



**UK AIRPROX BOARD**



**Analysis of  
Airprox in UK Airspace**  
Report Number 3  
July 1999 to December 1999

Report by the UK Airprox Board,  
'Analysis of Airprox in UK Airspace'  
(July 1999 to December 1999)

produced jointly for

The Chairman,  
Civil Aviation Authority

and the

Chief of the Air Staff,  
Royal Air Force

## FOREWORD

This Report is the third of its kind from the UKAB and, like the others, is aimed at pilots and air traffic controllers, both civil and military, in the UK aviation community. The purpose behind the document is to promote awareness and understanding by sharing the lessons learned from Airprox incidents in the UK's airspace during the second half of 1999. Additionally, leading Airprox statistics for the last decade are set out to provide information and clear visibility on numbers, patterns, risk analysis and causal factors behind events. Importantly, trends are also exposed.

Looking at the overall scene, the picture that emerges is one of greater stability than popular opinion might lead us to expect. Between 1990 and 1999, total Airprox numbers were remarkably consistent, undulating near an average annual figure of 214 incidents. Last year there were 208. Two thirds of these incidents involved one or more aircraft from the General Aviation (GA) community – largest of the three groups tracked here. 47% of incidents involved one or more airliners, while at least one Military aircraft was involved in 45% of all encounters. It is quite understandable that public attention is focused more on the Commercial Air Transport (CAT) sector than anything else and so the records must be allowed to speak for themselves. Since 1990 the rate for total CAT encounters has gone down by more than one third and risk bearing incidents have halved. This has taken place against a background of substantial and sustained increases in CAT flying hours within our airspace. Further details on these aspects and more are covered in this Report under each of the aircraft user groups.

A copy of the statistics section is also available on the UKAB web site at address: [www.ukab.org.uk](http://www.ukab.org.uk)

Turning to the 113 individual case reports (July – December 1999) that follow the general statistics section, 78 of them were assessed as having no risk of collision. In a further 23 instances, safety was compromised, leaving 11 encounters where it was judged that an actual collision risk had existed. There was a single case where insufficient information was available to Board members to determine the risk level involved with any degree of assurance.

The assessment process undertaken by the Board prompts Recommendations to be made from time to time and these are included in this Report, together with action taken. However, the way forward to improve flight safety still further goes beyond adjustments to procedures – important though these may be. First and of prime importance is to safeguard against any signs of complacency, that would undermine all the hard work employed thus far by so many in the aviation community at large. Second is to get to grips with the most common causal factors behind Airprox incidents. Raising awareness and understanding in each of the three aircraft groups offers the best means of doing so.

*Gordon McRobbie*

Gordon McRobbie  
Director, UKAB

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## **INTRODUCTION**

### **UKAB COMPOSITION**

The UKAB is an independent organisation that was formed in January 1999 to replace two former assessment panels. It is sponsored jointly by the Civil Aviation Authority (CAA) and the Ministry of Defence (MOD) to deal with all Airprox reported within UK airspace. There are 8 civilian and 6 military members on the Board, which is Chaired by the Director UKAB. Each member is either a pilot or an air traffic controller and together they form a team of hands-on practitioners with first hand civil and military 'know how' on:

- All of the Air Traffic Control disciplines
- Commercial Air Transport flying (CAT)
- General Aviation (GA) flying, both fixed wing and rotary (Company pilots and instructors)
- Military flying by the RN, Army and the RAF, plus UK-based USAF ac

The Director UKAB reports directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force.

### **UKAB's ROLE**

The UKAB has the following roles in promoting improved safety standards in the air:

- The start point for an investigation process into each incident, carried out by a number of bodies, including Military HQs and the Safety Regulation Group (SRG) of the CAA.
- Determining what happened and analysis of the main causal factors.
- Assessment of risk levels involved.
- Making recommendations where appropriate to prevent incident recurrence.
- Communicating widely findings and lessons learned by publishing and distributing full reports twice a year.

### **SAFEGUARDING ANONYMITY**

Names of individuals or Companies are never published in reports. Safeguarding anonymity is a deliberate policy to encourage an open and honest reporting environment. Furthermore, the UKAB has no legal powers and does not apportion blame or liability; its sole purpose is to assess what took place in the interests of enhancing flight safety.

### **AIRPROX DEFINITION**

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

## 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 categories, agreed at international level, 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

## CAUSAL FACTORS

Every Airprox is assessed for cause and frequently several causal factors combine to provoke an eventual encounter. This means more causes are recorded than incidents. It is a mistake simply to look at causal factors in isolation and they should instead be examined within each of the aircraft classification groups (CAT, GA or Mil) to extract most understanding. The link between cause and risk is not as obvious as it may appear. For example some of the Risk C incidents contain all of the causal factors that could produce a Risk A result, but did not do so only because some other part of the 'safety net' intervened in time to prevent things becoming more serious.

## UKAB RECOMMENDATIONS

Recommendations are made when the Board believes that attention needs to be drawn to particular safety matters, e.g. where risk bearing incidents are repeated or where improved practices may prove beneficial. Subsequent 'acceptance' or 'non acceptance' is a matter for the organisation concerned to decide, based on its own professional judgement. The list that follows provides an update on information published in Report Number 2.

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<b>48/99</b>	<b>B737 and a B737</b>	<b>12 Apr 99</b>	<b>Risk Category: C</b>
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**RECOMMENDATION:** That the CAA considers introducing a more formal approach to the dynamic process of face-to-face co-ordination between controllers so that an audit trail results.

**Status – Accepted**

**CAA Action:** The CAA will commence a review of the relevant procedures at unit level and within generic requirements. The review and follow-up actions are expected to be complete by late summer or early autumn.

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<b>58/99</b>	<b>PA38 and a BAe 146</b>	<b>28 Apr 99</b>	<b>Risk Category: A</b>
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**RECOMMENDATION:** That the CAA reviews the way ATC instructions are given in sequence to aircraft prior to take-off so that post departure instructions are separated from take-off clearance.

**Status – Accepted**

**CAA Action:** A review of the related ATC phraseology and procedures as contained in the Manual of Air Traffic Services (MATS) Part 1 has been conducted. Having agreed that refinement to the text was required, the necessary amendments were included in Amendment 46, published in June 2000. These emphasised that take-off clearance should be issued separately from any other clearance messages.

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<b>65/99</b>	<b>B757 and a B737</b>	<b>06 May 99</b>	<b>Risk Category: C</b>
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**RECOMMENDATION:** The UKAB endorsed the ATSI view that LATCC should give further consideration to displaying the Minimum Stack Level and 'variable' outbound levels more prominently.

**Status – Open**

**CAA Action:** The CAA Safety Regulation Group is currently processing this Recommendation.

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<b>97/99</b>	<b>ATR 72 and a PA23 Aztec</b>	<b>22 Jun 99</b>	<b>Risk Category: A</b>
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**RECOMMENDATION:** That the CAA considers a review of current ATC practice at Bournemouth International Airport to ensure that aircraft conducting the standard missed approach procedure are deconflicted from other IFR inbound/holding aircraft.

**Status – Accepted**

**CAA Action:** The Authority accepts this recommendation. A review of the current ATC practice at Bournemouth International Airport is currently being conducted to ensure that aircraft carrying out the standard missed approach procedures are deconflicted from other inbound/holding aircraft.

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<b>98/99</b>	<b>Chipmunk and a Tucano</b>	<b>24 Jun 99</b>	<b>Risk Category: A</b>
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**RECOMMENDATION:** That the CAA reviews the decision to exclude LFS 'flow arrows' from those civil charts commonly used by civilian pilots flying below 2,000 ft outside controlled airspace.

**Status – Not accepted**

**CAA Action:** The CAA, through the Maps and Charts Working Group (MCWG), considered that the reasons given in answer to the same Recommendation submitted previously (109/98) for not showing flow arrows remained valid, and that the disadvantages of including them significantly outweighed any perceived advantage. It recognised that a flight safety problem existed, but felt strongly that education was the key factor in overcoming the problem. To this end, the MCWG agreed to a note being included at suitable positions on the CAA VFR charts highlighting the dangers of encountering low flying military aircraft.

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<b>127/99</b>	<b>B757 and a B757</b>	<b>19 Jul 99</b>	<b>Risk Category: C</b>
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**RECOMMENDATION 127.1/99:** That NATS considers reviewing arrangements on the display and handling of Limited Data Blocks on radar screens.

**Status – Accepted**

NATS accepts this recommendation and will conduct a review. It is expected that the review will be complete by 31 October 2000 and the findings will be reported to UKAB.

**RECOMMENDATION 127.2/99:** That NATS considers reviewing arrangements and guidance on how to decide when sectors should be 'split'.

**Status – Accepted**

NATS accepts this recommendation and will conduct a review. It is expected that the review will be complete by 31 October 2000 and the findings will be reported to UKAB.

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<b>172/99</b>	<b>CARJ and a FK100</b>	<b>17 Sep 99</b>	<b>Risk Category: B</b>
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**OBSERVATION:** The LATCC and Birmingham MATS Pt 2 entries for traffic inbound and outbound to Birmingham are not entirely aligned and this is a matter that might benefit from review. Under current arrangements at LATCC, control of Birmingham inbound and outbound flights is split between two TC controllers (COWLY SC and WELIN SC). Advantage might be gained if the (single) Birmingham controller retained the outbound ac on his frequency and co-ordinated further climb clearance with TC against inbound flights. This outbound traffic could be transferred subsequently to TC once the inbound and outbound aircraft had passed each other.

**Status – Accepted**

**CAA Action:** The Birmingham and LATCC procedures were identical but the amplifying details in Birmingham's MATS Pt II were not included in the LATCC manual. A LATCC Temporary Operating Instruction has been published to clarify responsibilities until a full review of Birmingham/Terminal Control Midlands sector is completed.

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<b>174/99</b>	<b>ATR-42 and a BA11</b>	<b>24 Sep 99</b>	<b>Risk Category: C</b>
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**OBSERVATION:** Some parallels existed to another Airprox (127/99) in which the question of manning levels and split sectors had been a contributory factor. On these grounds it might be useful to consider if general guidelines might be helpful on when to introduce a co-ordinator.

**Status – Accepted**

**CAA Action:** NATS accepts this Observation and will include its content under the arrangements for the review into Recommendation 127/99. It is expected that the review will be complete by 31 October 2000 and the findings will be reported to UKAB.



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<b>219/99</b>	<b>B75-2 and a B73-4</b>	<b>11 Dec 99</b>	<b>Risk Category: C</b>
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**RECOMMENDATION:** The Board endorsed the ATSI recommendation that CAA/NATS, through LATCC Management staff, should review with the appropriate authorities the vectoring restriction for ac on right turn-out SIDs from RW 26L/26R at Gatwick.

**Status — Open**

**CAA Action:** The CAA Safety Regulation Group is currently processing this Recommendation.

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<b>221/99</b>	<b>F100 and a A321</b>	<b>14 Dec 99</b>	<b>Risk Category: C</b>
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**RECOMMENDATION:**

That the CAA considers providing guidelines to operators on the response expected from aircrew when ATC gives instructions using the phrase "avoiding action".

**Status – Open**

**CAA Action:** The CAA Safety Regulation Group is currently processing this Recommendation.

## STATISTICS SECTION

### THE UKAB DATA SET

UKAB Reports 1 and 2 were compiled from separate pilot and controller reported Airprox records. However, all of these have now been merged into one comprehensive Airprox database. Each record was inspected for standardisation before being entered and this exercise exposed some discrepancies in the way incidents had been recorded in the past. Differences were then reconciled to safeguard information fidelity and consistency. These changes mean that some previously published figures were slightly different but the data in this report now represents the most precise picture possible. All aircraft records are stored under one of the following three broad classification groups:

**CAT** - Scheduled/Non-Scheduled passenger flights in Airliners and Helicopters  
 - Cargo flights

**GA** - Executive and Company aircraft (hired for specific reward)  
 - Private and Flying Club aircraft  
 - Gliders, sport aviation and airships/balloons  
 - Aerial work

**Military** - Aircraft flown by the RN, Army and RAF plus foreign military aircraft (in UK airspace)  
 - Defence Procurement Agency aircraft - formerly MOD (PE)

Statistics in this report set out results for 1999 and compare these with like results in preceding years. Analysis of both cause and risk is then presented in more detail under each aircraft user group.

### AIRPROX RESULTS FOR 1999

There were 208 Airprox during 1999 involving civil and military aircraft. The incident distribution pattern, (Fig 1 and Table 1) shows that results varied little from historic norms, except in three particular months. An abnormal increase in July was followed by an equally abnormal reduction in August, however the numbers evened out over the two months. The only other noticeable departure from expectations was an increase in December to almost twice the average figure.

To some extent weather had an influence on these results, but not exclusively e.g. following a warm clear spell in July, the weather in August was unremarkable and on its own unlikely to account for the sudden dip in encounters while traffic volumes remained high.

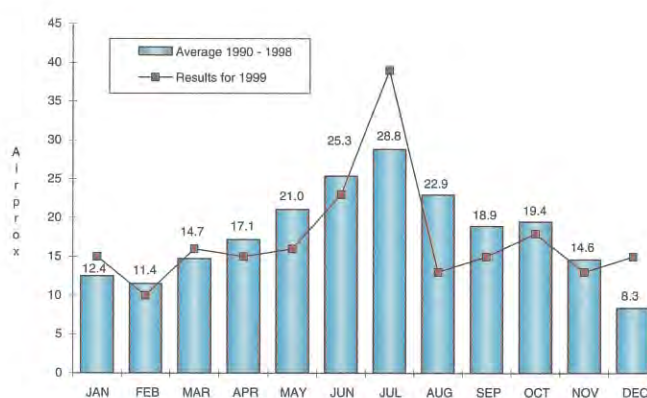


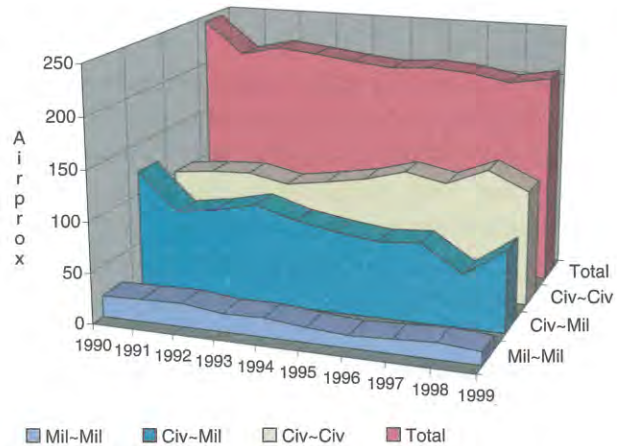
Figure 1: Airprox distribution during 1999

Table 1: Airprox distribution in 1999 and average figures for 1990 - 1998

Distribution Data	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average 1990 - 1998	12.44	11.44	14.67	17.11	21.00	25.33	28.78	22.89	18.89	19.44	14.56	8.33	214.9
1999	15	10	16	15	16	23	39	13	15	18	13	15	208

The chart at *Fig 2 (right)* shows the total Airprox profile between 1990 and 1999, together with the profiles for each of the three 'user' groups, i.e. Civ~Civ, Civ~Mil and Mil~Mil. Data is based on entries in *Table 2 (below)*.

Important points to note are that the total number of Airprox each year varies little and that the elements, which make up this profile, indicate definite long term trends. For example Civ~Civ encounters have increased gradually, while the trend with Civ~Mil meetings shows the opposite. Unlike both of these tendencies, however, is the Mil~Mil trend, which remains consistently well below the other two.



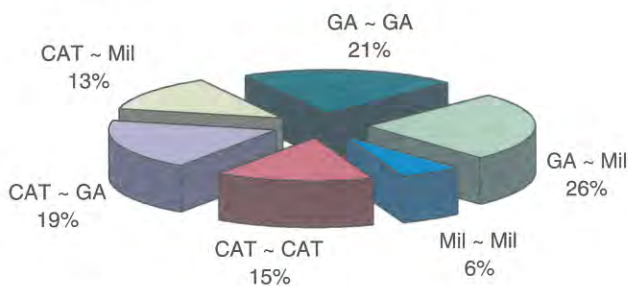
*Figure 2: Airprox totals by user group*

*Table 2: Airprox totals by mix 1990 – 1999*

Mix Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Mil~Mil	21	22	23	18	19	15	12	14	16	13
Civ~Mil	122	85	91	100	88	81	76	79	53	81
Civ~Civ	101	105	107	99	105	112	123	115	132	114
<b>Total</b>	<b>244</b>	<b>212</b>	<b>221</b>	<b>217</b>	<b>212</b>	<b>208</b>	<b>211</b>	<b>208</b>	<b>201</b>	<b>208</b>

### AIRPROX MIX COMPONENTS

Separating the Civ element of the mix into its CAT and GA components provides a better idea of how the various aircraft groups interact with each other. There are six possible encounter combinations and *Fig 3 (below)* illustrates how these looked in 1999; numbers are expressed as a percentage of the 208 incident total for the year.



*Figure 3: Aircraft groups making up the Airprox mix in UK airspace*

A significant point to note is that group encounters of like kind (e.g. CAT~CAT, GA~GA and Mil~Mil) accounted for only 42% of the whole story. Most Airprox resulted from wholly unexpected meetings between aircraft from separate groups.

Of these, GA aircraft were involved in 66% of all incidents, while the figures for CAT and Military involvement were 47% and 45% respectively.

## COMMERCIAL AIR TRANSPORT SECTION

### CAT FLYING HOURS

A significant increase in CAT flying hours in UK airspace took place during the last decade. The scale of these year on year increases is shown at *Fig 4 (right)*. In addition to arrivals and departures, figures include time taken by many airliners to transit through UK airspace on their way to and from other continents.

Two main points emerge from all of this:

- First is the difference between summer and winter volumes; the summer peak in 1990 (120K hrs) has now been overtaken by last year's slack winter period (123K hrs).
- Second – and perhaps most surprisingly - is that these large increases in traffic volume have not fed through into increased risk results, as one might have expected.

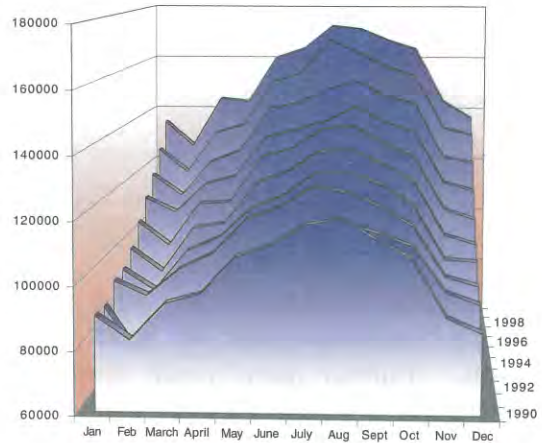


Figure 4: CAT flying hours in UK airspace

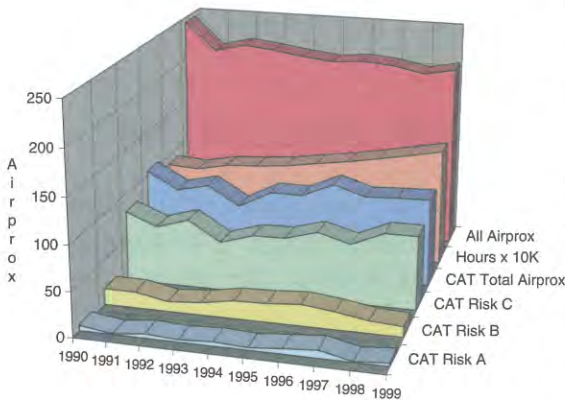


Figure 5: CAT risk distribution 1990 - 1999

*Fig 5 (left)* shows the annual incidence of CAT Airprox set against 'All Airprox' (repeated from Fig 2). Whereas the grand total profile shows a gentle decline since 1990, the steady increase in flying hours each year is clearly visible.

Since 1990, less than half the grand total numbers have involved CAT aircraft. Moreover, CAT total figures have been consistent for the last three years.

Over 80% of the CAT incidents last year were 'no risk'. Additionally, 'safety compromised' cases continued a downward trend from 14 to 12. There were 4 instances where 'actual risk' applied. All of these involved mixed encounters with GA (3) and Military (1) aircraft. *Table 3 (below)* lists the data.

Table 3: CAT risk data 1990 - 1999

CAT Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CAT Risk A	6	1	5	3	5	3	6	9	1	4
CAT Risk B	18	18	11	14	20	21	24	20	14	12
CAT Risk C	80	66	77	55	66	67	77	67	83	83
CAT Total Airprox	104	85	93	72	91	91	107	96	98	99
Hours x 10K	89.3	87.4	94.6	96.8	100.4	106.1	111.4	117.9	124.9	131.8
Airprox Grand Totals	244	212	221	217	212	208	211	208	201	208

A commonly used indicator or measure of air safety is the number of times an event occurs in 100,000 flying hours.

Using this yardstick, *Fig 6 (right) and Table 4 (below)* shows that the rate for all CAT incidents (A+B+C) has gradually reduced by over one third since 1990.

More importantly, the risk bearing rate in 1999 was less than half that recorded in 1990 (see *Table 4 below*).

These figures demonstrate gradual but sustained improvements in CAT safety standards. Further gains could come from more attention to 'causal factors'.

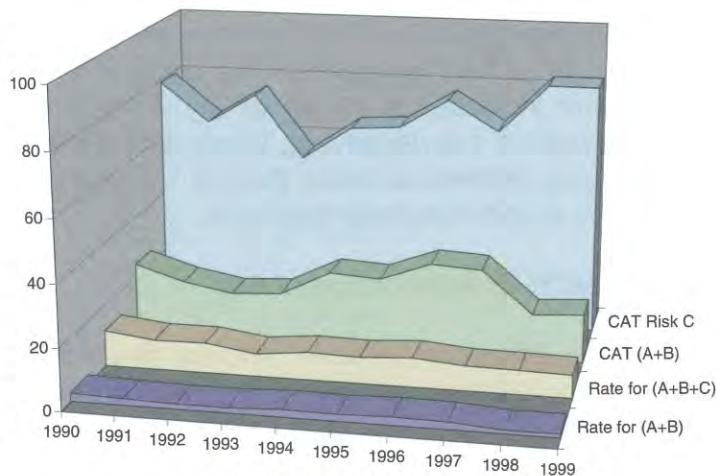
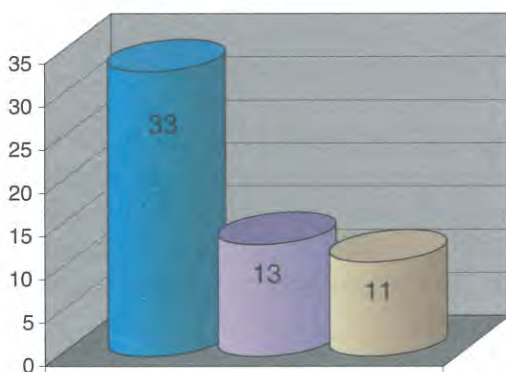


Figure 6: CAT Airprox rates

Table 4: CAT Airprox rates per 100,000 flying hours

CAT Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CAT Rate for (A+B)	2.69	2.17	1.69	1.76	2.49	2.26	2.69	2.46	1.20	1.21
CAT Rate for (A+B+C)	11.65	9.73	9.83	7.44	9.06	8.58	9.61	8.14	7.85	7.51

### CAT AIRPROX CAUSAL FACTORS



- Did not separate/poor judgement by controllers
- Level busts by pilots
- Unauthorised entry into CAS by GA/Mil pilots

Figure 7: Top three causal factors in Airprox involving CAT aircraft

During the assessment process, 123 factors were identified as the cause behind the 99 CAT Airprox incidents filed in 1999. Most factors were attributed either to pilots (53) or controllers (51), while the rest were spread between other miscellaneous categories (17) and system failures (2 only – both airborne).

*Fig 7 (left)* shows the top three reasons for encounters in which CAT aircraft were involved. More attention to these aspects by the specific sectors concerned could produce tangible safety improvements.

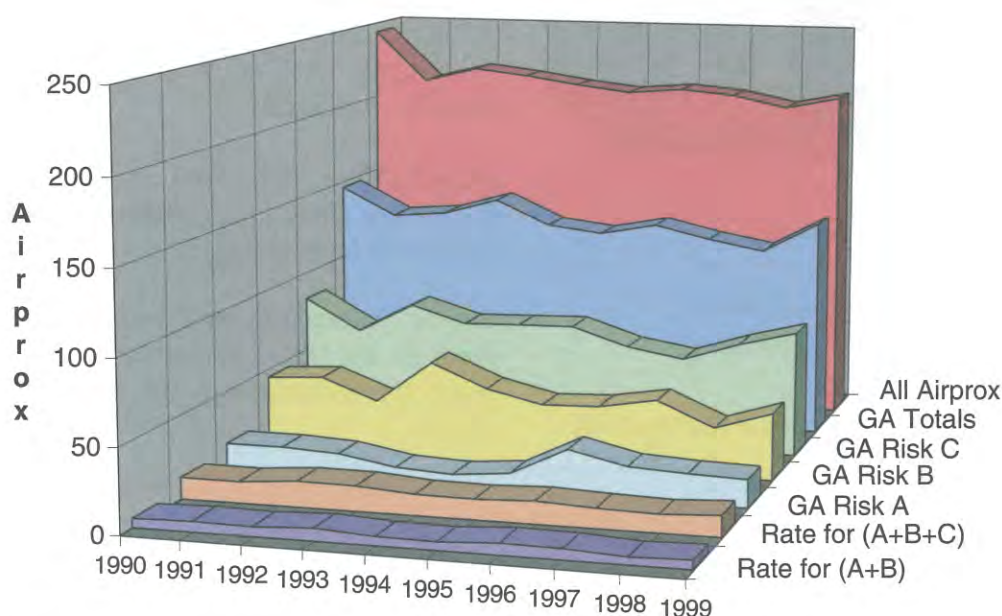
Mistakes by controllers (33 in thousands of movements) often happened in the 10 -15 min period after watch hand-over time, but not exclusively, or when moderate traffic levels prevailed once more after a busy period.

'Level busts' (pilots flying through their cleared level) still feature as one of the top causes.

The third group shows the adverse influence that mistakes by non CAT pilots can have.

## GENERAL AVIATION SECTION

In 1999 the GA Airprox total (135) rose above levels experienced in the preceding five years. Most cases were, however, assessed as 'no risk'. Moreover, the number of Risk B cases (41) fell squarely within the 30 – 60 band of incidents, which marked the limits recorded in earlier years. Finally, assessments concluded that the number of occasions where an 'actual collision risk' had existed (17) was very close to the previous year's figure (18). Factoring these results with GA hours flown in 1999 provides a 'rate'



**Rates show number of Airprox  
for every 100,000 hrs flown**

*Figure 8: GA risk distribution*

figure that can be used as a valid measure for comparison. Taking information from *Table 5 (below)*, the rate in 1999 (i.e. Airprox per 100,000 flying hours) for all GA incidents rose to 12.64. Similar inspection reveals that risk bearing cases moved up from 4.57 in 1998 to 5.47 in 1999. *Fig 8 (above)* allows a visual comparison to be made of rate results calculated over the last ten years; no deviations of any significance are evident.

*Table 5: GA risk data 1990 - 1999*

GA Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Rate for (A+B)	5.62	6.42	5.90	7.45	5.41	4.90	6.98	6.37	4.57	5.47
Rate for (A+B+C)	13.02	12.73	15.57	15.12	12.71	12.31	13.54	11.96	11.05	12.64
GA Risk A	18	18	16	10	8	11	28	20	18	17
GA Risk B	45	47	34	60	46	38	39	45	30	41
GA Risk C	83	64	82	72	73	74	63	57	68	77
GA Totals	146	129	132	142	127	123	130	122	116	135
Hours flown in K	1121	1013	848	939	999	999	960	1020	1050	1060
All Airprox	244	212	221	217	212	208	211	208	201	208

## GA AIRPROX CAUSAL FACTORS

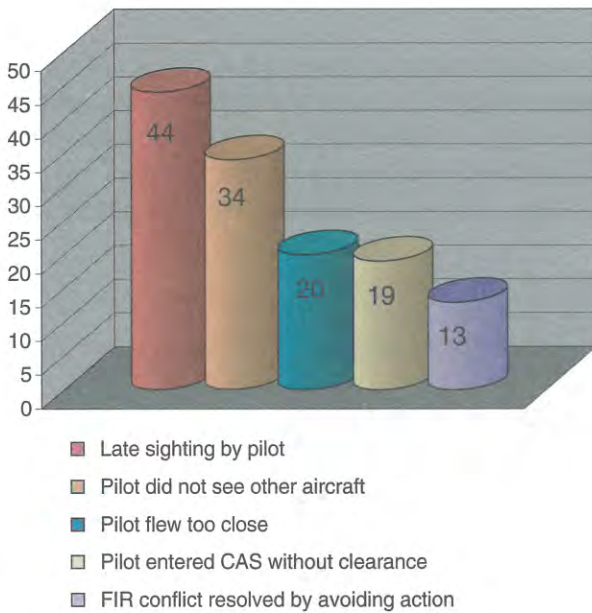


Figure 9: GA Airprox causal factors 1999

190 causes emerged from the 135 Airprox in which GA aircraft were involved and the most common ones are shown at Fig 9 (left). Ineffective 'lookout' was the largest single factor and accounted for 41% of all the causes in Airprox featuring GA aircraft.

The next most common cause was attributed to pilots 'flying too close' when passing another aircraft that has been seen. This could easily be rectified simply by giving a wider berth.

Unauthorised entry into controlled airspace by GA/Military pilots took fourth place as an unwelcome contributor to incidents.

Finally, straightforward encounters in the FIR, resolved by pilots, came fifth. This group has low significance compared with the other factors listed above.

## GA AIRPROX PROFILES

By way of interest, Fig 10 (right) illustrates in graphical terms what most aviators already know – that GA incidents correlate with the weather. All of the peaks show up in summer while lesser indications of 'early springs' and 'fine autumns' are also evident in some years.

GA flying hours by volume have not changed much over the last six years (see Table 5) and there seems every likelihood that this situation will persist. Therefore, it would be reasonable to expect that future patterns for GA Airprox will continue to form shapes similar to those shown opposite.

The answer to reducing these GA 'peaks' lies in tackling their cause, as listed above.

