blackpool QNH (1021mb) – as it departs from Blackpool about 14sec after the crew was instructed to stop climb at 3000ft QNH and call the APR. The avoiding action L turn issued by the Blackpool APR then becomes apparent. Horizontal separation reduced to a minimum of 1·8nm with 600ft vertical separation at 1453:38, as the two ac pass

starboard-starboard. Minimum vertical separation of 200ft occurred two sweeps later at 1453:54, at which point the two ac were 3nm apart and tracking away from each other.

UKAB Note (3): The UK AIP at AD 2-EGNO-1-5 notifies the Warton ATZ as a radius of 2½nm centred on RW08/26, extending from the surface to 2000ft above the aerodrome elevation of 55ft amsl, active H24. The Warton MATZ is active during the notified hours of watch only during weekdays from Monday-Friday.

UKAB Note (4): The UK AIP at AD 2-EGNO-1-5 notifies the Blackpool ATZ as a radius of 2½nm centred on RW10/28, extending from the surface to 2000ft above the aerodrome elevation of 34ft amsl, active in Summer 0600-2000.

HQ STC comments that the Hawk pilot was en-route to a display and remained well clear of the Blackpool ATZ 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.

It was clear to the Board that the Hawk pilot was operating entirely legitimately whilst in transit through Class G airspace to his display location. Whilst it was unfortunate that the Hawk pilot had been unable to contact Blackpool ATC on this occasion, nevertheless he was operating VFR in reported CAVOK conditions in Class G airspace clear of their ATZ. Furthermore, it had been explained that the Hawk pilot was in communication with Liverpool ATC and Members recognised that the pressures of obtaining relevant CAS entry clearances and passing details for the display had clearly been a priority. The ATSI report made it plain that the Blackpool APR had spotted the Hawk on radar at range whilst still within CAS executing his airways crossing with LJAO. This had subsequently prompted the controller to issue avoiding action and turn the B737 away from the Hawk as the latter's pilot followed his route to the display area. Although this occurred outside the displayed range of the Liverpool SRE and would not have been evident to the Liverpool APR, the Clee Hill Radar recording evinced that the Blackpool APR's avoiding action was entirely successful in turning the airliner away from the Hawk, albeit that standard separation was eroded. Following the B737 crew's prompt compliance with the controller's advice, 1·8nm of horizontal separation was maintained at the closest point when the Hawk was still 600ft above the airliner. By this stage, however, the reported TCAS TA had also alerted the B737 crew to the presence of the jet. With the nimble fast-jet remaining clear of the Blackpool ATZ throughout, horizontal separation had then increased to 3nm before vertical separation had reduced to a minimum as the airliner was drawing rapidly astern. In a controller Member's view this encounter between the IFR B737 and observed VFR traffic had been satisfactorily resolved by the Blackpool APR. Other Members agreed and the Board concluded that this Airprox had resulted from a TCAS sighting report, where the APR's avoiding action instructions had forestalled any close quarters situation and effectively removed any risk of a collision.

IIn view of the reporting B737 pilot's remarks regarding his conversation with ATC on 11 August 2006, some Members questioned the validity of this report. It seemed to some that the filing of this Airprox by the B737 pilot, following his conversation with Blackpool ATC and apparently at their suggestion, might have been prompted by an entirely mistaken impression of what the Hawk pilot was doing. In the Board's view, the filing of reports on such a basis was to be discouraged, being outwith the spirit of the Airprox reporting system.

PART C: ASSESSMENT OF CAUSE AND RISK

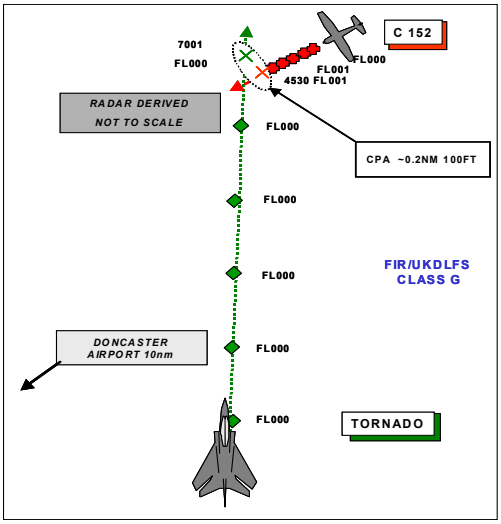
Cause: TCAS sighting report.

Degree of Risk: C.

AIRPROX REPORT No 128/06

AIRPROX REPORT NO 128/06

Date/Time:	8 Aug 1324	
Position:	5339N 00046W (10nm NE Doncaster)	
Airspace:	UKDLFS/Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Cessna 152
Operator:	HQ STC	Civ Trg
Alt/FL:	310ft	500-1000ft↑
	(RPS NR mb)	(RPS NR mb)
Weather	VMC HZBC	VMC NR
Visibility:	15km	20km
Reported Separation:		
	50ft V/50m H	150ft V/100m H
Recorded Separation:		
	100ft V/projected at 0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports flying a grey ac with HISLs selected 'on', squawking 7001 with Mode C and in receipt of a FIS from Linton Zone while on a singleton low level tactical training flight. While heading 350° at 415kt and 310ft Rad Alt at a position just S of Goole in good VMC, the pilot and navigator both saw a white, light ac at the same time; 100m away, co-altitude in the 2 o'clock position and heading about 240°. The sighting was too late to initiate any avoiding action other than a slight jink. The light ac also seemed to maintain its course and passed about 50m behind their ac. The incident was not reported over the R/T at the time.

Although the light ac did not appear on the replay of the HUD recording at any time, he assessed the risk as being high.

THE C152 PILOT reports flying a white ac with red stripes conducting a PPL skill test for a student on a local training flight from Sandtoft with the anit-coll switched 'on' and not in receipt of an ATC service but with the SSR and Mode C selected on. The flight consisted of a navigation exercise from Sandtoft to Pately Bridge; N of the Leeds Bradford Zone and then SE towards Market Weighton. On arrival at Market Weighton various general handling exercises were carried out whilst tracking S for a return to Sandtoft. The incident in question occurred whilst climbing away from a PFL heading S [he thought] 80-90kt when the student pilot saw the other ac first, slightly below, in their 12 o'clock. He, the instructor, was the handling pilot at the time and immediately initiated avoiding action in the form of a climbing turn to the left at which point the student saw the ac in their right approx 100-200' below heading NW [he thought] in level flight. He assessed the risk as being medium.

UKAB Note (1): The recording of the Claxby Radar shows both ac. The Cessna is squawking 4530C (Linton on Ouse) and the Tornado 7001C. The Tornado passed from the Cessna's 10 o'clock to its 4 o'clock just ahead of it and showing 100ft separation on Mode C. The actual Airprox takes place at 1324:54 between radar sweeps. By projection the horizontal miss-distance was just under 0.2nm (370m).

MIL ATC OPS reports that the RT transcript shows the Tornado to have been in receipt of a FIS from Linton on Ouse. There were no ATC aspects to this incident.

HQ STC comments that the Tornado crew possibly did not see the Cessna earlier as it was below the horizon carrying out the PFL.

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 reports from the appropriate ATC and operating authorities.

The Board was unable to determine why the Cessna had been displaying a Linton on Ouse squawk but it was suggested that it had been from a previous occasion.

The Board noted that both ac had been operating legitimately in Class G airspace; therefore the crews had an equal and shared responsibility to 'see and avoid' other ac. Under the Rules of the Air Regulations, Rule 17 (2), the Tornado had the Cessna on its right so it should have given way. However, the Tornado crew did not see the Cessna until late since for much of the time it was below them, climbing out from a PFL. When the Cessna did emerge from the background, the Tornado crew saw it but too late to initiate any effective avoiding action. Their ability to discriminate the Cessna from the background would have been degraded by its small size, its almost head-on aspect, its light colour and that it had almost no relative movement. The Cessna instructor was in a high workload situation and the Tornado was into sun from his viewpoint, also making it difficult to see. Although late the Cessna avoiding action was probably effective, the lateness of both sightings and the small resultant miss-distance convincing the Board that, although there had been no risk of collision, normally accepted safety margins had been eroded.

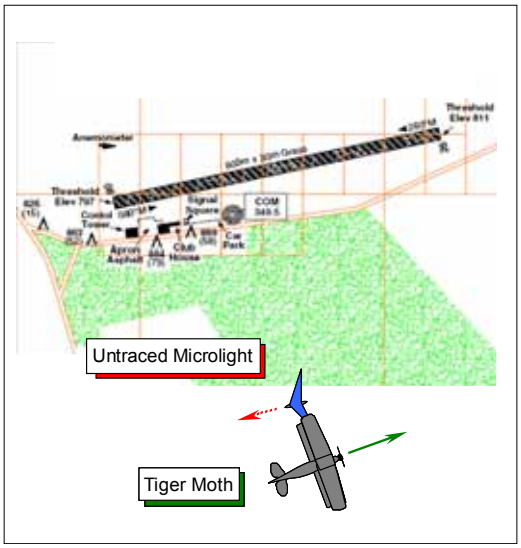
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by both crews.

Degree of Risk: B.

AIRPROX REPORT NO 129/06

Date/Time:	5 Aug 1350 (Saturday)	
Position:	5058N 00209W (½nm S of RW08 Compton Abbas - elev 811ft)	
Airspace:	Compton Abbas ATZ(Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Tiger Moth	Untraced Microlight
Operator:	Civ Trg	N/K
Alt/FL:	800ft QFE (995mb)	NR
Weather	VMC CLBC	NR
Visibility:	8km+	NR
Reported Separation:	Nil V/nil H	NR
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DE HAVILLAND DH82A TIGER MOTH PILOT reports that his vintage bi-plane is doped silver with yellow bands on the wings and fuselage. HISLs are not fitted. He was in communication with COMPTON ABBAS RADIO A/G Station on 122·7MHz whilst joining the cct for RW08 at Compton Abbas in VMC, some 500ft below cloud with an in-flight visibility of 8km+.

Having descended to a cct height of 800ft Compton Abbas QFE (995mb) on the DEADSIDE of the RW08 cct, he was listening to Compton RADIO after making a DEADSIDE call on RT and was aware of and in visual contact with the other cct traffic. He was flying the aeroplane from the rear cockpit of his Tiger Moth and was moving his head around looking out for any non-radio traffic. Whilst heading 080°(M) at 75kt, as his scan moved from the starboard side to overhead and through to the port side, he spotted a blue Microlight with red fin & rudder pass so close to his port wing that he estimated that the wingtips overlapped. Almost immediately he felt the microlight's slipstream, but as he looked behind he could see no course alteration by the microlight pilot nor did he hear any RT transmission. He reported the Airprox to Compton RADIO on RT and also after he landed.

THE RADAR ANALYSIS CELL (RAC) AT LATCC (MIL) reports that despite exhaustive enquiries through known operators in the area and local clubs, the RAC have been unable to identify the reported microlight. Consequently tracing action has ultimately proved fruitless such that it has not been possible to obtain a report from the microlight pilot.

THE COMPTON ABBAS AIR GROUND OPERATOR reports that the Tiger Moth had entered the cct at Compton Abbas after being issued the RW direction and QFE. The Tiger Moth pilot called him on RT and informed him he was on the DEADSIDE but in this position he was not in the A/G operator's field of vision. However, the next RT transmission from the Tiger Moth pilot was to inform him that he had experienced an Airprox with a blue and red coloured microlight which was flying in the opposite direction through the Compton Abbas cct. Prior to this call he had received no RT calls from any microlight pilot at all, either before or after the Tiger Moth pilot's report, neither was the microlight seen by him from the ground.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (2): The UK AIP at AD 2-EGHA-1-1 notifies the Compton Abbas ATZ as a radius of 2nm centred on RW08/26, extending from the surface to 2000ft above the aerodrome elevation of 811ft amsl. The ATZ is active in Summer daily 0800 Sunset and an A/G Service is provided.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from only one of the pilots involved - the Tiger Moth pilot and a report from the A/G radio operator.

It was unfortunate that despite their conscientious endeavours, the RAC were unable to identify the pilot of the reported microlight. No recorded radar information was available to assist the search and furthermore the A/G operator had not seen the microlight either. Consequently, with only the Tiger Moth pilot's account on which to base their assessment, the Board recognised this was a somewhat less than ideal situation. Nevertheless, the Tiger Moth pilot had provided a comprehensive account and the Members considered that there was sufficient information upon which to base their assessment.

A GA pilot Member explained the difficulties associated with look-out from bi-planes and he stressed that the Tiger Moth was particularly difficult with a number of significant 'blind spots'. It was clear that the Tiger Moth pilot was exercising a strict look-out regime and it was therefore unfortunate that the microlight was not detected beforehand. The A/G Operator had confirmed that no RT calls were received from the microlight pilot at all and the importance of appropriate RT calls to highlight the presence of these small machines, combined with a continuous watch on the frequency, was stressed - assuming that the microlight was fitted with RT. Members recognised that if the microlight pilot had made an RT call to announce entry into the ATZ, as the Rules of the Air – specifically Rule 39 – require to be done, in all probability this would have provided a warning to the Tiger Moth pilot. Moreover, the microlight pilot would have been able to obtain crucial aerodrome information, an essential pre-requisite before deciding whether it was safe to enter the ATZ. Importantly, this might have prevented the microlight pilot from flying through the aerodrome cct area, in addition giving a warning of the presence of the Tiger Moth from its pilot's RT calls. One pilot Member suggested that the microlight pilot might well have strayed into the Compton Abbas ATZ by mistake. Whilst this was purely speculation in the absence of a report from the microlight pilot, the pilot Member opined that the aerodrome is quite difficult to spot although another Member added that the aerodrome beacon should have made it readily apparent. Whilst it was undoubtedly a very late sighting of the untraced microlight, if the latter's pilot had communicated his intentions, potentially, this Airprox might have been averted. The Board concluded, therefore, that this Airprox had been caused by the untraced microlight pilot who entered the Compton Abbas ATZ in contravention of Rule 39 to the Rules of the Air Regulations 1996 and flew into conflict with the Tiger Moth.

Turning to risk, it was clear that the Tiger Moth pilot had been unable to affect the outcome of this extremely close encounter as he had not spotted the microlight before it passed abeam and was thus unable to increase the separation at all. It seemed inconceivable that the microlight pilot might have seen the Tiger Moth any earlier, for if that had been the case then surely the microlight pilot would have given the Tiger Moth a wider berth, but this again was pure speculation. From the Tiger Moth pilot's account the wings overlapped so it was purely fortuitous that the two ac involved here did not collide. The Tiger Moth pilot had not seen the microlight in time to take any avoiding action neither, it seemed, had the microlight pilot made any attempt to avoid the biplane. The Board concluded unanimously that from the information available an actual risk of collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

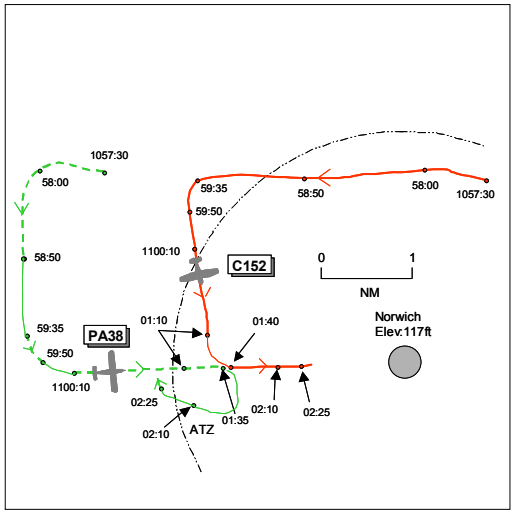
Cause: The untraced microlight pilot entered the Compton Abbas ATZ in contravention of Rule 39 to the Rules of the Air Regulations 1996 and flew into conflict with the Tiger Moth.

Degree of Risk: A.

AIRPROX REPORT No 130/06

AIRPROX REPORT NO 130/06

Date/Time:	17 Aug 1102	
Position:	5240N 00114E (2nm FIN APP RW 09 Norwich - elev 117ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA38	C152
Operator:	Civ Trg	Civ Trg
Alt/FL:	600ft↓ (QFE 997mb)	1000ft↓ (QFE)
Weather	VMC CLBC	VMC CLOC
Visibility:	>10km	10nm
Reported Separation:	200ft V/200m H	Not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA38 PILOT reports flying a dual local training sortie from Norwich and in receipt of an ATS from Norwich Tower on 124·25MHz; no transponder was fitted to the ac. The visibility was >10km in VMC and the ac was coloured white/yellow/blue with strobe lights switched on. He was instructed to extend downwind, owing to a FK50 at 6nm final, and to call when the traffic was in sight. On sighting the FK50 he was instructed to *"report final No 2"* and was also warned *"vortex wake minimum 4 mile separation"*. He was aware of a C152 following them in the cct and he adjusted their cct pattern to give the required 4nm separation behind the FK50 before receiving clearance for a 'touch and go', he thought. The C152 flight was then told to *"call final No 2"*, he thought, but shortly after this he heard the C152 flight call *"C152 c/s final 09"*. Heading 090° at 70kt descending through 600ft QFE 997mb, both he and his student looked for the C152 which appeared 200m away in their 10-11 o'clock, almost filling the top 25% of the LH windscreen, above them descending and completing its L turn onto final approach. He took control from the student and executed a tight R avoiding action turn onto heading 180° and advised ATC. The C152 passed about 200ft above and 200m clear to their L and he assessed the risk as very high.

THE C152 PILOT reports flying a dual local training sortie from Norwich and in receipt of an ATS from Norwich Tower on 124·25MHz; the transponder was switched off. The visibility was 10nm in VMC and the ac was coloured green/white; no lighting was mentioned. They were following a PA38 downwind in the cct which was extending slightly to allow for spacing between it and an airliner on final. He believed that he would be required to carry out an orbit to the R. On reaching the end of the downwind leg the PA38 had been cleared to land, he thought, with his ac cleared to final No 2. Turning onto base-leg at 90kt both he and his student looked for No 1 but nothing was seen until being told that they were above the other ac. He could only assume that the PA38 was below them in their blind-spot. The PA38 pilot took avoiding action on their ac and he assessed the risk as medium.

UKAB Note (1): Met Office archive shows the Norwich METAR as EGSH 1050Z 04010KT 360V070 9999 SCT012 SCT018 20/16 Q1001 TEMPO SHRA=

UKAB Note (2): The Norwich ADC did not submit a CA1261 report at the time but his recollections of the incident are included in the ATSI report.

ATSI reports that both ac were carrying out LH ccts to RW09 at Norwich. At 1054, the PA38 flight reported downwind for a touch and go. The pilot was requested to *"report ready to turn base leg"*. At the time, the C152 was carrying out a go-around from RW09, at ATC's request, due to faster traffic catching it up. The pilot of the PA38 reported ready for L base at 1055:54 and was instructed to continue downwind No 2 to an FK50 which was on final approach at 5nm. The pilot was instructed to report the traffic in sight. The radar recordings show that, at the time, the PA38 is downwind NW of the airfield and the FK50 is on final approach at 7·5nm. Approximately 1min later, when the PA38's pilot reported visual with the FK50, he was instructed to report final No 2 and warned

about the recommended vortex spacing of 4 miles. Shortly afterwards, the C152 flight reported downwind for a touch and go. The controller responded *"report finals you're number three number two is a Tomahawk which is late downwind"*. The pilot read back (1057:34) *"report finals copy traffic"*. Although he did not read back his number in traffic, there was no reason for the controller to believe that he had not assimilated the cct situation. At the time, both ac are seen on the radar recordings downwind, the C152 being 4·2nm behind the PA38.

[UKAB Note (3): The Cromer radar recording shows a primary only return, believed to be the PA38, turning L 30sec later onto base leg before fading from radar, after the radar sweep at 1058:50, steady tracking S. Forty-five seconds later (1059:35) the primary radar return, believed to be the C152, commences a L turn onto base leg as the PA38 reappears on radar 2·5nm to its SW commencing a L turn onto final. The PA38 fades for 3 sweeps before painting again at 1100:10 steady heading 090° on final approach RW09 with the C152 in its 10 o'clock range 1·9nm tracking S. The subject ac continue to converge until the C152 fades, last seen at 1101:10, when it is 0·4nm NE of the PA38.]

No further transmissions were made by either flight until over 3·5 min later when the C152 flight reported *"on finals for touch and go"*. The PA38 pilot immediately responded just before 1101:30 *"PA38 c/s we're er turning south the er the Cessna is above us descending"*. Thereafter, the 2 flights continued for their respective 'touch and go' manoeuvres, the C152 ahead of the PA38.

[UKAB Note (4): The CPA could not be determined. After the S'bound C152 on L base fades, the radar shows a series of single radar returns from the PA38 as it tracks E'bound on final approach to RW09. Somewhere close to 1101:30 when the C152 pilot reports on final and the PA38 pilot reports breaking off his approach, a transposition of radar returns occurs between the PA38 and the C152. The turn onto final approach by the C152 flight and the R turn executed by the PA38 flight is not shown. The transposition only becomes apparent when a pop-up return appears at 1102:10 0·4nm S of the extended RW09 C/L which is believed to be the PA38 apparently tracking WNW'ly having turned R to reposition back onto final approach 1nm behind the C152. The PA38 fades for 2 sweeps before it reappears at 1102:25 0·2nm S of the final approach in a R turn passing through heading 340° 1·25nm behind the C152.]

The ADC said that he had not seen the confliction between the subject ac until the PA38's pilot made comment about the presence of the Cessna above him, by which time he, the pilot, was taking appropriate action. Since the closure of RAF Coltishall, ccts on RW09 are carried out to the L to avoid the City. The ADC commented that, from the VCR, as the control positions face S across the airport, it is difficult to observe traffic to the NW in the cct. He added that at the time he was occupied with ac which had just landed and were in potential confliction on the taxiways. The subject ac would have been visible on the Aerodrome Traffic Monitor but the screen is not easily viewed from the ADC position. In any case, the controller believed that the cct position had been resolved, allowing him to turn his attention to other traffic.

MATS Part 1, Section 2, Chapter 1, Page 1, states that: *'Aerodrome control is responsible for issuing information and instructions to ac under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: ac flying in, and in the vicinity of, the aerodrome traffic zone'*. It is assessed that the ADC fulfilled his responsibilities by issuing appropriate instructions and information to the cct 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.

After ATC had told the PA38 pilot to extend his cct to fit in behind the FK50, the C152 pilot was also told his position in the traffic sequence and to follow the PA38 ahead. However, although he was cognisant of this ATC instruction and his position in traffic, the C152 pilot turned onto base leg without sighting the PA38. Shortly after this the PA38 pilot established on final approach whilst the C152 pilot continued his cct turn from base-leg onto final approach and flew into conflict with the PA38 which he did not see. This had caused the Airprox.

The PA38 instructor only saw the C152 after its pilot made a 'final' call, 200m out to his L and 200ft above but descending. The instructor quickly took control and executed an avoiding action turn to the R which Members believed was sufficient to remove the actual collision risk. However, the non-sighting by the C152 pilot and absence of any other safety nets - ATC were unaware of the deteriorating situation on final approach until hearing

the PA38 pilot's 'avoidance' call – was enough to persuade the Board that safety had not been assured during this Airprox.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C152 pilot did not comply with ATC instructions and flew into conflict with the PA38 on final approach which he did not see.

Degree of Risk: B.

AIRPROX REPORT NO 131/06

Date/Time:	22 Aug 1130	
Position:	5210N 00004W (8nm W Cambridge)	
Airspace:	LON FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Pegasus Glider	Beech 76
Operator:	Civ Club	Civ Trg
Alt/FL:	3350ft↑ (QNH)	3500ft↑ (QNH)
Weather	VMC CLBC	VMC NR
Visibility:	50km	>10km
Reported Separation:	0ft V/10m H	~50ft V/~20m H
Recorded Separation:	NR	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PEGASUS GLIDER PILOT reports flying a white standard class glider on a NOTAMed Gliding competition from Gransden Lodge. She was circling in the start zone, having previously been up to the cloudbase of 3600ft agl and at the incident time was climbing slowly (200 fpm) in a left turn through 3100ft QFE. She was alone in the thermal, flying at 45kt, using 45° bank to centre the thermal and climb, but was keeping a close lookout for the 50 other competing gliders and tugs as well as non-participating ac. As she turned through W she heard ac engines and saw an ac 100m away slightly below as she was turning through SW. The ac was tracking about N to her right and climbing into collision so she immediately applied full left aileron and rudder to tighten the turn to 'extreme' to keep inside the conflicting ac. They passed less than a glider wingspan apart in opposite directions (the BE76's course cut her circle) and she had an extremely close view of the other ac which did not alter course nor apply any noticeable control inputs.

She noted the position and time of the incident, the colour and registration of the other ac and reported the incident on the Gransden frequency; she then returned to land to contact Wycombe [the BE76 base] by telephone. She assessed the risk as being very high.

[The glider pilot had over 1900hrs gliding experience and holds an instructor rating].

THE BEECH 76 PILOT reports flying an instructional flight with another pilot under VFR from Cranfield in a white ac with strobes switched on. TCAS was not fitted. He had just executed a go-around at Cambridge, was squawking as directed and was in receipt of a RIS from them that had been reduced to a FIS since they had "too many contacts". He was heading 300° at 140kt, 3nm SE of Gransden Lodge when he saw a white glider appear 20m away, climbing from under his right wing, so he initiated a hard turn to the left. The glider was apparently in a competition from Gransden Lodge and was thermalling. He assessed the risk as being very high.

ATSI reports that a BE76 was inbound to Cambridge from/to Cranfield from airways for a radar-vectored ILS. The pilot contacted Cambridge APR at 1109, reporting passing FL70 in descent 14nm WNW of Cambridge.

Although he did not have the BE76 identified, at 1109:40 APR passed TI, "*...traffic believed to be you has traffic left in your twelve thirty range one mile crossing right to left no height information".* At 1110 APR identified the BE76 and further TI, believed to be a glider, was given at 1110:30. The BE76 was then appropriately placed under a Limited RIS due to radar clutter.

Cambridge had been notified that there was a glider competition on at Little Gransden and Gransden Lodge that day.

AIRPROX REPORT No 131/06

At 1116 the go-around intentions and routing back to Cranfield were ascertained and the pilot was advised *" and there is considerable gliding activity now at Gransden and Little Gransden they're all still in that area"*. At that point it was obvious that the BE76's track back to Cranfield would take him back through the gliders so the controller made the pilot aware of the situation.

Having made the go-around at 1124, the BE76 was re-identified at 1128 but no radar service was specified at that stage, APR assuming the pilot would realise that he was still under the Limited RIS previously applied. Although the BE76 was under his own navigation, appreciating that the mass of gliders (20 tracks to the NW of Cambridge showing on the radar recording) was not static, APR suggested a track of no greater than 250° to clear the gliders. At 1128:30 APR passed TI on a manoeuvring contact in the BE76's 12 o'clock at 2nm; no height information was available. The BE76 passed close, (about 0.5nm to the N) of this contact which was not the ac involved in the Airprox.

At 1129:30 APR advised the BE76 pilot *"C/S you're entering an area of high traffic congestion due gliding activity I am unable to give traffic information"* and the pilot replied *"er roger C/S were er good visual and we're keeping a very close lookout for those gliders"*. APR advised BE76 that he was unable to continue with a radar service, terminating it at 1130 and applied a FIS which the pilot acknowledged.

The BE76's track had been about 300° and at the time that APR was advising the pilot of the termination of radar service there was a primary only contact visible on the radar recording in the BE76's 12 o'clock at 0.7nm. The contact is intermittent and showing track jitter but at 1130:16 the contact appeared to be in the BE76's 1 o'clock at 0.3nm and at 1130:29 is in its 3 o'clock at 0.2nm. Thereafter the separation increased. It is believed that this was the glider involved in the Airprox.

At 1130:30 the BE76 reported at 3500ft and was advised to report leaving the frequency which he did 3min later.

The BE76 pilot did not report an Airprox on R/T to APR and moreover no gliders called Cambridge APR during this period.

The APR had been passing TI to relevant aircraft as a matter of routine and the Unit Investigation suggested that the glider in question was not painting on the Cambridge radar.

UKAB Note (1): The recordings of both the Stansted and Claxby radars were analysed. Both show the BE76 and a primary contact circling anti-clockwise in the reported position of the incident. Although neither shows the actual incident, the BE76 apparently tracks straight through the circle being flown by the primary contact.

UKAB Note (2): The gliding competition was the subject of NOTAM H2889/06 as follows:

Q)EGTT/QWGLW/IV/M/W/000/100/5211N00007W003
B)06/08/19 09:30 UTC C)06/08/27 19:00 NAVW (H2889/06)
D)0930-1900
E) AUS 06-08-0040/3059/AS2
MAJOR BGA GLIDING COMPETITION INCLUDING CROSS-COUNTRY RTES. INTENSE ACTIVITY WI 3NM RAD PSN 5211N 00007W (GRANSDEN LODGE AD,CAMBS). UP TO 60 GLIDERS AND 8 TUG ACFT MAY PARTICIPATE. GLIDERS WILL NORMALLY OPERATE BELOW THE INVERSION LEVEL OR BETWEEN THE TOPS OF ANY CUMULUS CLOUDS AND 500FT AGL. AFTER LAUNCHING MANY PARTICIPANTS MAY BE CONCENTRATED IN THE AIRSPACE AROUND AND JUST DOWNWIND OF THE LAUNCH SITE OR ON THE FIRST LEG OF THE CROSS-COUNTRY RTE.
FOR INFORMATION ON RTES FOR THE DAY AND LIKELY TAKE OFF TIMES CONTACT GLIDER CONTEST CONTROL TEL. 01767 677077.
F)SFC G)10000FT AGL

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that this encounter had taken place in Class G airspace where both users had an equal right to operate and the 'see and avoid' principle was the prime means of collision avoidance. They also noted that the Gliding competition had been properly NOTAMed, with a telephone contact number, and therefore the BE76 crew should have been aware that their planned routeing was such that they might encounter large numbers of gliders.

The BE76 had been on an instructional training flight with the student assumed to be seated in the LHS and busy after the go-around. The instructor in the right seat would also have been fairly busy concentrating on monitoring his student. In these circumstances lookout can suffer and Members thought that the crew would have been wiser, even if this had conflicted with mission objectives, to accept the Controller's offer of a radar heading that would miss most of the gliding activity (slow intermittent primary contacts) that he saw on his radar.

There was no doubt in Members' minds that the BE76 instructor had seen the glider very late (too late in fact for any avoiding action to be effective) as they were climbing through about 3500ft in their departure. It was equally clear that the glider had been thermalling at about the same height and in its orbit the glider had approached the BE76 from the RHS in a left turn as the former was being overtaken; thus initially the glider would only have been visible only to the BE76's Instructor. The much faster and climbing BE76 however might have been visible to the glider pilot had she been looking in that direction. In this scenario it is probable that as it turned, the glider would have become head on to the BE76 crew presenting a very small white target, backed by white cloud and also with almost no relative motion; it would therefore have been virtually impossible to discriminate from the background.

From the description by the glider pilot of the BE76's flight path - crossing through the glider's orbit, some 10m away - this was clearly a very close encounter. Although both pilots reacted very quickly, taking late but rapid and appropriate avoiding action, it was most likely that by the time the flightpaths of the respective ac had changed significantly, they would have passed. It was therefore only by good fortune that they had not collided.

PART C: ASSESSMENT OF CAUSE AND RISK

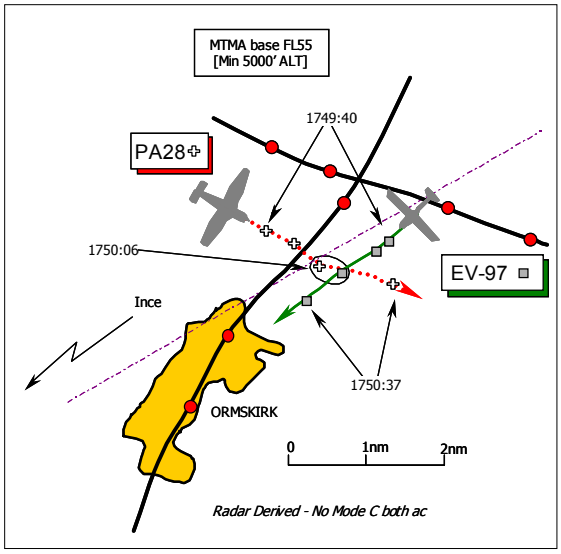
Cause: Very late sighting by the pilots of both ac.

Degree of Risk: A.

AIRPROX REPORT No 132/06

AIRPROX REPORT NO 132/06

Date/Time:	24 Aug 1750	
Position:	5335N 00250W (8nm E of Woodvale - elev 37ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Eurostar EV-97	PA28
Operator:	Civ Pte	Civ Club
Alt/FL:	2000ft	↓2000ft
	QNH (1011mb)	QNH
Weather	VMC CAVOK	VMC NR
Visibility:	<10km	10km
Reported Separation:		
	5m V/5m H	50ft V/100-150m H
Recorded Separation:		
	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EUROSTAR EV-97 MICROLIGHT PILOT reports that his machine has a polished aluminium finish with red/blue flashes to tail and wingtips. He had departed from a private strip at Hoghton bound for Ince in VMC and was monitoring the local frequency of 121·075MHz for cct traffic information. No Mode A/C nor S is fitted.

Flying into the evening sun heading 255°(M) in the vicinity of Ormskirk at 95mph in a level cruise at 2000ft QNH (1011mb), he became aware of the presence of another ac – the PA28 - only when it became bigger than the sun behind it and its entire silhouette filled his starboard vision. He reports sighting it first when the white PA28 was 20m away in his 2 o'clock at the same level - when his ac would have been in the other pilot's 11 o'clock. With no advance warning the PA28 came out of the sun so to avoid the other ac he pushed the elevator fully down and banked to the L as the PA28 passed 5m [16ft] above his ac and 5m to starboard with an *"extremely high"* risk of collision. As he executed his avoiding action manoeuvre he looked R and saw the ac registration as it passed very close down his starboard side. He then looked over his L shoulder as the PA28 continued its track but he was not aware of any avoiding action or manoeuvre taken by the other pilot.

He stressed that he is well aware that it was his responsibility to keep clear but he was unable to see anything of the PA28 until its close proximity made it larger than the sun behind it.

THE PIPER PA28 WARRIOR PILOT reports his ac has a white colour-scheme and he was conducting a local VFR flight from Barton with whom he was in communication but not in receipt of any ATS. Although reported as fitted and switched on, no Mode A/C was evident on the radar recording from this ac.

Over the NE corner of Ormskirk at a position 015° KIRKBY VRP 5nm he was descending from 4000ft to 2000ft QNH, on a heading of about 120° to get below a cloudbank approximately 2km ahead spreading across in front of him. As he drew level with the cloud base, at 100kt some 500m from it, he first spotted another ac 500-700m away in a L bank and in his 1130 position as it appeared from under the cloud. To avoid the silver–grey coloured Eurostar ac he started to bank to the L when he saw it; the other ac passed about 100-150m away down his right hand side about 50ft below his ac with a *"medium"* risk of a collision.

UKAB Note (1): The St Annes radar recording at 1749:40 shows both ac as primary-only contacts with no supporting SSR as they approach the Airprox location some 8nm E of Woodvale. However, at the scales viewed the contacts exhibit some 'track jitter' and are not evident continuously on every sweep of the radar and especially at the projected CPA. The EV-97 is shown maintaining a track of about 235° as the PA28 closes from the microlight's R 2 o'clock tracking about 120°. At 1750:06, the ac have closed to an estimated range of 0·3nm – some 600yd. Contact on one of the ac is then lost leaving a solitary primary contact on the next sweep. This might reflect that either both ac contacts merged or that only the EV-97 is shown as the PA28 is not evident again until

1750:37 when the aeroplane is shown 1·15nm to the E of the microlight after their respective tracks have crossed. Thus it is not feasible to determine the minimum separation than pertained independently, but it was probably no more than that reported by the PA28 pilot.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident to the Board that in the absence of any established ATS this Airprox was a matter of lookout, in the 'see and avoid' environment of Class G airspace. For his part the PA28 pilot reports he had spotted the small microlight at a range of some 500-700m whilst descending to get below a cloudbank. Whilst this was not ideal, it had been in time to prompt the PA28 pilot into taking action himself and he banked to the L when he saw the microlight. It might have been that the cloudbank might have had an obscuring effect here but in the Board's view this was a late sighting by the PA28 pilot and part of the cause.

Clearly, in this situation with both ac on a converging course at broadly the same altitude as the PA28 descended towards the EV-97 microlight, it was the latter's pilot who had the other ac to starboard and whose responsibility it was to give way and alter course under the 'Rules of the Air' to avoid the PA28. However, the 'Rules' can only work if the other pilot sees your ac in sufficient time to take appropriate action. Here, because of the dazzling effect of the bright Sun, the microlight pilot was completely oblivious of the presence of the white PA28 until it had flown into close quarters, some 20m away according to his account, before he detected it and took extremely robust avoiding action in his highly manoeuvrable ac. The Board was unanimous that this was a very late sighting by the Eurostar EV-97 pilot and the other part of the cause.

Turning to the inherent risk, the PA28 pilot was clearly wise to take avoiding action when he did and this Airprox illustrated an important point when operating VFR in the Open FIR insofar as you never know whether your ac has been spotted and – all things being equal - far better to give another ac as wide a berth as feasible when able. Nonetheless, there was a significant disparity between the minimum separation reported by both pilots. On the one hand the PA28 pilot's account had stated that the microlight passed about 100-150m away down his right hand side about 50ft below his ac, whereas the EV-97 pilot said the PA28 was only 16ft above him when it was some 5m away. Although the radar recording did not show both ac at the CPA, by interpolation of the projected track it did not seem to the Board that the separation was not quite as close as that reported by the microlight pilot. Whilst this was in no way doubting the veracity of the EV-97 pilot's account, it may be that the dazzling effect of the bright Sun behind the PA28 might have affected his estimate somewhat. Nevertheless, the PA28 pilot had seen the EV-97 slightly earlier and taken action himself. Thus having spotted it, the PA28 pilot was always able to take more robust action if needs be. Therefore, in the Boards view, although the safety of these two ac was not definitely assured by any means, the PA28 pilot's action had been sufficient to remove the actual risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

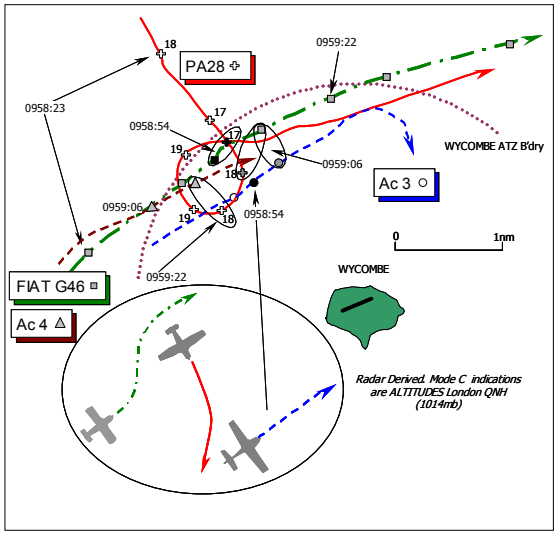
Cause: A very late sighting by the Eurostar EV-97 pilot and a late sighting by the PA28 pilot.

Degree of Risk: B.

AIRPROX REPORT No 133/06

AIRPROX REPORT NO 133/06

Date/Time:	27 Aug 0958 (Sunday)	
Position:	5138N 00050W (1·85nm NNW of Wycombe - elev 520ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	FIAT G46	PA28
Operator:	Civ Pte	Civ Trg
Alt/FL:	1500ft (QNH)	2000ft (QNH)
Weather	VMC CLBC	VMC NR
Visibility:	>10km	'Good'
Reported Separation:	40ft V/50m H	300f V/Nil H
Recorded Separation:	0·1nm (200yd) H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIAT G46 PILOT reports his ac has a yellow/brown camouflage scheme with yellow nose and bands; HISLs are not fitted. He had departed from Wycombe Air Park outbound for Little Gransden and was in communication with Wycombe TOWER on 126·55MHz, whilst operating VFR some 3000ft clear below scattered cloud with an in-flight visibility of greater than 10km. Although SSR is fitted with Mode C, it was turned off.

After take-off from RW24RHC behind a Wycombe-based PA28 that drifted left of centreline on climbout, he climbed straight ahead, passing below and well to the R of this local PA28. In compliance with local noise abatement requirements he then turned R downwind at 1500ft QNH and some 500m outside the "normal" circuit, keeping a lookout for a C152 [in all probability Ac3] that was in the circuit DOWNWIND at 1200ft QNH, inside his FIAT. At a position 330° Wycombe 1-1½nm at the midpoint of the DOWNWIND leg heading 060°(M) at 140kt, after looking to starboard at the C152 and checking astern for the local PA28 [in all probability Ac4] during his lookout scan, he looked forward and spotted an unknown PA28 about 100m away approaching from 10 o'clock ahead and to port from the area of the Stokenchurch mast. The unknown PA28, that was crossing at 90° to his course and heading directly for Wycombe when first seen, then turned in towards his FIAT onto an opposite track to the DOWNWIND leg for RW24RHC. To avoid the unknown PA28 he banked his FIAT to the L and pulled sharply into a climb as the unknown PA28 passed about 50m to starboard and some 40ft below his FIAT with a *"high"* risk of a collision. He added that the unknown PA28 was not in communication with Wycombe TOWER.

THE PA28 STUDENT PILOT provided a very frank and comprehensive account reporting that on this Sunday morning he was embarking on a solo navigation exercise as part of his PPL training. Operating under the instruction of a flying school, during the morning exercise his instructor briefed him on his solo trip to Leicester and they reviewed his flight plan calculations for accuracy. The sortie began with several circuits at Elstree flying together with his instructor, to ensure that he demonstrated proficiency at circuits and landings, which is customary practice prior to any student undertaking a solo flight from the school. After satisfactorily executing 3 or so landings, his instructor left the ac and he began his solo VFR navigational flight. The flight proceeded normally throughout the take-off and departure from Elstree, he navigated visually to the M1/M25 junction and then took up a heading to Bovingdon [BNN] VOR. From BNN, he began working from the timings off of his flight plan and he navigated by reference to heading and timings rather than being able to "read the ground" from memory.

His flight plan required him to take up a heading of 275°(M) for 7min to reach Princes Risborough [~7nm N of Wycombe aerodrome], a waypoint from which he was to make a turn directly overhead to route to Leicester – his destination. Heading 275°(M), aiming to cover about 10nm for the segment, after completing a FREDA check, he switched from Elstree INFORMATION and requested and obtained a FIS from Luton APPROACH. After 7min of flying, having ensured that he was flying in accord with the only compass on the ac, he found himself over a small town that appeared to be too small to be Princes Risborough. He looked along the ridgeline to locate the cross

carved into the ridgeline but was unable to find it so he then checked the DI to ensure that it was aligned with the compass, which it was. Confused as to why he was off course after such a short period of time, he began to investigate and commenced an orbit at 2000ft QNH while looking at his 1:500,000 scale chart to see if he could find any identifying features. At this point, he was unaware that his compass was off "dramatically". (He later estimated that the PA28's compass was out by some 50°, but with only 35 hours of experience, it did not immediately occur to him that the compass could be so far off.) His initial thought was that he had perhaps flown slower or faster than he had projected, as the cross-wind component was not significant. He continued to orbit at 100kt while trying to look for large landmarks and orientate these landmarks to his chart with the direction that the ac was tracking but his inability to determine which direction was N dramatically increased the difficulty in locating his position on his chart. Then he decided to utilise the VOR to obtain his radial from the BNN VOR to obtain his position. As he was orbiting, he became aware of another ac about "½nm ahead" and approximately 300ft below his PA28 heading away from him. He had not seen this ac or any others such that it would have made him think that an Airprox had occurred. [UKAB Note (1): Given the reporting pilot's estimate of the vertical separation – 40ft - it is not clear whether this was the FIAT G46, Ac3 or more probably, Ac4 after the FIAT G46 had passed astern and after the reported Airprox had occurred.] He left the orbit and followed "the FIAT" [UKAB Note (2): probably Ac4] on a track, which he estimated to be easterly, back in the direction of Elstree. After approximately 30sec he saw the other ac turn R [UKAB Note (3): As did Ac4 in the Wycombe cct at 1000:35] and he spotted Wycombe Air Park, he thought, 3nm away [UKAB Note (4): At this point the PA28 was some 1·65nm from Wycombe]. He used the VOR to track towards BNN but had to continually correct his heading as he kept drifting off the radial. Once he had BNN in sight, he requested a frequency change to Elstree, Luton's FIS was terminated and he switched to Elstree on 122·4MHz, whence he landed.

Once on the ground, he spoke with another instructor at the school who helped him push back the ac. They looked at the technical log and the compass was reported as defective (he thought it was recorded as a variance of 40° [actually 20°] against RW26 at Elstree). Whilst he was relieved to see that it was the compass that was inaccurate [see UKAB Note (5)] - making it easier to understand the context of the flight - he believes that the ac was unsuitable for a cross-country navigation flight as its compass was unserviceable. Furthermore, due to the compass failure, he was unable to accurately report his position or his heading at the time of the Airprox.

UKAB Note (5): The PA28 Student Pilot's Flying School helpfully provided copies of their PA28's Technical Log. The daily sheet dated 25 Aug – 2 days before the Airprox occurred - revealed a defect report of *"Compass reading 280° on RW26"*, which was 'deferred'. This reported defect was recorded on the defect rectification sheet for 29 Aug – 2 days after the Airprox occurred – as *"no fault found"*.

THE PA28 STUDENT PILOT'S FLYING SCHOOL comments that this Airprox raises a number of issues: Whilst the magnetic compass had been recorded within the technical log as being 20° in error to runway heading, the defect was 'deferred' for others to fly subsequent flights - some made by instructors who found no further error in the unit and were satisfied that the ac could continue to fly safely. This deferred defect was not picked up by the duty instructor on the day of the Airprox and solo student flights should not have been made until the compass was swung - as it eventually was. The statement by the student pilot that the error was in the region of 40° was inaccurate.

Our standard procedure is to align the compass unit with the Directional Gyro on the ramp and then check once lined up on the runway. In addition good map reading would have revealed such a large error. Standard procedure for the commencement of each navigational leg requires a "gross error" check to prevent this type of event. This all leads us to suspect the possibility that the student pilot had become disorientated. The subsequent compass swing performed by the engineer found no fault .

For those that know RW26 at Elstree, the initial sterile area provides a substantial uphill slope, this creates the opportunity to miss-set the compass prior to take-off - another possible factor - and even qualified PPL's have been witnessed doing this. Steps are being taken to put procedures in place to prevent a further recurrence of this kind.

THE WYCOMBE AERODROME CONTROLLER reports that the FIAT departed the ATZ from the DOWNWIND leg to RW24RHC, whence the FIAT pilot saw an unknown PA28 to his L tracking SE. This ac then turned R directly into his path, thereby flying in the opposite direction to the FIAT. Unknown traffic was then seen from the Tower to fly along the DOWNWIND leg in the wrong direction before turning N to leave the ATZ.

ATSI reports that no ATC errors were disclosed.

UKAB Note (6): The UK AIP at AD 2-EGTB2-1-3 notifies the Wycombe ATZ as a radius of 2nm centred on RW06/24, extending from the surface to 2000ft above the aerodrome elevation of 520ft amsl. The ATZ is active in Summer from 0800-1630 and an Aerodrome Control Service is provided.

UKAB Note (7): The Heathrow Radar recording shows the FIAT G46 as a primary radar contact only steadying outbound on a NE'ly track as it departs from Wycombe just outside the DOWNWIND leg as reported. Simultaneously, the PA28 is shown squawking A7000 indicating 1800ft unverified Mode C London QNH (1014mb) as it approached the Wycombe ATZ boundary on a generally SE'ly course. The two ac converge on a point about 1·85nm NW of Wycombe aerodrome with another ac – Ac3 – shown also as a primary contact in the 12 o'clock of the PA28 as it crossed 0·44nm ahead of the latter from R – L. On the next sweep the FIAT G46 is shown 0·1nm [200yd] astern of the PA28 - indicating 1700ft QNH – the FIAT pilot having turned L to avoid the PA28 as reported. The PA28 then commenced a R turn into an orbit as the FIAT opened NE and astern of the PA28 outside Ac3 which turns BASELEG in the Wycombe Cct for RW24RHC. As the PA28 turns through SW another circuiting ac – Ac4 - passes abeam on the DOWNWIND leg and in all probability was the ac spotted by the PA28 student pilot. The PA28 then steadied NE'bound maintaining 1900ft QNH and exited the Wycombe ATZ.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear that this Airprox stemmed from the PA28 student pilot becoming lost and confused as to why he was off course en-route to his turning point at Princes Risborough, subsequently inadvertently straying into the Wycombe ATZ and thereby into conflict with the aerodrome's cct traffic and the departing FIAT G46. Whether his ac's compass was indeed reading inaccurately at this point could not be established beyond all doubt because the subsequent defect rectification sheet for 29 Aug revealed that no fault had been found with the compass. Nevertheless, a problem had been noted with the instrument which had been recorded in the ac's technical log, something which should have been entirely evident to the Duty Instructor before the flight. Whilst the PA28 student pilot might have 'signed for' the aeroplane, it was the Instructor who was responsible for authorising this flight. Pilot Members alike agreed that the PA28 student pilot should not have been dispatched on a solo VFR NAVEX in an ac with a reported suspect compass. From the PA28 student pilot's flying school's helpful input, it was clear that measures were being taken to ensure that this did not happen again. But irrespective of the accuracy of the compass the PA28 student pilot had, for whatever reason, become lost and unable to locate his position. Pilot Members sympathised with the student pilot's predicament and recognised that in such an awkward situation lookout and scan for other ac could potentially be degraded. From the PA28 student pilot's report and the information provided from the radar recording it seemed that he was unaware of two of the other ac that flew by him whilst he was trying to establish his position. In all probability he did not see the FIAT G46 - which passed behind, not ahead of him before he orbited R - and the Board agreed he most probably spotted either Ac3 or Ac4 as he completed his orbit to the NW of Wycombe aerodrome. Here then was the first part of the cause - a non-sighting by the PA28 student pilot.

For his part the FIAT G46 pilot would not necessarily have expected to encounter another ac crossing the DOWNWIND leg unannounced. Whilst he might have been focussed on staying clear of the other circuiting ac it was fortunate that he spotted the PA28 when he did – he reports 100m away – which enabled him to turn clear astern just in time. The Members agreed that from his account this was a very late sighting indeed and another factor in the cause of this close quarters encounter. That the radar recording evinced this all occurred within the boundary of the Wycombe ATZ – established to afford a measure of protection to aerodrome traffic and within which specific rules apply – was also a significant factor. Nevertheless, the Board recognised that the PA28 student pilot was not aware that he had penetrated this airspace and his entry into the Wycombe ATZ without permission was an entirely inadvertent intrusion. Summarising a wide ranging discussion, the Board concluded unanimously that this Airprox had resulted because of a non-sighting by the PA28 student pilot of the FIAT G46 and a very late sighting by the FIAT G46 pilot following an inadvertent unauthorised penetration of the Wycombe ATZ by the PA28 student pilot.

Turning to the inherent risk here, 'see and avoid' is the basic tenet in Class G airspace but it was evident that the PA28 student pilot had not sighted the other two ac in relatively close proximity nor apparently the FIAT G46 before it turned to pass astern. Moreover, he was not aware that he was flying through the DOWNWIND leg to a fairly

busy aerodrome cct when this Airprox occurred. It was clear that the PA28 student pilot was responsible for giving way under the 'Rules of the Air' to the FIAT G46 ac on his right, but he could not do so if the ac was not seen in time to take action. Here, it remained up to the FIAT G46 pilot to spot the other ac in this situation, which he did albeit at a very late stage. Fortunately, it was in time to allow the FIAT G46 pilot to turn to avoid the PA28 which prevented an actual collision, the radar recording showing that this was by 200yd at most. The Members agreed unanimously that at these distances the safety of the ac involved had certainly been compromised.

This Airprox contained salutary lessons for Instructors and student pilots alike. Whilst the Members commended the student pilot for they way in which he eventually determined where he was, allowing him to find his way back to his base, perhaps he should have been more acutely aware of what assistance was available to him if he got lost. It was not plain what briefings had been given to him in this respect but external assistance was certainly available when he got lost and pilots should be in no doubt - be they a student or PPL holder alike - that it was far better to ask for help at an early stage rather than let the situation deteriorate. The NATS Advisor explained that assistance could have been sought from Luton APPROACH who was probably best placed to help in the first instance, but the student pilot made no attempt to do so. Moreover, the CinC FLEET Member stressed that Distress & Diversion Cell (D & D) at LATCC (Mil) was established specifically to help pilots in distress or in need of assistance. Controllers at D & D are well versed in providing help when needed but unless a pilot calls on 121·5MHz and the controller is made aware of the situation, help cannot be given to locate the ac. When flying in relatively close proximity to the lateral and vertical confines of regulated airspace far better to seek help earlier rather than stray into an ATZ without permission – or worse the LTMA or Heathrow CTR with all that this might entail. To this end it seemed to the Board that it would be wise to promulgate the lessons identified in this Airprox widely throughout the GA community for the benefit of others.

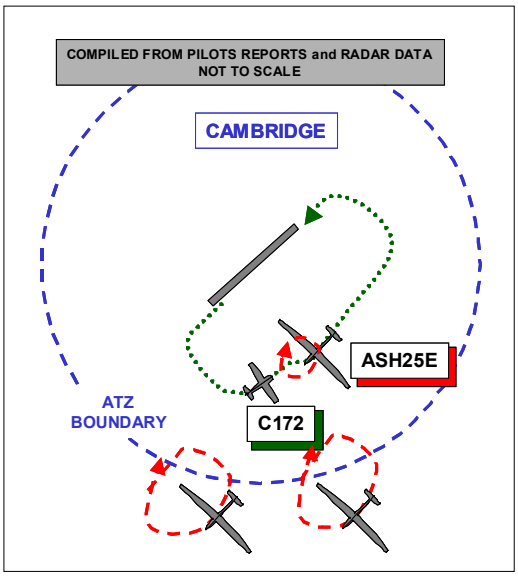
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the PA28 student pilot and a very late sighting by the FIAT G46 pilot following an inadvertent, unauthorised penetration of the Wycombe ATZ by the PA28 student pilot.

Degree of Risk: B.

AIRPROX REPORT NO 134/06

Date/Time:	22 Aug 1631	
Position:	5212N 00011E (1nm SE Cambridge Aerodrome - elev 47ft)	
Airspace:	Cambridge ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	ASH25E
Operator:	Civ Club	Civ Pte
Alt/FL:	1150ft (QFE 1016mb)	1200ft (QNH 1018mb)
Weather	VMC CLBC	VMC NR
Visibility:	>10km	20km
Reported Separation:	100ft V/50ft H	200ft V/50m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 172 PILOT reports flying a local training flight from Cambridge in a white ac with anti- colls, strobes and landing lights selected on and they were one of two ac in the traffic pattern at the time. They were heading 050°, downwind for RW23, at 90kt and at 1150ft AAL (on the QFE of 1016) less than ½nm [he thought, see UKAB Note 3] laterally from the RW and abeam the mid-point and were planning to remain in the traffic pattern when Tower called them reporting a glider in the downwind position. They acquired it visually very quickly and took immediate avoiding action in the form of a steep right turn. The oncoming glider was slightly to their left (closer to the runway) and slightly higher (less than 100ft possibly about 50ft). The glider was approaching head-on and was very hard to see, being slightly higher and with white cloud behind it and with no lights. He reported the incident on the radio but he thought that notwithstanding his avoidance the ac would not have collided.

THE ASH25E PILOT reports that he was flying an ASH25E which is a self-sustaining motor glider of 25m wingspan on a competition. He provided a trace of his ground track. The flight commenced from Gransden Lodge Airfield at 1120 and was a cross country of about 350km around Bicester, Thrapston and Mendlesham.

Towards the end of the flight, to the E of Cambridge, soaring conditions became very difficult and an outlanding or the use of the engine was required. The engine was started near Bury St Edmunds but it later failed in flight, near Newmarket at 2500ft QNH. The mindset in the cockpit therefore altered from it being a competition flight until Bury St Edmunds, a powered flight home until Newmarket, and from then on a difficult cross country flight back to Gransden Lodge with a high chance of an outlanding.

Conditions were such that from their height returning to Gransden was not possible without a further climb and so he diverted towards Cambridge Airport with the intention of either finding lift in the slightly better weather or landing at Cambridge.

On penetrating the Cambridge ATZ at about 1628 and at 1600ft (QNH 1018mb), he requested the P2, who was both glider and a PPL pilot, to contact Cambridge APP. Conversations took place with them regarding their intentions and they discussed the fact that they were slowly descending but hoped to climb away and continue towards Gransden or, if not, to land at Cambridge. After a short while their ac was identified visually by 'Tower' [sic] as being 1½nm SE CAM. At that point they were flying upwind heading SW, parallel to the main RW towards a "high key" circuit position at 55kt.

At about 1631, after they had completed two turns at about 55kt and at 1200ft QNH, they saw a small GA ac pass immediately below their nose with a steep bank angle. No avoiding action was taken, as no useful increase in

separation was achievable at that point; had the ac been seen sooner a different course of action may have been taken.

The passage of the ac, while relatively close and remarked on within the cockpit, was not close enough to initiate extended conversation and neither P1 nor P2 heard any information from APP pertaining to the other ac before or after the event. They continued to the upwind end of the airfield endeavouring to soar but failed so they completed the circuit and landed, under the guidance of the ADC.

On arriving at the GA centre he met the reporting pilot who indicated that he considered their position to be "flying the wrong way in the circuit" and inappropriate. Accepting his point, the glider pilot pointed out that they were in contact with Cambridge APP at the time and since he was not instructed otherwise, he felt justified in being there, however this does not explain or excuse why both pilots failed to observe each other until such a late moment.

He assessed the risk as being medium.

CAMBRIDGE AIR TRAFFIC CONTROLLERS (APP and ADC) report that at 1620 a glider reported on frequency about 2nm ESE of the overhead at 1800ft orbiting to gain height. APP made the ADC aware of the possibility of a glider penetrating the ATZ and the glider pilot was advised by APP that the circuit was active for RW23 left hand. APP asked the glider pilot to confirm his range as at that time he could not see the ac and when he did see it he checked its level. It was above the downwind leg at a reported height of 1400ft but he saw a C172 that was at 1000ft QFE avoiding it so he reported that the glider was at 1200ft. Some confusion then ensued because he could by then see two gliders and he was not sure which one he was speaking to. The glider diverted into Cambridge, landing at 1649.

The Cambridge weather was reported as:

1620Z 24006KT 200V290 9999 SCT046 21/11 QNH 1018 QFE 1016

ATSI reports that this event occurred at 1631 between a C172 and an ASH25E glider allegedly in the Cambridge visual circuit. Whilst several glider contacts are observed on radar to the S and SE of Cambridge and a glider, possibly the one involved in the Airprox, can be seen for a short period around the circuit area of RW23, the actual event is not seen on any recorded radar.

The visual circuit was active at 1000ft QFE when APP informed the ADC of a glider in the area at "*1700ft QFE south east of the ATZ trying to head for Little Gransden"*. The ADC, who was not at that stage visual with glider traffic, passed generic TI to the circuit traffic. The ADC subsequently passed further TI indicating that he had the glider visually and that it was heading in the opposite direction in the circuit to the C172; he believed the glider to be descending at that point.

At 1628 a glider established contact with the APP stating he was *"Low and struggling to ?????? just to the south of your er southeast of your ATZ Altitude is about one thousand seven hundred feet on one zero one eight".* APP ascertained that the glider was trying to get to Gransden Lodge and asked for an estimate of the range from the overhead and at 1629 was advised, *"I think approximately two miles I think we're just outside your ATZ"*. At this point the APP replied *"Visual with that Glider Glider C/S Yes have you in sight now the circuit's active runway 23 left hand circuit to your righthand side up to one thousand feet QFE"*. At 1629:30 the glider's altitude was ascertained as being 1400ft and descending. APP was concerned that the glider was not making any headway and may divert and asked the glider to report if a diversion was required.

At 1632 APP confirmed the glider was at the beginning of the downwind leg in a right hand orbit and at 1634 he asked the glider pilot to report his altitude and was advised 1600ft and climbing gradually. At 1634:30 APP advised the glider *"C/S one Firefly in a left crosswind runway two three has er one glider in sight but we can see two of you out of the window at the moment".* Later at 1638:30, in response to a location query from APP, the glider pilot reported *"C/S appear to be over Limekiln Hill er just below the Gogs at one thousand six hundred feet".*

Having been advised of the glider by APP the ADC, at 1628:40 advised the C172 circuit traffic *"C/S traffic information er glider believed to be just east of the ATZ one thousand seven hundred feet I've not got him visual this time he's talking to Approach I believe he's in the ATZ".* Subsequently at 1629 ADC advised the C172 *"C/S he's opposite direction to you I have him in sight now one thousand seven hundred feet he's going downwind right*

hand for runway 23" and the pilot replied *"Yeah OK I'm visual with that glider he's only about twelve hundred feet flying opposing the downwind".* The ADC passed TI on the glider to other circuit traffic and subsequently on a second glider also observed to be close to the circuit.

The Unit report states that the arrival in the area of another glider complicated matters and that had the other glider called the situation would have been much clearer.

UKAB Note (1): Cambridge has a 2½nm ATZ centred on the mid point of RW23 and up to 2000ft AAL.

UKAB Note (2): The map overlay on the glider pilot's route showed Cambridge ATZ as 2nm as opposed to the actual radius of 2½nm. The trace of the glider pilot's track shows it entering the lateral limits of the ATZ 2nm [2½nm] E of the field and then circling inside the ATZ at the upwind end of the RW as described by the pilot. There was no height readout.

UKAB Note (3): At 1629 (1min after the glider pilot called APP) the recording of the Stansted Radar shows 2 primary-only contacts orbiting just over 2nm S of Cambridge and a third (presumed to be the glider concerned) orbiting 2nm SE, as the C172 is seen shortly after takeoff. At 1629:30 the C172 turns crosswind about 1nm from the airfield datum and well inside both the ATZ and the 2 orbiting contacts. At 1629:45 the C172 turns downwind and levels initially at FL012 before descending to FL010 displaced about ¾nm from the RW. It passes directly through the last displayed position of the primary contact which does not show until it reappears in the same position some time later. The C172 also comes within ½nm of the contact on the second circuit 3min later. The actual Airprox therefore is not recorded.

UKAB Note (4): The ANO at Rules of the Air, Rule 17(5) states:

Flight in the vicinity of an aerodrome

Without prejudice to the to the provisions of rule 39, a flying machine, glider or airship while flying in the vicinity of what the commander of the aircraft knows or ought reasonably to know to be an aerodrome or moving on an aerodrome, shall unless, in the case of an aerodrome having an air traffic control unit that otherwise authorises:

conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome, or keep clear of the airspace in which the pattern is formed; and

make all turns to the left unless ground signals otherwise indicate.

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's gliding expert was surprised at the actions of the glider pilot which he considered, although in some respects understandable, less that professional and hopefully a 'one off'. The Board unanimously considered that the glider pilot(s) should have adopted the normal procedures for the busy airport at Cambridge, requesting clearance to penetrate the ATZ on the APP frequency, then conforming with circuit procedures as required by the ANO and the AIP and using the Tower frequency when flying in the circuit area. Had the pilot(s) been more punctilious, even if only conforming to the circuit pattern, it is probable that this incident would not have occurred. Members thought it advisable to behave in a predictable manner and not attempt to soar inside a busy ATZ. The Board also thought that since the glider was already eliminated from the competition, its pilot should have made an early decision as to whether or not to divert to Cambridge, land out, or try to recover to Gransden Lodge. It was explained to Members that the ASH25E is a large ac and although it can land out in a field, an airfield where the grass is short is easier to land on, safer and normally affords better access for the subsequent removal of the glider.

Since however, assisted by Cambridge ATC, both pilots had seen each other in sufficient time to assess whether or nor action was required, the Board considered that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

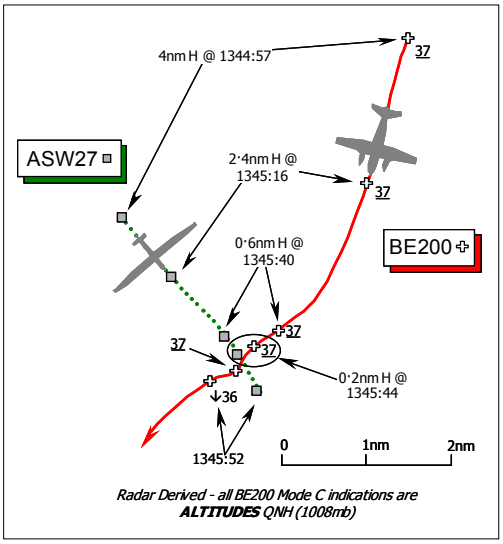
Cause: The ASH25E entered the Cambridge ATZ without permission and flew into conflict with the C172 in the circuit.

Degree of Risk: C.

AIRPROX REPORT No 135/06

AIRPROX REPORT NO 135/06

Date/Time:	29 Aug 1345	
Position:	5115N 00109W (6nm NW of Lasham - elev 618ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASW 27 Glider	BE 200
Operator:	Civ Pte	Civ Comm
Alt/FL:	3000ft↓	3500ft
	Lasham (QFE)	Benson (QFE)
Weather	VMC NR	VMC NR
Visibility:	50nm	20nm
Reported Separation:		
	50ft V/nil H	200ft V/100m H
Recorded Separation:		
	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASW27 GLIDER PILOT reports he was returning to Lasham in clear air some 500ft clear below cloud and in excellent visibility. Lasham aerodrome was clearly in view. His glider is coloured white and he was in communication with Lasham BASE on VHF.

Flying to the W side of Basingstoke, steady heading about 130°(M) and descending through 3000ft Lasham QFE [in the order of 3618ft amsl - Lasham elev 618ft] at about 200ft/min, whilst scanning for other traffic (he stressed that there were many gliders around) he suddenly spotted - about 200ft away - a dark mid-wing twin-engined propeller-driven ac travelling fast, in a slow climb he thought, off to port. Judging that it would "hit him in seconds", at 80kt TAS he had enough kinetic energy to pull back, which he did and managed to climb to avoid the twin as it passed about 50ft directly below him – "uncomfortably close" – with a *"high"* risk of a collision. Believing that the pilot of the twin-engined ac had seen him because the other ac's nose went down, he opined that had he been flying slower he would not have been able to climb. However, he would have been further back along his track so the conflict might not have occurred.

THE BEECH BE200 PILOT provided a very frank account reporting that his ac has a blue/white livery and the HISLs were on whilst flying a PAR calibration sortie to RW01 at Benson. It was a fine-weather day and they were operating VFR some 1000ft clear below the cloudbase with an in-flight visibility of 20nm+. A RIS was provided by Benson [APPROACH (APP)] and the radar calibration conspicuity squawk of A0024 was selected with Mode C. TCAS is not fitted.

There were a lot of gliders in the area, which they knew about, and Benson ATC had reported many contacts to them under the RIS. Positioning for a calibration run at 170kt in a level cruise at 2000ft Benson QFE, he thought – actually 3500ft Benson QFE [in the order of 3726ft amsl, Benson elev 226ft] - a white glider was spotted about 200m away at 2 o'clock and slightly above them. Despite both pilots looking out at the time, this particular glider was spotted late but he made a turn to avoid it and he recollects the glider going 200ft above and about 100m astern of his ac. He did not consider that there had been a significant risk of collision, which he assessed as *"low"*. The cockpit workload was quoted as *"light"* at the time of the Airprox.

MIL ACC reports that Benson APPROACH (APP) was providing an ATS to the BE200 crew who were calibrating the Benson PAR. On climb-out from Benson the BE200 crew called APP [climbing out to 3500ft QFE (1005mb)], who at 1328:58, enquired what type of ATS they required - which was a RIS. After passing traffic information on an unrelated ac the BE200 crew acknowledged the type of ATS. APP then advised the BE200 crew at 1332:55, "*…limited traffic information from the right for the next 10 miles as you transit an area of high traffic density; believed to be a gliding competition routeing from..Newbury up to Oxford.*" Further information was passed at 1333:09, "*…limited traffic information from the right for the next 10 miles as you transit close to an area of high*

traffic density; believed to be a gliding competition between Middle Wallop and Oxford." The BE200 crew acknowledged this information. [UKAB Note (1): The Mil ACC report reflects that APP passed a great many transmissions of traffic information to the BE200 before at 1341:46, crew reported, "…*turning right outbound, this is serial 5 and 6 next*", which APP acknowledged]. APP passed traffic information at 1344:30, "[BE200 C/S] *traffic left 11 o'clock 3miles, north bound, no height information*" which was acknowledged by the BE200 crew. APP then stated at 1345:12, "[BE200 C/S] *further traffic* [the ASW27] *right 1 o'clock 2 miles converging, no height information*" to which the BE200 crew replied, "*Thank you looking* [BE200 C/S]". At 1345:54, APP reported to the BE200 crew, "*…traffic southwest, 2 miles, north bound, no height information.*" Some 6sec later the BE200 crew replied "*Roger, looking for that one* "[BE200 C/S] *and we've just gone…fairly close to a glider…wasn't all that far off a collision course…same colour as the cloud - in case anybody calls we did see him and avoided him.*" APP acknowledged the information.

APP passed accurate traffic information on the ASW27 at 1345:12, in accordance with JSP552 and the controller's responsibilities under a RIS. The radar service had been limited due to the glider activity and non-squawking gliders often do not show consistently on [primary] SREs. Therefore, in this Command's view, there were no ATC issues.

UKAB Note (1): Analysis of the Heathrow Radar recording shows the BE200 squawking A0024 level at 3700ft London QNH (1008mb) turning R onto a track of 190° at 1343:35. The non-squawking primary contact, believed to be the ASW27, first appears [on the recording] at 1344:57 in the BE200's R 2 o'clock - 4nm tracking 150°, which is generally maintained throughout. At 1345:16, the ASW27 has closed to the BE200's R 1 o'clock - 2·4nm crossing R - L, the BE200 now tracking 200° maintaining 3700ft QNH (1008mb). By 1345:40, the BE200 has turned R onto about 240°, with the ASW27 in its 1 o'clock - 0·6nm. The ac converge to a range of 0·2nm at 1345:44 and the tracks cross, but at 1345:48, the ASW27 has faded from radar momentarily as the BE200 makes a L turn: therefore, the CPA is not shown. However, interpolation between radar returns would suggest that minimum horizontal separation was certainly less than 0·1nm and in general accord with both pilots' reports. On the next sweep the BE200 has descended to 3600ft QNH and then further to 3500ft QNH before regaining altitude once more.

UKAB Note (2): The 1350UTC Benson METAR was 300/14kt; 9999; FEW030CB BKN045; Q1009 CC BLUE. TEMPO 6000 TSRA CC WHITE. A SPECI was issued at 1407UTC for a thunderstorm but with no significant change to cloud/visibility.