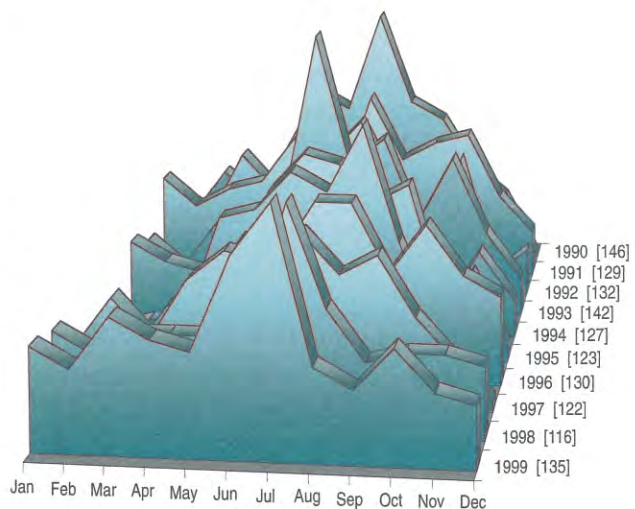
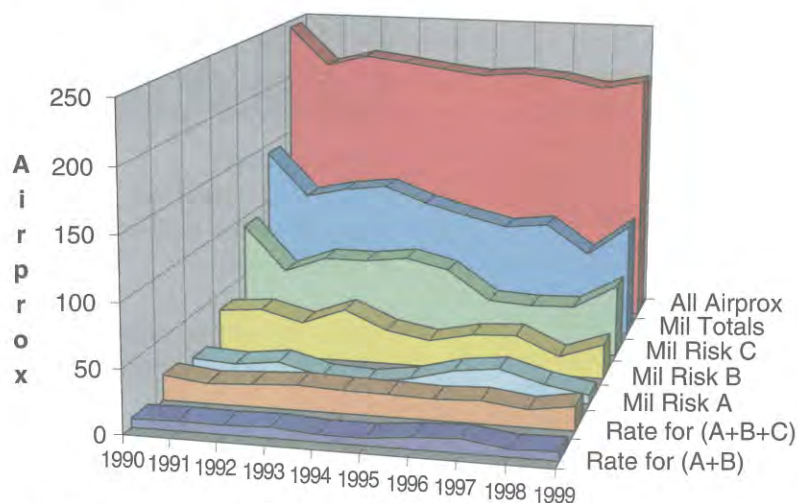


Figure 10: GA Airprox profiles

## MILITARY SECTION

Following a nine-year low of 68 incidents in 1998, Military Airprox numbers last year rose to 94. However, this level was still less than levels reached earlier in the decade. Despite the 'no risk' and 'safety compromised' figures for 1999 showing increases on comparable 1998 returns, this was against the trend for the whole ten year period, which has been a downward one (see Fig 11 below). Moreover, there was a significant fall in the number of cases where 'actual collision risk' existed. These came down from 13 to 7, the lowest number recorded for five years.



Rates show number of Airprox  
for every 100,000 hrs flown

Figure 11: Military risk distribution

Military flying hours continued short of the half million mark and this affected the rate of incidents per 100,000 hours. The overall involvement rate went up to 19.14, while the corresponding risk bearing rate (A+B) climbed to 7.13. Table 6 (below) lists for comparison all results during the last ten years.

Table 6: Military risk data 1990 – 1999

Military Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Rate for (A+B)	7.10	7.77	7.28	8.40	5.87	5.94	9.27	10.78	5.97	7.13
Rate for (A+B+C)	20.17	16.16	18.04	19.83	18.68	17.81	16.99	18.36	13.99	19.14
Mil Risk A	14	12	16	7	5	10	19	23	13	7
Mil Risk B	36	39	30	43	28	22	29	31	16	28
Mil Risk C	92	55	68	68	72	64	40	38	39	59
Mil Totals	142	106	114	118	105	96	88	92	68	94
Hours flown in K	704	656	632	595	562	539	518	501	486	491
Airprox Grand Totals	244	212	221	217	212	208	211	208	201	208



## MILITARY AIRPROX CAUSAL FACTORS

A total of 142 causal factors lay at the root of the 94 Airprox involving Military aircraft last year. Fig 12 (right) shows the top 4 reasons – all of the other causes had less than 10 examples in each group. Most encounters were with GA aircraft, so it is unsurprising to see the same factors appearing in both charts.

'Lookout' related causes led the field and figured prominently in some 37% of Military incidents. Next came straightforward conflicts in the open FIR, resolved safely by the pilots concerned.

The fourth most common cause reflects a feature of many incidents. These cases could easily be reduced if pilots were more sensitive to the concerns of other airspace users.

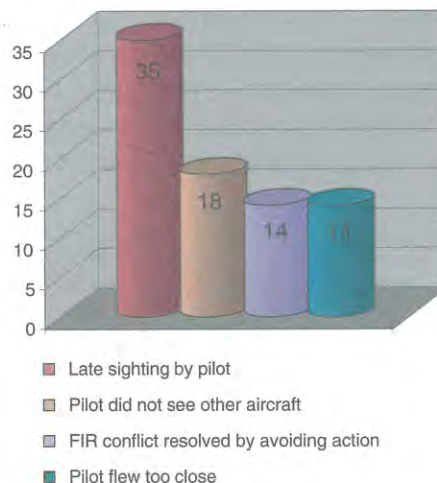


Figure 12: Military Airprox causal factors 1999

## MILITARY~GA ENCOUNTERS BELOW 2,000 FEET

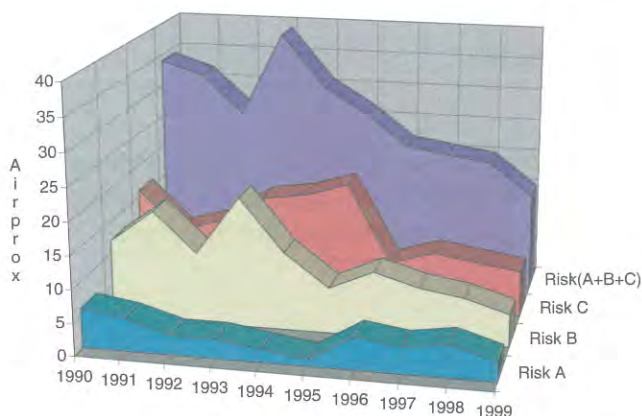


Figure 13: GA ~ Military risk distribution for Airprox in the UKLFS 1990 - 1999

The number of Airprox filed in the UK Low Flying System has been reducing gradually since 1990 and this trend continued in 1999. Last year's figures indicate a reduction of 25% compared with 1998, which at that juncture had seen the lowest returns of the decade. This welcome decline can be seen clearly from the profile for (Risk A+B+C) at Fig 13 (left). Similar downward trends are evident in the 'no risk' (Risk C) and 'safety compromised' (Risk B) profiles.

There were three cases where 'actual collision risk' existed (Risk A). This was lower than returns for each of the preceding three years (see Table 7 below).

Table 7: GA ~ Military risk data 1990 – 1999

GA~Mil Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cat Risk A	6	5	3	3	2	1	5	4	5	3
Cat Risk B	12	17	11	20	12	7	10	8	7	5
Cat Risk C	16	10	12	16	17	19	7	9	8	7
Totals:	34	32	26	39	31	27	22	21	20	15

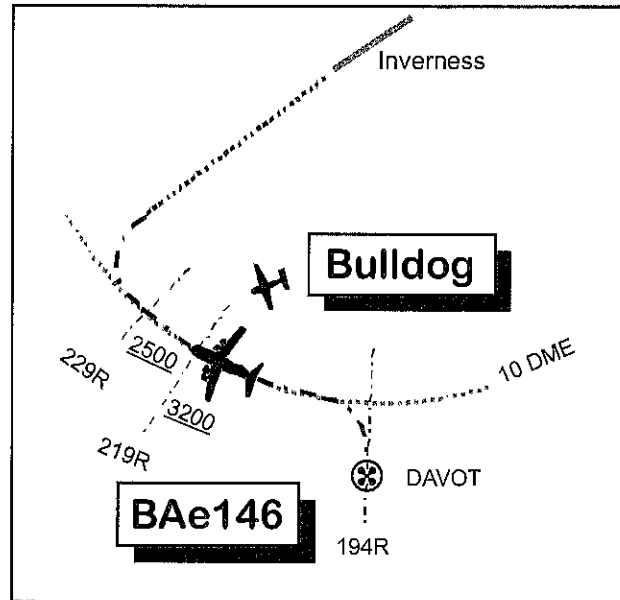
## GLOSSARY OF ABBREVIATIONS

AAA	Airfield Avoidance Area	CAT	Clear Air Turbulence
AAI	Angle of Approach Indicator	CAVOK	Visibility, cloud and present weather better than prescribed values or conditions
ac	Aircraft	CMATZ	Combined MATZ
ACAS	Airborne Collision Avoidance System	C/S	Callsign
ACC	Area Control Centre	CSC	Chief Sector Controller
ACN	Airspace Co-ordination Notice	CTA	Control Area
A/D	Aerodrome	CTR/CTZ	Control Zone
ADA	Advisory Area	DAAvn	Director Army Aviation
ADC	Aerodrome Control(ler)	DAT	Defence Air Traffic
ADCC	Air Defence Control Centre	D & D	Distress & Diversion Cell
ADF	Automatic Direction Finding Equipment	DF	Direction Finding (Finder)
ADNC	Air Defence Notification Centre	DFTI	Distance from Touchdown Indicator
ADR	Advisory Route	DH	Decision Height
ADRU	Air Defence Radar Unit	DI	Direction Indicator
AEF	Air Experience Flight	DME	Distance Measuring Equipment
AEW	Airborne Early Warning	DUA	Dedicated User Area
AFIS(O)	Airfield Flight Information Service (Officer)	EAT	Expected Approach Time
A/G	Air / Ground Operators	ERS	En Route Supplement
agl	Above Ground Level	FIC	Flight Information Centre
AGI	Air Ground Incident	FIR	Flight Information Region
AIAA	Area of Intense Aerial Activity	FIS	Flight Information Service
AIC	Aeronautical Information Circular	FISO	Flight Information Service Officer
AIS	Aeronautical Information Services	FMS	Flight Management System
a(m)sl	Above (mean) sea level	FONA	Flag Officer Naval Aviation
ALFENS	Automated Low Flying Enquiry & Notification System	FPS	Flight Progress Strip
AOB	Angle of Bank	GAT	General Air Traffic
APC	Approach Control(ler)	GCA	Ground Controlled Approach
APR	Approach Control Radar	GCI	Ground Controlled Interception
ARA	Airspace Restricted Area	GMC	Ground Movement Controller
ARP	Aerodrome Reference Point	HISL	High Intensity Strobe Light
ASR	Airfield Surveillance Radar	HLS	Helicopter Landing Site
ATC	Air Traffic Control	HMR	Helicopter Main Route
ATCC	Air Traffic Control Centre	HPZ	Helicopter Protected Zone
ATCO	Air Traffic Control Officer	HTZ	Helicopter Traffic Zone
ATCRU	Air Traffic Control Radar Unit	ICF	Initial Contact Frequency
ATIS	Automatic Terminal Information Service	IFF	Identification Friend or Foe
ATM	Aerodrome Traffic Monitor	IFR	Instrument Flight Rules
ATS (U)	Air Traffic Service (Unit)	IFTA	Instrument Flying Training Area
ATSA	Air Traffic Service Assistant	ILS	Instrument Landing System
ATSOCAS	ATSs Outside Controlled Airspace	IMC	Instrument Meteorological Conditions
ATSI	Air Traffic Services Investigations	JOI	Joint Operating Instruction
ATZ	Aerodrome Traffic Zone	KHz	Kilohertz
AWAC	Airborne Warning and Control	LARS	Lower Airspace Radar Service
AWR	Air Weapons Range	LAS	Lower Airspace Service
Awy	Airway	LATCC	London Area & Terminal Control Centre
BGA	British Gliding Association	LFA	Low Flying Area
BHAB	British Helicopter Advisory Board	LFC	Low flying Chart
BHPA	British Hang Gliding and Paragliding Association	LFS	Low Flying System
BINA ERS	British Isles/N America En Route Supplement	LHS	Left Hand Seat
BMAA	British Microlight Aircraft Association	LJAO	London Joint Area Organisation
CAA	Civil Aviation Authority	LOA	Letter of Agreement
CALF	Chart Amendment - Low Flying	LTMA	London TMA
CANP	Civil Air Notification Procedure	MATO	Military Air Traffic Operations
CAS	Controlled Airspace	MATS	Manual of Air Traffic Services
		MATZ	Military Air Traffic Zone
		mb	Millibar/s

MCTA	Military Control Area	TA	Traffic Alert (TCAS)
MCTZ	Military Control Zone	TANS	Tactical Air Navigation System
MEDA	Military Emergency Diversion	TBC	Tactical Booking Cell
MHz	Megahertz	TC	Terminal Control
MRSA	Mandatory Radar Service Area (Military Area)	TCAS	Traffic Alert & Collision Avoidance System
MSA	Minimum Safe Altitude	TDA/TRA	Temporary Danger or Restricted Area
MSD	Minimum Separation Distance	TFR	Terrain Following Radar
MTA	Military Training Area	TMA	Terminal Manoeuvring Area
MTRA	Military Temporary Reserved Airspace	TTA	Tactical Training Area
NATS	National Air Traffic Services	UAR	Upper Air Route
NDB	Non - Directional Beacon	UAS	Upper Airspace Service
NM	Nautical Mile(s)	UASRA	Upper Airspace Special Rules Area
NOTAM	Notice to Airmen	UDA	Upper Advisory Area
NVG	Night Vision Goggles	UDF	Ultra High Frequency Direction Finder
OAC	Oceanic Area Control	UDR	Upper Advisory Route
OACC	Oceanic Area Control Centre	UKAB	UK Airprox Board
OAT	Operational Air Traffic	UIR	Upper Flight Information Region
ODL	Opposite Direction Level	UKLFHB	UK Military Low Flying Handbook
OJTI	On-the-Job Training Instructor	USL	Under-slung Load
PAR	Precision Approach Radar	UTC	Co-ordinated Universal Time
PFL	Practice Forced Landing	VCR	Visual Control Room
PI	Practice Interception	VDF	Very High Frequency Direction Finder
PIC	Pilot in Command	VFR	Visual Flight Rules
PINS	Pipeline Inspection Notification System	VMC	Visual Meteorological Conditions
PTC	Personnel & Training Command	VOR	Very High Frequency Omni Range
QDM	Magnetic heading (zero wind)	VRP	Visual Reporting Point
QFE	Altimeter setting to give height above aerodrome or runway threshold	WIP	Work in Progress
QGH	Controlled descent through cloud	WRDA	Weapons Range Danger Area
QNH	Height above sea level (altitude)		
QSY	Frequency change		
QTE	True bearing		
RA	Resolution Advisory (TCAS)		
RAS	Radar Advisory Service		
RHS	Right Hand Seat		
RIS	Radar Information Service		
RNAS	Royal Naval Air Station		
RPS	Regional Pressure Setting		
RSO	Range Safety Officer		
RTF	Radio Telephony		
RVSM	Reduced Vertical Separation Minimum		
RWY,Rwy	Runway		
RVR	Runway Visual Range		
SAP	Simulated Attack Profile		
SC	Sector Controller		
SCH	Set Clearance Height		
ScOACC	Scottish and Oceanic Area Control Centre		
SID	Standard Instrument Departure		
SIF	Selective Identification Feature		
SMF	Separation Monitoring Function		
SRA	Surveillance Radar Approach		
SSR	Secondary Surveillance Radar		
STAR	Standard Instrument Arrival Route		
STC	Strike Command		
STCA	Short Term Conflict Alert		
SVFR	Special VFR		

**AIRPROX REPORT No 104/99**

Date/Time: 1 Jul 1012  
Position: N5728 W0413 (approx 7-10 NM S of Inverness Airport)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: BAe146 Bulldog  
Operator: CAT HQ PTC  
Alt/FL: 2900 ft ↓ 3000 ft  
(QNH 1011 mb) (RPS)  
Weather IMC CLBC VMC CLBC  
Visibility: 10 km+ 30 km  
Reported Separation: 0.5 NM, 300 ft  
Recorded Separation: NK



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

**THE BAE146 PILOT** reports descending into Inverness at 180 kt, cleared for the 10 DME arc for RW 06. Before joining the arc he was advised by Lossie radar of a Bulldog operating 7 NM SW of Inverness up to 5000 ft which caused him to comment that that was not a very sensible place to operate in view of the Inverness approach procedures. At 13 DME, just before joining the arc, he was handed over to Inverness TWR who advised him of the Bulldog operating to the SW, VFR. He turned onto the arc and descended in accordance with the procedure. After passing the 219 radial, just before turning onto finals, he broke out of cloud at 3200 ft to see a Bulldog 3-400 m away on his right, heading towards him at the same level. He disengaged the autopilot and turned to the left about 15°, increasing his rate of descent, to get away from the closing ac which passed behind and slightly above him. He considered the risk of collision was high and reported the incident to ATC. TCAS was not yet fitted to Company ac.

**THE BULLDOG PILOT** reports heading 240° at 110 kt on a dual general handling sortie, receiving a FIS from Lossiemouth on 119.35. He was at about 3000 ft when he saw the BAe146 in his 10:30 about 0.5 NM away, crossing left to right and some 300 ft above. It had been a late spot of a white ac against a

white cumulus background. Lossie informed him of the ac's position as it crossed ahead of him; he took no avoiding action as there was no confliction and no risk of collision.

**HQ MATO** reports that the Bulldog pilot was receiving a FIS from Lossiemouth Radar (LOS) on 119.35. The ac was operating to the S and SW of Inverness airport, at and below 5000 ft on the RPS 1007 mb and squawking 3722 with Mode C. (The ac was in Portree ASR; the Bulldog pilot's report states Orkney RPS, LOS' report states Portree RPS). At 1006:54 the BAe146 pilot established communications with LOS on the same frequency and was placed under RAS, following a radar handover from ScACC. The BAe146 was 26 NM SSW of Inverness, following ADR W4D and in descent to 5300 ft on the Inverness QNH of 1011 mb. At 1007:52, having just been further cleared to 4000 ft, the BAe146 pilot requested to conduct his approach to RW 06 via the 10 DME ARC procedure. LOS approved this and informed Inverness Tower (INV). At 1008:56, LOS advised the BAe146 pilot ".....there is eh Bulldog traffic operating VFR to the S, 6 miles to the eh, SW of Inverness" and the following exchange ensued;

BAe146 "That is copied c/s confirm 5000 ft?"  
LOS "Operating up to 5000 ft, eh a Bulldog"

146 "Roger, just confirm what range from Inverness?"  
 LOS "He's at 7 miles to the SW at the moment, but operating VFR"  
 146 "That's not a very good place to operate is it, right on the eh, ARC for the instrument approach procedure?"  
 LOS "I agree with you entirely but it is open FIR, he is flying VFR"

10 sec afterwards, at 1009:28, LOS advised the BAe146 pilot, "And for the procedure continue with Inverness 122.6. I'll advise the traffic of your position", and this was acknowledged. At 1009:57, LOS transmitted, "(Bulldog c/s) keep a good lookout, eh there is scheduled traffic inbound to Inverness from the SE positioning for the ARC procedure RW 06", but there was no reply. LOS made 2 further attempts to call the Bulldog pilot on RT before ringing INV at 1010:37, establishing contact with INV 20 sec later, "Have you got the (Bulldog c/s) with you", to which INV replied "...no he still hasn't called me yet". LOS then advised INV "No, he's not talking to me either", before adding at 1011:04, "I think he's right in the way of the (BAe146 c/s) but there we go, thanks very much". (Note: The INV transcript records all INV/LOS landline exchanges as occurring about 1 min later. INV advised the BAe146 pilot of the Bulldog's presence 30 sec after this landline exchange). LOS made 2 more attempts to call the Bulldog pilot before establishing contact at 1012:12, "Did you see the 146 go through your level?" The Bulldog pilot replied "c/s affirm, he was about eh 300 ft above us and about one mile to the east ....." At 1013:26, INV informed LOS by landline, "(BAe146 c/s)'s filed an Airmiss against that Bulldog to the SW."

Since 28 Jan 99, following previous incidents between military and civilian ac in the area, Lossiemouth ATC has assumed responsibility for the provision of radar services to ac departing from, and inbound to, Inverness airport. There is a substantial Letter of Agreement (LoA) between Inverness airport, RAF Lossiemouth and ScACC, which defines the procedures to be used by the 3 units when handling air traffic within a specified area around the airport. The recorded information

indicates that LOS complied with the requirements of the LoA for IFR inbound, which includes:

"Lossiemouth shall transfer the traffic to INV, once in receipt of a clearance to make an instrument or visual approach and when the ac is approaching 4000 ft QNH."

The LOS controller stated that the BAe146 was transferred to INV for the arc procedure just before it reached the reporting point DAVOT (193° INS/12 NM). At the point of transfer, the Bulldog was observed in a position about 5 NM S of Inverness. These positions were confirmed by the Lossiemouth Supervisor, who had a clear view of the Director's radar display whilst overseeing a busy recovery wave at Lossiemouth. Once the BAe146 had taken up the procedure, the Supervisor then concentrated on the Lossiemouth traffic situation and did not witness the Airprox. The arc procedure for RW 06 from DAVOT involves the ac turning L and flying a 10 NM DME arc until the 229° radial, from which the ac then turns R to intercept the 240° radial at 8 NM DME. Throughout, the ac is in a descent which intercepts the FAF (5 NM DME) at 1540 ft QNH. At the time of release to INV therefore, the procedure ensured separation from the Bulldog; the LOS controller was positive that the BAe146 was 'clean' and that the Bulldog did not constitute a confliction. On the procedure however, separation cannot be guaranteed from ac flying VFR and once the BAe146 was released, the Bulldog began to track SW towards the BAe146. DAVOT is 33 NM SW of Lossiemouth; it would not be practicable to continue RAS beyond this point as the ac would be descending out of solid radar cover.

While having no specific control over the Bulldog's activities, LOS undertook to advise the Bulldog pilot of the BAe146's position and had advised the BAe146 pilot of this intention. This was attempted, but no reply was received from the Bulldog pilot until after the Airprox had occurred. The Bulldog pilot's report states that he did not hear or receive any RT regarding the other ac, apparently not hearing the RT exchange between LOS and the BAe146 pilot

at 1009 concerning his ac's proximity to the instrument approach procedure.

The position of the Airprox is uncertain; it occurred below recorded radar coverage. The Bulldog pilot's report gives the position as 212° T (219° M)/7 NM from Inverness; 3 NM from the published track of the arc procedure. The BAe146 pilot's report places the BAe146 on the procedure at about 219° from Inverness, just prior to the final turn, but heading 340°.

It is not known how extensive a briefing is provided to Bulldog detachments operating out of Inverness, but it is believed unlikely that a pilot would consciously place himself in the vicinity of an active Instrument Approach Procedure. Following this Airprox, RAF Lossiemouth has written to the HQ of the Bulldog operators, highlighting the nature of operations around Inverness and the difficulty experienced when integrating scheduled IFR traffic to/from the airport with VFR traffic in the local area.

**HQ PTC** comments that there is disparity of perception between the 2 pilots' reports in this case; one under VFR and manoeuvrable and the other under IFR and not. Without the benefit of a radar plot it cannot be established whether the Bulldog pilot's position was inaccurate or the BAe146 was substantially inside the 10 NM arc. However, the fitment of TCAS might ease concerns for those required routinely to carry out IFR procedures in Class G airspace.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies and reports from the appropriate ATC and operating authorities.

This incident provoked a wide ranging discussion, largely because of the lack of a radar recording to show what actually happened and more importantly, where. An airline pilot member explained that the 10 DME

arc procedure was a tight one to fly properly. He said that if a turn was started at Davot the ac would usually end up inside the 10 NM arc, unless the turn was begun early or the crew already had the speed well back. It was suggested that Lossiemouth radar controllers might bear this point in mind while assessing potential clearance from VFR traffic, if not already aware of it.

Members wondered why the Bulldog pilot had apparently not heard any of the RT discussion about the unsuitability of his location, or LOS's calls directly to him. One thought that over-use of the mute switch might explain it. There was no direct evidence of this but nevertheless the Board considered it a point to bear in mind when receiving an ATS. Members also thought the Bulldog pilot would have been better advised to have asked for a RIS, but it was possible that he may have been unaware of the significance of the 10 DME arc procedure with RW 06 in use at Inverness. This raised a question on the content of any ATC brief the Bulldog Sqn may have received at the start of their detachment at Inverness, and the Chairman asked the HQ PTC representative if he would check to ensure that this topic was properly attended to on such detachments to non-RAF airfields.

Members also suggested that the BAe146 pilot had some responsibility for the encounter in that he was warned about the Bulldog operating close to the procedure's flight path, but chose to continue nonetheless. Airline members asked what else he could have been expected to do, apart from continue to the INV and carry out a more protracted procedure from there. Members concluded that such decisions were a matter of judgement for pilots to make, but having been warned about the Bulldog, the BAe146 pilots should not have been surprised subsequently to see it.

The Board also discussed the ATC aspects of the incident. Because the 10 DME arc procedure takes an ac close to the lower limits of and eventually out of Lossiemouth's radar cover, under the LOA the radar service is terminated at 4000 ft (in the Davot area) and ac

are transferred to Inverness. However, members suggested that there was some room for common sense and liaison between LOS and INV to vary this if there was other traffic, such as the Bulldog, in circumstances such as those pertaining in this incident. While LOS had judged before handover that the Bulldog would not conflict with the BAe146, it had turned out otherwise. At the same time there was little room for LOS to have altered the BAe146's track away from the procedure, for terrain clearance reasons. The Board came to no conclusions on this point.

In the end, members concluded that the incident could only be classed as a conflict of flightpaths in Class G airspace between IFR and VFR traffic. Both ac were fully entitled to be operating as they were in the area, although the wisdom of doing so could be questioned. Moreover, both crews were in a 'see and avoid' situation and saw each other in time to ensure there was no collision. It did not appear that there was ever a risk of the ac actually colliding; when first seen, the Bulldog was abeam the much faster BAe146 and could not have caught up with it.

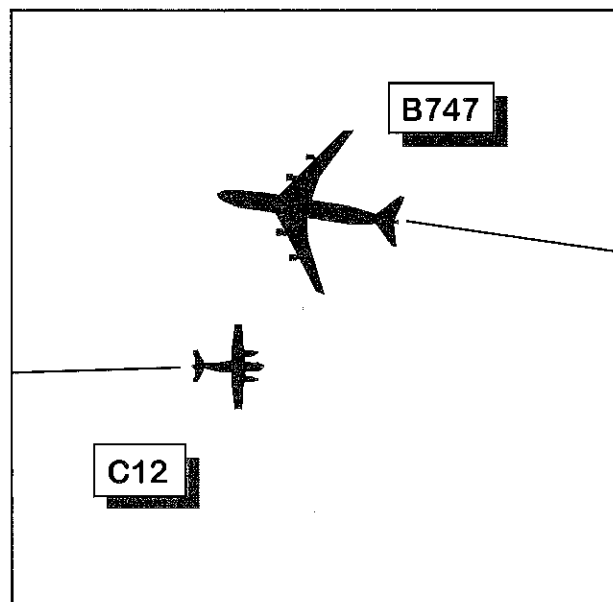
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Conflict of flightpaths in Class G airspace.

**AIRPROX REPORT No 106/99**

Date/Time: 1 Jul 1008  
Position: N5217 E0021 (2 NM NW of Newmarket)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: B747 C12  
Operator: Civ Comm Foreign Mil  
Alt/FL: 2000 ft 3000 ft  
(QNH 1014 mb) (QNH)  
Weather IMC IICL IMC  
Visibility:  
Reported Separation: 200 ft V, 200 ft H  
Recorded Separation: 0.2 NM, 600 ft V



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

**THE B747 PILOT** reports heading 290° at 190 kt in broken cloud while making an approach to Cambridge RW 23; he was on an intercept heading, level at 2000 ft and receiving a service from Cambridge ATC. Cambridge warned him of traffic 12 o'clock at 5 NM and at about that time TCAS indicated traffic 1000 ft above but

descending. A TCAS descent was commanded and complied with by the FO and in the descent he saw a Beech Kingair through a break in the clouds. It appeared to be about 200 ft above and 200 ft to the left, going in the opposite direction.

**THE C12 PILOT** reports being unaware of the incident at the time. He was asked about it 3 weeks later and, with the aid of RT transcripts, recollected that he had been en route to Mildenhall and had been cleared to a lower level when crossing the Westcott RC. When clear of the corridor he was cleared to 3000 ft and due to the short distance to Mildenhall, descended rapidly. In doing so he overshot his cleared level of 3000 ft by about 100 ft and corrected quickly to 3000 ft. He could not remember being given any traffic information at the time by London Mil or Lakenheath Approach.

**ATSI** reports that the B747 was being vectored by the Cambridge approach radar director in class G airspace for an SRA approach to RW 23 at Cambridge Airport. The flight had been cleared to 2000 ft and turned onto a heading of 060° for identification and positioning. The controller had also issued a limitation warning on the RAS that is required when using the Plessey 424 Radar equipment: "*Limited RAS due to limitations with this runway approach aid, separation from other traffic cannot be guaranteed*". Cambridge is not SSR equipped, however, in accordance with local instructions, the controller issued the flight a designated SSR code for the benefit of adjacent ATC Units, in particular Lakenheath. A Letter of Agreement (LOA) exists between Cambridge and RAF Lakenheath, part of which requires Cambridge to "Notify Lakenheath approach whenever radar approaches are being accomplished at Cambridge and if possible, the number or duration of these approaches." On this occasion it appears that Cambridge ATC did not notify Lakenheath about the B747's flight details.

Shortly after the flight had been turned onto left base-leg, the controller called a pop-up contact in the "1 o'clock, range 4 miles, if not sighted turn left heading 260". Avoiding action was also passed. The pilot reported seeing a contact on TCAS against which he then reported conducting a "TCAS descent". A visual sighting was then achieved during which the pilot stated the traffic was "*a twin going over the top a King Air*". This traffic was subsequently found to be

the C12 inbound to Mildenhall and believed to be level at 3000 feet, but which appeared to have descended below that level. At the time of the encounter Lakenheath RAPCON spoke to the Cambridge Approach (non-radar) controller in an attempt to co-ordinate.

Investigations suggest that Cambridge's failure to notify Lakenheath about traffic for a radar approach may not have been an isolated event as, it appears, traffic information is not routinely exchanged between the two units. Consequently, the appropriate Inspector of ATS (Southern) was asked by ATSI to discuss the subject with the Cambridge SATCO. The subsequent meeting prompted the issue of an operational notice to ATC staff reminding them to adhere to the LOA with regard to co-ordination. Also, an assurance was obtained that the SATCO would discuss with Lakenheath the current LOA and explore whether any changes needed to be made.

Note: LATCC radar recordings show the incident clearly. The B747 is steady at 2000 ft, tracking 280° and the C12 is in a descent, on a converging track of 087°. Its descent rate between 4400 ft and 3100 ft is 1400 ft/min which is continued down to 2600 ft where it passes 0.2 NM S of the B747. As it levels before climbing back to 3000 ft, the B747 starts its TCAS descent.

**HQ 3 AF** comments that investigation was hampered by the departure of the Lakenheath controller concerned from the UK and USAF, and a 15 day RT recording cycle due to a shortage of tapes. FPSs and the watch manager's recollections indicate that the C12 was accepted from London Mil, provided with a RIS and cleared to descend to 3000 ft; the controller may have seen the B747's 4656 squawk and assumed it would maintain 2000 ft in the Cambridge instrument pattern. Co-ordination with Cambridge was attempted but not achieved and the supervisor believes that Cambridge did not notify him that the instrument pattern was active as called for in the LOA between them. The Lakenheath controller does not appear to have passed traffic information about the B747 to the C12 pilot.



**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

A crucial factor in this Airprox was the limited capability of the Cambridge radar which did not allow the controller the option of avoiding the C12 or of prompting him to call Lakenheath to co-ordinate the 2 movements. However, the LOA, had it been adhered to, would have achieved the same object. If the C12 pilot had been advised that his descent to 3000 ft was co-ordinated with IMC traffic at 2000 ft, he might

therefore have paid more attention to his level out at 3000 ft and thus not triggered an RA in the B747's TCAS.

Some members suggested that in class G airspace, 500 ft of vertical separation was adequate and that the incident was no more significant than a 'TCAS event'. However the view prevailed that in IMC under a RIS the C12 pilot should have advised the controller of his departure from 3000 ft, and that his departure from this level was the cause of the Airprox. The Board noted that the C12 had dipped 400 ft below 3000 ft before regaining the cleared level. This resulted in a vertical separation of 600 ft. The existing lateral separation was some 400 yd and the Board concluded that there had not been a risk of the ac actually colliding.

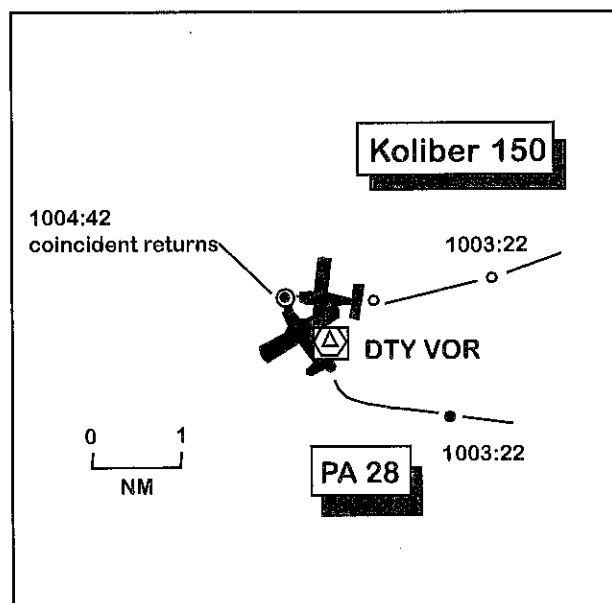
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The C12 pilot descended below his cleared level.

**AIRPROX REPORT No 107/99**

Date/Time: 8 Jul 1005  
Position: N5211 W0108 (-75 NM NW DTY VOR)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Koliber 150 PA28  
Operator: Civ Pte Civ Club  
Alt/FL: 2000 ft n/k (QNH)  
Weather VMC NO CLOUD VMC NO CLOUD  
Visibility: 25 km >10 km  
Reported Separation: 0 ft V/100-150 ft H  
Recorded Separation: returns merged



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

**THE KOLIBER PILOT** reports that he was flying from Seething to Halfpenny Green in VMC. There was no cloud, visibility was 25 km and cockpit workload was low. His ac is predominantly white with blue stripes, and he had a rotating red light on the tail. He was squawking 7000 (no Mode C fitted) and listening out with Birmingham ATC prior to calling them for a FIS and transit clearance. When about 3 NM WNW of the DTY VOR, heading 290° at 100 kt and level at 2000 ft on the Lakenheath QNH, he saw a low-wing single engined ac, white/deep blue in colour, as it crossed his track from L to R in level flight 100 – 150 ft away, at exactly his altitude. There was no time to take avoiding action and he thought that there had been a major risk of collision.

The pilot comments that he had not seen the other ac despite maintaining a good lookout; it was possible that it had been concealed by the Koliber's window frame. Also, vision was further reduced by a large number of squashed insects which had collected on the windscreen during the course of the flight. He was sure that the other pilot did not see him until very late, if at all. It was a very sobering experience.

**THE PA28 PILOT** did not complete a standard Airprox report, but instead sent a letter to AIS (Mil) via his CFI confirming that he departed for Manchester Barton from Denham at 0930 on the day in question. His speed was about 100 kt, there was no cloud and visibility was good. He was accompanied in the cockpit by a passenger who was a very experienced pilot.

Having initially obtained a FIS from Cranfield, he called Coventry for a similar service when overhead Daventry and setting course towards Lichfield. He no longer possessed the flight plan for the flight but thought that his ETA for DTY would have been about 1005. Neither he nor his co-pilot recalled seeing any other ac close enough to cause them concern. He subsequently called Birmingham ATC for a service when over Nuneaton.

UKAB Note: A replay of the LATCC radar shows a return, believed to be the PA28, leaving the Denham area at 0937:25, squawking 7000. The ac is tracked on radar towards the NW and at 1000 is about 10 NM SE of DTY. At the same time another 7000 return, believed to be the Koliber, can be seen tracking towards DTY about 10 NM to the E. At 1002:55 the PA28 turns L towards DTY which puts the 2 ac on converging tracks; at this point they are about 2 NM apart. At 1004:08 the PA28 turns R over DTY onto a northerly heading, with the Koliber at its 2 o'clock 1 NM tracking from R to L. The ac continue to converge, now almost at right angles, and at 1004:42 their returns merge 0075 NM NW of the DTY VOR.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

In the reported circumstances the PA28 pilot was required to give way in accord with the 'Rules of the Air'. The Board noted that the predominately white colour scheme of the Koliber 150 did not aid visual conspicuity. However, in full VMC, with excellent visibility and the marked absence of cloud a GA member was dismayed at the apparent non-sighting of the Koliber by the PA28 pilot, especially with a very experienced pilot occupying the RHS. This Airprox is a prime example of the need to exercise a vigilant all-round lookout when flying VFR in Class G airspace, especially when routing overhead a VOR at a commonly used transit altitude. Whilst noting the possibility of obscuration caused by the cockpit window frame and insect debris, members were similarly concerned at the late sighting of the PA28 by the reporting Koliber pilot. Consequently, the Board unanimously concluded that this Airprox resulted from a breakdown in effective lookout; the PA28 pilot did not see the Koliber at all and a late sighting of the PA28 by the Koliber pilot. Turning to risk, it was clear from the Koliber pilot's report that this was a close encounter, as evinced by the

radar recording, with little opportunity for avoiding action. Therefore, the Board concluded that there had been a risk of collision.

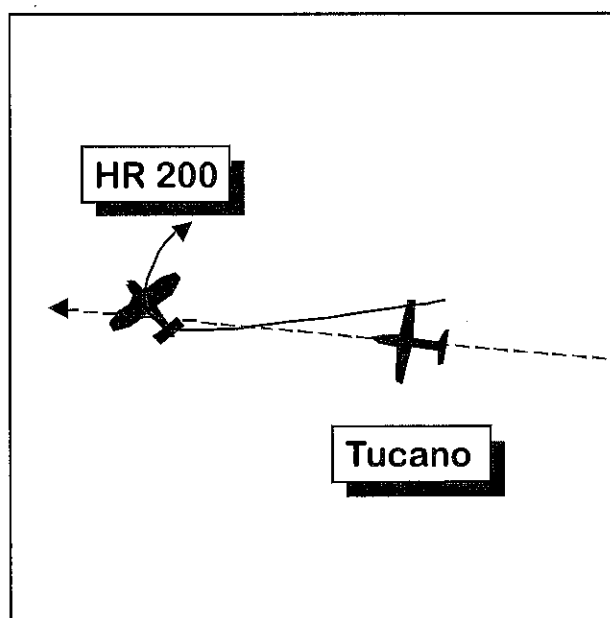
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: The PA28 pilot did not see the Koliber and a late sighting of the PA28 by the Koliber pilot.

### **AIRPROX REPORT No 108/99**

Date/Time: 8 Jul 1027  
Position: N5402 W0145 (7 NM NW of Harrogate)  
Airspace: FIR/LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Robin HR200 Tucano  
Operator: Civ Trg HQ PTC  
Alt/FL: 2000 ft 250 ft  
 (RPS 1031 mb) (msd)  
Weather VMC CLBC VMC CLBC  
Visibility: 30 km 8-10 km  
Reported Separation: 250 ft/250 ft  
Recorded Separation: NK



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

**THE ROBIN PILOT** reports heading NE at 95 kt on a general handling sortie, receiving a FIS from Leeds, when he saw a Tucano as it was about to pass underneath on a westerly heading. He held his attitude until he saw it reappear having passed 250 ft beneath with a high risk of collision.

**THE TUCANO PILOT** reports heading 275° at 240 kt on a low level sortie with a student in the front seat. While at 350 ft agl the student saw a light ac 1 NM ahead slightly above and moving left to right. The student immediately moved left to go behind it and adjusted the height to 250 ft. The crew of the light ac gave no indication of having seen them and he watched it into his 5

o'clock. There was no risk of collision; he considered the student acted correctly and had done well to spot the light coloured ac against the cloud backdrop.

Note: LATCC radar recordings show the HR200, identified from its Leeds Bradford squawk, and the Tucano, identified from its track and departure time from Linton. The HR200 is tracking W as the Tucano approaches in its 6:30 and the HR200 starts to turn right as the Tucano passes beneath it by 200 ft Mode C. (1500, 1300 ft Mode C. 1500 ft Mode C equates to 1900 ft QNH; the terrain is about 1000 ft amsl.)

HQ PTC comments that the Tucano was carrying out a properly authorised low-level sortie IAW the UKLF regulations. The student saw the Robin (possibly from within its blind arc) at a respectable distance and took action to ensure safe separation from it. With hindsight, a more obvious manoeuvre to achieve greater lateral separation could have indicated to the Robin pilot that he had been seen.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, and reports from the appropriate operating authorities.

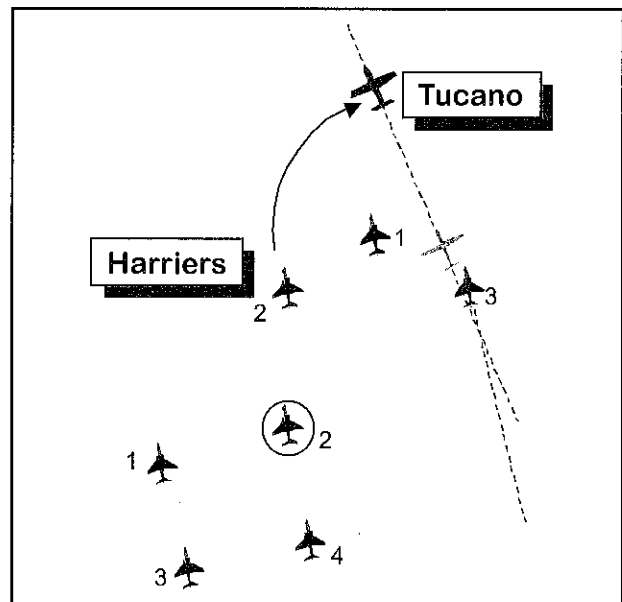
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Tucano pilot flew close enough to the Robin to cause its pilot concern for the safety of his ac.

**AIRPROX REPORT No 109/99**

Date/Time: 9 Jul 0951  
Position: N5502 W0213 (6 NM NW of Hexham)  
Airspace: LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tucano Harrier  
Operator: HQ PTC HQ STC  
Alt/FL: 250 ft 410 ft (agl) (Rad Alt)  
Weather VMC CLOC VMC CLBC  
Visibility: 10 km 25 km  
Reported Separation:  
 100 ft/150-200 ft, 500-1000 ft H  
Recorded Separation: 200 ft



It appeared that the Tucano pilot's memory of this particular sortie was not all that clear in terms of the height he was flying at as he encountered the Robin. The radar confirmed the Robin pilot's view that the Tucano passed close below and almost directly beneath him. There was sufficient room for the Tucano to manoeuvre and members agreed that, if it was 1 NM ahead when seen, the Robin should have been given a wider berth. The Board concluded that the cause of the incident was that the Tucano pilot had flown close enough to the Robin to cause its pilot concern for the safety of his ac. However, the Board accepted that having seen it the Tucano pilot was always in a position to ensure that he would not collide with it.

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

**THE TUCANO PILOT** reports heading 350° at 210 kt on a dual low level exercise in a red and white Tucano. Exiting the Hexham flow he saw a Harrier in his 8 o'clock and quickly ascertained that it was one of a 7 ac formation closing from the S and turning right. What looked like the LH Harrier of the lead section passed directly above by about 100 ft and the rest crossed L to R behind him. He remained level and below them to keep them in sight; at most there had been a slight risk of collision. He was not absolutely certain which Harrier of the formation had come closest to him; being at a similar level, parallax prevented him from accurately analysing the formation disposition; however it appeared to be one of the first section. None of the Harriers took any noticeable avoiding action.

**THE HARRIER PILOT** reports heading N at 420 kt on a low level exercise as No 2 (ringed in the diagram) of the second section of a 7 ac formation. The leader spotted a Tucano and called it to the rest of the formation; he saw what he thought was a black Tucano and assessed it was no threat. During the formation turn he saw a red and white Tucano crossing right to left below him; he tightened his turn and passed 500-1000 ft behind it and 150-200 ft above it; the risk of collision was nil.

UKAB Note: LATCC radar recordings show the large formation of Harriers tracking 340° in the wake of a separate 7001 squawk and overhauling it. The leading RH Harrier crosses left to right at a shallow angle behind the 7001 and passes it close on its right and 100 ft above. A few seconds later the leading LH Harrier, performing a cross-over turn to the right, passes 100 ft over and slightly behind the 7001 and then descends sharply, presumably to clear his leader's wake. The radar picture is confused in that no 2 sweeps display the same No of ac, and the picture is complicated by the Harriers crossing over in their turn as they pass the Tucano. All 4 ac of the following Harrier section would have passed clear more than 2 miles behind the 7001 squawk which is the reporting

Tucano if they had maintained the disposition shown in their diagram (reproduced above). However, during some of the radar sweeps it appears that the No 2 of the second section may have moved forward just prior to the turn and could have been involved in the lead section's encounter with the Tucano. Another possibility is that the Tucano seen by the Harrier pilot was another (untraced, non squawking) one intermittently seen on radar some miles astern of the reporting ac, which leaves the possibility that the pilots in the leading section did not see the reporting Tucano. When they were asked some months later, they agreed they had seen one Tucano which they did not consider posed a risk of collision.

**HQ PTC** comments that both the Harrier and Tucano pilots seem equally sanguine that this encounter, although close, bore little risk as both saw each other sufficiently early for more radical manoeuvring, had it become necessary. However, the radar replay seems to suggest that a second Harrier came equally close to the Tucano without seeing it. The confusion as to the Tucano's colour also suggests that this incident might not have been as simple as it first looked.

With the increased necessity to exercise such large packages, we welcome the enhanced notification measure being evolved by ALFENS Ops and its masters.

**HQ STC** comments that the Harrier pilot, in contrast to the Tucano pilot, did not consider the event to be significant and so there is clearly some doubt as to which 2 ac were involved in this Airprox. The Harrier pilot did take what he considered to be positive avoiding action on at least one Tucano around the time of the subject incident; it is disappointing, however, regardless of exactly which Tucano he was avoiding, that he passed close enough to cause concern to the pilot of the other ac. Given the weather conditions at the time, additional manoeuvre in the vertical plane was perfectly feasible and would have emphasised his intention to avoid the Tucano. Lateral separation alone is seldom sufficient to placate all parties, particularly in the dynamic low level environment.

MOD IFS (RAF) has, through FEEDBACK, emphasised the requirement for crews to make a positive effort to maximise separation between ac operating in the open FIR. After establishing visual contact with conflicting traffic, as wide a berth as feasibly possible should be given even when operators perceive there to be no actual risk of collision.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, and reports from the appropriate operating authorities.

The Board discussed whether or not the Harrier pilot who had supplied a report (ringed in the diagram) was the one who had come closest to the Tucano. If he had remained in his formation position until the start of the turn, then he would have passed nearly 2 NM behind the Tucano, which came into conflict with the leading section of 3 Harriers. Members thought it unlikely that he would have moved forward (he would not have been able to make up the distance in the short time from where he was seen on radar to be in the position described in his report.) It seemed to the Board therefore that the Harrier pilot saw either the reporting Tucano or another one and passed a reasonable distance from it.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: A Harrier had flown sufficiently close to the Tucano to cause its pilot concern for the safety of his ac.

However, the flightpath seen on radar of the No 2 (LH) Harrier of the leading section matched the reporting pilot's description of events, and the radar recording, and it certainly passed very close in plan and elevation to the Tucano. Before that, the leading section right hand Harrier had passed very close above and to the right of the Tucano before reaching his turning point. It had not been possible to find out from the leading section wingmen where the Tucano which they saw was in relation to their turning point; because there was an element of doubt about the identity of the Harrier concerned, the Board concluded that the cause of the Airprox was that a Harrier had flown sufficiently close to the Tucano to cause its pilot concern for the safety of his ac. Members endorsed the comments in the IFS 'Feedback' (22-99) about fast jets giving a wide berth to conflicting ac, and added that vertical avoidance was an easy and often overlooked option at low level. It was also acknowledged that the leading section's 0No 2 Harrier pilot may not have seen the Tucano at all and may not have taken avoiding action for this reason. While this suggested a very dangerous situation, the Board assessed that there had not been a risk of collision because the Tucano pilot, whose lookout to the rear was clearly to be commended, had seen all the ac in time to be in a position to take avoiding action had it become necessary.

## AIRPROX REPORT No 110/99

Date/Time: 8 Jul 1145  
Position: N5326 W0418 (1 NM E LYNAS)  
Airspace: Airway B1 (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: ATP B737-200  
Operator: CAT CAT  
Alt/FL: FL 160 FL 150

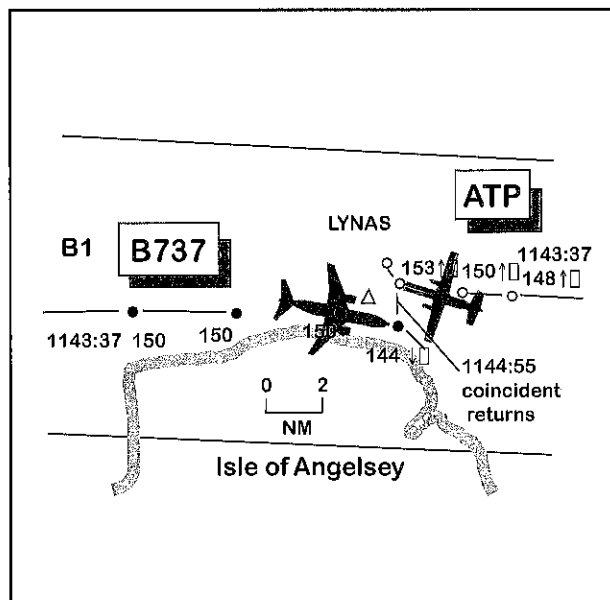
Weather VMC VMC  
Visibility: 10 km 50 km  
Reported Separation: 2 NM / not seen  
Recorded Separation: 1.5 NM H/900 ft V

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

**THE ATP PILOT** reports that he was climbing to FL 160 on a heading of 280° under the control of Manchester radar on 125.1. The visibility was over 10 km in VMC. When passing FL 153, ATC instructed him to turn R onto 010° and he heard them tell another ac to turn R onto 180°; the other ac was then seen to pass about 2 NM to his L at a similar level in the opposite direction. He thought there had been a high risk of collision. ATC subsequently told him on the telephone that separation distances had been about 108 NM and 200 – 300 ft.

**THE B737 PILOT** reports that he was cruising at FL 150 and heading 090° at 400 kt, about 50 NM W of Wallasey. He was receiving a radar control service from Manchester on 125.1 and squawking with Mode C. The visibility was 50 km in VMC. ATC instructed him to turn R onto 150° and then to descend immediately to FL 110. Neither he nor his co-pilot saw another ac.

**ATSI** reports that the Manchester W Sector Radar Controller was in position about 15 min prior to the incident. He described his workload as medium. He was operating with an inexperienced trainee, who was at the unit to gain experience prior to commencing an Area Radar course. The presence of the trainee, he explained, was a distraction and, in his opinion, a major contributory factor to the Airprox.



When the controller concerned took over the W Sector, the ATP was climbing to FL 160 direct to Wallasey (WAL). He confirmed that the ac's FPSs, correctly annotated, were in position on the display. He could not recollect whether those for the B737 were displayed at the time but he believed, according to its ETA at Liffey, it was likely that they were in place. The controller explained that his trainee had been operating the RT for about 10 min when the B737 contacted the frequency, reporting maintaining FL 150 direct to WAL. He commented that around this time, with the number of transmissions increasing, he was having to instruct his trainee what to say. At his suggestion, the trainee acknowledged the B737's initial call with "Roger". In the ensuing period he discussed the operation of the sector with his trainee, to the extent that he did not monitor the radar display as much as he would have done had he been operating alone. He added that, inexplicably, he believed the ATP was maintaining FL 160 and, consequently, was separated from the B737. The FPS did not indicate that the ATP had reached its cleared level because the arrow in the level box, which indicates that a climb clearance had been issued, had not been annotated with a line through it (the recognised method of showing an ac reaching its cleared level). The controller confirmed that he did not always carry out this strip marking.

The Radar Controller said that at 1144, during a routine scan of his radar display from his position behind the trainee, he noticed the ATP's SSR Mode C return was showing the ac at FL 150. Taking a few seconds to assimilate this information and to stand up in order to switch the transmitter to his headset, he instructed the ATP to turn R heading 010°. Although he did not use the term 'avoiding action' to the ATP, he did use it in his next transmission to the B737. The latter was given a R turn heading 180° followed by immediate descent to FL 100. As soon as the B737's pilot replied to the last instruction, the ATP pilot reported visual with the traffic. Consequently, the controller said, traffic information was not passed to either flight. He commented that the STCA did activate during the incident but only after he had started the remedial action.

The MACC MATS Part 2, Page WEST 1-10, states that: "A traffic orientation scheme (TOS) exists whereby all westbound traffic at MACC levels will be positioned on the north side of B1 and all eastbound traffic will be positioned on the south side of B1". The Radar controller said that, because of the trainee's presence and the fact that the traffic loading on the airway was not high on this occasion, the ac were left on their own navigation. Consequently, this placed them in the centre of the airway, thereby increasing the risk of a head-on encounter.

Radar photographs of the incident reveal that the ATP did not maintain at least 500 ft per minute during its climb to FL 160. The UK AIP, Page ENR 1-1-3-1, Paragraph 2.1.1 states that: "In order to ensure that controllers can accurately predict flight profiles to maintain standard separation, pilots of aircraft commencing a climb or descent in accordance with an ATC clearance should inform the controller if they anticipate that their vertical speed during the level change will be less than 500 feet per minute or, if at any time during such a climb or descent, their vertical speed is in fact less than 500 feet per minute". The RT recording confirms that no mention was made by the pilot of the ATP about the ac's climb performance.

Following the incident it was discovered that the B737's FPS had been placed in the wrong coloured holder. Westbound and eastbound flights are delineated at MACC by placing the former in blue holders and the latter in orange ones. It is open to conjecture whether this was a contributory factor to the Airprox, especially as the Radar controller said that he was aware of the B737's flight details.

UKAB Note: Pictures of the LATCC radar show the ac as they converge from opposite directions on a point about 1 NM E of LYNAS; the B737 has about 4 NM to run to LYNAS from the W and the ATP 2.5 NM from the E. At this point, the B737 is level at FL 150 and the ATP is climbing through FL 148. At 1144:55 the ac pass each other by 1.5 NM with the ATP indicating FL 153 climbing, and the B737 FL 144 having just commenced a descent. Both ac are just beginning turns to the R but these do not significantly enhance lateral separation.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members noted the low experience level of the trainee and wondered whether it had been wise to allow him to take control of the position. ATCO members said that this was always a difficult judgement to make but RT experience was absolutely essential, especially in the early stages of training, and controllers made every effort to accommodate trainees whenever possible. However, there was no doubt that this could be distracting on occasions and controllers had to be ready to intervene and resolve a situation quickly if the need arose. In view of the trainee's inexperience in this case, ATCO members felt that the mentor should have made a particular point of emphasising the traffic orientation scheme requirements of the MATS Pt 2 to ensure that the ac at MACC levels were given appropriate north side and south side tracks on the airway.



Noting that the ATP was handed over as climbing to FL 150 by the previous controller, an ATCO member said that ATPs had a notoriously slow rate of climb and so the viability of the climb clearance was, at best, questionable. An airline member agreed, but added that this did not absolve the ATP's pilot from telling the controller that he was unable to meet the minimum vertical speed requirements.

Although the mentor apparently did not feel the placing of the B737's strip in the wrong coloured holder was of any great consequence in this incident, ATCO members said that colour coding was a useful aid in the assessment of

traffic mix and an error like this could potentially be very misleading.

Weighing all of the information, the Board concluded that the Airprox occurred because the Manchester West Sector Radar Controller allowed himself to be distracted from his operational task. Whilst explaining the operation of the Sector to an inexperienced trainee he did not notice that the ATP was still climbing to its cleared level of FL 160 and into conflict with the B737 at FL 150. However, as the minimum lateral separation recorded on radar was about 1.5 NM, members were satisfied there had not been a risk of collision.

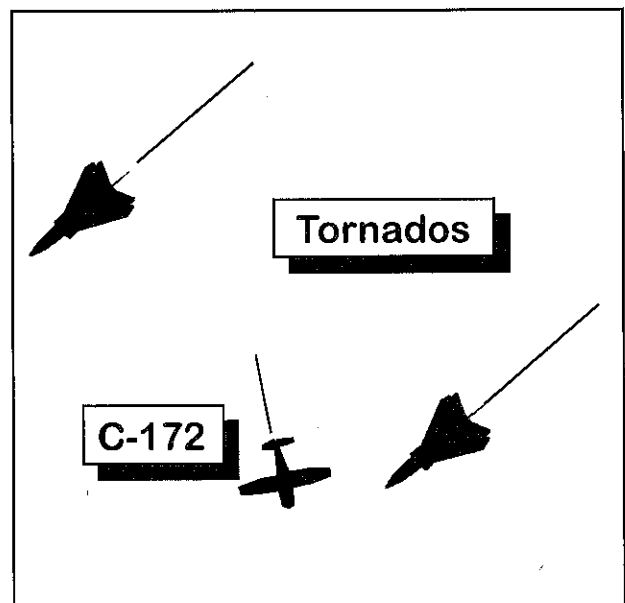
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Manchester West Radar Controller allowed the ATP to continue to climb into conflict with the B737.

**AIRPROX REPORT No 111/99**

Date/Time: 6 Jul 1056  
Position: N5059 E0125 (9 NM SSE of Dover)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: C172 Tornado F3  
Operator: Civ Pte HQ STC  
Alt/FL: 2000 ft 3000 ft  
(RPS) (QNH)  
Weather VMC CLBC VMC CLAC  
Visibility: 10 km+ 15-20 km  
Reported Separation: 200 m/1500 ft  
Recorded Separation: NK



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

**THE C172 PILOT** reports heading 175° at 102 kt cruising at 2000 ft en route to Le Touquet and receiving a FIS from Manston. His ac was white and green. He first saw a Tornado when it was

approaching from 500 m to his left. It manoeuvred to its left to pass 200 m ahead of him as he descended; it then reversed to regain its track as he encountered its wake. There had been no warning from Manston; having

subsequently been told that the Tornados were part of a large formation, the lack of traffic information surprised him. He gave no assessment of the risk of collision. He was not aware from the RT or visually of any other cross channel traffic anywhere near him; he believed there was something crossing from Lydd but that would have been some 15 NM further W.

**THE TORNADO PILOT** reports heading 240° at 450 kt on a formation exercise from Florennes as No 2 to his leader who was to his right and ahead. After pulling up from low level (the weather ahead was deteriorating) he saw a Cessna in his 2 o'clock roughly 1500 ft away at the same level and passed about that distance ahead of it. He rocked his wings and passed the details to the formation of 20 attack ac following 2 minutes behind. Being concerned about the possible effects of his wake on it, which he thought it would probably encounter, he turned to check on its continued progress. There was no risk of actually colliding with it.

UKAB Note: LATCC radar recordings show the Cessna tracking 170° at 2700 ft Mode C and the Tornado leader passing clear behind it on a SW track. The Tornado No 2 pops up at 2900 ft Mode C, in the vicinity of the Cessna, and then starts a gentle descent. There is no sign on radar of the large formation following the Tornados; presumably they were below radar cover.

**HQ STC** comments that both the Cessna and the Tornado were operating without a radar service in busy VFR airspace. They both, therefore, had an equal responsibility for maintaining a good lookout. The Tornado pair, leading a package of over 20 FJ ac on a composite air operation, pulled up from low level in order to establish radar contact with their GCI agency and noted the confliction with the Cessna. The wingman immediately wing rocked which, it seems, was interpreted by the Cessna pilot as a bank away followed by a reversal. If the Cessna had wished to avoid the inevitable FJ wake turbulence, a climb might have been more appropriate.

The Tornados then called the confliction to the remainder of the package, and the trailing fighters accordingly established radar contact on the Cessna, taking appropriate avoiding action to manoeuvre the package clear.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, and reports from the appropriate operating authorities.

Members discussed the lack of traffic information from Manston. The first point made was that under a FIS there was no need for a controller to identify an ac, let alone provide traffic information. However, if priorities allowed, a controller could offer such help but it was a bonus which some pilots had come to expect. (If the Cessna pilot was expecting traffic information then his lookout may have been less diligent than it might have been if he had realised he was 'on his own'.) Furthermore, pilots requiring traffic information should request a RIS, remembering always that in Class G airspace a controller would only provide a RIS if able to fit this in with other higher priorities and if the requesting ac was inside radar coverage. It was not known in this instance if the Cessna was in Manston's radar cover but on the LATCC radars the Tornados were not, until the leader popped up. Since it was passing behind the Cessna it would not have prompted a controller to comment, and the No 2 popped up into LATCC's cover at about the time of the Airprox. Similarly, the pop-up may not have shown on Manston's radar in time for the controller to have reacted. The large formation following at low level probably never showed on Manston's radar.

Members agreed that both pilots were in a see and avoid situation, but neither pilot saw the other ac in time to prevent the Airprox. Members further agreed that it was not surprising that the Cessna pilot had not seen the Tornado, below and camouflaged against a grey sea, before it popped up in his proximity.

On the other hand, the Cessna would have been skylined to the Tornado pilot and the latter's late sighting was considered to have been the cause of the Airprox.