UKAB Note (3): The glider competition mentioned by APP was the subject of NOTAM, which promulgated the activity 26 Aug – 3 Sep, 0930 – 1900 DAILY SFC – 10000FT:

MAJOR BRITISH GLIDING ASSOCIATION (BGA) GLIDING COMPETITION INCLUDING CROSS-COUNTRY ROUTES. INTENSE ACTIVITY WI 5NM RAD 5109N 00134W (MIDDLE WALLOP AD, HANTS). UP TO 60 GLIDERS AND 8 TUG ACFT MAY PARTICIPATE. GLIDERS WILL NORMALLY OPR BELOW THE INVERSION LEVEL OR BTN THE TOPS OF ANY CUMULUS CLOUDS AND 500FT AGL. AFTER LAUNCHING MANY PARTICIPANTS MAY BE CONCENTRATED IN THE AIRSPACE AROUND AND JUST DOWNWIND OF THE LAUNCH SITE OR ON THE FIRST LEG OF THE CROSS-COUNTRY ROUTE. FOR INFORMATION ON ROUTES FOR THE DAY AND LIKELY TAKE OFF TIMES CONTACT GLIDER CONTEST CONTROL 07804 678629.

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 the appropriate ATC authority.

It was evident to the Board that each pilot was legitimately proceeding about their respective tasks when this Airprox occurred. For his part the ASW27 glider pilot reports he was descending down toward Lasham when the BE200 was encountered. He reported the BE200 was climbing but his glider's attitude in descent might have given this impression in the moments from sighting the BE200 to climbing above it as the ac's Mode C data from the radar recording shows that the calibration ac was in a level cruise just before the Airprox occurred. From the ASW27 pilot's candid account, he also reports that he spotted the BE200 about 200ft away which was certainly less than ideal. The specialist Member on gliding opined that in the weather conditions reported the twin-engined aeroplane should have been detectable much earlier down Sun. Nonetheless, the blue/white colour scheme of

the BE200 had plainly defeated earlier detection so it was indeed fortunate that the ASW27 pilot spotted the BE200 when he did, enabling him to take robust avoiding action to climb above it. Whilst clearly under the 'Rules of the Air' the BE200 crew was required to give way to the glider, this relies on the pilot of the powered aeroplane spotting the glider in time to do so. The difficulties of detecting small white gliders at such aspects as these against a background cloudscape in fine weather are well known to the Board, a GA pilot Member familiar with the BE200 adding that the visibility out from the flightdeck is not as good as some other ac.

Controller Members recognised that the BE200 crew was well served by Benson APP who provided a good radar service and a virtual stream of traffic information about the numerous contacts in the vicinity - most probably gliders from the NOTAM'd gliding competition. [A significant number of transmissions of traffic information about other ac were excised from the Mil ACC report in the interests of brevity.] The specialist Member on gliding observed that the density of gliders in this vicinity was significant not only from Lasham, where the ASW27 was based, but also by virtue of the competition originating from Middle Wallop. He opined that in general terms glider competitions will commence at about 11 o'clock in the morning so if evolutions like the calibration task [the BE200 was positioning for a run when the Airprox occurred] which require minimal deviation from the desired course were completed earlier it might well reduce the potential for an encounter with competition ac. A NOTAM was not issued for the calibration flight, a Member observed, but it was explained that such activities might occur at short notice. However, controller Members recognised that the practicalities of booking navigational aid calibration flights such as these do not usually allow a great deal of flexibility and the scheduling of calibration flights is clearly entirely dependant on ac and equipment availability, weather and ensuring minimal interference with the Station tasks. It seemed to the Board that the controller had clearly succeeded in 'painting' a good picture of the resulting traffic scenario, which seemed quite dense. However, despite the stated 'limitation' to the RIS, APP had passed accurate traffic information on the ASW27 which ultimately enabled the BE200 crew to spot the reporting pilot's glider in time to turn away from it as the latter climbed above the aeroplane. However, the BE200 pilot himself had said frankly that this was a late spot and one Member thought that this was the cause. However, pilot Members opined that the BE200 pilot probably saw the ASW27 as early as could reasonably have been expected and both pilots had spotted this conflict in time to take avoiding action and resolve it. The Board concluded unanimously that this Airprox had resulted from a conflict in Class G airspace which had been resolved by both pilots.

Regarding the inherent risk, there was evidently a significant difference in the vertical separation reported by both pilots – the glider pilot reported he passed 50ft directly above the BE200 whose pilot said the glider went 200ft above him. Unfortunately, from the available data it was not feasible to determine independently the vertical separation that pertained here: the glider was not equipped with SSR and the absence of Mode C data at the critical moment did not allow the separation to be verified. Nevertheless, the radar recording had confirmed that the respective tracks had merged in azimuth with the minimum horizontal separation under 200m, which was less than ideal even at the larger of the two vertical separation distances quoted. It seemed that the BE200 crew was keeping a sharp lookout for the contacts reported by APP in the reportedly low workload situation that pertained for the crew before the actual calibration run. But whilst the BE200 pilot's reported sighting range of 200m was quickly eroded by their comparatively faster aeroplane, the avoiding action turn was apparently effective in his view as he assessed the risk as *"low"*. Conversely, the glider pilot reported the BE200 as flying "uncomfortably close" – with a *"high"* risk of a collision – even after his robust climb. Notwithstanding that avoiding action was taken just in time to avert any actual risk of a collision, in the Board's view, it was all a bit too close and a bit too late which convinced the Members that the safety of these two ac had indeed been compromised.

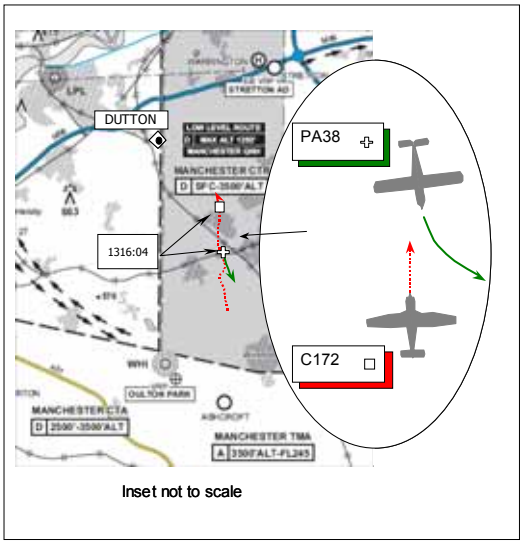
PART C: ASSESSMENT OF CAUSE AND RISK

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

Degree of Risk: B.

AIRPROX REPORT NO 136/06

Date/Time:	22 Aug 1315	
Position:	5316N 00234W (Manchester CTR Low Level Route)	
Airspace:	Manchester CTR LL Route (Class: D)	
	Reporting Ac	*Reported Ac*
Type:	PA38	C172
Operator:	Civ Trg	Civ Trg
Alt/FL:	1100ft QNH	1200ft QNH
Weather	VMC CLBC	VMC NR
Visibility:	10km	+10km
Reported Separation:	30ft V/12m H	300ft V/nil H
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA38 PILOT, a flying instructor, reports he was flying a VFR NAVEX with a student through the Manchester Special Low Level Route at 1100ft Manchester QNH routing Wigan – Ashcroft and back to Liverpool. A FIS was being provided by Manchester RADAR and he was operating in VMC some 2000ft clear below cloud with a flight visibility of 10km. SSR was selected on with Mode C.

Manchester RADAR reported a helicopter contact in their 11 o'clock position, which was acknowledged and visual contact established. An unreported contact – not the subject C172 - was then seen in their 9 o'clock position, which was pointed out to the student PF. Heading 180°(M) at 94kt some 5nm N of Ashcroft, whilst continuing to scan through to the 12 o'clock position the reported ac – the C172 - was then sighted less than ½nm away tracking in the opposite direction just to their right. To avoid the other ac – a white high-wing Cessna type - an emergency max rate descending turn to the L was initiated, but the pilot of the other ac did not seem to alter course as the C172 passed above his PA38 and some 12m to starboard with a *"very high"* risk of collision. Minimum vertical separation was 30ft. An Airprox was filed over the RT with Manchester RADAR who acknowledged the report, but informed him that they were not in contact with the pilot of the other ac. His PA38 has a white colour-scheme, the HISLs were on and he added that the workload was high for student and instructor alike.

THE C172 PILOT reports not being aware of the Airprox until contacted by the UKAB a month after the flight: hence, altimeter pressure settings and exact weather details cannot be recalled.

The sortie was a short navigation training flight of 25min (airborne) from Liverpool whilst in receipt of a FIS from Liverpool APPROACH on 119·85MHz. The planned route left the Liverpool CTR toward OULTON PARK VRP, thence via the overhead of Ashcroft aerodrome entering the Manchester Low-Level Route at 1200ft Liverpool QNH. A northbound track was followed until just S of the M56 where a L turn was made to rejoin the Liverpool CTR abeam Dutton. Whilst heading N at 105kt in a position some 12-13nm SW of Manchester Airport, a white Tomahawk ac was seen to pass some 300ft directly below, from NW to SE. There was no collision risk at any time. Once inside the Liverpool CTR they climbed to 1400ft QNH and carried out one LH orbit over the student pilot's new house before continuing on to Helsby and joined the Liverpool Cct on a L BASE for RW27 at Liverpool. The C172 has a white colour-scheme but HISLs are not fitted.

UKAB Note (1): The 1094 Airprox report was not received from the PA38 pilot until over 3 weeks after the date of the Airprox.

ATSI reports that the PA38 pilot contacted the Manchester APPROACH SOUTH Controller shortly after 1300:30 and reported being on a local flight from Liverpool, routeing via the Low Level Route and requesting a FIS. The controller advised the PA38 pilot to operate not above 1250ft whilst on the Low Level Route and passed the

Manchester QNH (1018mb), which was correctly acknowledged. The controller then instructed the pilot to squawk A7351 but did not inform the pilot, at any stage, that his ac was identified nor pass the pilot his position as detailed in MATS Part 1. At approximately 1313:45, the controller passed traffic information on a helicopter operating northbound on the Low Level Route with which the PA38 pilot reported visual. Shortly afterwards the pilot of the PA38 advised that he wished to file an Airprox with an opposite direction C150 (sic). The Manchester controller advised that she had no knowledge of such traffic which was, of course, permitted to operate within the confines of the Low Level Route without an individual ATC clearance provided certain criteria were met. The UK AIP at AD 2-EGCC-1-19 refers:

Remain clear of cloud and in sight of the surface; operate at or below a maximum altitude of 1250 feet on the Manchester QNH; operate with a minimum flight visibility of 4000m and use the route to transit through the CTR or proceeding directly to or from an aerodrome in the CTR.

Flights operating on the Low Level Route are responsible for their own separation from all other flights when operating within the Low Level Route airspace at all times.

Meanwhile, the C172 was also operating on a local flight to and from Liverpool and routed northbound along the Low Level Route. The pilot opted to stay on the Liverpool Approach frequency.

Analysis of the Clee Hill Radar shows an aircraft squawking A0260 (Liverpool Approach Conspicuity code) with no Mode C – the C172 - entering the Low Level Route northbound at 1311:58. The squawk allocated to the PA38 - A7351 - appears briefly at 1312:18, southbound along the Route, approximately 9nm N of the A0260 squawk. It disappears shortly afterwards and is next visible at 1316:04, when the two returns have passed each other.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The comprehensive ATSI report had made it plain to the Members that VFR traffic operating within this portion of Class D CAS does so under special arrangements and within specified criteria, enabling flights to be conducted without an individual ATC clearance through the Manchester CTR.

Members noted that the UK AIP required use of the Manchester QNH when flying within the Manchester Special Low Level Route whereas the C172 pilot reported operating on the Liverpool QNH. Whilst variations in the barometric pressure between Liverpool and Manchester would probably be very small, there was a slight potential for error within this slender corridor beneath the CTR: thus, use of the correct QNH was a sensible pre-requisite.

VFR transit traffic is a task which came right at the bottom of the Manchester APP controller's list of priorities when providing a service to pilots, a controller Member (also a keen GA pilot himself) explained. Nevertheless, these established procedures enabled VFR traffic to pass through the CTR in a more manageable way. It was fortunate that under the FIS that pertained, APPROACH was able to pass information about other known tracks but in this respect traffic information on other ac is a bonus and should not be expected as the norm in such circumstances. Indeed this Airprox illustrates clearly that ac can legitimately fly this Low Level Route whilst speaking to different ATSUs - which did not seem sensible to some Members. But in the narrow confines of the Special Low Level Route – the width is 4nm overall – and with the upper limit set at 1250ft altitude, 'see and avoid' predominates. The available airspace does not allow much room for manoeuvre when faced with conflicting traffic, a GA Member opined. Thus it is entirely the responsibility of pilots operating within the Route to sight other traffic in time to permit appropriate separation to be maintained under the 'Rules of the Air' regardless of whether traffic information was provide by the ATSU or not. However, the 'Rules' can only work if the other pilot sees your ac in sufficient time to take appropriate action. Here, with the northbound C172 flying an opposite direction track to the southbound PA38, Members agreed both pilots were equally responsible. The C172 pilot did not specify an acquisition range but reports seeing the PA38 pass some 300ft directly below. This was at odds with the account from the PA38 pilot who spotted the other ac less than ½nm away, tracking in the opposite direction, some 30ft above his PA38 and some 12m to starboard at the closest point with a *"very high"* risk of collision. A GA Member said that navigating a student through the vagaries of the Manchester Low Level Route is not easy and the PA38 instructor had a high workload and a number of other ac to deal with before the C172 hove into view. This white C172 of

small cross-sectional area against a cloudscape on a constant bearing with little crossing motion to draw attention to it would not have been easy to spot for the busy PA38 instructor.

Whilst not discounting the possibility that the C172 pilot was referring to a different white Tomahawk ac that might have been in the vicinity, it seemed to the Board that the C172 pilot had probably not seen the PA38 until after the latter's pilot had effected his robust, avoiding action, descending turn to the left – and thus SE'ly – a point which seemed to tie-in with the reported pilot's account. Thus the PA38 was there to be seen by the C172 pilot who should have done so earlier. Nonetheless, it was clear that a conflict had arisen which demanded immediate action by the PA38 instructor: all within the constricted boundaries of the Route made this doubly difficult. Members agreed that this Airprox had been caused by a conflict in the narrow confines of the Manchester Special Low Level Route, but which had been resolved by the PA38 pilot's robust avoiding action.

Turning to risk, the radar recording available to the Board had not illustrated the encounter so without the benefit of more precise radar data it was difficult to resolve the anomaly of the differing vertical separations reported by both pilots. But a sighting range of ½nm with opposite direction traffic at a closing speed of around 200kt did not permit much time to react and get out of the way – in the order of 9sec for the PA38 pilot. It was fortunate that he saw the other ac when he did and was able to manoeuvre his ac in time but the C172 pilot did not apparently see the PA38 at that range - only when it was passing 300ft clear below, apparently. Weighing all these points the Board concluded unanimously that the safety of these two ac had not been assured by any means.

Members were concerned that whilst the established procedures for the use of the Low Level Route were followed in the main, this Airprox illustrated some of the difficulties confronting GA pilots – some of whom might not be as fortunate as those involved here. The Advisor from NATS Ltd explained that suggestions have originated from the Unit about changes to the arrangements for the Special Low Level Route. The Board agreed that there seemed to be scope for improvement; within a wide-ranging discussion Members considered the merits of traffic separation schemes and it seemed that a northbound and southbound flow to either side of the Route might be advantageous. Moreover, the desirability of all traffic on the route being in receipt of an ATS from a single ATSU and on their RT frequency, would ensure that pilots could monitor each other's RT transmissions and potentially improve their situational awareness as ac progressed through the Special Low Level Route. The Members agreed unanimously that a review of the arrangements applicable to VFR transits through the Manchester Special Low Level Route would be beneficial. In the light of this Airprox, therefore, the Board recommended that the CAA review the procedures applicable to flight in the Manchester Special Low Level Route.

PART C: ASSESSMENT OF CAUSE AND RISK

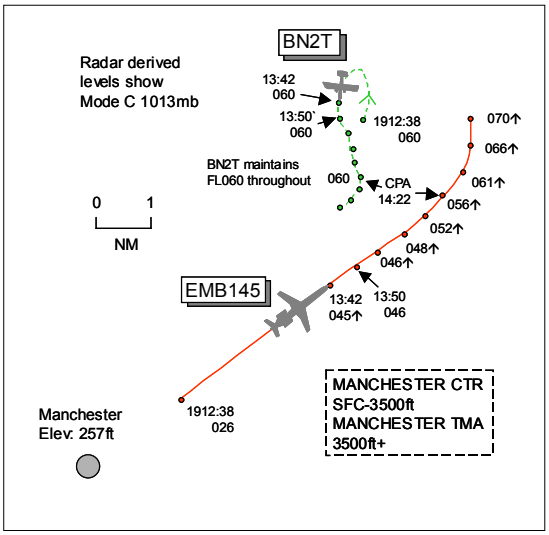
Cause: Conflict in the narrow confines of the Manchester Special Low Level Route resolved by the PA38 pilot.

Degree of Risk: B.

Safety Recommendation: The CAA should review the procedures applicable to flight in the Manchester Special Low Level Route in the light of this Airprox.

AIRPROX REPORT NO 137/06

Date/Time:	7 Sep 1914 (Night)	
Position:	5326N 00207W (8nm NE Manchester - elev 257ft)	
Airspace:	MTMA	(Class: A)
Reporter:	Manchester APP S	
	First Ac	*Second Ac*
Type:	BN2T	EMB145
Operator:	Civ Comm	CAT
Alt/FL:	FL60	NR↑
Weather	VMC CLNC	NK
Visibility:	>10km	NK
Reported Separation:		
	Not seen	Not seen
Recorded Separation:		
	400ft V/1·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MANCHESTER APPROACH S CONTROLLER reports that the BN2T was operating on the RW06 climb-out near to Stockport at FL60 with traffic levels medium. She was alerted to a departing EMB145 climbing above 5000ft when conflict alert activated flashing red but by this time the EMB145 had passed the BN2T and was climbing rapidly. She felt that avoiding action and TI was inappropriate as the confliction had passed. Separation had reduced to 100ft and 1·75nm.

THE MANCHESTER N UPPER RADAR CONTROLLER reports working a bandboxed sector mentoring a trainee who was due for validation the following week. There were two Category B flights operating in the N Sector, one of which was the subject BN2T approximately 4nm NE of Manchester in the RW06 climbout at FL60. The subject EMB145 flight became airborne on a POL 4S departure and when the crew called at 5000ft his trainee climbed the flight to FL120. However, he, the mentor, missed this given instruction as he was briefly distracted by a non-operational matter. Even so, he believed that there would not have been enough time to intervene owing to the close proximity of the traffic when conflict alert flashed white once and then red once before the traffic had passed. Owing to this, TI and avoiding action were superfluous.

THE MANCHESTER N COORDINATOR reports coordinating traffic with Sector 29 Coordinator. At the end of the call, the APP S telephoned to advise that the BN2T, which was operating 4nm NE of Manchester, had had an 'airmiss' with the departing EMB145. The N radar controller, who was mentoring a trainee, was informed.

THE BN2T PILOT reports that he was unaware of any Airprox, only being informed of an incident by ATC later. At the reported time, he was operating about 2nm NE of Manchester at FL60 and 90kt and in receipt of a RCS from Manchester Approach on 135·0MHz squawking a discrete code with Mode C; TCAS was fitted to the ac. Neither he nor his crewmembers saw any conflicting ac nor were any TCAS TAs or RAs indicated.

THE EMB145 PILOT reports that they did not receive any warning or advice about a reported Airprox during their IFR flight between Manchester and Edinburgh. No information was given by ATC of where and when the Airprox occurred, only being told of an incident by his Flight Safety Department post flight.

ATSI reports that the controller was operating the N Upper Sector combined with the Lower Sector, with an experienced trainee who was due to undertake a competency board for the sector within a week. They had been in position for approximately 11min before the Airprox occurred. The mentor described the workload as light.

At the time of the incident there were two flights operating under CAT B conditions. One was carrying out operations 25nm N of Manchester Airport at FL80 and in the opinion of the controller did not affect this incident. The other, the subject BN2T which was using a B suffix to its c/s to indicate its Category B flight priority, was

operating approximately 4nm NE of the airport, close to the departure path of RW06, at FL60. The BN2T flight had reported on site at 1851 and was under the control of Manchester Approach S. In accordance with local SOPs its SSR label was displayed as its c/s but excluding the B suffix. The N Upper Sector had been advised of its detail and the appropriate orange-coloured engraved strip was in position on the fps display board.

The EMB145 flight established communication with the N Upper Sector at 1913:40, reporting reaching 5000ft on a Pole Hill (POL) 4S SID. This SID, departing RW06L, is to *'Climb straight ahead. At not below 757ft ALT (500ft aal), but not before DER, adjust track onto MCT VOR R055. At MCT d7 turn left to intercept POL VOR R182 (002M) to POL VOR. Cross POL d12 at 4000ft or above (4.27%). Cross POL d8 at 5000ft'*. The trainee instructed the EMB145 flight to climb to FL120. The radar recording, timed at 1913:50, shows the EMB145 tracking NE, passing FL46 (equivalent to 5000ft on QNH 1027mb) 2·7nm S of the BN2T which is maintaining FL60 on a S'ly track. No further transmissions were made to, or received from, the EMB145 until over 4min later - i.e. after the Airprox had occurred - when further climb was issued.

The mentor explained that, when his trainee instructed the EMB145 to climb to FL120, he had been briefly distracted by a non-operational matter which necessitated turning his attention away from the radar/fps displays. He commented that because the traffic situation was light and his (experienced) trainee had separated 2 previous departures from the BN2T, he did not anticipate any problems would arise whilst his attention was momentarily elsewhere. He added that he had heard his trainee issue the climb instruction, although due to the mentor box he found it was difficult to hear the trainee clearly. By the time he looked back at the radar display the STCA activated, initially with a low severity alert but turning to high severity straight away. By this time, the two ac had passed, negating any need for avoiding action instructions. The pilot of the EMB145 did not refer to any incident on the frequency. The mentor mentioned that he did receive a comment from the Approach Controller but only after the Airprox had occurred.

The Approach S reported that she was only aware that the EMB145 climbed through 5000ft, thereby into confliction with the BN2T, when the STCA activated with a high alert. She commented that the outbound EMB145 had already passed the BN2T and was climbing rapidly, too late for any meaningful avoiding action or TI to be issued. The BN2T's pilot made no comments about the incident on the frequency.

The mentor commented that he believed that his trainee had overlooked the presence of the BN2T, even though its SSR label had been 'boxed', at the time because he had been pre-occupied between separating the EMB145 from an inbound flight to Liverpool. This flight was routeing westwards, N of Manchester, and had been descended to FL130, to allow the outbound to climb to FL120. He added that the fps display did not readily show the confliction between the subject ac as the BN2T's strip, which had been displayed for some time, had ended up at the bottom of the bay, as other fps had been moved. The radar recordings show that standard separation was lost only after the ac had passed. As the EMB145 was passing FL52 (1914:14) the two ac were 1·6nm apart. The horizontal distance decreased to 1·5nm (1914:22), when the vertical separation was 400ft. Thereafter, the lateral distance increased and the two flights were approximately 1·9nm apart as their levels crossed. The mentor explained that because the Manchester Radar was not being used on the sector at the time, local instructions required a radar separation of 5nm.

Since this Airprox and other incidents involving the BN2T, a MACC TOI (554/06) was issued, effective 6 November 2006, setting out procedures for handling this flight. Of relevance to this incident, a new green coloured engraved strip is being produced to try and highlight its position on the display board: in the meantime 'mock-up' strips will be in use. There is a reminder for controllers to ensure that this strip is positioned, appropriately, to show potential conflictions. If the BN2T or similar flights will be operating around the Manchester area at Minimum Stack Level (MSL) or above and is/are likely to conflict with departures then a 'not above 5000ft' symbol will be written in Box B of the fps of departing ac before airborne. The 'highlight' facility should be used on the radar display and at the end of November 2006, the BN2T's code/callsign will show as a more easily recognisable c/s label.

It is welcomed that, as a result of a number of incidents involving the BN2T, local ATC Management have produced further procedures to address the problem of separating flights from similar CAT B ac operating in the Manchester area.

AIRPROX REPORT No 137/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that the green coloured strip was chosen to highlight CAT B flights, as it was more prominent when placed alongside the blue and orange coloured strip holders that were used for other fpss. Members understood the Mentor's predicament at the time of the incident. He had been lulled into a false sense of security by his trainee's actions when the latter had correctly separated the two previous departures against the BN2T. However, a trainee's actions should be carefully and continuously monitored by a Mentor at all times, as the Mentor is ultimately responsible for the Sector and the trainee's actions. As seen in this case, when the Mentor was briefly distracted, he missed the trainee's issued instruction: in effect, the Mentor had allowed his trainee to climb the EMB145 into conflict with the BN2T which had caused the Airprox.

Both the Approach S and N Upper controllers reported that there had been little time to take any effective action after they were both alerted to the potential conflict by STCA. The EMB145 and BN2T crews were unaware of the situation, as ATC gave neither TI nor avoiding action. In addition, TCAS did not give the pilots any 'heads-up', TA or RA alerts/warnings. As revealed in the ATSI report, STCA had only activated as separation was lost, after the subject ac had passed and just after the trainee had issued the climb instruction to the EMB145 flight. The radar recording had shown that the EMB145 had already passed through the BN2T's 12 o'clock before vertical separation reduced below 1000ft. Thereafter, their tracks diverged, the BN2T turning R whilst the EMB145 climbed through the BN2T's level. Although this had had the potential for being a more serious incident, given the absence of TCAS alerts and the geometry/separation that pertained at the time, the Board were able to conclude that safety had not been compromised during the encounter.

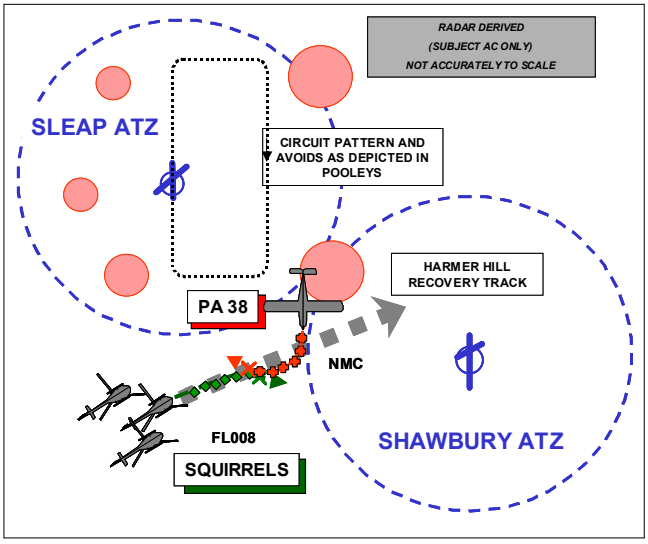
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MACC N Upper RC allowed his trainee to climb the EMB145 into conflict with the BN2T.

Degree of Risk: C.

AIRPROX REPORT NO 138/06

Date/Time:	8 Sep 0940	
Position:	5248N 00244W (2.5nm W Shawbury - elev 269ft)	
Airspace:	Shawbury MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Squirrel HT1/2	PA38
Operator:	HQ PTC	Civ Trg
Alt/FL:	1000ft (QFE 1023mb)	800ft (QFE 1022mb)
Weather	VMC CAVOK	VMC CLBC
Visibility:	40km	+10km
Reported Separation:	100ft V/Nil H	250ft V/Nil H
Recorded Separation:	NR V/Contacts Merge H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL HT 1/2 PILOT reports leading a formation of 3 black and yellow helicopters with all lights and HISLs selected on recovering through the 'Harmer Hill' entry lane to RAF Shawbury at the end of a Formation Flying sortie. The formation was heading 060° at 80kt, had already called Shawbury Tower and was around 1.5nm inside the lane (2.5nm inside the Shawbury MATZ). The Squirrel leader and the student co-pilot both saw a blue and white low-wing T tail monoplane at the same time about ½nm away in their 12 o'clock. They were trying to work out where it was going when Squirrel 2 called the ac on their air-to-air frequency. It was a very unusual place to find another ac as the lane/gate system at Shawbury ensures a one-way system - traffic would not normally be encountered in that location. When it became clear that the other ac was not taking any avoiding action, Lead called *"turning right, turning right"* and at the same time initiated a slight climb to increase separation. Squirrel 2 (right rear) was observed to continue in formation but Squirrel 3 (left rear) was not happy with his separation criteria so he broke up and left from the formation, calling for clearance to rejoin very soon after. Squirrel Lead called Shawbury TWR to inform them of the FW traffic. Squirrel 3 estimated that the vertical separation was between 100 and 200ft and they assessed the risk as being high.

THE PA38 PILOT reports that he was the instructor, with a student pilot, flying RH, 1000ft QFE, circuits to RW36 at Sleap and in receipt of an A/G service from them squawking 7000 but Mode C was not fitted. Their aiming point from right base to turn on final RW 36 was the high ground S of the threshold for RW36. On the 5th circuit, after calling RH downwind 36 touch and go and prior to turning right base, another ac called entering RW36 and backtracking; they saw the ac on the RW and extended downwind by about 40sec for spacing. They turned onto right base, heading 270°, and set the power to 1600RPM, 1st stage flap, 75kt airspeed and started a descent to the aim point on final of 600'. On passing about 900ft he noticed 3 helicopters 1½nm ahead and above so he turned the landing light off and on and increased the rate of descent slightly. The helicopters passed overhead and he continued onto final to carry out a touch and go.

Before leaving their base at Liverpool at 0940 local they had booked their circuit detail with Sleap (PPR) and were informed that the active runway was RW18 but on arriving overhead the field they saw that RW 36 was in use so carried out their circuit detail on RW36, conforming to the pattern being used by the other ac. He assessed the risk as being medium.

UKAB Note (1): The following are extracts from the UKAIP and Pooleys Flight Guide in respect of Sleap:

UKAIP AD 2 EGCV-1-1. The aerodrome is strictly PPR by telephone (briefing must be obtained).

Pooleys: Pilots must contact Shawbury Zone for MATZ clearance.

Circuits normally left hand except when RAF helicopters operating on the airfield. During these periods civilian circuits are to be to the East.

Circuits should be contained within the ATZ. The circuit patterns shown (see diagram) are the required maxima.

UKAB Note (2): Both Shawbury and Sleap have a 2nm ATZ centred on the longest RW.

MIL ATC OPS reports that the Shawbury Low Level Controller (LOW) was controlling a formation of 3 Squirrels under a FIS, in the area to the W of Shawbury at low level. Simultaneously a PA38 was operating in the Sleap [36 Right Hand] visual circuit. At 0937:11 Squirrel Formation crew reported, "*Shawbury Low Level, Squirrel Formation C/S complete in Western, stud 2.*" LOW acknowledged the transmission and about 2min later, Squirrel Leader checked in on the TWR frequency: "*Shawbury Tower, Squirrel Formation C/S request join for dispersal with Echo.*" The ADC passed initial joining instructions: "*Squirrel Formation C/S, Shawbury Tower, join, surface wind 150, 10 knots, confirm which gate.*" Squirrel Leader responded: "*Pim Gate, Squirrel Formation C/S*" and ADC queried, "*Confirm that's Harmer Hill?*" to which Squirrel Leader responded, "*Correction, Harmer Hill.*" At 0939:33 ADC passed further joining instructions, "*Squirrel Formation C/S, join, surface wind 150, 10 knots, 3 in area right, 2 on sloping ground.*" Leader acknowledged the details and at 0940:13 stated, "*We've just had a fixed wing go underneath us coming out of the gate, believe he's Sleap traffic. You might want to have a word.*"

Analysis of the Clee Hill radar commencing at 0937:30 shows the Squirrel formation 4nm W of Shawbury indicating FL008 and tracking 080°. The PA38 was in the formation's 11 o'clock at 2.5nm with NMC, tracking 180°. Both ac continued on these tracks until 0939:55 when the PA38 (NMC) began a right turn while the Squirrels (FL008) were in its 12 o'clock at 1nm. The tracks merged at 0940:13, with the Squirrel formation (NMC) tracking 080° and the PA28 (NMC) 270o; after that the ac diverged.

The Shawbury Supervisor (SUP) established the identity of the conflicting ac through liaison with Sleap Aerodrome. The Squirrel Formation followed a standard visual recovery profile to the aerodrome and LOW had no reason to believe that an ac operating in the Sleap visual circuit would impinge upon that recovery profile due to the restrictions specified in the LOA. In addition the ADC was unaware of the presence of the conflicting ac. The LOA between RAF Shawbury and the Shropshire Aero Club states that, ì*During the operating hours of the RAF Shawbury CMATZ, civil aircraft will contact Shawbury Zone (120.775Mhz) before leaving the Sleap ATZ. Aircraft departing east of a North/South line through Sleap will be at or above 2000 feet Sleap QFE before leaving the Sleap ATZ.*î To cross through the Harmer Hill gate profile the PA38 would have to leave the Sleap ATZ: therefore the pilot should have made contact with Shawbury Zone. Furthermore, the Harmer Hill gate is E of the N/S line through Sleap aerodrome which means that ac should be at or above 2000ft Sleap QFE prior to leaving the Sleap ATZ (if departing the circuit).

HQ PTC comments that the Squirrel formation and PA38 flew close enough to cause concern in Class G airspace. The visiting PA38 pilot may not have been fully aware of the intensity of rotary wing training conducted in the vicinity of Shawbury and the importance of remaining inside the ATZ whilst in the Sleap circuit. Likewise the Squirrel formation assumed a level of protection in the Harmer Hill recovery lane and although inside the Shawbury MATZ they were outside the Shawbury ATZ and still in Class G airspace.

RAF Shawbury has conducted a Flight Safety Investigation (765B) into this incident. Although there were a number of contributory factors, this investigation concluded that a greater understanding and awareness by Shawbury crews of civilian operations and vice versa would reduce the chances of a similar occurrence. This will be actioned through a series of flight safety briefs and by forming a local aviation user group between Shawbury and Sleap/other 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.

Members were concerned that this incident took place at another airfield (the 3rd) where apparently mandatory flight procedures were published in Pooley's Flight Guide but not in the UK AIP which is the authoritative document. They accepted however that at Sleap the mandatory PPR and telephone brief may be intended to

cover the local situation. Members were also concerned that the procedures agreed in the LoA with Shawbury were also not reflected in the UK AIP. The Military ATC Ops Advisor informed Members that the respective units were reviewing the LoA. With the Board's agreement, the Chairman undertook to write to the Aerodrome Manager at Sleap requesting that when the new LoA is available then the Sleap Flight Procedures information in the UK AIP is also updated.

Since there was no record of the telephone brief given to the PA38 instructor, the Board had to assume that the importance of remaining inside the ATZ when flying visual circuits had not been mentioned to the pilot in that brief. Members were disappointed that despite the fairly extensive measures taken by Shawbury and Sleap to deconflict their traffic in this very busy part of Class G airspace, they had apparently not worked.

Notwithstanding the LoA and deconfliction measures put in place, both ac had an equal right to operate in the Class G airspace in which the incident took place and the 'see and avoid' principle was therefore the prime method of collision avoidance. In this case it had worked and all the pilots involved had seen and avoided the opposing ac with no risk of collision; the Board therefore determined that this incident had been a conflict in the FIR.

PART C: ASSESSMENT OF CAUSE AND RISK

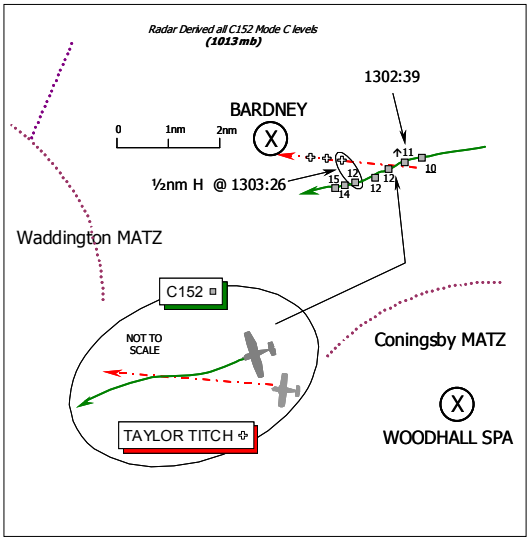
Cause: A conflict in Class G Airspace.

Degree of Risk: C.

AIRPROX REPORT No 139/06

AIRPROX REPORT NO 139/06

Date/Time:	8 Sep 1302	
Position:	5313N 00014W (11nm ENE of Waddington - elev: 231ft)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Cessna 152	Taylor JT2 Titch
Operator:	Civ Trg	Civ Pte
Alt/FL:	1500ft↑	2000ft
	QFE (1023mb)	RPS (1027mb)
Weather	VMC NR	VMC CAVOK
Visibility:	NR	10km+
Reported Separation:		
	100ft V/nil H	500ft V/nil H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports that he was instructing a student whilst returning under VFR to Waddington from Skegness in VMC whilst in receipt of a FIS from Coningsby ZONE. SSR with Mode C was on. After a "handover" to Waddington ZONE on 127·35MHz, still in receipt of a FIS, they were asked by Waddington ZONE to join overhead at Waddington due to a busy aerodrome circuit. Heading 270° at 80kt during the cruise climb through 1500ft Waddington QFE (1023mb), he became aware of another ac closing from their 7-8 o'clock about ¼nm away. To avoid the other ac - a low-wing red Taylor Titch - he banked his ac to the R as the Taylor Titch passed 100ft directly overhead with a *"medium"* risk of a collision. He called his student's attention to the other ac which appeared to maintain its course.

When he landed he obtained the Taylor Titch pilot's telephone number and called him the following day to ask why he had flown so close to his ac. Allegedly, the Taylor Titch pilot said that he was visual for about 1 min before the incident so he is still perplexed as to why the Taylor Titch pilot flew so close to his C152 whilst visual with his ac.

THE TAYLOR JT2 TITCH PILOT reports he was inbound to Sturgate from E Kirkby in his red coloured ac. Flying in a level cruise under VFR in CAVOK conditions at 2000ft BARNSLEY RPS (1027mb), he was in receipt of a FIS from Waddington ZONE on 127·35MHz. SSR is not fitted. Approaching Bardney heading 310° at 125kt, a white coloured high-wing single engined ac – the C152 – was first sighted about 1000ft below, 2nm away in his 2 o'clock low position. No avoiding action was taken - it was "not appropriate" - as the other ac crossed from R - L directly below his Titch ac from his 2 o'clock to his 8 o'clock. He commented that the track of the C152 ac would have crossed ahead of his ac but the C152 pilot altered course to the L which took it underneath him. He overflew it about 500ft above – the C152 having climbed - and rocked his wings as he flew overhead as a sign of recognition. The risk was assessed as *"none".*

He opined that his ac's altitude should have been apparent from the RT but it seemed to him that the C152 pilot was not maintaining a look-out in the direction of his ac's bearing. Furthermore, his ac's relative position was in the blind spot above the C152's port mainplane so the wing should have been lifted to complete a proper look out scan. But it seemed to him that the C152 pilot's first visual contact was when his Taylor Titch passed overhead the C152. Furthermore, the sudden visual acquisition of his ac flying at 125kt – when compared to the C152's 80kt - probably took the C152 pilot by surprise and made him assume it was closer than it was. At no time did he divert from straight and level flight as it was clear that he would have adequate vertical separation.

THE WADDINGTON LARS CONTROLLER (ZONE) reports that on taking over the LARS position, he was initially working 2 other ac in excellent VFR conditions. Four minutes later he received a handover from Coningsby ZONE on the Taylor Titch, in a position 4nm NW of Coningsby. When the Taylor Titch pilot contacted him he applied a FIS, confirmed the ac was at 2000ft BARNSLEY RPS (1027mb) and asked the pilot to report visual with Sturgate

aerodrome. Shortly afterwards, the C152 pilot 'free-called' ZONE some 3nm to the N of the Taylor Titch climbing through about 1200ft RPS and heading 270° for a visual recovery to Waddington. A FIS was applied and the Waddington RW/QFE issued. Shortly afterwards he began a handover to Cottesmore ZONE on another unrelated ac and whilst concluding this hand-over the C152 pilot transmitted that he had been overflown by another ac that had waggled its wings at him. There was a brief 'exchange of views' on frequency and then both ac continued on their way. On landing the C152 pilot telephoned and discussed the scenario with him, intimating that an Airprox might be filed.

UKAB Note (1): The 1250UTC Waddington Weather was: Surface Wind: 140/05kt; Visibility 60km; nil Wx; Cloud: FEW @ 3800ft; QNH1032mb; QFE1023mb. The BARNSLEY RPS for 12-1300 & 13-1400UTC was 1027mb.

UKAB Note (2): The Claxby Radar recording did not depict this Airprox as the Taylor Titch is not shown until after the respective tracks have crossed. The C152 is shown passing N abeam Woodhall Spa squawking A3632 [a Waddington assigned code] in a steady shallow climb [about 100ft every two sweeps] indicating 1000ft verified Mode C (1013mb) – equating to about 1420ft BARNSLEY RPS (1027mb). A slight L turn is apparent at 1302:39, as the C152 is shown climbing through 1100ft Mode C and subsequently levelling at 1200ft Mode C – about 1620ft BARNSLEY RPS – at 1302:55, which is probably when the Airprox occurred. At this point a R turn is just perceptible from the C152 before it turns L again to regain course. The Taylor Titch (SSR not fitted) is first shown as a primary contact from 1303:26, in the C152's R 2 o'clock at a range of ½nm. The Taylor Titch maintains a steady course to pass just to the S of Bardney as it opens to starboard of the C152, whereupon the latter then resumes a climb.

MIL ATC Ops reports that the Waddington tape transcript is, unfortunately, not available. Both of the crews involved in the Airprox were receiving a FIS from Waddington ZONE, in good weather conditions. The Taylor Titch pilot was transferred to ZONE from Coningsby ATC at 2000ft Barnsley RPS tracking West, no SSR fitted. The C152 crew freecalled ZONE some 3nm N of the Taylor Titch climbing through 1200ft Barnsley RPS and tracking WNW, requesting a visual recovery to Waddington. ZONE assigned a squawk of A3632 to the C152 applied a FIS and passed the Waddington runway in use and the QFE – 1023mb. ZONE asked the C152 crew to perform an overhead join due to Waddington Visual Circuit being busy. The crew acknowledged this and reported in the climb to 2000ft QFE. ZONE then proceeded to handover an unrelated aircraft to Cottesmore. The Taylor Titch pilot subsequently reported that they were visual with an ac [the C152] in their left 11 o'clock, ½nm flying below them. The C152 crew reported they were unhappy with the position of the Taylor Titch but did confirm that the Taylor Titch was "waggling his wings". The C152 crew and Taylor Titch pilot then reportedly commenced an exchange on the RT, which was continued on landline after landing.

Under a FIS controllers are not responsible for separating or sequencing ac. However, provision of the service should include:

"Where a controller suspects, from whatever source, that a flight is in dangerous proximity to another aircraft a warning is to be issued to the pilot. It is accepted this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for its accuracy".

When the C152 pilot initiated communications with ZONE the C152 was already in the vicinity of the Taylor Titch, but some 800ft below it. The climb, to 2000ft, by the C152 crew reduced the vertical separation enough to cause them alarm. Any traffic information which ZONE may have been able to offer would have allowed both crews the opportunity to acquire the other ac visually earlier.

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 ATC authority.

It was unfortunate that for whatever reason the Waddington ZONE controller had not been able under the FIS to proffer a 'warning' to the C152 pilot about the Taylor Titch that was also in receipt of a FIS from the same controller and apparently overtaking at a significant rate from the C152's port quarter. It was reported that the Taylor Titch pilot had called on the same ZONE frequency before the reporting C152 pilot and it was evident from the latter instructor pilot's report that he had been completely unaware of the presence of the other ac until it was seen closing in his 7-8 o'clock about ¼nm away. Whilst recognising entirely that both flights were operating VFR in

Class G airspace where 'see & avoid' prevails, the Mil ATC Ops report had observed sagely that if ZONE had been able to offer traffic information to the C152 crew, they might have scanned for it and spotted it earlier than they did. Moreover, a traffic information call would have forewarned them of its presence in the first instance which might well have effected their decision to climb, in response to ZONE's apparent instruction to execute an overhead join, thus the C152 crew might have delayed the climb until they could see the Taylor Titch.

The exact geometry of this encounter could not be resolved because the Taylor Titch – which did not have SSR fitted - was not shown on the radar recording until after the event. Nevertheless, both pilots' reports seemed to broadly correlate in azimuth, albeit the reported minimum vertical separation was significantly at variance. The Taylor Titch pilot, flying some 800-1000ft above the C152 initially, had suggested that his ac's altitude of 2000ft RPS should have been apparent to the reporting pilot from the RT. However, the lack of an RT transcript for the Waddington ZONE frequency had clearly hampered the investigation as without this essential record the Board did not have ready access to what was said exactly to both pilots by ZONE, or vice versa, or more importantly when. Therefore, it was unclear if the C152 pilot could have gleaned anything helpful from transmissions by ZONE to the Taylor Titch pilot which might potentially have alerted him to its presence and prompted him to search for it. For his part, the Taylor Titch pilot – without any 'warning' from ZONE but with the added benefit of being able to hear the C152's initial call to ZONE and the controller's response - had spotted the C152 some 2nm away at 2 o'clock as he closed at a 45kt overtake from abaft the C152's port beam and was quite content with the situation. At that stage it would appear that although the Taylor Titch pilot had the C152 to his right and was thus required to 'give-way' under the 'Rules of the Air' there was significant vertical separation, making any avoidance manoeuvre unnecessary. However, he saw the C152 – whose pilot was still unaware of the Taylor Titch – turn slightly L (as replicated by the radar recording) and was also aware that the C152 had climbed but it was unclear if this was from continually observing the other ac or from discussions after the event. For it seemed that the respective tracks had crossed when the C152 was climbing through 1200ft Mode C (1013mb) – about 1620ft RPS (1027mb) - thereby suggesting to the Members that vertical separation was in the order of 380ft at best if the Taylor Titch had maintained a level cruise at exactly 2000ft RPS as reported. This was clearly somewhat more than the 100ft the C152 pilot had reported but conversely it was less than the 500ft reported by the Taylor Titch pilot but this could not be independently resolved without SSR Mode C data, which itself is only accurate to about 300ft. Although the C152 instructor sitting in the RHS had seen the other ac earlier than the Taylor Titch pilot had thought, the former might well have spotted it as early as he could ¼nm away, albeit perhaps somewhat later than ideal. Nonetheless, the Taylor Titch pilot was aware of the C152 and whilst he might not have made any overt attempt to increase the separation or to give way he had not considered any avoiding action was necessary and had rocked his wings to indicate that the C152 had been seen. Members endorsed the notion of moving the ac to ensure a good all-round scan was maintained. Nonetheless, in the Board's view, this Airprox had stemmed from a sighting by the C152 instructor of the Taylor Titch overtaking his ac from astern where, in the circumstances reported here, no risk of a collision had existed.

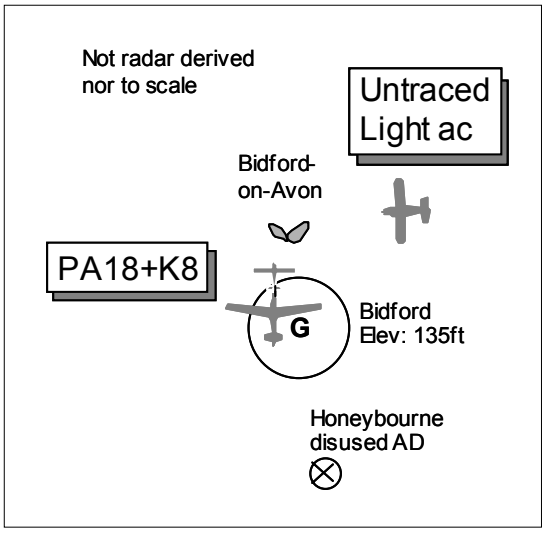
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 140/06

Date/Time:	7 Sep 1542	
Position:	5209N 00152W (1·5nm NW Bidford G/S - elev 135ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA18+K8 Glider	Untraced Light ac
Operator:	Civ Pte	N/K
Alt/FL:	1800ft↑ (QFE)	N/K
Weather	VMC CLBC	NK
Visibility:	>20km	
Reported Separation:	Nil V/<100m H	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA18 PILOT reports heading 360° at 65kt during an aerotow of a K8 glider from Bidford and listening out on a common frequency 129·975MHz. The visibility was >20km flying 2000ft below cloud in VMC and the ac was coloured cream with a single strobe light switched on. When 0·5nm S of Bidford village climbing through 1500ft QFE, he saw a Cessna about 1·5-2nm away on his starboard side tracking 260° at about 2000ft. As the relative motion remained the same he initiated a R turn to pass behind the Cessna but simultaneously the Cessna turned L, creating a 'head-on' picture and it started to descend as well. Seeing that the Cessna was now slightly to his R, he started a L turn away from it; by now the tug/glider combination was climbing through 1800ft. During the turn he lost sight of the Cessna but then a few seconds later saw it passing close to the still attached K8 glider whilst it continued on its S'ly heading until reaching Honeybourne disused airfield area where it was seen to turn onto a W'ly track. The Cessna, possibly a C172 or 182, was coloured white with dark markings and he estimated the Cessna passed <100m clear to his R at the same level, assessing the risk as high. He opined that the Cessna pilot had possibly not seen them at all and had shown poor planning when flying at 1500-2000ft in the vicinity of an active glider site. Another possibility was that the Cessna pilot had seen the tug/glider combination and had decided to have a closer look for the benefit of his passengers.

RAC MIL reports that the incident was not observed on recorded radar and despite extensive procedural tracing action, the identity of the reported ac remains unknown.

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

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

The only information available was a report from the pilot of the PA18.

The gliding Member informed the Board that the K8 glider was a type used during the early stages of gliding and pilots of such are therefore likely to be inexperienced. 'Casting-off' the K8 by the PA18 pilot would in general be a last resort because the cable drops from the tug and remains attached to the glider until released by its pilot: the discarded cable then creates an additional hazard when it free-falls to the ground. During the aerotow, the glider pilot focuses his attention on the tug ac at all times, ensuring that his relative position remains constant, so that the responsibility for the glider's safe flight path is devolved to the tug pilot. Members understood why the PA18 pilot was anxious during this encounter, with limited manoeuvrability available to his combination and endeavouring to make smooth and small changes to their flightpath when necessary.

It was unfortunate that the other ac went untraced as only one viewpoint was available to Members to assess the incident. The PA18 pilot had tried to avoid the crossing 'Cessna' type early by turning R but was quickly thwarted when the other ac turned L towards him and commenced a descent. Now being faced with an almost head-on encounter with the other ac slightly to the R, he executed a L turn away and continued climbing whilst the untraced 'Cessna' type passed to his R, tracking S'bound close to Bidford glider site. With the glider site clearly depicted on the topographical charts, the other pilot should have planned his flight to avoid the glider site by a wide margin thereby reducing the chance of just such an encounter as this. On the limited information available, it was not possible to gauge whether the other ac's pilot had seen the tug/glider combination although it was thought unlikely that he could have flown close to the PA18/K8 pair without seeing either or both. However, it was clear that the untraced light ac's proximity had caused concern to the PA18 and K8 pilots which had caused the Airprox to be filed. In the end, on the balance of probability, Members agreed that this had been an encounter in Class G airspace where 'see and avoid' had worked, albeit with separation margins reduced, and that flight safety had not been compromised during the incident.

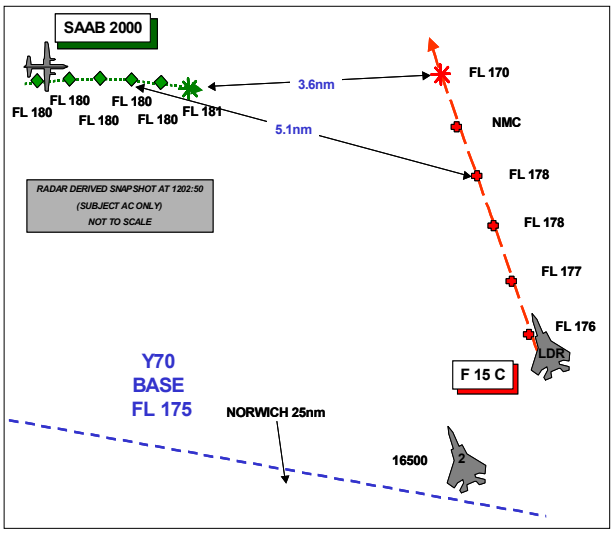
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In the vicinity of a notified and active glider site, the untraced light ac pilot flew sufficiently close to the PA18/K8 combination to cause their pilots concern.

Degree of Risk: C.

AIRPROX REPORT NO 141/06

Date/Time:	11 Sep 1203	
Position:	5310N 00115E(30nm N Norwich)	
Airspace:	Y70	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	Saab 2000	F-15C
Operator:	CAT	Foreign Mil
Alt/FL:	FL180	FL175
		(30.09in =1019mb)
Weather	VMC Haze	VMC CAVOK
Visibility:	5-8km	>8nm
Reported Separation:		
	0 V/ 5nm H	Not seen
Recorded Separation:		
	1100ft V/3.6 H	(Min V 200ft at 5.1nm)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 2000 PILOT reports flying a scheduled passenger flight inbound to Norwich with TCAS fitted. As he was preparing to descend, heading 110° at 230kt in airway Y70, he was instructed by ATC to maintain FL180 and his present heading to remain inside CAS due to several military contacts S and SE of his position.

The TCAS showed the ac in question at 8nm in their 1 o'clock approaching them from the SE at about FL120 with very high rate of climb. Due to high rate of climb and [very high] speed, their TCAS triggered with TA initially and shortly after an RA. Just after the RA the other ac descended rapidly and departed northbound. He reported the incident on the RT and assessed the risk of collision as being moderate.

THE F-15C PILOT reports flying a grey [single seat] ac as leader of a pair of ac with HISLs selected on an exercise sortie involving 24ac. He was squawking an exercise squawk with Mode C and was receiving a service from a [non-British] AWACS. Although he was aware of the existence of Y70 and its base level he was flying on the Force QNH (1019/30.09) which prescribed by the exercise staff and used by all participants to ensure coordination.

At 1201Z they were operating at 24000ft S of Y70 and a threat was designated N of the Airway and they began to run an intercept while descending to 17000ft. They were established at 17000ft 3nm S of the Airway when they began acquiring the threat N of Airway. At 1202:20, the leader acquired a radar lock on the threat to the N and while setting up the appropriate aspect at 1202:25 he had a momentary and unintentional deviation above 17000ft. His gradual climb continued until 1202:31, when he recognized the deviation and immediately corrected back to 17000ft. During this 6sec deviation, the maximum level he reached (from the mission tapes) was 17730ft on 30.09in (1019), the Force QNH [passed by the AWACS as the operating QNH and used by him], equivalent to FL175.5. Neither he nor his wingman were aware of any traffic in the Airway. The incident was reported to the exercise staff on landing. [During this period the No2 ac remained at 16500ft throughout].

[UKAB Note (1): The Norwich (actual) QNH at 1150 was 1018mb. The Humber RPS forecast for 12-1300 was 1014mb.]

MIL ATC OPS reports that the ac involved were participating in a multi-national exercise over the North Sea. At 1202:25z a foreign E3 was controlling a formation of 2xF15's under a RIS, manoeuvring in a combat air patrol (CAP), at various levels and meanwhile Norwich APR was controlling a Saab2000 under RC, routing E along Y70 at FL180. The F15 leader reported in position at 1121:13, "*F15 Formation C/S on station bulls eye 140, 52.*" and the E3 crew responded, "*F15 Formation C/S, E3 S, radar identified RIS limited below 10 thousand.*" There was a period of exercise RT until at 1202:19, F15 leader stated, "*Closest group 086, 36, 18 thousand, assumed non-player.*" And the E3 crew clarified the traffic situation at 1202:33, "*085 35 non-player. Hostile group pistol 070, 33 manoeuvring north 13 thousand hostile.*" The F15 leader then requested, "*say again.*" but the E3 crew does not

respond to the request. At 1202:58 E3 crew pass a maximum level stating, "*F15 Formation C/S max angel on your position 175.*" And the F15 Formation crew replied: "*F15 Formation C/S are 165.*"

[An analysis of the radar recording was conducted but being the same as the one done by ATSI outlined below has not been included].

The E3 crew fulfilled their responsibility to pass TI to an ac receiving a RIS. However, the information regarding the Saab was only passed after a query from F15 leader and with less than 7nm lateral and 200ft vertical separation. The E3 passed a reminder of the base level of the airway after F15 leader had descended back below the base level of the airway and the closest point of approach had been reached. The high rate of climb and subsequent inadvertent penetration of CAS by the F15 leader is likely to have caused the TCAS alerts reported by the Saab.

ATSI reports that the Saab 2000 pilot established communication with Norwich APR at 1200, reporting heading 095° and passing FL210, descending to FL180. At the time, the flight was within Airway Y70, where the base is FL175, 39nm NW of Norwich Airport. The pilot was instructed to maintain FL180 on reaching and to continue on his present heading to remain within CAS. He was advised: *"there's considerable military traffic to the east and south of you"*. The radar recordings show a number of military ac in the area, operating to the N, E and SE of the Saab, between FL129-FL160, all outside CAS. Approximately 1min later the pilot was warned that he would be routed *"quite a way east"* in the airway to avoid military traffic that was not working *"an agency that I can coordinate with"* (AWACS). The ac was then instructed to turn right heading 110°, routeing virtually along the centre of the Airway.

The radar recording, timed at 1202:16, shows the Saab passing FL182 and in its 2 o'clock, 9.6nm, is an ac squawking 1632 tracking N, having just crossed the S boundary of Y70 at FL170. This ac was later identified as the subject F15. The recordings show this flight passing FL176 and thereby entering Airway Y70, at 1202:23, with its Ground Speed indicating 535kt and at that time the Saab was at FL180, at a distance of 7.8nm. Fourteen seconds later the Saab pilot reported a TCAS RA climb, when the radar photograph shows the subject ac 5.1nm apart, with the F15 in the Saab's one o'clock passing FL178. Just to its left is another ac on the same N track but showing as a primary radar return only. The controller immediately issued TI to the Saab *"military traffic indicating one seven zero just crossing twelve o'clock two miles right to left"*. The F15 crossed through the Saab's track at a range of 3.6nm but by then the Saab was 1100ft above the F15 which had descended to FL170 as the Saab had just commenced its RA climb from FL180. The primary-only traffic crossed 1.8nm in front of the Saab.

[The recording of the Cromer Radar shows the F15 at FL178 for 2 sweeps and the Claxby for 1 sweep; on the sweep before both showed it at FL176. The accuracy of Mode C is quoted as being +/- 200ft]

The Norwich APR Controller's plan to ensure that the Saab remained within CAS was sound and should have resolved any conflictions with military traffic in the area. In the very short span that it was apparent that the F15 had entered CAS, the APR was in the process of vectoring another ac, by which time the Saab reported a 'TCAS climb'. The controller complied with MATS Part 1 requirements for the use of levels by allocating a level 500ft above the base of CAS. (Section 1 Chapter 6, Page 4). However, in the circumstances, it is possible that the Saab pilot would have received a TCAS alert, even if the F15 had levelled off just below CAS.

HQ 3 3AF comments that the brief altitude bust, corrected immediately, occurred during a period of high workload for the F-15C pilot. Given the impossibility of ATSU/AWACS coordination, the positioning of AWACS-controlled exercises in congested areas of UK airspace must be questionable.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although it was clear that the F15 pilot was flying on the 'Force QNH' that was passed to him by the AWACS, it was not clear where this had been derived, as it did not accord with the RPS for the time of the Exercise. Attempts by the UKAB to ascertain why 1019mb had been selected produced no results. The Board determined that although this might well have been a factor, even ignoring this inconsistency the F15 tapes had, as its pilot

acknowledged, shown that the ac had actually infringed the CAS of Y70, this being further supported by the radar recordings. The Board accepted, however, that as soon as the pilot became aware that he had climbed above his planned level-off alt of 17000ft [and into CAS] he had taken immediate taken corrective action. Although this deviation had not resulted in any confliction with the Saab, the F15's rate of climb and high speed had caused a TCAS RA in the Saab (and, as stated in the ATSI report, may still have done had the pair of F15s levelled at their planned Alt just below the base of the airway).

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The unintended climb by the F15 leader into Class A CAS caused the Saab to receive a TCAS RA.

Degree of Risk: C.

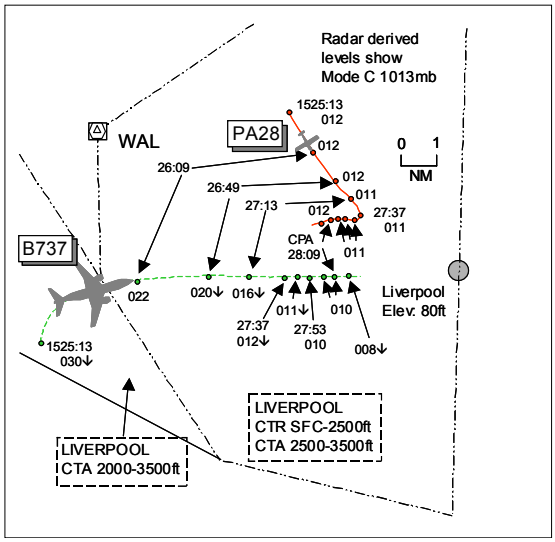
AIRPROX REPORT No 142/06

AIRPROX REPORT NO 142/06

Date/Time:	9 Sep 1528 (Saturday)	
Position:	5321N 00257W (3·5nm W Liverpool - elev 80ft)	
Airspace:	Liverpool CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	B737-800	PA28
Operator:	CAT	Civ Club
Alt/FL:	1160ft↓ (QNH 1022mb)	1500ft (N/K)
Weather	VMC CLBC	VMC NR
Visibility:	10km	10km

Reported Separation:
400ft V/just L ahead NR

Recorded Separation:
200ft V/1·6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 095° at 137kt inbound to Liverpool IFR squawking 6671 with Mode C. On request from the APR on 119·85MHz, an SRA was conducted towards RW09. They followed promptly all heading instructions and started descent from 2500ft at the point indicated by ATC. Initially they were slightly high on final by about 120ft at 6nm but passed the 4nm point at the advised altitude of 1360ft. Shortly afterwards, at 1160ft, TCAS issued an RA warning *"adjust v/s"* so the Captain, PF, disconnected the A/P and A/T, advanced the thrust levers to close to GA thrust, pulled up the nose and quickly verified the speed, increasing the body attitude further to about +7 to follow the RA: the Nav display was indicating traffic at –400ft just L of their track on a 5nm scale. As soon as the warning had stopped the ac was steered onto the correct final descent profile again and a safe landing was made. After the event, he asked ATC if they knew about the traffic and they told him that it was holding on final, he thought. He assessed the risk as high. The Captain further commented that instead of clearing their flight for an ILS in busy GA traffic, an SRA was requested which is an unusual exercise for both ATC and aircrew. Consequently, pilots are being distracted from the outside events by verifying and executing the controller's instructions. Although the Wx conditions were perfect for VFR, this exercise should be considered as a pure IFR flight. The Capt further opined comments that on a nice VFR day during a weekend, crews should be alert for any possible inadvertent manoeuvres of GA pilots. ATC requests for SRA's produce valuable experience for all pilots in order to be prepared for worse circumstances. When requested by ATC, such approaches are to be considered as non-precision approaches in IFR conditions as the attention of the crew is being drawn away from the VFR theatre due to the interaction between ATC and pilots – heading instructions and altitude advice at DME fixes. It is to be understood that such an exercise poses an increased risk on every flight. As a consequence, before such exercises are performed ATC should verify that other traffic is cleared outside the normal ILS environment, not only in the approach area but as well in the go-around area in case the exercise leads to an unstable approach.

THE PA28 PILOT reports returning to Liverpool VFR from Seaforth VRP at 1500ft and 100kt and was told by Approach to hold over Garston Docks and to report field in sight. Once Liverpool was in sight he was told to contact Tower who instructed him to join downwind No 2 to a B737 on final. He saw the B737 and increased his downwind leg to accommodate wake turbulence from the large jet before turning onto base leg then final to land.

THE LIVERPOOL APR reports the B737 was on an SRA to RW09 for controller currency. The PA28 was approaching RW09 from the NW along the River Mersey for base leg with a clearance limit of Garston Docks; the flight was transferred to Tower. When the B737 was at 4nm DME on the C/L heading 095° the crew called 'TCAS Climb'. He passed TI on traffic N, light ac on L base and the B737 crew reported that it was 400ft below. He asked the crew if they were going-around but the ac was already descending again, eventually landing at 1529 from the approach.

THE LIVERPOOL ADC reports working the AIR position whilst split from GMC and being busy with VFR traffic and coordination with the APR. The B737 was cleared to land via the LCIS (Landing Clearance Indicator System) and the crew called on frequency after landing but did not mention a TCAS RA. The ADC was unaware of the Airprox/TCAS RA incident and when asked to complete a CA1261, the ADC believed that a different PA28 was involved, not the subject one, which had joined downwind from the NE and had conflicted with a departing ac and possibly the B737.

UKAB Note (1): The ADC's actions are captured in the ATSI report.

UKAB Note (2): The Liverpool METAR shows EGGP 1520Z 14011KT 9999 FEW040 20/17 Q1023=

ATSI comments that this Airprox involved a B737 and PA28 on final to RW09 at Liverpool in Class D airspace. The PA28 flight was rejoining after a local flying detail from the NW via the Seaforth VRP and the B737 flight was inbound to Liverpool from Treviso, being vectored in a RH radar cct to a Surveillance Radar Approach to RW09 for controller currency requirements.

The radar recording shows, at 1525:13, that the PA28 is 6·7nm NW of Liverpool with the B737 on a radar RH base leg 11·8nm WSW of Liverpool. The PA28 is indicating FL012 (1500ft QNH 1023mb) and the B737 FL030 (3300ft QNH) descending. The PA28 is in the B737's 2 o'clock at 9·5nm. The B737 is turned onto the final approach heading at 1525:30.

The PA28 flight, having reported field in sight, was transferred to the Tower frequency at 1526:50 when just over 4·2nm NW of the airfield. The B737 is 7nm final indicating FL020 (2300ft QNH) descending with the PA28 in its 10 o'clock at 4·4nm indicating FL012 (1500ft QNH). Prior to transfer of the PA28 to the Tower, although both flights had been in contact with Radar and therefore should have been aware of each other, neither crew were given TI on each other. The Manual of Air Traffic Services Part 1, Section 1 Chapter 2 Page 1, Para 2 Classification of Airspace requires the passing of traffic information in Class D as follows *"(b) pass traffic information to IFR flights on VFR flights and give traffic avoidance advice if requested"* and *"(c) pass traffic information to VFR flights on IFR flights and other VFR flights".*

At 1527 after first contact with the Tower, the PA28 pilot was given position in traffic as *"…you're number two to a seven three seven on five mile final do you have traffic in sight".* Having replied in that he was looking, the PA28 pilot was told, at 1527:10, to take up LH orbits and advise when the traffic was in sight. The PA28 pilot responded immediately that the traffic was now in sight and was instructed to report final No 2 and advised of the recommended vortex wake spacing.

[UKAB Note (3): At 1527:37 the PA28 can be seen to be turning downwind at FL011 (1400ft QNH) and 8sec later to be 3·1nm WNW of the airfield tracking W'ly with the B737 on 4·4nm final descending through its level. The next radar sweep at 1527:53 shows the PA28 indicating FL011 (1400ft QNH) in the B737's 10 o'clock at 2nm which apparently has arrested its descent at FL010 (1300ft QNH) and this level is maintained for a further 2 sweeps.]

The B737 crew reports a TCAS climb to the APR at 1528:00 whilst the PA28 is in the B737's 0930 position at 1·8nm. Respective indicated FLs are the B737 at FL010 and the PA28 at FL011 with both ac continuing on opposite direction parallel tracks. The CPA occurs at 1528:09 when the PA28 indicating FL012 (1500ft QNH) is virtually in the B737's 9 o'clock position at 1·6nm with the B737 indicating FL010 (1300ft). Thereafter the separation increases and the B737 continues the approach and lands.

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 had been a situation involving the integration of VFR cct traffic with a TCAS-equipped ac the crew of which were flying an instrument approach under IFR. A Member observed that the ATC procedures in use were established prior to the introduction of TCAS and it appears that since its inception, no guidelines have been drawn up as to how close VFR ac could fly to the FAT without triggering TCAS alerts and/or warnings. That said, proximity is only one element of the ACAS equation as TCAS senses relative flight paths and calculates closure rates before issuing appropriate alerts or warnings at a 'time-to-go' to the CPA.

Members fully understood the B737 crew's viewpoint as they were undoubtedly surprised when, without any prior warning before or during their SRA, the TCAS equipment gave an RA warning and the display indicated that there was traffic ahead, close to the FAT, 400ft below and in potential confliction. No TI was passed by the APR to the B737 flight on this traffic, as required by the MATS Part 1 for the Class D airspace. This "heads-up" information would have certainly improved the crew's situational awareness of other traffic's position, separation distance and its pilot's intentions, thereby enabling them to satisfactorily discharge their responsibilities in Class D airspace, to either 'see and avoid' or request avoidance from ATC. At the time, the crew were most probably busy 'in-house' with cross-cockpit checking of the advisory heights/altitudes and radar ranges during the SRA. However, Members agreed that even if an ILS approach had been flown, the TCAS warning would still have occurred and, irrespective of being informed of the traffic, the TCAS guidance would usually have to be followed in accordance with the company SOPs. One Member opined that this type of scenario could become more prevalent in light of the recently-introduced procedure requiring ac to squawk within the visual cct environs. This aspect must have been considered when the procedure was drawn up but the situation needed to be monitored in case a review of ATC and/or flight operational procedures is required.

[**Post Meeting Note:** The Chairman brought this Airprox to the attention of the Safety Investigation & Data Department at CAA's Safety Regulation Group and to the Defence Aviation Safety Centre in the context of the procedure regarding ac squawking in the cct.]

From the radar recording it can be seen that the subject ac were on conflicting flights paths until the PA28 pilot was given TI by the ADC on the B737 and saw the airliner before carrying out a tight R turn onto the downwind leg. However, from the B737 flightdeck, the TCAS equipment on the 5nm range selected had shown the PA28 as being close to the FAT before its pilot had turned his ac to fly parallel to and more than 1·5nm N of the extended C/L. The B737's TCAS had correctly captured the potential confliction with the PA28 below its level and issued an 'adjust v/s' (reduce descent RA) to the B737's crew who had reduced their ROD before the PA28 pilot's turning downwind manoeuvre had removed the flight path confliction. TCAS then quickly annunciated 'clear of conflict'. The B737 crew were able to readjust their flight path to effect a normal landing, unaware of the actual separation distance that pertained at the time of the encounter. All of these elements when combined were enough to persuade the Board that, from the actual flight paths flown and actions taken by all parties, this incident constituted a TCAS sighting report and that safety had been assured during the encounter.