As to the miss distance, members considered that it may not have been as small as believed by the understandably startled Cessna pilot, but also it may not have been as large as suggested by the Tornado pilot. The immediacy with which the Cessna struck the Tornado's wake and the fact that the first concern of the Tornado pilot was that of the effect of his wake on the Cessna lent weight to the feeling that the miss distance was probably somewhere

between the 2 pilots' estimates. Moreover, the Tornado pilot had time to assess that he was not on a collision course and to perform a wing rock; this led the Group to conclude that there was not a risk of the ac actually colliding.

UKAB staff were asked if a NOTAM on the military exercise had been published. This had been done for a possible operation in E Anglia but not for the passage along the Channel. The manager of the LFS has undertaken to ask the military authorities to arrange for a civil NOTAM to be issued for such a routeing in the future, in view of the considerable amount of cross-channel GA traffic.

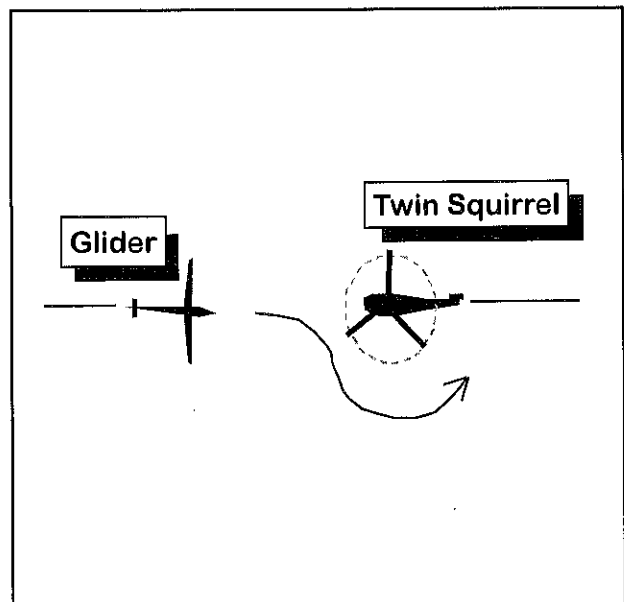
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Late sighting by the Tornado pilot.

**AIRPROX REPORT No 112/99**

Date/Time: 9 Jul 1625  
Position: N5705 W0250 (Aboyne airfield - elev 460 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Puchacz glider AS355 Twin Squirrel  
Operator: Civ Trg Civ Pte  
Alt/FL: 1300 ft 1300 ft  
(QFE) (QNH 1007? mb)  
Weather VMC CLBC VMC  
Visibility: 20 NM  
Reported Separation: 300 yd H/50 ft V  
500 m H/50 ft V  
Recorded Separation: N/A



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

**THE PUCHACZ PILOT** reports demonstrating a deadside descending airbrake rejoin to his student over Aboyne. The visibility, 1600 ft

below cloud, was 20 NM. His ac is predominantly white but with red tips on wings, tailplane and rudder. While passing 1300 ft (QNH) at 55 kt over the airfield, he saw a dark blue helicopter in level flight about 800 m away approaching him head-on and slightly below his

level. He immediately turned hard R and the ac passed about 300 yd down his port side and 50 ft below. Owing to his high workload and restricted downward vision he felt there had been a high risk of collision. The pilot comments that the airfield is notified for intense gliding activity and the helicopter had flown directly over it at a level which was likely to conflict with circuit or joining traffic. Following the encounter the other ac was seen to continue on its course until about 0.75 NM away when it made a minor heading change.

UKAB Note (1): In a subsequent telephone conversation the glider pilot told UKAB staff that only one other glider was airborne from the airfield at the time of the incident but this was well outside the circuit area. After the encounter he turned L to pass behind the helicopter and to keep it in sight. All gliders operating from the site were predominantly white in colour.

**THE HELICOPTER PILOT** reports flying from Dundee to a private site near Ballater in VMC. He was squawking 7000 with Mode C. His speed was 110 kt. Owing to the low cloud base N of Dundee (1500 ft), he arranged his route to track NE towards Edzel and Fordoun and thence towards Banchory where the base was 1700 ft. He called Aberdeen ATC who advised him to contact Aboyne radio, which he did, passing his altitude, destination and track, which was westerly. Aboyne advised "no circuit traffic" to which he replied "good I'll come straight through". Two min later he called Aboyne again saying "approaching airfield and in contact with a glider" (he thought they ought to know there was an ac in the circuit). The glider, which he describes as yellow, was about 1500 m ahead of him and diverging to his L; having passed about 500 m away and 50 ft below it then turned L and flew to the rear of him. As a glider pilot himself he was used to seeing other gliders at close range and did not consider there had been any threat or danger of collision.

UKAB Note (2): A radar recording does not show the incident.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac.

A glider member commented that instructional workload at this stage of flight was high; moreover, he felt it was unsurprising that the glider pilot saw the helicopter late because the presence of the front seat pupil tends to obstruct the instructor's forward view from the ac.

A GA member pointed out that air/ground operators at airfields can offer only the most basic of services. They are not permitted to pass executive instructions or specific traffic information. In this case a phrase such as 'there are gliders in the area' might, in his opinion, have been appropriate. It appeared that the helicopter pilot mistakenly interpreted Aboyne's radio message as a clearance to route over the airfield, which then led him into conflict with the active circuit. The airfield is a well known glider site which is marked on the 1:500 000 topographical chart and notified in the AIP. Members considered the helicopter pilot's decision to fly overhead and thought it was ill-judged on two counts. First, a short detour around the site would have removed any possibility of meeting gliders within the circuit, and second, as a glider pilot himself he should have been aware of the hazards. The Board concluded, therefore, that the helicopter pilot had caused the Airprox by routeing overhead the active glider site, and flying close enough to the glider to cause concern to its pilot. However, members were satisfied that the helicopter pilot had seen the glider sufficiently early to ensure that there was no possibility of collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

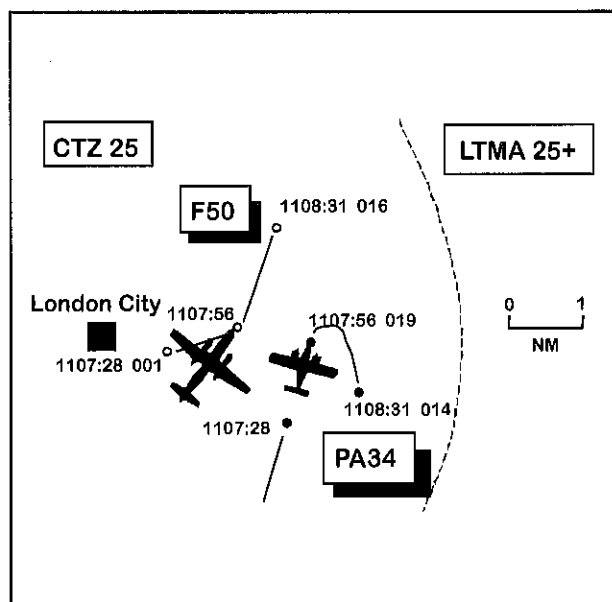
Degree of Risk: C

Cause: The Twin Squirrel flew close enough to the glider to cause concern to its pilot over an active glider site

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### **AIRPROX REPORT No 113/99**

Date/Time: 10 Jul 1108 (Saturday)  
Position: N5130 E0007 (2.3 NM E London City airport - elev 17 ft)  
Airspace: CTZ (Class: D)  
Reporter: Heathrow  
First Aircraft Second Aircraft  
Type: Fokker 50 PA34  
Operator: CAT Civ Pte  
Alt/FL: 3000 ft 2000 ft  
(QNH) (QNH 1024 mb)  
Weather VMC VMC  
Visibility: >10 km  
Reported Separation: not seen  
Recorded Separation: 1 NM/



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE THAMES RADAR CONTROLLER**, acting as mentor, reports that the PA34 pilot contacted the frequency (13207) requesting a VFR crossing clearance of the London City Zone via the River Lea Valley (W of London City Airport). A squawk was allocated but no radar response was seen and clearance to enter the CTZ was not given. The pilot was asked to recycle the squawk, whereupon a return was immediately observed about 2 NM E of London City Airport tracking N; prior to this, no primary return had been seen. At this time a F50, which had previously been released on a DVR 3U SID, was seen climbing straight ahead from RW 10 towards the PA34. The controller under training immediately instructed the PA34 pilot to turn R 130° then telephoned the London City Tower controller to instruct him to turn the F50 L onto 360°. When the conflict had been resolved, both pilots were advised that reporting action

would be taken by ATC. The PA34 returned to Biggin Hill, the pilot reporting that he had 'radio problems' (though he could be heard clearly by ATC). Meanwhile London City was informed by the F50 pilot that he had maintained continuous visual contact with the PA34 from take off. The ac passed with about 1 NM lateral separation.

The PA34 PILOT reports that he was flying solo from Biggin Hill to Elstree under VFR. The visibility was over 10 km in VMC. Following a major nav/comm refit in June, the ac had just been returned to service. However, the No. 1 Radio Box had not been replaced owing to a fault which was still being rectified.

After take off from Biggin, he routed to Dartford Bridge at 160 kt and at Swanley called Thames Radar on 13207, advising them that he wished to track direct to Elstree. He anticipated being allowed to cut the corner of the London City CTZ but intended to remain clear of CAS until

entry clearance had been given by Thames Radar. The controller instructed him to squawk 7050. While he was making this selection, there was a sudden severe noise, as if a cabin door had opened. He checked both doors for security but the noise remained so severe that he had to remove his headset. He then noticed that the Global Nav System (GNS) screen was recycling back to the test page, the ADF was flashing on and off and the RAD ALT and RMI dials were oscillating. He unsuccessfully attempted to recycle the radio and found that the only way to stop the noise was to turn down the volume. He noticed that the noise appeared to abate when either Thames or another ac was transmitting. ATC asked him to check his squawk and then instructed him to turn R for avoidance. The radio was very spiky and distorted and he advised Thames that he was returning to Biggin.

Whilst dealing with the increased workload he acknowledged that he had allowed his ac to enter the London City CTZ. He commended the Thames Radar controller for his prompt and professional actions and regrets that he did not respond as well as he ought to have done to the emergency situation. After landing it was found that a major electronics failure had occurred and the ac was taken out of service. The following day he flew the route with an instructor and reviewed emergency procedures.

UKAB Note (1): The F50 pilot declined to file a report.

UKAB Note (2): The PA34 pilot sent a tech log book certificate dated 15 Jul detailing the faults subsequently found. It was discovered that all avionics power was lost when transmitting on either VHF Comm 1 or Comm 2. Investigation traced this to the avionics master relay circuit which was burnt out. It is suspected that the cause of this was the general ageing of the spade connector, which was the main feed to the avionics bus bar.

UKAB Note (3): A replay of the Heathrow radar first shows the F50 as it passes 100 ft Mode C about a mile E of London City airport. At the same time a primary contact, which had

previously entered the CTZ on a northerly heading at about 1106, is about 2.5 NM to the SE of the airfield. At 1107:41 the latter return shows a squawk of 7053, Mode C 019, and 15 sec later begins a sharp R turn onto a southerly heading. At this time the F50, just over 1 NM to the W, also turns sharply, onto a northerly heading; there is no Mode C on the F50 at this point but the ac would probably have been climbing through 500 – 600 ft. By 1108:31 lateral separation is rapidly increasing through 2.5 NM as the F50 climbs through 1600 ft Mode C and the PA34 exits the CTZ to the SE.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilot of the PA34, transcripts of the relevant RT frequencies, a radar video recording, and a report from the air traffic controller involved.

While generally sympathetic to the PA34 pilot's predicament following the distracting nature of the radio emergency, members felt that he had not helped his position by flying at high speed and making an assumption that he was going to get an early crossing clearance. The normal requirement to call ATC 10 min before reaching the zone boundary was clearly not possible in this case but the pilot should have ensured that his initial route and speed after takeoff from Biggin enabled him to keep clear of CAS while obtaining a transit clearance from Thames Radar. In the event, members thought it probable that he had already begun to enter the CTZ in anticipation of receiving a clearance and that his radio emergency then distracted him from the prime task of navigating his ac. As a result he flew N from the Swanley area and into the eastern part of the London City CTZ, below primary radar cover, and remained undetected until a delayed squawk revealed his imminent conflict with the departing F50.

The Board concluded that the PA34's inadvertent penetration of the London City CTZ caused the Airprox. Fortunately, the error was quickly spotted by the Thames Controllers and

the Board commended them for their timely actions in both giving avoiding instructions to the PA34 pilot and co-ordinating the F50's avoiding turn with the London City ADC. It was

also noted that the F50 pilot had watched the PA34 throughout. With these facts in mind the Board concluded that there had not been a risk of collision.

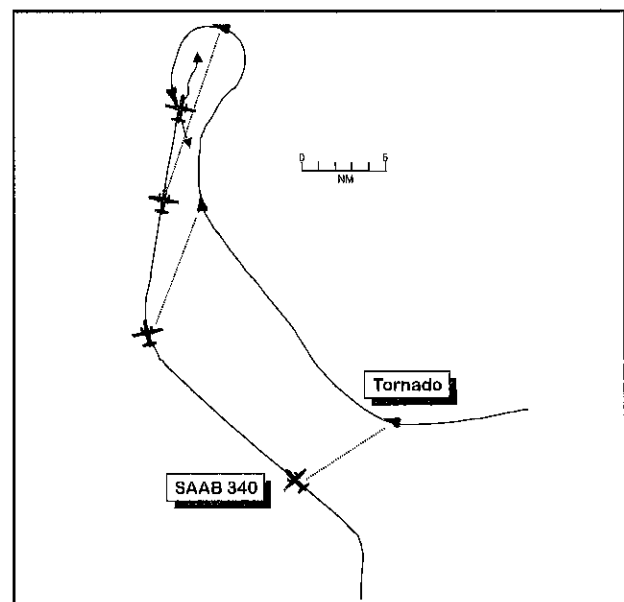
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Inadvertent penetration of the London City CTZ by the PA34.

**AIRPROX REPORT No 114/99**

Date/Time: 12 Jul 0923  
Position: N5552 W0225 (8 NM WSW of St Abbs Hd)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: SAAB 340 Tornado GR  
Operator: CAT HQ STC  
Alt/FL: FL 150  
Weather VMC CLOC VMC CLOC  
Visibility: 50 km 50 km  
Reported Separation: 0.5 NM/200 ft  
Recorded Separation: 0.57 NM/200 ft



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

**THE SAAB PILOT** reports heading 010° at 200 kt en route from Manchester to Aberdeen at FL 150; Scottish Military, from whom he was receiving a RAS, warned him of traffic converging from the right at a similar level. The controller offered avoiding action (a turn onto NW) which he accepted. He saw the traffic which turned N when about 5 NM away and when the separation had increased he resumed heading, keeping an eye on the other ac. About 2 minutes later the controller advised that the ac was heading S. He saw it in his 12 o'clock on a steady bearing so he switched on his landing lights. Becoming concerned about the situation, they took avoiding action; the FO disconnected the autopilot and turned right at

30° AOB. The other ac also turned right, passing less than 0.5 NM away and 200 ft below; it was a grey Tornado, rocking its wings as it passed. He commented that despite the good service from Scottish Mil, they are limited by lack of RT contact with conflicting ac and added that routing within airways would avoid this unnecessary hazard. TCAS was not fitted to the ac on the date of the Airprox.

Note: AIS (Mil)'s initial information from ScACC was that the military ac was an F3 from Leuchars; it could not be identified from its 7000 squawk. After Leuchars ac were eliminated from enquiries, a second radar replay was carried out which indicated the ac involved had come off a tanker; enquiries with Brize Norton

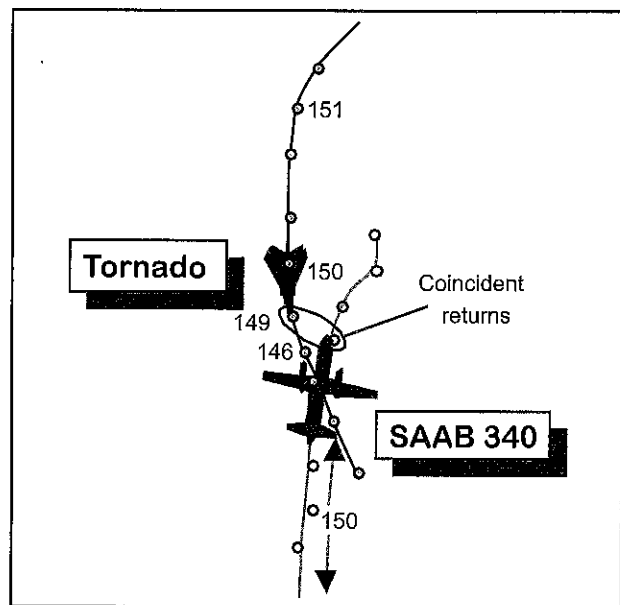
eventually suggested the ac may have been a Brüggén Tornado. It took until 29 July to confirm this - the Nav of the crew involved was contacted the next day (pilot on leave) and he completed his report that day.

**THE TORNADO NAVIGATOR** reports flying in the area at 400 kt. He was asked to report on the incident 18 days and 15 sorties after the event and could not remember the details of heading, height etc; 10 – 15 ac are seen on an average sortie. He was positioning as 'bounce' ahead of his target formation and as far as he could remember was in a descent when he saw the SAAB, he rocked his wings to indicate to the other pilot that he had seen him. He did not take avoiding action and there had been no risk of collision.

**THE SAAB 340 PILOT'S COMPANY** comments that opinion in the company about whether to route in Class A or G airspace is divided; the topic had been discussed at 2 flight safety meetings. Routeing in the FIR under a RAS from Scottish Mil was seen as perfectly satisfactory. While a class A route might be a few minutes longer, a route in class G airspace under RAS often involved extensive manoeuvring to avoid other ac. The Flight Safety Officer intended to raise the matter again at the next meeting.

**HQ MATO** reports that the SAAB340 was receiving a RAS from ScATCC (Mil) Console 4 (CON4) on 134.47 at FL 150. At 0915:23, CON4 transmitted "C/s traffic R 2 o'clock 20 NM crossing R to L indicating FL 150, if not sighted turn L heading 310" and the call was acknowledged by the SAAB340 pilot: "OK turning L heading 310 c/s." CON4 updated traffic information (TI) at 0916:45 "....now R 3 o'clock, crossing R to L indicating FL 140," to which the SAAB340 pilot replied "Yes we're visual with that..... Looks like it's going round behind us." When asked whether he was happy to turn back towards Aberdeen, the SAAB340 pilot replied "We'll just give it a short delay." CON4 updated TI at 0918:51, ".....due N of you 7 NM, northbound indicating FL 135." The SAAB340 pilot indicated that the crew were still visual and that the other ac was ".....doing

*some manoeuvring obviously,"* following which the SAAB340 resumed track for Aberdeen. Three min later, at 0922:21, CON4 transmitted "C/S previously reported traffic's now R 1 o'clock 10 NM crossing R to L indicating FL 140," with the SAAB340 pilot replying "Ah yes visual with that. I don't think (2 sec unintelligible) I don't think...he's higher than we are." CON4 offered a turn to the pilot, although the pilot replied "No, we're fine for the moment." CON4 advised the pilot that the other ac appeared to be climbing through FL 145, to which the SAAB340 added "...he's definitely higher than that" at 0923:14 and "Yeh c/s, this is unnecessarily close altogether." When asked by CON4, the SAAB340 pilot identified the other ac as a grey Tornado. The pilot indicated that the confliction was "...not an Airmiss in that way. We saw him and he clearly saw us, but I just think it's strange that in the open FIR he turns and flies towards us so that we have to turn away from him." The pilot went on to state that it would be raised as a point of concern with his company safety bureau.



The ATC radar recording shows the SAAB340 tracking N towards St Abbs at FL 150, with its mode 3/A squawk converted to read the C/S. The ac turns L 310° and later R 010° in response to CON4's vectoring instructions. The Tornado can be seen squawking 7000 with



Mode C, crossing the coast in the vicinity of Newton Point and when about 5 NM inland, turning northbound to parallel the coastline. In the first encounter, at 0917, the Tornado passes 4 NM to the R of the SAAB340 in a gentle descent from FL 140. At 0922:20, the Tornado is 4 NM NW of St Abbs, in a L turn passing 320° and indicating FL 139 in a climb. At this point the SAAB340 is 10 NM SSW of the Tornado heading about 010°; these positions accurately correspond with CON4's TI call at 0922:21. At 0923:10, the Tornado has steadied on a track of 185° in a climb through FL 148; both ac are now 3 NM head on, as their SSR labels begin to flash (conflict alert). The closest point of approach recorded on radar is shown at 0923:40, with both ac in a 10 o'clock position relative to each other, with the processed radar contacts partly overlapped and the Tornado's Mode C indicating FL 149 (in the previous sweep it indicated FL 150). The subsequent sweep shows the ac both in a 7 o'clock position, with the edges of the radar contacts just separating and the Tornado indicating FL 146 in a descent. Neither ac appears to alter track significantly until after they pass. (UKAB Note: The CPA is between radar returns; by interpolation the radar separation is about 0.5 NM.)

CON4's workload was low at the time of the incident; the SAAB340 was the only ac he was providing a radar service to. The controller provided an appropriate level of radar service throughout and did everything within his power to ensure separation was maintained. Advisory avoiding action was passed on initial detection of the confliction and later TI was passed which enabled the SAAB340 pilot to see the Tornado 1 min (about 9 NM) before the Airprox.

**HQ STC** comments that the pilot and navigator of the Tornado were both extremely experienced and neither considered the encounter at all exceptional, performing a wing-rock as a matter of courtesy and to allay any fears in the other ac that they had not been seen. However, the SAAB pilot clearly made a highly accurate assessment of the separation and has offered a credible reconstruction of the event. To that end, some doubt exists as to

whether the Tornado crew are referring to the same incident.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board was advised that the company was still operating this route in Class G airspace where other airspace users, particularly the military, would be operating without an ATS. Members expressed no view about the relative safety of operating inside or outside controlled airspace but agreed that the latter could result in extensive avoiding action being offered which should be acknowledged as an integral part of the choice.

As to the incident, because it had taken some time to trace the Tornado involved, it could not be ascertained that the crew's recollection in fact referred to this incident. Members agreed that the Tornado pilot would not have wished to fly this close to an airliner, had he seen it in time to avoid it in a more timely manner and concluded that the cause of the Airprox was a possible late or non sighting of the SAAB340 by the Tornado pilot, resulting in the Tornado flying close enough to the SAAB to cause its pilot concern.

The risk level generated some discussion because of the possibility that the Tornado pilot may not have seen the SAAB. However, because the SAAB340 pilot had been watching the Tornado all the time, and the separation had been in the order of half a mile, the Board concluded that there had not been a risk of the ac actually colliding.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

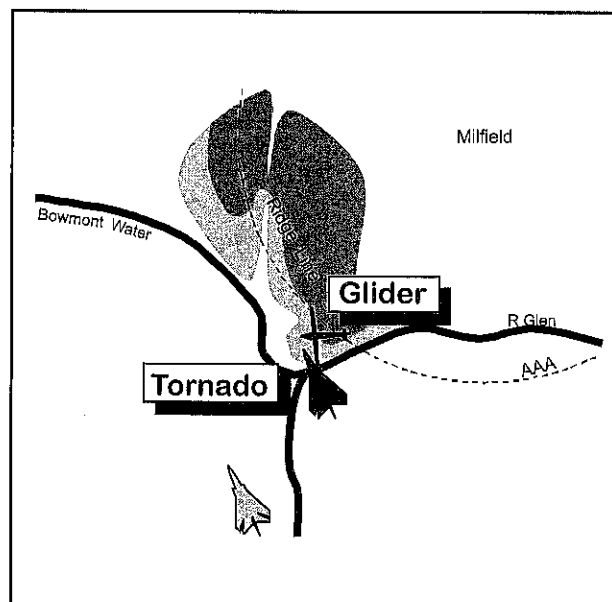
Cause: Possible late or non sighting of the SAAB340 by the Tornado pilot, resulting in the Tornado flying close enough to the SAAB to cause its pilot concern

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### **AIRPROX REPORT No 115/99**

Date/Time: 12 Jul 1537  
Position: N5534 W0209 (2 NM SW of Milfield - elev 155 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Glider Tornado GR  
Operator: Civ Pte HQ STC  
Alt/FL: 950 ft 250 ft  
(QFE 1010 mb) (msd)  
Weather VMC CLNC VMC CLNC  
Visibility: 50 km+ 20 km+  
Reported Separation:  
200 ft V & H/1.5 km, 750 ft  
Recorded Separation: NK



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE GLIDER PILOT** reports heading 270° at 45 kt while ridge soaring at a position on the edge of the Milfield low flying avoidance area. He saw a Tornado a few seconds before it passed on a track from his 8 o'clock to his 2 o'clock. It was about 150-200 ft ahead and below and appeared to be following the contours. He could hear a second Tornado further away on the opposite side of the valley. He thought the risk of collision was moderate. On landing he heard that a member of the public had phoned the gliding club to say he had seen a Tornado almost collide with a glider. The pilot provided time, track and height data printouts from his barometric logger.

**THE TORNADO PILOT** reports heading 317° at 420 kt on a low level exercise at 250 ft agl with his No 2 tracking 4 km to his W and 40 seconds behind. Crossing the high ground about 3.3 NM

SW of Milfield he saw a pair of gliders in his 2 o'clock circling above by about 750-1000 ft and about 1-1.5 km to the right of his track. He discussed it with his navigator and decided it would be safe to continue on track making a large wing-rock. There was no danger of collision and he had seen the gliders in good time.

**UKAB Note:** The glider pilot points out that he was ridge soaring at 50 -100 ft above the ridge, and was on his own. Other gliders seen by the Tornado crew were probably in the Milfield circuit.

**HQ STC** comments that it is probable that the crew of the lead Tornado concentrated their lookout in the direction of the airfield, seeing only the gliders in the circuit at Milfield and not the ridge-soarer. This incident once again highlights the hazards of operating in a particularly busy area of the UK LFS.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings and reports from the appropriate operating authorities.

The position and number of gliders seen by the Tornado pilot indicated that he had not seen the

one close to the ridge and near his level; the Board agreed that this was the cause of the Airprox. Members had difficulty assessing the risk level with only one pilot's information to go on but concluded that although the ac missed each other without taking avoiding action, the fact that they had come close without the Tornado pilot seeing the reporting glider indicated that the safety of the ac had not been assured.

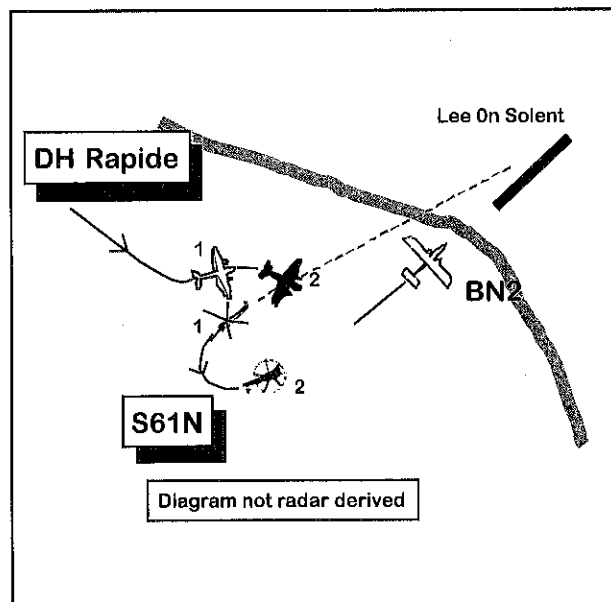
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: The Tornado pilot did not see the reporting glider.

**AIRPROX REPORT No 116/99**

Date/Time: 11 Jul 1003 (Sunday)  
Position: N5048 W0114 (Lee-on-Solent - elev 32 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: S61N DH Rapide  
Operator: Civ Comm Civ Pte  
Alt/FL: 500 ft 800 ft  
(QFE 1020 mb)  
Weather VMC NIL VMC CAVOK  
Visibility: 20 km >10 km  
Reported Separation: 100 ft V, 200 m  
H/200-300 ft V  
Recorded Separation: N/A



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

**THE S61N PILOT** reports that he had taken off from Lee-on-Solent airfield for a local area training flight. There was no weather and the visibility was over 20 km. Immediately after departure he was informed that an Islander was returning to Lee-on-Solent with an engine problem. He assumed his coastguard rescue callsign, co-ordinated with the Islander pilot on

13507 (Lee Base) and advised him that the helicopter would be escorting him.

Having initially flown away from the airfield, he turned L onto S, flying at 80 kt, to position 300 – 400m behind and 100 ft above the Islander, which was on long finals for RW 05. When the Islander was about 400 m from the RW threshold, a Rapide appeared at the helicopter's 11 o'clock low position (flying at about 400 ft and following the coastline) and

then passed about 200 m ahead and 100 ft below between him and the Islander; there was no time to take avoiding action and the helicopter crew were very shaken by the experience. He informed Southampton APC that he would be filing an Airprox report.

The helicopter pilot comments that he was later advised by Southampton ATC that the Rapide pilot was made aware of gliding activity at Lee-on-Solent. While there is no ATZ, the airfield is promulgated as a glider site, and for 24 hours coastguard and police activity. He thought it was very irresponsible of the Rapide crew to be flying at such an altitude in close proximity to the RW centre line at Lee-on-Solent. He accepted that neither he nor his crew had seen the Rapide earlier but thought this may have been because they had only just completed a turn and were concentrating their attention in the direction of the ac in difficulty.

**THE DH RAPIDE PILOT** reports that he was flying at 800 ft and 100 kt from Bournemouth to Rochester in CAVOK conditions while receiving an advisory service from Solent Radar. When about 3 NM from Lee-on-Solent, he saw a coastguard helicopter depart and head towards him. He twice advised Solent that he was visual with the helicopter before turning to port to fly behind it. At the same time he was aware of an Islander on long finals for Lee-on-Solent. The helicopter passed down his starboard side and then turned towards the Islander; he thought it was about the point the helicopter pilot saw him and declared an Airprox. He was not into sun, conditions were VFR and he could not understand why the helicopter pilot had not seen him before. He did not perceive any danger and did not consider avoiding action necessary.

UKAB Note (1): In a subsequent telephone conversation the Rapide pilot was asked if he could clarify the geometry of the encounter from his perspective. He explained that he was heading E along the South coast past Southampton under a FIS from Solent Radar when he saw the SAR helicopter take off from Lee-on-Solent and fly towards him. He informed Solent radar that he was in visual contact with the helicopter at least twice and

received an acknowledgement; he was already aware of the Islander which he also had in sight. Realising that the helicopter was on a conflicting course with him, he turned L about 30° to allow it to pass clear down his starboard side, which it did by about 200 m on a SSW heading. As his track was now taking him towards Lee-on-Solent, he had begun to turn R back onto his original course when he noticed that the helicopter, which he had been watching, was making a fairly tight L turn (almost a 'wing over') onto a reciprocal track and climbing slightly to position behind the Islander. This effectively put the ac back into conflict and was the point at which he believes the helicopter pilot suddenly saw him and declared an Airprox. The Rapide pilot was adamant that at no time did he feel the ac came close enough together to create a hazardous situation and he could not remember at any point actually passing ahead of the helicopter's nose though he could understand that from the other pilot's perspective it might have appeared as if he did. The pilot commented that his ac is quite a large bi-plane and probably looked a lot closer than it actually was.

UKAB Note (2): ATSI advise that the relevant RTF recording from Southampton revealed the following sequence of events:

- 0941 The Police Islander Pilot reported a snag with one of the props and was returning to Lee-on-Solent.
- 0958 The Rapide pilot contacted SOLENT, 2nm west of Beaulieu River heading east at 800', was placed under a FIS and asked to report at Calshot.
- 0959 The Islander Pilot reported checks complete and descending into Lee-on-Solent before leaving the SOLENT frequency.
- 1003 The Rapide pilot reported south of Calshot, with Lee-on-Solent and a helicopter (presumably the S61N) in sight.
- 1004 After SOLENT passed the Rapide pilot traffic information on an unrelated light aircraft he reported that he had an

Islander and a helicopter "close to me" - with which he had good visual contact.

A few seconds later, the S61N pilot came on frequency to announce that he had had an 'airmiss' with a Rapide, crossing the Lee-on-Solent centreline while an Islander was carrying out an "emergency landing". The SOLENT controller advised the S61N pilot that the Rapide pilot had been visual with him for some time who responded that he would ring the controller on landing.

1005 The Rapide pilot reported that he was at 900', had the S61N in sight throughout its circuit and the Islander throughout its approach.

The controller concerned submitted the following account, written from memory, on October 1st - some eleven weeks after the event:-

Traffic conditions were light and one of the ac on the Radar frequency (120022) was an Islander which had been carrying out single engine tests to the S of Lee-on-Solent. The pilot called that he had completed his tests and was routeing back to Lee-on-Solent. A frequency change was approved as there was no known traffic to affect the ac, which was understood to be making an approach to RW 05. Shortly afterwards, the pilot of a Rapide called requesting a FIS while routeing VFR from Bournemouth to Rochester. This was approved, the Southampton QNH passed and the pilot asked to report passing Portsmouth. He informed the Rapide pilot about the Islander, which had by now dropped out of both primary and secondary radar cover, and the pilot acknowledged. A minute or so later, he received a transmission from a rescue helicopter saying that a bi-plane had come very close. He advised the helicopter pilot that he was working a Rapide flying VFR eastbound which could have been passing abeam Lee-on-Solent at about that time. The helicopter pilot said that he might file a report and would telephone Solent Radar after landing, which he did. However, no miss distances were stated. The pilot said that the Rapide had flown too low and close to Lee-on-Solent and that he was

considering filing an Airprox report. Sometime later the Rapide pilot called and said that he had spotted the Islander on being passed traffic information and turned to pass behind it. This then took him towards the helicopter, of which he had been unaware.

UKAB Note (3): The Airprox is not seen on recorded radar.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the Board included reports from the pilots of both ac, comment from the Air Traffic Controller concerned and a synopsis of the RTF recording from the appropriate ATC authority.

It was immediately apparent to the Board that the Rapide pilot had seen both the S61N whilst it was outbound from Lee-on-Solent and the inbound Islander in good time. He had apparently taken positive action to remain clear of the helicopter, whose pilot was unaware of the Rapide at this point. The Rapide pilot's L turn away from the helicopter naturally took his ac closer toward Lee-on-Solent than he may have originally planned or intended. According to the S61N pilot's report, he was apparently unaware of the Rapide until he was established behind the Islander that was long final to RW05. Several members commented that during emergency incidents the urgency of the situation can result in a concentration of effort and closely focused attention, which could be potentially detrimental to overall situational awareness and lookout. Clearly the S61N pilot did not see the Rapide until after he had turned L into conflict with it, although the Rapide pilot had the S61N in sight throughout. Therefore, the Board concluded that the fundamental cause was a late sighting of the Rapide by the S61N pilot. Turning to risk, though events may have seemed alarming from the helicopter pilots perspective, members were satisfied that the Rapide pilot was always in a position which would enable him to avoid the S61N and the Islander, thereby removing any risk of collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Late sighting by the S61N Helicopter pilot.

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### AIRPROX REPORT No 117/99

Date/Time: 14 Jul 1526

Position: N5402 W0141 (10 NM N of LBA)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: C152 Tornado GR

Operator: Civ Trg HQ STC

Alt/FL: 1900 ft 3500 ft

(QNH 1007 mb) (RPS)

Weather VMC CLBC VMC CLOC

Visibility: 30 km 15 km

Reported Separation: 500 ft/NK

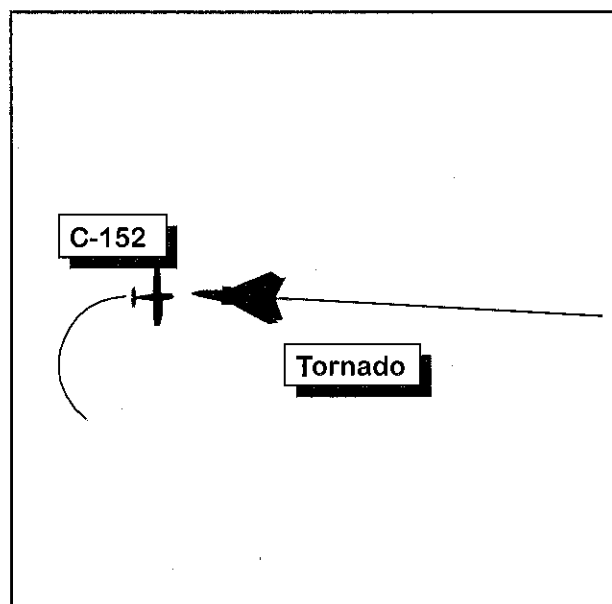
Recorded Separation: 1400 ft

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

**THE C152 PILOT** reports heading 090° at 95 kt on a training exercise; he was at 1900 ft on the Leeds QNH and receiving a FIS from Leeds Bradford Approach. He saw a Tornado when it was about to pass 500 ft above him, approaching from his 12:30. The high wing of his ac impeded vision from the cockpit. He held his course and the Tornado passed overhead; he assessed the risk of collision as medium.

**THE TORNADO PILOT** reports heading NW at 450 kt through the area of the Airprox at about 3500 ft. He was acting as bounce for another pair of Tornados and was about to start the first interception; neither he nor the other Tornado crews saw the light ac.

UKAB Note: LATCC radar recordings show the Cessna, identified from its Leeds/Bradford squawk turning R from NW onto E at 2000 ft Mode C as the Tornado, identified from LATCC and Linton squawks, tracks 275° directly above the Cessna at 3400 ft Mode C, at a



groundspeed of 466 kt. Its high rate of angular change as it passed the Cessna at a closing speed of some 560 kt may have given the Cessna pilot the impression that it was less than 1400 ft above him.

**HQ STC** comments that it is unclear as to why no-one within the Tornado formation saw the Cessna. However, the recorded vertical separation is significantly greater than that reported by the Cessna pilot and his ac would almost certainly have been obscured by the nose of the subject Tornado as they merged. The Tornado crew would have made all efforts to clear their own flightpath but the recorded separation, in this instance, seems merely fortuitous.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings and reports from the appropriate operating authorities.

The altitudes reported by the pilots were confirmed by Mode C. The existing vertical separation was more than enough to explain

why the Cessna was not seen by the Tornado pilot, and the Board concluded that the Airprox report resulted from a mistaken impression of a lack of vertical separation by the Cessna pilot. There was clearly no risk of collision; indeed if the separation had only been 500 ft as suggested by the Cessna pilot, there would still have been no risk. 500 ft (quadrantal separation) is an acceptable vertical separation under VFR.

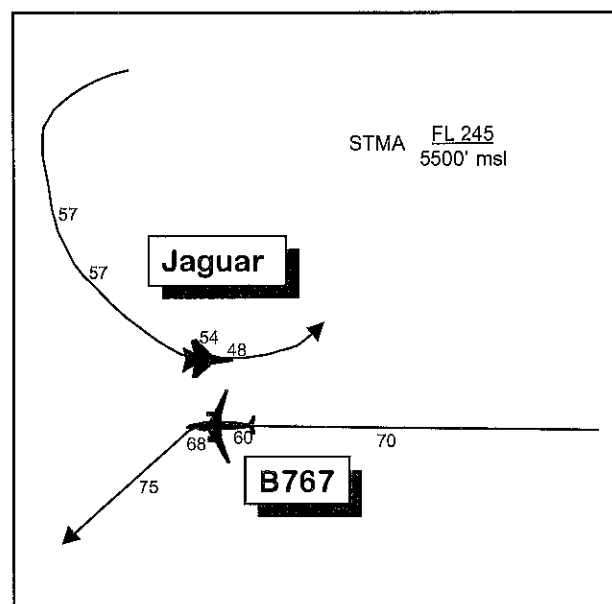
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Mistaken impression of a lack of vertical separation by the Cessna pilot.

**AIRPROX REPORT No 118/99**

Date/Time: 15 Jul 1010  
Position: N5523 W0342 (14 NM WSW of TALLA)  
Airspace: STMA (Class: D)  
Reporting Aircraft Reported Aircraft  
Type: B767-300 Jaguar  
Operator: CAT HQ STC  
Alt/FL: 6000 ft 5000 ft  
 (QNH 1008 mb) (RPS 1000 mb)  
Weather IMC INCL IMC INCL  
Visibility:  
Reported Separation: 0.5 NM/NK  
Recorded Separation: 1.5 NM



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

**THE B767 PILOT** reports heading W at 250 kt under radar control from Prestwick Approach on 120.55, maintaining 6000 ft on the Prestwick QNH in IMC and following vectors for the ILS to RW 31. He received a TCAS alert indicating traffic from the right followed 5 seconds later by a RA to climb. ATC advised of fast closing military pop-up traffic and gave avoiding action to turn left onto 210° which he followed with the

RA. Being in cloud, he did not see the traffic; ATC advised that it had popped up into controlled airspace without calling.

**THE JAGUAR PILOT** reports heading S at 420 kt as one of a pair acting as aggressors for 4 other Jaguars conducting operational low flying. The weather was generally good with cloud bases at 2000 ft and layers up to 5-6000 ft. During the break-off from one engagement,

while pulling up and left onto W he inadvertently entered cloud which was thicker than expected so he carried out an abort to safety altitude, topping higher than planned at 5000 ft on 1000 mb. He then turned S where he knew the weather was better and let down to safety altitude at which point the cloud began to break up. He regained VMC and returned to low level. Whilst transiting to the next engagement he heard ScACC transmitting on guard, directing ac to remain clear of the TMA. He did not see the B767.

**PRESTWICK ATC** reports, with RT transcript that on handover from ScACC the B767 was descended initially to 6000 ft to keep it in controlled airspace. There was significant military activity beneath it, so the pilot was advised he would be kept in CAS as long as possible. At 1010 the B767 pilot reported "Got a TCAS same level we're climbing, TCAS climb". The controller saw a pop up SSR contact 4 NM N of the B767, closing and indicating 4500 ft and climbing. He passed an avoiding action turn onto 210° and passed further traffic information: "*right 3 o'clock range of 3 miles indicating charlie 58 unverified, military traffic, present track should pass behind right to left*". Once the traffic was clear he descended the B767 back to 6000 ft.

Note: ScACC radar recordings show the B767 tracking W and descending to 6000 ft Mode C corrected to altitude. During the latter part of the descent the area ahead and to the right is heavily covered with radar returns both from high level traffic and 7001 squawks beneath, tracking in a generally NW direction. At 1010 one of the latter separates from the mass in a left turn onto SE towards the B767 and can then be seen to be at 5700 ft. At 1010:30 the STCA operates with the ac 4.5 NM apart and the B767 levelling at 6000 ft. (STCA is not shown on the Prestwick radar.) The Jaguar continues to turn left onto E and the ac pass 1.5 NM apart at 1010:50; as they pass the Jaguar is showing a descent between 5700 ft and 5400 ft as the B767, starting a brisk climb, is between 6400 ft and 7000 ft. The 5700 ft shown for the Jaguar is a QNH corrected figure; the base of the TMA in that area is 5500 ft QNH. A pull up to safety

altitude (5000 ft) on the RPS (1000 mb) would have put the Jaguar at 5220 ft on the QNH; 5700 QNH equates to 5480 on the Jaguar's altimeter.

**HQ STC** comments that the wisdom of aborting from low level underneath the TMA without an emergency squawk is questionable. In mitigation, the Jaguar pilot did not initially know at what height he would level-off nor had he any awareness of traffic in his vicinity. However, the message is clear: aborting into controlled airspace requires an immediate emergency squawk to alert controllers to a potential problem. The incident generated significant concern amongst senior RAF officers and prompted the widespread publicity of low-level emergency abort procedures. The pilot was debriefed accordingly.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

In this incident the Jaguar pilot had carried out a safe low level weather abort. Entering cloud while at low level should be avoided wherever possible by re-routing but if it occurs accidentally the pilot is in an emergency situation. Levelling the wings and applying a 3g pull-up, in most fast-jets to 30° nose up, was an emergency procedure the safe demonstration of which is part of the pilot's IRT. Its philosophy embraces a sudden transition from visual flight to instrument flying while close to the ground and is therefore designed to be safe and straightforward and to minimise the chance of disorientation. Once the ac is established in its wings-level climb the pilot should take safety height, the location of controlled airspace, squawking emergency and calling on guard into account, but not at the expense of safely controlling the ac. Civilian members of the Board understood this and suggested that HQ



STC should be careful about 'throwing darts' at the pilot for entering controlled airspace by a small margin. It was pointed out that an attempt to avoid CAS during a low level weather abort might have been a feature in the recent fatal Tornado accident near Newcastle, and the BOI has stressed the importance of employing the correct low level abort procedures. In this Airprox, the Jaguar pilot topped slightly above safety altitude which, on the RPS, happened to be 200 ft inside the base of the STMA as defined by the Glasgow QNH. The Board therefore concluded that the cause of the Airprox was the penetration of the STMA by the Jaguar, following its low level weather abort.

In another incident dealt with at the Board's meeting there had been an 8 mb difference between the RPS and a local QNH and it was suggested that aircrew operating underneath CAS should be aware of its defining QNH and

possibly use that instead of the RPS. The Board was not competent to resolve this issue and asked the Chairman to pursue it outside the meeting.

Other matters commented on by the Board included praise for the Prestwick controller's prompt detection of the incursion on what was probably a busy radar screen, and his reaction to it, and also the commendably prompt climb and turn made by the B767 pilot. The Board was sometimes disappointed to see a slow response by airliner pilots to avoiding action, but in this case the pilot's example was excellent. While this must have been a startling incident for those aware of it, the Board assessed that the prompt avoiding action and the Jaguar's turn and descent to pass about 1000 ft below and 1.5 NM from the B767 had removed any risk of the ac colliding.

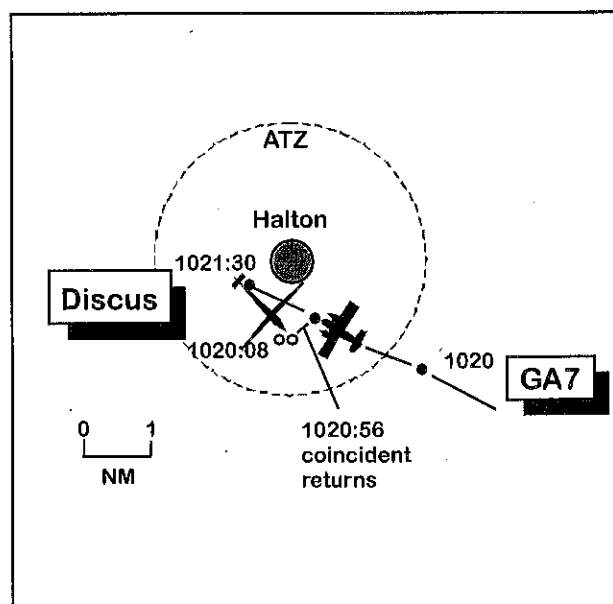
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: While carrying out a low level emergency weather abort, the Jaguar pilot penetrated controlled airspace.

**AIRPROX REPORT No 119/99**

Date/Time: 15 Jul 1020  
Position: N5146 W0044 (1 NM S Halton - elev 370 ft)  
Airspace: FIR/ATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Discus glider GA7  
Operator: Civ Club Civ Pte  
Alt/FL: 1800 ft 2400 ft  
(QFE) (QNH)  
Weather VMC VMC  
Visibility: 10 km >20 km  
Reported Separation:  
<100 m same level/Not seen  
Recorded Separation: 500 - 600m



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE GLIDER PILOT** reports that he was established in a stable thermal in the SE sector of the Halton ATZ and climbing in a R turn through about 1800 ft (QFE). The visibility was over 10 km in VMC. He had completed 3 or 4 turns when a low wing twin ac, Aztec or similar, appeared from the Bovingdon direction about 250 m away at the same height. He tightened up his turn to about 65° AOB and the other ac passed in a northwesterly direction down his port side less than 100 m away; it then tracked directly through the middle of the ATZ, at a speed he estimated around 120 kt, and continued towards the Aylesbury area with no apparent alteration of heading or indication that he had been seen. He felt there had been a very high risk of collision and reported an Airprox to Luton approach on 129055.

**THE GA7 PILOT** reports that he was flying solo from Elstree to Cranfield at 2400 ft (Elstree QNH) in VMC; the visibility was over 20 km. He was receiving a FIS from Cranfield on 122085 (no service was available from Luton) and squawking 7000; he does not say whether the ac was equipped with Mode C. His speed was 120 kt. No gliders were seen throughout the entire flight.

UKAB Note: Elstree confirmed that the GA7 departed at 1007 for Cranfield, and a recording of the Heathrow radar shows the ac carrying out one circuit there before setting course towards the Bovingdon area squawking 7000. At 1020 the ac is about to cross the lateral boundary of the Halton ATZ 2.5 NM to the SE. At 1020:08 a slow primary return, believed to be the glider, appears, manoeuvring in a R turn just over a mile S of Halton. At 1020:56 the GA7 passes 500 – 600 m to the E of the circling glider, and then tracks about 0.6 NM SW abeam Halton.

## PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac and a radar video recording.

Members were critical of the GA7 pilot's decision to route close to Halton at an altitude which took him only marginally above the airfield's ATZ. A GA member commented that there was sufficient airspace between Halton and the Luton CTZ to allow him to take a more easterly routeing. Moreover, he pointed out that there were plenty of landmarks, including a very conspicuous cement works, to facilitate navigation in this area. The Board concluded that the Airprox occurred because the GA7 pilot flew close to the top of the Halton ATZ and into conflict with the glider, which he did not see.

A gliding specialist said that in these circumstances the glider was probably completing an orbit about every 20 sec, thereby enhancing its conspicuity and also enabling its pilot to clear the airspace around him more effectively. However, despite this he saw the GA7 late and, though taking effective avoiding action, he nevertheless felt that the encounter had been uncomfortably close. Members noted that the radar suggested lateral separation was somewhat more than the 100 m the glider pilot estimated. Although the returns were clearly separated on the radar recording, it was difficult to measure the distance with any degree of accuracy, but it was believed to be in the order of 500 m; members concluded that the actual distance probably lay somewhere between the two. Given the glider's late sighting, and that the GA7 pilot did not see the glider at all, the Board concluded that the safety of both ac had been compromised.

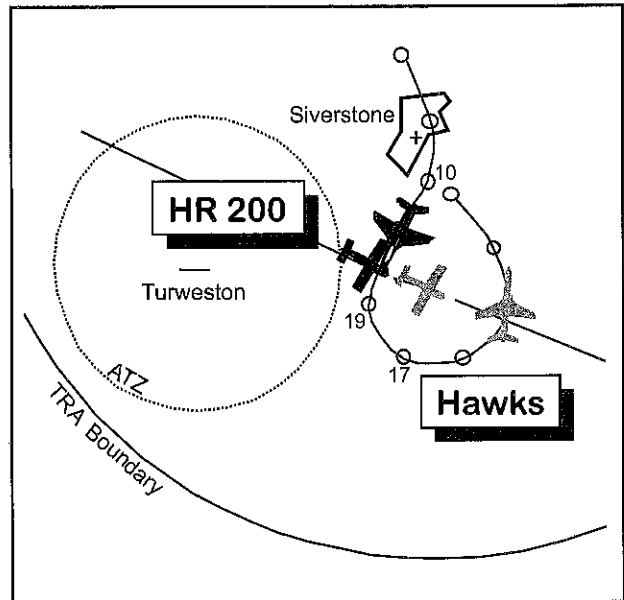
## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The GA7 pilot flew close to the vertical extent of the Halton ATZ and into conflict with the glider, which he did not see.

### **AIRPROX REPORT No 120/99**

Date/Time: 11 Jul 1107 (Sunday)  
Position: N5202 W0102 (2 NM SSW of Silverstone)  
Airspace: TRA (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Hawk Robin HR 200  
Operator: HQ PTC Civ Pte  
Alt/FL: 2000 ft ↑ 3000 ft  
(QFE 1005 mb) (RPS)  
Weather VMC CLOC VMC CLNC  
Visibility: 40 km 20 NM+  
Reported Separation: H 500 ft /NK  
Recorded Separation: H 500 ft, 1300 ft V



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

**THE HAWK PILOT** reports heading S at 360 kt while leading the Red Arrows in a display at Silverstone. He was warned by Brize, from whom he was receiving a RIS, about crossing traffic so he started to reverse bank and pull up into a left wing over. The formation was nose-up and committed to a climb to 2000 ft in a left turn when a team member saw a single engine light ac 500 ft away. It was very alarming for the whole formation and there was no opportunity for avoiding action due to the late sighting. The risk of collision was very high; with the formation passing about 150-300 ft in front of the other ac. He had been receiving a RIS from Brize Norton and a TRA up to 7000 ft amsl had been promulgated out to 6 NM from the centre of the racing circuit. He added that it takes about a mile of airspace to reverse a formation turn from 60° AOB to 60° AOB the other way; this was the 4th infringement of a RAFAT TRA this year.

**THE ROBIN PILOT** reports heading 120° at 105 kt cruising at 3000 ft and in communication with London Information. His transponder did not include Mode C. He was aware from his flight planning that there was a Red Arrows TRA at Silverstone and associated helicopter protected area at Turweston. He intended to route S of Turweston and also to remain clear of the HIRTA to the SW of Turweston, and N of Luton, to avoid Dunstable, for a transit under the LTMA, and estimated his distance from Silverstone visually as in excess of 6 NM. Approaching Turweston he was keeping a sharp lookout, particularly for helicopters, as intense traffic had been briefed in the AIC. He saw no activity at Silverstone and no other ac; he did not think he would have missed seeing the Red Arrows had he flown near them.

UKAB Note: The Robin pilot advised the GAD (CAA SRG) that he did not think he was involved in the event in question and being a

very experienced professional pilot he was very conscious of the need for flight safety. There is no doubt that his was the ac in question; it can be tracked continuously on radar, it followed the route described by the pilot and its Luton and Thames Radar squawks were allocated to his c/s.

**HQ MATO** reports that the Red Arrows were receiving a RIS from Brize Radar (ZONE) on 123.55. The Brize Norton radar was not available and the radar service was provided using Clee Hill SSR data only. The RIS had been correctly limited and acknowledged by the Hawk leader. At 1105:36, whilst the Hawks were inbound to the display area, ZONE transmitted *"Pop up traffic, 12 o'clock, range 6 NM, eastbound, no height information."* This call had also been made 10 sec previously, but a repeat had been requested. At 1105:58, ZONE updated the traffic information (TI) *"C/S that previously reported traffic now (unreadable) o'clock, 4 NM, south-east bound, slow moving."* Eighteen sec later, the Hawk pilot requested *"Give an update on that traffic please?"* to which ZONE replied *"Now R 2 o'clock, 3 NM, Southeast bound, slow moving."* Further TI was passed at 1107:13, *"C/S traffic SW, 4 NM, Southeast bound."* The Hawk pilot responded *"Copied thanks...do you have a height?"* to which BZN replied *"No height, same traffic."* ZONE gave a final call at 1107:29 *"Coming up on top of him now, south-east bound, no height"* and the lead pilot replied *"visual thanks."* Ten sec later, the Hawk pilot transmitted *"Brize, C/S, can you try and track him please, he's right in the TRA,"* later adding that an Airprox would be filed. Tracing action by AIS (Mil) later identified the ac.

LATCC radar recordings show the Hawks as a single radar contact, squawking 7003 with Mode C and turning R to track about 210° as they overfly the racing circuit at an indicated 1000 ft Mode C, which equates to 760 ft (+100 ft) on the Silverstone QFE 1005 mb. The Robin can be seen squawking 7000, without Mode C, tracking about 120°. The Hawks' groundspeed is 3 & 4 times faster than that of the Robin. The position of the Robin corresponds accurately with the TI calls made by ZONE during the minutes prior to the incident. The closest point

of approach recorded on radar occurs in the radar sweeps timed at 1107:27 and 1107:35. In the first frame, the Robin is in the lead Hawk's 12 o'clock position, range 0.5 NM, crossing R to L at 90° to the Hawk's track. The Hawk is still indicating 1000 ft Mode C (760 ft QFE) and tracking 210. The subsequent frame shows the lead Hawk indicating 1900 ft Mode C (1660 ft QFE) with the Robin in its 6 o'clock at about 0.25 NM. (UKAB Note: By interpolation, the lead Hawk passed almost directly beneath the Robin.) The Hawks then make a descending L turn back towards Silverstone, which takes them just over 0.5 NM ahead of the Robin, rolling out on a heading of 340°, whilst the Robin maintains its previous track. The Robin pilot's report states that he was flying at 3000 ft on the RPS (mb value not given). The Cotswold RPS at the time of the Airprox was 1020 mb. 3000 ft on this setting equates to 2550 ft on the Silverstone QFE. The Robin's track passes exactly 2 NM from the TRA datum.

UKAB Note: The video recording of the display shows the Hawks in vic formation crossing the display datum in a right turn, smoking red white and blue and ceasing smoke as they roll from a right into a left climbing turn. Traffic information is relayed by a formation member to the leader: "Traffic south east 2 miles" and "don't go any higher" as the 9 ac vic passes 65° AOB rolling into a wing-over to the left. There is no sign of the Robin on the recording at a similar level to the Hawks. The formation issues smoke again in the turn as it re crosses the Robin's track.

At the time of the incident, the Hawks were the only ac on ZONE's frequency and therefore the controller was able to dedicate full attention to the traffic situation around the TRA. The TRA boundary was also displayed on the dynamic map of ZONE's radar console. Although giving a limited radar service, ZONE provided accurate information and assistance to the Hawk pilots throughout, which successfully alerted them to the impending conflict. This is one of several incidents that have occurred this year, involving GA ac infringing TRAs established for the protection of jet aerobatic teams whilst conducting air displays and promulgated by AICs and NOTAMs.

**HQ PTC** comments that the Red Arrows were operating in a properly established TRA which had been promulgated by the widest means possible. Information on their activities also appears in quasi-official GA publications and is available on the AIS website and Freephone service. These measures reflect our general concern of the seriousness of intrusions into such large formation aerobatics. However, lack of information on the TRA was apparently not a factor in this case. While there is no doubt that the Robin was the ac concerned, it seems inexplicable that the pilot could be so aware of the event, have a proposed plan of avoidance and yet still fly through the TRA and into close proximity with the Red Arrows without apparently noticing anything unusual. Fortunately, the Zone controller was able to alert the Team leader and assist him in avoiding the Robin.

Worryingly, we can suggest no measure which would prevent an incident like this from recurring.

#### **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board asked how experienced the Robin's pilot was and were advised that he was an experienced ex-RAF pilot now flying commercial air transport. Members were at a loss to understand how a pilot with such experience could have been so far out in his

navigation, and have misjudged his 2 NM distance from Silverstone as 6 NM. Some members thought one explanation might be, despite the pilot's report, that he was unaware of the TRA. It was also pointed out that the preparation for and execution of a navex in a light ac presented a very different set of problems to those involved in fast jet or airliner operations, and wondered if the pilot had paid sufficient attention to what may have seemed a trivial task.

However, it was clear that the cause of the Airprox was the Robin pilot's penetration of the TRA and his non sighting of the Red Arrows. This in itself was hard to understand but it was probable that the Hawks approached 2000 ft below and along the axis of his wing and were out of sight beneath his ac. On re-crossing ahead they would have been beneath his nose but they were smoking as they passed from his 11 o'clock to the leading edge of his port wing and should have been visible there.

The Board understood how disturbing it would have been while manoeuvring a 'Big Vic' of Hawks to hear there was an ac in the TRA conflicting with their flightpath with no height information. While banked steeply it is less easy to judge vertical separation from another ac on the beam and the Robin may well have appeared very close to the Hawk pilots. However it appeared that there had been about 1000 ft of vertical separation between the lead Hawk and the Robin. Some members considered that in these circumstances there had been no risk of collision, but a majority, taking account of the width of the Red Arrows' formation and the Robin pilot's non-sighting of the Hawks, considered that the safety of the ac had been compromised.

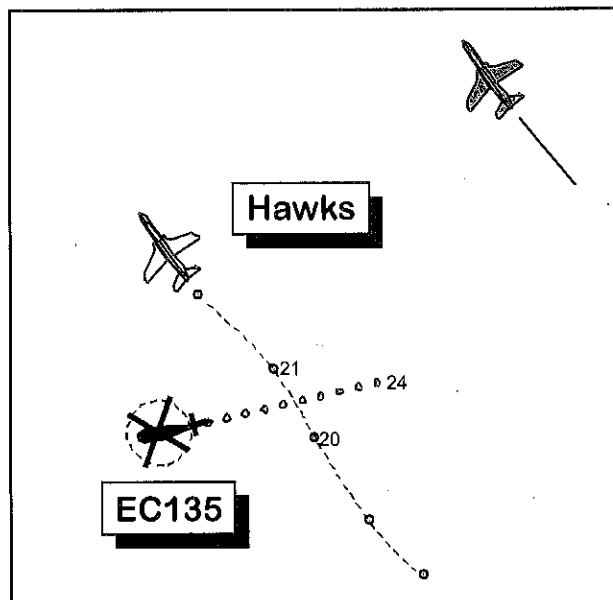
#### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: The Robin pilot penetrated the TRA and did not see the Hawks.