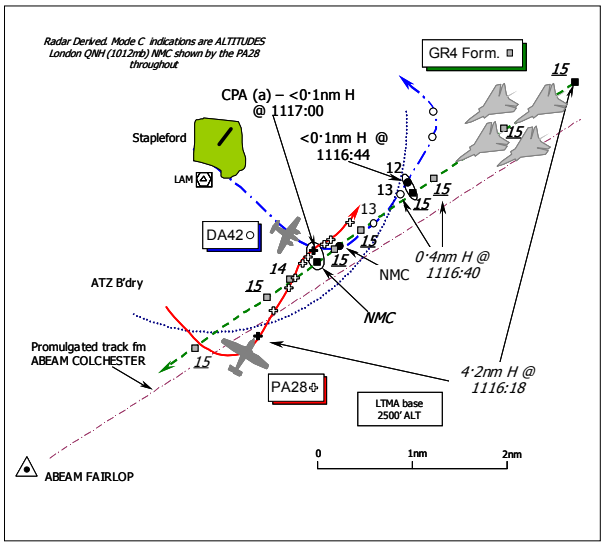
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 143/06

Date/Time:	17 Sep 1117 (Sunday)	
Position:	5138N 00011E (1·6nm SE of Stapleford A/D - elev 185ft)	
Airspace:	Stapleford ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	PA28
Operator:	HQ STC	Civ Club
Alt/FL:	1420ft	↑1500ft
	QNH (1012mb)	QNH (1012mb)
Weather	VMC In Haze	VMC In Haze
Visibility:	6km	6km
Reported Separation:		
	<30ft V/50m H	300ft V/100m H
Recorded Separation:		
	<0·1nm (200yd)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports that he was leading a formation of 4 camouflage-grey GR4 Tornado ac in support of an HQ 1GP task for the 'Battle of Britain' commemoration flypast at Westminster Abbey on Sunday, 17 September 2006. He stressed that careful co-ordination had been effected through Airspace Utilisation Section (AUS) at DAP.

[UKAB Note (1): Under Activity No 2006-09-0223, AUS had promulgated an Airspace Co-ordination Notice (ACN), dated 1 September 2006, for this flight which was originally planned to be a 9-ac formation.]

The established route for the 'BOX 4' formation was via a hold at Southwold routeing to a point ABEAM COLCHESTER – ABEAM FAIRLOP STATION – thence to WESTMINSTER ABBEY. Weather was within limits for the sortie and they were flying in VMC some 500ft below and 10km+ clear of cloud with an in-flight visibility of 6km with slight haze. A RIS was provided by THAMES RADAR at LTCC on 128·025MHz and they were squawking A7050 with Mode C on. White HISLs and navigation lights were on; neither Mode S, TCAS nor any other form of CWS is fitted.

Flying in level cruise at an altitude of 1500ft London QNH (1012mb) whilst approaching a position 51°37·949'N 000°11·228'E heading 234°(T) at 282kt, numerous traffic information calls were received from THAMES. At 1115:49, THAMES reported one ac 5nm away in his 11 o'clock NE bound at 1800ft and then two ac in their 12 o'clock at 8nm range, one at 1300ft unverified Mode C and a second with no height readout [respectively the DA42 and the subject PA28]. A further call was received at 1116:24, when the other ac [the subject PA28] was at 3nm NE bound 200ft below them. Moments later at about 1116:30, his R wingman saw the light ac – coloured white with red trim – 200m away and called for the formation to descend. He as the formation leader immediately rolled L with 10° AOB and descended about 20ft as the light ac passed 50m down the right side of the formation with no more than 30ft of vertical separation and a *"very high"* risk of collision. Entry into CAS for the flypast was subsequently executed without further incident.

THE PA28 PILOT, a flying Instructor, reports his ac has a red/white colour-scheme and the HISLs were on whilst flying a local solo sortie from Stapleford. He was in communication with Stapleford A/G Station on 122·8MHz and a squawk of A7000 was selected with Mode C on, he thought. [UKAB Note (2): NMC was evident from the PA28 throughout the period of the Airprox.]

At the time of the Airprox he was heading 040°(M) at 80kt, climbing through 1500ft QNH (1012mb) DOWNWIND in the LH cct for RW22L, to position on the DEADSIDE (N of the aerodrome) to remain clear of the Tornado formation. He saw 3 [of the 4] camouflaged Tornados pass 300ft beneath his ac 100m to starboard, flying in the opposite direction with a *"high"* risk of a collision. No avoiding action was taken as there was *"no time to react"*.

Stressing that the Tornados flew through the DOWNWIND leg in the opposite direction at about cct altitude [1200ft], he added that the cct was busy.

UKAB Note (3): In a subsequent telephone conversation with UKAB staff, the PA28 pilot expressed surprise that the Tornado formation had routed so close to Stapleford as he had expected their track to be several miles to the SE and certainly clear of the DOWNWIND leg and the ATZ. He stressed it was very difficult to see the camouflage grey Tornado jets in the prevailing 6km visibility because of the haze – he had no recollection of any appreciable cloud.

THE DA42 PILOT also helpfully provided a report stating that he was inbound to Stapleford VFR and in communication with Stapleford A/G Station. HISLs were on and a squawk of A7000 was selected with Mode C. He believed that from the promulgated information the Tornado GR4 formation would pass to the E of Stapleford cct at 1500-2000ft. Furthermore, he understood that the formation flight would be cancelled if the cloudbase was below 1500ft and the stipulated visibility limit. On returning to the aerodrome it was established that the formation was not in the cct area and therefore he proceeded to fly to the DOWNWIND position - ahead of the PA28 in the cct - flying some 300ft below and 10km+ clear of cloud with an in-flight visibility of 5km. When established DOWNWIND at 1300ft QNH, heading 040° at 120kt, he spotted 4 ac ½nm away converging on his ac at the same altitude and flying the wrong way through the active RW22L cct. To avoid the formation he immediately initiated a rapid descent and the formation passed 300ft directly overhead with a *"medium"* risk of a collision.

UKAB Note (4): In a subsequent telephone conversation with UKAB staff, the DA42 pilot opined that previously TRA's had been established for such evolutions, which had been complied with. In his view it was not difficult to arrange a short closed flying period and seemed the safest option.

UKAB Note (5): ACN 2006-09-0223 dated 1 September 06 promulgated under *CO-ORDINATION ARRANGEMENTS* at para 12:

Adjacent Airspace Users

a. Airfields, gliding sites and microlight sites adjacent to the flypast route have been advised of the formation flypast by means of this ACN and NOTAM action. All such organisations are requested to brief their airfield operators and club members on this activity and to suggest that the formation route is safely avoided by at least 2½nm either side of track.

b. The… and CFI of the Stapleford Flight Centre at Stapleford Aerodrome…have all been advised of the route and timings of the formation passing adjacent to their airfields by means of this ACN. All are requested that they brief their club members and publicise the event with all airfield operators in order that this activity can be safely avoided.

At WEATHER CHECKING AND LIMITATIONS it is stated at para 14:

a. The full flypast will be cancelled if the significant cloud base is less than 2,000ft amsl and the visibility is less than 5km.

Stapleford Flight Centre ATC was included as an addressee on the distribution of this ACN.

UKAB Note (6): Meteorological Office archive data gives the following as the respective airport METARS for the period:

LONDON City:
1050Z 25004kt 190V290 8000 FEW022 20/14 Q1012
1120Z 23004kt 170V270 8000 FEW022 20/14 Q1012
LONDON (Heathrow):
1050Z 28007kt 240V310 CAVOK 20/14 Q1012 NOSIG
1120Z 23007kt 180V280 CAVOK 21/14 Q1012 NOSIG
LONDON (Stansted):
1050Z 24005kt 190V280 6000 FEW024 19/14 Q1012
1120Z 24005kt 7000 FEW020 SCT026 20/15 Q1012

UKAB Note (7): A NOTAM was issued by AUS for this Activity – promulgated by AIS as H3362 - that included the following detail:

CEREMONIAL FLYPAST 5130N 00008W (WESTMINSTER ABBEY ñ LONDON) BY 9X TORNADO ACFT.ÖSOUTHWOLD - DEP APRX 1103HRS AT 3000FT DESCENDING TO 1500FT AMSL - 5153N 00049E (ABM COLCHESTER APRX 1111HRS) - 5136N 00006E (ABM FAIRLOP APRX 1118HRS 1500FT AMSL)- 5130N 00008W (WESTMINSTER ABBEY 1120HRS)Ö.NON-PARTICIPANTS ARE REQUESTED TO AVOID THE FORMATION ROUTE BY 2NM EITHER SIDE OF TRACK.

LTCC ATCI reports that as no mention of this incident was made on the RT at the time, the THAMES RADAR controller was unaware that an Airprox had taken place and consequently no report was submitted by the controller. This Airprox occurred between ac flying under VFR and the THAMES RADAR controller fulfilled the obligations of a RIS by passing timely and accurate traffic information to the formation.

ATSI reports that the Tornado GR4 formation called the THAMES RADAR controller at 1114, and after two-way communication was established the controller instructed the formation to squawk A7050. This was acknowledged and the formation reported: "*…23 miles inbound…*". Analysis of the radar recording shows the formation was 8·5nm NE of Stapleford indicating 1500ft Mode C. The controller advised the formation that they were cleared for the flypast 1500ft VFR and Special VFR and shortly afterwards the formation reported at 1400ft "*…good Victor Mike*".

Although a discrete squawk had been allocated, the Thames Radar controller did not inform the pilot that the formation was identified nor did he pass their position as is required by MATS Part 1, Section 1, Chapter 5, page 9, Table 5. The controller then placed the formation under a Limited RIS as it continued on its southwesterly track. (*ATSI note: Both the TOI and the ACN state that ATC will endeavour to provide a RIS but this is not assured. Similarly, crews are reminded that the RIS may well be limited*). Traffic information was passed on one unknown ac NE bound and also on two ac [a DA42 and the subject PA28] which were SE bound, but with no height information. [UKAB Note (7): the LTCC Unit report reflects that at 1115:36, the Tornado leader reported maintaining 1400 feet in good VMC to which THAMES RADAR replied "*…limited radar information service, there is unknown traffic left 11 o'clock 5 miles NE bound at 1800 feet unverified*. *Two further contacts, 12 o'clock range 8 miles, SE bound, one indicating 1300 feet unverified, the other one with no height.* The Tornado Leader replied *"looking".* At 1116:20, this traffic information was updated to "*..previously mentioned traffic 12 o'clock range of 3 miles northeast bound indicating 200 feet below*". These ac – the DA42 and the subject PA28 - were operating within the left hand cct for RW22L at Stapleford aerodrome. The formation continued to close on the first contact - the DA42 - and passed 'starboard to starboard' at a range of 0·1nm [~200yd] [in a position 2·1nm ESE of Stapleford aerodrome]. The formation continued and passed the second ac - the subject PA28 - also 'starboard to starboard' at a range of 0·1nm [~200yd] 1·6nm SE of Stapleford.

Although the requirements for identifying the formation were not followed, the THAMES RADAR controller provided timely traffic information as required under a Limited RIS. The formation made no reference to an Airprox on RT at the time.

UKAB Note (8): The UK AIP at AD 2-EGSG-1-3 notifies the Stapleford ATZ as a radius of 2nm centred on RW04/22, extending from the surface to 2000ft above the aerodrome elevation of 185ft amsl and active during the period of this Airprox. Stapleford operates an A/G Service – C/S STAPLEFORD RADIO – on 122·8MHz.

UKAB Note (9): The UK Mil AIP at Vol 3 – LFS – TVAA, specifies that Stapleford [CA02] attracts a 2nm avoidance below 2000ft agl.

UKAB Note (10): Analysis of the Stansted 10cm Radar recording shows the GR4 formation as a single corresponding primary & secondary contact only (the individual ac within the formation are not discernable) whilst in transit for the flypast maintaining a level cruise at an altitude of 1500ft verified Mode C London QNH (1012mb) and closing gently on the promulgated track from the R heading directly towards the check point at ABEAM FAIRLOP. Meanwhile, the DA42 is shown overhead Stapleford A/D heading SE before turning L DOWNWIND indicating 1300ft London QNH (1012mb) unverified Mode C. The subject PA28 – the reported ac – is also shown, flying at a radar computed GS of 93kt, having turned L NE'ly from a SE'ly course (as passed in the first transmission of traffic information) outside the ATZ boundary; NMC is shown at all from the PA28 although it is reported as selected 'on'. At 1116:18, the PA28 is in the GR4 formation's L 11:30 position at a range of 4·2nm

crossing obliquely from L – R, with the DA42 3nm directly ahead on a reciprocal heading flying at a radar computed GS of 136kt. The formation closes at a radar computed GS of 278kt as the DA42 draws slightly R of the nose at a range of 0·4nm indicating 1300ft unverified Mode C – some 200ft below the indicated altitude of the GR4s. The CPA with the DA42 occurs at 1116:44, just outside the ATZ boundary - with the GR4s 2·1nm from Stapleford - as the DA42 passes <0·1nm on the beam 'starboard to starboard' having descended another 100ft to an indicated altitude of 1200ft unverified Mode C, in conformity with the DA42 pilots reported avoiding action descent. The formation then enters the Stapleford ATZ, maintaining course and level at 1500ft London QNH verified Mode C. The Airprox occurs with the subject PA28 at 51°37'54"N 000°11' 02"E as the latter crosses through the formation's 12 o'clock from L – R, again drawing R until it is shown abeam at 1117:00, at <0·1nm minimum horizontal separation, with the formation 1·6nm from Stapleford. NMC is evident from either the GR4 formation or the PA28, thus the vertical separation cannot be determined at this point. However, the GR4 leader's reported avoiding action descent is shown to an indicated 1400ft verified Mode C on the next sweep, suggesting that if the PA28 was flying at 1500ft QNH the vertical separation was <100ft. The GR4 formation then regain a level cruise at 1500ft, exit the ATZ and achieve the promulgated track on top the check-point at ABEAM FAIRLOP at 1117:46.

THE TORNADO GR4 PILOT'S STATION comments that the route flown by the Tornado formation followed precisely that prescribed within the ACN. The route defined in the ACN includes the clipping of the Stapleford ATZ. As such, it enables the formation to minimize over-flying built-up areas to the greatest extent possible and is also necessitated by the lack of manoeuvrability of large formations of aircraft and the requirement to line-up the formation on Westminster Abbey from 'ABEAM FAIRLOP'.

The formation was flying at the datum altitude and well within the vertical bounds promulgated in the ACN. Weather METARs for London City, London Heathrow and London Stansted all give greater than 5km visibility and greater than 2000ft cloud base; the minimum weather requirements for the flypast were observed. The ACN states that "*the full flypast will be cancelled if the significant cloud base is less than 2000ft amsl and the visibility is less than 5km*." What the ACN does not make clear, which the HQ STC Flypast Operations Orders do make explicit, is that these weather limits are pertinent within the London CTZ. Therefore, the flypast could have continued even if the cloudbase near Stapleford were marginally below 2000ft. The words "*full flypast*" are open to interpretation: does this mean the flypast in its entirety would be cancelled if the cloudbase were below 2000ft or that a flypast by a formation of a reduced size would take place? Not withstanding the potential confusion created by the wording of the ACN, the pilots of the DA42 and the PA28 should not have assumed that the flypast had been cancelled. The decision to fly to the east of Stapleford by these 2 pilots created the conditions for the Airprox; had they remained 2·5nm clear of the published route, albeit within the Stapleford ATZ, as advised within the ACN, then the conflict would not have arisen. Finally, it is fortunate that the formation was reduced to 4 ac rather than the 9 ac originally planned and published in the ACN as the potential for a collision in this instance would have been considerably greater. In summary, there are lessons to be drawn regarding the wording of the ACN such that no false assumptions are made with respect to routeing or possible cancellations of any such flypasts.

HQ STC comments that as part of a flypast over London, the GR4 Leader may have assumed, erroneously, that the ACN conferred more avoidance privileges to his formation than it did. This flypast was not large enough to attract a TRA [now termed a Restricted Area (Temporary) - RA (T)] as other London flypasts do. That said, the route and timing was available to the ac at Stapleford and it is disappointing that there was confusion about where the track went. Also disappointing was the assumption by the Stapleford pilots that the formation would be cancelled due to the weather that, on the day, was within the required limits. The Tornados were going to be abeam Stapleford at that time, on that day. Had the local ac been elsewhere for those few minutes the Airprox may not have occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed that the lead Tornado GR4 crew had only reported an encounter with one ac, no reference being made within their report of sighting the DA42. Its pilot had however been contacted during tracing action and had provided a helpful account, adding to the Board's overall understanding of the circumstances of this Airprox. Although the DA42's presence could not be overlooked in the analysis of this Airprox, nonetheless the Board could only base its assessment of 'Cause and Risk' upon the PA28 which was the reported ac.

Members were under no illusions as to the difficulties confronting both planners and the fast-jet crews themselves when planning and executing flights such as these through the congested airspace of SE England. An AUS Advisor, who helpfully attended specifically for the assessment of this Airprox, briefed the Board that this route had been used for many years by military formation flypasts over London and this activity differed little from previous events. Furthermore, no special 'protection' was afforded to the formation flypast route. The ACN was relatively 'standard' and the formation was not a large one so neither did the ACN afford any dispensation to relax normal operating practice or specify that the formation might not be able to conform with the normal 'Rules of the Air'. Larger events which attracted participation by a number of ac formations - maybe of dissimilar types – were sometimes afforded a TRA and the Board was briefed that consultation by UKAB staff had revealed a significant level of concern exhibited by all the pilots involved here that no TRA had been established for this event. The Command had mentioned that this flypast was apparently not large enough to attract a TRA – the formation having been reduced from 9 ac to 4 by the Command. The HQ STC Operations Order for the flypast formed the basis upon which the ACN had been formulated. Whereas, the introduction to the ACN stated that "*…measures had been agreed by AUS with the organiser and airspace controlling authorities to accommodate the subject Unusual Aerial activity",* participating crews reading this might be forgiven if they believed that positive co-ordination had taken place and agreed individually between AUS and all the ATSUs and flying units affected by their task over the whole of their route. But strictly, this "co-ordination" referred to that portion of the flight within CAS. Whilst this might be a common misconception, the Advisor pointed out that for those portions of the activity outside CAS the only co-ordination effected was the dispatch of the ACN to the appropriate unit. Nevertheless, the planning had been for a 9 ac formation which was also promulgated in the NOTAM. It was purely fortuitous that only 4 ac were involved here: had this encounter been with the planned 9-ship formation the outcome might have been much more serious. However, the Board only deals with what actually happened and not what might have occurred in different circumstances.

It had been explained that the flypast route - as plotted from the co-ordinates given for the established points ABEAM COLCHESTER to ABEAM FAIRLOP – tracks through the Stapleford ATZ boundary. The Board was briefed that the ACN accorded the formation no priority status through the ATZ. Moreover, it had been confirmed with Stapleford's management that they had received the ACN and thereby advised of the route and timings of the formation passing adjacent to them. They had been requested to brief flying club members and publicise the event with all airfield operators in order that this activity could be safely avoided - suggesting by at least 2½nm either side of track - yet still this Airprox occurred. The Board was briefed that there was no compunction on GA pilots to comply with this "request", thus only 'good airmanship' could dictate compliance with this sound 'advice'. Nevertheless, following independent consultation with both the PA28 pilot and the DA42 pilot it was explained to the Board that both pilots were cognisant of the intended Tornado flypast and the timings for it but had either expected the formation to remain outside the ATZ - further to the SE of Stapleford - or, in the case of the DA42 pilot, to pass E of the Stapleford cct at 1500-2000ft. The DA42 pilot also thought that the formation flight would be cancelled if the cloudbase was below 1500ft and the stipulated visibility limit – though it was actually specified as: 2000ft amsl and visibility less than 5km. So as the weather had been worse earlier in the morning when the DA42 pilot departed for his training sortie he perceived that the formation flypast would not take place. However, the GR4 pilot's unit had explained that the promulgated weather limits were for flight in the Heathrow CTR so it was incorrect to assume that this applied to the route outside CAS in Class G airspace where this Airprox took place. Some Members thought that in this respect, too much information was promulgated to other airspace users in the NOTAM for if this weather limit had not been mentioned then there would be no reason to suppose that the sortie would not take place, as planned, and that the GR4's would be flying the promulgated route at the scheduled times. A debate ensued about notification to other flying units of the cancellation of events such as these. It was pointed out that the ACN did include at para 16 concise cancellation procedures and various contact telephone numbers for the LATCC (Mil) Supervisor or the LTTC Traffic Manager. Thus if there had been any doubt as to whether the flypast was taking place then a call to either of these could have resolved the issue.

The reported PA28 pilot had believed that the formation would remain outside the ATZ further to the SE of Stapleford. This was surprising to some pilot Members who felt that simply plotting the formation's route on a chart would have revealed the proximity of the planned track to Stapleford. The GA pilot Member raised a concern over the way in which AIS promulgates information. In his view, notwithstanding the standard formats for NOTAMs etc, a graphical means of representing such events as this would help GA pilots to absorb and understand such warnings more easily. The AUS Advisor cited production limitations at AUS but the Board was advised that some ACNs do include simple charts for graphical representation. Clearly, although the information was available at Stapleford in the form of an ACN and NOTAM the pertinent information had not been made clear to these two Stapleford-based pilots who – for whatever reason – had not realised that their flights would be so close to this

formation and their own aerodrome. Notwithstanding the PA28 pilot's wide crosswind departure outside the ATZ and across the formation's planned track, a controller Member – also an experienced GA pilot himself – opined that it was not unreasonable for these GA pilots here to expect the GR4 formation to stay outside the Stapleford ATZ and other Members agreed. In general, Rule 39 to the 'Rules of the Air' Regulations mandates that civilian pilots communicate with an A/G Station as a prerequisite to entry into an ATZ so that information can be obtained about activity within it to enable the flight to be conducted with safety. From the Tornado formation crew's perspective, under ANO Article 152, military crews are specifically exempt from the major provisions of the ANO and as such compliance with Rule 39 is not obligatory. However, military flying regulations invariably cover such aspects as this within the UK LFS – usually more strictly - which would invariably afford an aerodrome avoidance mirroring the dimensions of an ATZ, thereby affording a measure of 'protection' to this airspace and thus fully within the 'spirit' of the 'Rules of the Air'. This is the case around London in the Thames Valley Avoidance Area of the UK LFS, where the UK AIP at Vol 3 – LFS – TVAA, specifies that Stapleford [CA02] attracts a 2nm avoidance below 2000ft agl. Whilst the ACN specified that TVAA entry "clearance" would be arranged, in the Board's view it did not seem to encompass entry into the Stapleford ATZ, but perhaps the formation's crews may have thought so. It was clear from both the NOTAM and the ACN that the formation was planned to pass abeam Stapleford just before 1118, which was the stated time ABEAM FAIRLOP at the promulgated altitude of 1500ft amsl. However, any deviation R of track below 2185ft amsl – the upper altitude limit of the Stapleford ATZ - would take the formation further into the ATZ and allow them to encroach further toward the DOWNWIND leg for Stapleford's RW22L– as occurred here. Members agreed that it was a mistake to plan this route cutting so close within the ATZ and just because it had been used before was no reason to continue. In this respect it was pointed out that since this Airprox occurred steps have been taken to move the inbound leg slightly further to the S thereby eradicating the problem with Stapleford itself. However, the GR4 lead pilot's Unit report had made it plain that there was a requirement to line-up the formation on Westminster Abbey. Hence the "suggestion" of avoiding the route by 2½nm in the ACN – 2nm in the NOTAM - to afford a 'safe buffer' was indeed a sensible precaution. However, with the formation passing 2nm from the aerodrome, within the ATZ, so strictly within the promulgated 'advice' this effectively precluded ac from departing from Stapleford – especially RH DOWNWIND off RW22L – over the period. Given the nature of the sortie and who was flying it, it seemed axiomatic that the formation would fly past Stapleford on, or very close to, their planned track and pass through the promulgated points at the briefed time. The radar recording had evinced that the GR4s were marginally R of track and closing from the R as they approached ABEAM FAIRLOP, and about 14sec early (given about a 4sec data update rate) on the planned time, so it should have come as no surprise to the DA42 pilot when he first saw the 4 camouflage-grey GR4s ½nm away converging on his ac, at the same altitude he reports, flying the wrong way through the active RW22L cct unannounced. Mention had been made from the civil perspective of the convention for entering an ATZ by radio-fitted ac and Members queried whether one of the GR4 crews could have called on the Stapleford A/G frequency. This would have highlighted to other pilots the presence of the jets and also might have enabled the A/G Operator to pass information about the aerodrome traffic possibly forestalling this close quarters situation. An experienced fast-jet navigator opined this would not have been feasible with a 4ac formation whose crews would have been working very hard listening to Thames RADAR on VHF whilst speaking on UHF to the other formation elements; however, this might be possible with a larger 9ac formation. Despite the lack of any prior warning on RT, fortunately the DA42 pilot had spotted the formation in time to take his own avoiding action but, at a closing speed in the order of 420kt, little time was available to accomplish this before moments later the 4 jet crews passed the DA42 out on their starboard beam, unbeknown to them at the time it would appear. For his part then the DA42 had been able to avoid the jets, but in the Board's view he should not have allowed himself to be placed in this difficult situation. Whether the formation crews had not spotted the DA42 or had discounted it as not a factor was unclear. Nevertheless, moments later the subject PA28 had been spotted by the starboard GR4 wingman out to the formations R, who saw the white/red PA28 a mere 200m away and called for the formation to descend, which was indeed timely.

It was noted that the Thames RADAR controller had provided a good flow of traffic information to the formation leader under the RIS. Indeed it was clear from the concise ATSI report that traffic information had been given by RADAR twice about the DA42 and the subject PA28. This should have been ample warning and yet in a controller Member's opinion the formation still pressed on and took no immediate action - however, this was a solitary view and in the opinion of other Members there were few options available. Members were reminded of the difficulties confronting a formation leader aiming to maintain his track and be on time for such an event. So it was entirely fortunate that the leader was able to manoeuvre his unwieldy formation into a gentle banked turn with a slight descent to avoid the PA28 by a wider margin. This pilot reports that he saw 3 of the 4 camouflaged Tornados pass just beneath his ac 100m to starboard, flying in the opposite direction. It was not feasible to ascertain which of the 4 jets the PA28 pilot actually saw nor which one he did not see and it was indeed possible that he might not have

seen the jet that flew closest to him but in any event the PA28 pilot said no avoiding action was taken as there was no time available. The Board agreed that this was part of the cause – a late sighting by the PA28 pilot – but questioned why he placed himself in such a position. Notwithstanding his expressed concern that the Tornados had entered the ATZ and flown through the DOWNWIND leg in the opposite direction at about cct altitude through a busy cct, pilot Members stressed that he was aware of the flypast and had precise information beforehand to tell him where it would be and, to the minute, when. Moreover, the PA28 pilot had flown CROSSWIND after departure extending outside the ATZ before turning DOWNWIND across the jets' path so this encounter could as easily have occurred seconds earlier just outside the ATZ - as did that with the DA42 moments beforehand. So it seemed that some pilots had completely disregarded the advice contained in the ACN and the NOTAM, which the PA28 pilot confirms he read. He reports, furthermore, that he was climbing through 1500ft London QNH (1012mb) DOWNWIND in the LH cct for RW22L, to position into the DEADSIDE to the N of the aerodrome to remain clear of the Tornado formations route. But Members recognised that to depart L DOWNWIND knowing that he would be in the vicinity of the jets at the specified altitude for the flypast – the radar recording had shown they had maintained their planned 1500ft QNH - and clearly at the prescribed time was plainly unwise. Notwithstanding the formation's unannounced entry into the ATZ and the choice of the route, the GR4 pilots might reasonably have expected other aviators to exercise good airmanship, take heed of the NOTAM, and safely avoid their formation for a minute or so – for that is all it would have taken. In the Board's view, this was the nub of the issue, Members concluding that despite all the information promulgated in advance of this activity, pilots still chose to ignore the advice contained in the NOTAM. In so doing they hazarded not only their own ac but in this case four fast jets flying in an unwieldy formation that was difficult to manoeuvre around other slower traffic. This in the constrained airspace below the LTMA in the vicinity of the Heathrow CTR made avoidance doubly difficult. After weighing all these many factors carefully, the Board agreed that this Airprox had resulted because the PA28 pilot, whilst trying to avoid a NOTAM'd flypast route, nevertheless flew into conflict with the Tornado GR4 formation which he saw late.

The Board agreed with all the pilots involved that this was a risk-bearing Airprox, but one which seemed entirely preventable. Reporting that he was unable to take any avoiding action himself, the PA28 pilot said there was *"no time to react",* and it was very difficult to see the camouflage grey Tornado jets in the prevailing visibility because of the haze: clearly, safety was not assured. His account states that the 3 Tornados that he saw passed some 300ft beneath his ac 100m to starboard, flying in the opposite direction with a *"high"* risk of a collision - but where was the fourth jet in relation to the PA28. This was not clear but the PA28 pilot's assessment of the minimum separation was significantly greater than that of the lead GR4 pilot who said that the light ac passed 50m down the right side of the formation with no more than 30ft of vertical separation and a *"very high"* risk of collision and this was after he had taken avoiding action. With the tight 'BOX 4' formation at low-level the radar recording merely reflected one contact for all four ac and given the inherent range discrimination limitations of the recorded radar source it was not feasible to resolve this anomaly other than to record that the minimum horizontal separation was certainly less than 0·1nm when the Airprox occurred with the PA28 1·6nm from Stapleford. As no Mode C was indicated by either the GR4 formation or the PA28 at this moment, the vertical separation could not be independently determined. However, the radar recording showed that the GR4 formation had accurately maintained 1500ft London QNH as they approached ABEAM FAIRLOP and with 1400ft verified Mode C shown on the next sweep after the CPA and the PA28 reporting that he was climbing through 1500ft QNH, the analysis had suggested that the vertical separation was less than 100ft as the 4 jets passed on the beam. However, Members noted that the traffic information provided by Thames RADAR had ensured that the GR4 formation crews were looking for the other ac as they approached the area, thus when his starboard wingman detected the PA28 and called this to the GR4 formation leader he was able to gently manoeuvre the 4 jets by rolling L with 10° AOB, which was probably as much as the leader could do at low-level, and descend. The irony that this occurred with only 4 Tornados instead of the planned 9 ac GR4 formation was not lost on the Members and it was clear that with a larger formation the outcome could have been very different. However, the Board bases its assessment of Risk on what actually occurred and not what might have happened in different circumstances. Whilst the Stansted radar recording evinced that the GR4 leader's avoiding action was barely taken in time, it was effective in averting a collision even though this was certainly a close call. The Board agreed that the safety of the ac involved had certainly been compromised.

Given the difficulties experienced by the formation and the anomalies revealed during the assessment of this Airprox, Members were concerned that this could, potentially, occur again. It was evident to the Board that despite the advance warning, advice and comprehensive detail about this formation flight within the ACN and the NOTAM, this had all come to nought in preventing a close quarters situation that was almost entirely predictable. There were valuable lessons within this Airprox for the benefit of all concerned and it was important for the aviation

community as a whole that these were not lost. During a wide-ranging and comprehensive debate, concern was expressed over the lack of RT communication by the formation with Stapleford, which was intrinsic to safe operation of an aerodrome cct. The methodology for the promulgation of the route was discussed: the GA Member suggested making it easier for GA pilots to assimilate what would occur, possibly by the judicious use of graphics within the ACN. Perhaps pilots could call AIS for information on whether the activity was actually 'on or off'; alternatively, maybe it might be cascaded down through ATSUs. But overarching all these suggestions it was apparent that the pilots involved here believed that a TRA would have been appropriate for this evolution. It appeared that some pilots at Stapleford would have been quite content to have had a short temporary restriction placed upon them to ensure that this event could be conducted with safety. Where, previously, TRAs had been established, this had been accomplished satisfactorily with apparently a minimum of disruption and Members agreed that the judicious application of a Restricted Area (Temporary) - RA (T) had merit. Wishing to ensure that the potential for a recurrence of an Airprox such as this was minimised in the future, the Board was moved to make a Safety Recommendation that: The MOD and CAA should jointly review the arrangements, safety provisions and notification procedures for formation flights in Class G airspace such as these, so as to minimise the risk of a conflict arising between formations of ac and non-participating flights.

PART C: ASSESSMENT OF CAUSE AND RISK

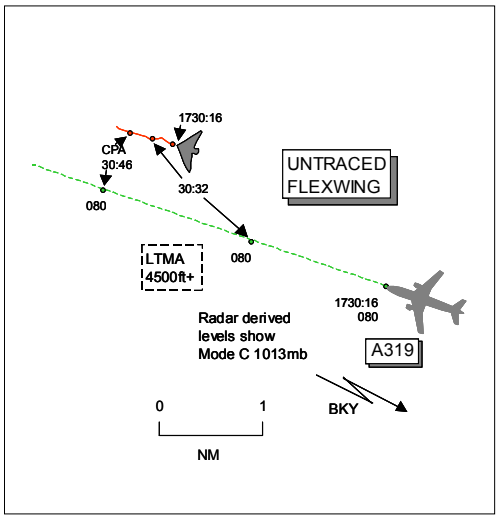
Cause: The PA28 pilot, whilst trying to avoid a NOTAM'd flypast route, nevertheless flew into conflict with the Tornado GR4 formation, which he saw late.

Degree of Risk: B.

Safety Recommendation: The MOD and CAA should jointly review the arrangements, safety provisions and notification procedures for formation flights in Class G airspace such as these, so as to minimise the risk of a conflict arising between formations of ac and non-participating flights.

AIRPROX REPORT NO 144/06

Date/Time:	23 Sep 1731 (Saturday)	
Position:	5204N 00011W (10nm NW BKY)	
Airspace:	LTMA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A319	Untraced Flexwing M/Light
Operator:	CAT	N/K
Alt/FL:	FL80	(N/K)
Weather	VMC CLOC	NK
Visibility:	10km	
Reported Separation:	Nil V/1-2nm H	
Recorded Separation:	0·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports outbound from Stansted IFR heading 290° at 290kt (speed control had been removed) and FL80 in contact with London on 119·77MHz. When about 10nm from BKY on radial 300°, they saw a weight-shift-type M/Light in their 2 o'clock position at approximately the same level. They estimated the lateral separation as it passed down their starboard side to be 1-2nm and as it went from their view it appeared to commence a gentle L turn. He assessed the risk as medium.

RAC MIL reports that with intermittent radar contact on the M/light, tracing action proved extremely difficult. The radar return fades in the general area and so procedural tracing action was undertaken in an attempt to identify the M/light. However, with 49 sites identified (the ones that are annotated on the charts) within 25nm radius of the Airprox position, the tracing action was protracted. After two months of tracing action, the identity of the M/light was never established.

THE LTCC NW DEPS RC reports the A319 flying a BUZAD departure from Stansted was received on handover heading 290° at FL80, owing to holding traffic, for climb when possible. After giving climb to the A319 flight the crew reported microlight activity 2nm N and that they intended to file an Airprox. No blips were seen on radar, due to coverage limitations from Pease Pottage radar, but even if there were the M/Light had no transponder.

ATSI comments that at 1730:46, the TC NW Deps instructed the crew of the A319 to climb from FL80 to FL120. The pilot acknowledged this and reported sighting a M/Light ac *"...about two miles to the right of us at the moment"*. The controller had no knowledge of the M/Light and it was not visible on his radar. Later unit investigation showed an unidentified primary response displayed on the Heathrow 23cm radar and the Stansted 10cm radar. Although the A319 pilot reported the ac to be approximately 2nm away, the radar showed that the A319 passed 0·6nm to the S of the unidentified target. No civil ATC errors disclosed.

UKAB Note (1): The Heathrow recorded radar shows the A319 climbing on a steady 290° track with a primary-only return, believed to be the Flexwing M/Light, tracking generally SSW to its NW. At 1730:16 the A319 levels at FL80 with the Flexwing in its 1230 position range 2·5nm now tracking 280° having just completed a R turn from its previous heading. The separation reduces to 1·4nm 16sec later by which time the subject ac are on broadly parallel tracks. The CPA occurs at 1730:46 as the ac pass abeam each other 0·6nm apart before the A319 rapidly overhauls the Flexwing which then turns slightly R onto a more NW'ly heading.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the A319 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members were surprised with this occurrence as the M/Light was flying at an unusually high level, firmly within the LTMA at about 3500ft above base level and as such it was considered that an erroneous altimeter subscale setting by the M/Light pilot could not be a possible causal element. There had been no recent changes of CAS boundaries/levels in the area so that the M/Light pilot should have been cognisant of the airspace structure from the promulgated 1:500,000 topographical chart during both the pre-flight planning and actual flying phases. With no extenuating circumstances apparent, Members unanimously agreed that the cause of the Airprox was an unauthorised penetration of Class A CAS by the untraced microlight pilot.

Without the benefit of the M/Light pilot's cockpit viewpoint, Members were limited on information on which to assess the risk. Although all safety nets were breached, owing to no SSR being displayed by the M/Light and the ac not being seen by the primary radar selected, it was fortunate that the A319 crew saw the M/Light whilst flying IFR within CAS. From the A319 crew's description and the geometry shown by the recorded radar, the Board believed that the A319 crew's early visual acquisition of the M/Light had allowed them to quickly assess that avoiding action was not required and to monitor its flight-path, watching it pass clear to their R. This was enough to persuade the Board that the A319 crew were always in a position to take timely avoiding action, if deemed necessary to avoid the M/Light, and to that end, safety had not been compromised during the encounter.

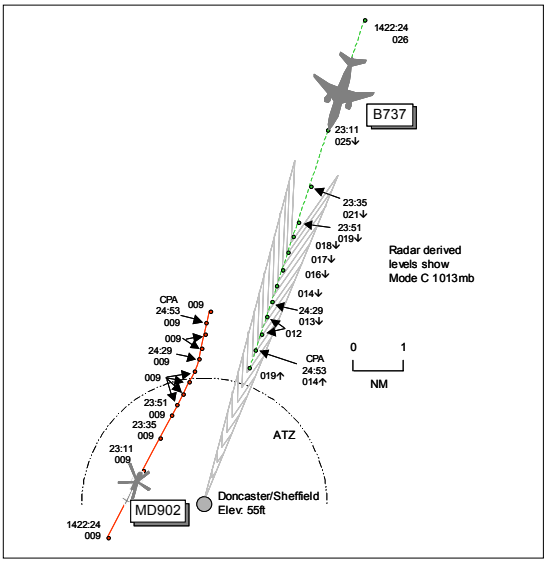
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class A CAS by the untraced microlight pilot.

Degree of Risk: C.

AIRPROX REPORT NO 145/06

Date/Time:	25 Sep 1425	
Position:	5332N 00058W (3·5nm FIN APP RW20 DSA - elev 55ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-800	MD902
Operator:	CAT	Civ Comm
Alt/FL:	1450ft↓ (QNH 1009mb)	350ft agl (QNH)
Weather Visibility:	IMC KLWD	VMC CLBC 6km
Reported Separation:	100ft V/<1nm H	Not seen
Recorded Separation:	500ft V/1·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Doncaster/Sheffield (DSA) IFR and under vectors from DSA Radar for the ILS RW20 squawking 6170 with Mode C. They were told of a helicopter (the subject MD902) passing 3nm W of DSA at 1000ft agl. Once established on final approach heading 201° at 167kt with gear down, flap 40 selected and A/T engaged a TCAS return was observed closing the C/L from the W 600ft below. This contact then closed almost onto the LLZ C/L so a missed approach was initiated coincident with a 'traffic' alert from TCAS. The last observed relative position was 1230 <1nm and 100ft below. The traffic was not seen visually as they were flying in cloud and in rain at the time of the incident. He believed a high risk of collision existed and the Capt reported the Airprox to DSA Tower shortly after the missed approach was initiated. ATC had described the position in relative terms throughout the incident but insisted that the traffic should be of no concern.

THE MD902 PILOT reports operating in a position about 1·5nm W of the DSA RW20 extended C/L tracking N'ly at slow speed approximately 7nm out, he thought, and remaining below 500ft agl. He was working DSA Approach on 126·225MHz under a FIS squawking a discrete code with Mode C; TCAS was fitted. This was at the time when a B737 was commencing an ILS to RW20. The visibility was 6km flying 200ft below cloud in VMC and the ac was coloured blue/yellow with nav, landing and HISLs all switched on. ATC had made his position, height and activity clear to the B737 flight and this information was acknowledged by the crew. At some stage during its approach the B737 flight carried out a go-around and informed ATC, which was the first indication to him of the B737 crew's decision and actions. At no time did he have the B737 in sight and he did not know at what stage of the approach the B737 initiated the go-around, consequently no avoiding action was taken. ATC had cleared him to remain in his notified position whilst the B737 flight commenced its approach. The B737 crew requested better 'protection' for their second approach and he then complied with ATC's request to move further W and hold. His TCAS was indicating the positions and levels of inbound and holding ac but at no time was an alert received.

THE DSA RADAR CONTROLLER reports that the B737 was on an ILS approach to RW20 when the MD902 pilot called to pass 3nm W of DSA N'bound and which subsequently operated to the W of the RW20 FAT. The B737 and MD902 crews were given TI on each other. The B737 crew reported going-around on Tower frequency, owing to a TCAS contact and then reported an Airprox when back on the Radar frequency. The B737 crew reported separation of 1nm horizontally and 100ft vertically.

UKAB Note (1): Met Office archive data shows the Doncaster/Sheffield METAR as EGCN 1420Z 36003KT 2700 -RADZ BR FEW005 BKN015 17/16 Q1009=

ATSI comments that this Airprox was filed by the 737 flight against an MD902 helicopter and occurred while the B737 making an ILS approach to Doncaster RW20.

AIRPROX REPORT No 145/06

The B737, operating IFR, was inbound to Doncaster from Greece and had approached through the airways system from the SE while the MD902, operating VFR, was on a detail that would ultimately require it to pass to the W of Doncaster. The approach radar service is provided to Doncaster remotely from Liverpool airport using 'piped in' primary and secondary radar feeds. Despite requests for investigation reports from the Units concerned non have been forthcoming. The APR's workload is accordingly assessed as moderate.

The B737 flight was identified on its first call at 1415:30 and advised of the type of approach. At 1416:50 the APR advised the B737 that it had just left CAS and correctly placed the flight under a RAS. At this time the MD902 flight was on frequency but not relevant at this stage. The type of service being provided to the MD902, which was operating VFR, is not known since the flight was already on frequency prior to the start of the RT transcript. It is, however, believed to have been under a FIS. This is borne out by the MD902 pilot report.

At 1420:00 the MD902 pilot advised the APR that he was breaking off from the area he was in and was heading to the N to a point 15 miles from the current position which would entail a transit about 3nm to the W of the field. The APR advised at 1420:20 *"MD902 c/s roger no known traffic to affect you er west abeam report if you wish to come any further closer to the airfield please got er traffic on the ILS shortly"*.

Analysis of the Clee Hill radar recording at 1420:30 shows the MD902 5·3nm SW of the airfield with the B737 11nm NE. The MD902 is indicating FL014 (1280ft QNH 1009mb) and the B737 FL037 (3580ft QNH). At 1420:30 the MD902 acknowledged the APRs information on the forthcoming ILS approach and request to advise if needing to come closer to the airfield with *"That's copied MD902 c/s will advise"*.

The APR continued vectoring the B737 to close and establish on the ILS until at 1422:20 in response to the B737 crew's LLZ established report he advised *"B737 c/s just for information er you can probably see a couple of contacts er close to the overhead other helicopter's working me maintaining three thousand five hundred feet and there is also a helicopter just passing about two miles west abeam er northbound staying to the west of the approach at a thousand feet or below"*. The B737 crew replied *"that's copied and we've got both on TCAS at the moment"*. At this time the MD902 is 1·6nm W of the airfield and the B737 is on 9nm final with the MD902 in his 1 o'clock at 9·7nm. At 1423:10 the APR transferred the B737 to the ADC frequency.

[UKAB Note (2): Immediately after this the APR transmits *"MD902 c/s traffic's a seven three seven just er coming on to a six mile final runway two zero".* A carrier wave transmission is detected but no modulation is heard.]

Just under 1 min later (1424:20) the APR asked the MD902 flight *"MD902 c/s have you got the seven three seven in sight"*. The response was *"MD902 part c/s"*. It cannot be established from the transcript if this was an affirmative. At 1424:30 the APR asked the MD902 to say again and received the following reply *"????? for me you have another ?????"* (3-4 unintelligible words). Again it cannot be established if this was a reply to the APR or a question on the MD902 domestic frequency. The APR advised *"yeah it's going to pass down your right hand side by about a mile so no further w-east than your present position please*". The MD902 pilot replied *"understood and we're down to five hundred above ground"* which the APR acknowledged.

Meanwhile the B737 flight had contacted ADC at 1423:30 and was cleared to land and advised of the runway state. At 1423:50 the B737 crew advised the ADC he had a TCAS contact 4 miles and a thousand feet below. The ADC stated the only traffic he'd been advised of was the MD902 passing to the W at a thousand feet (ATSI note - which had been advised to the B737 by the APR).

The B737 crew advised *"er roger he's a bit to close to us actually for this…",* the transmission ending in a carrier wave with no modulation. About 20sec later at 1424:30 the B737 crew reported *"I got er TCAS contact out on the right going around".* The ADC replied it was the MD902 1·5nm W at 1000ft (ATSI note – he thought) and transferred the B737 back to radar for vectoring. Having recalled the APR the B737 was vectored for an approach and landing.

[UKAB Note (3): The Claxby radar recording at 1423:11 shows the MD902 passing 1·4nm WNW abeam DSA indicating FL009 (780ft QNH) while the B737 is on a 7·8nm final indicating FL025 (2380ft QNH) descending with the MD902 in his 1 o'clock at 7·7nm. The contacts are on almost parallel opposing offset tracks but with a slight convergence towards the FAT by the MD902. When the B737 called going around just after 1424:30 the MD902 is 2·9nm N of the airfield still indicating FL009 (780ft QNH) with the B737 indicating FL013 (1180ft QNH) descending at 4nm final and with the MD902 in his 1-2 o'clock at 1·8nm. The next radar sweep 8sec later shows

the B737 arresting its descent at FL012 (1080ft QNH) with the MD902 300ft below at FL009 and now having altered track 15° to the L. These tracks are maintained, the next sweep showing the separation having reduced to 300ft vertical and 1·2nm horizontal. The CPA occurs on the next sweep at 1424:53 the MD902 at FL009 passing 1·1nm WNW of the B737 in its 3 o'clock, the B737 now indicating a climb through FL014 (1280ft QNH) as the go-around climb becomes apparent.]

The Manual of Air Traffic Services Part 1, Section 1 Chapter 2 Page 1, Para 2 Classification of Airspace does not require the passing of TI to either IFR or VFR flights in Class G airspace however, the APR had provided both subject flights with advice on each other. Notwithstanding the latter, until the time the B737 was transferred to ADC, it was being provided with a RAS in Class G airspace in IMC, it is debatable whether the APR should have provided something more positive in terms of 'separation' or avoiding action against the VFR helicopter. He had at 1420:30 and 1422:20 passed TI to both flights. The MATS Part 2 Section 4 Chapter 4 Page 1 Para 3.1 states *"Primary radar is good on the whole, the only area of concern being to the north of the airfield in the vicinity of the 20 final approach. With a target the size and composition of a typical PA28 aircraft, when descending on a 3 degree glide path the primary return becomes intermittent, from 5nm disappearing at 4nm when descending through approximately 1700ft..."*. Whilst the helicopter would present a larger reflective area, the Airprox occurred at a location in excess of 30 miles from the primary radar head and 25 miles from the secondary radar head and given that its track was also largely tangential it is not certain that the APR would have had constant radar contact with the helicopter.

UKAB Note (4): The UK AIP at AD 2-EGCN-1-6 promulgates the Doncaster/Sheffield ATZ as a circle radius 2·5nm radius centred on the midpoint of the longest notified RW 02/20 at 532829N 0010016W from SFC to 2000ft aal, elevation 55ft amsl.

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 sympathised with the B737 crew's predicament as the Airprox occurred in Class G airspace where pilots are responsible for providing their own separation through 'see and avoid'. The MD902 pilot had called the APR and informed him that they were routeing N'bound to pass 3nm to the W of DSA and the controller had asked him to advise if he wished to route any closer owing to ILS traffic, the subject B737. As shown by the radar recording, the MD902 flight did, in the event, route closer to DSA and also on a more NNE-NE'ly track than its pilot had declared on the RT – ATC should have been advised. Later, as the B737 flight reported LLZ established, the APR had noticed the MD902 tracking through the DSA ATZ so he told the B737 crew that it was passing 2nm W of DSA N'bound staying W of the approach at 1000ft. The B737 crew reported 'seeing' the helicopter on TCAS and were transferred to Tower. Following this, the APR passed TI to the MD902 pilot but, as the response was a carrier wave transmission only, it was unclear whether this TI was 'taken on board' by the helicopter pilot. However, it appears that the APR, although happy with the traffic situation, may not have taken the Wx conditions into account: the B737 crew were flying in IMC in cloud and the MD902 pilot was flying just below cloud in reduced visibility. Neither crew would therefore be able to visually acquire each other's ac until the latter stages of the B737's approach as it descended clear of cloud on about 3-4nm final. About 1min later, the APR twice asked the MD902 pilot if he had the B737 in sight but did not obtain positive responses. The APR could see the MD902's position relative to the FAT for he then told the helicopter pilot that the B737 would be passing down his RHS by about a mile and to go no further E than his present position. However, by this stage, the B737 crew, who had continued watching the helicopter's progress on TCAS, perceived that it was in confliction, unaware – being now on Tower frequency - of the APR's RT exchange with the MD902 flight. Pilot Members reiterated one of the features of TCAS equipment, *viz* the system is designed to resolve only in the vertical plane; information displayed in azimuth being difficult to interpret at short ranges. Crews are expected to attempt to establish visual contact with the intruder ac and other ac in the vicinity when a TA alert is received but not to deviate from an assigned clearance based solely on TA information and to be ready to respond to any subsequent RA warnings should they occur. However, from the B737's cockpit the MD902 was showing on TCAS ahead on a potentially conflicting flight path and, perceiving that traffic was very close to the C/L, the pilot elected to initiate a go-around simultaneously with receiving a TA alert.

From an ATC perspective, civil ATCO Members opined that the provision of a RAS by the APR had been fulfilled and that this type of occurrence should be expected by CAT operators when flying within Class G airspace. Military

ATCO Members took a different viewpoint, believing that controllers providing a RAS should warn pilots when they are unable to achieve standard separation and should limit the service, stating the reason. In this case, one option would have been to hold the B737 flight until the MD902 was well clear of the FAT area before commencing the approach. That said, all Members agreed that, from the geometry shown from the radar recording, the MD902's track had been sufficiently offset from the FAT to provide adequate safe separation but its 'seen' flight path and proximity had been enough to cause concern to the B737 crew who were unable to visually acquire the helicopter traffic. TCAS had only given a TA alert in the B737 as the missed approach was initiated with the MD902 pilot not receiving any alerts. These factors were enough to persuade the Board that this had been a TCAS sighting report and that safety had not been compromised during the encounter.

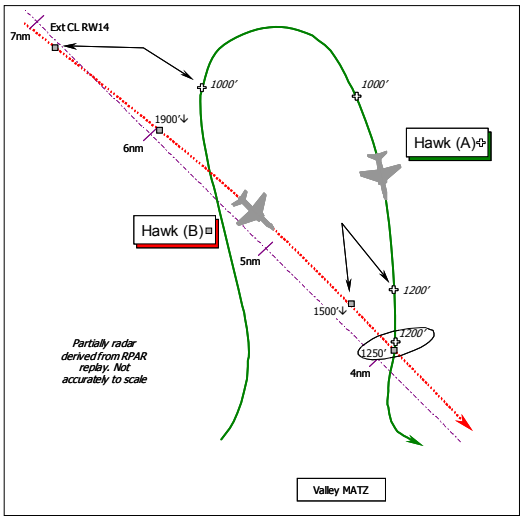
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 148/06

Date/Time:	12 Sep 1045	
Position:	5317N 00437W (4nm FINALS Valley RW14 - elev 37ft)	
Airspace:	Valley MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1(A)	Hawk T Mk1(B)
Operator:	HQ PTC	MoD DPA
Alt/FL:	1000ft	1300ft↓
	QFE (1012mb)	QFE (1012mb)
Weather	VMC CLBC	IMC
Visibility:	10nm	NR
Reported Separation:		
	50ft V/150m H	300ft V/nil H
Recorded Separation:		
	From PAR: 50ft V/nil H @ 1044:54	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HAWK T Mk1 (A), an instructor pilot, reports that he was instructing a student, the PF who was seated in the front seat. Their ac is coloured black and the nose light and HISLs were on. Neither TCAS nor any other form of CWS is fitted. They were inbound to Valley VFR, flying at 1000ft QFE in VMC, some 200ft below a solid layer with scattered cloud 2km away and an in-flight visibility of 10nm. A squawk of A3737 was selected with Mode C on.

Whilst setting up for a straight-in approach, Valley APPROACH (APP) informed them of inbound traffic at 7nm on a PAR approach [actually 7nm SW of the aerodrome] in IMC – Hawk (B). The weather over higher ground to the W (Holyhead Mountain) forced them to make a non-standard final approach, with a few track changes required to avoid small pockets of scattered cloud & showers with a base at 800ft QFE. They attempted to self-position in front of the IFR traffic – Hawk (B) - as they were on a 5nm BASE LEG. Approaching the extended centreline of RW14, they were forced to make a turn away from the centre-line onto a heading of about 020°(M) to avoid some low cloud and then to re-position onto a 'STRAIGHT-IN' FINAL, as the weather had caused them to slightly overshoot the centreline. After they cleared the cloud, his student turned to intercept a 45° BASE LEG from the N side of the extended centreline of RW14. Heading 170°(M) at 165kt and as they were about to turn onto FINALS at about 4½nm, he spotted another black Hawk jet descending out of cloud through about 1000ft QFE slightly nose-down in their immediate vicinity. Taking control of the ac from his student, he commenced a descent from about 900ft agl with a turn to the NW to avoid the other jet which passed 150m away some 50ft above his ac, with a *"medium"* risk of a collision, before it began to climb away. Climbing his jet to the SW, he rejoined the cct for RW14 a few moments later for an approach to land and completed the sortie without further incident.

THE PILOT OF HAWK T Mk1 (B) reports he was the front seat PF inbound to Valley in his black jet with another pilot occupying the rear seat. Both the HISL and landing light were on but neither TCAS nor any other form of CWS is fitted. Whilst flying a PAR to RW14 in IMC and in receipt of a RAS from Valley TALKDOWN they were given traffic information about one 'visual joiner' – Hawk (A) - in their 10 o'clock at 2 miles, 500ft below them, which they *"assumed"* would be heading towards the airfield in VMC below the cloud. Established on the centreline and glidepath as they proceeded down the approach at 140kt it became apparent to him that the visual joiner was not being predictable and that the TALKDOWN controller was confused about the visual joiner's intentions. The next meaningful traffic information given to them was that the other jet – Hawk (A) – was 1nm away and a few hundred feet below. As they passed 1300ft QFE descending on the approach the TALKDOWN controller instructed them to execute a missed approach procedure (M/APP), he thought, which they did. Advancing the throttle he brought his jet into a climbing attitude as, simultaneously, they entered a gap in the cloud where they could see the surface, but not the airfield or its surroundings. As that stage the rear-seat PNF spotted the conflicting traffic – Hawk (A) – less than ½nm away and called it to him. The traffic was seen in their 8:30 – 9 o'clock position about 100-200ft below, heading SW crossing from L – R at 90° to their heading (and thus the runway centreline) with under-

carriage and flaps down. Minimum vertical separation was 300ft as Hawk (A) passed directly beneath with no horizontal separation and with a *"high"* risk of a collision. During the avoiding action M/APP they very quickly re-entered cloud again and the visual joiner disappeared into cloud to the W.

THE VALLEY APPROACH CONTROLLER (APP) reports that the Watchman primary SRE was out of service. He was taking over the APP position when the crew of Hawk (A) called for a visual recovery. The off-going controller informed the crew of Hawk (A) of the position of instrument traffic recovering to Valley, including a Griffin helicopter and Hawk (B). The pilot of Hawk (A) said he would remain below 1500ft QFE over the Bay. Hawk (A) was not identified but was squawking A3737 [Valley visual recovery conspicuity squawk]. The ac he believed to be Hawk (A) came quite close to the helicopter before the crew reported switching to TOWER. He did not update Hawk (A) on the position of Hawk (B) at the time, the latter being on BASE LEG 10nm NW of Valley at 2000ft QFE, as he did not believe it to be a factor, but he then observed Hawk (A) to the NNE of Valley heading about 030° indicating 1000ft Mode C. Calling the ADC, he checked that he had called the instrument traffic to the crew of Hawk (A), which TOWER confirmed he had, but he then observed Hawk (A) turning towards the instrument traffic whereupon he overheard TALKDOWN giving avoiding action to the crew of Hawk (B) against Hawk (A).

THE VALLEY AERODROME CONTROLLER (TOWER) reports just taking over as ADC after a break and was advised that there was a visual straight-in approach at 5 miles – Hawk (A) - and radar traffic at 8 miles - Hawk (B). Whilst waiting for the LONG-FINALS call he noticed that the SSR return on the HI-BRITE ATM for Hawk (A) was still at 5 miles. It was difficult to see a trend as the primary radar was U/S and the SSR track history was turned off. Observing the SSR contact for Hawk (A) move away from the airfield, the pilot advised that he was re-positioning at 5 miles for a straight-in approach. He advised the crew of Hawk (A) of the position of the radar traffic - Hawk (B) – at about 7½nm which was acknowledged. Hawk (A) then carried out an orbit to bring the ac back onto the extended centreline, at this point the two ac were merging on the HI-BRITE. He updated Hawk (A) about the radar traffic once again – Hawk (B) - and (A) called visual. A few seconds later both secondary contacts were on top of each other, it was difficult to make out the Mode C due to the label positions. The pilot of Hawk (A) then advised him that he was breaking off to position to join through INITIALS, while APPROACH informed him that Hawk (B) was breaking off from the PAR to position for a further approach.

THE VALLEY PAR CONTROLLER (TALKDOWN) reports that Hawk (B) was positioned by DIRECTOR for a normal PAR approach from the W to RW14. A normal handover and line-up was accomplished. At about 6½nm he reported visual joining traffic to Hawk (B), which he believed at the time to be 'no factor', as visual recovery traffic squawking A3737 is required to maintain visual separation from instrument traffic. At this point he instructed Hawk (B) to begin a descent for a standard 3° glide-path. At 6nm he called the visual joiner traffic – Hawk (A) - again at L 10'o'clock – 2nm crossing L to R indicating 500 feet below Hawk (B). The visual joining traffic at this time appeared to be 1nm ahead, slightly faster and converging slightly from the L, level at about 1000ft. At 5½nm he called the traffic again, L 10 o'clock - 1nm slightly below – and questioned if the crew were visual? The pilot reported no contact with the visual joiner so he instructed Hawk (B) to climb to 2000ft to avoid the other ac vertically as he did not believe the crew of the joining ac – Hawk (A) - was visual with Hawk (B). At approx 5nm the visual joiner – Hawk (A) - appeared to veer R towards the centreline and climb. At this point the pilot of Hawk (B) reported the visual joiner in sight, which at this point appeared to descend rapidly. He then handed Hawk (B) over to DIRECTOR for a further PAR, remaining on the same frequency.

MIL ACC reports that Hawk (A) was on a visual recovery [VFR] to Valley, initially under a FIS from APP and subsequently an aerodrome control service from TOWER. The Valley TALKDOWN Controller (TALKDOWN) was controlling Hawk (B) on a PAR to RW14 under a RAS.

The crew of Hawk (A) called for recovery at 1038:05, "*APPROACH* [Hawk (A) C/S] *is er, 15 miles south with Golf.*" After speaking to another flight, APP requested that the message be repeated. At 1038:19, Hawk (A) crew said, "*Valley Approach it's* [Hawk (A) C/S] *for a er, VFR join.*" APP replied, "[Hawk (A) C/S] *Valley APPROACH, Valley are runway 14, QFE 1012, Flight Information Service.*" Hawk (A) crew acknowledged with "*Flight information* [Hawk (A) C/S]". APP then passed traffic information to Hawk (A) at 1038:31, about instrument traffic 4nm S Valley – a helicopter - which the crew acknowledged, stating that they were looking and adding at 1038:47 "[Hawk (A) C/S] *will stay at 1500ft over the bay initially and then to TOWER.*" APP acknowledged this information and passed traffic information about Hawk (B) - "[Hawk (A) C/S] *that's copied and there's further instrument traffic South West of Valley, 7 miles, er, downwind in the instrument pattern, descending 2000ft, similar type.*" The crew of Hawk (A) replied "*Roger, we'll stay at 1500ft* [Hawk (A) C/S]." APP called the helicopter again at 1042:01 and 6sec later, Hawk (A) acknowledged the traffic information and changed to TOWER. Hawk (A) crew called on the ADC's

frequency at 1042:23 stating, "*TOWER* [Hawk (A) C/S] *join straight in.*" Whereupon, the ADC issued the clearance, "[Hawk (A) C/S] *Valley TOWER, join straight in runway 14, QFE 1012, 1 in report long finals with intentions.*" Hawk (A) crew acknowledged and agreed to comply. The ADC then issued a clearance for a helicopter to depart. The crew of Hawk (B) checked-in with TALKDOWN at 1042:33, "*Valley Talkdown, good morning* [Hawk (B) C/S] *with you steady heading 120.*" TALKDOWN responded, "[Hawk (B) C/S] *Valley TALKDOWN, identified, readback QFE.*" Whereupon Hawk (B) crew read back the correct QFE. TALKDOWN continued to make all relevant RT and liaison calls for Hawk (B)'s approach. After a liaison call from TALKDOWN, the ADC broadcast to all ac on the TOWER frequency at 1043:21, "*Hawk* [Hawk (B)] *8 miles* [from touchdown] *roll and join.*" At 1043:33, the crew of Hawk (A) informed the ADC "*TOWER* [Hawk (A) C/S] *we'll join at 5 miles final for...runway 14.*" TOWER then requested Hawk (A) crew's intentions, which were to land. The crew of Hawk (A) was advised by TOWER, "*Roger, there's radar traffic* [Hawk (B)] *now at 7 miles, report short finals gear down.*" In reply, Hawk (A) crew reported at 1043:49, "*Roger, at 5 miles, turning inbound and we'll call short finals* [Hawk (A) C/S]."

At 1044:13, TALKDOWN informed Hawk (B), "*Turn right 5 degrees heading 145, 5 and a ½ miles.*" Then at 1044:23, TALKDOWN passed traffic information on Hawk (A), "*Traffic left 10 o'clock, 1 mile, crossing left to right believed to be a visual joiner 5 miles.*" Shortly afterwards TALKDOWN asked, "[Hawk (B) C/S] *are you visual with that traffic?*" Hawk (B) crew replied that they were not visual and that they were IMC. Subsequently, at 1044:38 TALKDOWN issued the instruction, "*4 and a ½ miles, er,* [Hawk (B) C/S] *climb report level 2000ft immediately, traffic 12 o'clock, 1 mile, crossing left to right.*" Some 12sec later Hawk (B) crew reported, "[Hawk (B) C/S] *climbing this time, visual with that traffic just as we got VMC, about..a hundred feet below us, straight underneath.*" TALKDOWN acknowledged this transmission and then continued to pass control instructions regarding the repositioning of Hawk (B) for a further approach.

Simultaneously, with the RT exchanges between TALKDOWN and the crew of Hawk (B), APP was liaising with the ADC on the landline. At 1044:21 APP asked, "*is* [Hawk (A) C/S] *visual with the instrument traffic?*" The ADC replied, "*I've just told him he's not called visual.*" APP acknowledged the ADC's reply and as APP was on the point of passing traffic information to the ADC the latter cut-off the landline call. The traffic information [intended for the ADC] is therefore not recorded on the ADC's position tape. However, from the APP landline tape the controller said, "*He's…in his right 3 o'clock by…half a mile at the moment descending.*" At 1045:12, the ADC advised the crew of Hawk (A) *"..instrument traffic's 3 and a ½ miles.*" Hawk (A) crew then stated, "[Hawk (A) C/S] *roger..was visual with that traffic*", adding "*..breaking it off, in a right turn for initials*", which the ADC acknowledged.

Analysis of video stills from the Valley PAR were used to provide radar data, subsequent investigation revealed a timing error of 1min 15sec so all PAR times in this report have been corrected to synchronise with those RT timings above. All ranges herein are from TOUCHDOWN and height estimates are derived from the y-axis of the PAR *elevation* display for Hawk (A) and by the use of the data block in relation to the 3° glide path for Hawk (B). Displacement L or R from the extended centreline is from the data block for Hawk (B) and estimated from the y-axis of the *azimuth* picture for Hawk (A). At 1042:15 Hawk (B) is 10nm FINALS to RW14 at about 1800ft, 1·3nm R of the centreline, correcting nicely. Hawk (B) is 9·5nm from touchdown at 1042:41; 0·8nm R of centreline correcting nicely, at 1900ft. Hawk (A) begins to 'paint', in elevation only, at 4·7nm at 1000ft. Hawk (B) is 0·4nm R of centreline correcting nicely at 1800ft, 8·5nm from touchdown at 1043:06. Hawk (A) begins to 'paint' on azimuth at 4·3nm, 0·7nm R of centreline, crossing rapidly from R - L at 1200ft. At 1043:17, Hawk (B) is 0·3nm R of centreline, correcting slowly at 1850ft, 8nm from touchdown. Hawk (A) is 0·3nm R of centreline, crossing R - L at 1000ft 4·7nm from touchdown. Hawk (A) passes through (B)'s 12 o'clock 2·6nm away at 1043:26; Hawk (A) is 5·1nm from touchdown 0·2nm R of centreline at 1200ft. Hawk (B) is 7·7nm from touchdown, 0·2nm R of the centreline correcting slowly at 1950ft. Having passed through the centreline, Hawk (A) then commences a R turn. During the turn Hawk (A) is 'standing still' in relation to Hawk (B), the lateral separation between the ac reducing to 1nm at 1044:14. Hawk (B) is 5·6nm from touchdown, 0·1nm L of centreline at 1600ft. Hawk (A) is 5·2nm, 0·9nm L of centreline at 1000ft. Hawk (A) is now converging slowly from the L. Hawk (A) is 0·3nm L of centreline converging steadily, at 1100ft, 4·3nm from touchdown, at 1044:43. Hawk (B) is at 1300ft, 0·1nm L of the centreline correcting slowly, 4·5nm from touchdown. Hawk (A) is in Hawk (B)'s L 11 o'clock, 0·3nm. At 1044:53 Hawk (B) is at 4·2nm, 0·1nm L of centreline correcting slowly at 1200ft. Hawk (A) is at 4.1nm, 0·1nm L of centreline at 1200ft. Hawk (A) is in Hawk (B)'s 12 o'clock, 0·1nm at the same level. The contacts merge in azimuth at 1044:54 - both ac are 4·1nm from touchdown, 0·1nm L of centreline; Hawk (B) is at 1230ft correcting slowly towards the centreline, Hawk (A) has begun a rapid descent and is passing 1180ft, whilst converging more quickly towards the centreline. Both ac change direction, Hawk (B) turns R and begins to climb, reaching 1485ft at 1045:00, 0·1nm R of centreline at 4nm from touchdown. Hawk (A) turns L, parallel to and 0·1nm to the left of the extended centreline

and levels off at 800ft. Thereafter the ac diverge as Hawk (B) continues to climb away. The CPA during the incident was 50ft vertical separation with no horizontal separation evident.

The TALKDOWN Controller fulfilled his responsibilities for the passing of traffic information to aircraft on PAR in accordance with JSP 552, Section 405.135.20. He correctly stated that the ac was believed to be a visual joiner and passed accurate traffic information. APP was providing the crew of Hawk (A) with a FIS and had correctly passed traffic information about Hawk (B) to the crew of Hawk (A) to enable them to maintain VFR separation. The reported weather was marginal for VFR recoveries but may not reflect airborne conditions. The TALKDOWN controller could have expected the crew of Hawk (A) to remain clear of the instrument traffic because the Valley FOB states that aircraft on a VFR recovery, "*will be advised of relevant IFR traffic from which they are to maintain VFR separation*." The ADC also provided accurate and timely traffic information and updates to the crew of Hawk (A) regarding the range from touchdown of the IFR Hawk (B). When the situation became more serious, the TALKDOWN Controller gave a positive control instruction in an attempt to avoid a collision. JSP 552, Section 405.135.20 states that when there is a collision risk in both azimuth and elevation, "*Advice on suitable action for collision avoidance is to be passed to the pilot…*" Despite the guidance contained within the FOB the QFI of Hawk (A) states in his report that, "*I expressed my concern that the other aircraft was operating IMC at the time, and that we could not have possibly done more to avoid a collision given the information we had.*" When ADC stated that there was radar traffic at 7 miles the instructor pilot of Hawk (A) stated in a supplementary report filed to his unit:

" *at this time, we were at approximately 5·5 nm, 1000ft QFE, and were flying at a speed of about 180kt (roughly 40kt faster than the reported traffic). We were also pointed at the runway and were operating below the base of cloud in VMC, so I told the student to continue setting up for the approach, as all the information led me to believe that we were ahead of and flying faster than the IFR traffic. We made a slight turn to avoid an area of showers and to line up with the extended centreline of the runway. However, we remained pointed in the direction of the threshold for most of the turn, inside of the last reported DME of the IFR traffic, and with a substantially greater forward speed. The turn took roughly 20 seconds to execute.*"

This description of events differs significantly from that seen on radar and suggests that the crew of Hawk (A) may have lost situational awareness regarding their position relative to the radar traffic and therefore inadvertently reduced the separation between the subject ac.

MIL ACC Note: A MET SPECI issued at 1045 – the time of the Airprox - shows a prevailing visibility of 9km with a minimum visibility of 5000m to the S of the airfield. Moderate rain and drizzle were also present with FEW @ 900ft and scattered clouds at 1200ft. RAF Valley were using RW14 and operating with "carry fuel for radar" as the fuel state.

UKAB Note (1): Another Valley SPECI - the 1050UTC – was issued at 1056 and gave a s/w of 180/14kt; visibility 9km – min visibility 4000m to the W in rain & drizzle; FEW @900ft, SCT@ 1200ft and BKN @ 2100ft.