## AIRPROX REPORT No 121/99

Date/Time: 15 Jul 1145  
Position: N5314 W0349 (4 NM S of Llandudno)  
Airspace: FIR/LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: EC 135 Hawk  
Operator: Civ Comm HQ PTC  
Alt/FL: 2400 ft 2000 ft ↑  
(RPS 1013 mb) (RPS 1006 mb)  
Weather VMC CLBC VMC CLNC  
Visibility: 10 KM+ 10 km+  
Reported Separation: 400 m, 50 ft/1 NM  
Recorded Separation: 0.7 NM, 300 ft



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

**THE EC135 PILOT** reports heading 250° at 130 kt in a transit at 2400 ft. He had been watching a pair of Hawks for several minutes before the incident; they were manoeuvring to the S of his track and well below. TCAS had drawn his attention to them when they were 6 NM away. The Hawks then turned N and entered a climb, passing 4-500 m astern and 50-100 ft below, without making any sign of having seen him. He considered the risk of collision would have been high if the Hawk pilot had not seen him, and he only saw one of them at the time of the Airprox. He suggested that fitting TCAS to the Hawk would eliminate collision risks and added that although the equipment was a tremendous bonus, the helicopter's lack of manoeuvrability compared with a Hawk meant that even having seen a fast jet there was often not much the helicopter pilot could do about it. The TCAS in question is TCAS1 which provides traffic information only.

**THE HAWK PILOT** reports heading 330° at 360 kt squawking 7001 and HISL on, with his wingman 2000 yd to his right. He saw a helicopter 4-5 NM in his 11 o'clock and slightly above and while climbing out from low level continued to watch it move left on a westerly heading. He waggled his wings and passed about 1 NM behind the helicopter at a similar

level. There was no risk of collision and no need for avoiding action.

Note: LATCC radar recordings show the incident as described by the pilots. The EC135, identified from its 0032 squawk, is tracking 258° at 2400 ft Mode C. The Hawks are represented by a single 7000 squawk (not 7001 as reported) which is manoeuvring to the S and SW of the helicopter before turning to climb gently on a track of 321°. It passes just over 0.7 NM or 1450 yd behind the helicopter, climbing between 2000 and 2100 ft as it crosses the EC 135's track. The leader advised that his was the ac which was squawking. (The Holyhead RPS at the time was 1012 mb and the actual QNH was 1007 mb.)

**HQ PTC** comments that it seems plain from both reports that each had the other in sight for some time before the event and that the angle of their encounter ensured that there was little risk of collision. It is a pity that the EC135 pilot was not able to be reassured by the Hawk lead's "waggle".

### PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, radar video

recordings and reports from the appropriate operating authorities.

It seemed that the Hawk pilot must have performed his wing rock while out of sight behind the helicopter; at least, the helicopter pilot did not see it and thus was not reassured. The Board was interested that this helicopter had been fitted with TCAS which should undoubtedly enhance its safety, if it does not distract the pilot at an inopportune moment. The fitment of a collision warning system to fast jets was a matter the MoD had had under research for some time. No one doubted the benefits; it was more a question of competing operational demands for limited funds.

The BHAB member, who is in the same line of work as the filing pilot, disagreed with the suggestion that a helicopter would have difficulty, in the circumstances of the Airprox, in taking effective avoiding action from a fast jet; in a hover or with a USL matters might be different. From the information available, the Board agreed that the Hawk had passed well clear, horizontally and vertically and that the incident was not more than a sighting report. However, it was probable that the report could have been avoided altogether if the helicopter pilot had seen the Hawk pilot's wing rock, which was a lesson for fast jet pilots.

### PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Sighting report.

### AIRPROX REPORT No 122/99

Date/Time: 7 Jul 1319

Position: N5108 W0215 (The Park gliding site - elev 697 ft)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	Glider	PA28
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<u>Operator:</u>	Civ Pte	Civ Pte
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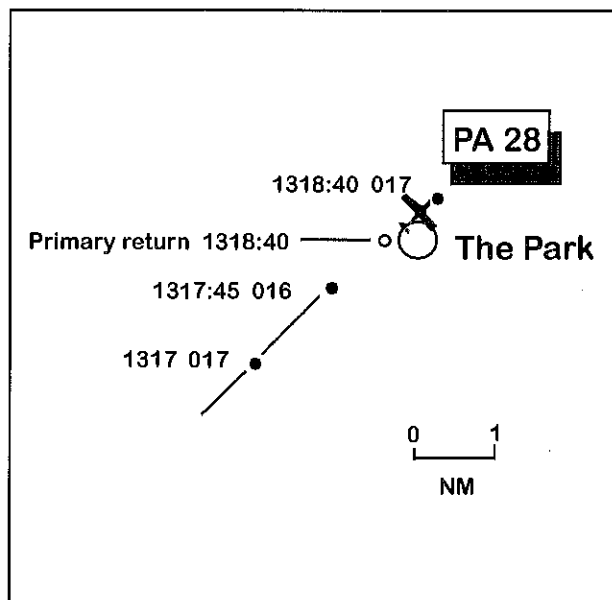
<u>Alt/FL:</u>	1400 ft ↑ (QFE)	1700 ft
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<u>Weather</u>	VMC CLBC	VMC NIL
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<u>Visibility:</u>	10-15 NM	v good
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Reported Separation:  
50 ft V 50 yd H / not seen

Recorded Separation: N/K



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

**THE GLIDER PILOT** reports that he was being winch-launched solo from The Park gliding site. The visibility, 500 ft below cloud, was 10 – 15

km in VMC. As normal in a winch launch he had a high nose-up attitude and, because of the wind, his starboard wing was slightly lowered to compensate for drift. These factors inhibited lookout, particularly in the direction from which

the other ac came. He was climbing through 1400 ft (QFE) heading 260° at 50 kt and about to relax backward pressure on the stick prior to cable release, when a low wing single engined ac appeared about 50 yd ahead and 50 ft above tracking from L to R. Although it was very close it was quickly apparent that the ac would not actually collide; however, because of his vulnerable attitude on the cable, he thought it would be unwise to attempt any turn manoeuvre off the cable. He felt there had been an extremely high risk of collision and reported an Airprox to the UKAB.

UKAB Note (1): The glider pilot's account is supported by a report from the winch operator who describes the light ac appearing directly overhead the winch, having approached from WSW and behind the operator. Because of the noise from the winch it was only possible to detect the other ac visually. The glider was at about 60° elevation, slightly higher and about 5 wingspans away from the light ac. He elected to continue the launch as he could see that the intruding ac was clear of the cable; to release early might have proved hazardous had the glider pilot dropped his nose and turned.

**THE PA28 PILOT** reports that he was flying from Yeovil to Denham in very good VMC; his plan was to route northeast to Keevil at 2300 ft skirting the NW edge of D123. From memory he was squawking with Mode C and probably receiving a RIS or a FIS from Yeovilton at the time of the incident, though he thought he may have previously been under a RAS. At some point, which he cannot recall, Yeovilton put him onto a more easterly heading to skirt/exit their zone and by the time he was told to resume his own navigation he realised (in hindsight) he must have been approaching The Park. He remembers being given advisory traffic information which had prompted him to keep his altitude down, but at no time does he recall being as low as 1700 ft on QNH or QFE. He did not see the glider in question and believes the incident probably occurred while he was trying to decide whether to re-establish his original route to Keevil or request an ATC service and transit via Boscombe.

UKAB Note (2): AIS (Mil) advised UKAB that during the initial tracing process the Burrington, Pease and Heathrow radars did not show the PA28 and the Clee Hill was not used because it was thought the incident position was outside its area of cover. However, some weeks later, while tracing another ac in an unrelated incident using the Clee radar head, the Yeovil squawk was observed and the PA28 was subsequently identified. Hence the PA28 pilot did not complete his report until 2 Sept and UKAB did not receive it until 10 Sept.

HQ MATO reports that due to the elapsed time between the Airprox and the subsequent tracing of the PA28 (6 – 7 weeks) the Yeovil Radar (LARS) RT recording was not available and the controller concerned could not be identified. The only record of the PA28's flight was a FPS. Available data shows that the ac had departed from Yeovil for Denham at a reported altitude of not above 2000 ft on the Portland RPS (1023). The ac was squawking 0231 and receiving a FIS from LARS.

The base of Yeovilton's radar cover in the area of the Airprox is about 1800 ft amsl. The Park gliding site is not marked on the Yeovilton radar displays and no information regarding activities there would be available to controllers.

UKAB Note (3): A replay of the LATCC radars does not show the Airprox. However, at 1317, the PA28, identified by its Yeovil squawk, can be seen heading NE towards the Park Site indicating 1700 ft Mode C. From archive data, the QNH at this location was 1025mb, giving a height of about 1363 ft for the PA28 above The Park's elevation. The ac passes less than 005 NM W abeam The Park at about 1318:20; 20 sec later it is 006 NM NE of the site at which time a slow moving primary contact, believed to be the glider, appears about 005 NM in trail. At 1318:49 the PA28's squawk disappears as the pilot changes to code 7000, which suggests that the pilot may already have left the LARS frequency on instructions to change to an en-route frequency at, or shortly before, the time of the Airprox.



UKAB Note (4): The Park gliding site is notified in the UK AIP for the winch launching of gliders up to 3000 ft agl during the hours of daylight (ENR 5-5-1-6). The site is also marked on the ICAO topographical chart with a warning of cables up to 3000 ft agl.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, the glider winch operator, radar video recordings, and reports from the appropriate ATC authorities.

The Board was very concerned that the PA28 pilot had flown in such close proximity to a notified winch launch glider site and not seen the reporting pilot's glider. They believed this to be fundamental to the cause of the Airprox. However, during the discussion it became apparent that there was also a "Groundsmanship" lesson to be learned from this Airprox. Whilst the PA28 may have been out of sight prior to launch, it was incumbent on the ground handling party to ensure the airspace into which the glider was to be

launched was clear of other traffic, both before and during the launch. Clearly if the noise of the winch adversely affects the detection of other traffic a very careful visual search must be made prior to each launch. In this instance it is reported that the PA28 "...appeared directly overhead from behind the winch", leading some members to suggest that the ground party may have been concentrating on the glider itself, to the detriment of lookout in a WSW direction to where the glider was going. Whilst the PA28 pilot did not recall flying below 1700 ft agl over The Park glider site, where the elevation is nearly 700ft, on the radar recording the ac's verified Mode C indicated that he did, thereby lending support to the Glider pilot's contention that it was indeed a close encounter. Therefore, the Board believed this Airprox resulted because the PA28 pilot did not see the glider on the winch and flew into conflict with it, over a notified glider site. Whilst the Glider pilot had stated that the ac would not have collided, the relative distances involved, the lack of manoeuvrability of the glider on the cable, coupled with the non-sighting by the PA28 pilot led the members to conclude that the safety of both ac had not been assured.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

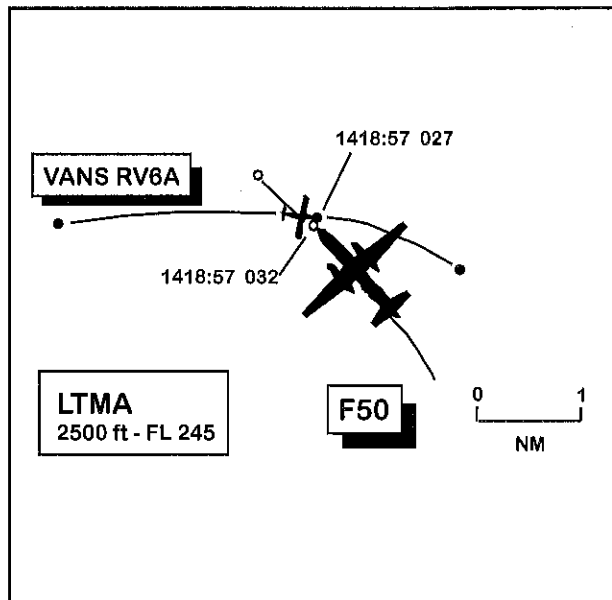
Degree of Risk: B

Cause: The PA28 pilot did not see the glider on the winch, which he flew into conflict with over a notified glider site.

**AIRPROX REPORT No 123/99**

Date/Time: 16 Jul 1419  
Position: N5138 W0000 (5.5 NM WSW LAM)  
Airspace: LTMA/FIR (Class: A/G)  
Reporter: LATCC TC

<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u> F50	VANS RV6A
<u>Operator:</u> CAT	Civ Pte
<u>Alt/FL:</u> 3000 ft (QNH)	2700 ft
<u>Weather:</u> IMC	VMC CAVOK
<u>Visibility:</u> n/a	>10 km
<u>Reported Separation:</u> not seen	not seen
<u>Recorded Separation:</u>	500 ft V/300 M H



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

LATCC TC (NE DEPS LOREL) reports that the F50, outbound from London City to Manchester, called on the DEPS frequency at 3000 ft on the departure SID. STCA then alerted on a 7000 squawk tracking W to E without an apparent Mode C. The F50 pilot was instructed to expedite a climb to 5000 ft. Traffic information was passed and avoiding action given, though the latter was not required because the unknown return then displayed a Mode C altitude of 2800 ft (London QNH 1018mb); as the F50 was showing 3200 ft climbing at the time, vertical separation was assured and the F50 pilot was instructed to resume normal navigation.

UKAB Note (1): The F50's Flight Safety Manager subsequently spoke to the ac's captain who confirmed that he was level at 3000 ft as cleared, having departed from London City Airport. He was in contact with LATCC to whom he had just been passed by London City ATC. The controller instructed him to expedite a climb to 5000 ft, which he did, and then asked him if he had seen other traffic at his 2 o'clock position. He replied that he had not as they were in IMC. The captain added that the circumstances did not seem particularly unusual and the only reason he remembered

the incident was the urgent tone of the controller when instructing an expeditious climb to 5000 ft. He was unaware that any report was being filed.

**THE VANS RV6A PILOT** reports that he had departed from Wycombe Air Park in good VFR conditions with one passenger on board for a destination in France. His speed was about 140 kt, and he was squawking 7000 with Mode C while listening out on the Thames radar frequency. He believes he would have been in the vicinity of the Airprox position at about 1420. Being based at Wycombe, he was very familiar with the initial routing through the London area, particularly with regard to Luton, Heathrow, London City and Stansted, and the limitations of the LAM corridor of 2500 ft. He recalled routing E toward LAM to ensure he crossed the Lee Valley Lakes at the causeway (this enables the congestion around the LAM VOR to be avoided, and a direct route to Dover flown without infringing the London City CTA).

Thames radar was not contacted as they seemed to be very busy; furthermore, they had asked Wycombe pilots not to call them if they only required a FIS. His flight through the Wycombe/LAM sector would have been at around 2400 ft which, although close to the upper limit of the corridor, provided a safe margin in the event of an engine failure. Neither

he nor his companion, also a pilot of similar experience, could recall seeing another ac in close proximity.

In a subsequent discussion with AIS (Mil) he was told that he had climbed to about 2700 ft, thus penetrating the London TMA. He understood the flight safety implications of this and was very concerned if he had inadvertently infringed CAS. The pilot comments that at the time of writing he had not been able to check the calibration of his altitude encoder but intended to do so as soon as possible.

UKAB Note (2): From archive material the visibility was 30 km. The cloudbase in the Lambourne area was 3/8 at 2500 ft and 7/8 at 2800 ft and the London QNH 1018mb.

UKAB Note (3): A replay of the LATCC radar at 1418 shows the F50 about 5 NM N of London City airport turning L through N and indicating 2900 ft Mode C. At the same time a 7000 return, indicating 2600 ft and previously observed departing from Wycombe Air Park, is heading E at the F50's 10 o'clock 5.5 NM. The F50 continues a sweeping climbing L turn towards the NW and at 1418:57, 5.5 NM WSW of LAM, the radar contacts of the ac partially merge as they pass starboard to starboard with the F50 indicating 3200 ft and the other ac 2700 ft. Lateral separation cannot be measured precisely but, as the radar returns were touching, it is likely to have been in the order of 300 m or less.

UKAB Note (4): The Rules for Visual Flight in Class G airspace require a pilot flying below FL 100 at 140 kt or less to be clear of cloud and in sight of the surface.

UKAB Note (5): In a subsequent telephone conversation the VANS RV 6A pilot stated that during the next flight one month later to Amsterdam he requested a Mode C check. Allegedly, the Dutch controller reported that the indicated Mode C value was 200ft above the altitude shown on his barometric altimeter. Shortly afterwards the ac was damaged in an accident and is currently grounded.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

GA members felt that there was a fine balance of airmanship to be struck whilst flying VFR in Class G airspace, but in close proximity to the base of CAS. Pilots had to choose between flying at an altitude which would afford an appropriate margin below the base of CAS - and thus remain clear of traffic within it - or staying high enough to allow for a forced landing in the event of an engine failure. The basis of this incident was an unverified Mode C indication from the VANS and resultant STCA alert, but it was clear to the members of the Board that without the Mode C indication an Airprox report would have been unlikely. The LATCC radar recording shows that the VANS unverified Mode C indicated a maximum of 2700 ft (1013mb), which equates to about 2835 ft amsl (London QNH 1018mb) and in accord with the maximum altitude of 2800 ft observed by the LATCC TC NE DEPS LOREL controller. The Board noted that on the very next flight when the VANS pilot called for a "correspondence" check of his Mode C/barometric altimeter, the actual altitude was 200 ft below that indicated on Mode C and within the tolerance for verification. This was reassuring. It was a matter of conjecture, therefore, if the VANS pilot had inadvertently climbed above 2500 ft amsl into Class A airspace and by what amount. In the end the Board concluded the cause of the Airprox was an apparent penetration of the London TMA by the VANS. However, at the closest point of approach between the two ac 500 ft of Mode C separation was indicated; when the F50 climbed rapidly through 3200 ft (1013mb). This led the members to assess that no risk of a collision existed.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

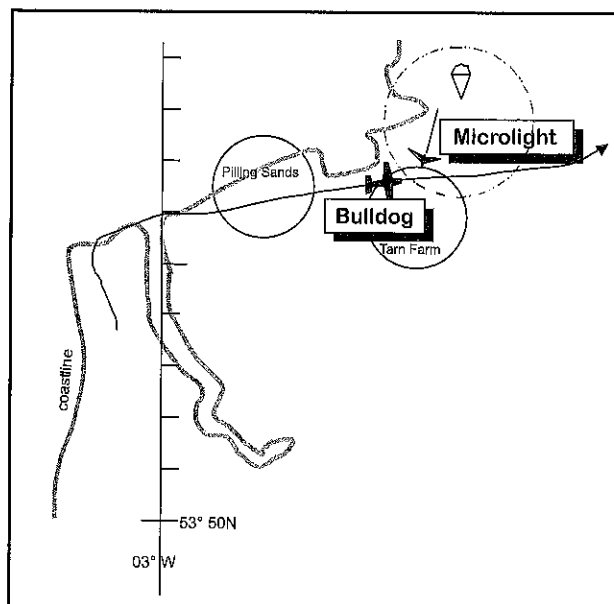
Cause: Apparent penetration of the London TMA by the VANS RV6A.

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### **AIRPROX REPORT No 124/99**

Date/Time: 19 Jul 0909  
Position: N5356 W0250 (6 NM E of Fleetwood)  
Airspace: FIR/LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Microlight Bulldog  
Operator: Civ Pte PTC  
Alt/FL: 600 ft ↓  
(QFE 1007 mb)  
Weather VMC CLBC VMC  
Visibility: 60 km  
Reported Separation: 2-300 m, 200 ft  
Recorded Separation: NK



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

**THE MICROLIGHT PILOT** reports heading 200° at 55 kt descending through 600 ft on finals to land at the Tarn Farm microlight airstrip when a military trainer ac passed right to left about 2-300 m in front and 200 ft below him. It had passed before he could react and he thought the risk of collision was fairly high. It was a single engined low wing ac, either a Bulldog or a Tucano which passed directly over the microlight site. He described its colour as 'RAF training livery.' When asked later what he meant by this, he said the ac was red and white, and thought it was probably a Bulldog.

**UKAB Note:** Initial tracing action was hampered by the use of incorrect settings on the radar replay console which resulted in no ac being seen in the Airprox area. The Request Ident procedure was invoked but disclosed no military ac in the area at the time. It was subsequently realised that the area was well within the coverage of the Gt Dun Fell radar and

a further replay was conducted which disclosed an ac transiting the Tarn Farm MS site as reported by the microlight pilot. Its track also passed through the adjacent Pilling Sands MS site. The complete track concerned was investigated and found to have adopted a Blackpool squawk in the Blackpool area; ATC there was able to provide the identity of a Bulldog from Woodvale which had been allocated that squawk at the time. The Tarn Farm (and Pilling Sands) microlight sites are listed in the UK LFH. The Bulldog's Mode C showed 900 ft as it crossed the MS; this equates to 750 ft agl on the existing QNH (1008 mb).

**THE BULLDOG PILOT**, when contacted, had no memory of the sortie and was unable to provide any information beyond what was disclosed on the radar recording.

**UKAB Note:** UK LFHB LFS rules for light propeller driven ac include the following: 11 (b) states that such ac are considered to be low

flying when at less than 500 ft MSD. 25 (e) states that avoidance areas are to be avoided or overflown by 1000 ft MSD, and 25 (n) (1) states that, at microlight sites, these rules do not apply to light ac flying at less than 140 kt, which are to operate under the see and avoid principle.

**HQ PTC** comments that the exception which applies to light ac in this case is predicated on the "see and avoid" principle which in this case clearly did not work. A greater degree of prudence would have been more appropriate at such a formative stage of flying training. Notwithstanding the summer change around of UASs and some initial doubt over the precise timing of the event (both of which served to confuse) we are also unhappy that it took so long to identify the ac concerned. However, HQ EFT have acted appropriately to ensure that the lessons have been learned and that Units take prompt and appropriate initial and follow-up action.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Non-sighting of the microlight by the Bulldog pilot and the late sighting of the Bulldog by the microlight pilot.

recordings, and reports from the appropriate operating authorities.

While the microlight pilot believed he was at 600 ft when he saw the Bulldog pass 200 ft below his level, the Bulldog's Mode C indicated that it was somewhat higher. While the Bulldog pilot was not contravening any rules by flying where he was, he was required to see and avoid microlights using the Tarn Farm site. The fact that he did not see the microlight indicated how difficult they were to spot and emphasised the advisability of avoiding their sites anyway; members considered that even if this was not mandated, it was good airmanship. The site was Class G airspace and not marked on CAA 1:500 000 charts so the microlight pilot had a responsibility to keep a general lookout for passing traffic such as the Bulldog. The Board concluded that the cause of the Airprox was the non-sighting of the microlight by the Bulldog pilot and the late sighting of the Bulldog by the microlight pilot.

Because the Bulldog pilot passed fairly close to the Microlight on finals without seeing it, the Board assessed that the safety of the ac had been compromised.

**AIRPROX REPORT No 125/99**

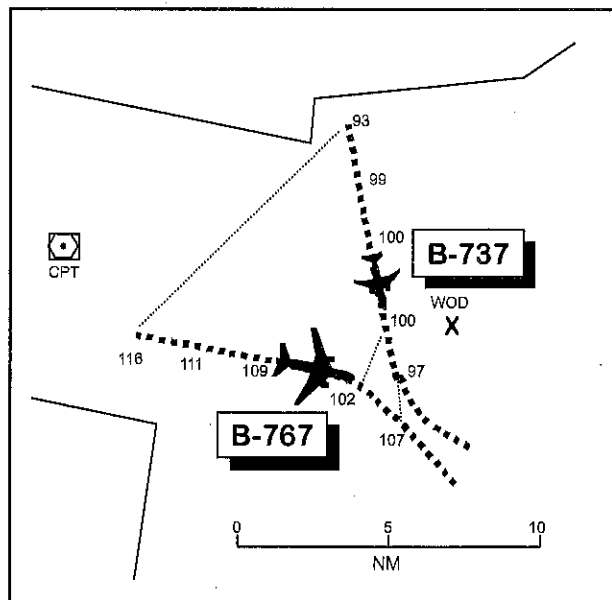
Date/Time: 19 Jul 1833  
Position: N5126 W0057 (3 NM W of WOD)  
Airspace: LTMA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: B737-300 B767  
Operator: CAT CAT  
Alt/FL: FL 100 ↓ FL 100  
Weather VMC CLNC VMC  
Visibility: 10 km+  
Reported Separation:  
2 NM, 600 ft/1 NM, 3-500 ft  
Recorded Separation: 1.9 NM, 200 ft

**BOTH PILOTS FILED**

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

**THE B737 PILOT** reports heading about 160° at 350 kt level at FL 100 during a departure through the London TMA. He saw a B767 or B777 in his 2 o'clock descending towards his FL on an easterly heading; immediately ATC urged the other ac to climb back to FL 110 and to turn right as an avoiding action. He was also advised to turn onto 090° and to descend to FL 90. Avoiding action was initiated in a firm but passenger-friendly manner and he advised ATC that he had the other ac in sight. The time from first sighting to closest point was 15-30 seconds; he did not report any TCAS indications.

**THE B767 PILOT** reports following a 110° vector at 220 kt and had been cleared to descend from FL 140 to FL 110. He was then cleared direct to OCK and, he believed, to maintain FL 100. His FO (PNF) read back the clearance, he thought, to FL 100. While the FO was programming the FMC to take them to OCK, he selected FL 100 in the ALT window and started a descent in flight level change mode (FLCM). The FO, busy with the FMS, did not notice this. At about FL 105 the controller, sounding obviously distressed, gave him a turn of 20° to the right and told him to maintain FL 110. He started the turn and selected 'Alt Hold'. At that point he received a TCAS RA to climb at



1500 ft/min so he disconnected the autopilot and started to climb in accordance with the TCAS indications. Another controller then came on the RT and told him he had been cleared to FL 110. At this point the other ac passed behind. He was subsequently recleared to Ockham and to descend to FL 100.

**LATCC** reports that the B767 was on an OCK 1F STAR to LHR and the B737, having flown a CPT SID from Luton, was on a radar heading of 180° at FL 100. The trainee Ockham SC therefore cleared the B767 to descend to FL 110 and to maintain the radar heading of 110°. The following RT exchanges took place:

- B767 (1829:30) London good evening (c/s) with you descending to 140 heading 110.
- OCK SC (c/s) Continue on the heading descend flight level 110.
- B767 Down to one one zero (c/s).
- OCK SC (1832:05) (c/s) Route direct to Ockham maintain flight level one one zero.
- B767 Direct Ockham maintain one one zero.

Ock SC (1832:50) (c/s) Maintain flight level one one zero turn right immediately turn turn right heading 180 degrees

B767 OKAY turning right and maintaining er one one zero (c/s)

Ock SC (Avoiding action then passed to B737)

There was no mention of TCAS avoiding action on the RT.

(UKAB Note: Because of the B767 pilot's recollection of the conversation, the RT recording was rechecked; the recording is absolutely clear with no possibility of misinterpretation and is correctly transcribed above.)

Radar recordings show the ac converging towards a point just west of Woodley with the B737 levelling at FL 100 at 1832:22. The B767 is in a descent from the W and levelling at FL 110, 7 NM in the B737's 1:30. At 1832:37 the B767 resumes its descent with 5.4 NM between the ac. 5 seconds later the STCA is triggered with the B767 passing FL 108, 4.9 NM from the B737. The STCA turns red 16 seconds later as the B767 passes FL 105, 3.3 NM in the B737's 1 o'clock. At 1833:07 the B767 which has begun to turn right, stops its descent at FL 102, 2.4 NM in the B737's 1 o'clock. Both ac turn and are then parallel, tracking 136°, with the B767 1.2 NM ahead as it climbs back to FL 110. The B737 moves away to the E at FL 90; the B767 was recleared to Ockham before completing its turn onto 180°.

**THE B767 PILOT'S COMPANY** provided information from company SOPs which did not include a description of specific responsibilities of the PF and PNF regarding who should make changes to the autopilot ALT selector and what should be done to elicit a check from the other pilot. (The company will consider a more formal procedure in their next SOP revision.) There is a requirement for the PNF to call the passing level and assigned level with 1000 ft to go to level off altitude and for the PF to acknowledge; presumably this should have required the FO

(PNF) to have called out "FL 120 for 110". In addition the SOP includes the following:

"The PNF will communicate with ATC but both pilots must be aware of all clearances received. The captain and FO will ensure that the MCP altitude and transponder are correctly set. . . . In flight when the autopilot is engaged, MCP selections shall be accomplished by the PF (altitude selections may be done by the PNF) while CDU selections are accomplished by the PNF. All CDU entries must be verified by the PF prior to execution."

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members found much to discuss in this incident whose cause seemed clear; the B767 pilot had descended through his cleared level having apparently misheard, more than once, the level required. This was a human error which occasionally arose. In this case the pilot appeared to have missed 2 other clues available in UK airspace; first, the word 'maintain' is never used by a UK controller in connection with a change of level, and second, the phrase 'Flight Level one hundred' is used in UK FIRs for FL 100, to help overcome the common confusion with FL 110. (The UK CAA has requested that the company's Flight Operations Manager should remind his pilots of these points.)

In further discussion, airline pilot members of the Board considered that there had been a breakdown in crew co-ordination arrangements designed to detect and correct such common errors as this. It appeared that one pilot was attending to the direction the ac should take and the other to its level with neither consequently able to check what the other was doing. While not meaning to interfere with a company's

operational procedures, and with only a partial understanding of this company's SOPs, members observed nonetheless that operations manuals based on the concept of one pilot flying the ac and the other checking what he was doing appeared to produce fewer incidents. Mandating that 'Both pilots are to check . . . etc' appeared less effective than stating which pilot (PF, PNF) should carry out an action and which pilot should check that it was correct.

Members also observed that the B767 pilot did not say on RT that he was following a TCAS RA, as is required, but that since this was in the

direction required by ATC, no further problems resulted. Finally, the Board congratulated the Ockham sector control team, trainee and mentor, on their swift and competent handling of a frightening situation which developed very quickly leaving them no margin for error. While the situation had some disastrous potential, members took note that the B737 pilot was immediately aware of the problem, saw the B767, and was always in a position to avoid it if he had considered it necessary. This, in addition to the alertness of the OCK SCs, led the Board to conclude that there had not been a risk of the ac actually colliding.

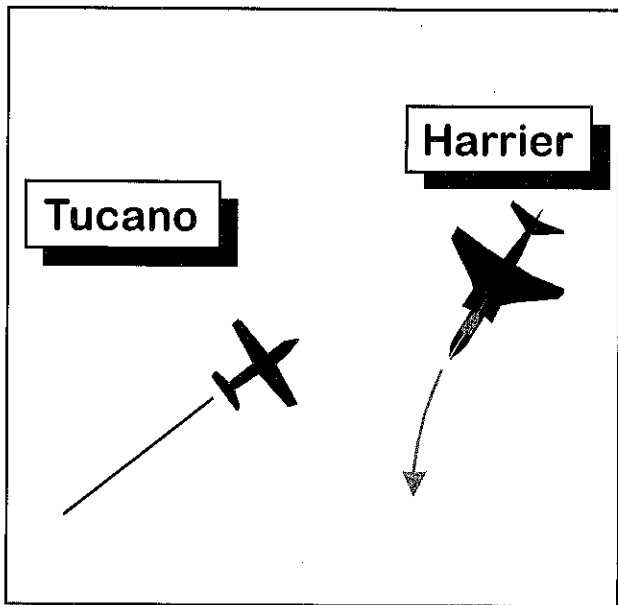
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The B767 pilot descended through his cleared level.

**AIRPROX REPORT No 126/99**

Date/Time: 14 Jul 1332  
Position: N5539 W0212 (2 NM SE of Coldstream)  
Airspace: LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tucano Harrier  
Operator: HQ PTC HQ STC  
Alt/FL: 250 ft 250  
 (msd) (Rad Alt)  
Weather VMC CLBC VMC  
Visibility: Unltd  
Reported Separation: 10 m V, 10-20 m H  
Recorded Separation: NK



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

**THE TUCANO PILOT** reports that whilst at 250 ft MSD, heading 066° at 195 kt on a low flying training sortie, the rear-seat pilot (instructor) saw 2 Tornados manoeuvring in his 11 o'clock and another high in his 5 o'clock also tracking N. Having satisfied himself that there was no

risk of collision, he continued his lookout scan, starting in his 7 o'clock and scanning clockwise. As his scan passed through the nose, he became aware of a Harrier just to the right and slightly low. The ac was ahead of him, with significant left bank, and seemed to be about 20-30 ft away (initially estimated as 10-20 m).



He quickly assessed from the sight-line rate, however, that the 2 ac would not collide. The Harrier appeared to have a level flightpath, possibly descending, and was on a reciprocal to his own track. As the ac passed, the Tucano instructor noticed the rapid change in the Harrier's nose position and considered that it may have departed from controlled flight. He initiated a climbing left-hand turn with the intention of filing an initial Airprox report with Edinburgh.

**THE HARRIER PILOT** reports that in the course of a pre-planned offensive counter air training sortie, heading SW at 420 kt, he was flying in loose tactical formation, as the starboard ac of a pair, with a number of escorting Tornado F3s. Having seen one of the escorting fighters in his 10 o'clock, he suddenly caught sight of an ac just to the right of his nose and pointing at him. For a moment he identified the ac as a Jetstream and decided to manoeuvre to the left to maintain separation. He immediately realised that it was a Tucano at extremely close range and that a collision was imminent. He rolled left and pulled back hard.

**HQ STC** comments that on the basis of this evidence alone, it seems that this Airprox once again highlights the ever-present risk of a random mid-air collision between 2 military ac operating in the UKLFS. Without the integration of a comprehensive and advanced Collision Warning System, incidents such as this will remain a factor. It would appear that, ultimately, the principle of see-and-avoid was effective; however there is strong evidence to suggest that the margin of error was reduced to such a degree that the manoeuvre required to break the collision resulted in the loss of an ac. This comment does not represent the findings of the Board of Inquiry into the loss of the Harrier; the president has yet to conclude his investigation.

**HQ PTC** comments that the Tucano pilot was engaged in a properly authorised and booked low-level navigation sortie when he encountered this group. Not knowing how many there were, he could not be sure that he could maintain continuous awareness of all the ac involved, despite keeping a good lookout.

We welcome the measures now in place to assist our training ac to keep clear of such operational groups, and we strongly endorse STC's plea for the universal fit of a CWS to all ac, including our own, which operate in this demanding environment. The caveat applied to the HQ STC remarks applies equally to these.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board concluded that the cause of the Airprox, which contained a very high risk of collision, was a late sighting of the other ac by each pilot. This was not a criticism of their lookout (which in both cases had obviously been heightened by the knowledge that there was a lot of activity in the area) but was more a statement of fact. A 600 kt closing speed, ac camouflage and a terrain background all played a part. Added to that was an acknowledgement that lookout cannot cover 360° in 2 planes and 180° in the third simultaneously which meant that, occasionally, conflicting ac would not necessarily be seen at the instant they became visually observable objects. It appeared that the Harrier pilot had almost achieved such a sighting, but he had not seen the Tucano in time to analyse the sighting as well as take effective avoiding action.

The Board agreed with HQ STC and HQ PTC that the incident and the subsequent loss of the Harrier could only lend weight to the argument in favour of a CWS. The last reorganisation of the LFS had greatly reduced the frequency of head-on Airprox, where fast jet closing speeds rendered a timely sighting so unlikely, but the remainder of the LFS allowed encounters such as this, which remained an operating risk.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Late sighting by both pilots.

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### AIRPROX REPORT No 127/99

Date/Time: 19 Jul 1114

Position: N5148 E0226 (9 NM W REFSO)

Airspace: UAR (Class: A)

Reporter: LATCC

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	B757(A)	B757(B)
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<u>Operator:</u>	CAT	CAT
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<u>Alt/FL:</u>	↓FL 280	FL 350
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<u>Weather</u>	VMC CAVOK	VMC CAVOK
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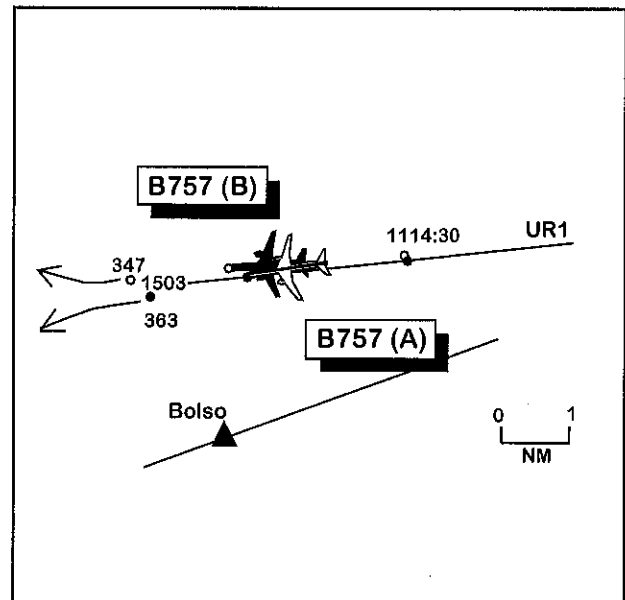
<u>Visibility:</u>	10 km	>10km
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<u>Reporting Separation:</u>	1200 ft	800 ft V
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<u>Recorded Separation:</u>	1100 ft V	Nil H
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## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LATCC reports that all systems were serviceable. The ac involved in the incident were two B757s inbound to Heathrow, which were in the vicinity of REFSO, one at FL 350 and the other at FL 390. They were virtually coincident in plan and, as the lower B757 was on an unconverted non ORCAM code of 4117, it was displayed as a background track which was shown relatively dimly when compared with the foreground track of the ac above it, which was callsign converted. The two controllers concerned were respectively handing over and taking over the CLN sectors 13 and 14 which were combined at the time. Traffic loading was moderate to heavy and the trainee CSC, who had identified a peak in the traffic between 1115 and 1120, had considered splitting the sector. However, his mentor assessed that the traffic situation was sustainable by the combined sector.



Both ac called simultaneously and were instructed to maintain their respective levels. At 1112:55, the B757 at FL 390 requested descent and was instructed to descend to FL 280. During this period RT loading was high and when the instruction was issued the ac were precisely one on top of the other. At about this time the process of handing over the position began. As the acs' forward estimates for LOGAN were within one min of each other, their FPSs would have been adjacent or very close to each other in the strip display. However, the information on these FPSs was clearly not assimilated by the handing over controller when he issued the descent clearance, and the position of the B757 at FL 350 was neither notified by him to the oncoming controller nor questioned by the latter during the handover. At 1114:20, by which time the handover was complete, the lower ac reported "somebody descending on top of us". This came as a surprise to the oncoming controller who was still unaware of this ac's position, so he asked for a

repeat of the message. However, at 1114:27 the higher ac reported being in a TCAS climb followed immediately afterwards by the lower ac reporting a TCAS descent. Realising immediately what had happened, the controller instructed the former to turn L heading 200° and the latter to turn R heading 300°, and then passed each pilot traffic information. The ac turned expeditiously onto these headings and standard lateral separation was quickly restored. Minimum vertical separation of 1100 ft occurred at 1114:46.

**B757 (A) PILOT** reports that he was in his own navigation for REFSO at FL 390 and heading about 275° at M0075 under the control of LATCC. Flying conditions were CAVOK. ATC cleared him to descend to FL 280. On passing about FL 363, a TCAS RA demanded climb, whereupon the ac was levelled and at the same time ATC instructed a L turn onto 200°. Although the other ac was seen to pass about 1200 ft directly below them, he felt there had been a high risk factor in the encounter. The pilot comments that the 2 initial LATCC frequencies in use were far, far too busy to enable him to query his descent clearance.

**B757 (B) PILOT** reports that he was cruising at FL 350 at M0079 under the control of LATCC and tracking westbound towards Heathrow. The visibility was 50 km in VMC. A TCAS TA alerted traffic and very shortly afterwards an RA demanded descent. The auto pilot was disconnected and the RA followed until clear of the conflict, as per Company procedures; at this point ATC instructed him to turn R. Although the other ac was seen about 800 ft directly above them, he nevertheless thought there had been a high risk in the encounter.

The pilot comments that he was aware that the other ac (a Company B757) had been 4000 ft above him for some time. The CLACTON controller was extremely busy and it took about 5 min for him to establish contact on transfer from Maastricht. He saw the other B757 begin its descent and assumed it had been cleared to FL 370. As it passed about FL 368 he called ATC to query it but the TCAS warning was received before they could reply.

**ATSI** reports that the Airprox occurred in Class A airspace near Reporting Point REFSO. This is within a portion of airspace where the provision of Air Traffic Services at FL 235 and above is delegated to LATCC, and is known as the GORLO Box. REFSO is also the Start Processing fix for Flight Data provided by the Host Computer System (HCS) to support the CLACTON Sector.

At the time of the incident, CLACTON westbound Sectors 13 (High level) and 14 (Low level) were being operated in the banded mode and there was a high RT workload. Analysis of the traffic counts shows that although the demand for the sectors when counted individually was well within capacity, when combined the demand exceeded capacity by a significant amount for a period of 2 hours between 1000 and 1200. Additionally, there was one ac on frequency at the time of the Airprox which would not have been included in the westbound traffic count as it was eastbound but required to work the westbound controller(s).

B757 (A), from Hannover to London Heathrow, was cruising at FL 390 and first called the CLACTON sector at 1110:30. The end of the transmission was garbled with another transmission, which was also garbled and ended "—SO", with the result that the CLACTON controller did not acknowledge the call. The following transmission was the initial call from B757 (B) (of the same company) which was acknowledged by the controller together with routing instructions. B757 (B) was en route from Berlin-Tegel to London Heathrow, cruising below B757 (A) at FL 350, but both ac were virtually co-incident in plan view on the radar. At 1110:50, B757 (A) called again and was again blocked by a simultaneous transmission from another Company ac. However, the pilot eventually established contact at 1111:30 and, in another garbled transmission, it is believed he requested descent. This transmission was heard and acknowledged by the controller. At 1112:55, the controller instructed B757 (A) to descend to FL 280. Twenty sec later a different controller's voice was heard on the RT. At 1114:30 both

pilots reported TCAS RAs with B757 (A) reporting that he was climbing and B757 (B) descending. At 1114:40 the controller applied headings to the ac that diverged by 100 and rapidly restored standard lateral separation.

The captain of B757 (A) stated that the RT was far too busy to allow him to query the descent clearance issued. The captain of B757 (B) stated in his report that it took about 5 minutes to establish contact with the CLACTON Sector on handover from Maastricht. He also said that he was aware of the presence of B757 (A) 4000 ft above him as they had been tracking together for some time, and so he was ready to take action when the descent clearance was issued to B757 (A). In addition, the CSC Under Training (U/T CSC) had been discussing with his own mentor the possibility of splitting the sector as there was a build up of pending FPSs under the LOGAN designator. However, the relieving mentor CSC decided that the traffic was containable with the sector in the banded mode. The sector controller who was relieved just before the incident was a CSC doing a radar duty in order to maintain currency; he stated that he was aware of a discussion going on behind him about whether or not to split the sector. Had he not heard this discussion taking place he said that he would have asked for the sector to be split himself.

When the 2 ac first called the CLACTON sector they were in Maastricht Delta Sector's airspace and running together in almost the same plan position. According to the current agreement, the transfer point for this traffic is GORLO and until ac have passed this point and entered the GORLO box the CLACTON sector controller may not alter any part of the clearance. Both sector controllers stated that it was not the practice for Maastricht controllers to warn LATCC controllers of two ac running together superimposed, as would happen at LATCC internally. B757 (A) was on a normal ORCAM squawk, which would have been automatically passed to the LATCC HCS through the On Line Data Interchange (OLDI) and would have been included in the active Flight Plan. This results in a Track Data Block (TDB) being displayed on the radar consisting of Callsign, Flight Level and

Destination. B757 (B) was on a squawk which was not recognised by the HCS as an ORCAM squawk and would therefore be displayed as figures, these being the SSR code, and the Flight Level. Furthermore, it would not be tracked by the HCS and it would be displayed as a Background (dimmer) Track in the form of a Limited Data Block (LDB). Had B757 (B) been on a recognised ORCAM squawk, the two data blocks would have garbled and the sector controller would have been warned of other traffic in the same position. One of the sector controllers stated that it was normal practice for the LDBs to be displayed at a lower brightness level because it reduced the visual interference of the "7000" squawks outside CAS. The end result of this was that the LDB of B757 (B) was directly beneath the TDB of B757 (A) and so was invisible to the sector controller. (The reason that B757 (B) was on a non-ORCAM squawk is that the number of flights airborne in the European Region from time to time exceeds the number of SSR codes which are available. This results in occasions when a squawk is issued necessitating a change of code when the ac passes from one ACC to another. The sector controllers confirmed that this happens sufficiently often for it to be a nuisance, if not a danger).

UKAB Note (1): Data blocks of the type used in this incident are not 'transparent' on the radar screen. If a TDB becomes superimposed over or merges with an LDB, the TDB blots out the (dimmer) LDB completely.

As both ac were estimating LOGAN at the same time, their FPSs should have been adjacent in the FPS bay. Each member of the control team was asked where they thought the two FPSs were in relation to each other; however, no-one could remember exactly where they had been placed apart from in the same general area, as there were other ac estimating the same position at the same time. Had they been together this would more readily have warned of the probability of a conflict. The unrecognised squawk of B757 (B) would have been recorded by the HCS on the FPS for that ac, so the sector controller should have been warned that this would have resulted in an LDB

on the radar display and all that implied. The fact that the sector controller issued an instruction to descend to B757 (A) from FL 390 to FL 280 right on the edge of sector airspace would indicate that this instruction was issued with reference to the radar display alone.

B757 (A), having had difficulty in establishing contact with the CLACTON sector, requested descent earlier than would normally be expected. At 1112:55, the sector controller cleared the ac to descend to FL 280. Shortly after this the CLACTON Sector controllers commenced a handover but as it was very busy there was no time for a normal procedure, that is where controllers pass on information verbally; instead, the oncoming controller watched the offgoing controller for a period of time to assess the traffic conditions for himself and, when he was sure that he had the relevant picture, took over the sector. However, he had failed to notice the unsafe descent clearance because he was concentrating on the main area of tactical vectoring, which is to the West of REFSO, and not necessarily checking the FPS display. The off-going controller, concerned that he was not able to speak with the controller taking over, remained close by the sector immediately following the handover to provide advice and information should it be required. Despite this, however, the incident occurred within a minute and a half of handover. The off-going controller was convinced that if they had had sufficient time for a normal handover one of them would have spotted the error. This indicates that the sector was too busy for proper ATC procedures to be followed and supports the notion that the sector should have been operating in the split mode.

At 1114:30 when the ac called their TCAS RAs, the first reaction of the sector controller was to request a repeat. When the actual situation became apparent he turned both ac away from each other and passed traffic information. When standard separation had been restored, the ac were placed on normal vectors.

UKAB Note: A recording of the LATCC radar at 1111:00 shows the ac on almost identical westbound tracks 2 NM S of REFSO. At this

point B757 (A) is about 003 NM S of B757 (B) with Mode Cs indicating FL 390 and FL 350 respectively. From this point the tracks gradually converge and it becomes very difficult to distinguish the two with Mode C readings becoming overlapped and occasionally missing altogether. At 1112:55 the returns appear coincident, with no Mode C indications. However, at 1113:38 a brief Mode C figure suggest that B757 (A) was still at FL 390 at that point. By 1114:30 (when both pilots reported RAs) the ac are still coincident in plan and tracking 256° 7 NM W of REFSO; the first indications of their tracks splitting comes at about 1114:56. By 1115:03, with B757 (B) now at B757 (A)'s 2 o'clock 005 NM, their respective tracks begin to diverge rapidly with Mode C readings indicating FL 347 for B757 (B) and FL 363 for B757 (A). Minimum separation distances of 1100 ft vertically and zero laterally are believed to have occurred at about 1114:46.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Though the fundamental cause was readily apparent to the Board, members identified several complex factors which had adversely compounded the situation. The CLACTON Sector 13/14 controller had issued an unsafe descent clearance that would have allowed B757(A) to descend through the level of B757(B), which he had inadvertently not taken into account. However, members probed further into the background and an ATSI adviser emphasised the unusual combination of circumstances which pertained. First the track of B757(A) directly overlaid that of B757(B), obscuring B757(B) on the radar display. Second, the dim LDB of B757(B) was overlaid by the brighter TDB of B757(A), such that B757(B)'s presence was not readily apparent. Third, both pilots' initial calls overlapped when they tried to check in on the Sector frequency, (UKAB Note: the pilot of B757(B) waited under

one minute before obtaining a response not 5 as alleged).

Further discussion revealed that the display settings of LDBs are adjustable by controllers, who usually set them to give a dimmer presentation, thereby reducing the distraction from ac squawking 7000 in Class G airspace. Whilst members appreciated the limitations of Mode A and the finite number of available squawks, they were surprised that the squawk could not be changed until the traffic had entered the GORLO box. It was noted that the FPS gave both the extant and ORCAM assigned squawk and it was normal for the controller to instruct the squawk change with ident at the appropriate moment, thus pairing the squawk to the callsign through the CCDS and enabling the LATCC Main Mode to display it as a TDB. That had not been done at the time of the Airprox. Further explanation was given to the Board that the dearth of codes caused this situation to occur frequently and that some controllers thought it was a danger. Pursuing this point, the Board was advised the frequency was about 3/hour, which led some controller members to believe it would be safer to display LDBs at the same relative brightness as TDBs.

Ultimately, however, the FPS display remained the principal aid to the controller to highlight the potential confliction. As it was believed the appropriate FPSs were displayed under the appropriate designators (the LOGAN estimates differed by only one minute) the information was there to alert the offgoing SC before he issued the descent clearance. It appeared to the Board, he had not checked the FPS thereby creating the confliction that the oncoming controller did not spot either in the busy scenario.

A controller member thought that in a busy traffic situation a radar controller would react to observed radar data; if that was not presented clearly it would understandably inhibit his appreciation of the traffic situation. This situation was far from ideal, with much potential for a recurrence and the Board felt that a recommendation to review the situation was warranted. Another factor was the relative traffic

intensity and workload that confronted the Sector Controller at the time. From the information available members believed that the bandboxed CLACTON Sector 13/14 was far too busy and should have been 'split' earlier. This was indicated by the reports from both pilots and the offgoing controller and supported further by ATSI. The intensive RTF load, the inability to transmit important messages, and recurring simultaneous transmissions all adversely effected safety in the bandboxed sector. Furthermore, the tactical situation did not permit an adequate handover to take place between oncoming/offgoing SCs. Members agreed these points had a direct bearing on the Airprox and some controllers thought the opportunity to 'split' Sector 13/14 had been missed. They noted the relative inexperience of the trainee CSC, who had suggested such action and were advised that the offgoing SC undertaking radar duties was a qualified CSC and had also favoured splitting. Another controller member on the Board explained that the decision making process for splitting a bandboxed sector at ScOACC involved the ACC Supervisory staff. It seemed to be markedly different to arrangements at LATCC, where the CSC alone appeared charged with the responsibility. Hearing this members wondered if things could be improved; if the combined Sector 13/14 had been too busy, and there was every indication that this was the case, there might be merit in looking at arrangements that involved supervisory staffs more directly in the decision making process. The Chairman was asked by the Board to recommend another look at present arrangements with a view to providing guidance to those with responsibility for splitting Sectors.

After this lengthy debate the Board concluded that during an extremely busy period, the cause of the incident was that the offgoing CLACTON Sector 13/14 controller descended B757(A) into conflict with B757(B). However, TCAS RAs received by both ac successfully reduced the risk of a collision. Of note, these TCAS interventions had begun to resolve the confliction before another line of defence, the STCA equipment, could alert the controller. Consequently, as vertical separation of 1100 ft

remained members concluded there had not been a risk of a collision.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C.

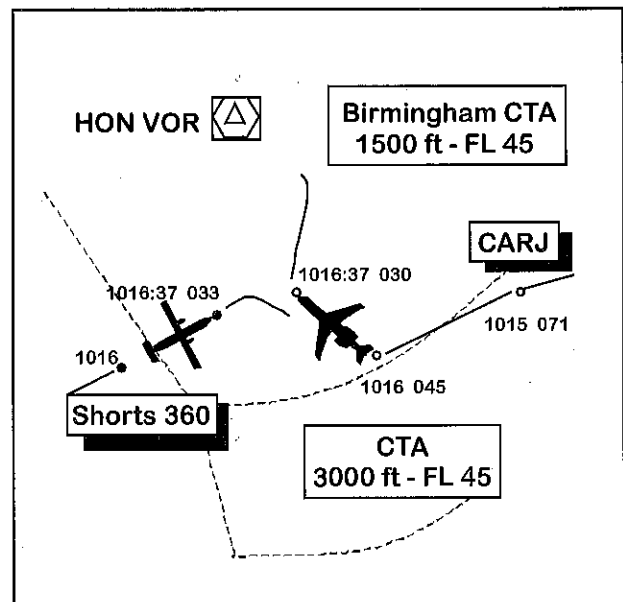
Cause: During an extremely busy period, the offgoing CLACTON Sector 13/14 controller descended B757(A) into conflict with B757(B).

- Recommendations:
1. That NATS considers reviewing arrangements for the display and handling of Limited Data Blocks on radar screens.
  2. That NATS considers reviewing arrangements and guidance on how to decide when sectors should be 'spilt'.

**AIRPROX REPORT No 128/99**

Date/Time: 20 Jul 1016  
Position: N5217 W0140 (4.75 NM S HON)  
Airspace: CTA (Class: D)  
Reporter: Birmingham ATC

<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u> Shorts 360	CARJ
<u>Operator:</u> CAT	CAT
<u>Alt/FL:</u> ↓3000 ft (QNH 1004 mb)	↓2500 ft (QNH 1004 mb)
<u>Weather:</u> VMC	VMC
<u>Visibility:</u> 10 km	
<u>Reported Separation:</u>	2 NM
<u>Recorded Separation:</u>	2 NM/300 ft



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

**BIRMINGHAM ATC** reports that the CARJ (Canadair Regional Jet), inbound to Birmingham from Stuttgart, reported on the RADAR DIR 2 position at 1013, descending to FL 80 and reducing speed to 250 kt. The pilot was instructed to turn L 10°, descend to FL 50 and to report the new heading, which was given as 270°. At 1014 he was instructed to turn further L heading 250° (to give more track miles

for descent) and cleared to 4000 ft QNH 1004. The Shorts 360 (SH36) pilot then called on the frequency heading 035° and descending to 3000 ft; he was instructed to turn R heading 040°. At 1015 ATC advised the CARJ pilot that he was being vectored through the localiser for RW 33 and instructed him to descend to 2500 ft. At this point the SH36 entered CAS and was turned R onto 055°. At 1015:40 the CARJ was turned R onto 330°, then 360° to report

established. At 1016:28 the SH36 pilot was instructed to turn L heading 170° (the pilot queried the direction of turn which was then corrected to a R turn). At 1016:45 the SH36 pilot was advised of traffic..."12 o'clock 2 miles passing 2800 ft"; he replied that he had the traffic in sight. Minimum separation distances were assessed as 108 NM and 400 ft as the CARJ passed below the SH36 from R to L. Shortly afterwards the SH36 was turned L onto base leg, by which time standard separation had been restored.

**THE SH36 PILOT** reports that he was approaching Birmingham from the SW at 180 kt descending to 3000 ft on radar vectors from Birmingham APR. On emerging from cloud shortly after being turned onto 170° he saw an ac, believed to be a B737, at his 11 o'clock range 2 NM. He thought there had been a medium risk of collision but did not consider it necessary to file an Airprox report.

UKAB Note (1): The CARJ pilot was contacted but had no knowledge of the incident; he was therefore unable to contribute to the investigation.

**ATSI** reports that the Birmingham RADAR 2 Controller described her traffic loading at the time of the incident as very light. She explained that she had been in position about ten minutes before the occurrence. Previously, she added, the RADAR 2 function was being undertaken in a bandboxed configuration on the RADAR 1 position.

The RADAR 2 Controller said that although her headset was plugged in she was not sitting at the radar display, but was available in the Approach Room if it was considered necessary to open the position. She was, therefore, not monitoring the operational situation. She said that at about 1013, the RADAR 1 controller requested her to open the RADAR 2 position. She was informed of the CARJ and warned about an overflight at 4000 ft routing E to W to the S of Birmingham. She mentioned that no other information was passed during this handover. She explained that when she had been operating previously, about 20 min earlier,

the RW in use had been 15. However, it had been changed in the meantime to RW 33. Consequently, she assumed, albeit momentarily, that the RW in use was still 15. This, she considered, may have added to the time necessary for her to assimilate the situation.

The pilot of the CARJ contacted the RADAR 2 frequency reporting descending to FL 80 on course to HONILEY. He was instructed to turn left 10° (new heading 270°) and to descend to FL 50. Shortly afterwards, the RADAR 2 Controller, considering that the CARJ was a little high, instructed its pilot to turn L heading 250° to widen its circuit. Assessing that the ac would be separated from the overflight, she cleared it to descend to 4000 ft. Around this time she was made aware of the SH36 approaching Birmingham from the SW outside CAS, descending to 3000 ft.

The SH36 pilot established contact with the RADAR 2 position at 1014, reporting passing 3400 ft for 3000 ft. The flight was given a 5° R turn heading 040°. The RADAR 2 Controller stated that her plan was to vector the CARJ through the ILS localiser, to ensure that it had enough distance to lose height, before instructing it to turn R to establish; the SH36 would then be vectored behind it from L base. Accordingly, the CARJ pilot was informed of her intention and cleared to descend to 2500 ft, thereby dispensing with vertical separation between the subject ac.

A radar photograph at 1015:15 shows the subject ac approximately 10 NM apart on conflicting tracks, separated vertically by 3000 ft. The SH36 pilot was informed that he was entering CAS under a Radar Control Service and was instructed to turn R heading 055°. Shortly afterwards, the CARJ was given R turns, first onto 330° and then onto 360° to report localiser established.

The RADAR 2 Controller said that the CARJ took longer to make the turn than she anticipated. At the time she believed that the flight was operated by a B737 rather than a CARJ, even though the FPS showed the correct



type and the pilot had reported the ac type on initial contact on her frequency. In her experience, the CARJ does take longer to turn and could explain why lateral separation was compromised with the SH36. Realising the situation, she instructed the SH36 to turn on to a heading of 170° (initially, in error, the wrong way) and passed information on traffic at 12 o'clock, at a range of 2 NM, which was passing 2800 ft; the SH36 pilot reported visual with the traffic. The controller agreed that she should have used the term avoiding action but at the time, because she was confident that no collision risk existed, she decided not to.

UKAB Note (1): A replay of the Cleve Hill radar shows the incident as described. Minimum separation distances of 2 NM and 300 ft occurred at about 1016:40 as the CARJ passed below and in front of the SH36 from R to L, about 5 NM S of the HON VOR.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the SH36 pilot, the air traffic

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Birmingham RADAR 2 controller vectored the Canadair Regional Jet into conflict with the Shorts 360.

controller involved and the appropriate ATC authorities, transcripts of the relevant RT frequencies and radar video recordings.

Several factors indicated to the Board that the controller's appreciation of events and the ensuing traffic situation appeared to be somewhat lacking. Members were surprised that the Runway change had escaped the Controller's notice and that she was directing the CARJ under the mistaken belief that it was a B737, although the FPS showed, and the pilot had reported on RT to the contrary. These factors had an adverse effect on the subsequent vectoring of the ac and several controller members of the Board thought that it was unwise to base separation on an anticipated rate of turn, as seemed to be the case in this instance. All this undoubtedly contributed to the loss of horizontal separation as the CARJ was descended through the SH36's assigned altitude. Therefore, the board concluded the cause to be that the Birmingham RADAR 2 controller vectored the CARJ into conflict with the SH36. However, given the minimum horizontal separation of 2 NM at the time, the Board agreed that there had not been a risk of collision between the subject ac.

## AIRPROX REPORT No 129/99

Date/Time: 20 Jul 1532  
Position: N5933 E0132 (Beryl A platform)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Super Puma (A) Super Puma (B)  
Operator: CAT CAT  
Alt/FL: FL 40 ↑FL 50

Weather VMC CLBL VMC CLAC

Visibility: >10 km

Reported Separation:

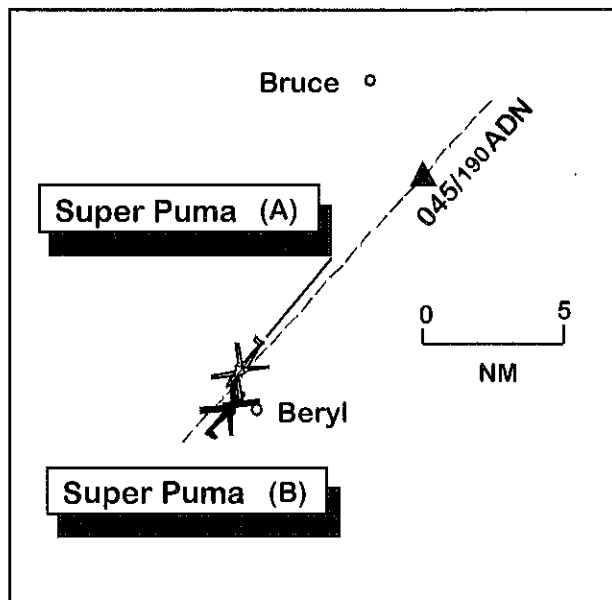
1 NM/200 ft/0.5 NM/500 ft

Recorded Separation: not recorded

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

**THE SUPER PUMA (A) PILOT** reports that he was cruising at FL 40 and heading 220° at 140 kt having departed from the Bruce oil platform for Aberdeen. The visibility, 700 ft above cloud, was over 10 km in VMC. He was receiving an SSR based RIS from Sumburgh radar on 123.15 and squawking 3041. When on the ADN 045°R/180 NM he saw another Super Puma about 1.5 NM ahead and slightly below as it climbed towards him on a track which diverged slightly to his L. He turned about 40° to the R and the other helicopter passed down his port side 1 NM away and 200 ft above. He thought there had been a medium risk of collision and later telephoned the Sumburgh Supervisor to report an Airprox. The pilot comments that while his cockpit workload was low he was aware that the other pilot was probably very busy.