HAWK T Mk1 (A) PILOT'S UNIT conducted a very thorough and comprehensive investigation into this Airprox (F765B), concluding that this Airprox highlights the insidious way in which Human Factors can affect a routine procedure. The mixing of IFR and VFR traffic is a necessity for 4 FTS, and, as with all VFR operations, relies on VFR traffic maintaining safe separation. In this instance, a number of Human Factors combined to compromise that safe separation. It was recommended that:

a. All 4 FTS staff and student aircrew are re-briefed on the importance of VFR traffic maintaining VFR separation from IFR traffic; and

b. Undertake formal Human Factors (HF) training as part of their groundschool at 4 FTS, or at the earliest opportunity thereafter.

It was observed that the intensity of 4 FTS operations necessitates the mixing of IFR and VFR traffic. Accordingly, ATC are faced commonly with having to trust the pilots of VFR traffic to take safe separation. In this instance, the PAR controller is to be applauded for recognising the severity of the developing situation and initiating the only avoiding action option available to him.

The Squadron Commander added that **c**learly the instructor pilot of Hawk (A) suffered a lack of SA that led him to think that he was clear of radar traffic. This was exacerbated by focussing inappropriately on achieving the

objectives of the sortie, despite the weather being at best marginal for a visual approach. With hindsight the build up to this incident was well telegraphed: poor and deteriorating weather, IMC radar traffic approaching finals, and task fixation by the instructor pilot. However, at the time these clear warning signs were missed. The main lesson is clear – maintain SA and, if in doubt, ask.

The Station Commander concluded that the instructor pilot was focussed on the achievement of the task in such a way that his SA broke down at a critical time in marginal weather conditions. This incident provides a valuable reminder for all aircrew of the dangers associated with task fixation.

HAWK T Mk1 (B) PILOT'S UNIT had nothing further to add.

HQ PTC comments that the final stage of this occurrence was clearly captured on the Valley PAR recording. The Unit has conducted a Flight Safety Investigation (F765B) and concluded that Human Factors was the main causal factor rather than a 'systemic' problem. This Airprox highlights the difficulties of maintaining situational awareness, whilst recovering VFR to an airfield in deteriorating weather trying to teach a little used 'straight-in' approach.

MOD DPA had no further comments to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that the prevailing weather during the period of this Airprox – 4000m in rain & drizzle with FEW @ 900ft, SCT @ 1200ft - had clearly caused the instructor pilot of Hawk (A) some difficulties as he was recovering back to the aerodrome for his visual straight–in approach. The instructor pilot's laudably frank and honest account had revealed that his student had to manoeuvre the jet to a significant degree around weather. These manoeuvres were shown on the radar recording which illustrated that Hawk (A)'s visual straight-in approach to land was not a standard pattern by any means. Members questioned the wisdom of visual recoveries in this weather, which although some thought marginal was still technically Colour Code GREEN, but it was observed that colour codes cannot 'paint the whole picture'. Clearly Hawk (A) instructor pilot's unit had considered the extant weather to be "at best marginal". Pilot Members opined that the weather was evidently not suitable for mixing VFR and IFR recoveries where the visual joiner operating under VFR was entirely responsible for sighting and remaining clear of the instrument traffic which, in this instance he could not see until the last moment. A wide-ranging debate also encompassed the level of flying supervision and whether the duty pilot should have been more proactive. Clearly at this major flying training aerodrome the pressure to complete the training task was significant - as candidly noted by the Station. However, an experienced fast-jet pilot Member detected an air of "press-on-regardless" in this scenario, which is insidious and must be guarded against at all costs. Therefore, whilst noting the unit had been very frank with their comments, some Members suggested that the Station should have exercised more positive authority over visual recoveries in the apparently testing weather that pertained here. Whilst this was clearly a matter for the Command, the Members agreed that QFIs should be quicker to say when the weather is no longer suitable for the training task. The unit's recommendation regarding HF training was evidently well founded and the Board was encouraged by remarks from the HQ STC Member that tri-service HF training policy has been mandated for military aircrew by DASC, which is being progressed as a matter of priority.

An experienced military ATC Advisor believed there was also a lesson here for ATC who should not allow the close mixing of VFR and IFR traffic in these weather conditions. Here the TALKDOWN controller was reliant on the VFR traffic remaining clear of ac under his control but the application of a RAS seemed somewhat problematic. The naval Member contended that, in his view, both APP and TALKDOWN should have taken action at an earlier stage when it became apparent that Hawk (A) was not lining up for the visual straight-in approach as he might have been expected to do. The Member opined that the controllers should not have allowed separation to be eroded as much as it was. However, it was pointed out that APP had only just taken over the position and was actively engaged with TOWER to find out if the crew of (A) was visual with the PAR traffic so he was clearly alert to the situation and taking positive steps to resolve it. It was stressed that PAR controllers will expect to see VFR cct traffic passing relatively close to IFR traffic on their screens in the final stages of an approach and knowing just when to issue avoiding action on PAR based on observed contacts which are known to be recovering visually can be a difficult judgement call. The DASC Advisor questioned what the SUP was doing at this stage, which was not readily

apparent, and it was in situations such as this where an experienced pro-active ATC SUPERVISOR can make a significant difference. This should not be viewed as criticism of any inaction, more a matter of highlighting the fine judgement required in such circumstances - clearly there has to be a significant level of reliance on VFR pilots to fulfil their responsibilities and stay clear of IFR traffic which is essential in this mixed VFR/IFR environment, a point clearly appreciated by the Station who have taken action to ensure that this is reinforced to aircrew. The PTC Member explained that the visual straight-in was a little-used procedure and in his view the instructor pilot 'lost the air picture' and erroneously thought that he could retrieve the situation and complete the approach whilst remaining clear of the IFR traffic. Whilst the crew of Hawk (A) had clearly been advised about Hawk (B) inbound to the aerodrome in the instrument pattern by both APP and then by TOWER one minute after they called to join, fast–jet pilot Members agreed that the situational awareness of Hawk (A)'s instructor pilot had apparently become confused by his student's manoeuvres to avoid cloud. Although himself aware of Hawk (B) on recovery, Members agreed his appreciation of how close he was to the other jet was wrong. It was evident to the Board from the recorded PAR data that the outward turn away from the aerodrome executed by Hawk (A) around weather had quickly eroded any existing separation with the inbound Hawk (B) that from the speeds reported was only 25kt slower down the glidepath, resulting in a conflict at 4nm FINALS on the centreline. The STC pilot Member was concerned when the crew of Hawk (A), advised when at 5 miles by TOWER that there was radar traffic [Hawk (B)] at 7 miles from touchdown and only 2nm astern, merely turned inbound. Generally, whilst faster VFR ac might be able to get out of the way of slower IFR traffic, the very experienced fast jet QFI Member questioned the wisdom of trying to fit in ahead of an ac that could not be seen in cloud with only 2nm separation reported and known to be descending on the final approach from above and astern. The Member postulated that the instructor pilot could not have appreciated how wide his student's turn had been if he thought his student could get into FINALS ahead of Hawk (B) without it all getting very close indeed – which the radar recording subsequently evinced it did. Moreover, as the instructor pilot could not see Hawk (B), which was in cloud until just before the Airprox occurred, Hawk (A)'s crew could only rely on the updates of Hawk (B)'s distance from touchdown broadcast by TOWER and judging the separation accurately would have been quite problematic. In the Board's view, the crew of Hawk (B) whilst inbound on their IFR recovery to RW14 in cloud had little influence on this situation initially until the final stages of the encounter when TALKDOWN instructed them to execute an avoiding action climb. Albeit that the PF of Hawk (B) had inferred in his report that he was uneasy about what Hawk (A) was doing from TALKDOWN's transmissions. Nevertheless, it was clear to the Board from the foregoing that the crux of this Airprox was that the instructor pilot of Hawk (A), whilst on a visual recovery did not maintain safe separation and flew into conflict with the IFR inbound Hawk (B) on an instrument approach, which Members concluded unanimously was the fundamental cause.

Clearly the Station had carried out a very thorough review subsequent to this Airprox, which had led to some forthright conclusions and it was evident that the recommendations made by the unit would be helpful in reducing the potential for a recurrence. However, in assessing the inherent risk the Board agreed unanimously this was indeed a close call. Whilst it seemed that the avoiding action instructions issued by TALKDOWN were promptly executed by the PF of Hawk (B), it would appear from the instructor pilot's account from Hawk (A) that he sighted Hawk (B) just before this avoiding action climb was executed as he states he sighted the other jet descending out of cloud slightly nose-down in their immediate vicinity just before he took control from his student. He then took avoiding action himself by descending rapidly below Hawk (B) before it began to climb away, which was indeed replicated by the PAR recording. From the other cockpit the rear-seat PNF in Hawk (B) first saw the other jet out to starboard, which was after the respective tracks had crossed and Hawk (A) had already under flown the instrument traffic and just as they started to reverse their descent into a climb. The recorded precision radar data from the RPAR showed that the contacts had merged in azimuth with 50ft of vertical separation. Therefore, with only the crew of Hawk (A) sighted before the conflict and the crew of the other ac in cloud and relying on the avoiding action instructions from TALKDOWN, the Board was convinced that an actual risk of collision had certainly existed in the close quarters situation conscientiously reported here.

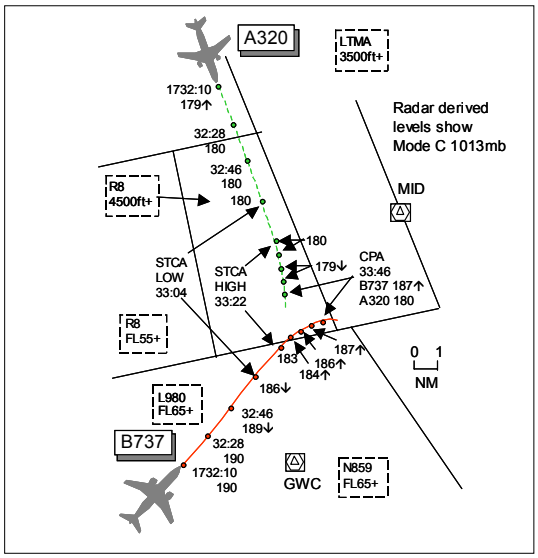
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The instructor pilot of Hawk (A) on a visual recovery did not maintain safe separation and flew into conflict with the IFR inbound Hawk (B) on an instrument approach.

Degree of Risk: A.

AIRPROX REPORT NO 149/06

Date/Time:	5 Sep 1734	
Position:	5059N 00045W (7nm SW MID)	
Airspace:	N859/L980	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A320	B737-800
Operator:	CAT	CAT
Alt/FL:	FL180	FL190↓
Weather	VMC CLNC	NK
Visibility:	50km	NK
Reported Separation:		
	200ft V/5nm H	NR
Recorded Separation:		
	700ft V/2·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports that on handover to London on 135·325MHz they were initially cleared to climb from FL170 to FL220 [UKAB Note FL210] but this was immediately changed to stop climb at FL180. After levelling at FL180 heading 165° at 300kt, traffic was seen on TCAS approximately 15° R of their ac's nose at range 10nm, 1000ft above and descending. This traffic was acquired visually crossing R to L before a TCAS TA alert was received at range 6nm. Almost immediately London issued an *"avoiding action turn onto heading 260°* which was followed by a TCAS RA *"descend, descend now"*. The A/P was disengaged and the ac was descended 150ft at which point TCAS gave *"monitor v/s"* and then *"clear of conflict"*. During this manoeuvre the other ac's belly was seen as it turned to avoid them. Minimum separation was judged to be 200ft and 5nm and he assessed the risk as medium.

THE B737 PILOT provided a brief report stating that when approximately 22nm S of VATON descending from FL190 to FL180 they received a TCAS TA alert. ATC asked them to make a climbing R turn onto heading 175° [UKAB Note 195°] and FL190. During this manoeuvre an RA warning was received and the ac was levelled-off at FL192 before they were cleared to resume their own navigation back to VATON and to descend to FL180. They did not see the other ac visually and did not assess the risk.

THE LTCC CAPITAL SC reported that training was in progress. The trainee gave S18 climb clearance for the A320 to FL180 and then descended the B737 to FL180. The B737 was then given an avoiding action turn and climb back to FL190 by the trainee whilst S18 gave the A320 an avoiding action turn.

THE LACC SECTOR18 TACTICAL (S18T) reports the A320 flight called climbing to FL170. His Planner obtained FL180 from the Capital Sector, as there was a LOREL arrival via AVANT - the subject B737, at FL190 - so he then climbed the A320 to FL180. A couple of minutes later his Planner noticed the B737 had vacated FL190 descending so he turned the A320 hard R heading 260° followed by TI. The A320 crew advised they had received a TCAS RA, which he acknowledged, before informing the crew that they were clear of traffic. The A320 flight reported that they were returning back to FL180.

THE LACC SECTOR18 PLANNER (S18P) reports that when the A320 came into range at WOD climbing to FL170, he called Capital Sector requesting a higher level. Seeing that there were LOREL arrivals on S19, he negotiated FL180 only and when the A320 crew called on frequency the S18T climbed the flight to FL180. A few minutes later he spotted the LOREL inbound ac, the subject B737, descending out of FL189. He cautioned the S18T who gave avoiding action to the A320. He immediately phoned the Capital Sector to warn them and they answered confirming that they were climbing and avoiding with the B737. The A320 crew subsequently reported a TCAS RA.

AIRPROX REPORT No 149/06

ATSI reports that at the time of the Airprox, the B737 was in communication with the TC Capital Sector whilst the A320 was in contact with the LACC S18T controller. The Capital SC described the workload as having been busy and the traffic situation complex but, at the time of the Airprox, both had reduced to a much quieter level. The Capital Sector was operating with a mentor and trainee in position.

The B737 flight contacted the Capital SC at 1732:10, and reported level at FL190. The ac was 5nm W of Goodwood at this time with the subject A320 in its 10 o'clock at a range of 17nm, just levelling at FL180. The trainee SC acknowledged the call and at 1732:25, instructed the B737 crew to descend to FL180, which they correctly read back. Analysis of the radar recording shows that FL180 was set as the Selected Flight Level by the crew of the B737 at 1732:46, when the A320 was in its 10 o'clock position at 11·7nm, the latter still maintaining FL180.

STCA activated 'low severity' at 1733:04, and at the same time the SC transmitted *"B737 c/s avoiding action turn right heading one niner five"*. The crew read this back and then the SC instructed them to climb to FL190. At the same time, the S18T transmitted to the crew of the A320 *"A320 c/s avoiding action turn right now heading two six zero degrees*". STCA changed to 'high severity' at 1733:22, when the A320 was in the 10 o'clock position of the B737 at a range of 5·1nm and 300ft below. The effect of the avoiding actions turns started to take effect with the two ac passing port-to-port, separation reducing to 2·2nm and 700ft at 1733:46, when STCA ceased. Subsequently, both crews reported having received TCAS RAs.

The mentor explained that he was one of three controllers who had been training the trainee SC. The trainee was advanced in his training and his Board had been booked for the following watch cycle, this being an extension Board to his existing certificate of competence. Prior to the incident the trainee had handled a busy and complex session, lasting about an hour, without experiencing any difficulty. Even though the trainee had coped well the mentor was still monitoring closely and making use of the 'mentor box'.

The mentor advised that the A320 was a Luton outbound routeing via CPT, and such traffic works TC NW Departures before being transferred to TC South. Once clear of their traffic the flight would have been transferred to LACC Sector 18. Given the performance of many ac following this route it is commonplace for S18 to coordinate with TC Capital for climb above the standard level of FL170. At 1729:40, the S18P called and requested FL180 from the Capital Sector. The trainee agreed this but he did not, as is standard practice, place the relevant strip, provided for such flights, into the active strip bay.

MATS Part 1, Appendix D, para 2.3 states: '*The flight data display shall be updated immediately to reflect the current traffic and control situation whenever necessary. In order to ensure that all relevant air traffic control actions are reflected in the data display, it is essential that agreements made during controller to controller communication, whether this be effected by the use of recorded telephone lines or intercom systems or by 'face to face' verbal coordination, are recorded on the flight data display*'. The mentor advised that not all controllers on the watch follow this practice although he did. He could not say for certain what the other trainee's mentors had been teaching. He advised that it was his practice to place strips on such flights, appropriately marked with the coordinated level, into the strip display and retain them there until the ac was clear of conflictions and/or above FL210. Use is made of the long-range radar display to locate the positions of traffic inbound to Luton and Stansted traffic when such requests are received.

The trainee had agreed that Sector 18 could climb the A320 to FL180 whilst within TC Capital's airspace: however, he relied on memory rather than an accurate strip display to remind him of this fact. Unfortunately, the mentor had not noticed this omission at the time. The error was then compounded when, some 45sec later, the trainee instructed the B737 to descend from FL190 to FL180 putting it into direct confliction with the converging A320. Both mentor and trainee simultaneously spotted the confliction and the trainee passed avoiding action. This happened at around the time STCA activated.

The telephone line from Sector 18 rang and the following exchange took place: (Capital) "*It's all right I'm sorting it*", (S18) "*You going right*", (Capital) "*Yeah*", (S18) "*We're going right*". The mentor believed that the trainee was handling the situation well and so did not intervene but closely monitored the trainee. When he passed avoiding action he used the words 'avoiding action' but did not pass any TI. The mentor was aware of this and advised that had he been in the position he would like to have thought that he would have done so. The trainee was fully debriefed after the incident. In summary, the mentor stated that he believed a recurrence would be avoided if all controllers made use of the strips provided and placed them in the flight data display.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members sympathised with the Capital mentor's situation. The trainee was a validated controller, albeit on another sector, and was due to undertake an extension Board on the Capital Sector during the next watch cycle. Also, having just handled a busy and complex traffic session on the Sector immediately prior to the Airprox, it was understandable that the mentor may have been lulled into a false sense of security by the trainee's previous good performance. It appeared that the mentor had 'taken his eye off the ball' as he had then missed two significant events – the trainee agreed coordination that S18 could climb the A320 to FL180 in their Sector but did not use the appropriate fps as an 'aide memoir' and secondly he then descended the B737 to the same level. However, as the ultimate responsibility for the Sector remains with the mentor, Members agreed that he had allowed his trainee to descend the B737 into conflict with the A320 and this had caused the Airprox.

Members commended the good TRM shown by the LACC S18T and P controllers who noticed the B737's descent through FL190 prior to STCA activating and gave an avoiding action R turn to the A320 flight. STCA had alerted the Capital mentor and trainee to the situation and the trainee issued an avoiding action R turn and climb back to FL190. The B737 crew had received a TCAS TA prior to the ATC avoidance instructions and an RA climb command ensued - complementary to the ATC avoidance climb – which was followed. The A320 crew had earlier seen the approaching B737 on TCAS and visually acquired it about 10nm away as standard vertical separation was lost. Almost simultaneously with a TA alert, ATC gave the A320 crew an avoiding action R turn before an RA 'descend' was received and the TCAS guidance was followed. The radar recording shows the B737 crew arresting their descent at FL183 before executing a rapid climb, crossing through the A320's 12 o'clock just less than 5nm away with both ac in a R turn and the A320 commencing a descent. Taking all of these elements into account, the Board were able to conclude that the combined actions taken by all parties had quickly and effectively removed any risk of collision during this incident.

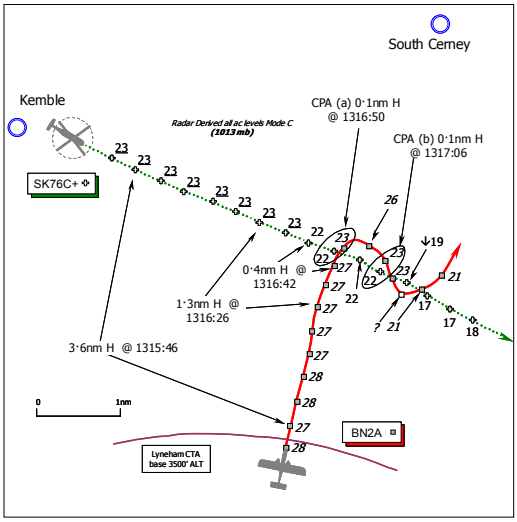
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC Capital mentor allowed his trainee to descend the B737 into conflict with the A320.

Degree of Risk: C.

AIRPROX REPORT NO 150/06

Date/Time:	29 Sep 1317	
Position:	5139N 00157W (4nm ESE of Kemble)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Sikorsky SK76C+	BN2A Islander
Operator:	Civ Exec	Civ Comm
Alt/FL:	2000ft	1600ft
	(QNH 1003mb)	(QFE 985mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	30km	5nm+
Reported Separation:		
	Nil V/nil H	NR
Recorded Separation:		
	100ft V/0·1nm (200yd) H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SIKORSKY SK76C+ PILOT reports that his helicopter was in transit to Blackbushe crewed with two pilots, whilst in receipt of a RIS from Lyneham ZONE on 123·4MHz. A squawk of A4521 was selected with Mode C: TCAS is fitted. Heading 115°(M), passing a position 110° Kemble 3nm at 135kt in a level cruise at 2000ft QNH (1003mb) in VMC, they were aware of an Islander in their 2 o'clock also talking to Lyneham and displayed on TCAS 500ft above their altitude. Flying about 200ft clear below cloud with an in-flight visibility of 30km and in sight of the surface, the Islander was in cloud and not visible. TCAS then enunciated a TA, alerting them that the Islander was descending. Brief visual contact was established with the Islander at 12 o'clock about 200ft above them as the aeroplane crossed 100m ahead of his helicopter from R - L. To avoid the Islander he descended his Sikorsky rapidly, at 2000-2500ft/min, but TCAS still indicated the aeroplane was at the same level as it apparently turned towards them and indicated the same location also in a rapid descent with no lateral separation indicated and a *"high"* risk of a collision.

He had been very concerned and stressed he had manoeuvred his ac by descending very vigorously. In his view, for the Islander crew to have descended through cloud in IMC when in the vicinity of another ac was inappropriate and endangered both ac.

THE BRITTEN-NORMAN BN-2 ISLANDER PILOT provided a very comprehensive account reporting that he was delivering the ac to South Cerney following maintenance at Bournemouth and had been handed over to Lyneham ZONE on 123·4MHz from Boscombe RADAR who had previously been providing a RAS whilst flying in IMC at 3000ft QNH. Lyneham issued a squawk and cleared him through their Class D CTR, VFR, at 2500ft Lyneham QFE (985mb). After descending to 2500ft he was still in IMC so requested a lower height. ZONE gave him 2000ft QFE that put him in VMC. Whilst still in transit through the Lyneham CTR he was advised of conflicting traffic passing L-R at 1500ft, he thought 6nm ahead – the SK76 – whose crew was also on frequency and receiving a RIS - although he did not know if they were flying on QNH or Lyneham QFE. [UKAB Note (1): The SK76 was actually reported at a range of 5nm as "*..indicating 500ft below..*" therefore on Mode C indications this was the same displayed pressure reference.]

As he came out of the CTR heading 010°(M) at 120kt, underneath the CTA he entered a bank of cloud and asked about the progress of the other ac as he was nearing his destination. Lyneham told him that it was passing by and could he remain at 2000ft QFE for now. He maintained 2000ft QFE for a further couple of minutes and entered a large hole in the cloudbank with the lakes 3nm SW of South Cerney clearly visible. He could see that at his level he would re-enter cloud overhead South Cerney so he decided to descend where he was until he had better lateral visibility. Announcing on RT that he intended to descend overhead the lakes in a right hand orbit, he was sure that the other ac would have passed by now but made this call just to let Lyneham and the other pilot know. With no response from either he considered that it was safe to descend. At about 1600ft Lyneham QFE [that would equate to about 2440ft displayed Mode C on 1013mb] he heard what he assumed was the SK76 pilot announce in fairly

strong language that another ac - that he assumed correctly to be his Islander - had just fallen out of the sky on his head - or words to that effect. He looked to his R and saw a large helicopter travelling at speed away from him to the R and slightly behind his track. The helicopter appeared to be 1-200 ft below him and about ½nm away. No avoiding action was taken as the "threat had passed" and he did not assess the risk.

The SK76 pilot said he had received a TCAS alert and Lyneham ZONE attempted to establish whether or not he wanted to file an Airprox. Whilst unable at the time to get a word in on the RT, he considered it would be more appropriate to wait until he had landed and call Lyneham ATC on the telephone. In the meantime he made note of the time/height etc. on his knee pad so that he could give as accurate a report as possible. He subsequently spoke to a controller at Lyneham and gave his name and phone number to him for forwarding to the SK76 pilot, but he did not hear from him.

Commercially rated and holding a current IR, he added that he did not see the Airprox as the SK76 was at least ½nm away when he first saw the helicopter. Since he was in a right hand orbit it would appear that the SK76 came from under his left wing across his track; he was therefore unsighted at the time. If he was just under the cloud base at the time it may well have appeared to the other pilot that he was falling out of the sky since he would most likely not have been able to see the hole in the cloud within which he was descending from that angle. He was in Class G airspace at the time and was taking every precaution not to come into conflict with the helicopter. He had arrived at his destination, was visual with the ground, clear of cloud and beginning his descent to land. He had continued with a RIS even though this was not obligatory and had announced his intentions before descending. He was also still 100ft above his last reported height and approaching from the helicopter's R when he reported the Airprox.

UKAB Note (2): Meteorological Office Archive data gives the 1250UTC Lyneham Weather as: surface wind 170°/ 5kt; Visibility: >10km in rain showers; Cloud: FEW @ 1500ft; SCT @ 2000ft; BKN @ 3000ft; QNH1002mb. CC: WHITE. TEMPO 6000m in rain showers; SCT @ 1200ft; CC: GREEN. The COTSWOLD RPS for 1300-1400UTC was 997mb.

THE LYNEHAM ZONE CONTROLLER reports that he was acting as Mentor to an inexperienced controller under training who had worked the Islander through the Lyneham CTR NE bound toward South Cerney at 2000ft Lyneham QFE (985mb) squawking A4520. The SK76 crew free-called ZONE overhead Kemble, requesting a RIS and was instructed to squawk A4521. Meanwhile, traffic information was passed to the Islander crew on the SK76, indicating 500ft below them. After the SK76 was identified, the flight was placed under a RIS at 2000ft COTSWOLD RPS (997mb) and the crew passed traffic information on the Islander to which they responded that the other aircraft was on TCAS before they reported visual contact. The Islander pilot then requested a descent into South Cerney and was told to maintain his altitude due to traffic – the SK76 - 500ft below him, which he had not reported visual with. Further traffic information was passed and the Islander pilot elected to orbit 3nm to the S of South Cerney. Squawks from both these ac merged and it was not possible to see the squawk or Mode C levels on either. The Islander reported VMC and descending, which was acknowledged and then the SK76 informed ZONE that the Islander had descended through his level and, in the SK76 pilot's opinion, had not been VMC. At this point the Islander's squawk became apparent indicating 1600ft Mode C.

MIL ATC OPS reports that a student/mentor team was manning Lyneham ZONE and was controlling the SK76 inbound to Blackbushe under a RIS. ZONE was also working the Islander routeing from Bournemouth to South Cerney under a RIS. The Islander pilot called ZONE at 1309:29, "*Lyneham ZONE* [C/S] *with you squawking 4620.*" ZONE replied, "*Islander* [C/S] *Lyneham identified* (unreadable) *limited radar performance, fly at 2500ft Lyneham QFE 985.*" The unreadable portion was the application of service [a RIS]. The Islander crew agreed to the height and read-back the correct QFE. At 1309:53, ZONE queried of the Islander crew, "*do you require an IFR or VFR crossing of Lyneham controlled airspace?*" If the type of service was RAS then the crossing would always be IFR. Therefore, this would suggest that RIS was the agreed service because the type of crossing required clarification. A VFR crossing was requested by the Islander crew and ZONE issued the clearance, "*cleared…VFR crossing 2500 feet 985.*" The Islander crew read-back the clearance correctly. For the next 2min ZONE was busy with 2 unrelated flights that free-called. After a brief exchange of administrative RT between ZONE and the Islander pilot at 1313:40, the crew requested a "…*descent to maintain VMC.*" ZONE replied, "…*what..height do you require?*" Whereupon the Islander crew responded "…*2000 feet should do it….*" ZONE then stated, "[Islander C/S]*..descend to 2000ft* [QFE] *approved and recycle squawk 4520.*" The Islander crew read-back correctly, "*2000ft and 4520* [Islander C/S]." The SK76 crew made their initial call to ZONE at 1314:10. ZONE requested the flight details which were, "*SK76 helicopter, 2 crew on board…back to Blackbushe. We're coming up to the Kemble*

overhead, talking to them on the other box and wonder if you could offer a radar information service, track will remain clear of CAS." ZONE allocated a squawk of A4521, which was correctly read-back by the crew before ZONE asked at 1314:33, "…*request your transit altitude?*" The SK76 crew answered, "*currently maintaining 2000ft.…*". At 1315:13, ZONE advised the Islander pilot *"…leaving CAS, radar information service, traffic left 11 o'clock - 5 miles* [the SK76] *slow moving, crossing left to right indicating 500ft below.*" The Islander pilot read-back the radar service, "[Islander C/S] *radar information.*" At 1315:27, ZONE advised the SK76 crew that their flight was *"..identified radar information*", which was acknowledged. ZONE passed traffic information about the Islander to the SK76 crew at 1315:36, "..*traffic right 1 o'clock - 4 miles crossing right to left indicating 500ft above.*" Whereupon the SK76 C/S crew replied that they were "*TCAS looking* [C/S]". ZONE then made an unintelligible transmission before passing the COTSWOLD RPS (997mb) to the SK76 crew, which was read back correctly. [UKAB Note (3): From the SK76 pilot's report it seems that the crew did not reset their altimeter to the COTSWOLD RPS (997mb) and were probably flying with 1003mb set at the time of the Airprox. The Lyneham QNH was 1002mb]. Shortly thereafter, at 1316:20, the Islander pilot stated that "[C/S]..*needs to come down to 1500ft now erm how's that traffic looking for me?*" ZONE replied at 1316:27, "[Islander C/S] *maintain 2500ft this time traffic* [the SK76] *now just crossing 12 o'clock, - 1 and a half miles crossing left to right 5 hun. 4 hundred feet below.*" In fact, the Islander had already descended to 2000ft Lyneham QFE (985mb) which would have been about 360ft above the SK76 if the latter had been flying at an altitude of 2000ft with reference to the COTSWOLD RPS of 997mb. The SK76 crew interjected, "[C/S] *visual*", which ZONE acknowledged. The Islander pilot then stated "..*I'm going to orbit here for a second*", which ZONE acknowledged before the Islander pilot added at 1316:48, "..*maintaining this position to descend to 1500ft.*" ZONE replied, "[Islander C/S] *roger surface wind at Lyneham 160-8 knots*" and added "..*report changing to South Cerney.*" At 1317:20, the SK76 crew asked ZONE "*Lyneham..do you have the traffic in my vicinity.*" ZONE replied, "..*affirm, he's under my control*." Whereupon the SK76 crew then stated "…*you've just allowed him to descend..straight through our level whilst he was in cloud and I'm not happy with that.*" The ZONE Mentor replied, "…*negative we er asked him to maintain until he was VMC.*" The SK76 crew responded, "*well he wasn't (unreadable)* [we?] *did a rapid descent to 1600ft to avoid on TCAS and we were eh with no height separation and no lateral separation on TCAS that was good.*" ZONE requested at 1317:58, "[SK76 C/S] *do you intend to file.*" The SK76 crew answered, "*I'll leave that up to you",* before asking who and where the aeroplane was from. ZONE did not answer before at 1318:56, the Islander crew reported, "[C/S]..*that's us in sight now and frequency change 129·9.*" ZONE replied, "…*roger, er, squawk 7000, good day.*"

Analysis of the Clee Hill Radar recording at 1315:07, shows the SK76 overhead Kemble indicating 2300ft Mode C, tracking 120° - it maintains this track throughout the incident. The Islander is shown in the SK76's R 2 o'clock - 6nm, indicating 2800ft Mode C tracking 010°. By 1315:36 the Islander had closed to a range of 4·5nm still indicating 2800ft Mode C before at 1315:46, it indicates a descent to 2700ft Mode C, whilst in the SK76's R 2 o'clock - 3.6nm. The Islander returns to 2800ft Mode C at 1315:54, when it is in the SK76's R 2 o'clock - 3nm. After one more sweep indicating 2800ft Mode C some 2·7nm away, once again the Islander indicates a descent to 2700ft Mode C at 1316:11, the SK76 maintaining 2300ft Mode C with the Islander in its R 2 o'clock - 2·2nm. Both ac maintain track and indicated level until 1316:42 when the Islander has commenced a R turn and is passing through 015°. When the Islander is passing through the SK76's 12 o'clock - 0·4nm, the SK76 indicates a descent to 2200ft Mode C. On the next radar update at 1316:50, the Islander is turning R and is indicating a descent to 2300ft Mode C; the SK76 is still indicating 2200ft Mode C with the Islander in its left 11 o'clock - 0·1nm at CPA (a). The Islander continues to turn and is passing through 090° at 1316:58, when it indicates a climb to 2600ft Mode C and is indicating 400ft above the helicopter in the SK76's L 9 o'clock - 0·2nm. [This climb to 2600ft seems at odds with the Islander pilots account and it may be a spurious return as no climb was reported at this stage.] Whilst turning through 160° at 1317:06, the Islander indicates a descent to 2300ft Mode C; it is in the SK76's L 9 o'clock - 0·1nm some 100ft above the latter at CPA (b). The SK76 indicates a descent to 1900ft Mode C at 1317:14, with the Islander in its 6 o'clock 0·2nm, maintaining track and indicated level at 2300ft Mode C. Further descent is shown by the SK76 to 1700ft Mode C at 1317:23, but the Islander is lost from radar on this update. The Islander reappears at 1317:31, in the SK76's 6 o'clock - 0·4nm indicating 2100ft Mode C. The Islander is now in a left-hand turn passing through 100°. The Islander maintains the left-hand turn and the separation continues to increase as the aeroplane draws astern of the SK76.

Both flights were in receipt of a RIS. Initially the Lyneham ZONE Controller gave good traffic information to both crews and fulfilled the requirement to do so under RIS as required by JSP235.155, specifically:

"*RIS is an air traffic radar service in which the controller will inform the pilot of the bearing, distance and, if known, the level of the conflicting traffic. No avoiding action will be offered. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information."*

This clearly states that regardless of information passed the pilot is responsible for his own separation. When the Islander pilot initially requested a descent at 1316:20, the controller instructed him to maintain 2500ft due to the presence of the SK76 below him. At this time the SK76 was in the Islander's L 11 o'clock - 1·7nm. However, it was clear from the transcript that the Islander was in fact flying at 2000ft QFE [some 540ft above the SK76 pilot's reported 2000ft altitude on 1003mb]. In this case ZONE fulfilled condition b. of JSP235.155 that states:

b. The controller will only update details of conflicting traffic, after the initial warning, at the pilot's request or if the controller considers that the conflicting traffic continues to constitute a definite hazard.

When the Islander pilot stated his intention to descend at 1316:48, the SK76 was in the Islander's L 9 o'clock - 0·4nm. On this occasion, the controller simply passed the surface wind at Lyneham and gave no further update on the conflicting traffic, which definitely constituted a hazard. Whilst the pilot has ultimate responsibility for his own separation, ZONE did not provide the best information available. However, the trainee controller may have been misled by the call 10sec earlier when the crew of the SK76 reported visual with the Islander; the actual transmission of this traffic information having been addressed to the Islander pilot and not the SK76 crew.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Despite both flights receiving an ATS from the same controller it was unfortunate that these two ac still flew into very close quarters. In one controller Member's view it seemed significant that the Islander had been receiving a RAS from Boscombe Down whilst in transit under IFR before being handed over to Lyneham ZONE. Whilst noting that the Islander's transit through the Lyneham CTR was conducted under VFR with a RIS being applied when the Islander had cleared CAS, the Member wondered if this RIS might have been imposed by the controller rather than at the request of the pilot. A RAS might have been preferable for the Islander pilot in these apparently marginal weather conditions. However, the Board was briefed that the RT transcript had clearly shown that a RIS had been acknowledged by the Islander pilot when he left CAS and if he had wanted a RAS - where standard separation minima would have been effected by the controller - then he should have made it plain to the controller in the first instance. The Mil ATC Ops report had shown clearly that under the RIS that was provided by ZONE to both flights at the time of the Airprox, after traffic information had been provided it was the crews themselves that were responsible for sighting the other ac and effecting their own visual separation between one another. Thus a RIS requires weather suitable to ensure this. It seemed to the Members from the pilots' own reports and the 1250UTC Lyneham weather - albeit 30min before the Airprox occurred - that the actual weather conditions with rain showers and scattered cloud seemed marginal at best for VFR flight in an aeroplane. It was noted that the SK76 crew, flying in VMC clear of cloud and in sight of the surface, were unable to spot the Islander until it descended toward them, apparently through a hole in the cloud. Some CAT pilot Members contended that the Islander pilot had apparently descended in IMC so a RAS might have been preferable, even for both flights. Nevertheless, each pilot had received the radar service that he had asked for – a RIS - and comprehensive traffic information about the other ac had clearly been given to each flight by ZONE. Therefore, each crew should have had sound situational awareness as to where the other ac was as they approached each other. However, the Mil ATC Ops Advisor explained that the Lyneham ZONE controllers might have been able to help more here and he reiterated the Command's view, that ZONE could have given further update on the traffic information to the Islander pilot about the conflicting SK76 traffic, a situation which definitely constituted a 'hazard'.

The Member from CinC Fleet noted that these two flights were operating on different altimeter settings which it was unwise to allow if it could be avoided. He opined that the unnecessary mixing of pressure settings can give rise to potential confusion - especially for trainee controllers – especially when the settings vary so markedly as here. Where feasible, it would have been far preferable to ensure that both of these flights were operating to one common pressure setting, rather than permit a number of variations to create unnecessary difficulties. Here, the Islander was descending with the Lyneham QFE (985mb) set and, from his account, it seemed he might have been confused as to the level of the SK76 beneath him. The helicopter crew had been given the COTSWOLD RPS of 997mb by ZONE, but from the radar recording and the reporting pilot's account it was evident that the helicopter crew was flying on a QNH of 1003mb. It would therefore seem that the helicopter crew interpreted the call giving them the RPS as being 'for information' rather than an instruction to adjust their altimeter subscales, an interpretation that was not unreasonable in the view of pilot Members. Nevertheless, the traffic information provided had been sensibly transmitted by ZONE as a relative separation from the Mode C indications which were

all based on 1013mb and therefore all related to the same pressure reference. Thus it should have been plainly evident to the Islander pilot where the SK76 was, both horizontally and relative to his aircraft in the vertical plane, before he initiated his descent. Some Members debated whether it was wise for the islander pilot to descend from his transit altitude here, in these weather conditions. It seemed to a highly experienced test-pilot Member that an earlier descent - possibly within the relative sanctuary of CAS - might have been preferable to enable the pilot to get into good VMC below cloud more safely. ZONE might well have been able to provide a radar monitored cloud-break descent within the CTR if asked, rather than effect the descent later in Class G where the conflict should have been apparent. Nevertheless, this was said in the clear light of hindsight and, as it was, the Islander pilot reported that having earlier entered a bank of cloud he elected to descend through a hole in this cloud as he neared his destination. Whilst it was clear that in response to the Islander pilot's request to descend ZONE had advised the Islander pilot at 1316:27 to "…*maintain 2500ft this time",* a height of 2500ft QFE would only have provided 860ft of vertical separation above an ac flying at what ZONE believed was 2000ft RPS (997mb). But it seemed to have escaped both the Mentor and his trainee's attention that the Islander had already descended to 2000ft QFE (985mb) by then - as evinced by the radar recording – a mere 360ft above the SK76 believed to be at 2000ft (997mb) but more probably some 540ft above the SK76 flying on 1003mb. In the 'heat of the moment' this incorrect height might have been a 'slip of the tongue' by the trainee controller on RT, or he might have misread his fps. Nonetheless, this should either have been challenged by the pilot or clarified by the Mentor who should have interceded: by then, however, it was clearly all getting a bit too close. The ZONE trainee's Mentor had also explained in his report that SSR label overlap was a problem here, preventing both he and his trainee from seeing clearly what the actual levels of the respective ac were and that might well have been a factor if the Mode C was not readily apparent throughout. As it was, ZONE had passed traffic information about the SK76 which was "*..just crossing 12 o'clock, - 1 and a half miles crossing left to right 5 hun. 4 hundred feet below*", and that was the theoretical extent of their remit. This call should have been ample warning to the Islander pilot that he was in close proximity to the helicopter. The Clee Hill radar recording reflects 400ft separation at this point based on the indicated Mode C from both ac which were 1·3nm apart. Nevertheless, some 20 sec later at 1316:48, just as the ac approach CPA (a), the Islander pilot advised ZONE "*..maintaining this position to descend to 1500ft.*" Clearly a height of 1500ft QFE (985mb) would take the aeroplane down through the 2000ft (1003mb) altitude of the SK76 - which would have equated to about 1460ft QFE. This should have been apparent to ZONE but the trainee merely acknowledged the Islander pilot's intention by transmitting the surface wind. Mil ATC Ops had suggested in their report that ZONE might have confused the transmission from the SK76 crew when the latter interjected "[SK76 C/S] *visual*" as emanating from the Islander pilot; this was entirely feasible in the 'heat of the moment', but evidently wrong. A civilian controller Member opined that even though traffic information had been issued to both flights, neither crew had requested an update and ZONE had received a visual call from one of them. Stressing that SSR label overlap had been a factor here, in his view it seemed that ZONE could have done little more. Whilst this was the opinion of the overwhelming majority of the Members who did not consider that ZONE's actions were contributory to the Airprox, the CinC FLEET Member postulated that ZONE could have done more to forestall the Islander pilot descending into conflict with the SK76. However, it was clear that the Islander pilot had not spotted the helicopter before he descended through his reported hole in the cloud – marginal VMC at best, an experienced CAT pilot opined - even though he had been advised of its presence and had received advice from ZONE not to do so. The Board concluded after a full and wide-ranging debate that this Airprox had resulted because whilst flying in marginal VMC and contrary to the advice of ATC, the Islander pilot had descended into conflict with the Sikorsky SK76, which he did not see.

The Board then considered the intrinsic risk in this encounter. Aided by the traffic information from ZONE it was clear that the SK76 crew had acquired the Islander on TCAS when it was 500ft above them. The radar recording had shown that this separation persisted until the ac had closed to a range of 2·7nm, thereafter 400ft was maintained until the two ac were less than ½nm apart. The Islander's descent was first shown on the radar recording at CPA (a), the SK76 indicating 2200ft Mode C with the Islander in its left 11 o'clock 0·1nm away, the tracks having crossed. This was in close accord with the SK76 pilot's account of sighting the other ac briefly as it crossed from R - L through their 12 o'clock 100m ahead of his helicopter and about 200ft above them. The Board recognised that it would not have been clear to the SK76 crew that the Islander was very close vertically until this late stage. Whilst the SK76 pilot reports he descended his helicopter rapidly this is not evident in the radar recording until some 24sec after CPA (a), although Mode C lag may have played a part here. It was not until the return after CPA (b) – where the ac were again 0·1nm and 100ft apart - that the SK76 was shown passing 1900ft Mode C in a robust descent, bottoming out at 1700ft and now drawing ahead of the aeroplane in the Islander's L 10 o'clock. It seemed to the Members that the Islander pilot probably spotted the helicopter in the vicinity of the last radar return shown on the diagram - or slightly before as he turned L towards S Cerney - for he states that the helicopter was to his R slightly behind his track 1-200 ft below and about ½nm away travelling at speed away from

him. Thus the two ac had been in very close proximity for some while and their safety had been significantly compromised. A highly experienced helicopter pilot Member explained that at the RoD replicated by the recorded Mode C, the SK76 was probably descending at a rate near to autorotation, which is the most effective way of descending rapidly to get out of the way. But with only one ac's crew aware of the close proximity at the time and then only sighting the Islander briefly - relying on TCAS in the main for their situational awareness as the Islander drew astern in this close quarters situation - the Board agreed unanimously that an actual risk of a collision had certainly existed in the circumstances conscientiously reported here.

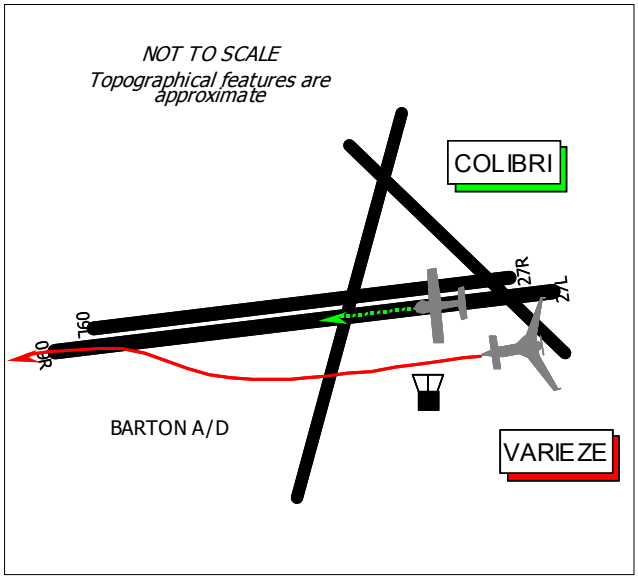
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In marginal VMC and contrary to the advice of ATC, the Islander descended into conflict with the Sikorsky SK76, which he did not see.

Degree of Risk: A.

AIRPROX REPORT NO 152/06

Date/Time:	7 Oct 1608 (Saturday)	
Position:	5328N 00223W (RW27L Manchester/ Barton Aerodrome - elev 73ft)	
Airspace:	ATZ	(Class: G)
Reporter:	Barton AFISO	
	First Ac	*Second Ac*
Type:	Colibri MB-2	Rutan Varieze
Operator:	Civ Pte	Civ Pte
Alt/FL:	Landing (QNH)	Landing (QNH)
Weather	VMC NR	NR CAVOK
Visibility:	NR	>10km
Reported Separation:	NR	NR
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MANCHESTER BARTON AERODROME FISO reports that the Colibri and Varieze were both flying in the cct for RW27L at the time of the incident - the Varieze was No 2 to the Colibri. The Colibri pilot reported on final approach for RW27L with the intention of doing a 'touch and go' which was acknowledged by him as the Duty FISO 'at the pilot's discretion' as per normal. When asked if he was visual with the Colibri ahead, the pilot of the Varieze reported that he was visual with the one ahead for the 'touch and go' - the Colibri - and also visual with another ac just climbing out so he would be making this a 'go-around'. Watching from the VCR the Varieze was then observed to make a low approach along the S side of RW27L at Tower Level - less than 80ft - and at very high speed. No attempt was made to execute a standard 'go-around', he opined, although the Varieze pilot was aware of the operating procedures at Barton. At the point the Colibri was 'rounding-out' into the flare the Varieze passed very closely down the port side of the Colibri and then passed in front of the Colibri, whilst both were climbing-out. This then caused the pilot of the Colibri to say on RT - "That was close"! The Varieze then continued to climb out on a more SW'ly heading. This action was severe enough for him to make a comment on RT to the pilot of the Varieze who advised that he would not be landing and departed the cct.

THE COLIBRI MB-2 PILOT reports that he was flying in the cct for RW27L at Barton after returning from a local flight and was operating under an Aerodrome FIS from BARTON INFORMATION on 120·25MHz. During the final stages of one approach, he heard on the RT the pilot of the ac behind – the Varieze - say that he was "going around". Heading 270° at 50kt, the Varieze then appeared in his field of view on his port side in level flight, or possibly a slight descent followed by a climb, whilst he himself was either just rolling on the RW or just afterwards. No avoiding action was taken as the Varieze was significantly faster than his own ac. He could not give an accurate assessment of either its height or horizontal position as it came into his field of vision at the point of minimum separation and he opined that the FISO in the Tower would have had a much better view. However, the Varieze did drift across the centre-line of the runway in front of him - probably by the time the Varieze reached the upwind end of RW27L or beyond. Reiterating that it was very difficult for him to give an accurate assessment of the ac's actual distance from his own Colibri ac with its height at that point, the lateral disposition was easy as he was sighting down the runway. He did mention that it was a "bit close" on the RT. [UKAB Note (1): On the Colibri pilot's diagram of the Airprox after the Varieze passed on the beam, the overtaking ac reached the 11 o'clock position before crossing into the Colibri pilot's 12 o'clock and climbing away.]

He assessed that the risk was *"low"* because he assumed that the Varieze pilot had his Colibri clearly in view up to the point that the other pilot passed his ac. The much greater speed of the Varieze meant that there was no chance of his Colibri accelerating up too close behind the Varieze on the climb out, once the latter had overtaken him. Nevertheless, his Colibri ac is fairly small, manoeuvrable and is capable of quite a deceptively high RoC - initial and sustained - for its appearance; hence if he had chosen to break-off the approach from "low down" they

could have flown into conflict quite rapidly. The big speed differential, which meant safety after the Varieze had passed him, would then have been the problem.

After discussing the occurrence with the FISO he elected not to initiate an Airprox report, but agreed to submit a form if requested.

THE RUTAN VARIEZE PILOT reports in his brief submission that he was inbound to Manchester Barton from Sleap and was in communication with BARTON INFORMATION on 120·25MHz. Whilst he was on the approach, heading W, the Colibri was in clear view and its pilot made no complaint. Neither the minimum separation nor the risk was assessed and he strongly contended that there had not, in his view, been an Airprox.

ATSI comments that the RT transcript confirms the FISO's report.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (2): The UK AIP at AD 2-EGCB-1-4 notifies the Manchester/Barton ATZ as a radius of 2nm centred on RW09R/27L, extending from the surface to 2000ft above the aerodrome elevation of 185ft amsl excluding that portion that lies within the Manchester CTR. An AFIS is available from BARTON INFORMATION on 120·25MHz. Fixed Wing FLIGHT Procedures are specified at AD 2-EGCB-1-5:

a Fixed winged circuit height is 1000ft (Barton QFE)ÖÖÖÖ.

d Circuit directions: Runways..27L,27R - RH;
e Orbits within the circuit are not permitted unless required for safety reasons.
f Go-Around Procedures:

i Above 200ft
If safe, manoeuvre the aircraft to the deadside of the aerodrome keeping any other aircraft in sight and climb on runway heading, parallel to the runway in use, to circuit height.
ii Below 200ft
Climb straight ahead, unless avoiding action must be taken, to circuit height. In all cases, do not climb above 500ft until you have passed the upwind numbers of the runway in use.
iii Aircraft should not continue approach below 200ft if the runway is occupied.

g Pilots must not carry out 'run and break' manoeuvres within the Barton circuit.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This Airprox was unusual in that it had been submitted by an Aerodrome Flight Information Service Officer (AFISO) who was providing a FIS at the time of the occurrence. Strictly speaking, Airprox can only be filed by pilots and controllers. However, not wishing to lose potentially important flight safety lessons, in accordance with established practice within the UK and at the discretion of the DIRECTOR UKAB, occasionally Airprox reports submitted by FISOs are accepted for assessment by the Board - as was the case here.

Notwithstanding the assertion by the Varieze pilot that an Airprox had not occurred, he was not the sole person involved. Here it was apparent that the catalyst to this Airprox had been the nature of the GO-AROUND executed by the Varieze pilot himself, which had formed the basis of the FISO's concerns. From the information provided, it was not clear how experienced this pilot was but it had been suggested that he was quite familiar with Barton Aerodrome and its procedures. Neither had the Varieze pilot revealed within his brief account the distances involved here. For his part, the Colibri pilot's comprehensive account also lacked a clear indication of the minimum separation that actually pertained. Moreover, the absence of recorded radar data did not allow this to be ascertained independently. Thus the Board could only assess the fundamental aspect of the distances involved on the basis of the FISO's report that "the Varieze passed very closely down the port side of the Colibri", as the latter was 'rounding-out' into the flare, before then passing in front of the Colibri whilst both were climbing-out.

An Aerodrome FISO is not empowered to issue any 'instructions' to pilots in the air so there was clearly little more he could do here. Members felt that the FISO had done all that was necessary to ensure that the Varieze pilot was provided with all the pertinent information that was needed to allow him to execute his cct. Moreover, the FISO had ensured that the Varieze pilot was aware of the Colibri on FINALs, which was ahead of the Varieze in the landing sequence and had 'right-of-way' in the pattern. Nevertheless, it was clear that when overtaking on the DEAD-SIDE during the GO-AROUND, it was solely the Varieze pilot who chose the separation at which he flew past the slower Colibri whilst its pilot executed his landing and subsequent take-off during the 'Touch & Go' manoeuvre. Of the two pilots involved here, only the Varieze pilot had the other ac fully in view as he overtook during the GO-AROUND and if it was close enough to cause the Colibri pilot to voice his concern on the RT - as evinced by the transcript of the RT recording – then, in the Board's view, it was probably too close. Such small ac as these can be significantly affected by wake turbulence and a highly experienced GA Member said that this might have been a factor here. He opined that to pass very closely down the port side of the small Colibri whilst the latter was executing a 'Touch & Go' could have serious consequences and he questioned the wisdom of the Varieze pilot's actions. Here, it was entirely the Varieze pilot's responsibility to ensure that his GO-AROUND did not impact on the slower Colibri pilot's 'Touch & Go' in any way. But during a wide-ranging debate, it seemed to the Members that in descending below the level of the Tower and thus apparently below a height of 80ft during his GO-AROUND, the faster Varieze pilot had either left his decision to GO-AROUND very late indeed or he had not given the much slower Colibri as wide a berth as perhaps he might. On the basis of the limited information provided, the Members agreed that this Airprox had resulted because the flight path chosen by the Varieze pilot during the GO-AROUND caused the Colibri pilot and the FISO concern.

The Colibri pilot had observed that if he had executed a GO-AROUND then the Varieze pilot might have been caught out by his ac's ROC. But the Board only dealt with what actually occurred, not what might have happened in other circumstances. Thus, the Board agreed that once the Colibri had been overtaken, clearly there was no possibility of a further confliction between the slower Colibri and the Varieze. The Board agreed unanimously, therefore, that no risk of a collision had existed in these circumstances.

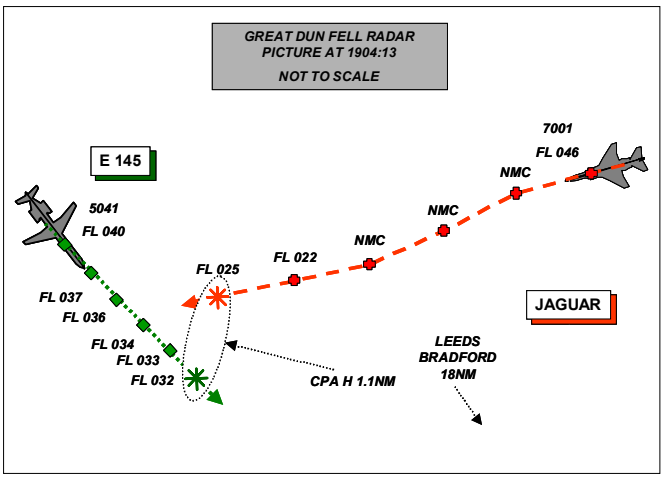
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The flight path chosen by the Varieze pilot during the GO-AROUND caused the Colibri pilot and the FISO concern.

Degree of Risk: C.

AIRPROX REPORT NO 153/06

Date/Time:	10 Oct 1904 (Night)	
Position:	5401N 00206W (18nm NW Leeds Bradford)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Embraer 145	Jaguar
Operator:	CAT	HQ STC
Alt/FL:	3500ft↓ (QNH)	4000ft↓ (N/K)
Weather	IMC KLWD	VMC CLBL
Visibility:		~10km
Reported Separation:	0ft V/1nm H	Not Seen
Recorded Separation:	700ft V/1.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports that the captain was the handling pilot on a scheduled passenger flight to Leeds, squawking as directed by them and with Mode S and TCAS fitted. While they were being vectored at 200kt for an ILS approach to RW14 and just before they made the base turn onto a heading of 140°, APR told them that he had just seen unknown fast moving (400kts) traffic "pop-up" tracking 280° at ~4500ft tracking towards them. The crew were in a high workload situation and were closely monitoring their MSA. Just as they commenced the turn they saw proximate traffic on the TCAS. ATC simultaneously advised them that they were now under a RAS and suggested they change heading from 140° to 180°. The controller also authorised a descent clearance to 3000ft. The conflicting traffic changed direction and descended towards them in their 11 o'clock position at the same level and a TCAS TA was received. The traffic's mode C then disappeared but reappeared as an RA alert in their 8 o'clock position, just below their level at a distance of 1nm. Although they were mostly IMC, they managed to see the other ac briefly and the TCAS contact changed course and appeared to follow them so they accelerated to 250kts to vacate the area. The conflict disappeared and the radar records indicate it descended to 2100ft and turned its transponder off (he thought).

He assessed the risk as being high.

THE JAGUAR PILOT report, received two months after the incident, stated that he was flying a 2-seat ac on a night vision goggle (NVG) training flight. He was squawking 7001 and had red strobes and nav lights switched on but was not in contact with any unit. They took off at 1845 for 1½ hrs and the front seat pilot was flying the ac with a supervisor in the rear cockpit; both pilots were wearing NVGs. At the reported time of the incident the ac was letting down to low level, heading about 270° at 450kt under a RIS provided by LATCC (Mil) before the ac reached low level and went VFR enroute.

No visual contact with any conflicting ac was made.

ATSI report that this encounter was between the E145 inbound IFR from Glasgow via airways, being vectored, as number 3 in the traffic pattern, towards a right base leg for an ILS approach to Leeds Bradford RW14, and a Jaguar carrying out a night vision goggle (NVG) training sortie and operating VFR in Class G airspace.

Due to the dimensions of the Leeds CTA/CTZ it was not uncommon, at the time of the event, for ac to be vectored outside CAS for the base leg when RW14 was in use. Locally clarifying the requirements of MATS Part1, Section 1 Chapter 5, Page 11 Para 12.1.3, the Leeds Bradford MATS Part 2 stated *"…..ac may therefore be vectored outside CAS during positioning to Runway 14. During the period of flight outside CAS, pilots must be advised of the change to radar service, i.e. Radar Control to Radar Advisory".* There was also a local requirement for pilots to be asked if they would accept vectoring outside CAS; in the subject Airprox however, APR did not ask the E145

pilot, although he had asked the previous ac in the sequence. Additionally although he did inform the pilot of the change to the radar service being provided, it was not until the ac was well outside CAS.

Analysis of the Great Dun Fell (GDF) radar recording, on which the event can be seen in its entirety, shows that the E145 left Leeds CAS at 1901 and turned onto a heading of 335° with the Jaguar 20nm ENE of it turning onto a W'ly track. Thirty sec later, having vectored the E145 outside CAS, APR gave it a right turn onto a heading of 125° to close the Localiser and, having received an acknowledgement from the pilot, then stopped the turn as a result of seeing the Jaguar on the Leeds radar for the first time. Implementing a change of plan at 1902, he turned the ac left onto a heading of 140° and applied a RAS. This was the start of tactical vectoring to attempt to provide separation from the Jaguar. A further 19sec later the Jaguar was on a W'ly track indicating FL036, 13nm E of the E145 which was indicating FL044. A further 11sec later (1902:40) APR passed TI on the Jaguar as *"…fast moving traffic just popped up about ten to the east of you westbound at this time climbing through four thousand seven hundred feet*". The GDF shows the E145 to have just started turning left at this time, descending through FL044 with the Jaguar to the E of it by 12.2nm indicating FL042 and still on a Westerly track.

In an attempt to increase separation, APR gave the E145 further descent against the Jaguar which was still indicating as climbing on his radar display. At 1903:04 the Jaguar can be seen to turn slightly left onto WSW which puts the E145, in a left turn, in its 12:30. There is then some track jitter but the Jaguar remains steady on that track. At 1903:19, GDF shows the Jaguar still to be E of the E145 by 8.9nm, the latter indicating FL044 and the former FL047, before indicating briefly FL046 at 1903:40. At 1903:42 the E145 passes through the Jaguar's 12 o'clock at 5.5nm; the Jaguar is indicating NMC and the E145 is passing FL037. Thereafter the Jaguar's Mode C read out is not displayed for 30sec until 1904:05 when it indicates FL022 as it passes about 1nm behind the E145 and 700ft below it.

The CPA is at 1904:13 with the Jaguar in the E145's 8 o'clock at 1.1nm indicating FL025 and the E145 FL032.

Just before 1904 APR, having observed the track adjustment made by the Jaguar, issued the following *"E145 turn right heading 180 degs immediately"*. Whilst the phrase "avoiding action" was not used the tone of the APR's voice had sufficient emphasis to convey the urgency of the situation but this turn had not taken effect by the CPA.

The E145 reported having the Jaguar on TCAS at 1903:30 and that he had, again on TCAS, *".. just seen him go behind us"* at 1904:30 but the pilot did not report a TCAS RA. MATS Part 1, Section 1 Chapter 5 Page 3 for the provision of a RAS, states:

"e) Controllers shall pass avoiding action instructions to resolve a confliction with nonparticipating traffic and, wherever possible, shall seek to achieve separation which is not less than 5nm or 3000ft, 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 ac make unpredictable changes in flight path, it is not always possible to achieve these minima".

APR was not able to achieve the latter.

The details of this event have been publicised within the ATS Department and controllers have been reminded of the option of using the LBA hold for ac as an alternative to using an extended radar pattern which makes it necessary to vector ac outside CAS. Furthermore, the unit has formed a small working group to rationalise approach operations and has issued a TOI that controllers will not vector ac outside CAS unless specifically requested by the pilot.

UKAB Note (1): Both the controller involved and the unit provided reports. The information therein is all replicated in the ATSI report above.

UKAB Note (2): An independent analysis of the GDF radar recording confirmed the analysis conducted by ATSI above.

HQ STC comments that it is surprising, with the benefit of NVGs, that the Jaguar crew did not see the other ac. However, they were tracking well to the North of the Leeds Bradford zone where they would not, perhaps, have expected to see civil inbounds.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was unsure as to whether the Embraer pilot was fully aware of the consequences of being vectored outside CAS where much less protection can be offered from conflictions with other ac legitimately operating in Class G airspace. Even though ac may be operating under IFR, Members pointed out that in Class G airspace pilots are responsible for collision avoidance. While a RAS may assist pilots with this responsibility, it still rests firmly with them as opposed to the controller. Controller Members pointed out that an elongated traffic sequence and the problems associated with vectoring ac outside dedicated CAS could be avoided by the use of holding procedures.

The Board was informed that the Jaguar was flying a normal NVG training sortie, employing a normal, albeit slightly slow, descent to the W from the area overhead Linton on Ouse and tracking well clear of the Leeds Bradford Zone. Both pilots would have been on NVGs and although both would have a reduced field of view of about 15°, crews are taught to increase their scan rate to compensate for this. NVGs do not however "see" through cloud and if the Embraer were in cloud - or even intermittently in cloud, slightly above the Jaguar - it would probably not have been visible to the Jaguar crew. Further, when using NVGs ac lights can be very difficult to break out from cultural lighting on the ground, lighting that may be a considerable distance from the ac. In addition, the Jaguar pilots would not have been expecting to see an ac in the Leeds Bradford instrument pattern 18nm N of the airfield. Members were not therefore surprised that the Jaguar crew did not see the Embraer. Having not seen it or being aware of it from any traffic information calls, the Jaguar crew would not have been in a position to take any avoiding action to prevent TCAS warnings in the airliner.

Although the Leeds Bradford controller had been attempting to provide the desired separation of 5nm or 3000ft, the information available to him was incomplete (Mode C drop out from the Jaguar at the critical moment). However, by descending the Embraer to the lowest altitude available, namely 3000ft, the controller inadvertently and unbeknown either to himself or the pilots reduced the vertical separation, the Jaguar (while indicating NMC) having descended below the altitude of the Embraer. Furthermore, the controller did not recognise that the Jaguar was a potential conflict to the Embraer until his options to take effective horizontal avoiding action were very limited.

It was recognised by all Members that the controller had been busy but opinion was divided as to whether or not he had the opportunity to recognise that the Jaguar was a potential threat at an earlier stage. Certainly, before the Jaguar almost simultaneously turned to the NW then W and changed to a 7001 squawk as it entered low level from overhead Linton on Ouse, there would have been no opportunity to assimilate its intentions. However it was steady on a W'ly track squawking the low level squawk of 7001 for 2 min before the controller issued the first avoidance instruction when the ac were 14nm apart. Further, the avoidance issued by turning the Embraer the long way round onto 140° actually brought it back into conflict just over 1min later (the CPA) when other lateral options had been available to the controller, albeit limited by terrain and other factors.

Summarising their views, Members noted that the experienced controller had been attempting to provide the Embraer with the separation appropriate to a RAS in Class G airspace but had not been able to achieve it.

The Board noted the full and open reports from the controller and the airport management and was briefed on the extensive measures taken by the Leeds Bradford management following this incident.

PART C: ASSESSMENT OF CAUSE AND RISK

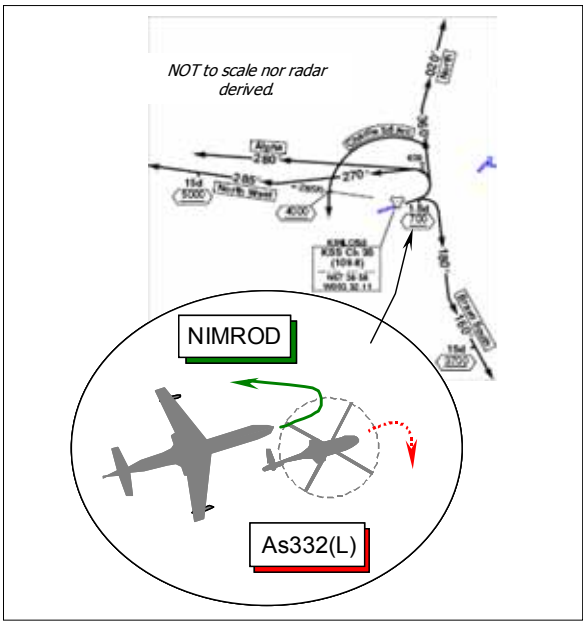
Cause: Conflict whilst the Embraer 145 was being vectored outside CAS.

Degree of Risk: C.

AIRPROX REPORT No 154/06

AIRPROX REPORT NO 154/06

Date/Time:	17 Oct 1905	NIGHT
Position:	5739N 00331W (Vicinity of Kinloss Airfield - elev 22ft)	
Airspace:	Kinloss MATZ	(Class: G)
Reporter:	Lossiemouth APP	
	First Ac	*Second Ac*
Type:	Nimrod MR2	AS332L Puma
Operator:	HQ STC	Civ Trg
Alt/FL:	1500-2000ft↑	1000ft↑
	QFE (1007mb)	QNH (1008mb)
Weather	IMC In Cloud	IMC In Rain/Cloud
Visibility:	NR	NR
Reported Separation:		
	Not seen	Not seen
Lossiemouth APP: 200ft V/contacts merged		
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LOSSIEMOUTH APPROACH CONTROLLER (LOS APP) reports that he was operating as the combined Lossiemouth/Kinloss APPROACH/DIRECTOR/DEPARTURES/LARS controller during this night flying period with low cloud and poor visibility affecting both Lossiemouth and Kinloss. Primary radar was unserviceable so he was operating SSR only, with one ac – the subject Nimrod on UHF 234·87MHz - in the radar training cct (RTC) to RW08 at Kinloss. The Nimrod pilot was intending to roll, he thought, from the azimuth-only approach [the PAR clearance request was for an overshoot] for a further approach and an IFR release was given for a SID 'Alpha', to recall him on frequency 234·87MHz. The Nimrod was then handed over to Kinloss TALKDOWN and the approach commenced. Kinloss TOWER then requested an IFR release for a helicopter – the subject Puma - going back to Aberdeen climbing to FL55. This ac from Aberdeen was conducting visual ccts at Kinloss. The Puma was given an IFR release of: SID 'Bravo South', climbing FL55, squawking A3701 and to call on VHF - 119·350MHz. Kinloss TOWER is responsible for providing initial separation for IFR departures out of Kinloss and he expected to get the Puma after the Nimrod had commenced the SID 'Alpha. Both SIDs require the ac to climb on RW track [076°] until reaching 1·5nm DME from [KSS] Kinloss or 700ft QFE, whichever is the later, before turning and continuing the climb as specified.

[UKAB Note (1): A SID 'Alpha' requires crews to: turn L to track 280° climbing to 2000ft QFE and call Lossiemouth. A SID 'Bravo South' requires crews to: turn R to track 180° to intercept the KSS 160R maintain the 160R to 15D climbing to not below 3700ft QFE and call Lossiemouth ATC.]

As the Nimrod approached 2-3nm FINALs to RW08 at Kinloss, he noticed the ac's Mode C indicating the Nimrod was climbing and he took this to mean the ac was being broken off from the approach because of the Puma in the cct. He observed an intermittent squawk A3701 – the Puma - at the departure end of RW08 and mentioned this to his SUPERVISOR. As the Nimrod approached the departure end of RW08, the A3701 squawk was directly ahead of and slightly below the Nimrod and turned R eventually onto a track of about 170°. The Nimrod was indicating 2200ft Mode C and the Puma was indicating 2000ft Mode C climbing. There was no time to call Kinloss before the SSR returns merged with both ac indicating the same level on Mode C.

The crew of the Nimrod called him on UHF shortly before the returns merged and informed him of the ATS required and intentions all in one transmission, which delayed his avoiding action turn instruction by some 3-4 seconds. As a result both ac were diverging with less than ½nm horizontal separation by the time the Nimrod pilot was first instructed to make an avoiding action L turn. The Puma pilot then called him on VHF in the climb, but as the ac' were now safely diverging no avoiding action was given to the Puma crew. He asked both acs' crews if they had been visual with each other and both informed him that they had not seen the other ac and that they were IMC

throughout. The Puma crew had not followed the SID 'Bravo South' profile and, in the LOS APP controller's opinion, if they had, the two ac would have collided.

THE NIMROD MR2 PILOT reports flying under IFR on a PAR azimuth-only approach to RW08 at Kinloss, whilst in receipt of a RAS from Kinloss TALKDOWN initially before being switched to LOS APP. Descending through 650-800ft QFE (1007mb) at between 2-3nm FINALs, TALKDOWN instructed them to 'break-off' their approach as there was one ac on the RW for departure. Heading 076° at 200kt they complied with the instruction and climbed-up in accordance with the K1 TAP Missed Approach Procedure (MAP) [which is to fly a SID 'Alpha']. He stressed that they had intended to carry out a further instrument approach and missed approach for training but that the SID 'Alpha' for RW08 was identical to the climbout instructions they had already been passed by LOS APP whilst DOWNWIND in the pattern. They remained IMC throughout the MAP and the weather at this stage was overcast with the cloud-base of 500ft QFE with tops at 2500-3500ft. Upon checking-in with LOS APP they were given an avoiding action L turn and the controller asked them if they had been visual with a helicopter. He replied negative, as they were unaware of the Puma at the time and flying in IMC, but he added that given their range from touchdown when the 'break-off instruction' was given and the prevailing weather they believed the helicopter's perceived IFR departure had been co-ordinated by ATC. The helicopter was not seen at all and the risk was not assessed.

The navigation lights, landing lights, taxying lights, and red HISLs were all on and the crew for this pilot currency training sortie consisted of 4 pilots, 1 engineer, 2 navigators and 3 other crew members.

THE AS332L PUMA PILOT reports he was conducting a night crew-training sortie at Kinloss. TCAS is not fitted but SSR was selected on. Navigation lights and HISLs were all on.

On arrival at Kinloss they were cleared to operate in the LH visual cct to RW08, maintaining a listening watch with TOWER [on VHF NATO TOWER Common 122·1MHz], and they were told there were no arrivals expected within the next 60min. However, after about 20min the weather deteriorated such that on landing on RW08 he elected to cancel the remainder of their sortie and requested a departure from TOWER to return to Aberdeen at FL55. TOWER issued their departure clearance for a SID 'Bravo South' from RW08 [climbing to] FL55, squawking A3701, which was selected with Mode C 'on'.

They became aware of an ac by return calls from the Air Traffic Controller on the VHF TOWER frequency, but he stressed that at no time had they heard any calls from an approaching ac or had they been warned by ATC of an approaching ac. They were given clearance to TAKE-OFF and departed within 60secs. During the departure, turning R onto 180° about 1½nm E of Kinloss climbing out at 80kt, they switched to LOS APP and were asked their flight conditions and if they were visual with a Nimrod. He reported being IMC and that they did not see or hear another ac. The return to Aberdeen was uneventful and they were asked to contact Lossiemouth ATC by phone upon landing, who informed them of the Airprox.

Upon reflection as they lifted for TAKE-OFF he believes they might have heard ATC call the approaching ac at 2nm to GO-AROUND left.

THE KINLOSS PAR CONTROLLER (TALKDOWN) reports that the Nimrod was inbound for multiple GCAs prior to landing and was the last scheduled ac expected. However, he was aware that TOWER was working a civilian helicopter in the visual cct.

The Nimrod was vectored by LOS APP for an 'azimuth-only' approach [no glidepath information - advisory heights are passed with range from touchdown] to RW 08, handed over to TALKDOWN and the approach commenced. At 8nm from touchdown the appropriate liaison call was made via the Radar Clearance Line (RCL) to TOWER, which was acknowledged. At 4nm he called for a clearance and was instructed to "call by 2". During the latter part of the approach he was fairly busy dividing his attention between the PAR display and the Bird Radar [Goose Detection System (GDS)], as it was apparent that there was significant goose activity in the local area. At 2¼nm he went through for the clearance and was told by TOWER to "break-off the approach one on for departure", which was relayed to the pilot who immediately responded "roger breaking off". When he asked the Nimrod pilot if he was visual with the aerodrome [this question was not actually asked – see Mil ACC report], he responded "negative we're executing the missed approach onto the SID 'Alpha' passing 1500ft as released by Lossie". This was acknowledged and the Nimrod quickly transferred to the LOS APP frequency which was also selected on the adjacent console to TALKDOWN with the loudspeaker on. Immediately after the crew called he heard LOS APP

issuing avoiding action to the Nimrod pilot against a civilian helicopter – the Puma. He looked again at the 'Bird Radar' and saw a contact less than 1nm E of KINLOSS aerodrome turning slowly L. This he assumed was the Nimrod. A further contact was visible 2nm S of the climbout lane tracking S which he believed was the conflicting helicopter. TOWER called shortly afterwards, the 'break-off' and the increasing goose hazard was discussed. No traffic information or avoiding action had been passed by LOS APP at all during the approach nor was he aware of a potential confliction in the climbout lane with the Puma. Although he understood the Puma had been the cause of the 'break-off', he fully believed that the helicopter was either still on the RW or in the visual cct at the time. Subsequently, he learned that Lossiemouth ATC was filing an Airprox because of a perceived confliction in the climb-out lane.

THE KINLOSS AERODROME CONTROLLER (TOWER) reports that the landline to Lossiemouth was ringing to request a release on the Puma from Lossiemouth when the PAR controller made the 8nm call on the RCL. Lossiemouth then gave the release and he made a broadcast on 122·1MHz –TOWER VHF - for the 8nm range call for the Nimrod on its radar approach. He then passed the departure clearance to the Puma. At the time he believed the Puma was DOWNWIND, as he had watched it land on and then establish forward flight, this all before he had logged it on the statistics page. But the Puma crew informed him that they had in fact landed back on RW08 and were now well up the runway, E of the overrun cable and close to the upwind threshold. Clearance to depart was given, as it seemed to him that the Nimrod could not have travelled particularly far and the Puma helicopter was in fact blocking the runway. As the Puma was departing to the S and only had to travel 1·5nm DME before turning S and the Nimrod was departing to the NW he did not envisage a problem. When the Nimrod was at 4nm from touchdown he gave TALKDOWN a 'CONTINUE', because the helicopter had lifted into the hover but had not established forward flight. He believed that the Nimrod would still achieve his approach and that by executing the 'ROLL', it would slow the Nimrod down and put even more distance between the jet and the Puma [the Nimrod pilot's intentions as passed to TOWER by TALKDOWN were to 'OVERSHOOT']. He broadcast on 122·1MHz "Nimrod 4 miles continuing" but at 2¼nm he broke off the Nimrod as the Helicopter was only just starting to transition into forward flight. He broadcast on 122·1MHz again "Nimrod 2 miles breaking off", so the Puma crew should have been "fully aware of the picture". As they were in the 'Goose Season' at Kinloss, he had been monitoring the GDS since coming on watch. The Puma appeared to have turned S bound on the SID early and was indicating 2nm SSE of the RW26 threshold when the Nimrod was overshooting the RW08 threshold on its 'BREAK-OFF'. He then received a phone call from Lossiemouth to ask what had happened and so he explained that the Puma had taken a long time to get airborne. Subsequently, he received another call to tell him they were filing an Airprox.

UKAB Note (2): The routine 1850UTC Kinloss METAR was: Surface Wind: 070/10kt; Visibility 2500m in Drizzle; Cloud: FEW @ 300ft; BKN @ 500ft; QFE1007mb.

A special report was however issued at 1909UTC: Surface Wind: 070/10kt; Visibility 3200m in Drizzle; Cloud: BKN @ 400ft; OVC @ 1400ft;QFE1007mb.

MIL ACC reports that Kinloss TOWER was controlling a Puma, operating under a listening watch, manoeuvring independently in a LH visual cct to RW08. [At 1845:40, TOWER had issued permission to the Puma crew to continue under a "Listening Watch" as no traffic was expected for 60min, in an unrestricted LH cct at a height of 500ft - the low cloud required low-level ccts to be flown.] Kinloss TALKDOWN was controlling a Nimrod under a RAS for a PAR to RW08. The recovery of the Nimrod was notified to TOWER by LOS APP at 1849:42. Having established RT contact with the Nimrod crew, TALKDOWN stated at 1857:05, "[Nimrod C/S] *identified at 10 miles QFE read-back correct well left of centreline correcting nicely. Do not acknowledge further instructions unless requested.*" Moments later the Puma crew called TOWER and stated, "…*I'm afraid the weather is deteriorating on us a little bit more now, the circuit at 500ft and vis seems to be quite difficult. So in the light of sense I think we'll transform the rest of our sortie and return to Aberdeen.*" At 1857:32, in response to TOWER's request, the Puma crew passed their departure details, *"…to route direct if possible climbing FL55 IFR to Aberdeen.*" After TOWER requested confirmation that it was "…*to route direct at FL55*", the Puma crew was advised to standby. Meanwhile, at 1857:30 the Nimrod crew was advised they were, "*9 miles, left of centreline, correcting nicely.*" TOWER selected the Lossiemouth line at 1857:58, but before LOS APP replied TALKDOWN called TOWER on the radar clearance intercom line (RCL) and reported [iaw SOP], "*8 Miles Nimrod* [C/S] *overshoot for further*". LOS APP then answered the call from TOWER as the latter replied to TALKDOWN, "[Nimrod C/S] *overshoot for further roger TOWER.*" TOWER then broadcast on the TOWER VHF frequency at 1858:03, "*Nimrod 8 miles overshoot for further.*" At 1858:05, TOWER requested of LOS APP on the landline, "*Kinloss TOWER looking for release please on* [Puma C/S]". After LOS APP questioned, "[Puma C/S]…*what's he after*", TOWER advised, "…*direct routeing if he can, to Aberdeen in the climb FL55.*" LOS APP said

"*55*" and then continued, "*okay, he can have SID BRAVO SOUTH climbing FL55 squawk 3701 and* [LOS APP VHF frequency] *11935.*" TOWER read back, "*BRAVO SOUTH 55 3701 and 11935*", which APP confirmed as correct before TOWER signed off. Meanwhile TALKDOWN informed the Nimrod crew at 1858:26, "*7 miles, approaching descent point*" and then at 1858:35, instructed them to begin descent. TOWER passed the departure clearance to the Puma crew at 1858:32, "[Puma C/S] *your departure has been approved after this overshoot on a SID BRAVO SOUTH initial climb FL55 squawk 3701 and when clear of the Kinloss circuit* [switch to] *Lossie Deps on 11935.*" The Puma crew read-back, "*Roger, SID Bravo South copied, squawk 3701 and 11935 once clear of the MATZ*". TALKDOWN transmitted that the Nimrod was passing 6 miles at 1858:54. One sec later TOWER replied to the Puma crew, "[Puma C/S] *affirm read back correct report FINALS gear down for the OVERSHOOT.*" In fact, the read back was not entirely correct, the crew stating they would contact LOS APP when clear of the MATZ not the cct. The Puma crew then stated, "[Puma C/S] *we are presently on the runway and looking for departure.*" TOWER then exclaimed "*Crikey! Apologies, the weather has closed in, clear TAKE-OFF, surface wind 070 10 knots.*" At 1859:12, the Puma crew replied, "*Cleared TAKE-OFF, right turn* [Puma C/S] *thanks.*" Three sec earlier at 1859:09 TALKDOWN had reported the Nimrod as, "*5½ miles 1650 feet*" and passing "*5 miles 1500 feet*" at 1859:23. At 1859:38, TALKDOWN called, *"4½ miles, 1350 feet, check gear, acknowledge?",* but the Nimrod crew's reply was unreadable so TALKDOWN requested further confirmation which was then passed, "*Gear down and locked.*" TALKDOWN called on the RCL, whilst simultaneously transmitting to the Nimrod crew, at 1859:53, "*4 miles, 1200ft,* [Nimrod C/S] *OVERSHOOT.*" TOWER responded, "[Nimrod C/S] *call by 2.*" TALKDOWN read back on the RCL and transmitted to the crew, "[Nimrod C/S] *final clearance delayed continue approach.*" TOWER then broadcast on VHF at 1859:59, "*Nimrod 4 miles, continuing.*" At 1900:23, TALKDOWN reported, "*3 miles 900 feet*" but only 5sec later, at 1900:27, TALKDOWN requested clearance on the RCL at "*2¼ miles* [Nimrod C/S] *OVERSHOOT.*" TOWER's response at 1900:30, was "[Nimrod C/S] *break off the approach, there's one on for departure.*" At 1900:34, TALKDOWN read-back to TOWER on the RCL and transmitted to the Nimrod crew, "[Nimrod C/S] *break-off the approach, one on for departure, acknowledge.*" Whereupon at 1900:38, the Nimrod crew reported, "[Nimrod C/S] *going around*", which was immediately acknowledged by TALKDOWN, "[Nimrod C/S] *roger.*" Three seconds later TALKDOWN informed TOWER on the RCL "[Nimrod C/S] *going around*" and TOWER broadcast on VHF at 1900:45, "*Nimrod 2 miles breaking off.*" At 1901:06, TOWER said to TALKDOWN on the RCL, "*Sorry, he just took ages.*" TALKDOWN replied, "*Yeah, no worries.*" At 1901:23 TALKDOWN instructed the Nimrod crew to "…*fly through on the DEAD-SIDE and continue with Lossie as briefed.*" To which the Nimrod crew responded, "…*we are IMC remaining and we are flying SID A profile just levelling at 2000 feet.*" TOWER passed to TALKDOWN on the RCL at 1901:27, "*Seen all the geese again*". At 1902:09 TOWER instructed the Puma Crew to *"…continue with Lossiemouth Approach 11935*", to which the crew read back, "*119 decimal 35, thanks a lot.*"

At 1902:17, the Nimrod crew contacted LOS APP on UHF, "*Lossiemouth* [Nimrod C/S] *is with you, having broken off the approach as directed by TALKDOWN*. *We're level 2000 Radar Advisory, carrying out the SID A, just about to start the left turn.*" In reply LOS APP transmitted at 1902:27, "*Avoiding action turn left now traffic due south merged with you same height believed to be helicopter southbound no height.*" The Nimrod crew responded "*Lossiemouth* [Nimrod C/S] *is in the left turn and requesting Radar Advisory.*" LOS APP applied the requested service at 1902:40, "[Nimrod C/S] *Radar Advisory previously called traffic now in your 6 o'clock, 1 mile, Southbound, indicating 200 feet below.*" Six seconds later the Puma crew called APP on VHF "*RADAR* [Puma C/S] *is on frequency passing 2500…cleared Flight Level 55. Looking to route to Aberdeen shortly and…requesting Radar Information.*" The Nimrod crew then stated on UHF, "[Nimrod C/S] *we'll roll out heading 280*", before APP then advised the Puma Crew *"… identified in the climb Flight Level 55. Are you IFR, um, IMC?*" The Puma crew replied, "*Affirmative, IMC*", to which LOS APP then asked, "*Were you visual with the Nimrod that overflew you?*" But the Puma crew responded, "*..negative.*" At 1903:34, the Nimrod crew reported steady and level and then APP asked, "[Nimrod C/S] *roger were you visual with the helicopter?*", but they also replied "*..negative..*[Nimrod C/S] *we were IMC. We were passed by..TALKDOWN to carry out the Missed Approach and..flew the pattern.*" LOS APP acknowledged this and then at 1903:50 the Nimrod crew added, "…*we were..IMC all the way down and weren't visual with Kinloss at 600ft when we were told to break-off.*"

This Airprox occurred below recorded radar coverage. However, LOS APP reports that the radar contacts merged with the Nimrod indicating 2200ft Mode C and the Puma 2000ft. The Nimrod was flying a SID 'Alpha' and the Puma a SID 'Bravo South'. Both SIDs require crews to maintain runway track until 1·5nm DME or 700ft whichever is the later. The SID ALPHA then stipulates a L turn onto heading 280° climbing 2000ft and the SID 'Bravo South' turns R onto 180° climbing 3700ft.

The TOWER controller did not appear to have appreciated the difference in speed between the Nimrod on TALKDOWN and the departing Puma. This was compounded by the inability of the ADC to see the Puma due to

poor visibility, believing it to be DOWNWIND when TOWER called for a release. However, having been warned of the recovery of the Nimrod 8min before the 8nm call was passed, positive control over the Puma in the visual cct would have been more appropriate than allowing it to operate 'uncontrolled'. The LOS APP controller stated in his report that he expected the Nimrod to depart before the Puma. Unfortunately, he did not say so to the Kinloss TOWER controller who was responsible for providing the IFR separation. JSP 552, Section 310.100.1b states:

The TC(TOWER) is responsible for sequencing the mixed arrival and departure of visual and instrument traffic.

When the climb-out details were passed to the Puma crew, TOWER believed the helicopter was DOWNWIND in the cct. This may have led the TOWER controller to plan for the Puma to depart after the Nimrod. However, when the Puma crew reported that they were on the RW ready for departure a take-off clearance was issued without delay. This action appears to have been taken without consideration for the Nimrod which was just approaching 5½nm from touchdown. From this point onwards, an erosion of separation was inevitable unless positive action was taken. The subsequent issue of a delayed clearance to TALKDOWN and finally a break-off actually allowed separation to be further reduced. The TALKDOWN controller may have caused TOWER further confusion by calling for the clearance again very early [normally at 2¼ mile] and only 3sec after passing the 3 mile range call to the crew. TALKDOWN passed the break-off instruction at 1900:34. However, the normal supplementary question of "*are you visual with the aerodrome?*" was not asked and it was not until 1901:23, that TALKDOWN instructed the Nimrod crew to, "*Fly through DEAD-SIDE and continue with Lossie as briefed.*" At no stage did TALKDOWN inform LOS APP that the Nimrod was carrying out the Missed Approach, if this had been done then there would have been the opportunity to pass earlier avoiding action to the Nimrod crew. Both TOWER and TALKDOWN controllers did not follow standard procedures, which were major factors in this Airprox.

THE NIMROD MR2 PILOT'S UNIT comments that it would appear that a breakdown in communications between Kinloss TALKDOWN and Kinloss TOWER controllers, compounded by deteriorating weather and a poor comprehension of relative speeds, caused this incident. The installation of a HI-BRITE radar repeater ATM at Kinloss during Mar 07 should improve the Kinloss Aerodrome Controller's awareness of the traffic situation and hopefully prevent any recurrence of this type of incident.

HQ STC had nothing further to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

With no other traffic pending, it was understandable that TOWER might have allowed the Puma crew the freedom to operate 'uncontrolled' in the visual cct to RW08 at Kinloss. However, Members agreed that when the Nimrod returned for multiple practise approaches, TOWER should have imposed full positive cct calls immediately under the ATS provided within the ATZ and the associated MATZ - where mandatory instructions apply, a controller Member reminded the Board. The Mil ACC Advisor explained that whilst operating alone the Puma crew was operating under a 'listening watch' from TOWER, albeit that neither this 'service' nor an 'aerodrome control service' is defined as an ATS within Military ATC. Whilst the Puma was circuiting it appeared that positive 'control' was not re-established and full cct RT calls were not re-imposed by TOWER until after TALKDOWN had made an 8nm call when the Nimrod was inbound on its approach. This was after the Puma's departure clearance had been passed to its crew. The Board noted that when the Nimrod was at 6nm, TOWER asked the Puma crew to report FINALS with their gear down, then to learn that the helicopter had already landed and was on the RW. Controller members stressed that TOWER should have monitored the Puma more closely. The controller was evidently unaware of the position of the helicopter in the cct before the crew advised they had landed on the RW whence TOWER immediately issued their take-off clearance. This was a salutary lesson for the unwary, the HQ AIR (Trg) member highlighting that this Airprox was a good example of what can go wrong in 'low arousal' states with light traffic intensity.

The Puma crew had reported that whilst they were aware of another ac from the RT activity, they did not appear to understand the significance of the RT broadcasts made by TOWER on VHF. Clearly these were for their benefit - to advise them where the Nimrod was on finals as it approached the cct area - so that they could then integrate their own visual cct with the IFR traffic as the Nimrod crew executed their overshoot to RW08. Whilst it never got to that stage before the Puma crew elected to cancel their ccts and return to Aberdeen, Members ques-

tioned whether the Puma crew understood fully the different methodology between operating in the visual cct at a civilian aerodrome and the procedures used at a military aerodrome to integrate instrument and visual cct traffic. Whereas prior permission would have been required to operate at Kinloss, who might well have provided visiting ac with a brief on local procedures, the reason why TOWER was broadcasting the range and intentions of instrument traffic on the TOWER frequency at intervals during the IFR approach might not have been readily apparent from this local brief. This use of broadcast calls is explained in some detail for civilian pilots in the CAA's Safety Sense Leaflet 26: Operations at Military Aerodromes, which is available from the CAA website. This very useful brief gives general, non-aerodrome-specific advice for civilian pilots who might not regularly use service aerodromes about the 'military way' of doing things. When read in conjunction with the appropriate Flight Information Publications; TAP charts etc applicable to the specific military aerodrome this should equip visiting pilots with all the material they required with which to brief themselves on what might be expected. Whilst a military controller Member's view was that the Puma crew's 'situational awareness' should have picked-up the presence of the approaching jet, it was clear that they were not acutely aware of the progress of the Nimrod on final approach although TOWER had made the appropriate broadcasts on VHF on three occasions: at 8nm, 4nm and finally at *"..2 miles breaking off"* before the Puma crew switched to LOS APP. So the controller might reasonably have expected the crew to have been forewarned about the jet's approach. Muting of receivers in the cct was mentioned – a very unwise practise. A CAT pilot Member astutely observed that unless the helicopter crew were hailed on RT using their individual callsign then they would be unlikely to realise that the broadcast message was aimed at them, for if they had they might well have questioned it at the time. Perhaps this was the underlying reason that after the Puma crew took-off and departed IMC in cloud/rain they were not aware that the Nimrod was catching them up rapidly after the latter's pilot executed his MAP. Thus without TCAS and with no possibility of sighting the Nimrod approaching from astern, the Puma crew had little chance of influencing the overall outcome of this close quarters situation in the climb-out to RW08.

For their part, the Nimrod crew, also flying IMC in cloud, had been instructed to "..*break-off the approach, one on for departure.."* as they approached the 2nm point. However this was 1min 18sec after the helicopter crew acknowledged their take-off clearance and were already airborne. Nevertheless, the Nimrod Pilot Flying might quite reasonably have presumed that ATC would take action to effect separation between his ac and any other IFR traffic during the MAP. The Member from C-in-C FLEET questioned whether there were specific release criteria laid down for the benefit of LOS APP controllers. It was explained by the Mil ACC Advisor that such strict guidance was not published for LOS APP but left to the individual controllers' judgement. Perhaps if LOS APP had stipulated that he expected the helicopter to be held on the RW until the Nimrod was clear it might have prompted the TOWER controller to do so. But the Mil ACC report had shown that he did not say this to the TOWER controller who was ultimately *"..responsible for sequencing the mixed arrival and departure of visual and instrument traffic"* here. TOWER should have been acutely aware that the jet would be following a slower helicopter - at more than twice the Puma's speed - so to allow the helicopter to take-off into an IFR departure ahead of the jet was most unsound in the opinion of the controller Members. The TOWER controller reports that the Nimrod pilot's intentions were to 'ROLL' and he reasoned that by executing the 'ROLL' it would slow the Nimrod down and put more distance between the jet and the Puma. Whether any intention to 'ROLL' might have been passed earlier and then changed to an 'OVERSHOOT' later was unclear but from the RT transcript before and throughout the approach it was evident that the Nimrod pilot's intention was always to OVERSHOOT. Consequently, with no intention to utilise the runway during this approach, Members agreed with the Mil ACC view that by delaying the Nimrod's break-off the situation was further exacerbated and indicative of poor appreciation and unsound planning. Therefore, if the TOWER controller had been more acutely aware of where the Puma was, the Nimrod's approach could have been broken off at the 4nm point and the helicopter's departure held until the jet was safely out of the way. Up until the point that the Puma was cleared to take-off the situation was recoverable and the Airprox could have been prevented but once in the air with no enforced height separation the conflict was inevitable. A number of procedural errors had been highlighted within the Mil ACC report and a controller Member was of the view that LOS APP should not have 'released' the Puma on its IFR departure with the Nimrod about to execute the overshoot into SID 'Alpha'. However, after a lengthy debate the Board finally agreed, unanimously, that this Airprox had resulted because the Kinloss TOWER controller cleared the Puma to take-off into conflict with the Nimrod.

With regard to risk, conversely, there was little to dispute. Although there was no recorded radar data to confirm the assertion by LOS APP that the contacts merged with a mere 200ft of vertical separation on Mode C, there was no reason to doubt the veracity of this report. Neither crew was aware of the other's ac until a very late stage when they had switched to LOS APP. Both crews were IMC in cloud and neither ac was fitted with TCAS. Furthermore, it was unfortunate that the avoiding action proffered by LOS APP when confronted with these two ac in close

proximity was too late to be effective as the crew of the Nimrod called just before the returns merged. Thus it was purely fortuitous that any separation existed at all as each ac turned in opposite directions and both ac climbed. The Board concluded unanimously that a definite risk of a collision existed in the circumstances conscientiously reported here.

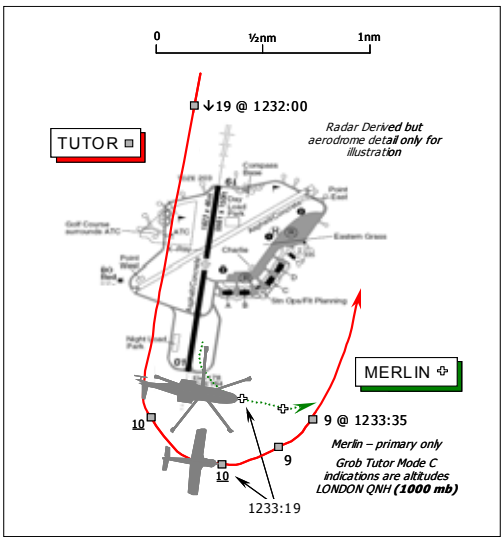
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Kinloss TOWER controller cleared the AS332L for take-off into conflict with the Nimrod.

Degree of Risk: A.

AIRPROX REPORT NO 155/06

Date/Time:	24 Oct 1233	
Position:	5137N 00106W (Benson RW19 a/d cct - elev 226ft)	
Airspace:	MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Merlin EH101	Grob Tutor
Operator:	HQ JHC	HQ PTC
Alt/FL:	↑1000ft	800ft
	QFE (992mb)	QFE
Weather	VMC NR	VMC NR
Visibility:	40km	>10km
Reported Separation:		
	100ft V/nil H	200ft V/200m H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN EH101 HELICOPTER PILOT reports he was operating in the underslung load (USL) cct at Benson on a training sortie with a Rope Troop Extraction System (RTES) USL. The helicopter has a green camouflage scheme but the HISLs were on whilst operating under the control of Benson TOWER on VHF - 127·15MHz - with a code of A3620 selected and Mode C 'off'.

TOWER cleared them to transition into the circuit with an RTES load of 3 troops. As he transitioned away from his location in the Day Load Park (DLP), the Grob Tutor was cleared to join the visual cct [for light ac at 800ft QFE] from the DEADSIDE and, he thought, the Grob pilot was informed by the controller that his Merlin was conducting ccts to the DLP with a load. As he executed his climbing CROSSWIND L turn through 100° onto the DOWNWIND leg at 50kt, the Grob Tutor was observed to pass down the starboard side of his helicopter and carry out a similar turn onto the DOWNWIND leg. Climbing to 1000ft QFE, visual contact was maintained by the crew of the Merlin who observed the Grob Tutor pilot tighten his turn to pass beneath the Merlin. As there was a significant danger to the RTES troops suspended 200ft beneath the Merlin, he elected to climb his helicopter to avoid a collision between his suspended load of 3 troops and the aeroplane. The Grob Tutor was observed by the RTES troops to pass directly beneath them at a vertical separation of about 75-100ft. A call was made on RT by his co-pilot to inform ATC of the incident and advise pilots within the cct that personnel were being carried on the RTES beneath his Merlin and that direct under-flight was inadvisable. He assessed that the minimum vertical separation was 100ft as the Grob passed from R to L directly below the personnel suspended from his helicopter on the RTES and the risk of a collision as "high". The RTES sortie was then continued without further incident.

THE GROB TUTOR PILOT reports that on completion of an air experience sortie for a cadet in the LH seat he was returning to Benson under VFR and in communication with Benson TOWER on VHF 127·15MHz. A squawk of A3621 was selected with Mode C on and he was flying the ac from the RH seat.

Inbound through INITIALS to circuit [LH] for RW19, TOWER advised that there was one in the circuit to the load park. After passing INITIALs he called DEADSIDE at about 1000ft QFE flying at 100kt. The cadet had been feeling unwell so he was making gentle turns as he turned L at the upwind end of RW19. Rolling out on a northerly heading at 800ft QFE at 80kt, he saw a Merlin helicopter about ½nm away heading in an easterly direction in his 10:30 position, about 500ft above his aeroplane. He also saw a rope hanging below the helicopter with two personnel suspended together and one further person slightly lower. To completely avoid the flight path of the helicopter would have required vigorous manoeuvring but he was confident that his current flight path would be laterally and vertically clear of the helicopter and the rope. The cadet was still feeling unwell so to avoid the Merlin he merely turned slightly R and descended slightly so as to pass ahead of the helicopter. He assessed the risk as "low", the minimum vertical separation as 200ft below the troops on the RTES with 200m of horizontal separation. The aeroplane is coloured white, but the HISL and landing lights were on.

AIRPROX REPORT No 155/06

THE BENSON AERODROME CONTROLLER (TOWER) reports screening a trainee ADC and had been in position for about 30min before the Airprox occurred. Benson was operating on RW19 in cc BLU [Vis: NLT 8km; 3 OKTAS 2500ft agl +or>] weather conditions with VFR circuit traffic on VHF 127·15MHz. The Merlin was positioned in the DLP and was carrying out load lifting ccts at 1000ft QFE with an RTES carrying up to 3 troops suspended beneath the helicopter.

The Grob Tutor pilot called for a visual cct rejoin with a/d information 'ROMEO' and was given the RW in use and advised of the cct state of '1 IN'. After calling at INITIALS the Grob Tutor pilot was passed the position of the '1 IN' - the Merlin in the Load Park. Shortly afterwards, the Merlin crew called ready for departure with 3 troops on the RTES and was cleared for TAKE-OFF. The Grob Tutor pilot then called DEADSIDE - now at 800ft QFE. Before any DOWNWIND call was received from either ac, a transmission was made from the Merlin to a "Grob Tutor collective callsign" warning the pilot about the troops on the RTES and not to fly underneath again. The Grob Tutor pilot made no reply to this transmission from the Merlin before he called DOWNWIND to land. Shortly afterwards the Merlin crew called "DOWNWIND with load for the load park" and was informed of the "1 ahead for the main" - the Grob. The Merlin crew then asked TOWER to note down the callsign of the subject Tutor ac.

The controller assessed the workload as "light" with 3 ac on frequency. [Another Grob pilot called to join just after the subject Grob pilot reported DEADSIDE and before the Airprox occurred.]

MIL ACC reports that the Merlin helicopter was operating under the control of Benson TOWER within the Benson visual cct area, carrying out USL circuits at 1000ft QFE (992mb) employing an RTES for up to 3 troops from the DLP. At 1230:06, the Grob Tutor pilot called TOWER "…for recovery with information Romeo". TOWER replied "[C/S] Benson TOWER join runway 1-9, 1 in", which was acknowledged by the Grob pilot. The Grob Tutor pilot reported INITIALS at 1231:16 and TOWER informed the crew "1 day load park". This was acknowledged by the Grob Tutor pilot. Some 20 sec later at 1231:36, the Merlin crew called "…ready for departure load park remaining 3 on the RTES". The Merlin crew was given permission for TAKE-OFF at 1231:49 and issued the surface wind of 250°/8kt. The subject Grob pilot reported DEADSIDE at 1232:02. Just 1½min later at 1233:32, a transmission was made by the Merlin crew on the frequency, "[Tutor C/S] under the helicopter, we have got people under the helicopter. Do not pass underneath it again". No response was made to this transmission and both crews continued with normal circuit work.

Aircrews operating within the visual circuit area of a military airfield operate VFR. TOWER is responsible for passing traffic information to allow crews to take their own separation against other ac. TOWER passed the position of the helicopter to the Grob Tutor pilot after the Tutor reported at INITIALS (that is 2nm range slightly offset to the R into the DEADSIDE from the RW19 centreline). Just after TOWER had informed the Tutor pilot of the Merlin's presence in the DLP, the Merlin crew transmitted on frequency that there were "3 on the RTES". It is considered that sufficient traffic information was passed to allow the Tutor crew to become visual with the Merlin.

[UKAB Note (2): Analysis of the Heathrow Radar recording shows the Tutor aircraft approaching Benson from the N squawking A3621, descending through 1900ft Mode C London QNH (1000mb). At 1232:59, the Tutor had descended to 1000ft London QNH (1000mb) - equating to about 760ft Benson QFE (992mb) - and is shown 0·8nm SSW of Benson heading S and commencing a L turn downwind. The Merlin helicopter first appears at this point - ½nm S of Benson - as only a primary contact with no supporting SSR or Mode C, tracking SE; the horizontal separation between the aircraft is 0·4nm. The Tutor continues in the L turn as horizontal separation reduces to 0·2nm whereupon the Merlin fades from radar at 1233:27 and is not displayed during the encounter. Projecting the presumed track of the Merlin, suggests the 2 ac might have crossed just after 1233:35, when the Tutor indicated 900ft London QNH (1000mb) Mode C - equating to about 660ft QFE (992mb) - whilst tracking 030°. The Merlin is not displayed again until after 1234:31, when it has turned DOWNWIND outside of the Grob Tutor's cct.]

UKAB Note (3): The UK Mil AIP at AD 2 - EGUB - 1 - 9 stipulates that:

Helicopters operate live and deadside up to 1000ft QFE

Heli circuits 1000ft and can be flown to the Loadparks. Light fixed wing aircraft height 800ft.

THE MERLIN EH101 HELICOPTER PILOT'S STATION helpfully provided a copy of the flight safety investigation conducted into this Airprox.

The Merlin helicopter crew was conducting RTES training for aircrew new to this method of extracting personnel with the instruction being provided by the ac Captain, a QHTI, and a Joint Air Transport Evaluation unit (JATEU) instructor who was also on board the helicopter. Three service personnel were simulating extraction: one of which was an aircrew member being trained in the handling characteristics of the RTES and experiencing the actual conditions that troops attached to the RTES would encounter. Each circuit profile started with the helicopter established in a 170ft hover, with the 200ft long rope attached to the ac's underslung load (USL) hook. There are 3 pairs of loop points in the lowest 25ft of the RTES rope that allow personnel to "clip-on", using a karabiner, and a final loop upon which personal equipment may be attached. Once the personnel were secured, the ac would be climbed to 1000ft QFE and follow the standard USL circuit pattern for RW19. Due to the length of the RTES and the light load that was attached to the rope, the helicopter would be flown at a relatively slow forward speed of 50kt, allowing the Merlin to climb much more expeditiously than would be normal if a heavier USL had been attached.

At 1231:36, the Merlin crew called ready for departure for the second of four such ccts, giving the location as the "load park" followed by "remaining 3 on the RTES". Clearance was obtained, and the Merlin crew climbed at 1231:53. The Grob by this time was tracking parallel to RW19, adjacent to the load park, and called DEADSIDE at 1232:02. As the cadet had been feeling unwell, the pilot of the Grob flew the aircraft sympathetically, making gentle attitude adjustments throughout the recovery phase. The ac descended during the DEADSIDE join and then turned CROSSWIND at a height of 800ft throughout which time the Merlin - complete with USL - would have been behind and under the port wing of the Tutor. As the Grob rolled out onto the DOWNWIND leg, he became visual with the Merlin and its USL of three personnel crossing his track from L to R, less than ½nm ahead of his ac, with the Merlin helicopter above the Tutor and the personnel on the RTES attached below the fuselage of the Merlin. To further increase separation, the pilot of Grob manoeuvred slightly to his R and descended gently, attempting not to worsen the condition of his passenger, whilst passing, he reports, 200ft below and 200m ahead of the bottom of the underslung RTES and attached troops. Meanwhile, the Merlin crew climbed their helicopter straight ahead until nearly abeam the threshold of RW01 when they began a CROSSWIND turn, still climbing to the [USL] cct height of 1000ft QFE. Visual with the Grob during their turn, the Merlin crew observed the Grob pass down their starboard side due to its greater speed and follow the Merlin's turn through the DOWNWIND leg. With the helicopter approaching 1000ft QFE - and the extremity of the RTES USL at about 800ft - the Merlin crew perceived that the Grob pilot had tightened his turn and adjudged that the separation between the Tutor and the personnel attached to the RTES would not guarantee the safety of either party; thus a further climb was initiated taking the Merlin to 1200ft and the USL to 1000ft. At 1233:32, the Merlin pilot broadcast on the TOWER frequency that they had personnel under their helicopter and that other ac should not fly underneath it again. The air crewmember upon the RTES estimated the minimum separation achieved to be 100ft vertically with no horizontal separation.

Both ac were operated in accordance with normal cct procedures which, whilst providing height and lateral spacing for most of their respective ccts, does present two occasions when the ac must cross each other's track whilst altering height. With each ac being flown at normal cct heights for their respective types, this did not provide separation between the bottom of the RTES USL and light ac cct.

After his DEADSIDE join, the Grob Tutor pilot did not expect that the Merlin, which had departed the DLP, would already have climbed to a similar level with an attached USL and turned inside of the FW circuit, crossing his aeroplane's track without some warning as to the shortness of the into-wind leg flown by the Merlin pilot. Neither did the Grob pilot appreciate early enough that the length of the rope attached to the Merlin posed a threat and so did not manoeuvre his ac away sufficiently dynamically from the USL attached to the helicopter to achieve a level of separation that would have reduced the likelihood of a collision without the Merlin altering either course or height.

The Merlin crew, having identified the 'threat' potentially posed by the Grob as they turned inside of the light ac cct pattern, assumed that the Grob pilot would recognise this risk but were then forced into making an avoiding action climb at the last moment.

Only the Merlin crew was aware of the length of the RTES rope but did not consider that this could constitute a threat to another ac, even when they turned CROSSWIND inside of the light ac cct and saw the Tutor turning and continuing to follow the normal track for the light ac circuit. ATC cleared the Grob pilot to join the circuit imparting that there was "one day load park" despite having seen, from the helicopter's previous cct, that it was flying a cct with a load which was considerably different to that normally seen beneath a helicopter in the Benson cct.

In addition to an update to the Flying Order Book, it was recommended that:

When ac operators are to knowingly deviate from normal procedures or practices that this be imparted to those that may be affected or to those that may be in a position to inform others of the potential impact of the change to normal operations.

Both RW and FW cct heights be reviewed with the intention that RW circuits are conducted at a height below that of the FW ac circuit.

It was observed that: the meaning of the transmission made by the Merlin crew "load park, remaining 3 on" was not fully understood by either ATC or other pilots in the circuit. Unfortunately, no one challenged the Merlin crew on RT as to the meaning of their message and therefore the helicopter crew assumed that their message provided suitable warning information to other pilots about their activity.

A further Tutor joined the cct during this incident but was not made aware of the unusual nature of the USL by ATC nor of the potential risk that existed between personnel suspended on the RTES and the light ac circuit.

Having turned inside of the Grob in the cct, the crew of the Merlin chose to monitor the aeroplane's track having recognised early on that the aeroplane had the potential to become a threat to their USL. Whilst other pilots would normally be expected to give way to an ac carrying an USL and not fly under it, the Merlin crew elected to remain 'reactive' until the last minute, when a further climb was initiated, rather than issue a pre-emptive broadcast warning about the USL.

HQ JHC comments that Benson conducted a thorough and accurate investigation and we support the recommendations detailed in the report. However, we believe that had a safety management case been conducted in consultation with Benson ATC before full implementation of the RTES equipment occurred, it is unlikely that the confusion arising from the sortie being flown by the Merlin would have occurred. It is confirmed that since the incident, Benson have revised their cct procedures so that the fixed wing traffic now sits above that of the rotary traffic when they are conducting underslung loads. This change in procedures should prevent the underflight of rotary ac by fixed wing traffic when they are in the RTES configuration.

This was a potentially serious incident caused by poor communication, a lack of understanding, marginal lookout in the visual circuit and less than ideal decision making. This HQ will ensure that the lessons identified in the report receive wide publicity, which, along with the actions detailed above, should help prevent a similar occurrence in the future.

HQ PTC comments that this Airprox was not as straight forward as the impression given by the initial notifications. There were factors involving both aircraft and ATC and had any one not happened this Airprox would have been avoided. Ultimately, the Merlin pilot had the Tutor ac visual throughout the incident and took appropriate action to avoid an actual collision with the Merlin's USL.

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 Station's comprehensive analysis had proved very helpful in explaining to the Members the nature of the exercise being conducted by the Merlin crew, especially to those not intimately familiar with such helicopter tasks, thereby giving the Board as a whole a better understanding of the Merlin crew's somewhat unique sortie.

Having already completed one cct with the RTES, the unusual and unwieldy nature of this sortie - particularly the considerable length of the 200ft USL compared to a more-conventional USL strop - should have been readily apparent to the controllers in the Tower. It was clear that the Merlin crew were already operating in the USL cct when the subject Grob returned to the aerodrome to join the LA cct, experienced military Members expressing surprise that these two seemingly incompatible cct profiles were allowed to operate simultaneously. Some Members were amazed that the USL cct was above the LA cct, the HQ AIR Cmd (Trg) Member agreeing that the ccts had not been well designed. Given the potential hazard to the suspended troops it seemed to some Members

that there were grounds for sterilising the LA cct below the helicopter pattern when such evolutions were in progress. Some Members therefore viewed the cause as intrinsically a conflict between the stipulated cct patterns. The Board questioned whether such evolutions as this were highlighted at morning briefings for the benefit of other station aircrew, especially when practising the use of RTES appeared at face value to impact so significantly on the operation of the LA cct. However, HQ JHC explained that action had already been taken subsequent to the Station's investigation of this Airprox such that the USL cct is now below that for circuiting fixed-wing ac, thereby allaying Members concerns in this respect.

The reporting Merlin pilot thought that the Grob pilot had been informed by the controller that his Merlin was conducting ccts to the DLP with a load. However, the Mil ACC report had revealed that the trainee TOWER controller only passed the standard responses to the Grob pilot's joining calls, with no indication at all to the other pilots [neither the Grob pilot involved nor the second Grob pilot joining] that the Merlin had a 200ft rope suspended beneath it with three personnel attached. Members were concerned that the nature of this activity did not prompt a warning from TOWER and the presence of the RTES/troops suspended below the Merlin appeared to come as somewhat of a surprise to the Grob Tutor pilot. The TOWER controller's report had revealed that he was screening a trainee controller at the time and so it seemed that all of the instructions and cct information would have originated from the trainee. Nonetheless, in this "light" traffic situation the Mentor was in a position to ensure that his trainee's instructions and level of control were not detrimental to the overall ATS provided. It was clear that in response to the joining call TOWER merely advised the Grob Pilot that there was "…1 in" and, as per norm, later reported the helicopter's location of "1 day load park" when the Grob Pilot called at INITIALS some 2nm out. Notwithstanding the Merlin pilot's rather obscure transmission, the Members recognised that this limited cct information, provided by TOWER in accord with established military ATC practise, did not paint a very comprehensive picture to the Grob pilot of what he might encounter when he actually turned into the cct. This cct information provided no warning at all about the RTES suspended below the Merlin which encroached directly into the LA cct and might well have been difficult to spot at range - looking down - especially if the troops were dressed in camouflaged combat gear, which they probably were. It seemed to the Members that a more comprehensive warning about the unusual nature of the Merlin's USL should have been provided by TOWER to the Grob pilot. Thus he could have been 'primed' and looking out for the RTES and the personnel suspended below the Merlin at exactly the same height at which he was about to join the cct when he turned from the DEADSIDE and descended from 1000ft onto the DOWNWIND leg. Members agreed that the information provided by TOWER was inadequate in these circumstances and it was not surprising that the Tutor pilot reports he was not aware of the Merlin's RTES and suspended troops until a very late stage indeed - he reports becoming visual when the Merlin and its USL of three personnel was crossing his track less than ½nm ahead of his ac. A prior warning from TOWER would undoubtedly have helped the Grob pilot to grasp an appreciation of the situation earlier, allowed him to look out for the USL under the helicopter and enabled him to integrate into the cct more safely and perhaps given the helicopter/USL a wider berth.

The HQ PTC Member pointed out the difficulties of sighting traffic below and to port from the RH seat of a Grob, which is where the pilot was seated, and the Station's report had highlighted this point. It was mentioned that as the Grob descended from the DEADSIDE and turned CROSSWIND to join the cct at a height of 800ft the Merlin and attached RTES would have been behind and under the port wing of the Tutor until the Merlin climbed up to cct height and thus above the Grob. It was at this point that the Merlin crew saw what was happening and its pilot elected to climb to avoid the Grob as the latter rolled out onto the DOWNWIND leg for the LA cct, inside that of the USL cct. The majority of Members took the view that the Merlin with its unusual USL was already 'IN' the cct - as reported by TOWER to the Grob Tutor pilot - and as the Merlin pilot was somewhat restricted in his ability to manoeuvre, the Grob Tutor pilot would have to give way to other ac already circuiting in the pattern. However, another view was that the Merlin pilot had not been cleared to lift from the DLP by TOWER until after the Grob Tutor pilot had reported INITIALS and thus the Merlin crew had a mutual responsibility to watch out for the Tutor joining - which they should have been aware of from the latter pilot's RT calls - to ensure that their cct's did not conflict. Whilst the helicopter crew was doubtless keeping a good lookout, the Merlin airloadmaster's attention would understandably have been focused on the RTES and the pilots would have been unable to spot traffic approaching from astern until it overtook them on the beam at about 1½ times their speed. Moreover, the white Grob Tutor is a notoriously difficult ac to spot so the Merlin pilots probably saw the Grob as soon as they could have done. In the Board's view, as the Merlin crew was given permission by TOWER to TAKE-OFF before the Grob reported DEADSIDE, the latter's pilot should have been looking out for the helicopter as it lifted into the cct and given it a wider berth as he executed his turn DOWNWIND. Whilst there was potential here for the situation to get dramatically worse, the Board could only assess what actually happened. The Board accepted that the relative vertical disposition of the respective ccts was not at all suited to USL carriage of the RTES although this

issue had now been satisfactorily addressed. Therefore, taking all these factors into account the Board concluded that this Airprox had resulted because the Grob Tutor pilot flew close enough to the helicopter with its underslung load to cause the Merlin crew concern.

Turning to the inherent risk, the Merlin's USL was considered here to be part of the ac and therefore in their assessment of the risk of a collision the Board considered not only that between the helicopter and the Grob but also the risk between the aeroplane colliding with the RTES and the troops borne aloft on it. The Grob pilot reported that he had not sighted the Merlin helicopter until it was in his 10:30 crossing from L - R ½nm ahead and then subsequently saw the troops suspended on the RTES. The Grob pilot says the helicopter was 500ft above his aeroplane at that point: whether this was before or after the Merlin executed his avoiding action climb was not clear, because without any Mode C data from the Merlin the vertical separation could not be determined independently. Nonetheless, if the Merlin climbed to 1200ft QFE, placing the USL at 1000ft QFE as the Station had reported, the radar recording does show the Grob's Mode C indicating an equivalent height of about 660ft just before the tracks crossed, adding credence to the Grob pilot's assertion. The Grob pilot says that he merely turned slightly R and descended slightly so as to pass ahead of the helicopter with a "low" risk, the minimum vertical separation from his perspective being 200ft below the troops on the RTES with 200m of horizontal separation. Whilst noting that the Grob pilot mentioned that his cadet passenger was unwell, if he had need to manoeuvre more robustly to avoid a collision the Board was in no doubt he would have done so. Nevertheless, as he was not aware of the situation until he had turned DOWNWIND the Grob pilot was also somewhat restricted in his ability to manoeuvre at that late stage, a Member observed. So also was the Merlin pilot at these close quarters who might have been, understandably, very reluctant to release the RTES USL load in an emergency. Nevertheless, the Merlin pilot had spotted what was happening in sufficient time to exercise the other option available to him, which was to climb further and give the Grob a wider berth. The Merlin pilot's view was that the Grob passed from R to L 100ft directly below the personnel suspended from his helicopter - which the aircrew member actually watching from the RTES supported - with the risk of a collision stated as "high". There was considerable debate as to whether the Merlin crew would have been able to judge the separation as accurately as the Grob pilot looking straight at the RTES but the helicopter pilot Members affirmed that the loadmaster would have been able to judge quite well the vertical displacement below the RTES. As it was, both pilots had taken timely and effective avoiding action, which led the Board to conclude, unanimously, that no risk of a collision had existed in the circumstances conscientiously reported here.

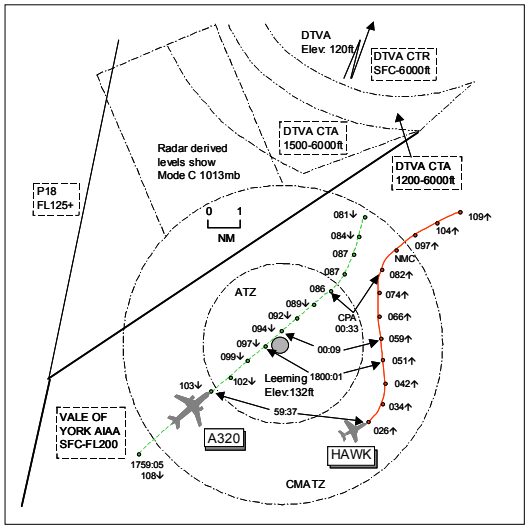
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Grob Tutor pilot flew close enough to the helicopter with its underslung load to cause the Merlin crew concern.

Degree of Risk: C.

AIRPROX REPORT NO 156/06

Date/Time:	2 Oct 1801	TWILIGHT
Position:	5420N 00128W (11nm S DTVA - elev 120ft)	
Airspace:	Vale of York AIAA	(Class: G)
Reporter:	DTVA APR	
	First Ac	*Second Ac*
Type:	A320	Hawk TMk1A
Operator:	CAT	HQ STC
Alt/FL:	NR↓	↑FL150
Weather	IMC KLWD	VMC CLOC
Visibility:		>20km
Reported Separation:		
	Nil V/3nm H	Not seen
Recorded Separation:		
	400ft V/1·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DURHAM TEES VALLEY APR reports that the A320 was being vectored from the SW heading 050°. He telephoned Leeming requesting the lowest level that he could transit their O/H and was told FL50. The A320 was descending through about FL90 just SW of Leeming when he saw an 0410 squawk rapidly climbing through FL60 and into conflict with the A320. He gave TI to the A320 crew and an avoiding action R turn onto heading 120° but the crew elected to turn L. He telephoned Leeming and enquired what they were doing and they just replied 'sorry'. He subsequently telephoned the Leeming Supervisor who stated that they had got unexpectedly busy and would appear to have forgotten about the supposed agreement.

THE LEEMING APPROACH CONTROLLER (APP) reports working as both the Approach and Director and also monitoring the Zone VHF/UHF frequencies during a busy period of night flying. The DTVA radar controller gave TI regarding a DTVA inbound, the A320, and subsequently called back to request the lowest level to which the DTVA controller could descend his A320 through the Leeming O/H. The APP told the DTVA controller he could descend to FL50, judging that the track of the DTVA ac would take it N of the Leeming O/H. At the time 3 ac were on frequency, 1 inbound and 2 others on departure requiring handover to other units, with 3 pre-noted departures. The subject Hawk climbed out on a SID E departure under a RIS whilst there were 2 ac in the visual cct that were displaying squawks which made it difficult to maintain track identity on the DTVA inbound A320 as it approached the O/H. The APP was then too busy to go back to the DTVA controller with TI on the subject Hawk. TI on the A320 was then given to the Hawk pilot as *"West 5 miles tracking N indicating FL80"* which was acknowledged before turning attention to another outbound ac which was on climbout. The Supervisor then informed the APP that DTVA had reported that the A320 had received a TCAS RA.

THE LEEMING SUPERVISOR (SUP) reports that the APP, during and after the reported incident, was extremely busy working as both Departures and Arrivals functions. The APP received a call from DTVA identifying a track, the A320, positioning for a LH downwind join for DTVA RW23 which was heading NE to fly through the Leeming radar O/H. The DTVA controller requested the lowest level available to which he could descend his A320 through the O/H. To give vertical separation against any Leeming visual cct traffic, the APP allowed the DTVA controller to descend his A320 to FL50 but no formal coordination was undertaken. As the A320 approached the O/H, a SID E departure, the subject Hawk, called on climb-out. Initially it was difficult to see the position of both ac owing to being close to the radar O/H and SSR label clutter with other ac in the area. Just as both subject ac approached about 3nm NE of Leeming the DTVA controller called to clarify whether his A320 had been cleared down to FL50 through the O/H. Later, the DTVA controller informed him that his A320 flight had received a TCAS RA and would be filing an occurrence report.

THE A320 PILOT reports heading NE at 250kt inbound IFR to DTVA from Leeds and in receipt of an ATS from Durham ATC squawking an assigned code with Mode C. Whilst in an en-route descent following vectors from ATC

in the vicinity of DTVA they received a TCAS TA. The traffic was to their R and below but climbing and he turned L to avoid without any ATC advice, he thought. They were flying in cloud in IMC so the other ac was not seen visually but he estimated from TCAS that it passed 3nm clear with no vertical separation.

THE HAWK TMK1A PILOT reports on departure RW16 at Leeming on a day-into-night navigator-training sortie and in receipt of a RIS from Leeming on 386·575MHz squawking 0410 with Mode C. Departure was via the Leeming SID E climbing to FL150. Weather was SCT to BKN cloud in the climb out lane with >20km visibility in VMC and the ac was black in colour with HISLs switched on. At some time during the initial climb accelerating through 300kt heading 355° to intercept the LEE 060°R outbound, he received a call on traffic to the NW above him. The traffic was not seen and by the time he acknowledged the call he had turned onto 060° with the traffic behind him. At no time did he consider this traffic to be a hazard.

ATSI comments that at the time of the Airprox the A320 was in communication with the Durham Tees Valley APR. In accordance with the LoA in place at the time, details on the inbound A320 were passed to Leeming. The A320 flight contacted the APR at 1756:40, when it was 36nm SW of DTVA. The crew were instructed to turn R heading 050° and descend to FL90. A short time later the APR instructed the crew to descend to 4000ft, QNH 997mb before informing the crew that they were now in receipt of a RAS and would be vectored to the ILS for RW23. At 1759:05, the APR telephoned Leeming and said: *"What is the lowest level I can go through your overhead on the (A320 squawk) please"*. The reply was *"Are you happy with FL50?"* to which the APR advised that he was.

The A320 was 6nm SW of Leeming (23nm SW of DTVA) when this coordination was initiated. Although the A320 had been cleared to 4000ft it was still only passing FL109 and so the APR assessed that there was no need to amend the descent clearance (FL50 being equivalent to 4520ft QNH 997mb). At 1759:38, the Great Dun Fell radar recording shows an 0410 squawk appear 2·5nm SE of Leeming indicating FL026. The A320 was now passing FL103 still heading 050° and 3nm SW of Leeming. The 0410 squawk (now known to be the subject Hawk) is then observed to turn L and, at 1800:01, is in the 2 o'clock position of the A320 at a range of 3·7nm with the A320 passing FL97 and the Hawk converging and passing FL51.

At 1800:09, the Hawk is tracking N, passing FL59 climbing, and in the 2 o'clock position of the A320, which is passing FL94, at a range of 3·1nm. The A320 crew transmitted *"A320 c/s we have traffic in ????? ?????* (one or two words unintelligible) to which the APR responded with *"Affirm sir turn right heading one two zero degrees avoiding action"*. He then telephoned Leeming and requested the intentions of the 0410 squawk. The Leeming Supervisor advised that the ac was following a 'SID East' and climbing to FL150. When the APR asked why this was happening when the arrangement was for the A320 to transit the Leeming overhead at FL50, the Supervisor apologised. At 1800:33, the CPA, the Hawk was in the 12 o'clock position of the A320, in a turn onto a NE'ly track, at a range of 1·7nm with the A320 at FL86 and the Hawk passing FL82 climbing. The A320 crew transmitted *"And now we are turning heading zero five zero now confirm"* to which the APR replied *"A320 c/s thanks"*. Even though the APR had previously issued an avoiding action turn to the A320, from 050° onto 120°, the crew did not comply with this instruction.

[UKAB Note (1): The radar recording reveals that at the CPA the A320 has arrested its descent at FL86 and for the next 2 sweeps (16sec) indicates a climb and level-off at FL87 before its descent is recommenced. Meanwhile the Hawk shows NMC before 1000ft vertical separation is established on the 2nd sweep, during its R turn, by which time it is climbing through FL97 and lateral separation has increased to 2nm.]

At the time of the Airprox the LoA between Leeming and DTVA required that all SID N departures must receive a positive release from DTVA but this did not apply to SID E traffic which was what the Hawk was following. However, paragraph 15 of the LoA states: '*In addition to the Gap Traffic procedures set out in paragraph 27, the ATSU at Leeming is to notify the ATSU at DTVA of any arriving, departing or transit traffic which, due to routeing and traffic information already received, is likely to affect aircraft operations at DTVA*'. The DTVA APR correctly notified Leeming of the A320 traffic and coordinated a transit through the O/H descending to FL50. Subsequently the Hawk was permitted to depart and fly into conflict with the A320 without any further notification to the DTVA APR.

MIL ACC reports that during a period of day-to-night flying the subject Hawk taxied at Leeming for departure to the E climbing to FL150. Leeming Ground notified the Hawk's climbout detail to Leeming Approach/Departures (APP) at 1752:59. At 1759:00, DTVA Radar Controller contacted APP via landline to request *"What's the lowest I can go through your overhead on the 4376?"* APP replied *"Are you happy with FL50?"* DTVA confirmed that he was and the

landline call was terminated. Nine seconds later the Hawk crew reported on APP's frequency *"Hawk c/s airborne passing 1500ft".* APP identified the Hawk at 1759:22 *"climbing FL150 radar information, limited due to poor radar performance".* The Hawk crew acknowledged the identification and read back the cleared level. At 1800:00, APP verifies the Hawk's level passing as FL60. Another ac unassociated with the Airprox reports airborne at 1800:17. DTVA contacts Leeming Supervisor (SUP) at 1800:27 but the conversation is initially blocked out by ac calling on other frequencies but SUP responds with *"the 0410 is climbing to FL150 on a SID East and is going to work in the Vale".* DTVA replied *"…(unreadable)…deal was not…(unreadable)… I could go through your overhead at FL50".* APP passes TI to the Hawk crew at 1800:57 as *"Hawk c/s there's traffic west 5 miles tracking north indicating FL80".* The Hawk crew report "*looking*". No further communication is made regarding the Airprox.

Analysis of the Great Dunfell Radar shows the Hawk climbing out of Leeming and instigating a L turn squawking 0410A and indicating FL026C climbing. Simultaneously, the A320 is 3nm SW of Leeming tracking 040° and indicating FL103C descending. The Hawk steadies onto a N'ly heading whilst indicating passing FL051 with the A320 overhead Leeming indicating FL097 still descending. As the lateral separation between the 2 ac reduces to 2·6nm the Hawk, indicating FL066 climbing, is in the A320's right 2 o'clock indicating FL092 descending. The CPA occurs at 1800:33 with the Hawk, indicating FL082, crossing R to L in the A320's, R 2 o'clock at 1·7nm with 400ft vertical separation shown. At this point the Hawk is seen to commence a R turn away from the A320. The next sweep shows the lateral separation increases to 1·8nm but the Hawk's Mode C indication disappears for one sweep. The next sweep, at 1800:49, shows the Hawk's Mode C indication returning at FL097 and above the A320 which is indicating FL087. After this point the separation between the 2 ac continues to increase.

This Airprox occurred in Class G airspace, the Hawk being in VMC. The Hawk had been prenoted to APP for a SID E Departure off RW16 at Leeming and APP had received TI from DTVA regarding an inbound track, the A320, which would be routeing through the Leeming overhead. The Letter of Agreement (LOA) between Leeming and DTVA dated Nov 04, which was active at the time of the Airprox, states at Para 19:

Teesside Inbounds:

"(1) *Inbounds from POL will be notified to Leeming and co-ordination on levels and routeing will be mutually agreed when necessary*".

Historically, the wording of this paragraph has caused misunderstandings between Leeming and DTVA controllers in particular as to when co-ordination has been effected. In this instance, Leeming APP was under the perception that coordination had not been agreed but merely TI had been passed between the 2 units. A thorough review of the contents of the LoA between Leeming and DTVA has been carried out jointly by MoD and SRG, with major changes made reference TI and coordination. The new LoA became effective as of Dec 06. Notwithstanding whether coordination had been achieved or not, APP was providing the Hawk crew with a RIS as per JSP552:

"RIS is an air traffic radar service in which the controller will inform the pilot of the bearing, distance and, if known, the level of conflicting traffic. No avoiding action will be offered. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information"

APP did not provide the Hawk crew with TI until the lateral separation between the 2 ac was 2·5nm and increasing, after the CPA of 1·7nm/400ft, and the Hawk had initiated a R turn and the A320 is seen having commenced a L turn. Earlier TI would have allowed the Hawk crew more opportunity to acquire the A320 visually. Similarly, APP was aware of the A320's flight profile and should have taken this into account when climbing the Hawk through the A320's level with particular reference to the passing of TI to the Hawk crew to allow them to take adequate visual separation.

STATION comments that the Hawk pilot was unaware that there had been any conflict until ATC informed him of such and, as stated, the pilot had already carried out a manoeuvre that had effectively removed any risk of collision.

The Hawk ac was under RIS and the Leeming controller's responsibility was therefore only to call traffic. Although the Leeming controller should have called the traffic earlier, it must be acknowledged that the controller's workload at the time was high. The A320 was under RAS and the onus was therefore on the DTVA controller to instigate either co-ordination or timely avoiding action to maintain standard separation. Although TI had been passed by the DTVA controller, no coordination had been agreed. The recent review of the LoA between Leeming and DTVA

specifies the phraseology and actions required for coordination to be effected. This should prevent future occasions when the DTVA controller believes that co-ordination has been agreed but Leeming believes only that TI has been passed.

HQ STC comments there was obviously a misunderstanding between the two controllers concerned as to what had been agreed on the landline prior to this incident. The reworded LoA should make these transactions more robust.

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 ACC Advisor informed Members that since this incident Leeming ATC have reviewed manning levels for night flying and now ensure that staffing is appropriate to open the 2 main radar positions if necessary. Turning to the subject Airprox, civil ATCOs believed that the DTVA APR had acted appropriately and complied with the LoA extant at the time. He had pre-noted the A320 to the Leeming APP with TI, immediately prior to the flight calling on his frequency, and then believed he had effected coordination with the Leeming APP, a little over 2min later, who proffered FL50 as the lowest level to which he could descend the A320 in the Leeming O/H. However, the APP and SUP at Leeming thought that this conversation had only been further TI, not coordination. This view was shared by Military ATCO Members who firmly believed that if a controller asks for a level, this is not coordination and only becomes so if the appropriate word 'coordination' is used during the conversation. The circumstances of this Airprox therefore provided a salutary reminder to all ATCOs when attempting to establish coordination between civil and military ATSUs. That said, Members agreed that the Leeming APP was then aware from this 'TI' of the A320's intentions with this telephone exchange occurring immediately before the subject Hawk's pilot made his first call on the APP's frequency. Members wondered why the APP had not acted on this information whilst it was very fresh in his mind. Although undoubtedly busy, owing to the bandboxed configuration, Members thought that this would have been an opportune time for the Leeming APP to have passed TI to the DTVA APR on the departing Hawk, as required by the LoA, as its SID E profile clearly did affect the A320's flight path. The APP had reported difficulty maintaining track identity on the A320 owing to other ac's squawks in the cct but some Members believed that perhaps the APP should have restricted the Hawk to climb not above FL40 until sure that the subject ac were not on conflicting flight paths. The APP had stated that he thought the A320's track would take it to the N of the O/H but this would have been difficult to monitor as the ac's radar return would disappear from the radar display as it passed through the radar O/H. One ATCO Member opined that when an ac is passing close-to or through the radar O/H, a blocking strip can be used as an 'aide memoire' to re-inforce its presence, although this procedure is not used at Leeming. Another Member thought that perhaps the Leeming APP just simply forgot about the A320 'in the heat of the moment'. However, the APP was cognisant of the A320's flight path but had not notified DTVA of the departing Hawk and did not attempt to separate. Had Leeming passed TI to DTVA on the Hawk, Members believed that this would have invoked coordination between the 2 ATSUs and established a course of action and agreement to resolve the potential confliction. This led Members to agree that the cause of this Airprox was that the Leeming APP did not comply with the provisions – specifically paragraph 15 - of the LoA.

Although the Hawk pilot was in receipt of a RIS from Leeming, it was evident that the TI given to him on the A320 was after the CPA when separation was increasing. Earlier TI from Leeming APP would have given the Hawk pilot a heads-up on the approaching A320 thereby enabling him to decide the best course of action as he was responsible for his own separation through 'see and avoid' during this Class G airspace encounter. From the Hawk pilot's perspective, no confliction was apparent when he was told of traffic 5 miles to his W tracking N away from his NE'ly track and below his level. This led Members to agree that the lack of timely TI from the Leeming APP to the Hawk pilot in accordance with the requirements of a RIS had contributed to the Airprox.

Risk-wise, the Hawk pilot had not seen the A320 as it was approaching from his rear L quarter. As he followed the SID E departure, unbeknown to him, his accelerating, climbing R turn quickly helped to resolve the confliction. The A320 crew had seen the Hawk on TCAS and informed the DTVA APR of the potential confliction, who gave the crew an avoiding action R turn onto 120°. Immediately, the APR telephoned Leeming to establish the Hawk's intentions and was given TI by the SUP. Meanwhile, the A320 crew had monitored the deteriorating situation and, contrary to the APR's R turn instruction, had briefly arrested their descent and elected to turn L away out of conflict without visually acquiring the Hawk. Although ultimately these actions had partly resolved the confliction, pilot

Members noted that the A320 crew had manoeuvred in response to a TA alert, contrary to TCAS recommended practice. The ACAS equipment is known to have limited capabilities in resolving the bearing, heading or vertical rates of intruders accurately. Although singularly untidy, all of these elements when combined with the actual geometry that pertained at the time were enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

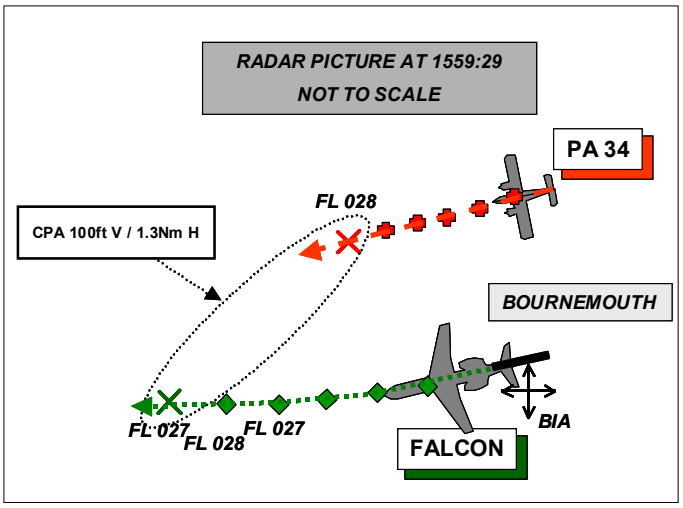
Cause: The Leeming APP did not comply with the provisions of the LoA.

Degree of Risk: C.

Contributory Factor: The Leeming APP did not give timely TI to the Hawk pilot in accordance with the requirements of a RIS.

AIRPROX REPORT NO 157/06

Date/Time:	27 Oct 1559	
Position:	5047 N 00152 W (1.5nm W Bournemouth - elev 38ft)	
Airspace:	Solent CTA 2	(Class: D)
Reporter:	Bournemouth APC	
	First Ac	*Second Ac*
Type:	Falcon 900	PA34
Operator:	Civ Comm	Civ Trg
Alt/FL:	2500ft (N/K)	3000ft (QNH NR)
Weather	VMC NR	VMC CLBL
Visibility:	10nm	>10nm
Reported Separation:	NR	1000ft V/1nm H
Recorded Separation:	100ft V/1.3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

BOURNEMOUTH APR reports that after issuing an airways clearance to the ADC for a Falcon 900 of *'cleared to EGLL via SAM and OCK, climb F70, Squawk 6024',* she then issued the ADC with a release of *'fly heading 270 degrees, climb to altitude 2000 feet'* [See ATSI report below]. This was due to a PA34 being in the BIA hold at 3000ft [Alt]. The ADC passed this restriction to the Falcon pilot several times [she thought] until a correct readback was received. The Falcon departed and as soon as the SSR return appeared on radar the ac was indicating 3000ft. The Falcon was approximately 1½nm W of the PA34 that was westbound in the BIA hold at that time. As she was giving the PA34 pilot avoiding action, the ADC had observed the 'level bust' [sic] by the Falcon on the ATM and instructed the pilot to descend immediately to 2000ft. Separation was then restored.

THE FALCON 900 PILOT reports that their departure clearance was to SAM, OCK and to maintain FL070. Upon entering RW26, the ADC then cleared them for the noise abatement procedure for RW26 until 2000ft. Their understanding was that at 2000ft they could start their turn to SAM and continue the climb to FL070. The Bournemouth Controller informed him of the incident.

THE PA34 PILOT reports that he was Westbound in the BIA hold at 3000ft at 115kt on a training flight. The departing Falcon turned right towards them after takeoff and climbed to their level. When the separation was 1 to 2nm he was given an Avoiding Action left turn onto S. He assessed the risk as being low/medium.

ATSI reports that a Falcon 900 had taxied for departure to Heathrow, lined up on RW26 and was issued with an Airways Clearance that was read back correctly as routeing SAM-OCK, climb and maintain FL70, squawk 6024. Bournemouth APR subsequently released the ac with a restriction to maintain heading 270° and climb to 2000ft, passing this to the ADC who in turn passed it to the pilot which he acknowledged. This procedure followed the approved unit procedures for the issuing of an Airways Clearance and a subsequent IFR Release.

In accordance with unit procedures, once airborne and prior to transfer to APR, the ADC confirmed with the pilot to *"maintain 2000ft on reaching"* [UKAB Note: This transmission series commenced at 1559:10 as the Falcon was passing 1700ft in the climb]. The Falcon 900 pilot responded immediately by asking if that transmission was for him; the ADC confirmed that it was [UKAB Note: At 0959:25 as the Falcon was just levelling at 3000ft] and repeated the transmission, which was then read back correctly by the pilot. The height readout of the ac was noted by both the ADC and APR as being 3000ft on the Bournemouth Radar and ATM and the pilot was immediately instructed by the ADC to descend back to 2000ft; the pilot complied without any delay, saying that they were descending back to 2000ft. The pilot then questioned why he was being asked to maintain 2000ft, having been cleared to FL70.

The Falcon's flightpath resulted in a degradation of required separation with the PA34, in the BIA hold at 3000ft, so the PA34 pilot was also given prompt Avoiding Action by APR as soon as he noted that the departing Falcon had continued to climb through the altitude at which he intended it to level.

The intended release restriction transmitted to the Falcon 900 by the ADC was not expressed in an unambiguous format, was over-complex; and was open to interpretation ("*after noise abatement fly heading 270 degrees to altitude 2000ft ?????").* The intention of the ADC was to give the Falcon pilot **both** a heading and an altitude restriction but the wording he adopted could be, and was, interpreted as being a heading restriction until an altitude of 2000ft had been reached and thereafter the original departure clearance applied. Although the intended restriction is a routine departure instruction for operations at Bournemouth, the Falcon pilot, who was not locally based, would not have known that. In addition there was no need to state "after noise", as the Preferential Noise Route (PNR) requires the ac to fly RW track to 0.6nm DME and then to turn right 18° onto a track of 275° to 2000ft [before turning to SAM in this case].

Commencing at 1559:10, with the Falcon 900 airborne, the continuous sequence of R/T dialogue with the ADC was as follows:

"C/S maintain altitude two thousand feet upon reaching contact Bournemouth Radar on frequency one one niner decimal four seven five"

"Maintain two thousand is that for [Falcon 900 C/S]"

"Affirm maintain altitude two thousand feet upon reaching and report the heading to Bournemouth Radar on frequency one one niner decimal four seven five"

(This transmission ended at 1559:30)

"C/S copy"

"[Falcon 900 C/S] Bournemouth"

"Bournemouth go ahead". (This was from the Falcon at 1559:40)

"Just confirm maintaining two thousand feet"

"Yes sir we're descending back to two thousand thought we were cleared to seven er……".

Analysis of the Pease Pottage and Jersey Radars show the PA34 established in the BIA hold at FL028 [3000ft alt]. At 1559 the Falcon 900 is first seen on radar indicating FL006 and is in the PA34's 11 o'clock at 1.2nm. The PA34 is to the N of Bournemouth Airport on a Westerly track in the hold. At 1559:37 the Falcon is in the PA34's 1030 at 1.4nm and indicates FL028. This is the maximum level reached by the Falcon and is displayed for one sweep only before a descent takes effect. The distance between the Falcon and the PA34 then continues to increase and at 1559:44 the Falcon is in the PA34's 11 o'clock at 1.6nm indicating FL027 as the descent given by the ADC begins to occur. The Falcon is shown passing FL023 at 1559:55 when in the PA34's 1130 at 2.1nm. The avoiding action turn given by APR at 1600 can be seen to be taking effect with the Falcon 900 indicating FL021. At 1600:01 the Falcon is 2nm W of the turning PA34, indicating FL021 with the PA34 indicating FL027.

Commencing at 1559:40, having called the Falcon to see if it was on frequency, the APR commenced passing avoiding action to the PA34 as *"C/S turn left immediately turn left heading one seven zero degrees avoiding action traffic west of you at mile and a half three thousand feet Falcon nine hundred".* This transmission ended at 1559:50. Receiving no acknowledgment the APR immediately transmitted *"[PA34 C/S] I say again turn left immediately turn left heading one seven zero degrees avoiding action that traffic now descending two thousand five hundred feet.* This transmission ended at 1600 and was immediately responded to by the PA34 pilot with *" C/S we turned".*

The Unit advises that all Controllers have been reminded by means of an ATC Safety Notice of the need for accurate and unambiguous RT.

UKAB Note (1): MATS Part 1 states at Ch 4 7.2 (Amendments to Clearances):

When an amendment is made to a clearance the new clearance shall be read in full to the pilot and shall automatically cancel any previous clearance. Controllers must be aware therefore, that if the original clearance included a restriction e.g. 'cross ABC FL150 or below' then the issue of a revised clearance automatically cancels the earlier restriction, unless it is reiterated with the revised clearance.

UKAB Note (2): The Bournemouth METAR for 1520Z on 27/10/06 was:

EGHH 271520Z 25006KT 9999 FEW026 FEW035 14/10 Q1023=

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.

Pilot and controller Members stressed the need for clear and unambiguous phraseology when passing safety critical clearances. The phraseology used in MATS Part 1 Appendix E is clear, unambiguous and universally understood which, if adhered to, will minimise the risk of any misinterpretation.

The departure restriction placed on the Falcon by the APR and passed by the ADC had been intended to be both a heading and altitude restriction to prevent any conflict with the PA34 in the hold. However, the wording used by the ADC did not clearly convey these intentions to the Falcon pilot who understandably interpreted the message as being a heading restriction that applied until they reached 2000ft whence it was removed and his original clearance to FL70 inbound SAM applied. Although one airline pilot opined that had he been passed the same clearance he would have held on the ground and queried it, there was clearly no doubt whatsoever in the mind of the Falcon crew as to the meaning of the restriction until after take off when the ADC instructed them to maintain 2000ft. By that time it was too late as they were above that altitude and climbing fairly quickly. Although initially questioning the 2000ft altitude restriction - since they had just previously been cleared to FL70 - the Falcon crew reacted promptly and correctly by levelling and then descending as instructed as the limitation became clear in the continuing transmission sequence. It was noted also that the ac had been on a short, but high intensity, positioning flight through complex and busy airspace. The Falcon would have been light and climbed quickly and the crew would have been in a high workload situation.

The Board observed that, in their opinion, this incident should not be recorded as a 'level bust' as an altitude restriction using the approved phraseology had not been given to the Falcon crew.

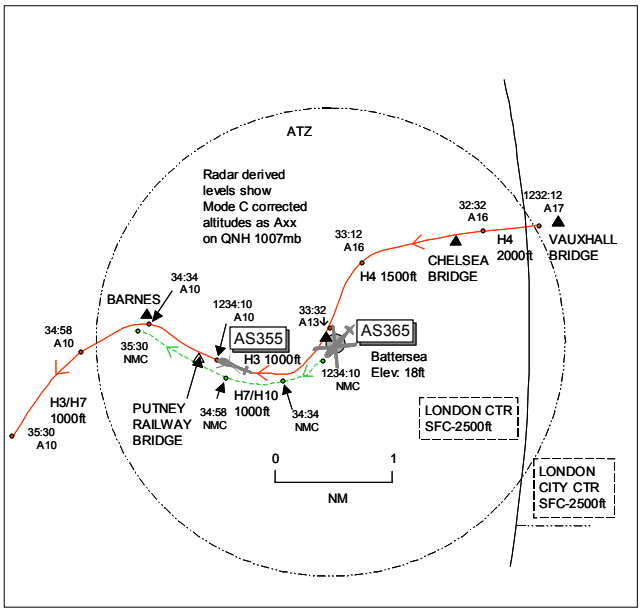
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Falcon crew climbed into conflict with the PA34 as a result of an intended altitude restriction given using phraseology that was open to misinterpretation.

Degree of Risk: C.

AIRPROX REPORT NO 158/06

Date/Time:	31 Oct 1234	
Position:	5128N 00011W (0·25nm SW Battersea Heliport - elev 18ft)	
Airspace:	Battersea ATZ/ Heathrow CTR	(Class: A)
Reporter:	Battersea ADC	
	First Ac	*Second Ac*
Type:	AS365	AS355
Operator:	Civ Pte	Civ Pte
Alt/FL:	↑1000ft (QNH)	NR (QNH)
Weather	VMC CLOC	VMC NR
Visibility:	>10km	
Reported Separation:	Nil V/0·5nm H	Not seen
Recorded Separation:	0·9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BATTERSEA ADC reports that she was issued a SVFR clearance from the SVFR/Thames Coordinator which she passed to the AS365 pilot and which was correctly read back. She then issued a departure clearance to the AS365 flight from RW21 and the helicopter lifted and began climbing towards Wandsworth Bridge. Whilst watching the AS365 she noticed another helicopter, an AS355, flying over Putney Bridge that had not been coordinated. She immediately called the Radar Controller/Coordinator to request information on the overflying traffic. The Coordinator said that the traffic was an AS355 and that it looked as though it was on the N bank of the river. She passed TI to the AS365 pilot and then transferred the flight to Heathrow radar frequency 125·625MHz.

The Battersea METAR shows EGLW 1220 27014KT 230V330 9999 BKN036 14/06 Q1007=

THE HEATHROW SVFR/THAMES RADAR CONTROLLER reports he was mentoring a trainee on the combined Thames/SVFR position. The AS355 was en route from St Pauls to Waltham Place and the flight was cleared Heli-route H4 then H3 and they (mentor and trainee) presumed their support controller had coordinated the AS355 as an overflight with Battersea Tower. This was subsequently found not to be the case and the support controller then released a W'bound helicopter, the subject AS365, from Battersea as well. The AS365 followed the AS355 as it passed Battersea.

THE HEATHROW SVFR/THAMES RADAR COORDINATOR reports coordinating the bandboxed sector with a mentor and trainee working both positions. The AS355 flight lifted from St Pauls in central London and was cleared W'bound. Later on Battersea called for a release on the subject AS365 via H3 to Farnborough and, being unaware of the conflicting AS355, he released the AS365 flight. Battersea called to enquire when it became apparent that un-coordinated traffic (the AS355) was overflying their zone in confliction with their departing AS365.

THE AS365 PILOT reports receiving and copying normal clearances from Battersea Tower on 122·9mhz for a standard SVFR departure RW21 for H3 to exit the London Zone at Bagshot Mast for Farnborough. The visibility was >10km in VMC and the helicopter was coloured grey/silver with nav, anti-collision and landing lights all switched on; TCAS was not fitted. He was given T/O clearance with a cautionary warning regarding cranes on RW heading. He flew a standard T/O profile heading 220° at 90kt climbing to 1000ft QNH and following the Thames W'bound to Barnes. He noticed a helicopter, an AS355, 0·5nm ahead at the same level flying a similar track and shortly afterwards this helicopter turned S at Barnes for H3. He was told by Battersea that the other helicopter traffic was 'not coordinated' with Battersea and to change frequency to 'Heathrow Special' on 125·625MHz which he did. No further mention was made until he received a telephone call from Battersea, 45 min later post flight, who declared that he was 'very close' to a collision. He remains blissfully unaware of how

close his ac was to the other at the time of the reported Airprox, adding that both helicopters would have been flying 'centre of river' during the incident.

THE AS355 PILOT reports being unaware of any Airprox incident. He was aware that the subject AS365 flight departed Battersea Heliport as his ac transited in accordance with a SVFR clearance to follow H4 under a RCS from Heathrow SVFR on 125·625MHz. The weather was VMC and the ac was coloured green/yellow with nav, strobe and anti-collision lights all switched on. He had over 16 years experience of operating SVFR inside this airspace and was familiar with the procedure where Battersea Tower contact London ATC by land-line to ensure that the airspace is clear before giving T/O clearance to departing ac which he was led to believe did not occur on this occasion.

ATSI reports that the Airprox occurred in Class A airspace, within the London (Battersea) Heliport ATZ/London CTR. At the time of the incident the Thames Radar/Heathrow Special VFR frequencies were bandboxed. The combined sector was being operated by a mentor and an experienced trainee, together with a Coordinator. Both the mentor and the Coordinator commented that, with hindsight, the positions should have been split. The decision to operate in bandboxed configuration was to allow the trainee to gain experience of a higher level of traffic. The situation then became more complex because of the mix of traffic arriving and departing London City Airport. The trainee was an experienced controller, who was extending his Certificate of Competencies to include Thames Radar/Special VFR.

At 1227, the AS365, which was inbound to London (Battersea) Heliport via Helicopter Route 3 (H3), was transferred by Thames Radar to the ADC frequency. (The Airprox occurred on its outbound flight). Shortly afterwards, the AS355 flight established communication with Thames Radar, reporting ready to lift from a roof at St Pauls, to return to Waltham Place. The pilot requested to join H4, then H3 to Ascot. There was a short delay whilst the controller dealt with traffic to London City Airport. The flight was then cleared to lift to remain N side of the River Thames and advised of the AS365 routeing S of the river. Further clearance was passed: *"Just route towards the river for the moment and then stay northside of the river after which you're cleared H Four H Three to leave standard operating altitudes initially and advise when you're approaching Thorpe"*. The AIP, Pages AD 2-EGLL-1-25/26, states the maximum altitude for H4 between Chelsea Bridge and London Heliport as 1500ft and for H3 from London Heliport to Barnes as 1000ft. *'Pilots are required to be at the lower altitudes on arrival at the point at which lower altitude applies.'* Although no SSR squawk was issued to the AS355, it is, subsequently, observed displaying 7031, which presumably it was allocated on its inbound routeing.

In accordance with the agreed procedures between LTCC and London Heliport, the Heliport ADC telephoned the Thames Radar Co-ordinator, at 1232, to request the AS365's departure approval to Farnborough, via H3. This was agreed and the flight was released. The pilot was issued with a clearance on H3, at standard altitudes and at 1233:43 was cleared for take-off RW21. The Coordinator confirmed later that the AS365 should not have been released, without restriction, because of the conflicting presence of the AS355 on H4. At the time, the latter had just passed Vauxhall Bridge. The LTCC MATS Part 2, Page THS-64, states the procedure for co-ordination with London Heliport. Of relevance to this incident: *'Coordination is to be effected with London (Battersea) Heliport in respect of flights under the control of Heathrow SVFR or Thames Radar/City Radar which pass within* ***2nm*** *radius of London (Battersea) Heliport or conflict with the London (Battersea) Heliport circuit. The London (Battersea) Heliport circuit is between Putney Railway Bridge and Chelsea Road Bridge and is variable in direction. TC Heathrow (SVFR)/Thames is responsible for maintaining separation between traffic that is under the control of Battersea ATC and other traffic operating under the control of TC that is outside the Battersea circuit area.'* Page HRW-79, of the same document, states *'Thames Radar/SVFR will pass details of all inbound/overflying helicopter traffic to London (Battersea) Heliport ATC before such traffic passes Kew Bridge, Teddington, Caesars Camp or London Bridge'*. The Coordinator commented that he had not been informed about the AS355's detail. Although, as a Coordinator, he has the ability to listen to the frequency, he confirmed that he had not heard the helicopter being issued with clearance along H4/H3. He thought it probable that he was occupied with telephone coordination at the time obtaining higher altitudes for London City departures. NB. The recording of the telephone line was not clear enough to establish if any telephone calls were being made when the RT transmissions were carried out.

The Heliport ADC stated, in her written report, that *"while watching the departing helicopter* (the AS365*) I noticed that there was a helicopter, that appeared to be a Twin Squirrel, flying over Putney Bridge that had not been co-ordinated".* At 1234, she telephoned Thames Radar to enquire about the unknown traffic routeing towards Barnes. The radar timed at 1234:10, the first time that the AS365 appears after its departure, shows the AS355 at 1000ft,

R of the river, with the AS365 0·9nm E of it, mid-river. (Track distance would have been slightly more because of the bends in the river.) The AS365 was not showing a Mode C SSR return, either at the time or as it proceeded en route, so there was no indication of the vertical separation. It had been displaying Mode C when it was on its inbound flight. The Coordinator apologised and requested that TI was issued to the AS365. However, the telephone exchange continued, with further coordination of another helicopter flight, until 1235:30. Consequently, TI was not issued to the AS365 until this time: *"that Twin Squirrel ahead of you wasn't coordinated with me it's a mile .. should be a mile … in front of you two miles in front you".* The pilot reported the traffic in sight and was transferred to Thames Radar. The AS365 flight contacted Thames Radar at 1236:10, reporting at Richmond Park, visual with the traffic ahead. The trainee responded *"Roger".* The radar shows that as the following helicopter passed Barnes, the two flights were 1·5nm apart and this distance had increased to 1·6nm, when the AS365 flight contacted Thames. No further transmissions were made to the 2 helicopter flights until after the sector was split at 1239:50. Just after this the pilot of the AS365 reported just passed Sunbury, visual with the one ahead.

When London (Battersea) Heliport is open, a red blocking strip is displayed within the Thames/Special VFR fps display. This was in position; consequently both the Radar Controller and the Coordinator were aware of its operation and, in accordance with the LTCC MATS Part 2 procedures stated previously, any overflying traffic should have been advised to the Heliport. The radar mentor explained that he believed that the Coordinator had overheard the AS355 being routed via H4/H3 and he would inform London Heliport. He agreed that neither he, nor his trainee, had requested the Coordinator to carry out this action. Additionally, the AS355's fps was not annotated to indicate that it had taken place. However, the mentor commented that fps marking of coordination was not always strictly applied and its absence was not always indicative that it had not taken place. He added that if he had been operating on his own, he would have cleared the helicopter initially to Vauxhall Bridge, clear of the heliport and then confirmed whether its details had been passed to that unit, before allowing it to proceed. The Coordinator said that when London Heliport requested the AS365's departure, he had looked at the radar display but had not seen the AS355. It is possible that its SSR label was overlapping with Heathrow traffic at the time. As he had not been advised of the AS355's presence and had not observed any conflicting traffic, he released the flight, without checking with the radar controller.

As the occurrence occurred within Class A airspace, the two helicopters should have been separated. The London Heliport MATS Part 2, allows reduced separation within the vicinity of the airport in accordance with MATS Part 1 procedures. These include *'adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this controller; when one aircraft is following another the pilot of the succeeding aircraft reports that he has the other in sight and can maintain separation'*. On this occasion, it could be argued that as soon as the ADC observed the unknown helicopter she was utilising this reduced separation criteria against the AS365. Consequently, separation was momentarily lost as the AS365 lifted but was reinstated when both helicopters were in sight. Thereafter, once visual contact with both helicopters was lost and the AS365 was transferred to Thames Radar, different separation criteria applied. The LTCC MATS Part 2, Page HRW 11.13, states *'Separation may be reduced between helicopters following published routes on the basis that pilots of helicopters may be asked by ATC to maintain visual separation from other helicopter traffic provided that: the reported Met visibility at Heathrow is 6km or more and the helicopters can maintain an in flight visibility of 6km or more; there is agreement between the helicopter pilots concerned; the current route structure, the altitudes applicable and communication procedures are adhered to; appropriate traffic information is passed to the helicopter pilots'*. During this incident, there was no agreement between the helicopter pilots to agree to visual separation and although the following aircraft reported visual with the helicopter ahead, no information was issued to the preceding flight as required under the current procedures. The other approved form of reduced separation in the circumstances was to use, with certain conditions, geographical i.e. instructing the helicopters to remain N and S sides respectively of the River Thames on course to Barnes. The AS365 was not instructed to remain S of the River. NB. Neither of these separation techniques are available for use by London Heliport ATC. Consequently, technically, separation was not ensured between the subject helicopters along the helicopter routes. However, it could be argued that, as the AS365's pilot had visual contact with the AS355 along H3 and the horizontal separation continued to increase slowly, he was ensuring that adequate spacing was maintained.

It is understood that, as a result of this Airprox, the operation of traffic on London helicopter routes is being reviewed by local ATC Management, in order to ascertain the practicality of the procedures and to remove any anomalies between the way Thames and Special VFR Sectors control the flights.

AIRPROX REPORT No 158/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that discovered anomalies with respect to control procedures in the LTCC MATS Part 2 have been addressed. Members felt that there were TRM issues during this Airprox which stemmed from the London/Battersea ADC not being informed of the AS355's transit through the ATZ. Firstly, there was an assumption made by the mentor/trainee that the Coordinator had overheard the AS355 being cleared by them, via the Heliroutes, and that the Coordinator would inform Battersea: in fact, no request was made to the Coordinator to carry out this action. The NATS Advisor stated that the Coordinator was normally tasked to act for the Thames Radar Controller and that no actions were specified with respect to the situation when the position was bandboxed with SVFR. Normally when the positions were split, the SVFR controller would act alone and carry out his own coordination. Secondly, the Coordinator had released the AS365 from Battersea without first checking with, or informing, the Thames/SVFR mentor/trainee team. These factors caused an element of surprise to the Battersea ADC when, having been given an outbound release, the AS355 was seen to the W of Battersea, after it had passed the Heliport and as it approached Putney Bridge, nearly 1nm ahead of the departing AS365. Owing to the lack of prior coordination, the AS355 was therefore 'unknown' traffic. From the ATSI report, it was clear that when the potential confliction became apparent to all parties, no meaningful attempt was made to restore separation between the two flights. The ADC had delayed passing TI to the AS365 pilot, after establishing that the AS355 was known to the Thames/SVFR controller, and had delayed transferring the flight. Similarly, when the Coordinator passed TI to the ADC he did not endeavour to ensure that separation was applied immediately. That said, although there was a technical loss of separation, the AS365 pilot had already visually acquired the AS355 ahead, before receiving TI, and continued to draw astern of it with horizontal separation increasing gradually as both helicopters progressed along the same route; this had ensured that any collision risk was completely removed. A combination of all of these factors led the Board to agree that by the time the ADC had seen the AS355, the potential for any confliction had passed and the ensuing visual separation and ATC coordination had removed the 'unknown' element to the equation, ultimately leaving this incident to be a controller perceived confliction.

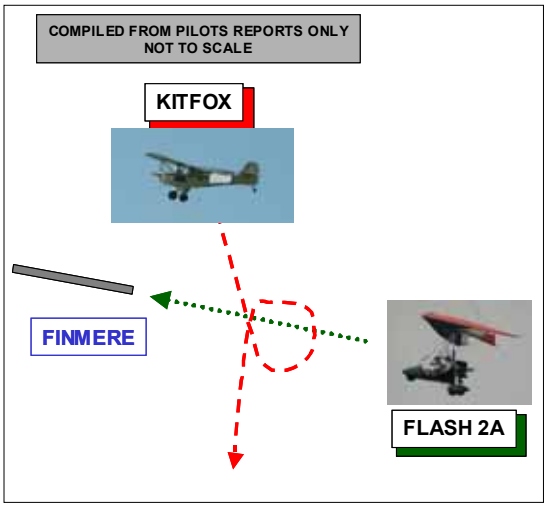
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C.

AIRPROX REPORT NO 160/06

Date/Time:	4 Nov 1615 (Saturday)	
Position:	5159N 00103W (Finmere - elev 395ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Mainair Flash 2A	Denney Kitfox
Operator:	Civ Pte	Civ Pte
Alt/FL:	800ft↓	1800ft
	(QFE NR mb)	(QNH 1034mb)
Weather	VMC NR	VMC NR
Visibility:	>10nm	20nm
Reported Separation:		
	1-200ft V/50m H	500ft V/0 H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MAINAIR FLASH 2A PILOT reports that he was completing the final stage of a trial flight with a first-time passenger and was in the descent to land on RW28 at Finmere. He was heading 280° at 42kt at about ½nm from the threshold at 800ft QFE when he first saw a blue high wing ac about 800m away and slightly above him. The ac approached from about 45° right of his nose and about 100ft above, passed overhead and then suddenly executed a tight descending turn to the left in their 8 o'clock position, flew underneath them to the right (3 o'clock low) and then climbed sharply to his left about 100-200ft in front. The wake turbulence from the prop wash alarmed his already nervous passenger. As the ac passed in front he clearly identified its registration and he assessed the risk of collision as being high. He did not take any avoiding action.

THE DENNEY KITFOX PILOT reports flying to Holmbeck Farm from Hinton in the Hedges. While heading about 110° at 65kt, just to the NE of Finmere, he sighted a yellow ac, later identified as a flex-wing microlight, at a distance of about 4nm. The ac appeared to be at least 500ft below his altitude in a slow descent but in a level attitude and, if it maintained its course, it would pass down his left side and below him. He assumed the ac was making an approach to the Western RW at Finmere. Another ac also based at Holmbeck farm was about 5nm behind and he decided to make a delaying 360° turn to his left to allow that ac to catch up and formate on him, while also keeping the flex-wing in sight. After completing 110° of turn however, he lost visual contact with the flex-wing and the 360° turn was completed and flight continued to his destination. He did not take any avoiding action, assessing the risk of collision as 'low'.

He was not aware of having infringed the flex wing's flight path at anytime.

UKAB Note (1): Neither ac showed on any of the recorded radars.

UKAB Note (2): Finmere is an unlicensed private aerodrome with no ATZ.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information consisted solely of reports from the pilots of both ac and the Board therefore had some difficulty in resolving the circumstances of the incident since the two reports differ markedly, particularly regarding the heights of the respective ac. Since the Microlight pilot described the manoeuvre flown by the Kitfox in some detail, particularly regarding when it was above and when it was below him, the Board was slightly more inclined to his version of events.

Although one Member suggested that the Kitfox might have been 'sightseeing' round the microlight, the majority accepted that he was merely conducting a delaying turn (turns since the other Kitfox was 5min behind) in an inappropriate place. Specialist GA Members considered it poor airmanship to conduct an orbit on the approach

to a known and active aerodrome and also, having done so, to lose sight of an ac on the final approach which had previously been seen.

Since there was some doubt regarding the incident circumstances and the Kitfox pilot had lost sight of the microlight, the Board determined that safety could not have been assured.

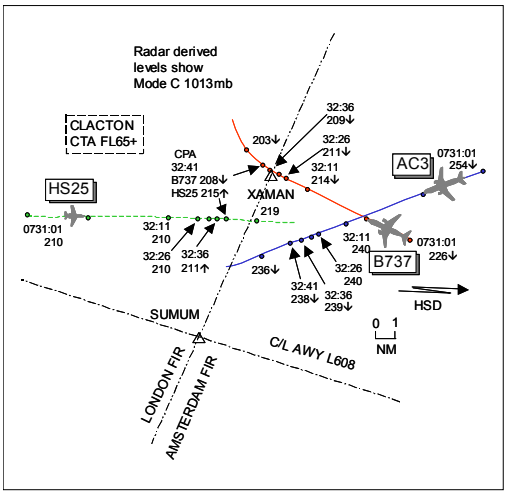
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Kitfox pilot flew into conflict with the Flash 2A on the final approach to Finmere.

Degree of Risk: B.

AIRPROX REPORT NO 161/06

Date/Time:	2 Nov 0733	
Position:	5145N 00211E (39nm E CLN)	
Airspace:	Clacton CTA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	HS25B	B737-500
Operator:	Civ Pte	CAT
Alt/FL:	FL210	FL210↓
Weather Visibility:	IMC KLWD	IMC KLWD
Reported Separation:	Nil V/<5nm H	Nil V/6nm H
Recorded Separation:	700ft V/3·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HS25 PILOT reports heading 075° at 280kt and FL210 en route to HSD VOR in Holland and in receipt of an ATS from London squawking with Mode C. A TCAS TA alert was received on an ac 5nm away in their 12 o'clock position, descending through their level. About 15sec later an RA 'climb' warning was received, as the oncoming ac descended through FL210, so a climb was initiated and on climbing through FL218 'clear of conflict' was received. After advising London of the RA they were told that the conflicting ac was clear of them by 5nm and that ATC did not consider there to have been a confliction.

THE B737 PILOT reports inbound to Stansted IFR and in receipt of a RCS from London squawking with Mode C. Flying on radar heading 310° at 280kt and descending to FL180, TCAS showed another ac 10nm away which became 'proximate traffic' (full white symbol). ATC told them to 'turn R' and they started turning, asking 'will heading 340° be OK'. At this moment the symbol changed to a yellow TA for about 5sec then it changed white again; no RA was received. They estimated the other ac passed about 6nm away as their levels crossed; later, ATC asked the crew what TCAS indications had been received. They assessed the risk as low to none.

THE LTCC SABER SC reports the HS25 was on radar heading 085° level at FL210 whilst the B737 was heading 310° descending to FL180. The HS25 crew reported a TCAS TA alert and were given TI and then reported a TCAS 'climb' so TI was given on a Gatwick inbound flight in their 12 o'clock descending to FL220; the HS25 was seen to climb to FL218. The B737 crew reported no RA and STCA did not activate.

ATSI reports that the controller had been operating as the SC for the combined East Sector for about thirty four minutes. She described the traffic loading and workload as light, adding that she did not consider the bandboxing of the various sectors contributed to the cause of the Airprox.

The HS25 flight established communication with the East Sector, at 0717, reporting climbing to FL210, heading 075°. The pilot was instructed to continue on the heading. The next transmission to this flight was approximately 4min later, when it was instructed to turn L heading 070°. Some 7min later, at 0729:20, a heading change to 085° was issued. This was shortly after the B737 flight had reported on frequency descending to FL220.

At 0730:36, the B737 flight was requested to state its present heading. This was established as 310° and the pilot was instructed to continue as a radar heading. Shortly afterwards (just before 0731:00), the SC instructed the B737 flight to descend to FL180. At the time, the B737 was passing through the HS25's 12 o'clock at a range of approximately 20nm. The controller explained that she believed that she had established the subject ac on radar headings which would ensure the required horizontal separation as the B737 descended through the level of the HS25. Because of the continued absence of the Debden radar source, the SC was utilising Pease Pottage. In accordance with the LTCC MATS Part 2 requirements for the authorisation of reduced radar separation of a

minimum of 3nm, the subject ac would have to have been within 60nm of this radar head. However, as at the time of the Airprox they were at a range of about 96nm from Pease Pottage, a minimum of 5nm was required.

Just over 1min after the B737 flight had been instructed to descend, the pilot of the HS25 reported, at 0732:08, *"we have a TA descending in our twelve o'clock"*. The SC responded *"affirm five miles ahead"*. The radar shows the B737, at FL214, passing through the 12 o'clock of the HS25, 7·9nm ahead, the latter maintaining FL210. Although the SC believed that the 5nm radar separation would exist, she decided to widen the B737's heading slightly to 320°. The pilot reported turning R but did not read back the revised heading. Immediately afterwards, at 0732:28, the HS25 reported *"we're getting a climb indica-* (clipped transmission). The SC replied *"don't climb there's one on your nose descending above"*. The radar timed at 0732:26 shows the subject ac 4·9nm apart. The B737, at FL211, is in the HS25's 11 o'clock position heading NW. The other traffic (AC3), referred to by the SC and which is not yet on frequency, is 12 o'clock to the HS25, 6·2nm away, descending through FL240 to the standard handover level FL220, tracking WSW.

Although the heading issued to the B737 was 320°, the pilot reported *" we're heading three four zero okay"*. It is not known whether this was a misunderstanding of the heading issued, or the pilot was widening the distance between the subject ac. The radar timed at 0732:41 (the CPA), just after this message, shows the HS25 climbing through FL215. The B737 is in its 10 o'clock position descending through FL208 3·5nm away and the other traffic (AC3), passing FL238, is in its 2 o'clock at 3·9nm. The SC then instructed the HS25 to *"descend now Flight Level Two One Zero traffic descending above"*. Only after this transmission, did the HS25's pilot request to descend back to FL210. The radar recordings show that the HS25 climbed to FL219, when it was 1·9nm N of and 1700ft below the other traffic.

The MATS Part 1, Section 1, Chapter 9, Page 2, states the ATC procedures after a pilot has reported a TCAS climb or descent. *'On being informed that an aircraft is manoeuvring in accordance with a TCAS 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 SC agreed that, in the circumstances, the instructions for the HS25 not to climb and, thereafter, to descend to FL210, when no completion of the manoeuvre had been received, was inappropriate. Although the pilot had not used the standard phrase of *"TCAS climb"*, she was aware of his intentions. She commented that she was sure that the confliction between the subject ac was being resolved and she was more concerned about the potential confliction between the HS25 and the other traffic above it in its vicinity.

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 although the LTCC Saber SC had placed both subject ac on radar headings, she had not ensured that standard separation was maintained which had caused the Airprox. The B737 had crossed only 7·5nm ahead of the HS25 on a crossing track but only diverged slowly and this had triggered a TCAS TA alert in the HS25. The HS25 crew had told the SC of the TA alert and very quickly thereafter, as the B737 descended through the HS25's cruising level, an RA 'climb' warning was triggered in the HS25 cockpit. Pilot Members commented that as TCAS equipment normally would be endeavouring to issue commands to provide about 600ft vertical separation at these levels, the HS25 crew appeared to have overreacted during the manoeuvre, reaching FL219. As the climb was commenced and the B737 continued its descent, the RA would have 'softened' very quickly to a 'monitor v/s' and then 'clear of conflict'. The robust actions taken by the HS crew almost certainly led to the B737 crew only receiving a brief TA alert where a complementary RA would be expected. It was noted that the HS25 crew did not use standard TCAS phraseology of 'TCAS climb' which should be used whenever possible so that all parties are left in no doubt what is happening. Also noteworthy was the SC's incorrect response to the HS25 crews 'climb' call and subsequent instructions which, with hindsight, she had agreed were inappropriate and contrary to the MATS Part1 procedures: at the time, she was concerned with a potential conflict evolving with AC3.

Turning to risk, the Saber SC had been fully cognisant of the traffic situation but had misjudged the headings required to provide 5nm separation distance between the B737 and HS25. Understandably, the HS25 crew were concerned to receive an RA warning in IMC and had reacted promptly to the TCAS commands. However, looking

at the geometry of the incident with both subject ac 'locked' on radar headings and the TCAS event occurring as the B737 descended through the HS25's level whilst diverging 4·9nm away to its NE, the Board were in no doubt that safety had been assured during the encounter.

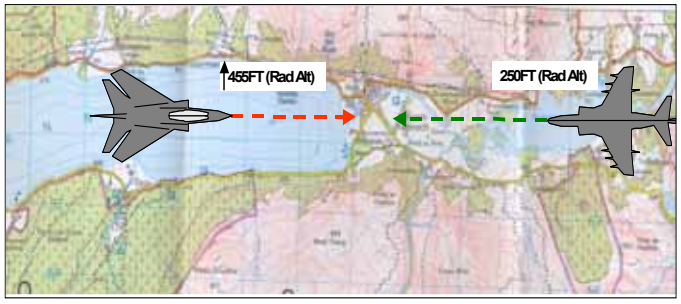
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC Saber SC did not ensure that standard separation was maintained between the HS25 and B737.

Degree of Risk: C.

AIRPROX REPORT NO 162/06

Date/Time:	16 Nov 0950	
Position:	5642N 00403W (Loch Rannoch)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Harrier GR9	Tornado GR4
Operator:	HQ STC	HQ STC
Alt/FL:	250ft (Rad Alt)	455ft (Rad Alt)
	(QNH 980mb)	(QNH 971mb)
Weather	VMC NR	VMC NR
Visibility:	40km	20nm
Reported Separation:		
	20ft V/0nm H	50ft V/0m H
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER GR9 PILOT reports that he was flying in a grey ac with HISLs on, but with no TCAS fitted and was squawking 7001 with Mode C. He was an OCU student and was tasked with a local singleton low-level tactical training sortie flying from Kinloss into LFA 14. He flew down Loch Rannoch at 420kt on a W heading when he saw a Tornado GR4 heading in the opposite direction at the last moment before they crossed with no horizontal displacement and about 20ft above him. Immediately after sighting the other ac he initiated an aggressive bunt to avoid it. After resuming straight and level flight he recovered to RAF Kinloss without further incident, reporting the incident to Lossiemouth APR on first contact. He assessed the risk as being High.

THE TORNADO GR4 PILOT reports that he was the rear seat instructor of a student pilot who was flying his 2nd GH sortie on his conversion to the Tornado GR4; he was also the ac captain. They were flying in a grey ac with HISLs switched on and squawking 7001 with Mode C, but the ac had no TCAS fitted. The sortie had commenced 15min earlier from Lossiemouth and was being flown off the planned track due to weather. Having flown down Loch Rannoch, heading 082° at 436kt in good visibility 2000ft below cloud, they initiated a slight climb to pass over a saddle at its E end; just after the climb, at a Rad Alt of 455ft, the student saw an ac approaching head-on about 100m away and slightly below them. Neither ac's track changed due to the lateness of the sighting, and the other ac, identified as a Harrier, passed directly underneath them, about 50ft below. The instructor saw the ac only briefly and was unable to attain visual due to the direction of its approach and departure so advised the student to climb in order to assess the situation. After a period of around 1min the sortie was continued and completed before return to RAF Lossiemouth. He thought that the high workload and the colour of the Harrier had contributed to the lateness of their seeing the Harrier and considered the risk to have been high. He reported the incident to his Duty Authorising Officer on landing.

THE HARRIER STATION comments that it is probable that the avoiding action taken by the Harrier pilot came so late that it in itself did nothing to guarantee the safety of the 2 ac; by the time the manoeuvre was initiated, the danger of collision was probably over.

What the incident does highlight is that safety of flight cannot always be assured by the 'see and avoid' principle alone; this principle if coupled with an effective CWS would go a long way to mitigating the risks associated with flight in the UKLFS.

THE TORNADO STATION comments that detailed examination of the HUD video shows the extreme difficulty in spotting the Harrier in the prevailing circumstances. The Harrier appears at a very late stage from a well-concealed position emerging from the near side of a dark wooded ridge from behind the left canopy arch. The combination of light conditions, camouflage and a relatively small head-on aspect, combine in this case to permit little or no time for crew reaction; indeed the (understandable) reaction of the Harrier pilot taken as the GR4

shadow passed his cockpit would have been too late. The vertical separation distance visible in the HUD video seems to be in the order of 60ft.

This incident serves yet again as a timely reminder of the paramount importance of lookout in the busy airspace below 2000ft. That said, there remains an operational hazard that is unavoidable in such circumstances where 'free' low-level airspace is shared by multiple users. Every effort is being made to procedurally and electronically reduce risk, as well as to continually remind crews of the need to do every thing that they can in this area – but we all accept that we do not, and never will, live in a risk-free world.

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

HQ STC comments that this very close encounter took place at the point both crews would have been heading for to cross the saddle. Work continues on a CWS for both these ac types.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was shown an extract of the Tornado FLIR which verified the miss-distance estimated by the Tornado Station. Both pilots had been engaged on early OCU training flights and were most likely very busy concentrating on mission objectives at the time of the Airprox. In any case, in the precise circumstances of the incident location, it is unlikely that either pilot in the Tornado would have been able to break the camouflaged Harrier out from the dark wooded background any earlier. Similarly, the Tornado would have initially been below the horizon and not visible from the Harrier pilot's viewpoint. Although a collision warning system (CWS) might have given a few moments additional warning to both crews, this would have been very limited since, by virtue of the topography, the ac would not have been line-of-sight to one another until the last moment; thus CWS would probably not have been effective in this case. Since the Tornado was not flying his planned track due to weather, the instructor had, quite legitimately, decided to operate in an area where the weather was suitable for his exercise. It was pointed out to the Board that, in these circumstances, neither electronic nor manual route deconfliction would have been effective and it was only by (bad) luck that the ac were in the same place at the same time. The effectiveness of nose (forward pointing continuous beam) lights was also discussed; in circumstances where a dark ac is emerging from a dark background they have proved their worth on many occasions. The HQ STC Member undertook to brief the Board on the status and effectiveness of a study that was undertaken some time ago to fit such a light to low flying ac in wing mounted pods. He also briefed the Board that the MoD is fully committed to fit both the Tornado GR4 and the Harrier with a form of CWS but that this is very time consuming due the extensive modifications required to both ac.

Members were informed that Low Flying Ops Sqn had also discussed this incident in detail to try to determine if any changes, in particular a one way flow, were required to the LFS. They concluded that if tactical freedom is to be preserved no changes were required.

In this incident the Board determined that both pilots had seen the opposing ac as early as the circumstances reasonably permitted. Both ac had been in the DLFS and had, to the best of the Board's knowledge, been there legitimately, operating in a professional manner and exercising due diligence; it was therefore only by good fortune that the ac had not been at the same height and collided.

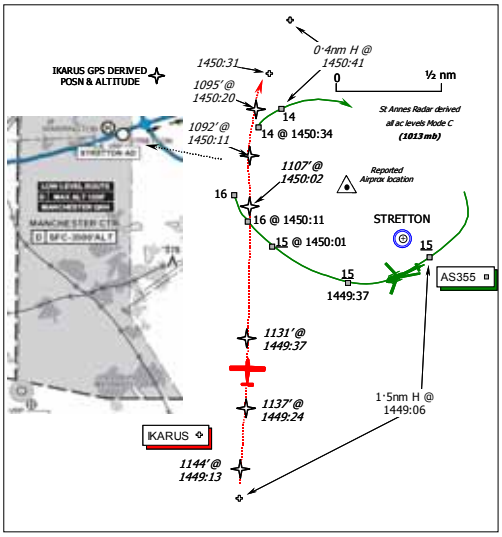
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the UK DLFS.

Degree of Risk: A.

AIRPROX REPORT NO 163/06

Date/Time:	20 Nov 1450	
Position:	5321N 00232W (vicinity of Stretton a/d elev: 235ft)	
Airspace:	Manchester LL Route (Class: D)	
	Reporting Ac	*Reported Ac*
Type:	AS355-F2	Ikarus C42
Operator:	Civ Comm	Civ Pvt
Alt/FL:	1000ft QNH (997mb)	1200ft QNH (997mb)
Weather	VMC NR	VMC NR
Visibility:	>10km	20nm
Reported Separation:	Nil V/<100m H	Nil V/200m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS355-F2 TWIN SQUIRREL HELICOPTER PILOT reports that he was engaged in a police task in the vicinity of Stretton airfield [also a VRP] in his black & yellow helicopter. He was operating in VMC with the HISL on and in receipt of a FIS from Manchester ATC on 135·00MHz, whilst squawking A0055 with Mode C; TCAS is not fitted.

Whilst in a slow R turn through 030° at a speed of <30kt, at 1000ft QNH (997mb), his observer in the LH seat spotted a small ac very close through his port window. Both the rear observer and himself also saw the ac – a high wing microlight coloured red & white - and he maintained the R turn, increased speed and dived off some height. Minimum separation was <100m at the same altitude as the microlight passed to port. He and all of his crew were alarmed at the close proximity of the other ac and concerned that had he needed to reverse his turn whilst "on task" the situation would have been dangerous. Stressing that no avoiding action was taken as he was already in a R turn away, he assessed the risk as *"very high"* and added that ATC had passed details about the other ac when it was 10nm to the S. However, whilst "on task" they had been concentrating on ground "targets" and had not spotted the microlight before the Airprox occurred.

Upon returning to base at Harwarden he telephoned Barton aerodrome and spoke to the microlight pilot concerned who confirmed that he had seen his helicopter and believed that they had been in a hover. The microlight pilot also acknowledged that as his helicopter was on the right and thus had "right-of-way" so the microlight pilot was "bound" to keep clear. He also stated that he had seen them when 1nm away and made a decision not to pass directly behind them. But none of these responses satisfactorily addressed the microlight pilot's decision to fly at the same level from their port quarter and pass within 50m (sic) of his helicopter.

After some consideration he decided to file an Airprox and informed Manchester ATC. He is concerned that GA pilots may not be sufficiently aware of the requirements of police operations and that while "on task", police helicopters may behave in an unpredictable manner. Equally, helicopter pilots may be subject to high workload during a task and might subsequently be late spotting an ac in their vicinity. Stressing that he was not trying to exonerate himself or apportion blame to anyone, he was aware that a microlight was tracking to Barton past his position and perhaps he should have made greater attempts to get the other ac "visual". However, he would have felt more comfortable had he known the other pilot was going to give him a wider berth.

THE IKARUS C42 MICROLIGHT PILOT provided a very detailed and comprehensive account, including GPS data and a chart fragment. SSR is not fitted. He reported that he was the PF, routeing from Wolverhampton to Manchester Barton with a PPL holder who was making the RT calls. Flying under VFR in VMC in a level cruise at 1200ft Manchester QNH (997mb), they tracked NE towards the Manchester Low Level Route (MLLR) and called Manchester APPROACH for a FIS about 5nm S of Winsford. Whilst monitoring Manchester APPROACH he heard

the AS355 pilot who said he was tracking to Winsford. They were also aware of an Army helicopter southbound on the western edge of the MLLR that had strayed into the Liverpool CTR. Shortly afterwards the AS355 pilot reported at Winsford and said he was now going to carry out a few orbits at Stretton. Heading N at 80kt, when they were about 2nm S of Winsford they spotted the Army helicopter about 3nm to the W southbound. Manchester APPROACH called the AS355 pilot and passed traffic information about his microlight and as their planned track would take them to the W of Stretton, knowing the AS355 was operating in that area, they kept a good lookout. When they were 2nm SW of Stretton the black & yellow AS355 was spotted at the same level over Stretton and appeared to be hovering in their 1 o'clock position 2nm away but at that point it was not on a constant bearing - Manchester APPROACH was informed that they were visual with the helicopter. A minute later the AS355 was then on a constant bearing in his 2 o'clock position and appeared to be tracking W at slow speed so he executed a slight L turn, more Westerly, so that the helicopter was not on a constant bearing and would pass behind them but close. The helicopter was in their view all the time except when it was in their 6 o'clock position but it then reappeared again in their 7 o'clock position in a L turn flying away from them. Shortly after this, Manchester APPROACH called the AS355 pilot to say that his microlight was now to the N of the helicopter's position. No further sightings were made of the helicopter and he continued inbound to Barton.

After landing he received a phone call from the Control Tower at Barton to say that the AS355 helicopter pilot had filed an Airprox. He telephoned the pilot who said that he would have preferred it if they had stayed away from the helicopter's operating area, but also stated that he did not see his microlight until very late. Apologising to the AS355 pilot if he had caused him concern he confirmed that they were visual with the helicopter but unsure of his intentions.

Concluding that although the AS355 had 'right-of-way' as it was out on his right, the helicopter did initially appear to be hovering. When it became apparent the AS355 was on a constant bearing the correct procedure would have been for him to turn his microlight R and pass behind the helicopter. This could not be done as by now the AS355 was in about his 2 o'clock position and closing towards him. A turn to the R would also have put him closer towards Stretton, which is the area he knew the helicopter was operating in, but he was also unsure whether the AS355 pilot was going to turn L or R to go back towards the disused airfield. Electing to make a slight turn L, this kept the AS355 helicopter in sight and also stopped the AS355 being on a constant bearing. Highlighting that his planned track would take him about ¾nm W of Stretton airfield, at this point there is the town of Warrington ahead and to the left, so he had to fly the route he did because 'permit' ac are not allowed to fly over congested areas.

Whilst he understands the nature of such helicopter operations, he opined they have a difficult task and may have to change direction suddenly, but this makes avoiding action against these helicopters even more difficult.

ATSI reports that this Airprox occurred within the Manchester Special Low Level Route (MLLR), whilst both aircraft were in communication with the Manchester APPROACH South Radar Controller.

The MLLR is within the Class D Manchester CTR, 4nm wide, running N - S between Manchester and Liverpool Airports. The flight procedures are stated in the UK AIP, at AD 2-EGCC-1-19. Within the MLLR helicopters or aeroplanes may fly without individual ATC clearance subject to:

They remain clear of cloud and in sight of the ground;

maximum altitude 1250ft, Manchester QNH (available from ATIS);

minimum flight visibility 4km;

they are transitting through the CTR or proceeding directly to or from an aerodrome in the CTR.

Flights using the Low Level Route are responsible for their own separation from all other flights when operating within the Low Level Route airspace at all times.

The AS355 Twin Squirrel helicopter established communication with Manchester APPROACH at 1431, initially routeing to Macclesfield. Subsequently, the pilot reported changing the detail to operating around the Stretton Airfield area. This airfield is situated on the eastern edge of the Low Level Route. The controller cleared the helicopter, at 1436, *"you can enter the zone around the Stretton area, not above 1500 feet report if you have to go any further east than say the M6"*. This transmission was acknowledged by the pilot.

At 1438 the C42 microlight pilot contacted Manchester APPROACH. Although initially asked to standby, the pilot reported 4nm S of Winsford at 2000ft, routeing from Wolverhampton to Barton. At the pilot's request the controller informed him that he would provide a FIS and he should proceed on the Low Level Route, not above 1250ft. Information was issued about other traffic just leaving the Low Level Route to the S. Just over 1min later, at 1441:40, the AS355 pilot was informed about *"...a microlight* (the C42) *just entering the Low Level Route at Winsford northbound on the lane inbound to Barton"*. He responded *"I'll keep a lookout I'm on task at Stretton"*. Traffic information was then issued to the C42 microlight pilot *"traffic for you is a Twin Squirrel operating around Stretton just inside the Low Level Route"*.

The next transmission by either of the subject aircraft was at 1449:10 when the C42 pilot reported visual with the helicopter. The radar recording [at 1449:06] shows a primary radar return, believed to be the C42, tracking N on the RH side of the MLLR. The AS355, displaying its allocated SSR squawk, is in its 1 o'clock, 1·5nm away, close to the eastern edge of the Route. The Mode C of the helicopter is indicating 1500ft SAS (1013mb) – equating to about 1068ft Manchester QNH (997mb). At 1450:40, the controller informed the AS355 that the microlight was *"just passing north abeam you now"*. The pilot replied that he was visual. Although no comments were made on the frequency at the time, some four minutes later the AS355 pilot requested the registration of the microlight. He stated that *"it passed come up to me closely when he was en route"*. The C42 had already changed frequency to Barton.

It is considered that the Manchester APPROACH South Radar Controller, whilst providing a FIS to the subject flights, passed appropriate and timely traffic information to both pilots. There were no ATC causal factors. As stated in the UK AIP - flights in the MLLR are responsible for their own separation.

UKAB Note (1): Because of the dearth of available radar data on the Ikarus microlight, the pilot provided a download of the positional data from his GPS Unit for this flight. With the most helpful assistance of the GPS unit manufacture's product support department this positional data was extracted, which enabled the microlight's location to be plotted, together with a GPS derived altitude. However, the GPS unit only logged position at irregular times and only two 'fixes' correlated exactly (to the second) with the timing of the radar-derived position of the AS355. Moreover, the combined tolerances applicable to radar & GPS position, plus the absence of radar data on the AS355 at the moment of the Airprox, does not enable exact measurement of the separation, hence this is noted as "not recorded". The diagram, therefore, is a compilation of the best available data from two dissimilar sources.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that, unlike most other police helicopters, this particular AS355 airframe was not fitted with any form of TCAS but then neither was the Ikarus C42 fitted with SSR: therefore TCAS could not have provided any form of warning to the AS355 pilot about this microlight.

Here, both pilots were operating under VFR and had been informed about each other following the traffic information conscientiously provided by the Manchester APPROACH controller. Thus alerted to each other's presence, it was up to the pilot of the Ikarus and the AS355 pilot assisted by his crew members to spot other traffic in the vicinity and afford appropriate separation. However, it was unfortunate that having been provided with this early warning both pilots eventually flew so close to one another.

It was evident that this Airprox had occurred on the eastern side of the MLLR where Members agreed the ability of both pilot's to manoeuvre their ac was somewhat constrained. Not only did the available airspace of the MLLR restrict the Ikarus pilot to no more that 1250ft QNH but he had also cited the difficulties of built-up areas to the left of his route that had to be avoided by microlights. The AS355 pilot had a little more airspace available to him, Members noting that Manchester APPROACH had cleared its pilot to operate up to 1500ft QNH and, laterally, across to the M6 just to the E. Therefore, the AS355 pilot had slightly more freedom to manoeuvre outside the Eastern boundary of the MLLR, whereas this conflict occurred to the W of Stretton. Helicopter pilot and controller Members alike recognised fully the difficulties that confronted the AS355 pilot when engaged on policing operations although a controller Member wondered if the AS355 pilot had been focussed too much on his task to the detriment of an all-round scan for other ac. Whilst this was clearly a high workload situation, a controller

Member postulated that with three pairs of eyes in the helicopter, at least one should have been keeping a lookout for the pre-warned, approaching ac. A small slow microlight might not be an easy ac to spot but the AS355 pilot's division of attention seemed to be concentrated on his 'target' thus effecting his appreciation of the surrounding air situation. The combination of the GPS derived track of the Ikarus and that of the AS355 from the radar recording had shown that the AS355 was turning R as the microlight approached. The latter should have been plainly visible to the helicopter crew from at least 1½nm away: its approach from the S should not, therefore, have come as any surprise. Whilst appreciating entirely the AS355 pilot's point about the respective right-of-way under the 'Rules of the Air', the microlight was to the R of the helicopter for a portion of the latter's orbit and a helicopter pilot Member opined that the AS355 pilot should have made a more determined attempt to sight the Ikarus and thus not rely solely on other pilots spotting his helicopter and staying out of his way. The AS355 pilot's report had suggested that other pilots might not be sufficiently aware of the requirements of police operations and that while "on task", police helicopters may behave in an unpredictable manner. Acknowledging this point, Members opined that police helicopter pilots must take this into account within their general airmanship. The Board recognised that it was intrinsically difficult to advertise this unpredictability to other airspace users unless a positive call was made on RT requesting that they keep clear. However, this point seems to be well understood by the Ikarus pilot as he reports that he is cognisant of such helicopter operations and that pilots of these ac may have to change direction suddenly. Whilst Members understood that this might make avoiding action more problematic, the key is to take positive action at an early stage. Here the Ikarus pilot says he spotted the police helicopter from 2nm away – in good time at these speeds - initially perceiving it was in a hover. If he had indeed recognised it as a police helicopter and believed its course might therefore be unpredictable then Members believed that it would have been better to have afforded it a wider berth at that point. This Airprox was thus a good example to others of what can occur if positive action is not taken at an early stage. A CAT pilot Member opined that although the Ikarus pilot was concerned at the proximity of the built-up area to the L of his planned track, if it was necessary to steer that way to avoid imminent danger or resolve a conflict with another ac as here, then that was preferable to getting too close to a helicopter, likely to manoeuvre unpredictably, when there was no confirmation that its pilot had seen the microlight. In the Board's view, the Ikarus pilot had realised too late that a conflict had existed because he had not afforded, for whatever reason, the AS355 a sufficiently wide berth. Consequently, the Board agreed unanimously that this Airprox had resulted because the Ikarus C42 microlight pilot flew close enough to the AS355 to cause its pilot concern.

Although the minimum separation could not be determined exactly from the combination of the GPS derived position of the microlight and that of the AS355 shown on radar, nonetheless it was clear that the resultant separation was relatively close at broadly the same altitude. One pilot Member considered that safety was not assured here, as the Ikarus pilot would not have been able to avoid the helicopter at these close quarters. Others took a different view insofar as although the AS355 pilot had not sighted the microlight out to port until a very late stage, it was always turning R and no avoiding action was necessary on the part of the helicopter pilot, the latter had reported. Whereas the Ikarus pilot had seen it from some distance away and, notwithstanding the built-up areas in close proximity, he could have manoeuvred his nimble microlight robustly out of the way if needs be. Consequently the Board concluded that no risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

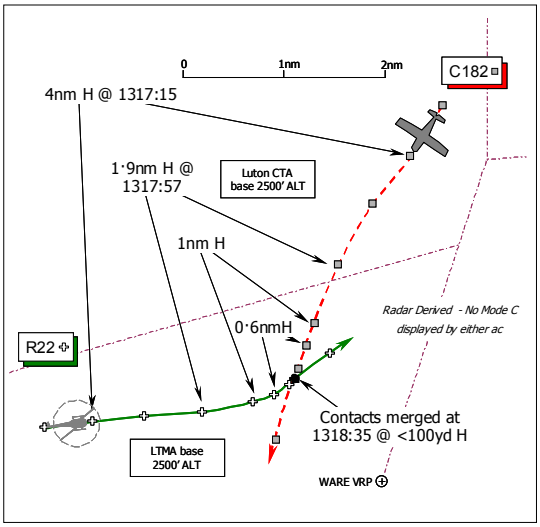
Cause: The Ikarus C42 microlight pilot flew close enough to the AS355 to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 164/06

AIRPROX REPORT NO 164/06

Date/Time:	21 Nov 1318	
Position:	5149N 00003W (1nm NW WARE VRP)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Robinson R22	Cessna C182
Operator:	Civ Trg	Civ Trg
Alt/FL:	2000ft	2000ft
	QNH (995mb)	(QNH 995mb)
Weather	VMC CLOC	VMC Nil Cloud
Visibility:	>50nm	10km+
Reported Separation:		
	100ft V/<20m H	300ft V/200m H
Recorded Separation:		
	Contacts merged <100yd H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBINSON R22 HELICOPTER PILOT reports he was instructing a student flying a NAVEX in preparation for gaining a CPL (H). He was occupying the LH seat of the orange-coloured helicopter and they were flying in VMC with no cloud in the vicinity and an in-flight visibility of >50nm. A squawk of A7000 was selected; neither Mode C nor any form of TCAS is fitted.

Approaching a position about 1nm NW of Ware VRP, heading 060° at 80kt they had selected the Essex RADAR frequency of 120·625MHz and were listening-in just prior to his student making an initial call to RADAR to obtain a FIS as briefed before flight. Flying in a level cruise at 2000ft – the Stansted QNH of 995mb had been set already - he spotted a high-wing single engine monoplane [the C182] to port in their 10 o'clock about ½nm away flying directly towards them at the same altitude. He reported this to his student - the PF - and instructed him to maintain course and speed but the other pilot also maintained his course and speed towards them. When it was apparent that the pilot of the other ac was making no attempt to 'give-way' in accordance with Rule 17 of the 'Rules of the Air', he took control of the R22 from his student and commenced an avoiding action descent whilst instructing his student to record the registration of the converging ac [which was only partially obtained]. The other ac maintained its course and speed and passed about 100ft above his helicopter as it crossed <20m ahead from L – R into their 4 o'clock. He assessed the risk of collision as "low" and added that his student was concentrating on fixing their position prior to calling Essex RADAR, to whom an Airprox was reported on RT.

THE C182 PILOT, a flying instructor, provided a very comprehensive account 3 months after the event reporting that he was conducting an IMC revalidation training flight in VMC operating under VFR with the student flying the ac from the LH seat. The purpose of the flight was to exercise VOR intercepts; VOR radial tracking and, later in the sortie, NDB tracking. The intended route was from Little Staughton eastwards to intercept the BARKWAY (BKY) 010 radial thence to BROOKMANS PARK (BPK), LAMBOURNE (LAM), then eastwards to MALDEN [VRP], before turning N to Earls Colne and CAMBRIDGE (CAM), before positioning at Fenland for landing.

Just to the S of Bourne and to the W of Duxford he was handling the RT to allow the student an opportunity to concentrate on the VOR tracking. He contacted Essex RADAR on 120·625MHz, passed the normal details including his route to LAM and requested a FIS. The response from ATC was "roger, Stansted QNH 995, report when leaving the frequency". From this he deduced that his request for a FIS had not been granted and "they were to continue being responsible for separation and lookout but could not expect position reports about other ac". He added that ATC at the time was very busy.

At BKY they turned onto a heading computed from the VOR for BPK. A squawk of A7000 was selected but he could not recall if Mode C was fitted/selected. They were heading 207° abeam WARE at 120kt, flying level at 2000ft QNH (995mb) in very good VMC with an estimated visibility of 10km+ and no significant cloud.

Prior to this incident, from the RH seat, he had observed an ac off to port some 2nm away on what appeared to be a reciprocal track but the ac appeared lower than them. From the RH seat it was clear that the other ac would gradually be no longer visible to him so at about 1315 he asked his student PF in the LH seat to spot the ac on the port side and call it out accordingly. He asked for its position and after the student responded positively that he had it in sight below, his student then said "the helicopter will pass under our nose to the front and will soon appear on your [starboard] side". As it was well below them they took no avoiding action. The helicopter then transited below their aeroplane from their 11:30 position to their 4:30 position some 250-300ft beneath them to starboard and slightly in front of their C182 and was next seen by him passing to starboard about 200m away at the closest point with a *"low"* risk of a collision.

Some time later they heard a transmission from the pilot of an ac that had not transmitted on frequency beforehand, asking Essex RADAR if they had seen another ac. After a short time the pilot of the reporting ac stated that the ac was a high wing type and stated an ac registration that was not identifiable as that of their C182. But he also gave its position as WARE and said that he was at 2000ft. This was their approximate position and, if they were the ac that the other pilot was referring to, he was definitely lower than them.

His student, who is a qualified and current helicopter pilot, had the impression that the helicopter may have been climbing before the incident. Both the student and himself believe the helicopter was painted red and had yellow rotors and was probably a Robinson.

They continued on track to BPK and then turned towards LAM. At an appropriate point they asked Essex RADAR for permission to leave their frequency, which was granted and as they were not contacted about this incident by RADAR assumed it was most unlikely to have involved their ac. Nevertheless upon landing at Fenland and having been concerned at these events, they made notes so that if in the unlikely event they were the reported ac involved they would be able to respond. They did not file an Airprox themselves because they did not consider there was a danger of collision. He added that the radar recording will undoubtedly show the tracks of the 2 ac, but his view was that the helicopter was at 1700ft QNH (995mb) and on a reciprocal heading to them off their port side.

UKAB Note: (1): In a subsequent telephone conversation the C182 instructor pilot reaffirmed that, from his perspective, the red helicopter was first seen to port - L of the nose - at a range of 2nm. He then lost sight of it to port, but it was seen by his student before it then flew into his field of view again to starboard. Furthermore, he explained he was fully aware of the nature of a FIS.

THE ESSEX RADAR CONTROLLER helpfully provided a short report of the R22 helicopter pilot's subsequent RT report stating, that a 'free-call' was received from the R22 pilot. When the controller responded to this initial call, the R22 pilot announced that he would like to file an Airprox report. This confirmed the details submitted in his account adding that the other ac was a Cessna southbound that passed at the same altitude 100ft away.

ATSI had nothing to add.

UKAB Note (2): The Stansted 10cm radar recording illustrates this Airprox quite clearly. However, the absence of Mode C from both ac does not allow the vertical geometry of this encounter to be resolved independently. The two ac are shown converging on the Airprox location on steady relative bearings – both squawking A7000. No other relevant ac are shown in radar coverage in the immediate vicinity at the time of the Airprox. At 1317:15, the R22 helicopter is tracking about 085° with the C182 at L 10 o'clock – 4nm tracking SW towards the BPK. Closing to a range of 1·9nm at 1317:57, the R22 is still well to starboard of the C182, which has altered slowly more southerly onto a track of about 200°. The R22 then turns slightly L. When horizontal separation decreased to 1nm the C182 was tracking about 200° with the helicopter in the C182 pilot's 12:30 position - still R of the nose. The range continued to decrease and when 0·6nm apart the R22 makes a turn of about 30° to the L, which is just before the R22 instructor pilot reports sighting the C182 [½nm] as the latter maintains its track and draws slightly R. The contacts merged about 1nm NW of WARE VRP, with less than 100yd horizontal separation, and no further significant deviations from track readily apparent.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, and a report from the air traffic controller.

It was clear that this Airprox between two VFR training flights operating in fine weather in the 'see and avoid' environment of Class G airspace stemmed from lookout issues. Furthermore, it was clear to the Members from a comparison of the pilots' reports with the data from the radar recording that there was a significant difference between the R22 pilot's perception of the geometry of this Airprox and the C182 instructor pilot's recollection of the encounter. For his part, the R22 instructor pilot reports sighting the C182 at a range of ½nm and that he elected initially to 'stand-on'. Whilst in the Board's view this was a quite late sighting of the other ac, nevertheless the R22 pilot had sufficient time at this closing speed to assess what was happening before deciding that avoiding action was necessary on his part. The Board recognised entirely that if the helicopter was to starboard of the C182, it was the latter pilot's responsibility under the 'Rules of the Air' to 'give way' to the helicopter to ensure that he passed 'well clear' of it. However, the 'Rules' can only work if the other pilot has seen your ac in sufficient time to take action to pass 'well clear' and this is sometimes not plainly evident at all. So in the view of pilot Members, all things being equal it is always better to give other traffic as wide a berth as feasible by making a bold alteration early which will leave the other pilot in no doubt that his ac has been seen. However, the Board recognised the understandable desire by instructors to allow their students to gain maximum benefit from their sorties by causing as little disruption to their planned tracks as possible.

The C182 instructor pilot's recollection of the geometry was somewhat different in that he perceived that whilst tracking towards BPK, the helicopter that he saw 2nm away was initially to port before it passed under the nose and reappeared in his field of view to starboard. Thus for an ac to port, it would have been that pilot's responsibility to 'give-way' and remain 'well clear'. The Board discussed this surprising anomaly at length: with no abnormal weather reported which would have caused a significant amount of drift – the C182 pilot's navigation log gave a wind of 220°/10kt - it was not feasible to reconcile the C182 instructor's account with the evidence from the radar recording. Members noted that it was some 3 months after the Airprox before the instructor pilot had rendered his report, but he had noted the possibility himself that a report might be required and so, accordingly, had made notes of the encounter. However, neither his reported recollection nor that of his student agreed with the data from the radar recording which always showed the R22 off to starboard of the C182. It might therefore have been that the C182 pilot had not seen the R22 flown by the reporting pilot at all, but if that was the case then they were both unaware of another ac that had closed within 100yd of their aeroplane and which should have been plainly in view from the RH seat. Another possibility was that there was another Robinson helicopter off to port not detected by the available radar sources but on balance this seemed improbable. No other ac were shown in the immediate vicinity and it was clear that the correct ac involved had been identified on the radar recording in the reported location. The absence of Mode C data from either ac did not allow the vertical geometry to be determined independently but both pilots reported that they were flying at 2000ft QNH (995mb) just before the Airprox. Thus it seems that it was left to the R22 pilot to take action to avoid a collision which the instructor did by taking control from his student and robustly descending. As the C182 pilot's account had reflected that he saw the helicopter 300ft below his aeroplane, it seemed to some that he must have spotted the helicopter after the latter's pilot had descended it out of the way. Others thought that the C182 pilots were either not keeping a good lookout or had in the intervening period between the encounter and filing the report perhaps confused this event with another during what was clearly a very intense training flight. Some thought it might be easy to misjudge range against such a small helicopter the size of the R22 but then the C182 pilot had advised that his student was very familiar with Robinson helicopters so this did not gel either. The Board could only conclude on the information available that this Airprox had been the result of a conflict in Class G airspace that had been resolved by the R22 helicopter pilot. Whether he should have been placed in this position in the first place could not be gauged with absolute certainty but despite the closeness of the encounter in the horizontal plane he had descended at least 100ft clear below the C182 and thus, in the Board's view, there had been no risk of a collision following this robust action.

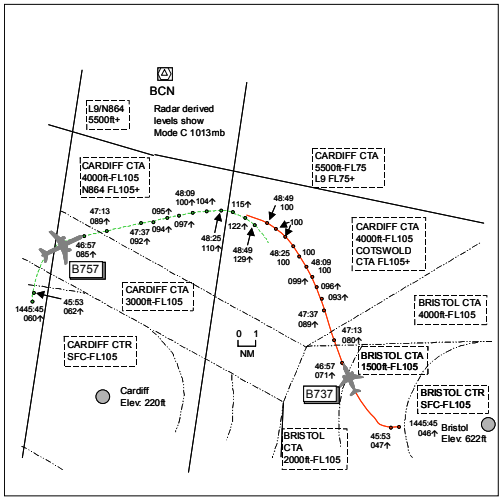
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the R22 helicopter pilot.

Degree of Risk: C.

AIRPROX REPORT NO 165/06

Date/Time:	18 Nov 1448 (Saturday)	
Position:	5135N 00306W (14nm NE Cardiff)	
Airspace:	Cotswold/Cardiff CTA (Class: A/D)	
	Reporting Ac	*Reported Ac*
Type:	B757-200	B737
Operator:	CAT	CAT
Alt/FL:	FL100↑	↑NR
Weather	VMC CLOC	VMC CLBL
Visibility:	10km	NR
Reported Separation:		
	NR	NR
Recorded Separation:		
	Nil V/7·5nm H or 1000ft V/4·9nm H or 2900ft V/0·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports being just on handover from Cardiff Approach to London Control at 350kt climbing through FL100 having been cleared to FL230 and asked to expedite through FL150. Passing FL105 heading 110°, they were told to turn R onto heading 180° for avoiding action. The A/P was disengaged and the turn was executed immediately, during which a TCAS TA alert was received. Simultaneously, the 'bank angle exceedence' warning sounded and on climbing through FL130 and passing heading 150°, London advised the other traffic was 2000ft below and that they could turn L again onto heading 110°. London told them that the other traffic was working Cardiff. During the manoeuvring the FO caught a fleeting glimpse of the other traffic but was unable assess the vertical or horizontal separation.

THE B737 PILOT reports outbound from Bristol IFR and in receipt of a RCS from Cardiff on 125·85MHz squawking an assigned code with Mode C. He was unaware of any Airprox until informed post incident so he was only able to complete the report form from memory. He recalled a B757 flight being on frequency outbound from Cardiff showing on the TCAS display climbing at a similar rate and on a closing heading. They were asked to turn but were not told that it was for avoidance. No TCAS TA alerts or RA warnings were received and ATC did not inform them of any loss of separation.

THE CARDIFF RADAR CONTROLLER reports mentoring a trainee with Radar 1&2 positions bandboxed and traffic loading light. The departing B757 flight reported on frequency routeing to ALVIN and the trainee placed the flight on heading 010° and climbed it to FL100. Shortly thereafter the B737 flight called departing Bristol and was instructed to climb to FL100 and, when on course to BCN, to continue as a radar heading. The trainee's plan, after assessing both acs' headings, was to climb the B737 above the B757. As the B757 was climbing well, the trainee changed the plan and climbed the B757 flight to FL110 on its own navigation to ALVIN which was made a radar heading. After reassessing the headings the trainee turned the B737 L onto 325° to pass behind the B757 and then whilst the B757 was climbing through FL95 the flight was transferred to LACC to report the heading. The B737 flight reported approaching FL100 for further climb and was told to maintain owing to traffic, the B757, climbing to 1000ft above. The trainee then communicated with another flight operating to the W of Cardiff. The mentor saw the B757 climbing through FL100 and gave the B737 flight a L turn onto 290° to take it at least 3nm behind and 1000ft below the B757. The LACC Sector 5 telephone rang and a male voice said that they were turning L with the B757 c/s followed by a female voice in the background saying 'turning R' and he saw the B757 climbing through FL115 in a R turn. He assessed separation was at least 3nm and least 1000ft.

THE LACC SECTOR 5/8/23/35 TACTICAL CONTROLLER reports operating a bandboxed sector when the B757 crew called on frequency heading 085° climbing to FL110 passing FL90. As soon as the flight called she saw the subject B737, under Cardiff Approach's control and heading towards the B757, was also climbing through FL90 at 2500fpm with approximately 7nm separation; the B737 was only climbing at 900fpm. She gave the B757 flight

avoiding action by expediting its climb to FL230 and turning it onto heading 180° - at this point she did not know if separation was lost. Later she heard that the B757 crew would be filing.

ATSI reports that the Cardiff Approach Radar Controller was acting as mentor to a student trainee. The mentor described the workload as light, adding that, apart from the subject flights, the only other ac on frequency, in the period leading up to the Airprox, were two operating VFR. As a result of the low workload the Approach positions were bandboxed.

The B757 flight established communication with Cardiff Approach at 1444, having departed from Cardiff's RW30, to route E'bound on Airway L9. The pilot reported passing 2600ft climbing to 5000ft. The trainee instructed the flight, on passing 3000ft (end of noise monitoring restrictions), to fly heading 010° (rather than the NE'ly SID track to ERNOK) and to climb to FL100. Shortly afterwards, the B737 flight, having departed RW27 at Bristol, contacted the frequency, reporting following a BCN 1X SID climbing to 6000ft. The BCN 1X SID is: *'Climb straight ahead. At I-BTS D4.5, at or above 3000 (8.2%), turn R to intercept BCN VOR R150. Cross BCN D20 above 4500, cross BCN D15 at 6000 to BCN VOR'*. Thereafter the ac would route N'bound on Airway N864. The flight was instructed to climb to FL150, the Standing Agreement Level with LACC S5, and, when established on the heading for BCN, to continue it as a radar heading.

Although no discussion took place between the mentor and his trainee about the trainee's plan to separate the two ac, the mentor was content with the trainee's actions. He assessed that the B737, on a shorter flight, would climb through the level of the B757 and the radar headings would position the former ac behind the latter. However, at 1445:45, when the B737 was still below the B757's level, the trainee changed the plan and instructed the B737 to stop its climb at FL100 and the B757 to climb to FL110, the Standing Agreement Level with LACC S23. The radar timed at 1445:45, when the trainee changed the plan, shows the B757 passing FL60 on its assigned heading 010°. The B737 is tracking W, prior to its turn towards BCN, passing FL46, 24nm to the SE of the B757. Shortly afterwards, the B757, now 1500ft above the B737, was instructed to resume its own navigation to ALVIN (approximate track 070°). One minute later (1446:57), the B737, now established en route to BCN, reported its heading 340°. As the B757 was routeing eastbound, the subject ac were now on conflicting flight paths, 17·5nm apart, the B757 passing FL85 and the B737 FL71. The mentor commented that he was surprised that the trainee had turned the B757 towards ALVIN and, therefore on to a potentially conflicting flight path with the B737. However, he still believed that separation would be maintained, either laterally, vertically or a combination of both, although he would continue to monitor the situation closely.

The mentor later said that he had expected his trainee would request a higher level from LACC for the B757. However, at 1447:12, the B757 was instructed to *"continue your present heading as a radar heading report that heading to London Control* (LACC S5 frequency*)"*. LACC Sectors 5,8,23 and 35 were bandboxed. The pilot acknowledged the instruction, reporting heading 085°. At the time, the B757 was passing FL89 and the B737 FL80. The two flights were now on conflicting tracks, 15·4nm apart. The mentor agreed that separation had not been ensured, as required, before the B757 was transferred to London Control. The Cardiff MATS Part 2, Page APR-24, states that: *'traffic should be presented to LACC in such a manner as ensures the application of not less than 5nm minimum separation or 1000ft vertical'*. He commented that he was surprised that the trainee had transferred the B757 to LACC without ensuring separation. It was not possible to intervene on the frequency, to stop the transfer, as the pilot of the B737 had commenced transmitting, reporting approaching FL100.

The B737 flight was instructed to *"turn L heading 325° traffic crossing a thousand feet above your cleared level expect further climb shortly"*. The radar recording at the time of this instruction (1447:37) shows the B757 passing FL92, 12·3nm NW of the B737, which is passing FL89. The trainee's attention then turned to passing TI to the two VFR flights operating to the W of Cardiff Airport. The mentor realised that the heading change would not ensure the required 5nm radar separation and took over the RT as soon as the transmissions to the VFR ac had been completed. He instructed the B737 flight to turn L heading 290° but did not use the phrase *"avoiding action"*. The pilot reported *"visual with the traffic above"*. Once the subject ac had passed each other, the trainee instructed the B737 to turn R heading 360° and climb to FL150.

Meanwhile, when the B757 established communication with LACC, at 1447:30, it was instructed to continue its reported radar heading 085° and climb to FL230. The Tactical Controller quickly realised the confliction with the B737 and initially instructed the B757 flight to expedite its climb through FL150. As soon as another flight's transmission had been acknowledged, the controller instructed the B757 *"avoiding action turn right immediately radar heading one eight zero degrees traffic twelve o'clock crossing right to left same level"*. The radar recordings

reveal that the B737 had not commenced its L turn at the time and, consequently, the B757's avoiding action R turn was apparently appropriate. LACC (understood to be the Sector Planner) then telephoned Cardiff, initially saying *"avoiding action we're going L"*. Following an off-telephone background comment, this was corrected straight away by *"we've gone R to avoid"*. Cardiff responded *"Okay ours has stopped at a hundred we've gone L"*. The radar recordings show that at 1448:09, the subject ac were 7·5nm apart, both at FL100. Sixteen seconds later, the B757 had climbed 1000ft to ensure vertical separation from the B737. The two flights were now 4·9nm apart. The B757's expedited climb ensured separation was not lost. The relative heading changes issued to the ac, to resolve the confliction, only became apparent after vertical separation was provided. Thereafter (1448:49), the ac passed 0·8nm apart, with vertical separation of 2900ft. At the time of the minimum separation, the B757 was within Class A airspace of the Cotswold CTA and the B737 was in Class D airspace of the Cardiff CTA (FL105 is the boundary level between these CTAs).

The mentor confirmed that he was monitoring his trainee's actions closely throughout the occurrence. The trainee did not request any assistance or inform him of the plan(s). He had believed that "separation would be tight", especially after his trainee altered the initial plan. In view of the trainee's experience, he decided to let the situation continue for training benefit, rather than intervene. He agreed that he should have taken action earlier to resolve the confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although separation was not lost, this incident did have the potential for being a more serious encounter. ATCOs sympathised with the mentor's predicament when monitoring an experienced trainee who would be making all of the executive decisions for the control position. The OJTI mentor/trainee scenario is a close one-to-one relationship, there being a fine dividing line between letting the trainee carry on controlling for as long as possible without knocking their confidence by 'taking over' control. However, ultimately the mentor is responsible for the trainee's actions and Members believed that the rapidly changing evolution of this encounter could have been 'nipped in the bud' by an earlier intervention by the mentor. Members agreed that the mentor did not ensure that his trainee transferred the B757 to LACC correctly separated from the B737 and this had caused the Airprox.

From the traffic situation presented to both the Cardiff mentor and LACC 5/8/23/35 controller it was understandable why they had issued turn instructions to resolve the confliction even though this resulted in the subject ac turning towards each other. The B737 crew had noticed the approaching B757 on TCAS and, whilst executing the L turn issued by the Cardiff mentor, had watched it climb through and above their level; TCAS did not issue any TA alerts or RA warnings. Fortunately the LACC controller had, immediately prior to issuing the 'avoiding action' R turn, noticed the confliction and told the B757 crew to expedite their climb through FL150. The B757 crew had promptly complied with this instruction, the radar recording revealing that a high ROC was very quickly established which led to the flight passing through FL110 before lateral separation was lost. During their turn a TCAS TA alert was received in the B757's cockpit with the FO catching a glimpse of the B737 as it passed below. Although the ATC turns issued reduced the separation at the CPA, the prompt and robust actions taken by the B757 crew were enough to persuade the Board that safety was not compromised during the encounter.

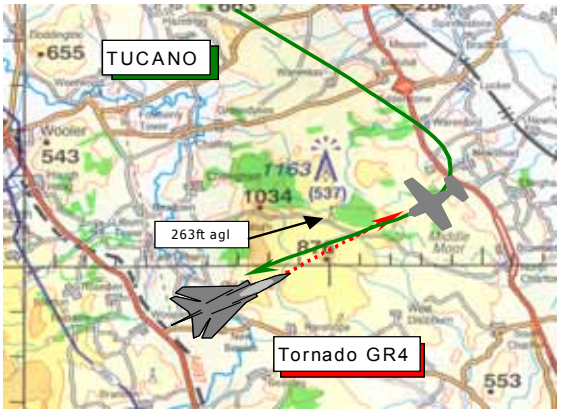
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Cardiff APR mentor did not ensure that his trainee transferred the B757 to LACC correctly separated from the B737.

Degree of Risk: C.

AIRPROX REPORT NO 167/06

Date/Time:	28 Nov 1355	
Position:	5531N00148W (12nm NW of Alnwick)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tucano T Mk1	Tornado GR4
Operator:	HQ PTC	HQ STC
Alt/FL:	270ft (agl)	250ft (agl)
Weather	VMC CLOC	VMC NR
Visibility:	8km	NR "good"
Reported Separation:	30ft V/nil H	NR
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO T Mk1 PILOT, a QFI, provided a very comprehensive account and helpfully included a copy of his chart. He reports that as the ac captain he was flying his Tucano from the rear seat (the usual instructor position) on a low-level staff-training sortie, with a student pilot acting as supernumerary crew in the front seat whilst returning to base from Dundee. The ac has a black/yellow high conspicuity colour-scheme and the HISLs and two landing lamps were on. TCAS I is fitted and a squawk of A7001 was selected with Mode C on. He was not in receipt of an ATS but listening out on 278.00MHz – the UKLFS safety frequency.

Approximately 30sec after he had executed a 90° degree R turn they were steady on a heading of 260° at 240kt in a very shallow climb at a position about 12nm NW of Alnwick. He was demonstrating to the student how to assess or "calibrate" his visually judged 250ft Minimum Separation Distance (MSD) by using a 263ft agl mast in their 1 o'clock position about 1nm away. Flying at about 270ft agl, the Sun was on the nose, and there was a considerable "dead ground effect", thus terrain and features below the horizon were difficult to make out. Just as he was momentarily 'heads-in', checking the ac instruments, his student in the front seat shouted after spotting a fast-jet ac on the nose, slightly low and head-on. On hearing this he looked out to see "something light coloured" almost instantaneously flash below his starboard wing and pass some 30ft almost directly beneath his Tucano with a *"high"* risk of a collision. No avoiding action was taken and he estimated the time from visually acquiring the fast-jet ac to it passing below was less than ½sec. He pulled up and established a left-hand orbit at 1200ft in an attempt to acquire the fast-jet ac or any others in the vicinity. The low-level training element of the sortie was then discontinued and a medium level recovery was initiated back to base. An RT Airprox report was filed with Scottish MILITARY on 282·625MHz.

Neither he nor the student PNF saw a contact on the TCAS screen [that was selected to 6nm displayed range] prior to the Airprox, although he added frankly that neither of them recall scanning the TCAS immediately prior to the encounter. No TCAS traffic audio warning was enunciated nor was an ac shown on the TCAS screen after the incident. The student pilot subsequently assessed the reported ac to be a Tornado with wings swept back.

THE TORNADO GR4 PILOT reports his ac has a grey camouflage scheme but the HISLs were on whilst conducting a low-level sortie in LFA12. They were listening out on the UKLFS safety frequency, a squawk of A7001 was selected with Mode C but neither TCAS nor any other form of CWS is fitted. In the vicinity of the reported Airprox location he was heading 310° [more probably NE'ly at the time] at 520kt, flying at 250ft agl and had just commenced an 'IP - target run'. The Tucano ac was not seen.

UKAB Note (1): A sketch of the GR4 pilot's route was included with his report which showed that the location of the Airprox was adjacent to his planned turning point from a NE'ly track onto 310°. Thus the diagram above is compiled from those provided by both pilots.

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

THE TUCANO T Mk1 PILOT'S UNIT comments that whilst in this case TCAS provided no crew observed warning of the approaching Tornado, the system has for a year now been reliably proving its value on the Tucano fleet against squawking traffic at all levels. This occurrence serves as a reminder that TCAS is a useful tool for assisting with crew's awareness but is not infallible, especially in the low flying environment where there is no substitute for a good look-out scan.

THE TORNADO GR4 PILOT'S UNIT had nothing further to add.

HQ PTC comments that with a near head-on closing speed of about 760kt it would be difficult for the crews of these 2 ac to see each other. There could be several reasons why the TCAS I did not alert the Tucano crew to the presence of the Tornado and although TCAS I is a useful tool for traffic awareness this Airprox shows it is not infallible.

HQ STC comments that it is disappointing that nothing showed on the Tucano's TCAS I due, probably, to the high ground between the two ac. The minimal time available to see the 'blooming' of a contact directly ahead is minimal and well documented. In this case, luck prevailed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Whilst the Tucano involved here was fitted with a basic form of collision warning system - TCAS I, which can potentially provide advance warning to the crew of 'squawking' traffic in the vicinity - it was probable that this close quarters situation in the UK low-flying system had defeated this valuable aid. Although there was no reason to doubt the veracity of the GR4 crew's account, it was not feasible to confirm independently that the GR4 was definitely squawking. Therefore, given the absence of any radar data that might have illustrated the geometry of this scenario, it was difficult to resolve with any certainty why the TCAS I did not give a traffic alert. On balance, it seemed that terrain masking was the most probable reason. Given the heights of the two ac, the GR4 could well have been obscured as it climbed up to the W of the hill as the Tucano crew turned SW on the other side of the feature, preparing to descend into the valley approaching spot height 846 and thereby screening the 'line-of-sight' the TCAS I needed to detect the fast GR4. Whilst clearly not a substitute for a good lookout scan, TCAS was a proven device – even in its basic form – so Board Members stressed that this Airprox certainly does not negate the overall benefit to safety that a CWS in the form of TCAS I can achieve. It was in similar scenarios to this incident – a head-on closing geometry - that the PTC TCAS trial had proved so effective. Indeed 30sec warning had been achieved, which attested to the desirability of a collision warning system to supplement lookout scan. But unfortunately it had not been able to forestall events here.

Thus with the Tucano's TCAS I apparently blind to the GR4 and the latter ac not fitted with any similar device, it was left to each crews' eyes to detect the other ac. The LF Ops Advisor, himself experienced in fast jet operations, stressed the amount of 'eye work' necessary for the GR4 pilot whilst setting up for the 'IP to target' run at low-level. A single engined ac with a small cross-sectional profile, such as a Tucano, approaching 'head-on' with no crossing motion to draw attention to it would have been difficult to spot. Indeed, it was evident that the black Tucano had defeated the GR4 crew entirely who were completely oblivious to its presence as they crested the hill, not seeing the ac at all as they underflew it. The same difficulties confronted the Tucano crew who also had the long engine nacelle of their ac to contend with as they flew into Sun. This might well have obscured the jet approaching from ahead and below until the Student spotted it and alerted the QFI flying the ac, as per norm, from the rear-seat. A helicopter pilot Member commented that it was not wise to fly 'into Sun' for any significant period if this can be avoided, for this very reason: in the Member's view pilots should climb and/or alter heading to improve forward visibility. However, the Student's alert had little impact on the eventual outcome as the QFI flying the ac was unable to do anything before he saw the jet momentarily as it opened to starboard at high speed. Patently, 'see and avoid' had not worked during this encounter at low level where the closing speed of about 760kt clearly gave the crews little opportunity to spot each other's ac in time to take appropriate action. Both crews were to varying extents also somewhat distracted at the critical moment, it would appear. The GR4 crew were setting up for the target run and either turning, or just about to turn, onto the 'IP to target' heading and possibly clearing the airspace into the port turn. Conversely, the Tucano QFI was explaining about gauging their MSD by reference to the mast in their 1

o'clock position about 1nm away thereby distracting his scan away from the 'threat' at the critical moment - a salutary lesson for all concerned. Members also noted that although both crews were monitoring the usual LFS safety frequency, neither had made nor heard any RT transmissions which could have effected the situation. The Board concluded, unanimously, that this Airprox had resulted from a conflict in the UK low-flying system and at the distances reported by the Tucano QFI – he reports the GR4 flew 30ft beneath his ac - an actual risk of collision had certainly existed in these circumstances.

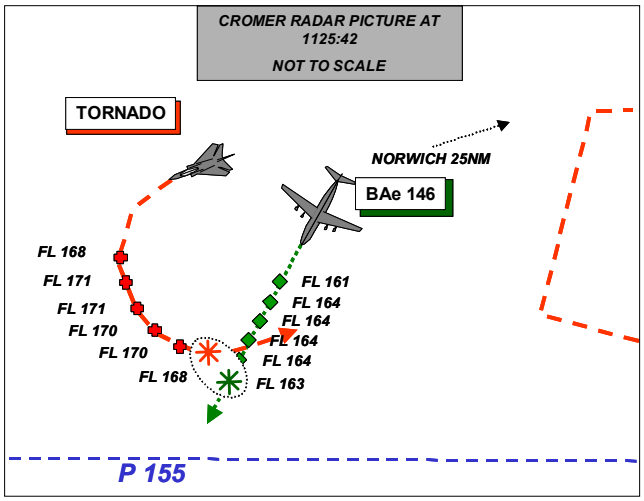
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the UKDLFS.

Degree of Risk: A.

AIRPROX REPORT NO 168/06

Date/Time:	30 Nov 1123	
Position:	5228N 00035E(30nm WSW Norwich)	
Airspace:	London FIR	(Class: G)
Reporter:	Norwich ATC	
	First Ac	*Second Ac*
Type:	BAe146	Tornado GR4
Operator:	Civ Comm	HQ STC
Alt/FL:	FL150	FL175
Weather	VMC NR	VMC NIL WX NR
Visibility:	6-7km	40km
Reported Separation:	NR	0ft V/3nm H
Recorded Separation:	500ft V/0.8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

NORWICH APR reports that he agreed co-ordination with Marham between a BAe146, to maintain FL160, against a Tornado that was to maintain FL170; the Tornado was Westbound and the 146 Southwest bound. When the Tornado had passed 3 miles still heading W he instructed the 146 to climb expecting Tornado to continue to the W. The Tornado however was seen to commence a left turn so the BAe146 was advised and instructed to descend to FL160. He estimated the distance between the ac as being 2-3nm and about 600ft vertically. The BAe146 pilot advised that he had received a TCAS RA.

THE BAE146 PILOT reports heading S at 250kt on a non-scheduled flight from Norwich to Paris. He was squawking with Mode C, was TCAS equipped and was in communication with Norwich who had cleared him to FL180 from FL160. After leaving FL160 and while he was passing through FL166 for 180 he was told by ATC to return to FL160. Before they could get back down to FL160 they received a TCAS TA followed by an RA but he did not see any other ac. He assessed the risk as being Medium.

THE TORNADO GR4 PILOT reports flying a recce task to the S of Marham squawking with Mode C and in receipt of a RIS from Marham APP, they were informed of civil traffic leaving Norwich Airport. For co-ordination they had been asked by APP to maintain FL175 or above, whilst the civil traffic would be climbing to FL170 before joining the airways (see UKAB Note 1). They called visual with the traffic at 12nm and continued with their task. As they turned left through 080° at 300kt they noticed that the civil traffic had continued to climb through their level. Upon asking Marham ATC they confirmed that the civil traffic had been coordinated with Norwich ATC. They continued the turn maintaining visual throughout, with no risk of collision.

MIL ACC reports that a BAe146 was under the control of Norwich (NOR), in receipt of a RAS while a Tornado GR4 was receiving a RIS from Marham Zone (ZONE). At 1119:35 ZONE was called by NOR who stated, "*Hello Marham, Norwich. Traffic information, coordination. Your 3640 track south of.*" Zone instructed NOR to standby, then said, "*36*" after which NOR continued, "*Sorry, 3640 track north of Honington by 6 miles.*" And ZONE responded "*3640 Standby.*" At 1120:11 ZONE then said "*Right 364*" to which NOR responded "*Sorry?*". ZONE then restated the squawk and NOR acknowledged. ZONE then stated at 1120:20, "*3640 Um, He's manoeuvring in the block FL100 FL200 general handling.*" NOR then replied "*Okay, right; the 3705 northwest of him by 7 miles and the 3702 west of Norwich by 10 miles; both routing to BKY, climbing 180. You couldn't stay out to the east of that bit east or stay in your present position or east of that.*" ZONE responded, "*Contact. Um, I will ask him to remain east.*" ZONE then transmitted "*GR4 C/S, Marham Zone*"; the GR4 crew replied "*Go ahead*" and ZONE continued "*GR4 C/S, request from Norwich can you manoeuvre no further West than your current position for the next few minutes for co-ordination?*" The GR4 crew replied "*I'm just rolling out on West at this time!*" NOR then says, "*Hello Marham*" and ZONE replied, "*Hello*" and NOR asked "*Hello, yes, er cou, can we coordinate at all? Is your 3640 or not.*" Simultaneously the GR4 crew transmitted, "*We're just rolling out on West this time level FL170.*"

ZONE then instructed NOR to "*Standby*" and acknowledged the info from the GR4 crew. ZONE then told NOR, "*He's er just rolling out on a Westerly heading now FL170*" and NOR queried, "*170?*" which ZONE confirmed. NOR then requested "*What, to maintain?*", ZONE said "*Standby*" and then transmitted "*GR4 C/S, for co-ordination request you maintain not below FL170*" and the GR4 crew said "*Wilco*" so at 1121:32 ZONE informed NOR, "*Yeah he'll be not below FL170*" and NOR replied "*Lovely, we'll come up to 160 then; thank you very much*" and both controllers signed off. Then at 1121:47 ZONE passed TI as "GR4 C/S *intermittent contact South half mile tracking north no height information*" and the GR4 crew acknowledged. ZONE then spoke to another control position and another ac before passing further TI at 1123:15, "GR4 C/S *Traffic North 4 miles tracking West South West co-ordinated not below, not above FL160*" but the GR4 crew's acknowledgement was unreadable. ZONE then stated, "*GR4 limited traffic information from all around as you operate in the Marham overhead*" and the GR4 crew acknowledged this and then at 1123:41 stated, "*GR4 C/S' got the traffic in sight*" and ZONE acknowledged. Later at 1125:13 the GR4 crew called ZONE, ZONE acknowledged and the GR4 crew requested, "*Confirm that traffic's still 160?*" to which ZONE responded, "*GR4 C/S, he's currently east of your position by 3 miles tracking South West indicating FL165 climbing now, standby*" and the GR4 crew stated, "*Roger understood we were co-ordinated we're visual and will take avoid…….but he he's climbing through the level we were asked to stay at.*" And ZONE responded "*GR4 C/S understood*." From this point onwards, the speech from NOR was not recorded due to a technical fault. At 1125:37 ZONE called NOR and said "*Roger request the co-ordination reference your 3702.*" There followed a discussion regarding what had been agreed and what ZONE had meant. Subsequently at 1127:51 ZONE transmitted "*GR4 C/S now clear of co-ordinated traffic manoeuvre as required between FL100 and FL200.*"

Analysis of the Cromer Radar showed the BAe146 on the Marham 090^{o} at 14nm at 1121:10, tracking 260^{o} and indicating FL098 with the GR4 in its 8 oíclock 11nm. The GR4 then turned left and climbed while the BAe146 maintained track and climbed steadily. At 1122:36 the BAe146 began a left-turn while indicating FL152 then tracked 28^{o} having climbed to FL170 while in the BAe146ís 9 oíclock at 3.1nm. The BAe146 established on a track of 2^{o} at 1123:43 and remained on this track throughout the remainder of the incident. The GR4 passes through the BAe146ís 12 oíclock at a range of 1.9nm at 1124:00 while tracking 2^{o} and indicating FL170 while the BAe146 was passing FL155. The GR4 commenced a left turn at 1124:37 while it was in the BAe146ís 3 oíclock at 3.2nm and indicated FL170; the GR4 appeared to tighten its turn at 1125:37 and continued to pass behind the BAe146. The CPA occurs at 1125:41 with the BAe146 tracking 2^{o}, indicating FL163 and the GR4 was in its 4 oíclock at 0.8nm, tracking 08^{o} and indicating FL171.

ZONE fully complied with all requirements of RIS in accordance with JSP552, Section 235.115. Not only was TI passed and the traffic reported in sight, but TI was updated when the ac continued to converge. It would seem that there must have been a misunderstanding by NOR of the coordination agreed. There was no agreement for lateral separation, only vertical, and the ZONE had clearly stated that the GR4 was general handling; therefore, its track would be unpredictable and varied.

ATSI reports that Norwich Approach was manned by an APR Controller, who was dealing with outbound flights, and a Radar Director (DIR), who was responsible for inbound and overflights. The former controller described his workload as high and the latter considered his as light. For this reason the DIR assisted his colleague by carrying out a telephone co-ordination call with Marham, on the APR Controller's behalf. The DIR commented that the standard of the telephone equipment at Norwich is poor, making it difficult to carry out the co-ordination process with Marham; however, he confirmed that he was in no doubt about the co-ordination agreed. It is understood that the equipment is to be replaced in the near future.

A BAe146 was the second ac routeing from Norwich Airport to join CAS at a point 16nm NE of BKY. The first flight was a DHC8, consequently of lower performance than the following BAe146. CAS joining clearances of FL180 for the DHC8 and FL170 for The BAe146, subject to the DHC8, had been co-ordinated with LTCC. When the TWR requested departure clearance for the DHC8, APR released it on track to BKY, climbing to FL180. Three minutes later, the BAe146 was released straight ahead (to achieve separation from the DHC8) to FL170.

The BAe146 established communication with APR at 1118, reporting climbing to FL170. APR instructed the ac to maintain FL100 initially, the flight was identified and instructed to continue straight ahead because of the slower DHC8 and the radar recording show it tracking SW, about 8nm ahead of the 146. The BAe146 pilot was informed that he was being provided with a RAS. APR commented that he stopped the BAe146's climb at FL100 because he had observed military traffic, showing a Marham squawk (3640), tracking SE at FL166, about 17nm SW of Norwich and he thought it might conflict with his departing traffic. This ac was, subsequently, identified as the

Tornado involved. APR asked the DIR to telephone Marham to enquire about the details of this flight. The recording of the telephone call between the Norwich DIR and Marham Zone, which lasted about two minutes, is detailed in the Mil ACC report above.

Although it is impossible to decipher with any certainty the Marham *"not below Flight Level"*, it would seem that both ATC Units agreed that it was FL170 and consequently Norwich stated that their traffic would be climbing to FL160. Norwich DIR confirmed that no co-ordination about the Tornado's heading was agreed with Marham and that it was purely a level agreement. Although neither Norwich Controllers could recollect exactly the message that DIR passed to APR, following the co-ordination with Marham, the latter controller confirmed that he was aware that no agreement had been arranged for the Tornado to continue heading W.

Before this co-ordination had been completed, the BAe146 had been cleared to climb to FL170. As soon as APR became aware that the Marham traffic would be remaining FL170 or above, he instructed both the DHC8 and the BAe146 to stop their climb at FL160. The radar photograph timed at 1121:50 as these instructions were being issued shows the 146 tracking W, passing FL104, 8.8nm NNW west of the Tornado, maintaining FL170 and also tracking W; the DHC8 was tracking SW and passing FL95, has just passed through the Tornado's twelve o'clock.

At 1122 Norwich APR received a telephone call from LTCC requesting information on the two outbound ac routeing to BKY. During the communication, LTCC co-ordinated revised joining levels for the two ac namely FL180 for the BAe146 and FL170 for the DHC8. At 1123:12, as soon as the call had finished, APR instructed the BAe146 pilot to climb to his revised joining level of FL180 and to turn left for BKY. The radar recording shows the BAe146 passing FL144, 4.4nm N of the Tornado with both ac on slowly conflicting tracks. APR commented that he had momentarily forgotten the presence of the Tornado when issuing the climb clearance however, he immediately realised his error and instructed the flight to stop its climb at FL160 and informed the pilot of the traffic 4nm to the S. The BAe146 was passing FL148 and the DHC8, now clear of the Tornado, was instructed to climb to FL170.

At 1124:54, observing that the tracks of the two ac had passed, as the BAe146 routed to BKY and the Tornado was still tracking W, the APR Controller instructed the BAe146 to climb to FL180. The radar photograph shows that the Tornado at FL170, is W the BAe146 but has recently commenced a left turn. The two ac are 3.9nm apart and the BAe146 is tracking SSW passing FL161. Shortly afterwards at 1125:07, APR realising that the Tornado was not tracking W but was now turning back towards the 146, transmitted to the latter *"you can level off again that traffic that was supposed to be going away from you is coming back towards you if you can level off again at Flight Level One Six Zero or One Six Five traffic's now three miles west of you at three miles turning back into you"*. The term 'avoiding action' was not used. The radar photograph timed at 1125:16, shows the Tornado turning through a southerly heading, 3.3nm W of the BAe146, which was passing FL163. The pilot reported descending to FL160 and then added that he had received a TCAS RA. The radar recordings show that the 146 levelled at FL164 and maintained that level for 20sec before descending. In that time the Tornado continued its left turn towards the BAe146, closing to 1.3nm. As the BAe146 descended through FL163 the Tornado, now at FL168, was continuing its left turn 0.8nm behind the former ac. Further climb to the BAe146 to FL180 was given at 1126:18 when the ac were away from each other. The APR Controller explained that he was anxious to instruct the 146 to climb to FL180 as soon as possible to ensure it would reach its CAS joining clearance position 16nm NE BKY, at that level consequently he issued a climb clearance to the BAe146 earlier than was advisable in the assumption that the Tornado would continue to the W for a time sufficient to allow the BAe146 to climb safely to FL180 (the 146 had about 20nm to run to the 16NM NE BKY point at the time).

The Norwich MATS Part 2, Section 4, Chapter 2, Page 2, states the SOP for 'Transit of ac to CAS' is to 'pre note to LATCC Mil prior to departure and handover as soon as possible after departure and ac are to wear Norwich squawks until commencing the handover to LATCC Mil to avoid the possibility of other agencies trying to contact an incorrect unit for co-ordination'. During this incident both controllers agreed that it was not feasible to involve LATCC Mil as it would have been necessary to separate the two outbound ac, before being able to transfer them. On this occasion, by the time this was achieved, the ac would have been close to CAS and needed to be transferred to LTCC.

In accordance with MATS Part 1, Section 1, Chapter 5, Page 3, 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 3000ft, 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 ac make unpredictable changes in flight path, it is not always possible to achieve this minima'. On this occasion the

Tornado was 'known traffic' to APR. (The MATS Part 1 definition of 'known traffic' is 'traffic, the current flight details of which are known to the controller concerned through direct communication or co-ordination'). However, only the Tornado's level was co-ordinated, consequently its lateral manoeuvring was unknown to the Norwich Controller and 5nm separation was required.

Norwich APR Controller realised early that there was a potential confliction between his outbound ac and the Tornado so co-ordination was agreed with Marham, to ensure that vertical separation between the ac would exist; however, APR acted too early when instructing the BAe146 to climb to FL180, its CAS joining level. Although the subject ac had passed, he made the erroneous assumption that the Tornado would continue Westbound sufficiently for lateral separation to exist between it and the BAe146 as the latter climbed to its CAS joining level. On realising that the Tornado was turning towards the BAe146, he did instruct the latter to descend to FL160 or level at FL165, but without using the term 'avoiding action' and thereafter, the pilot reported a TCAS RA. While providing the 146 with a RAS the controller was obliged to maintain 5nm horizontal separation from the Tornado after dispensing with the co-ordinated vertical separation.

HQ STC comments that it would appear that the Norwich controller was not fully aware that the Tornado crew was likely to manoeuvre when clearing the BAe146 to its revised joining height of F180. The Tornado crew spotted the other ac climbing towards them and avoided it visually.

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 comprehensive, accurate, complementary and thorough reports above enabled the Board to agree the cause of this incident with relative ease. Both Norwich and Marham controllers agreed, as did their respective regulatory authorities, that having initially handled the situation correctly, the Norwich APR, for whatever reason, assumed that the Tornado would continue to the W so he instructed the BAe146 to climb through the co-ordinated level of the Tornado, to its CAS joining level, without ensuring that the requisite lateral separation would continue to exist.

Although the co-ordination agreed was poor and took some time, it was eventually unambiguous and agreed by all concerned and was witnessed by the Marham RT recording (although not the Norwich). The ATSI Adviser, when questioned, opined that the poor telephone communications between Norwich and Marham had not in this case been a factor but informed Members that the telephone upgrade referred to by the Norwich controller was still in progress.

Again, although not a factor in this incident, Members were informed that work is still ongoing in the CAA and MoD regarding civil/military co-ordination procedures.

Specialist Members discussed whether or not there was a systemic problem with the Norwich/BKY CAS joining procedure and concluded that there was not and that this incident had merely been an isolated human factors 'slip'.

Since the BAe 146 TCAS warned correctly of the Tornado and the pilot of the latter saw and visually avoided the 146, the Board determined that there had not been any risk of collision.

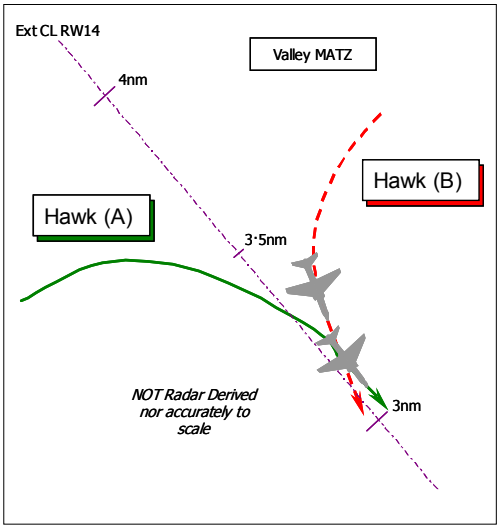
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Norwich APR climbed the BAe146 above the co-ordinated level and into conflict with the Tornado.

Degree of Risk: C.

AIRPROX REPORT NO 169/06

Date/Time:	28 Nov 1519	
Position:	5316N 00435W (3nm NW of Valley - elev 37ft)	
Airspace:	Valley MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1	Hawk T Mk1
Operator:	HQ PTC	HQ PTC
Alt/FL:	1200ft↓	1200ft↓
	QFE (1005mb)	(QFE 1005mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	10km+	10km+
Reported Separation:		
	50ft V/Nil H	30ft V/Nil H
Recorded Separation:		
	From PAR: Nil V @<200yd	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HAWK T Mk1 (A), a QFI, reports he was conducting a simulated emergency exercise for his student requiring a visual straight-in approach under VFR to RW14 at RAF Valley in good VMC. He was in communication with Valley TOWER and squawking the assigned VFR conspicuity code of A3737 with Mode C. Neither TCAS nor any form of CWS is fitted but the HISLs and noselight were on.

Whilst in final descent through 1200ft QFE (1005mb), heading 135°(M) at 150kt some 3nm NW of the aerodrome, another Hawk jet was first seen after it had passed under his ac from L - R. The other ac was seen as it flew away in the front right quarter of the canopy, about 50ft below his jet with a *"high"* risk of collision as it joined through INITIALS. He was aware that another ac – Hawk (B) - was joining the cct from RT transmissions but he had not seen it before the Airprox occurred. An Airprox was reported over RT to TOWER and he added that the student/ instructor workload was high during the simulated emergency recovery.

THE PILOT OF HAWK T Mk1 (B), a QFI, reports he was occupying the rear seat, as the PNF, with the student pilot (the PF) in the front seat. Flying a Mona-to-Valley transit from RW22 at Mona inbound to RW14 at Valley under VFR, they were following the standard routeing promulgated in the Station Flying Order Book (FOB). Squawking the assigned VFR conspicuity code of A3737 with Mode C, neither TCAS nor any form of CWS is fitted, but the HISLs and nose light were on.

Upon being told by APPROACH (APP) that there was no instrument traffic to affect his recovery, the student PF switched to the Valley TOWER frequency. After checking-in, they were passed the airfield details and advised that there were 2 ac "IN" [which included Hawk (A)]. Both the student PF and himself understood this to mean "2 ac in the visual cct". They continued to route in towards "INITIALS" at about 1500ft QFE (1005mb), whilst attempting to visually identify the cct traffic. Whilst heading about 225°(M) - with poor into-sun visibility, he stressed - the student PF began a descending turn at "INITIALS" in preparation for a visual 'run-in and break' for RW14 to land [executed at 1000ft QFE]. Immediately after making the "INITIALS" call to TOWER, the controller informed them of one ac joining for a straight-in approach – Hawk (A). This was the first time they had heard of this traffic and the student pilot immediately recognised a potential risk as their track was about to cross the extended centreline for RW14. Heading 150°(M) at 360kt descending through 1200ft QFE, as the student PF looked away from the cct area [LH cct on RW14] towards the extended centreline in an attempt to spot the other joiner, he saw a Hawk straight ahead - Hawk (A) - co-height, he thought in a shallow R turn with 20° AOB and joining through INITIALS. To avoid this ac, which was flying at slow speed, the student PF instinctively and aggressively bunted his ac. During the bunt, he as the instructor became visual with Hawk (A) from the rear seat. Both he and his student estimate that Hawk (A) passed some 20–30ft vertically above his jet with a *"very high"* risk of collision. The pilot of Hawk (A) then declared an Airprox with TOWER. He stressed that the sun was behind the other ac.

AIRPROX REPORT No 169/06

THE VALLEY TOWER CONTROLLER (TOWER) reports working another Hawk jet in the cct for RW14 when Hawk (A) called requesting to join for a straight-in visual approach which was approved along with normal joining instructions. Then Hawk (B) requested to join the cct, which was approved, joining instructions given and the crew passed "2-in" for the number of ac in the visual cct at that point [another Hawk and Hawk (A)] as it appeared on the HI-BRITE ATM that Hawk (A) had passed through LONG-FINALS. The next call was from Hawk (B) at INITIALS so the position of the cct traffic was passed as "one joining for a straight-in approach". At which point the instructor in Hawk (A) said he was at LONG-FINALS and declared an Airprox on the ac going through INITIALS, believed to be Hawk (B). Hawk (A) then called "SHORT-FINALS gear down" so his intentions were requested and the crew instructed to continue as there was still an ac on the runway.

THE VALLEY ATC SUPERVISOR (SUP) reports that this afternoon he was in the APPROACH CONTROL ROOM monitoring a busy IFR recovery with UT controllers in both APPROACH and DIRECTOR whilst also listening to the TOWER frequency. At about 1515 he heard Hawk (A) call to join for a straight-in approach. Shortly afterwards he heard Hawk (B) call to join and TOWER advise that there were 2 ac in the cct rather than one ac 'in' and one joining for a straight-in approach. Realising that this was slightly misleading but considering also the good weather conditions, he believed at the time that this was not potentially dangerous and he could mention it to the TOWER controller later. Shortly afterwards he heard Hawk (A) report an Airprox with Hawk (B) and took the appropriate actions.

MIL ACC reports that TOWER was controlling Hawk (A) and Hawk (B) when this Airprox occurred. At 1517:19 Hawk (A) crew called Valley TOWER, "*…request..join LONG-FINALS.*" TOWER replied, "[Hawk (A) C/S] *Valley TOWER, join runway 14, QFE 1005, one in.*" Hawk (A) crew read back, "*14, 1005 and* [Hawk (A) C/S] *this'll be..a join for straight-in approach.*" TOWER then instructed, "[Hawk (A) C/S] *straight-in approach approved, report LONG-FINALS with intentions*", which Hawk (A) crew acknowledged at 1517:41. There then followed 2 RT calls between TOWER and another ac in the intervening 9sec before at 1517:50, Hawk (B) crew called and requested, "*Valley TOWER,* [Hawk (B) C/S] *join.*" Responding, TOWER said, "[Hawk (B) C/S] *Valley TOWER, join runway 14, QFE 1005, 2 in.*" Hawk (B) crew read back, "*14, 1005* [Hawk (B) C/S]". TOWER then passed landing clearance to another ac before Hawk (B) crew called at 1519:01, "[Hawk (B) C/S] *INITIALS.*" Acknowledging this call at 1519:05, the ADC then stated, "*one joining for straight-in approach, surface wind 230 - 15 knots.*" Some 8sec later Hawk (A) crew reported, "*and* [Hawk (A) C/S] *is just..filing an Airprox.*" Whereupon the ADC asked Hawk (A) crew to pass details which were, "[Hawk (A) C/S]..*callsign unknown…the aircraft has just gone through via initials so now filing an Airprox.*" The ADC acknowledged Hawk (A)'s report and the crew of Hawk (B) added, "*That's* [Hawk (B) C/S]."

Analysis of the video stills from the Valley PAR were used to provide radar data. There appears to be a discrepancy between the voice data recording and PAR recording: the times in this report have NOT been corrected because the exact difference cannot be confirmed. All ranges are from touchdown and height *estimates* are derived from the y-axis of the PAR *elevation* display. Displacement L or R from the extended RW14 centreline is *estimated* from the *azimuth* picture. At 1519:45 Hawk (A) is at 3·7nm, 1500ft R of the centreline for RW14 crossing R to L at 90° at 1500ft; Hawk (B) is not yet shown. Hawk (B) appears on radar at 1519:50 at 3·6nm, 3500ft L of centreline crossing L to R at 90° at 1500ft. Hawk (A) is in (B)'s 12 o'clock 3500ft, at 3.5nm passing through the centreline at an angle of 45° at 1500ft. The aircraft steadily converge, Hawk (A) turning R until parallel with the extended centreline but offset 1000ft to the L from 3·25nm at 1000ft at 1319:55. Hawk (B) crosses from L to R in a gentle L turn; Hawk (A) is crossing R to L at an angle of 30° in Hawk B's 12 o'clock <0·1nm, co-height. Hawk (B) then passes to the R of Hawk (A) and descends rapidly to 1000ft by 1520:00 at 3·05nm from touchdown on the centreline. Hawk (A) is 1000ft L of centreline, at 1200ft 3·1nm from touchdown.

The ADC had passed correct joining instructions to the crew of Hawk (A) for the straight-in join. The Valley FOB states that:

"Ac wishing to carry out a visual straight-in approach or position visually for an instrument approach should position at 10nm on the centreline of the in-use runway at 2000ft."

However, from the radar data Hawk (A) performed a right-base join and only established on the centre-line at 3·25nm FINALS. When the crew of Hawk (B) called to join, the ADC's traffic information was that there were 2 ac 'IN' the visual cct. The ADC reported that it was established from the HI-BRITE (ATM) that Hawk (A) had passed through LONG-FINALS and therefore the controller described it as being 'IN' the cct. Unfortunately, this RT description of the aerodrome traffic did not allow the crew of Hawk (B) to establish an effective mental picture of

the traffic scenario affecting them as they approached INITIALS at high-speed. However, this was the correct procedure to follow in accordance with FOB Section C, Order 5, Para 9 and 10, which state:

"When ac call to join, the Local Controller will confirm the RW in use, circuit direction, QFE, number of ac in the visual circuit, details of instrument traffic inside 8nm and any restrictions. When ac report at INITIALS, the Local Controller will confirm the position of fixed-wing ac in the visual circuit and pass the surface wind."

When Hawk (B) crew called at INITIALS, TOWER informed them of the STRAIGHT-IN approach. This was the first occasion upon which the crew were made aware that there was potentially conflicting traffic in the approach lane. From the report by the QFI of Hawk (B), it can be seen that this warning enabled them to spot Hawk (A), but at a very late stage. Unfortunately, due to the overlapping radar contacts in the elevation picture, this Command is unable to establish the exact vertical separation at the CPA but the contacts did merge.

The unit has advised that the FOB orders quoted above are being amended and traffic information on other visual joiners is now passed to joining traffic. Despite being in accordance with local orders, the incomplete nature of the traffic information passed by ADC contributed to the late sighting of Hawk (A) by the crew of Hawk (B). This was exacerbated by the poor into-sun visibility described in Hawk (B) QFI's report. However, it ultimately alerted the crew of Hawk (B) to the presence of Hawk (A) in their intended arrival path and enabled them to take avoiding action. In the light of this Airprox, the choice of cct information passed to joining traffic should be reviewed.

THE HAWK T Mk1 PILOTS' STATION comments that following this incident a Flight Safety Investigation was undertaken and the following are pertinent extracts from the report:

This Airprox has highlighted the lack of knowledge, guidance and standardisation surrounding the conduct of visual straight-in approaches at 4 FTS. However, there were a number of Human Factors – pressure, distraction and communication – which came together on this occasion to both expose and exacerbate these issues, and which together led to a loss of situational awareness for both crews who believed, incorrectly, that they were operating in a known traffic environment and with no conflicting traffic.

It was recommended that:

4 FTS review and revise its published straight in approach procedure to ensure the maintenance of a known traffic environment within the MATZ.

All 4 FTS aircrew (staff and students) undertake formal Human Factors training as part of their groundschool at 4 FTS, or at the earliest opportunity thereafter.

A key issue was also the disconnect between the pilot(s) and ATC regarding the point from which an ac should be considered to be 'IN' the visual cct. Notwithstanding the misleading nature of the information that was passed, the controller made the '2 IN' call in good faith. However, it is possible, perhaps even likely, that this disconnect is not limited to Valley; it may therefore be appropriate for higher authorities to review extant regulations regarding when an ac should be considered to be 'IN' the visual cct.

The Station Commander's view was that anyone practising such emergencies on recovery could consider taking, or retaining longer than usual, a radar service if they feel that task distraction or other factors are likely to reduce SA in the busy area around and in a MATZ. Secondly, if you are aware of other traffic but uncertain of its position, use the radio to communicate in order to build SA. In any event, don't continue the join if you are still uncomfortable about the position of other instrument or circuit traffic.

HQ PTC comments that the Unit has conducted a Flight Safety Investigation (F765B) into this Airprox. The traffic information passed to Hawk (B) by APP and the first RT exchange from the ADC enabled the pilot of Hawk (B) to form a mental air picture of 2 ac in the cct that did not include any ac on the extended centreline. It was only when the ADC advised Hawk (B) at INITIALS that there was one joining for straight-in approach that the pilot expanded his area of look-out from the cct to include the extended centreline where he saw Hawk (A) albeit at very close range. The opinion of all the pilots involved was that the phrase 'IN' meant that an ac was either in the visual cct or in the overhead flying some form of PFL. There is a need to review cct traffic information passed to joining traffic and consideration be given to publicise what is meant by ATC when traffic is reported as 'IN' the cct.

AIRPROX REPORT No 169/06

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This Airprox illustrated yet again a disturbing disconnect between what aircrew understood from the cct traffic information provided by ATC and conversely what information the controller was actually endeavouring to impart. The MIL ACC Advisor commented on this difference of opinion between aircrew and ATC as to what was deemed to be either 'IN' or alternatively outwith the cct and Members recognised it was this crucial packet of information that was the catalyst to this Airprox. Some of this stemmed from the Unit's own desire for brevity on the RT it would seem, to keep things straight-forward for student jet-pilots in this intense flying training environment. Thus at the Unit's instigation it had been decided to deem traffic out to about 4nm from the aerodrome to be 'IN' the cct, but this delineation had apparently not been imparted to the aircrew themselves. The HQ STC fast-jet Member, himself a very experienced QFI, disputed this interpretation, explaining that 'IN' the cct - and thus included within the aerodrome cct traffic count - included ac joining the visual cct inside INITIALS. Members stressed that clearly in this visual aerodrome cct traffic it was fundamental that pilots must look out for and integrate with other cct traffic within this invariably intense military fast-jet environment. Here it was suggested that the visual straight-in approach conducted by Hawk (A) was rarely used, which might have led to some confusion on the part of the ADC, especially when flown in a non-standard manner. Furthermore, it was noted that for a visual straight-in approach the unit FOB required pilots to position from "…*10nm on the centreline of the in-use runway…",* which was patently not the case here when Hawk (A) joined from a R BASE-LEG within 4nm. Whilst recognising that the simulated emergency being practised clearly had a bearing on what the QFI in Hawk (A) was trying to achieve from this instructional sortie, Members thought that any variations from the standard visual straight-in which ATC might reasonably have expected to be executed here should be communicated to ATC in good time where good airmanship should dictate that ATC was kept thoroughly appraised of pilots' intentions. But a fast-jet pilot Advisor reminded the Board of the intense nature of the flying training operations at Valley where practise emergencies were practically the 'norm' in this very busy and dynamic training environment where ATC had to contend with many unexpected changes of plan. That said, the crew of Hawk (A) were given clearance by TOWER to join for the straight-in approach in what was a relatively quiet cct at that time with only one other ac circuiting to the aerodrome. This was all just 9sec before the crew of Hawk (B) called on the TOWER frequency whereupon they were advised within their own joining clearance from TOWER that there were 2 ac 'IN' the aerodrome cct, thereby including Hawk (A) in the number that the pilot of Hawk (B) could expect to see in the cct already. The Mil ACC report had made it clear that the TOWER controller had passed the cct state in accordance with the stipulations of the FOB. An experienced ATC Advisor opined that, notwithstanding the FOB requirements, to pass the cct state in this way might perhaps be indicative of relative inexperience. Evidently, whilst listening-in, the ATC SUP had recognised the potential for confusion when the cct information was transmitted in this manner to Hawk (B). It was perhaps somewhat ironic that the SUP had intended to debrief the ADC on this point later, but it was understandable that there was no opportunity to intercede before the Airprox occurred a little more than 1min later. Civilian controller Members not familiar with the operation of military fast jet circuits were surprised that the ADC had not detected the potential problem earlier from the HI BRITE ATM. This should have illustrated to TOWER the relative positions of the two Hawks heading toward one another in addition to observation from the VCR windows up into the approach. Nevertheless, from the Mil ACC report it was clear that TOWER had seen Hawk (A) on the ATM but there was no reason for the controller to believe that the crews had not seen each other as clearly there is no compunction on the pilots to report visual contact to TOWER in a conventional fast-jet visual cct. Nevertheless, the crew of Hawk (A) should have been aware of the presence of Hawk (B) joining through INITIALS as soon as the latter called on the RT to join and the STC Member said that the crew of Hawk (A) should have been scanning for them from that moment. Members agreed with the Command's view that the crew of Hawk (B), having been told by TOWER that there were *"2 IN"*, would naturally have biased their own lookout toward the cct area in an attempt to identify the two ac closer to the aerodrome as they approached INITIALS at the relatively higher speed for a normal break into the cct. The PTC Member stressed that whilst a good all-round scan is intrinsic to basic airmanship, pilots would automatically look for the traffic they have just been told is there by ATC first. So in this respect the PTC Member opined that it was understandable that the eyes of Hawk (B)'s crew were biased into the cct area looking for the 2 ac they believed were there, when only one was actually there to be seen and the other – Hawk (A) - was somewhat closer than the crew of Hawk (B) expected it to be. It was not until the INITIALS call from Hawk (B), in conformity with the FOB and current general military ATC practice, that TOWER stated that Hawk (A) was a visual straight-in that it would have become evident to the crew of Hawk (B) that Hawk (A) was outwith the immediate aerodrome cct area. The Board noted the student pilot's swift appreciation of the

situation and his prompt sighting of the presence of Hawk (A) as his scan opened out to the R where the previously undetected jet was lurking. In the Members' view, Hawk (A) when established on LONG-FINALS had 'Right of Way' as both jets approached the cct area and it was up to the crew of Hawk (B) to integrate their cct join with traffic already established. Up until the final stages of the encounter the crew of (B) might reasonably have presumed the other jet was closer toward the a/d, inside INITIALS. A civilian controller Member agreed that if ATC said there were 2 ac in the cct that is where pilots will look for the other ac, but for him the cause was a 'systemic' error resulting from the misleading cct state engendered by the stipulations in the FOB. Another civilian controller Member suggested this Airprox stemmed from a conflict on FINALS resolved by the instinctive 'bunt' executed by the student pilot of Hawk (B) when the other jet was suddenly spotted close ahead. But the overwhelming view of the Board was that whilst the cct information provided to the crew of Hawk (B) was misleading and a causal factor, fundamentally, it was more a sighting issue as it was evident that both jets were there to be seen by each other's crew in this fine weather scenario and ultimately they each had a mutual responsibility to detect and avoid each other's ac. From the cockpit of Hawk (A) neither the student nor his QFI had spotted Hawk (B) before it underflew their jet and thus unaware took no action. The Board agreed, therefore, that the cause of this Airprox was a very late sighting by the crew of Hawk (B) and a non-sighting by the crew of Hawk (A), beforehand.

Whilst engrossed in their simulated emergency, as the crew of Hawk (A) were not aware of the imminent threat approaching from their port quarter they could not influence the outcome of this very close quarters encounter at all. Within the other cockpit it was only the student pilot of Hawk (B) who saw the other jet in time to take robust avoiding action by instinctively and aggressively bunting his ac below Hawk (A). It was not until this action was taking place - actually during the bunt – that the instructor pilot of Hawk (B) became visual with Hawk (A) from the rear seat. The QFI of Hawk (A) had reported the vertical separation as the other jet under flew to be no more than 50ft. whereas the QFI in (B), who probably had a better view, opined he flew 30ft below (A). The RPAR recorded data had shown that Hawk (A) was crossing Hawk (B)'s track R to L at 12 o'clock at a range of less than 0·1nm [200yd], at the same height, before Hawk (B) descended rapidly and thus evidence of the robust avoiding action taken to avert a collision. At these distances, with only the student pilot sighted to the imminent danger beforehand, and the robust avoiding action necessary the Board was convinced that an actual risk of collision had existed in the circumstances conscientiously reported here.

The Board noted the Recommendation made by MIL ACC at STC, that the choice of cct information passed to joining traffic should be reviewed. Members were reminded of previous Safety Recommendations made by the Board engendered by previous Airprox that had related to military cct traffic (Airprox 003/2002 & 145/2003). Clearly, in the light of this Airprox, the Command had considered it necessary to sagely recommend that there is a need to review cct traffic information passed to joining traffic and consideration be given to publicise what is meant by ATC when traffic is reported as 'IN' the cct. It seemed that the comments penned by a valued PTC Member of yore for Airprox 145/2003 were just as appropriate here insofar as - "ATC made all the right [standard] calls but they did not work". Consequently, the Board strongly endorsed the foregoing Recommendations from Mil ACC and HQ PTC.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the crew of Hawk (B) and a non-sighting by the crew of Hawk (A).

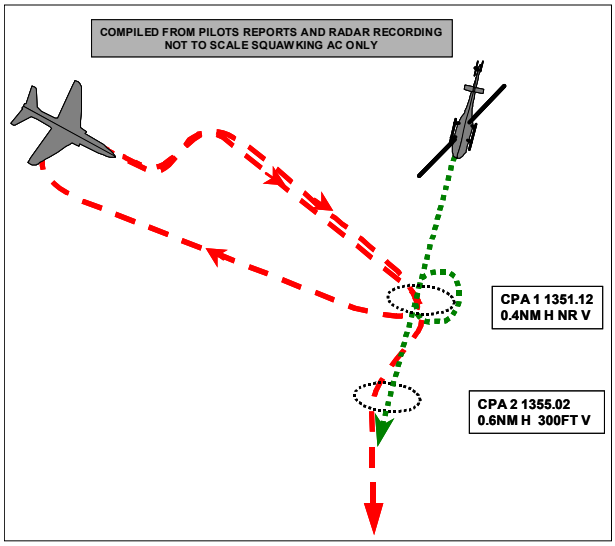
Degree of Risk: A.

Contributory Factor: Inaccurate cct information passed by TOWER within the joining clearance to the crew of Hawk (B).

AIRPROX REPORT No 170/06

AIRPROX REPORT NO 170/06

Date/Time:	29 Nov 1254	
Position:	5201N 00157 W (10nm NE Gloucestershire)	
Airspace:	Lon FIR/DLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Bell 206 JetRanger	Hawk T1x2
Operator:	Civ Comm	HQ PTC
Alt/FL:	500ft agl (RPS)	250ft agl (RPS)
Weather	VMC CAVOK	VMC NR
Visibility:	30nm	20km
Reported Separation:	200ft V/Nil H	500ft V/400m H
Recorded Separation:	See UKAB Note (3)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BELL 206 JETRANGER PILOT reports flying a pipeline inspection flight from Manchester Barton in a notified PIN area in a silver and black helicopter with all lights on, squawking 0036 [pipeline inspection] and with TCAS 1 fitted and between radio agencies. While heading 190° at 80kt about 10nm NE of Gloucestershire, he received an initial TCAS warning from his 6 o'clock position. Shortly afterwards he sighted the first black Hawk ac to his port as it was banking back to wings level. The second Hawk passed to his starboard, banked to the left in front of his ac and looked as if it was departing. However, it then turned back towards his ac and passed about 200ft directly above his helicopter. At this time, from the TCAS alert he had initiated a descent and left turn to keep the Hawk visual. The Hawks then departed to the N [he thought] without further incident; he assessed the risk as being moderate to serious.

THE HAWK T1 PILOT reports flying solo as leader of a pair of black Hawk ac on a low level training flight in Wales and the West Country. Whilst heading 120° at 420kt on a target run, he noticed a helicopter in his 1 o'clock at about 5km so he informed his wingman of the possible confliction. The helicopter passed 500ft above him and to his right by 400m. Having acknowledged the confliction, his wingman climbed to approximately 750ft, believing the helicopter to be at low level but did not see it initially. His wingman then became visual with the helicopter, in his right 1 o'clock at 3km, and passed 1500m behind the helicopter at co-altitude.

UKAB Note (1): The formation leader was a Reservist Military pilot and also an airline pilot; he was not contactable for additional information as he was overseas. The No 2 pilot was however contacted and provided useful additional information. The formation had been conducting a simulated target run on a ground feature. Although the helicopter was in the area it was some distance from the simulated target. The formation conducted two runs on the target since the leader 'missed' the target on the first run. Both pilots saw the helicopter while they were on the first run and avoided by what they considered a suitable margin of about ½nm with a little vertical separation. They both maintained visual with the helicopter and commenced a second run on the target. On the re-attack the No 2 - who was closer to the helicopter - climbed to give it more vertical clearance and again assessed the horizontal clearance to be just over ½nm.

UKAB Note (2): Only one of the Hawks can be seen on the radar recording squawking 7001 with Mode C. The JetRanger is seen throughout squawking 0036 with Mode C. It would seem from the available information that the ac squawking was the No2 but this cannot be confirmed. The diagram shows the squawking ac only.

UKAB Note (3): The Cotswold RPS for 12-1300Z was 1022mb. The height of the terrain in the area of the Severn valley is variable around 200ft. On the first pass the helicopter indicated FL005 and the lead Hawk FL 004 just after it had passed. The minimum horizontal separation between the Leader and the helicopter was 0.4nm. One of the Hawks does not paint at any time. The No2 pilot confirmed that unless both ac are in close formation, the

SOP is for both IFFs to be on with a code of 7001 with Mode C while at low level. His was on as briefed and was pre-flight-checked on the ground. On the second pass the squawking Hawk indicated FL007 and the helicopter FL004. The squawking Hawk passed 0.6nm to the W of the Helicopter.

UKAB Note (4): Pipeline Areas 1A, 1B, 2, 4, 5, 6, 7N, 7S, 8, 9, 10, 11N, 11S, 12, 17, 18 and TVAA were notified under the PINS system. This area covers virtually the whole of England except for a small area of W Cornwall and a similarly small area round Oxford.

HQ PTC comments that the Hawk formation was carrying out a normal low-level training exercise and they had visual contact with the helicopter throughout. Furthermore, the formation pilots considered that they had maintained a suitable horizontal margin the whole time.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board spent considerable time trying to piece together the occasionally contradictory information to reconstruct events at the CPA(s). The picture was confused by the fact that only one of the Hawks was displaying SSR information; did not therefore paint at all on the radar recording, and it was never established positively which Hawk that was. In addition, that being the case, the JetRanger TCAS was only displaying one TA despite both the Hawks being in close proximity to it. In the absence of any other information and accepting both pilots' assurance that their IFFs had been switched on, Members concluded that one or other of the ac's equipment had not functioned correctly at the time of the Airprox. Further, the No 2 Hawk pilot stated that he climbed to about 1500ft on the second pass (re-attack) and had been heading 120° on both occasions that he approached the helicopter. Although much of the information suggested that the squawking ac was the No2 neither the climb nor the heading of 120° was evident on the ac that painted on the radar recording. Also the Board could not determine why the JetRanger pilot had turned left to keep the Hawks visual when they seemed from the recording to turn right and depart back to the NW after the first encounter.

Although the picture was confused, both Hawk pilots (following further conversations with UKAB and PTC Flight Safety staffs) were satisfied that they had seen the JetRanger throughout the evolution but were surprised that it had not moved very much between the first and second encounter. They expected that when they conducted the re-attack on the same simulated ground target, the helicopter would have cleared well to the S. In any case the No2, who was closest horizontally to the helicopter, reported that he had climbed well above its height. Although the JetRanger pilot had not been continuously visual with the Hawks, he had seen them at the 2 CPAs so the Board concluded that there had not been any risk that the ac would have collided. Although accepting that it had not been their intention to do so, Members agreed that the Hawk(s) had flown close enough to the JetRanger, albeit with a few hundred feet vertical separation, to cause its pilot concern.

Members were unanimously concerned that this incident had taken place after the recent (Sep 06) review and updating of the PINs system but even the revised system and correct action by both the Hawk pilots gave no apparent protection to the three ac involved here. On the afternoon of the occurrence almost the whole of England had been notified as active for pipeline inspections for a total of 8 helicopters from 3 companies. The operator of the subject helicopter had notified almost the whole of England, S of Manchester for one helicopter for the 4½ hr period since this was the only way, within the constraints of the PINS system, that the necessary operational flexibility could be obtained.

PART C: ASSESSMENT OF CAUSE AND RISK

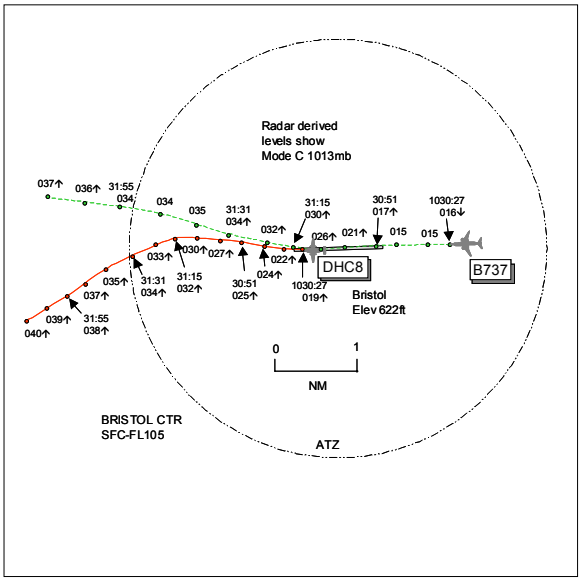
Cause: The Hawk pilots flew close enough to the helicopter to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 171/06

AIRPROX REPORT NO 171/06

Date/Time:	7 Dec 1032	
Position:	5123N 00246W (2nm W Bristol - elev 622ft)	
Airspace:	ATZ/CTR	(Class: D)
Reporter:	Bristol ADC	
	First Ac	*Second Ac*
Type:	B737-800	DHC8
Operator:	CAT	CAT
Alt/FL:	2500ftá	á
	(QNH 986mb)	(QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	15km	NR
Reported Separation:		
	Nil V/2nm H	Not seen
Recorded Separation:		
	Nil V/1·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL ADC reports having just returned from a SRATCOH break when the incident occurred. The DHC8 was cleared to line-up after the crew reported ready for departure. At this time the B737 was 5·5nm from touchdown established on the ILS RW27. There were showers present at the time, to the immediate SW of the aerodrome, the DHC8 crew finally electing to depart after some deliberation. The B737 flight received landing clearance at 1·5nm but as the ac approached 0·5nm from touchdown, it was seen to sink and rise again. The ac then maintained level flight (150-200ft) for a short while but as it approached the threshold it was clear that the crew had elected to go-around. At this point he called Radar to coordinate a turn for the DHC8. A heading of 180° was agreed so he instructed the DHC8 flight to turn as well as advising the crew that the B737 was going around. By now the DHC8 was 1·5-2nm W of the aerodrome and was observed to be slow in turning L. As the B737 was catching up the DHC8 he issued avoiding action to the B737 flight, a R turn onto heading 360°. On receiving this instruction, the B737 crew reported visual contact with the DHC8 and made the turn after continuing for another 0·5nm. The DHC8 flight took up a heading of 240° for Wx avoidance and both flights were transferred to Radar once standard separation had been achieved. The B737 crew later advised that windshear was encountered on short final with a speed loss of 20kt and that they had elected to go-around after receiving an audible windshear alert at approximately 200ft aal.

The Bristol special METAR shows EGGD 1035Z 24022G37KT 15KM SQ SCT035 08/05 Q0986=

THE B737 PILOT reports inbound to Bristol IFR and in communication with Bristol Tower on 133·85MHz squawking 1446 with Mode C. The visibility was 15km flying 800ft below cloud in VMC in rain and all the ac's lights were switched on. During a sudden windshear 'go-around' from RW27, they began to catch up with a DHC8 that had just taken off from the same RW, separation reduced to what looked like 2nm. They heard ATC instructing the DHC8 flight to take an avoiding action L turn. However, as it looked like the DHC8 was quite slow in making the turn and they were visual with the traffic, they made a 20° turn to the R onto heading 290° to help the avoiding action, also decreasing their ROC. They called this deviation on the RT but this was not acknowledged. Very shortly thereafter, ATC cleared them to the BRI NDB with which they complied. Subsequently, they were informed that ATC had issued them with a R turn onto N but this call was not heard possibly owing, he thought, to a blocked transmission as the RT was quite busy at the time. During the whole encounter no TCAS alerts or warnings were received. During the encounter, the DHC8 was known about and was visual at all times. He assessed the risk as medium.

THE DHC8 PILOT reports they were unaware of the Airprox situation with an ac going-around behind them during their departure from Bristol. They were cleared to line-up RW27 ready for departure with bad Wx passing S of the aerodrome. As they lined-up, ATC said that traffic was on finals at 2·5nm and that if they needed more time to

check the climb-out Wx on radar they would have to vacate the RW. Since they had assessed the departure Wx on radar as they lined-up, they rolled immediately, barely stopping. During the very turbulent climb-out climbing through 1000ft agl, they heard traffic behind them on approach going-around. ATC asked them to turn L onto heading 180° which would have taken them straight into bad Wx so they asked for a heading of 240° which was approved. An Airprox situation was not apparent to the crew; no TCAS alerts or warnings were received and they had no idea how close the other ac was during its go-around. They unfortunately did not have time in the prevailing conditions to observe the TCAS targets behind them. A Flight Crew Report was filed as no problem was apparent to them and therefore an ASR was deemed inappropriate.

ATSI reports that this Airprox was filed by the Bristol ADC following a go-around by a B737, caused by wind shear on a 1nm final, which brought it into confliction with a recently-departed DHC8 flying into strong SW'ly winds. The B737 was inbound to Bristol from Dublin and the DHC8 had departed RW27 at Bristol for Plymouth. Avoiding action, initiated by the ADC, was taken on and by both ac. Both ac continued without further incident.

The following is an extract from the comprehensive Unit Report:

1027:05	*"B737 c/s continue approach runway two seven you're number one".*
1028:20	*"DHC8 c/s's ready for departure"*.
1028:26	*"DHC8 c/s roger line up and wait runway two seven".*
1028:51	*"DHC8 c/s next frequency when advised will be Cardiff one two five decimal eight five zero".*
	"One two five eight five zero DHC8 c/s".
1029:00	*"DHC8 c/s runway two seven you are clear for take off surface wind two four zero degrees at two zero knots".*
1029:07	*"Clear for take off two seven DHC8 c/s"*.
1029:10	*"B737 c/s continue for a late landing clearance surface wind is two four zero degrees at two zero gusting three one knots".*
	"Roger B737 c/s".
1029:36	*"DHC8 c/s I've got inbound traffic now at two and a half miles if you're not happy with the weather out to the southwest can you vacate next right through Bravo"*.
	"Er we're rolling DHC8 c/s".
	(ATC) "Roger".
1030:15	*"B737 c/s runway two seven you're clear to land surface wind two five zero degrees at two two knots".*
	"Clear to land B737 c/s".
1030:51	*"B737 c/s going aroundî.*
1031:01	*"B737 c/s roger break DHC8 c/s turn left immediately heading one eight zero degrees traffic going around runway two seven is a (airline company) B737".*
1031:08	*"Left one eight zero DHC8 c/s".*
	????? ????? ????? ????? ????? Part simultaneous transmissions
1031:10	*"B737 c/s turn right immediately heading three six zero degrees avoiding action traffic is on a two mile climb out a Dash eight".*
1031:18	*"Taking a right turn B737 c/s traffic in sight".*
1031:23	*"DHC8 c/s request two four zero to avoid"* (weather)
	"DHC8 c/s roger, heading two four zero degrees is approved".
	"Two four zero thanks DHC8 c/s".
1031:45	*"B737 c/s we're maintain er climbing to three thousand have traffic on the left side he's in sight".*
	"B737 c/s roger heading three six zero degrees and maintain altitude three thousand feet on reaching".
	"Heading three six zero and three thousand on reaching B737 c/s".
1032:14	*"Descent to altitude e- correction B737 c/s contact radar now please on one three six decimal zero seven five".*
	"Three zero seven zero (sic*) B737 c/s bye bye"*.
1032:35	*"DHC8 c/s report your heading to Bristol radar on one three six decimal zero seven five".*
	"One three six zero seven five DHC8 c/s bye bye thanks".

The RT tape and the transcript supports the initial report filed by the ADC and the Initial Watch Management report filed by the Watch Manager (Note: the WM was present in the VCR at the time of the incident) and his, the WM's, initial opinion was that two adverse weather conditions came together to create a difficult situation (go-around due wind shear together with a slow departing ac due strong SW'ly winds). The WM further stated that he had both ac in sight during the event.

Subsequent to the incident the event was discussed with the ADC on duty who described the incident as per his filed report. He discussed with his Watch Manager whether to file as an Airprox and decided to do so because he did not have both ac in sight (namely the DHC8) throughout the event. From the RT recording the B737 crew appear to have had the DHC8 in sight at all times during the manoeuvre.

[UKAB Note (1): Analysis of the Clee Hill radar recording at 1030:27, shows the B737 at <1nm final for RW27 descending through FL016 (800ft QNH 986mb) when the DHC8 first appears 0·5nm W of the airfield indicating FL019 (1100ft QNH) climbing. The B737 arrests its descent for the next two radar sweeps at FL015 (700ft QNH) before the go-around climb is seen at 1030:51 as it indicates FL017 (900ft QNH). At this point, the DHC8 is 1·2nm W of Bristol and 1·6nm ahead of the B737. As the ADC's avoiding heading to the DHC8 comes into effect 1031:23 – this had been coordinated with radar - the DHC8 is in the B737's 1130 position at 1·3nm. The DHC8 is indicating FL033 (2500ft QNH) and the B737 FL032 (2400ft QNH). At 1031:31, the CPA, the B737 at FL034 (2600ft QNH) can be observed in a R turn, as instructed by the ADC, and has the DHC8 at the same level in his 11 o'clock at 1·2nm. This separation of 1·2nm with both ac at the same level is maintained during the next sweep as both ac climb 100ft to FL035 (2700ft QNH). The next 2 radar sweeps show the vertical separation increasing, but still separated by 1·2nm horizontally, as the B737 descends 100ft to FL034 and the DHC8 climbs through FL037 and then FL038. A further 8sec later at 1032:03 lateral separation then increases as the subject ac diverge, now separated by 1·3nm as the DHC8 climbs through FL039 (3100ft QNH) and the B737 now indicates a climb at FL036 (2800ft 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 NATS Advisor informed Members that a Safety Notice was issued at Bristol post incident, both to detail the event and to 'roll-out' lessons learnt to all ATCOs. Noteworthy was the implementation of increased spacing between ac, in adverse weather conditions, to mitigate the risk of a similar situation occurring again.

Some pilot Members wondered why the ADC, having lost sight of the preceding DHC8 whilst trying to establish separation between the subject ac, had filed this incident as an Airprox as it could have been filed as an ATC Incident under the MOR scheme. ATCO Members sympathised with the ADC's predicament, however, and understood the rationale for his reporting action. From the outset, there was a degree of uncertainty whether the ADC's plan would work following the DHC8's 'tight' departure ahead of the landing B737 during adverse weather conditions. Thereafter, when the B737 flight executed a go-around, the onus was on the ADC to establish separation between the subject IFR flights. The L turn onto S given to the DHC8 flight was not accepted, owing to weather, but the ADC accepted the crews preferred heading of 240°. This RT exchange was interspersed with an avoiding action R turn to the B737 flight onto 360° which the crew apparently did not 'take on board' as they acknowledged this call with 'taking a R turn' (no mention of 360) and 'traffic (the DHC8) in sight'. The B737 crew later reported that they had eased their ac 20° to the R onto 290° for avoiding action and decreased their ROC, apparently happy to maintain their own separation from the DHC8 when they saw it was slow turning L, all at a time when they were busy executing a go-around owing to windshear. They had heard the DHC8 crew's intentions from the RT and monitored its flightpath visually throughout, only acknowledging the R turn onto N when the ADC reiterated the instruction after the crew reported climbing to 3000ft and still in sight with the DHC8 on their LHS. However, the B737 crew 'contentment' with providing their own separation was not relayed to the ADC who, by now, had lost sight of the DHC8 and could not fulfil his requirements for providing reduced separation in the vicinity of the aerodrome, believing that separation had been lost and which led to the filing of the Airprox. Had the B737 crew imparted this information, it would have allayed the ADC's concerns as the B737 crew's actions fulfilled the requirements of reduced separation in the vicinity of the aerodrome. From the ADC's perspective, it seemed that the situation was almost out of his control, as the flights were not executing the turns according to his plan before he lost sight of the DHC8. The Board agreed that although there had been a technical loss of separation, from the

ADC's viewpoint, the B737 crew were fully cognisant of the situation and had taken prompt action to ensure that flightpaths would diverge, any risk of collision being thereby quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a go-around by the B737 in adverse weather conditions, the Bristol ADC thought that separation had been lost.

Degree of Risk: C.

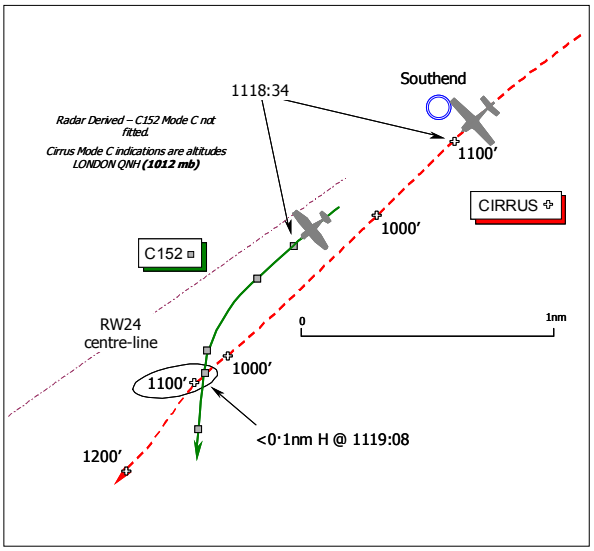
AIRPROX REPORT No 173/06

AIRPROX REPORT NO 173/06

Date/Time:	9 Dec 1119 (Saturday)	
Position:	5133N 00040W (1·5nm SW of Southend - elev 49ft)	
Airspace:	Southend ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Cessna 152	Cirrus SR22 GTS
Operator:	Civ Trg	Civ Pte
Alt/FL:	1200ft↑ QNH (1011mb)	1100ft↑ QNH (1011mb)
Weather	VMC No Cloud	VMC NR
Visibility:	10k+	10nm

Reported Separation:
20-50ft V/<200ft H Not seen

Recorded Separation:
>0·1nm H (~125yd)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports that his ac has a white/blue colour-scheme and the anti-collision beacon was on whilst departing off Southend's RW24 on a local training flight in CAVOK conditions. He was in receipt of an Aerodrome Control Service from Southend TOWER on 127·725MHz and squawking A7000; Mode C is not fitted.

A number of flying training ac [he identified, erroneously, a particular flying school] had departed at a similar time and he was cleared for immediate take-off behind a PA28. He thought that the other ac involved in the Airprox had taken-off shortly afterwards and being a much quicker ac had overtaken his Cessna. Just after he had completed a Rate 1 climbing L turn onto a heading of 190°(M) from 240° at 70kt, climbing through about 1200ft Southend QNH (1011mb) and still within the Southend ATZ, the other ac was spotted less than 200ft away. He thought, incorrectly, it was a white single engine Diamond Star [but actually the Cirrus] and it was close enough for him to see the registration on the ac as it "flashed by" crossing from L – R <200ft ahead in a shallow climb some 20-50ft above his ac with a *"very high"* risk of a collision. In his "shock and horror", they did not note down the registration. He stressed that the other ac suddenly filled his windscreen flying at 90° to their path and within seconds it was clear again so no avoiding action could be taken. An Airprox was reported to Southend TOWER on RT.

THE CIRRUS SR22 GTS PILOT reports that his ac is coloured white and the HISLs were on during this flight from Denham. TCAS is fitted; SSR and Mode C were selected on. He had telephoned Southend ATC beforehand and pre-booked 2 practise instrument approaches. On arrival at Southend, operating under VFR, he reports, the first approach was completed - a radar vectored ILS approach for RW24 - down to 600ft QNH before executing the missed approach procedure (MAP) and GO-AROUND under the control of Southend RADAR, on 130·775MHz, who were providing a "radar" service.

On the climbout he was instructed to return to the beacon and continue with a procedural approach for the ILS for RW24. Again on finals at 600ft QNH (1011mb) he executed the MAP. His aeroplane was set on autopilot flying at 120kt on a heading of 239°(M), with a rate of climb of 900ft/min to level off at 1500ft QNH. He did not see the ac flown by the reporting pilot at all but stressed that at a RoC of 900ft/min the angle of ascent is steep and the field of view down is fairly limited.

After being advised of the incident by RAC, based on the times of leaving and returning to Denham he estimates that the Airprox occurred during the climb-out from the second approach but there is a possibility that the Airprox occurred during the first ILS approach and go around.

THE SOUTHEND AERODROME CONTROLLER (ADC) reports that following the departure of a DA40 [the flying school name was specified, this ac being erroneously identified initially as the reported ac], 2 min later at 1118, the

C152 was airborne and its pilot was given a L turn out off RW24 for a local sortie to the S. The pilot of the C152 subsequently reported that the "last [flying school name - ac] airborne" had just flown through his 12 o'clock at the same or similar level. The incident was not witnessed by the ADC who was unable to recall whether specific traffic information was passed to the C152 before the ac departed. The workload at this time was assessed as high.

The 1120 UTC Southend METAR was reported as 320/10kt; CAVOK; 7/3; QNH 1011mb.

THE SOUTHEND APPROACH RADAR CONTROLLER (APR) reports that TOWER was passed an 8nm check on the Cirrus inbound on an ILS approach to RW24. Subsequently, several ac of the same flying school, flying VFR to Norwich, departed and called for an ATS to the N without restriction as it was considered that they would not be in conflict with the established ILS traffic. When the subject Cirrus ac was at 3nm FINALS, the ADC was advised and a standard missed approach climbing to 1500ft requested. This was approved by the ADC and the Cirrus pilot was subsequently cleared for a low-approach.

ATSI reports that the Airprox occurred within the Class G airspace of the Southend ATZ. At the time, the C152, operating VFR, was under the control of the ADC and the Cirrus was operating on the Approach Radar Controller's (APR) frequency. The pilot of the Cirrus stated in his written report that he was operating VFR at the time of the Airprox whereas the APR reports controlling the flight as IFR [providing a Procedural/Radar Approach Control service]. The ADC reported the workload as *"high"* whereas the APR's was described as *"low"*.

The C152 was cleared to taxy to the holding point for Southend's RW24 at 1111 for a local flight departing to the S. At 1116:30 the pilot reported ready for departure. The pilot was instructed to line up and wait behind a departing Cherokee and then advised to be ready for an immediate departure. About 25sec later the C152 pilot was instructed *"the Cherokee just airborne on track to Lydd VFR with a left turnout VFR to the south cleared immediate* [at 1117:10] *TAKE-OFF surface wind is 3-1-0 degrees 8 knots"*. The ADC explained the reason for the immediate TAKE-OFF clearance was the presence of the subject Cirrus, which was operating IFR, carrying out an ILS and GO-AROUND on RW24: from the radar recording at the time it was on final approach at 2·7nm passing 1100ft Mode C London QNH (1012mb).

In accordance with local procedures, previously at 1112, the APR informed the ADC, via intercom, that the Cirrus was at 8nm for an ILS approach. A further range check should have been passed at 4nm but this was delayed slightly whereupon the ADC was informed that the Cirrus was at 3nm for a GO-AROUND. The APR commented that the notification was probably delayed because the ADC was occupied with other traffic when the Cirrus was at 4nm. ADC responded *"continue"* and the APR replied that it would be carrying out a standard MAP. The ADC answered *"Okay yes"*. Although this response was somewhat ambiguous, both controllers were aware that the Cirrus would be carrying out a missed approach. Accordingly, at 1117:50 the APR cleared the Cirrus for a low approach. This instruction was issued about 40sec after the C152 had been cleared for TAKE-OFF. Straight away, the Cirrus pilot reported GOING-AROUND, was instructed to climb to 1500ft QNH on a standard MAP and was cleared for a further ILS to report 'BEACON OUTBOUND'. The standard MAP for RW24 at Southend is: *'Climb straight ahead to **1500 [QNH]**…or 1MIN after passing NDB(L) SND, whichever is the later, turn right to NDB(L) SND at **1500' [QNH]**.*

The RT recordings confirm that neither the C152 nor the Cirrus pilots were issued traffic information about each other. As previously mentioned, the ADC reported being aware of the Cirrus's presence. The controller estimated that by clearing the C152 for an immediate TAKE-OFF ahead of the Cirrus, when the latter was at 2·7nm FINALs, the two flights would not conflict. Anticipating that the C152 would commence its L turn to the S, the ADC believed the C152 would be sufficiently ahead of the Cirrus as the latter flew straight ahead on its GO-AROUND. However, the ADC did not monitor the progress of the Cirrus and the radar recordings reveal that it caught up with the C152 and overtook it. The ADC was surprised to see that the radar photographs revealed the Cirrus's GS had increased to 150kt as it approached the C152. The controller had anticipated it would have maintained a slower speed (the radar indicating the C152's GS to be 79kt.) The Southend ADC position is provided with an ATM showing primary radar only - Southend is not equipped with SSR. The Southend MATS Part 2 states that:-

"Control of aerodrome traffic is to be mainly based on direct visual observation of the manoeuvring area and the vicinity of the aerodrome. The use of the ATM must not be detrimental to the visual observation of aerodrome traffic".

The ADC commented that it is not unusual for traffic on approach not to be displayed on the ATM from a range of about 2nm, especially if it is high and not at low-level as if it were landing. On this occasion, the Cirrus started its GO-AROUND from 800ft. Consequently, although the controller could not remember specifically, the ADC believed that it would not have been showing as it approached the airfield. The ADC commented that whilst busy with other traffic the controller was not able to monitor its progress visually. The radar recording shows that the Cirrus started to drift S of the RW24 centre line when it was about 1nm from the threshold and commenced its GO-AROUND when it was at a range of 0·6nm, positioned just to the S of the RW24 centre-line. The ADC added that conflict between the subject ac was not seen, possibly because it occurred when the ac were unsighted behind a pillar of the Visual Control Room (VCR). Additionally, it would not have been displayed on the ATM as the incident occurred within the radar overhead.

The APR reported being unaware of the C152's departure. The Southend MATS Part 2, Page 3-7, states the procedures for co-ordination with Approach Control:

'Subject to the provisions of Section 1 Chapter 2, (see below) the Aerodrome controller is to co-ordinate all departures with Approach control. Approach control will not normally have detailed information on pending departures, and reference to such departures by way of aircraft type and route plus level/VFR will normally be sufficient. Full details will be passed if so requested by Approach control'.

Section 1 Chapter 2, states further light aircraft procedures. Of relevance to this incident is a paragraph entitled:

'VFR DEPARTURES – SINGLE-ENGINE PROPELLOR AIRCRAFT. During busy periods, without co-ordination with Approach control, such aircraft may be cleared to leave the ATZ not above 1000ft ALT, their tracks being contained within the following sectors: runway-in-use 24; Sheerness VRP, clockwise to South Woodham Ferrers VRP. However, as soon as workload permits, a higher maximum altitude and/or more direct track, as appropriate, should be co-ordinated with Approach control after departure. Because of the congested area of Southend-on-Sea and the Air Navigation Obstacles at Kingsnorth and Grain, this is particularly important in respect of traffic departing in the southerly sector 060-240 deg'.

No such clearance was issued to the C152. In the period leading up to the incident there had been a number of ac, from the same operating company, carrying out the same VFR cross-country exercise using Southend Airport. At 1114, when the ADC notified the APR of another 2 of these ac departing to Norwich, the latter controller said, *"just chuck 'em all out"*. Both controllers confirmed that they understood that this referred just to the ac group routeing to Norwich, rather than all VFR departures. The APR could not recollect the ADC instructing him that the C152, or the Cherokee ahead of it, were departing VFR to the S, after the Norwich departures. The RTF recordings confirm that no message was passed using the intercom. The ADC thought that the APR might have been informed directly 'off-microphone' . The Approach Radar position is situated at the back of the VCR and although at a lower level it is possible for both controllers to see each other. The APR commented that as far as he was aware no information had been passed to him about the VFR departures. He certainly had not acknowledged any such message. Consequently, on receiving clearance for the Cirrus's GO-AROUND, he did not anticipate any confliction.

There is no requirement to separate VFR and IFR flights within Class G airspace. However, the MATS Part 1, Section 2, Chapter 1, Page 1, states the responsibilities for the ADC. Of relevance to this Airprox:

'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'.

The Stansted 10cm radar recordings, show the Cirrus 'going around' and then passing 0·2nm S of Southend airport at 1100ft London QNH (1012mb). The C152 is airborne, just S of the extended RW24 centre-line, 1nm ahead [NMC fitted]. Both ac continue on similar tracks, with the Cirrus remaining just to the S of the C152 as it overhauls the latter. [UKAB Note: At 1119:04, the Cirrus, indicating 1000ft Mode C London QNH (1012mb) (having just descended from 1100ft) is 0·1nm ESE of the C152, the latter having turned L in conformity with the pilot's report. At the CPA on the next sweep at 1119:08, the Cirrus is <0·1nm away to the SW indicating 1100ft, having passed though the C152's 12 o'clock].

Although it is not a requirement for traffic operating VFR and IFR to be separated in Class G airspace, ATC should have taken measures to prevent any confliction. Certainly both ac should, as a minimum, have been issued with traffic information about their respective flights. The APR informed the ADC about the Cirrus's presence on the ILS but, apparently, was not made aware of the VFR departures by the ADC, as required by MATS Part 2 procedures. It would appear that the ADC was the only controller aware of both of the subject ac. The ADC did not take any action to ensure that both pilots were aware of the presence of each other's ac or monitor the situation closely enough to ensure that appropriate instructions could be issued to deconflict their flight paths as necessary.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was readily apparent that the C152 pilot was not aware of the presence of the Cirrus executing the low-approach and go-around before he spotted it crossing ahead. It was, therefore, understandable that the C152 pilot might have mistakenly thought that the other ac involved had just taken off from Southend. It was clear to the Board that neither controller involved here had passed traffic information to the flights under their control about the other ac. The comprehensive ATSI report had made it plain that the APR was unaware of the departing C152 and had not been advised of this specific VFR departure by the ADC, as required by the Southend MATS Part 2 procedures. Clearly if the APR had been conscious of the C152 himself he might well have acted differently – and traffic information might well have pre-warned the Cirrus pilot. However, the APR was not aware of the C152 when he relayed the clearance to the Cirrus pilot for a 'low-approach' and MAP because no co-ordination had been effected by the ADC. Furthermore, this clearance was indeed poorly expressed by the ADC with considerable scope for ambiguity. Members observed that perhaps the ADC had intended to allow the C152 to depart not above 1000ft QNH in accordance with the *'VFR DEPARTURES – SINGLE-ENGINE PROPELLOR AIRCRAFT'* procedure without prior co-ordination with APPROACH CONTROL in the first instance. Whilst this local procedure was available to the ADC – it was suggested by the ATSI Advisor that this was a useful procedure to keep traffic flowing in busy scenarios - no altitude restriction was imposed by the controller. Although the ADC contended that the APR might have been informed directly 'off-microphone' about the departure of the C152, it would seem that the APR was completely unaware of its presence. Without any positive evidence to support the ADC's view, the Board could only surmise that the ADC was mistaken in this respect and even if passed verbally to the controller it seemed the message had not been understood.

From the radar recording it was clear that although the Cirrus pilot was flying his ac normally, it is a relatively fast aeroplane and his ac was nearly twice the speed of the Cessna when he caught up the latter. However, the Cirrus pilot had seemingly levelled-off at about 1000ft just before the encounter, as he passed through the cct area, rather than climbing straight ahead to 1500ft QNH as the MAP required him to do - completely unaware of the C152 to starboard at the time. It had been explained in the ATSI report that the ADC was responsible for issuing traffic information and instructions to the C152 pilot to achieve a safe, orderly and expeditious flow of air traffic, but the controller had done little to assist the reporting C152 pilot here in preventing a conflict between his ac and other traffic within the ATZ, specifically the Cirrus that was executing the low-approach. Members agreed that the conflict between these two flights should have been readily apparent to the ADC and it was unwise to allow the C152 to take-off whilst the Cirrus pilot was completing the latter stages of his ILS into the low-approach. But having done so the ADC should have monitored these two flights more closely and at a minimum passed traffic information to the C152 pilot about the Cirrus and, moreover, in accord with the local procedures ensured that the APR was appraised of the situation so that he could similarly pass traffic information. It was this lack of traffic information at a minimum that concerned many controller Members and was cited as a significant causal factor to this Airprox. In the good weather that prevailed the Cirrus should have been able to spot the C152 and traffic information from the APR would have helped him achieve this. However, the Board recognised that only the ADC was aware of both of the subject ac, who had cleared the C152 pilot for take-off knowing that the Cirrus would be flying through for a low-approach, but did not apparently appreciate that the Cirrus would catch-up the C152 after it took-off. Therefore, in the Board's view this Airprox had resulted because the Southend ADC had cleared the C152 to take-off into conflict with the Cirrus SR22 executing its go-around.

Turning to the inherent 'risk', TCAS should have alerted the Cirrus pilot to the presence of the C152 but no warnings were triggered. The latter's pilot did not have the benefit of any sophisticated CWS such as TCAS. Thus both pilots involved here had to rely on their own 'see and avoid' as the only means of preventing a collision. However, even if the C152 pilot had received traffic information at this late stage about the Cirrus he would have

been hard pressed to spot it at all as it approached rapidly from astern whilst conducting the go-around. As the C152 was not fitted with Mode C it was not possible to gauge the vertical separation that pertained here. However, as the radar showed the Cirrus between 1000-1100ft London QNH (1012mb) – the different QNH only resulting in a theoretical reduction of 30ft - this gave weight to the reporting pilot's view that the Cirrus had passed close above his ac. He reports that it crossed his ac's nose as he executed his L turn onto S to depart, climbing through about 1200ft Southend QNH (1011mb), but the quoted vertical separation of 20-50ft at the time could not be substantiated independently. The C152 should also have been in full view of the Cirrus pilot but it seems that the white-coloured ac of small cross-sectional area, tail-on with no relative motion to draw attention to it had defeated the Cirrus pilot's lookout such that he was completely unaware of the presence of the C152 as he overtook it to port within the ATZ. Thus with only one pilot aware of the other ac who was unable to take any avoiding action at the time, the C152 pilot reports, the Board agreed unanimously that an actual risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

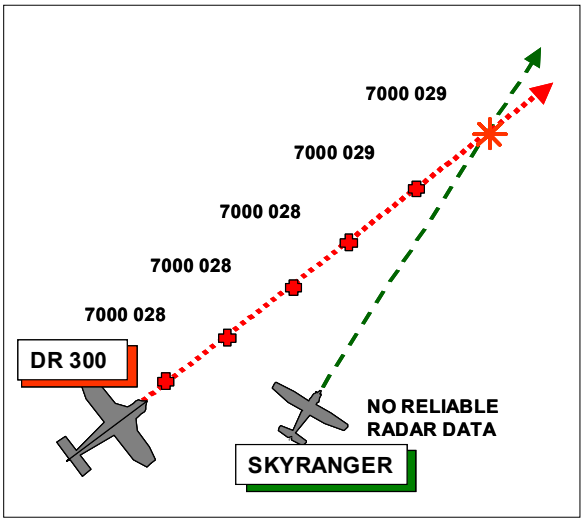
Cause: The Southend ADC cleared the C152 to take-off into conflict with the Cirrus SR22 which was executing a go-around.

Degree of Risk: A.

Contributory Factors: Lack of traffic information.

AIRPROX REPORT NO 174/06

Date/Time:	17 Dec 1431 (Sunday)	
Position:	5143N 00156W (2nm NNE Cirencester)	
Airspace:	Lon FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Skyranger Microlight	Robin DR300
Operator:	Civ Pte	Civ Pte
Alt/FL:	2200ft↑ (RPS 1022mb)	3200ft (1026mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10nm	>20km
Reported Separation:	<100ft V/Nil H	200ft V/200m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SKYRANGER MICROLIGHT PILOT reports that he had taken off from Kemble to return to a farm strip where his ac is based and was receiving a FIS from Brize Norton. His ac is not SSR equipped. He was heading 030° at 70kt inbound to his next waypoint, the VRP Northleach Roundabout, when he first saw a Robin ac through the lexan roof of his ac (a continuation of the windscreen) as it flew directly over his ac. It came from his 7 o'clock position and departed to his 1 o'clock and he estimated the vertical distance between the roof of his ac and the underside of the other one to be less than 100ft. He assessed the risk as high.

He had extensive experience of flying light ac and microlights and this was the closest he has ever come to another ac in flight; he is not scared easily, but this incident gave him a real fright.

The pilot of the Robin stated on the radio shortly after he, the microlight pilot, had reported the Airprox that she had had him in sight. Had this been so he would have expected her to alter course to overtake him on the right.

He emphasised that he was not reporting this Airprox to censure the other pilot but so that any lessons learnt can be added to the debate on flight safety and collision avoidance. He thought this was particularly relevant whilst the CAA DAP's consultation process on the interoperability of ac (Mode S) continues.

THE ROBIN DR300 PILOT submitted a very comprehensive report saying that they departed Kemble Airfield at approximately 1428 heading 035° inbound to Rothwell in a blue and white ac squawking 7000 with Mode C. Ahead of and behind them were numerous microlights and various light ac also having departed Kemble. In particular two microlights that took off ahead of her were of concern; the first was a yellow and white flexwing and the second a red fixed-wing. Both turned inside Rodmarton and appeared to be heading generally E. She took off behind them, extending to the west around Rodmarton before turning NE, climbing initially at 75 then 85kt. Her intention was to route to the N of Little Rissington which was notified as active and just S of Bourton in the Water which she deemed safe as the microlights were to her right.

As she approached top of climb both microlights were visible to her about 3nm ahead, the flexwing about 100ft above and 20° right and the fixed wing just to the left of the nose, about 1000ft below and with a slight relative movement from left to right. It was difficult to judge their exact headings, as they both were moving so slowly, but both appeared to be tracking generally ENE at that point. She therefore decided her planned route was still suitable but decided to aim to fly overhead Bourton (i.e. slightly more to the N) as she did not want to transit through Brize Zone and felt there was sufficient time to safely pass them, briefing her passenger to watch them. Her alternative, based on her estimates of the microlight tracks to that point, was to turn to the S and route through Brize Zone. She lost sight of the fixed wing ac on turning onto a heading of 035° but her passenger was visual with it to their right. They passed the flexwing about a minute later, clear to their left at about the same alt.

She reached TOC of 3200ft on the QNH of 1026, accelerated to 115kt, called Brize Radar and was told to stand by and just after this the incident was called on the RT at about 1434 so she replied that they might have been the ac involved since they were the only Robin at Kemble. She stressed that the passenger remained visual with the microlight: it was on his side of the ac. Her passenger stated that as it passed beneath the wing it was at the outer edge flying at a slight angle towards them and then was obscured by the wing; just after that the other pilot called an Airprox. Just prior to this, the ac has been outside the span of the right wing and some distance below, it appeared fairly small but the occupants were not visible and the registration could not be seen. (The ac was not visible from the pilot's side). Her passenger was not a pilot but he estimated that they were no closer than 200ft above, probably closer to 500ft above, and displaced 200m horizontally. He did not think that there was any threat.

The Robin flies in a very nose down attitude in the cruise and consequently has excellent panoramic visibility. She considers that had they been more directly behind the other ac, at about the same alt, the ac would also have been visible to her. She said that the closing angle is a concern and although the microlight was still in the climb for most of the time that it was observed, her passenger was satisfied that they were sufficiently far above and to the left for there to be no risk. On past experience her passenger is likely to comment sooner rather than later when he spots another ac of which he is unsure.

MIL ATC OPS reports that a Skyranger Microlight was receiving a FIS from Brize Norton APP while routeing from Kemble to a farm strip near Banbury. Meanwhile a Robin DR300 had made contact with APP prior to the Airprox but no type of service had been requested or applied. APP was working two frequencies at the time, a procedure used to enable one of the two weekend radar controllers to take a break. The Skyranger pilot made contact with APP at 1430:09, who responded and then the pilot passed his details as, "*[Skyranger C/S] is a Skyranger microlight, one person on board, out of Kemble to a farm strip near Banbury, currently at 2200ft on 1011, routeing via Northleach and overhead Enstone*". APP then asked, "*[Skyranger C/S] roger, are you transponder equipped?*", the pilot responding "*Negative, Flight Information Service please*" so APP then stated, "*[Skyranger C/S] roger, Flight Information Service, Cotswold pressure 1022, Report North abeam Little Rissington, be advised that Little Rissington is still active*" and at 1430:40 the pilot replied, "*[Skyranger C/S] 1022, report North abeam Little Rissington.*" During this R/T exchange, another ac was transmitting cockpit chat on another frequency monitored by APP.

At 1431:00 the DR300 pilot called APP, "*Brize Radar, [DR300 C/S]*" and APP instructed the DR300 crew to "*Standby*" and then attempted to speak to an ac on his other frequency. At 1431:21 APP requested "*Station calling on 124.27 pass your message*" but the DR300 pilot did not respond to this call so APP went on to control the other ac until 1432:25 when the Skyranger pilot reported "*Brize Radar, [Skyranger C/S] wishing to report AIRPROX with what looks like a Robin*". APP acknowledged and the Skyranger pilot continued, "*[Skyranger C/S] wishing to report Airprox with a Robin aircraft, just passed overhead, 100 feet above, from rear left to front right*". The DR300 crew then stated at 1432:55, "*Brize Radar we were visual with the aircraft. [DR300 C/S] was the Robin I suspect.*" Initially APP responded to this incorrectly, believing that he was talking to another similar callsign. Eventually, this was resolved and at 1433:37 the DR300 pilot passed her flight details as, "*[DR300 C/S] is a Robin DR300 out of Kemble to Rothwell, altitude 3000 feet on 1026.*"

Analysis of the Clee Hill Radar at 1430:09 shows an ac squawking 7000, believed to be the DR300, 2nm N of Kemble tracking 045^{o} and climbing slowly through FL024 while a primary contact, possibly the Skyranger, was in its right 1 oíclock at 2nm tracking 04^{o}. The DR300 maintained this track throughout the incident. At 1430:28 the DR300 indicated FL027 and the Skyranger commenced a left turn while it was in the DR300ís 12 oíclock at 1.8nm. At 1430:45 the DR300 was indicating FL028 with the Skyranger in its 12 oíclock at 1.4nm still turning left. The Skyranger faded from radar at 1430:51 and re-appeared at 1431:00 in the DR300ís 12 oíclock 0.9nm. Track jitter then made it impossible to ascertain the track of the Skyranger but the radar returns remain roughly in the DR300ís 12 oíclock and by 1431:16 the range had reduced to 0.3nm. The Skyranger completely disappears from radar at 14

At the time of the Skyrangerís initial call the ac were 2nm apart, both having departed from Kemble, and there was 50sec between their initial calls to APP. The Skyranger was not transponder equipped and was not being provided with a radar service. APP was not obliged to pass traffic information; JSP 552, Section 235.125.1 states:

Controllers are not responsible for separating or sequencing aircraft.

However, the same section also states:

d. Where a controller suspects, from whatever source, that a flight is in dangerous proximity to another aircraft, a warning is to be issued to the pilot. It is acceptable that this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for its accuracy.

In this case, the controller is unlikely to have had sufficient information to have decided such a threat existed and therefore, there were no Mil ATC factors involved in this incident.

UKAB NOTE (1): The radar returns presumed to be those of the Skyranger suffer from severe track jitter making its track immediately before the incident impossible to determine. In a follow-up telephone conversation with the pilot he confirmed that he had been steady on a GPS track inbound Northleach (about 030 ^{o}) and was climbing very slowly through about 2200ft on the RPS (1022). He was not in any way critical of the service from Brize Norton: rather he was surprised that had he had a transponder which would have allowed the controller to ëseeí his ac he would probably have been given TI on the Robin.

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.

GA specialist Members considered it inadvisable for pilots to lose sight of another ac when overtaking until well clear of it. Further, although passengers may be briefed to maintain a lookout, in many cases very sensibly to assist by providing an extra pair of eyes, separation from another ac is, in the Board's view, best judged by the handling pilot. Members were not persuaded by the Robin pilot's argument that overtaking the Skyranger on the right (in accordance with the Rules of the Air) was not possible due to the proximity of the Brize Zone; recorded radar data showed that, although there were 2 other primary contacts to the right, the Airprox took place over 5nm from the W edge of the Brize Zone.

The radar recording showed that the Robin was very close to the reported altitude of 3200ft QNH (1026mb, equivalent to FL028). The Skyranger pilot reported that he was climbing slowly through 2200ft on the RPS of 1022mb (equivalent to 2320ft on a QNH of 1026mb) but gave the vertical separation as less than 100ft. The Robin pilot reported the vertical separation as being 200ft but conceded that at the time she was not visual with the Skyranger. Members thought however that it was most unlikely that her reported alt, which was radar verified, would have been more than a few feet in error; Members concluded, therefore, that the Robin had actually been at or about 3200ft amsl. On the basis of the above and the Skyranger pilot's report that he had been passed the Cotswold Regional QNH of 1022mb (passed by Brize Radar as verified in the transcript). Assuming that he set the RPS and was climbing through 2200ft as he reported the separation would have been of the order of 880ft. Members thought it unlikely that an experienced Microlight pilot would have made an error in his estimation of the vertical separation of that magnitude so they thought that he might not in fact have set the Cotswold RPS and had been flying on 1011mb (as he initially reported to Brize Radar). Had that been the case and assuming a gentle climb, the vertical miss distance would have been closer to or just under 500ft: this however is speculative and again it is noteworthy that both pilots reported the vertical separation as being well under that. These altitude and vertical separation discrepancies made it impossible for the Board to determine accurately the vertical miss-distance but, regardless of the actual separation in terms of feet, the Skyranger pilot was clearly concerned by the proximity of the Robin. As regards the degree of risk, since the Robin pilot had lost sight of the Skyranger almost from the commencement of the overtaking manoeuvre Members were not convinced that safety had been assured during that manoeuvre.

The Board noted the Skyranger pilot's comment regarding the advisability of fitting/using a transponder in GA ac. The STC ATC Advisor stated that RAF radar equipped units are generally happy to provide GA pilots with a radar service if requested and if traffic loading permits.

PART C: ASSESSMENT OF CAUSE AND RISK

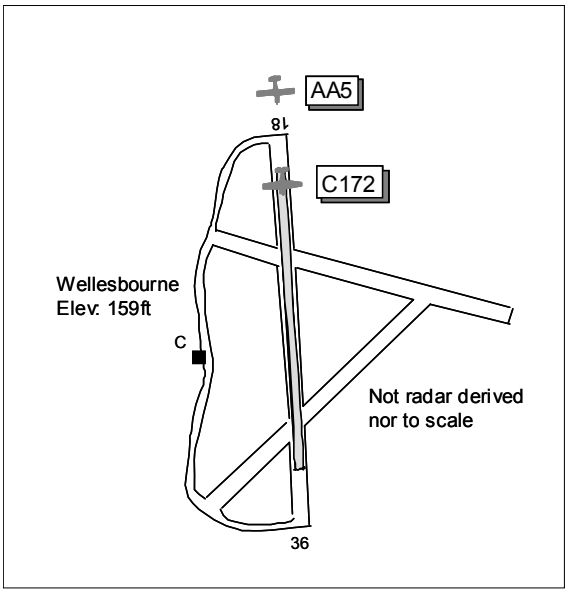
Cause: The Robin DR300 pilot did not overtake the Skyranger in accordance with Rule17 (4) of the Rules of the Air Regulations and passed sufficiently close to cause its pilot concern.

Degree of Risk: B.

AIRPROX REPORT No 176/06

AIRPROX REPORT NO 176/06

Date/Time:	16 Dec 1355 (Saturday)	
Position:	5211N 00137W (RW18 Wellesbourne Mountford - elev 159ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C172	AA5
Operator:	Civ Club	Civ Pte
Alt/FL:	0ft agl 159ft	300-400ft↓
	(QNH 1023mb)	(QFE)
Weather	VMC CAVK	VMC CAVK
Visibility:	10km	
Reported Separation:		
	20ft V	200-300ft V
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports flying a dual training sortie departing from RW18 at Wellesbourne VFR and in receipt of an AFIS from Wellesbourne Information on 124·025MHz squawking 7000 with Mode C. The visibility was 10km in CAVOK weather conditions and the ac was coloured white with red/blue stripes; anti-collision light was switched on. He was cleared to line-up and wait, he thought, in turn with a PA28, which took-off and he then reported 'rolling' at his discretion as given by the AFISO. After initiating the take-off roll and accelerating through 10kt, he heard the AFISO say to another flight "*confirm you are going around"*. Soon after that an AA5 passed over their heads by approximately 20ft, approaching the flare to land, which stayed in ground effect for the length of the RW before climbing away. He aborted his take-off immediately, assessing the risk as high.

THE AA5 PILOT reports flying inbound to Wellesbourne VFR and in receipt of an A/G service, he thought, from Wellesbourne Radio on 124·025MHz squawking with Mode C. The weather was CAVOK and the ac was coloured white/brown; lighting was not mentioned. He had joined the cct in a normal manner, reporting downwind and when calling finals heading 180° at 75kt descending through 700-800ft he was informed by the 'Tower' that there was traffic about to depart. He could see an ac about to lift-off but at about 300-400ft he saw another ac joining the active RW at which point he initiated a go-around; he estimated minimum vertical separation as 200-300ft. He thought the risk of collision was small, however he felt that 'Air Traffic/Tower' could have been more helpful. The second ac (the subject C172) was keen to follow the previous departing ac which led to confusion as the Tower had only informed him of 1 departing ac and also the low sun had restricted his vision. He wondered why the C172 joined the active RW when its pilot must have been aware that his ac was, by then, on short finals.

THE WELLESBOURNE MOUNTFORD AFISO reports the C172 pilot was told to report lining-up, which he did. The AA5 pilot called final and was told traffic to roll. As the C172 began its take-off roll he asked the AA5 pilot to confirm that he was going around and it was at this point the C172 pilot aborted his take-off and held on the RW. It appeared the AA5 was attempting to land over the C172 at the threshold, estimating the AA5 passed 20-50ft above the C172 near the RW threshold.

UKAB Note (1): The Airprox is not captured on recorded radar. A 7000 squawk with NMC is seen joining O/H Wellesbourne at 1349 and is believed to be the AA5. The radar shows this ac to position from the deadside onto the downwind leg RH for RW18 prior to turning onto final approach about 1·5nm N of Wellesbourne at 1354. Another 7000 squawk appears shortly thereafter just S of Wellesbourne tracking S airborne from RW18, believed to be the PA28 mentioned that departed ahead of the C172. The AA5 tracks S and passes O/H Wellesbourne at 1355 before turning R 1·5nm S of Wellesbourne onto the downwind leg. The C172 is believed to become airborne shortly thereafter following the AA5 1nm line astern.

UKAB Note (2): The UK AIP at AD2-EGBW-1-3 promulgates Wellesbourne ATZ as a circle radius 2nm centred on the longest RW (18/36) 521132N 0013652W surface to 2000ft aal elevation 159ft amsl. The ATZ hours are co-incident with AFIS hours but not by arrangement: Winter Mon-Fri 0900-SS or 1700 whichever is earlier, Sat-Sun 0900-1800 (also available Mon-Fri up to 2000 by arrangement); Summer 0800-1630 (also available Sat, Sun, PH 1630-1900).

UKAB Note (3): CAP393 Air Navigation: The Order and the Regulations Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions General Para (1) states: *(a) Notwithstanding that the flight is being made with air traffic control clearance it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft. (b) An aircraft shall not be flown in such proximity to other aircraft as to create a danger of collision. (d) An aircraft which is obliged by these Rules to give way to another aircraft shall avoid passing over or under the other aircraft, or crossing ahead of it, unless passing well clear of it.* Para (6) states: *Order of landing (a) An aircraft while landing or on final approach to land shall have the right-of-way over other aircraft in flight or on the ground or water.* Para (7) states: *Landing and take-off (a) A flying machine, glider or airship shall take-off and land in the direction indicated by the ground signals or, if no such signals are displayed, into the wind, unless good aviation practice demands otherwise. (b) A flying machine or glider shall not land on a runway at an aerodrome if the runway is not clear of other aircraft unless, in the case of an aerodrome having an air traffic control unit, that unit otherwise authorises.* Rule 39 Flights within Aerodrome Traffic Zones for an aerodrome having an air traffic control unit or an aerodrome flight information service unit during the notified hours of watch of the air traffic control unit or the aerodrome flight information service unit Para (2) states: *An aircraft shall not fly, take off or land within the aerodrome traffic zone of an aerodrome to which this paragraph applies unless the commander of the aircraft has obtained the permission of the air traffic control unit at the aerodrome or, where there is no air traffic control unit, has obtained from the aerodrome flight information service unit at that aerodrome information to enable the flight within the zone to be conducted with safety or, where there is no air traffic control unit nor aerodrome flight information service unit, has obtained information from the air/ground radio station at that aerodrome to enable the flight to be conducted with safety.* Para (3) states: *The commander of an aircraft flying within the aerodrome traffic zone of an aerodrome to which this paragraph applies shall: (a) cause a continuous watch to be maintained on the appropriate radio frequency notified for communications at the aerodrome or, if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means; (b) where the aircraft is fitted with means of communication by radio with the ground, communicate his position and height to the air traffic control unit, the aerodrome flight information service unit or the air/ground radio station at the aerodrome (as the case may be), on entering the zone and immediately prior to leaving it*.

UKAB Note (4): CAP410 Manual of Flight Information Services – Part B Aerodromes Chapter 1 Para 2 Responsibility of FISO states: *2.1 The FISO has the following specific responsibilities: a) issuing information to aircraft flying in the aerodrome traffic zone to assist the pilots in preventing collisions; b) issuing instructions and information to aircraft on the manoeuvring area to assist pilots in preventing collisions between aircraft and vehicles and obstructions on the manoeuvring area or between aircraft moving on the apron. c) issuing instructions to vehicles and persons on the manoeuvring area; d) alerting the safety services; e) initiating overdue action; f) informing aircraft of any items of essential aerodrome information.* Para 2.2 states: *Although FIS is an information service, it must be emphasised that the immediate passing of accurate information could be a vital safety factor when the FISO becomes aware of a dangerous situation developing within his area of responsibility. However, with the exception of issuing instructions to aircraft on the ground under the conditions described above, FISOs must not issue instructions of their own volition or exercise any form of control over aircraft. It should be noted that neither the aerodrome authority nor the FISO can prohibit an aircraft from entering the aerodrome traffic zone.* Para 6 Departing Aircraft sub para (6.1) Awaiting take off states: *(6.1.1) Aircraft are not permitted to hold on the end of the runway if another aircraft is landing. The holding point is never closer to the runway centreline than 30 metres. FISOs are not permitted to authorise a turn after departure, which is within the ATZ, that does not conform to the traffic pattern of traffic formed by other aircraft.* (*6.1.2) When the aircraft reaches the holding point of the runway to be used for departure, appropriate phraseology detailed in Chapter 8, Standard Phraseology shall be used.* Para 7 Information to Arriving Aircraft sub para (7.4) Joining circuit states: *Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some distance away from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned and to intelligently position the aircraft in relation to other aircraft in the circuit pattern. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly. Although there is a legal requirement for pilots to*

report entering and leaving the ATZ (Rule 39 of the Rules of the Air Regulations), this is not the case for other reports in the circuit. Any requests for position reports downwind, final etc., for the purposes of passing traffic information, only have the status of a request although it is expected that most pilots will comply. Para (7.5) Landing states: *When a pilot reports on final approach the FISO should respond with either 'Land at your discretion....', if they are number one, or 'The runway is occupied with....'. FISOs are not to advise pilots to 'Continue' or invite them to land after traffic already on the runway as this may encourage pilots to breach Rule 17 of the Rules of the Air Regulations. When the arriving aircraft has completed its landing roll, the FISO shall issue appropriate taxi instructions and information to the pilot.*

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and a report from the AFISO.

This incident occurred at an aerodrome where an AFISO was providing a service. Whilst the C172 pilot believed that he was cleared to line-up and wait in turn, this procedure is only used where an air traffic service is being provided by ATC. The AFISO said he told the C172 pilot to report lining-up. In situations like this, the onus is squarely on the pilot to be cognisant of the type of 'control' service that is being provided; what that service provides and to fulfil his responsibilities in accordance with the promulgated procedures. Without the benefit of an RT recording/transcript, it was not possible for the Board to ascertain exactly what was said on the RT during the incident or whether all parties made the appropriate calls. Both pilots were apparently monitoring the frequency so should have heard each other's RT calls announcing their intentions. That said, even if RT calls are not made or are missed, basic airmanship allows pilots to comply with the Rules of the Air Regulations by maintaining a good lookout for other traffic and separating themselves accordingly. The AA5 was there to be seen on finals when the C172 pilot lined-up for departure, the radar recording showing the AA5 turning finals at about 1·5nm within the ATZ. Members felt that the C172 pilot should have either expedited departure or remained clear of the RW. However, for whatever reason, the C172 pilot entered the RW, possibly without seeing the AA5 or believing that he could become airborne well before its impending arrival. In these situations, the pilot of the landing ac then has to make a decision as the RW is now occupied by departing ac. Depending on the relative positions of the two ac, either the approach can be continued, if there is sufficient time for the ac that is lined-up on the RW to depart, or a 'go-around' must be executed. Subject to there being no local airfield/aerodrome restrictions, the pilot of the ac on approach should immediately commence a climb and manoeuvre onto the deadside of the RW which facilitates maintaining visual contact with the departing ac and monitor its progress so that he can then safely re-integrate back into the cct. However it appears that the AA5 pilot carried out a non-standard go-around and flew close enough to the C172 to cause its pilot and the AFISO concern. This had caused the Airprox.

The AA5 pilot saw the C172 and believed that he had gone-around in good time. From the AFISO's viewpoint, he thought the AA5 was getting too close to the C172 commencing his take-off roll and called the AA5 pilot to confirm that he was going around. The C172 pilot had heard this call to the AA5 and elected to reject his take-off immediately from slow speed, stopping his ac close to the threshold. Although this had had the potential for being a more serious incident, the combined actions taken by all parties were enough to persuade the Board that any risk of collision had been effectively removed.

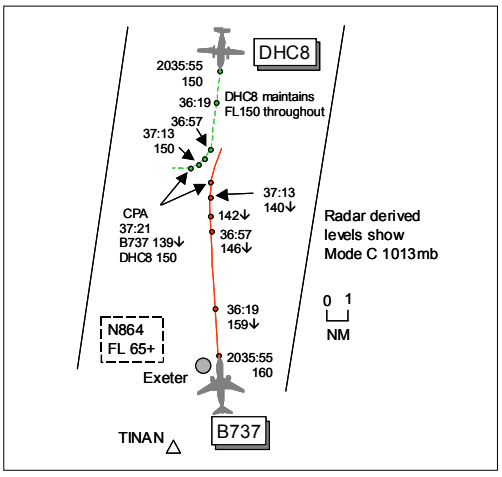
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AA5 pilot apparently carried out a non-standard go-around and flew close enough to the C172 to cause its pilot and the AFISO concern.

Degree of Risk: C.

AIRPROX REPORT NO 177/06

Date/Time:	29 Dec 2037	NIGHT
Position:	5054N 00325W	(30nm N BHD)
Airspace:	AWY N864	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	DHC8	B737-300
Operator:	CAT	CAT
Alt/FL:	FL150	↓
Weather	IMC NR	IMC
Visibility:		
Reported Separation:		
	Nil V/<2nm H	NR
Recorded Separation:		
	1100ft V/1·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports routeing S'bound on N864 approximately 10nm N of TINAN at 210kt in IMC and in receipt of an ATS from London on 126·075MHz squawking 7415 with Mode C. Whilst heading 200° level at FL150 and 'cleared when ready' to FL80, a TCAS target was observed flying in the opposite direction descending towards them. The other ac continued down and a TA alert was received: London then gave them a R turn onto 270°. The opposing traffic was not seen visually but passed down their LHS, within the TCAS 2nm range ring, descending through their level when at the 10 o'clock position. London said that they would be filing a report and he said that he would do the same. He assessed the risk as high.

THE B737 PILOT reports being unaware of the Airprox until informed by his Flight Safety Dept and Cardiff ATC post flight. He recalled the incident which occurred when flying inbound to Cardiff IFR in a descent S of EXMOR before levelling-off at their assigned level and working Cardiff ATC. He, the Captain and PF, noticed other traffic ahead on TCAS 1000ft below and he remembered saying to the FO that they would probably get further descent after he was clear. However, they were given descent through his level pretty much straight away so he told the FO that they would have to monitor the other traffic and he commenced the descent. At this point the other traffic changed from a TCAS non-intruding to proximate traffic displayed on their Nav screens. They were then given a heading change to the R about 40°: the controller did not appear concerned at any point and all instructions were given in a calm manner. At no point did they receive a TCAS TA alert or RA warning. The heading change seemed to give them better clearance and they continued their approach and landing unaware at any time during their descent that separation had been lost.

THE CARDIFF RADAR1 CONTROLLER reports working bandboxed without an assistant. Five ac were diverting into Cardiff from Bristol as well as an inbound ac and the subject DHC8 diverting to Plymouth. As things got busier the assistant's position was opened and manned by the acting Watch Manager (WM) who coordinated the DHC8 with LACC Sector 6 at FL150 descending to FL80. The RAD1 instructed the DHC8 to descend when ready to FL80. The B737 flight inbound from the S called on frequency, which call was acknowledged before the RAD1 continued to give vectors to other ac in the sequence and to an ac which had gone-around. The RAD1 then went back to the B737 flight and instructed it to descend to FL100. At this point the DHC8 flight requested a non-standard routeing, there being a lot of Wx between EXMOR and BHD, before it was transferred to LACC S6 not realising that it was in conflict with the B737. A call was then received from S6 and now realising the confliction the RAD1 turned the B737 R to avoid. The RAD1 believed that the B737 flight did not receive any TCAS advisory or resolution alerts.

THE CARDIFF WATCH MANAGER reports entering the approach radar room immediately after having been relieved from giving a half hour break to the ADC in the VCR. The RAD1 had just taken over the Radar position from the previous controller who had been working for 1hr and who had then left the approach room. He intended to work at the WM's position in the radar room but immediately realised that there was the potential for the RAD1 to become overloaded, as there were ac holding at Bristol which could potentially divert to Cardiff and there was

no ATSA support, so he opened up the ATSA position and conducted support duties. This proved to be the case and he took phone calls from the Bristol ATSA and entered the information into the local Flight Data computer to raise the appropriate fpss. During the course of about 35min he estimated that 5 ac diverted into Cardiff and the subject DHC8, which was originally intending to land at Bristol, made an en-route diversion. The DHC8 flight elected to divert to Plymouth so he informed LACC S6 ATSA. He later coordinated the DHC8 with the Sector 6 Planner (S6P) at FL150 descending to FL80. At one stage Exeter rang to advise of a lot of Wx on radar between TINAN and Plymouth and suggested that the DHC8 routed via BHD. Rather than explain this to the RAD1 to relay to the crew, he asked the RAD1 if he could inform the DHC8 crew directly which he did. He then believed he also informed the S6P. He was busy trying to produce a fps for a pending Exeter inbound at the time of the Airprox and for the whole time he was 'ATSA'ing' he was not listening in on the RAD1 frequency, just ensuring that the RAD1 was supplied with the correct flight data and answering phone calls. His attention to the incident was prompted by the RAD1 stating that a self-made error had occurred. When he looked at the radar the DHC8 was still at FL150 on a SW'ly track and the B737 was tracking N'bound descending through FL143 about 3nm to its S. He checked that the RAD1 was OK and then arranged for the controller to be relieved.

ATSI reports that at the time of the Airprox, the B737 was under the control of Cardiff Approach and the DHC8 had just been transferred from Approach to LACC Sectors S6/36. The Cardiff APR, who was operating in bandboxed configuration, described how the workload had quickly risen from low to high because of a number of ac, at short notice, deciding to divert into Cardiff from Bristol.

The APR took over the combined approach position at about 2000. At the time, the traffic workload was light and the APR did not envisage any problem operating without another controller. In accordance with standard operating manning, at that time of night, there was no extra controller or an Assistant (ATSA) rostered for the Approach position. Shortly afterwards, the Watch Manager (WM), following a break from Aerodrome Control duties, entered the Approach Room with the intention of carrying out non-operational duties at the Watch Manager's position. By this time, it was becoming apparent that ac would be diverting into Cardiff because of adverse weather at Bristol. Consequently, realising the potential traffic build-up because of the diverting traffic, he decided to help reduce the controller's workload by opening the ATSA position.

At 2011, the DHC8 flight established communication with Cardiff Approach, reporting routeing direct to RILES at FL150. This flight was tracking S'bound on Airway N862 to Bristol, its intended destination. Some 5min later, the pilot of the DHC8 was asked if he wished to take up the hold at Bristol, or to make an approach for that airport. He replied that he was in communication with Bristol and, initially, he would continue towards the hold although the weather at Bristol was out of his limits. At 2018, the DHC8 flight requested to route to TINAN and then to proceed to Plymouth unless the weather there was below limits when he would proceed to Newquay. The flight was instructed to continue on its present heading which was reported as 210°.

At the APR's request, the WM, acting as the ATSA, telephoned LACC, West End Sector, at 2022:10, to inform them that the DHC8 was diverting from Bristol to Plymouth. The WM/ATSA said he would allow time for the flight to be processed and would re-call for descent coordination. Consequently, at 2024:09, he telephoned LACC, identifying the DHC8 13nm NE of Cardiff Airport, tracking towards EXMOR *"to get him back in* (Airway N) *eight six four"*. The APR had recently instructed it to turn R heading 220°. LACC coordinated the flight, at Cardiff's request, descending to FL80, saying *"we'll take him whenever you're happy"*.

In accordance with the agreed coordination, the DHC8 flight was instructed, at 2028:10, *"when ready descend Flight Level Eight Zero"*. At the time, it was passing 4nm SE of Cardiff Airport, close to the eastern edge of Airway N864. Three minutes later, at 2031:20, when the pilot requested if he was still to maintain the heading, he was instructed to resume his own navigation to TINAN. The radar recordings show the DHC8, now in the middle of the Airway, still maintaining FL150. The other traffic involved in the Airprox, the B737, is passing FL256, 59·6nm to its S, still in communication with LACC.

At around this time, the WM/ATSA received a telephone call from Exeter, commenting on the weather conditions seen on their radar display relative to the DHC8's flight to Plymouth. It was suggested that it would be preferable for the flight to route via Berry Head and then to ERMIN. The WM/ATSA telephoned LACC to inform them of the message, both units commenting that they had no weather radar. Thereafter, the WM/ATSA, with the APR's consent, transmitted the Exeter weather information to the DHC8, adding that the pilot should inform LACC, after transfer, of his intentions. The pilot responded that, from his radar display, it might be possible to proceed from TINAN direct to Plymouth.

The B737 flight contacted Cardiff Approach, at 2035:18, reporting at FL160, on a weather avoidance radar heading 350°. The APR passed instructions to 2 other flights before responding to the B737's call: *"B737 c/s Cardiff radar vectoring for an ILS approach to runway One Two descend Flight Level One Hundred"*. The radar timed at 2035:55, as the B737's pilot responded to this transmission, shows the subject ac, on reciprocal tracks, 13·4nm apart: the DHC8 is maintaining FL150 and the B737 FL160. The latter ac descended through FL159 24sec later, 9·8nm from the DHC8. By this time, the DHC8, having requested to route direct to ERMIN, had been transferred to LACC S6, to make the routeing request on that frequency.

As soon as the DHC8 flight contacted S6, the LACC Controller instructed the flight, although using an incorrect company name, to *"turn right immediately heading two two zero avoiding action"*. The pilot reported that he had the ac on TCAS. Information was passed about traffic at 12 o'clock, range of 4nm, just passing through your level. The pilot was instructed to turn R heading 270°. TI was updated as *"right in about your ten o'clock range of two miles showing six hundred feet below"*, followed, after the pilot reported having it on TCAS, by *"now one mile about your ten o'clock showing nine hundred feet below"*. The pilot then reported clear of conflict. The radar recordings of the incident show that at 2036:57, the 2 flights were still on reciprocal tracks, 3·8nm apart, the DHC8 is still at FL150 and the B737 is descending through FL146. The next return shows the former ac in a R turn, 2·7nm N of the B737, which is passing FL142. At this time, the Cardiff APR instructed the B737 to *"turn right heading zero two zero degrees"*. The term avoiding action was not used and no TI was issued about the conflicting traffic. The APR commented having only used the term 'avoiding action' briefly whilst under training at the ATC College but had not used it in live circumstances. By the time vertical separation was established (2037:13), when the B737 was passing FL140, the two ac were 1·7nm apart, the DHC8 was still maintaining FL150. Although the DHC8 had been cleared to descend to FL80 about 9min earlier, the pilot had been given the option to descend when ready; consequently he was entitled to maintain FL150 for as long as he wished. In accordance with the Cardiff MATS Part 2, Page APR-24, *'traffic should be presented to LACC in such a manner as ensures the application of not less than 5nm minimum radar separation or 1000ft vertical'*.

[UKAB Note (1): The CPA occurs on the next radar sweep at 2037:21 as the subject ac pass with 1100ft vertical and 1·2nm horizontal separation with both ac turning R.]

The APR confirmed that when instructing the B737 to descend to FL100, the potential confliction between the subject ac was not seen on the radar display. The controller explained that N864 is a busy airway and it was possible that, had the APR noticed the DHC8's radar return at the time, the controller might have assumed it was overflying traffic above Cardiff's level. Normally, the fps display would have shown the confliction. The Approach fps display has 3 bays. The middle (Active) is provided with two strip designators i.e. N/S. The fps for ac inbound to Bristol from the N, e.g. the DHC8, would be displayed above the N designator. If, however, an ac was overflying Cardiff, it would be usual practice for another fps to be displayed under the S designator. On this occasion, because of the late decision for the DHC8 to continue to Plymouth, no such fps was readily available to be displayed under the S designator and the APR did not request the WM/ATSA to produce one. Additionally, fps for arriving ac would normally be placed, by the ATSA, as pending traffic in the R bay. The APR commented that these are usually produced about 20min before its ETA. The fps would then be placed by the controller in the appropriate N/S bay, depending on their arrival route. On this occasion, the APR recollected that 2 fpss, including the B737's, were placed in the pending section by the WM/ATSA but the APR believed, only just before the B737 flight made contact. The WM/ATSA could not remember when he had placed the B737's fps in the pending bay. He explained that, at the time, information on inbound ac had to be transferred from the National Airspace System (NAS) strips to the local 'Copperchase' strips. Although he was busy he did not believe he had delayed the preparation and positioning of the B737's fps. The APR said that, when issuing descent to FL80 to the DHC8 flight, there were no fpss displayed in the S bay to indicate any potential conflicting traffic. The APR explained that, as traffic progressed into the Cardiff O/H, its fps would normally be moved into the area between the two designators (CDF section). If it was continuing S, this fps would, subsequently, be removed as the flight progressed and the second fps, usually displayed under the S designator, as mentioned earlier, would be used to show conflictions with opposite direction traffic. Once again, on this occasion, when the B737 was instructed to descend, there was no fps in the S bay to indicate a confliction. The Cardiff MATS Part 2 does not require a second fps be produced and displayed but it is normal procedure to carry this out. The APR recognised that had the DHC8's fps been moved into the S bay, after the ac had passed Cardiff, it would have shown the confliction with the B737.

The RT recording confirms that throughout the incident the APR sounded confident and appeared to be coping with the busy situation. For about 15min before the Airprox, the workload was high as the APR was vectoring diverting ac downwind LH for RW12. Additionally, 1 of these ac made a go around and had to be repositioned into

the cct. As a result, the APR decided to place further ac into the hold. The APR's attention was focussed on the inbound situation, close to the airport and the APR only became aware of the confliction between the subject ac on receipt of a telephone call from LACC. At the time, although it was planned to be introduced, Cardiff was not equipped with STCA. It is now installed under trial conditions.

The WM said that on the evening of the incident, there were 4 controllers on duty i.e. one extra than the normal manning. However, he did not consider it necessary to utilise this extra person, in Approach, in the period leading up to the incident. He assessed that opening the Approach ATSA position would be sufficient to deal with the traffic. Although he realised the position was busy, he believed that the APR would be able to deal with the situation. However, to assist the APR he did perform controller tasks e.g. coordinating the DHC8's descent with LACC and passing information on the frequency. He added that he was unsure how he could have best utilised the spare controller. The Cardiff MATS Part 2, Pages APR 1-3 states the responsibilities for the Coordinator and Radar 2 positions. The Coordinator's responsibilities, apart from assisting the APR with coordination, include: *'Monitor the RTF, whenever primary duties permit, in order to facilitate efficient operation of the sector'; 'update the FPS display. This is a joint responsibility with the Radar 1 ATCO. The co-ordinator shall annotate FPS in accordance with instructions or co-ordination that he/she issues'; 'Generally support the Radar 1 ATCO, monitoring the Radar 1 position and providing advice and assistance as required'*. The MATS Part 2 states that *'Inbound traffic may be transferred by Radar 1 to Radar 2 for final vectoring on a tactical basis following co-ordination and agreement between the two ATCOs. For traffic from the east, Radar 1 shall allocate the initial heading/level/speed instructions to Bristol if required and specify the frequency to which the ac is to be transferred. Traffic may be instructed to contact Radar 2 directly'*. With hindsight, opening either of these positions may have assisted in preventing the Airprox. However, it does also state that *'It is the Radar 1 ATCOs responsibility to determine whether there is a requirement to initiate or cease 'normal manning' (Radar 1/Radar 2) of the Approach Room. It is the WM's responsibility to authorise that change. The Radar 1 ATCO determination should be based upon an accurate assessment of both current and forecast traffic levels, as well as additional factors such as the prevailing and forecast weather conditions, the activity of other airfields affecting the Cardiff operation, such as Bristol and St Athan and staff availability'.* The WM explained that, on this occasion, because he was busy preparing fps and making telephone calls, he was unable to monitor the Approach frequency closely and was only aware of the confliction between the subject ac when informed by the controller, after the Airprox had occurred.

Since this Airprox, a trial of the use of NAS fps, instead of the Copperchase, has been introduced to reduce workload involved with fps production. It was also recommended locally that the production of two fpss for N/S overflights be mandated; specific training would be introduced for first validations to include holding scenarios, short notice diversions and the use of avoiding action and the Cardiff ATSA Working Practice Agreement would be reviewed and if possible an ATSA would be deployed in Radar until 2100 local during weekdays. It is understood that all these recommendations have been accepted by local ATC Management.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear to the Board that there were some major supervisory and manning issues within this Airprox which the NATS Advisor confirmed had been addressed post-incident. He also confirmed that the other recommendations highlighted have all been accepted and, with the exception of the ongoing ATSA Working Practice Agreement review, will be completed by the end of May 2007. The Board welcomed the NATS safety initiatives and actions.

Turning to the specific incident, it was noteworthy that the high traffic levels at the time of the Airprox were not forecast, the majority of the traffic having diverted at short notice from Bristol to Cardiff. The Watch Manager had elected to assist the APR by opening the ATSA position and had provided the APR with fpss and making/receiving telephone calls. However, the APR was dealing with a busy traffic situation and owing to a breakdown in the management of the fps display was not aware of the inbound B737 from the S when issuing descent clearance to the DHC8 (about 7min before the B737 flight made its initial call). It was unclear when the B737 fps was placed in the 'pending' bay and subsequently moved into the 'active' bay but the APR did overlook the DHC8's presence when descending the B737, mainly because the DHC8's fps was not displayed in the fps display S bay. Controller Members felt that this was due to the APR either not moving its fps to that bay or requesting an extra fps. Although the descent instruction given to the DHC8 flight did not lead to a confliction, as it was below the expected level of the B737, the fps would have given the APR an indication of the subsequent potential problem. During this busy

and complex traffic situation, the APR did not take the DHC8 in account when descending the B737 and this had caused the Airprox. Although this confliction was not detected from the fps display, it should have been apparent to the APR as both ac were displayed on the radar. An ATCO Member commented that although the APR had been speaking to the DHC8 for over 20min, the controller had transferred the flight to LACC, which was after issuing descent to the B737, apparently still not cognisant of the potential confliction.

Turning to risk, the LACC S6 controller immediately saw the confliction and issued the DHC8 flight with an avoiding action R turn after its initial contact call. This was followed with TI and a further R turn, with updated TI, until the subject ac had passed. The DHC8 crew had seen the B737 on TCAS and had promptly executed the given R turn whilst watching it pass close down their LHS having descended through their level. The Cardiff APR was made aware of the deteriorating situation through a phone call from LACC and turned the B737 R which had slightly increased the horizontal separation at the CPA. Fortunately, the B737 crew had good situational awareness and had seen the approaching DHC8 ahead 1000ft below and had commenced descent when cleared whilst monitoring the DHC8's flight path. TCAS indicated the DHC8 as 'proximate' traffic (within 6nm and 1200ft) but no TA alerts or RA warnings were received and they turned R when instructed by the APR but were unaware that separation had been lost. Although a singularly untidy situation, the Board agreed that the actions taken by all parties, when combined, had been enough to ensure that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

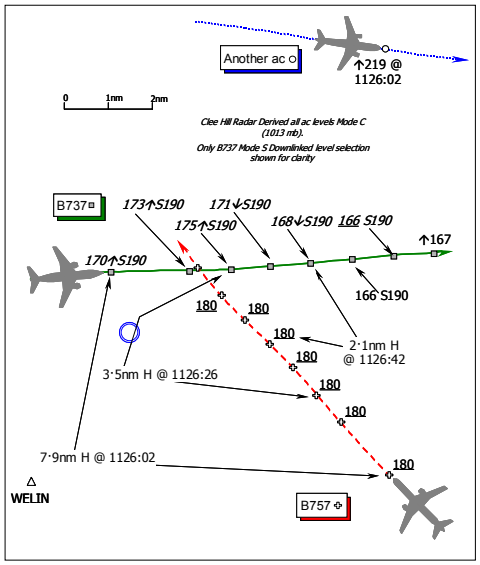
Cause: During a busy and complex traffic situation, the Cardiff APR did not take the DHC8 into account when descending the B737.

Degree of Risk: C.

AIRPROX REPORT No 178/06

AIRPROX REPORT NO 178/06

Date/Time:	16 Dec 1126 (Saturday)	
Position:	5220N 00043W (7nm NE WELIN)	
Airspace:	DAVENTRY CTA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-400	B757
Operator:	CAT	CAT
Alt/FL:	↑FL190	Not reported
Weather	VMC NR	VMC NR
Visibility:	10km+	NR
Reported Separation:		
	NR/500m H	Nil V/3nm H
Recorded Separation:		
	500ft Min V @ 3.5nm H	
	1200ft V @ 2·1nm Min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-400 PILOT reports he was outbound from Birmingham to Amsterdam and climbing to their assigned level of FL190 in VMC, whilst in receipt of an ATS from LTCC. Approaching a position about 35nm W of SIVDA heading E at 290kt, passing FL175 with 5° of pitch up climbing at 1500ft/min, a TCAS TA was enunciated followed by an RA to descend. The RA was complied with and his ac was descended about 8-900ft before they were clear of the conflict, which resulted in a maximum deviation of about 1500ft below their flight path. The other ac was seen out on the right-hand side of his ac at 2 o'clock from 5nm away and was level at FL180. Minimum horizontal separation was assessed as 500m and the risk *"medium"*.

THE B757 PILOT reports, nearly 2 months after the event, that he had departed from London Heathrow, bound for Manchester and was in receipt of a RCS from ATC whilst in a level cruise [at FL180]. During their approach briefing an ac was noticed on the TCAS display ahead and to their L, climbing. Judging the track of the ac they commented between themselves that they could expect a TCAS TA due to the other ac's rate of climb, although at that stage they assumed the ac would be levelling 1000ft below their cruising level, thereby effecting vertical separation. They observed the other ac on the TCAS display climb through the level below and continue climbing. A TCAS RA was expected by this stage, although none was received and only a TA was enunciated, although exactly when he cannot recall. The other ac appeared to pass through their level some 3nm ahead in their 12 o'clock position and it was only at this point that they gained visual contact on the traffic. Once it appeared that there was no further possible conflict with the other ac he queried the separation with ATC and the controller's response at the time was consistent with their TCAS observation [the B757 pilot reported on RT 2½nm ahead within 400ft]. The other [B737] pilot also responded on RT that he had their B757 visual throughout.

He was unaware that an Airprox had been generated until nearly 2 months after the event and thus cannot recall much more than this basic information. Although normal separation standards may have been compromised he believes the actual risk of collision was *"low"* and cannot recall any avoiding instructions being issued.

UKAB Note (1): The UKAB was first notified of this Airprox by post on 4 Jan 2007. The B757 pilot's company FSO was contacted the following morning on 5 Jan 2007. Despite hastening action twice no report was forthcoming until 13 Feb 2007, nearly two months after the Airprox occurred.

THE LTCC WELIN [ONCOMING] CONTROLLER provided a very frank account, reporting that he was working as the WELIN Radar controller in a "low traffic situation". The B757, was routeing from London Heathrow to Manchester at FL180 and on a heading to go behind another ac [outbound from E Midlands - not the subject B737] routeing to SIVDA climbing to FL210. At the same time the subject B737 travelling from Birmingham to Amsterdam and also routeing to SIVDA, was climbing to FL170 underneath the B757. Waiting for the 'pass',

before climbing the B737 further to the agreed level of FL210 for transfer to LACC, he observed that the 'other ac' had passed FL200 and so *"without thinking"* climbed the B737 to FL190 – through the B757's level.

He opined that there is no explanation as to why he did this, as he had already set up the process and was waiting for the pass to occur. Both acs' crews transmitted at the same time he believed; the B737 crew advising of a TCAS event and the B757 querying about an ac - the B737 - crossing 400ft below them. He did not observe vertical separation of less than 900ft, but that was probably because of the B737 crew's compliance with a TCAS RA.

ATSI reports that the B757 crew established contact with the LTCC WELIN Sector at 1119:25, and reported climbing to FL140 on a heading of 025º. This was acknowledged and the controller instructed the crew to climb further to FL180. At 1119:35, the crew of the B737 called and reported *"..passing 4-7 climbing level 6-0"*. This call was also acknowledged and the flight instructed by WELIN *"..no ATC speed restriction climb flight level 7-0".* At this time the B737 was in a R turn onto a southeasterly track, 4nm NE of Birmingham whilst the B757 was 67nm to the SE of the B737. Shortly after this transmission a change of controller took place on the WELIN Sector position.

At 1121:10, the new oncoming controller cleared the B737 crew to climb to FL110 heading 125º, meanwhile the B757 was still heading NE in order for it to be positioned on the eastern side of the airways structure, before heading N to its destination and was passing FL172 for its assigned level of FL180. Shortly after the B757 levelled at FL180, the controller instructed the crew to turn L heading 320º, before clearing the B737 crew to climb to FL170 and then to turn L heading 110º. The two ac were now 42nm apart and converging, with the B757 maintaining FL180 and the B737 passing FL103 for FL170. To the NE and tracking parallel to the B737, was an outbound flight from East Midlands [shown as 'another ac' on the diagram]. The WELIN controller's plan was to climb the B737 underneath the East Midlands outbound flight, wait for the cross with the northbound B757, before climbing the B737 to the agreed transfer level of FL210.

As the B737 passed FL130 in its climb, the controller instructed the crew to route direct to SIVDA. The B757 was now in the 1 o'clock position of the B737 at a range of 30nm. The controller was monitoring his plan and, at 1125:45, when he saw that the East Midlands outbound had passed FL200, he instructed the crew of the B737 to *"…climb flight level er 1-9-0"*. [UKAB Note (2): The Clee Hill radar recording shows the B737 crew's selection of FL190 was first displayed on the ac's SSR Track Data Block Mode S level select at 1125:54.] However, the WELIN controller had overlooked the presence of the B757, in the B737 crew's 2 o'clock - 11·5nm, maintaining FL180. The two ac continued to converge as the B737 crossed from L to R ahead of the B757.

UKAB Note (3): As the B737 passed through the 12 o'clock of the B757 horizontal separation was 4·9nm with 700ft of vertical separation evident, but decreasing as the B737 climbed through FL173. At 1126:26, when horizontal separation was 3·5nm the vertical separation had been eroded to a minimum of 500ft Mode C, before the B737 crew reversed their climb into a descent in conformity with the RA. This resulted in 900ft of vertical separation at a range of 2·4nm at 1126:34, with minimum horizontal separation of 2·1nm evident on the next sweep at 1126:42 as vertical separation increased to 1200ft after the tracks had crossed. Meanwhile, the B757 crew advised the controller just after 1126:30, that they "…*just had traffic pass in front of us at 2 and a half miles*". When questioned by WELIN, if they copied the B757 crew's transmission the B737 crew reported that they had the traffic – the B757 - in sight. No avoiding action or traffic information was proffered. WELIN instructed the B737 crew to climb to FL210 at 1127:30, but only when asked by the controller later at 1128:10, did they confirm that they had received a TCAS RA to descend. STCA was not triggered.

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 readily apparent to the Board from the WELIN Controller's very frank account that he had unwittingly instructed the B737 crew to climb up through the level of the B757. He could not explain why he had done this and neither could the Members, who recognised that this Airprox was the result of this human factor 'slip'. Whilst it was plain that the 'other ac' that had departed from East Midlands was a complicating factor in this scenario, from the comprehensive report provided by ATSI it was clear that the WELIN Controller was entirely cognisant of the B757 at FL180, his plan being to climb the B737 underneath the East Midlands outbound and wait for the track to 'cross' with the subject B757 before climbing the B737 to the agreed transfer level. But whilst this was a very

sound plan it was not executed correctly with the result that the WELIN Controller climbed the B737 too early and thus into conflict with the B757 which the Board agreed unanimously was the cause of this Airprox.

The minimum horizontal separation recorded here was 2·1nm, with not less than standard vertical separation evident and both crews cognisant of each other's ac. Moreover, the B737 had never actually climbed through the B757's level as the B737 crew had responded promptly to the TCAS RA which had effectively resolved any conflict. Therefore, the Board agreed unanimously that no risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC WELIN Controller climbed the B737 into conflict with the B757.

Degree of Risk: C.