**THE SUPER PUMA (B) PILOT** reports that he was climbing to FL 50 on a heading of 060° at about 80 kt after a second missed approach from the Beryl platform; his intention was to divert to Bergen on minimum fuel. Owing to the extreme range he was unable to contact Aberdeen. On passing FL 38 he was VMC on top; when climbing through FL 45 in the vicinity of the platform he saw another Super Puma about a mile away at his 11 o'clock tracking in the opposite direction at FL 40. It passed 005



NM down his port side and 500 ft below with a low risk of collision. He then established 'two-way' contact with Sumburgh Radar who instructed him to change to Stavanger on 125.55.

The pilot comments that the 2 Beryl platforms are situated at the very edge of Sumburgh radio range and consequently there are no ATC services available below 2000 ft within a 10 NM radius.

UKAB Note (1): The relevance of this information is addressed below in the CAA Flight Operations report.

**ABERDEEN ATC (SUMBURGH APR)** reports, with RT transcript, that Super Puma (A) was en-route from the Bruce oil platform to Aberdeen on 123.15. The ac's Mode C was indicating 3400/3500 ft (equivalent to FL 40) prior to the incident. Super Puma (B) pilot called, climbing out from the Beryl platform and requesting a climb to FL 50 on diversion to Bergen. He was passed the Sumburgh QNH and instructed not to climb above 2000 ft. At this time the SSR labels of the 2 ac were merging so he verified the level of Puma (A), which was FL 40. He then instructed the Puma (B) pilot to maintain 2000 ft and passed him traffic information on Puma (A). There was no other traffic in the vicinity and when the pilot reported visual with

Puma (A) he was cleared to climb to FL 50. Neither ac had yet been identified and therefore he was providing a FIS.

**THE CAA FLIGHT OPERATIONS INSPECTORATE** comments that the standard procedures for helicopters departing offshore installations require 2 way communication to be established with an ATSU (in this case Sumburgh) before climb above 1500 ft is attempted. In this Airprox, the pilot of Super Puma (B) did not comply with this requirement and climbed through this altitude without ATC clearance.

In mitigation, however, it has been acknowledged by the operating companies of the 2 ac concerned that, due to the extreme range from Sumburgh, it is frequently impossible to fulfil this requirement. The tendency has developed, therefore, to make the call to Sumburgh from a higher level where communications can be assured – as happened in this case.

UKAB Note (2): The UKAB understands that there have been discussions between NATS, the helicopter operating companies and SRG to consider the possibility of providing 2 more relay stations in the REBROS area to improve low level RT reception at the extreme ranges. Following a NATS offshore consultation meeting on 30 November 1999, actions were taken to investigate further technical and financial provision of the necessary equipment.

#### **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a report from the air traffic controller involved and a report from the appropriate operating authority.

Members noted that consideration was being given to improve low level RT coverage in the area of the Airprox. Under present arrangements pilots endeavoured to adhere to procedures which had been agreed between

operating companies and Aberdeen ATC (Sumburgh Radar). This necessitated a restricted initial climb pending the establishment of RT contact which was often impossible to achieve due to the extended range. However, following analysis of the Sumburgh Radar RT transcript, it was apparent to members that the pilot of Puma (B) had already climbed above the agreed altitude when he first made contact with the controller (who instructed him not to climb above 2000 ft). Almost coincidentally with this RT transmission, the pilot of Puma (B) reported having Puma (A) in sight; in his written report the former described this as having been when he was passing FL 45, VMC on top, with the other ac opposite direction at FL 40. Based on these facts members agreed that when the pilot of Puma (B) first called he must already have been above the level of Puma (A). The Board concluded, therefore, that the pilot of Puma (B) had caused the Airprox by climbing above the recommended agreed altitude. Several members commented that a blind call by the pilot of Puma (B) as he climbed away from the rig might have alerted the other pilot to his presence and thereby lessened the possibility of a confliction.

Some members wondered whether the incident in fact constituted an Airprox as the reported lateral distance was in the order of 1 NM with the acs' tracks diverging and the pilot of Puma (A) having seen the other ac from 1.5 NM away. He saw and avoided Puma (B) in good time, thereby fulfilling the separation requirements for flight in Class G airspace. On balance, however, Board members accepted that the pilot of Puma (A) had been sufficiently concerned about the presence of the other ac to feel that his ac had been endangered. Noting the distances estimated by both pilots and the effective action taken by the pilot of Puma (A) to maximise separation, the Board concluded that there had not been a risk of collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Super Puma (B) climbed above the recommended altitude and into conflict with Super Puma (A).

### **AIRPROX REPORT No 130/99**

Date/Time: 21 Jul 1543

Position: N5106 W0222 (12 NM NE of Yeovilton)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: ATR72 Jaguar

Operator: CAT DPA

Alt/FL: FL 145 ↑ ↓FL 95

Weather VMC CLAC VMC CLAC

Visibility: Unltd Unltd

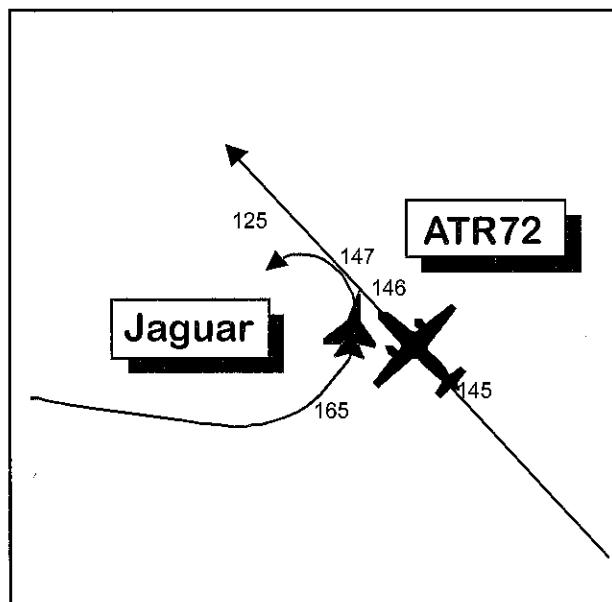
Reported Separation: 1-200 m/NK

Recorded Separation: 0.35 NM

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

**THE ATR72 PILOT** reports heading 330° at 170 kt in an en route climb from Bournemouth to Glasgow via BCN. He was receiving a RIS from London Mil who advised him of a fast moving target on a reciprocal heading at FL 140; he was passing FL 135 at the time. He did not see it. When passing FL 145 both pilots saw a Jaguar closing fast from the port. When it was very close it began a tight left descending turn which continued to a much lower level. The Jaguar passed 1-200 m away, descending through his level as he turned hard right and pitched up. He did not assess the risk of collision.

**THE JAGUAR PILOT** reports heading NW at 500 kt while carrying out a 'wind-up turn' from FL 168 to FL 95. He did not see the ATR72. He was receiving a RIS from Boscombe Down and had been warned about traffic 10 NM to his SE while heading 105° at 400 kt, climbing through



FL 145. 20 seconds later while passing FL 158 and heading 095 he received a second call advising that the traffic was 6 NM to the E. He visually cleared the area ahead and to the left and then started his manoeuvre. During the turn he concentrated his lookout on his intended flightpath and saw no other ac.

**HQ MATO** reports that the Jaguar was operating in airspace to the W of Boscombe Down between FLs 50 and 240 and receiving RIS from Boscombe Radar (BDN) on frequency 276.85. The controller's workload was low, the Jaguar being the only ac on frequency. At 1542:34, whilst the Jaguar was tracking SE, BDN observed traffic wearing a London Mil squawk and transmitted "c/s, traffic south....east south-east, 10 miles, tracking north-west, indicating FL 140," to which the Jaguar pilot responded "c/s" at 1542:40. 14 seconds later BDN updated the traffic information "That traffic now due east, 6 miles,"

and the Jaguar pilot replied "Roger." No mention of an incident was made on RT but at 1550 BDN was informed by LATCC (Mil) that an Airprox had been filed.

The ATR72 had established communications with London Radar Console 34 (LRAD) at 1537:13, on 133.3 and been placed under RIS. There was 1 other ac on the frequency. The pilot requested and was cleared to FL 180. At 1540:41, the pilot was requested to pass his estimate for BCN, but the pilot's replies became progressively more clipped, "*Estimating BCN at minute five,*" "*Estimating BCN at minute f*" and finally "*Yes esti.*" At 1541:22, a transmission from a different voice in the ATR72 was received and 2-way comms restored. At 1542:24, LRAD transmitted "*c/s, traffic left 10 o'clock, 10 miles, converging heading, fast moving indicating FL 140,*" to which the ATR72 crew replied "*Yup.*" At 1542:40, LRAD transmitted "*c/s, London Mil, do you copy?*" The ATR72 crew transmitted "*c/s yer, that's copied sir, we're looking out....*" at 1542:48, followed by "*c/s did you read?*" At 1544:59, LRAD acknowledged that the ATR72 pilot's transmissions could now be read loud and clear, the ATR72 pilot replying "*I'm reading you fives sir, copied your last message reference traffic, good victor mike, looking.*" At this point, the ATR72 and the other ac were not in conflict and, having obtained another VHF frequency, LRAD transmitted "*c/s roger, re-contact me on frequency 128.25*" at 1543:08. The ATR72 pilot checked in on the new frequency at 1543:30 transmitting, "*Er, c/s, I wish to report an airmiss with a fast jet, it's turning away to our left, much too close.*" The pilot went on to say that the ac appeared to have a red tail and LRAD confirmed that this was the traffic that had been previously called. Apart from confirming that he still wished to file, no further mention of the incident was made on RT.

The LATCC Pease Pottage radar recording shows the Airprox occurring at 1543:30. The ATR72 is squawking 3341, heading NW on a direct track from Bournemouth to BCN and in a gentle climb (approx 800 ft/min). The Jaguar is seen manoeuvring at varying levels before

steadying on a track of about 120° when 8 NM N of Yeovilton and climbing. The Jaguar's groundspeed and rate of climb are about 3 times that of the ATR72. The recorded positions and tracks of the 2 ac confirm the accuracy of the traffic information calls given by both LRAD and BDN. At 1543:05, as LRAD gave the ATR72 crew the new frequency, the ATR72 is tracking 315° and passing FL 144, with the Jaguar in its 10 o'clock range 4 NM, passing FL 163 in the climb and now tracking 110°. The Jaguar then starts to turn L and descend from FL 168, through FL 165 (at 1543:18) after which the Mode C readout is lost. At 1543:24, the Jaguar is in the ATR72's 9 o'clock at 0.5 NM; the ATR72 at this point is directly in front of the Jaguar, which is turning through a heading of about 040°. The closest point of approach is at 1543:30; the ATR72, passing FL 147, has the Jaguar in its 11 o'clock at about 0.35 NM passing through N in a tightening L turn. The Jaguar passes into the ATR72's 12 o'clock at 0.5 NM whilst still turning. The next height indication from the Jaguar is at 1543:43, FL 12?, the last digit being obscured by the ATR72's Mode C. At 1544:01, as the Jaguar completes the 360° L turn, its Mode C indicates FL 83, a drop of 8200 ft in 43 sec (over 11,000 ft/min or 190 ft/sec). If this descent rate had been constant throughout, the Jaguar would have been rapidly passing FL 142 at the closest recorded point on radar, 500 ft below the ATR72. It is more likely however, that the initial ROD would have been lower, therefore placing the Jaguar slightly higher and thus closer to the ATR72. This is borne out by the FL 12? readout 25 sec after the FL 165 indication. At this point, a constant 190 ft/sec would have equated to FL 117.

Both controllers provided appropriate and accurate traffic information in accordance with a RIS, and received acknowledgements from the aircrews. Although the subsequent timing of the LRAD frequency change was unfortunate, the ac were 4 NM horizontally and 2000 ft vertically separated, on tracks which were non-conflicting at the time. Without further information however, neither LRAD nor BDN could have predicted, or reacted quickly enough to, the rapid turn and descent which resulted in the

Airprox 20 sec later. The Jaguar pilot stated that he did not hear the level information that was passed in BDN's first call due to an audio warning in the ac. Without the pilot advising of this however, BDN would not automatically update level information in a second call.

**MoD DPA** comments that the Jaguar pilot's task was in accordance with an ETPS flight test plan. Both ATSU's provided traffic information to the pilots and the ATR72 crew saw the Jaguar but the latter's pilot, with a high workload, did not see the ATR72. DPA has agreed to increases in controlled airspace around Boscombe Down for the benefit of commercial traffic. The Airprox area is now the only area in which test activities can be carried out within a reasonable distance of Boscombe Down, and civil operators need to be mindful of the increased risk of flying outside the airways system. Boscombe Down has reminded all its controllers to ensure where possible that a dedicated controller is available for this type of sortie when requested by Boscombe aircrew.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members considered that the hint by DPA that civil operators should remain in controlled airspace between Bournemouth and Glasgow was probably not a commercial option and that they had every right to cross Class G airspace. However, a member from LATCC commented that one operator had done just that and taken

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: The Jaguar pilot did not see the ATR72.

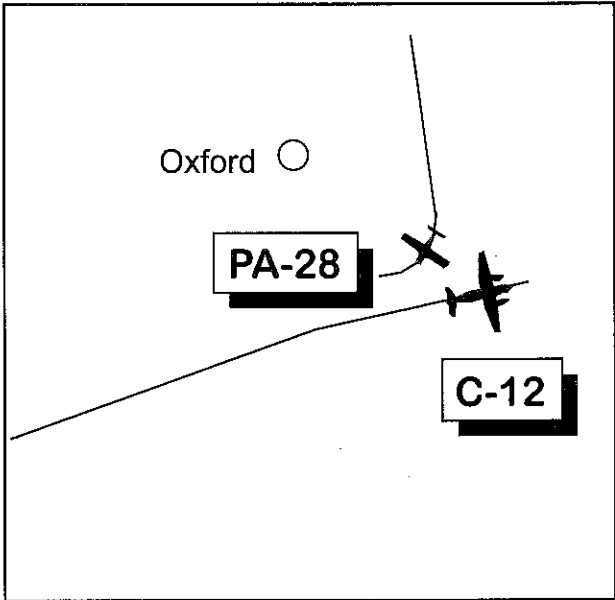
to routeing via R41 and the Daventry sector which, on a route to Glasgow, was a very small percentage increase in distance compared with routeing via BCN. There was also agreement that in Class G airspace the ATR72 pilots would have been better advised to ask for a RAS rather than the offered RIS. Civil and military members with experience of ETPS operations confirmed the high workload and extreme manoeuvring involved and that there was nowhere else within practical reach to carry out such activity. Given these circumstances, it was not the best airspace in which to fly an airliner.

Having said that, the Board agreed that the cause of the incident lay primarily with the Jaguar pilot who had flown very close to the ATR72 without seeing it. In particular members noted that he had not assimilated the traffic information given to him or asked for more detail before carrying out a manoeuvre into an area where he should have expected to encounter the traffic he was being warned about. It was suggested that with the nature of the exercise being performed, it was easy to become task oriented and unconsciously to exclude distracting information. However, members agreed that if a RIS was being used, then the onus was on a pilot to pay attention to the information he was being given and to ask for more if there was a possibility of any sort of conflict. In this incident the Jaguar pilot could have delayed the onset of his manoeuvre for a few seconds until advised the traffic was clear.

Because the Jaguar pilot had flown a high energy manoeuvre close to the ATR72 without seeing it, the Board assessed that there had been a risk of collision.

**AIRPROX REPORT No 131/99**

Date/Time: 21 Jul 0812  
Position: N5150 W0117 (1.5 NM SE of Kidlington - elev 270 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: PA28 C12  
Operator: Civ Trg Foreign Mil  
Alt/FL: FL 55 FL 60  
  
Weather IMC IICL VMC CLBL  
Visibility: 4 km  
Reported Separation:  
200 ft, 400 m/0.25-0.5 NM  
Recorded Separation: 0.25 NM, 100 ft



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

**THE PA28 PILOT** reports heading 190° at 100 kt on the outbound leg of the RW 20 hold at the OX NDB, descending through FL 55 to FL 50 between banks of cloud and receiving a procedural approach service from Oxford ATC. A T-tailed twin either came out of or from behind a cloud in his 2 o'clock, straight through the area of the hold, passing right to left across his nose 200 ft below and 400 m in front. He immediately reported an Airprox.

**THE C12 PILOT** reports heading NE at 235 kt and receiving a RIS from Brize Norton at FL 60. Brize called traffic at 4 NM, FL 60 on a SE heading which he saw after about 30 seconds. He advised Brize that it was in his 11:30 slightly high, to pass down the left side. On seeing it he made a slight turn to the right, keeping it in sight, and saw the other ac (low wing single engined) make a right turn also. It passed 0.25-0.5 NM to his left and slightly above and he did not consider there was a risk of collision.

**HQ MATO** reports that the C12 pilot was receiving a RIS from Brize Radar (LARS) on 134.5, en route from Boscombe Down to Mildenhall via the Brize overhead at FL 60. At 0810:32, LARS transmitted to the C12 pilot, "c/s, traffic left 10 o'clock, 4 miles manoeuvring, indicating FL 60," which was acknowledged. At

0811:59, the pilot transmitted "c/s, we've got a tally on traffic about our left 11.30, just above us about 500 ft," to which LARS responded, "Roger, that's your previously reported traffic." The pilot then added, "c/s, he's coming down the left side." Shortly afterwards, a controller from Oxford/Kidlington ATC telephoned the Brize Supervisor and stated that a PA28 was filing an Airprox against an ac, which looked like a Beech 200. The C12 pilot was asked to telephone the supervisor after landing.

The LATCC Heathrow radar recording shows the Airprox occurring 1 NM SE of Oxford/Kidlington airfield at 0812:05. The C12 identified by a 3711 squawk, is tracking 065° and level at FL 60 Mode C. The PA28 is seen squawking 7000 at an indicated FL 60 and is flying a clockwise circle around Oxford/Kidlington at a radius of about 1 NM. (The descent recollected by the PA28 pilot came later.) The closest point of approach (CPA) seen on radar is in the frame timed at 0812:05. The C12 is maintaining 065° at an indicated FL 59, with the PA28 in its 9:30 at a range of about 0.25 NM, passing a heading of about 200° in a right turn at FL 60 Mode C. The C12 alters course very slightly to the R about 10 sec before the CPA, which corresponds with the time that its pilot reported visual with the other ac; at this point, the ac were horizontally separated by about 1 NM. The C12's

groundspeed is about twice that of the PA28. The PA 28 is steady at FL 60 throughout; it begins a descent some 40 seconds after the Airprox.

LARS provided traffic information (TI) in accordance with RIS at an appropriate time and the call was reasonably accurate. There is scope for the controller to update TI if he/she considers that the conflicting ac continues to constitute a definite hazard; in this case the pilot reported visual at about 1 NM separation, which is roughly the time that LARS would have been about to pass an update, hence an update call was not made. Whilst it would appear strange that it took over 2 min for a horizontal separation of only 4 NM to reduce, at the time of the call, the PA28 was 1 NM W of Oxford passing through a northerly heading in a R turn. During the next minute, both ac were effectively flying the same heading as the PA28 turned onto S, hence there was initially only a very slow rate of separation loss. A Letter of Agreement exists between Brize Norton and Oxford/Kidlington, however the events in this occurrence are outside the scope of that agreement.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The C12 pilot flew close enough to the PA28 to cause its pilot concern for the safety of his ac.

the relevant RT frequencies, radar video recordings and reports from the appropriate ATC authorities.

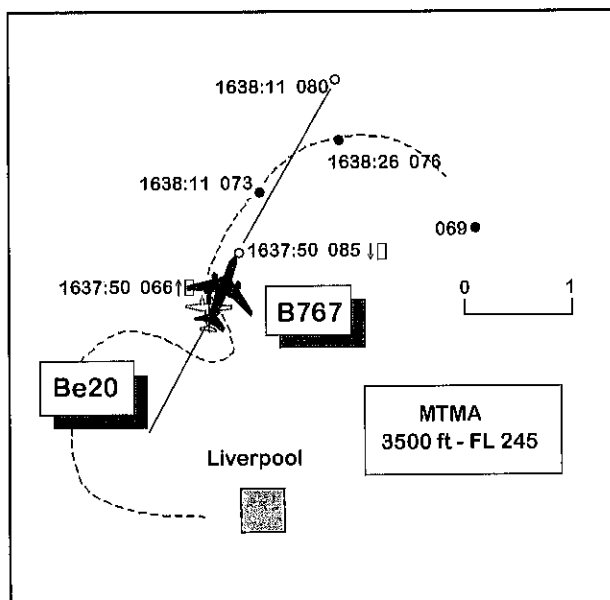
A member who flew from Oxford advised that the Oxford hold was usually full right up to the base of controlled airspace, but the 1 minute pattern flown by most ac in it meant that activity would be within a couple of miles of the fix; it appeared that the PA28's turn was associated with the holding pattern rather than avoiding action. While this was an area to avoid if possible, it was in Class G airspace and encountering passing traffic was a fact of life for holding ac. Because of the nature of the hold it was irrelevant whether or not passing traffic was at the correct quadrantal.

In this incident, the C12 pilot had seen the PA28 from 1 NM away and although he turned to avoid it, removing any risk of actually colliding with it, members considered he could have turned further to remove any impression of a collision risk. While the incident was not much more than a confliction of flightpaths resolved by the C12 pilot, the Board agreed that the C12 pilot had flown close enough to the PA28 to cause its pilot concern for the safety of his ac.



## AIRPROX REPORT No 132/99

Date/Time: 22 Jul 1638  
Position: N5322 W0252 (2 NM NW  
Liverpool airport)  
Airspace: MTMA (Class: A)  
Reporter: Manchester TMA W  
First Aircraft Second Aircraft  
Type: B767 Beech 200  
Operator: CAT Civ Exec  
Alt/FL: ↓ FL 60 ↑ FL 70  
Weather VMC VMC  
Visibility:  
Reported Separation: 1.5 NM/300 ft  
Recorded Separation: 1.5 NM/400 ft



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

The **MANCHESTER TMA W RADAR CONTROLLER** reports that he was acting as mentor to an advanced ab-initio trainee. The B767 was inbound to the MIRS1 hold and had been given descent clearance to 6000 ft. Meanwhile, the BE20 was climbing out from Liverpool on a Stock 2T SID and reported on the Manchester radar frequency (125.1). The descent clearance to the B767 was then amended to FL 80, which the pilot acknowledged, and the BE20 was instructed to fly a radar heading of 120° and to climb to FL 70, which was also acknowledged. Shortly afterwards the STCA activated, but this was not unusual in such circumstances. Seeing that the BE20 had not turned onto 120°, the trainee controller instructed its pilot to turn further R onto 160°. By this time the data blocks of both ac were garbling, but the level displayed in the conflict alert box for the BE20 indicated FL 77. The trainee controller immediately instructed the pilot to descend back to FL 70 (UKAB Note (1): the RT recording for 125.1 shows that the controller used the correct avoiding action phraseology when issuing this instruction). The BE20 pilot responded that he was already descending to FL 70. Minimum separation was believed to be in the order of 1.5 NM and 300 ft.

**THE B767 PILOT** subsequently spoke to UKAB staff by telephone. He said that they were descending very slowly and by the time they had reached FL 80 they were well ahead of the BE20. Although his TCAS equipment had alerted him to the presence of the other ac he did not consider the situation in any way hazardous and was unaware until advised by ATC later that an Airprox had occurred.

**THE BE 20 PILOT (PF)** did not submit a formal report and declined to comment on company procedures with regard to cross-checking R/T instructions from ATC. However, he did send a letter to UKAB (dated 30 November) in which he tried to recall what took place. He describes departing from RW 27 at Liverpool on a STOCK 2T SID - this requires the ac to turn R onto a heading of 020° to intercept the WAL 085° Radial - during which ATC instructed him to climb to FL 70 and to turn. He thought the heading passed was 120° and he acknowledged as such. However, he says his Supervising Captain (PNF) intervened because he understood the heading was 020° - his Captain had read that back and told him to turn onto 020°, which he did. He adds, however, that he did not hear his Captain transmit 020°.

UKAB Note (2): The only read-back on the R/T recording was the correct one of "120°". It must be assumed, therefore, that the Captain's

mention of 020° was made over the cockpit inter-com only and not on the R/T to ATC.

In his haste to regain what he now believed was the correct track the PF turned at more than the standard rate and also overshot his cleared level; he explained that he had been flying manually (the ac was light) with low power and a climb-rate of about 3000 ft per min. Just as he was attempting to correct his height, the controller, in an excited tone, instructed an immediate R turn, he thought onto 170° (the R/T recording reveals this was 160°, which was read-back wrongly at first as 060° but then corrected to 160° after further encouragement by the controller). Unfortunately, under the stress of the situation, he recalled being unable to arrest his climb before the ac reached FL 76. Moments later he said he regained FL 70 and then remembered seeing a B767 some distance away and 1000 ft below.

UKAB Note (3): A replay of the Great Dun Fell radar at 1636:39 shows the B767 tracking NE and descending through about FL 100 4 NM SW of Liverpool. At the same time the BE 20 appears on radar 2 NM W of Liverpool in a R turn climbing through FL 45. The BE 20 completes a turn onto 120°, then almost immediately reverses this into a L turn onto about 340° before again turning NE at 1637:50 and then SE in a sweeping R turn. At that point the B767, having flown a steady NE course, has passed about 2 NM W of Liverpool in a slow descent and overflown the BE30 005 NM to its N indicating FL 85; at this time the BE20 is climbing through FL 66. The BE20's subsequent R turn takes it well behind the B767 and at 1638:26 its Mode C shows a peak of FL 76 before regaining its cleared level of FL 70 at about 1638:50. It is estimated that vertical separation when the B767 overflew the BE20, at about 1637:40, was in excess of 1900 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of the B767 and a letter from the BE20 (PF), transcripts of the relevant

RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The root cause of this Airprox was readily apparent to the Board; it stemmed from the BE20 crew climbing above their assigned level. What was not so clear was why this had occurred and undoubtedly the lack of a report from the BE20 captain did not enable a complete picture to emerge. From the information supplied in the letter from the BE20 (PF) there would appear to have been a significant breakdown in crew co-operation and crew resource management. Clearly the TMA W Controller had issued the turn instruction onto 120° which the PF reports acknowledging and complying with. However, this appears to have been countermanded by the ac captain, the PNF, who, having misinterpreted the heading instruction as 020°, assumed the PF was wrong and instructed him to fly an erroneous heading. This stressful situation apparently distracted the PF who consequently exceeded his cleared level. Members of the Board sympathised with the difficult situation which confronted the PF, but were critical that the heading was not re-checked with TMA W when it was questioned by the PF. They wondered if this was indicative of inadequate crew resource management techniques. One member informed the Board that the CAA required those with a UK AOL to provide comprehensive CRM training through CAA approved courses.

A controller member emphasised the point that even when confronted with a high workload situation pilots should remember the importance of accurate height keeping. Vertical separation is intrinsic within the ATC 'System' and any height/level deviations could lead very quickly to eroded safety margins. Undoubtedly, the salutary lesson to be learned from this Airprox is – if doubt exists about an ATC instruction, ask to have the instruction repeated. The Board agreed unanimously that the Airprox resulted following a breakdown in crew co-operation, when the BE20 was climbed above its cleared level into conflict with the B767. They also considered that the actions of the

Trainee controller were laudatory; he reacted promptly and correctly when the situation became apparent. At the point of minimum horizontal separation (as the B767 overflew the BE20) about 1900 ft of vertical separation

existed and at the point of minimum vertical separation the B767 had over-hauled the BE20 by about 1.5 NM. Therefore, the Board concluded that there was no risk of a collision.

### PART C: ASSESSMENT OF RISK AND CAUSE

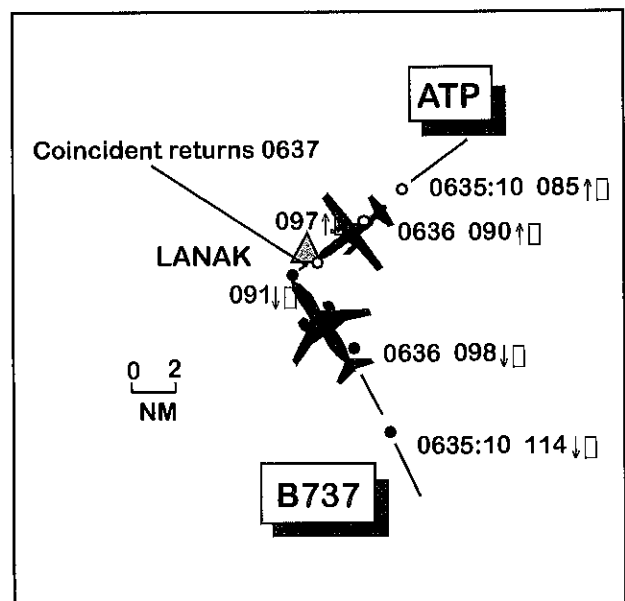
Degree of Risk: C

Cause: Following a breakdown in crew co-operation, the BE20 climbed above its cleared level into conflict with the B767.

### **AIRPROX REPORT No 133/99**

Date/Time: 23 Jul 0637  
Position: N5542 W0356 (LANAK)  
Airspace: TMA (Class: D)  
Reporter: SCACC

	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	ATP	B737
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	↑ FL 120	↓ 5000 ft (QNH)
<u>Weather</u>	VMC	VMC
<u>Visibility:</u>	good	60 km
<u>Reported Separation:</u>	2.3 NM/100 ft/2 NM /600 ft	
<u>Recorded Separation:</u>	1.4 NM/600 ft	



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

ScACC reports that the B737 had been under the control of the Talla Sector who had instructed it to descend to be level at FL 70 by LANAK. However, at the time of the incident, the flight was under the control of Glasgow Radar. The ATP had been instructed to climb straight ahead off RW 24 at Edinburgh and, although within the confines of the Talla sector, was under the control of Galloway and climbing to FL 120. Separation was lost as the B737 passed L to R in front of the ATP at a similar level.

**THE ATP PILOT** reports that he was climbing to FL 120 at 195 kt under the control of Scottish on 124.82. The visibility above cloud was good. When approaching FL 100 in the vicinity of LANAK, ATC instructed him to “turn left heading 180 immediately”, followed a short time later by an instruction to resume his original track. As he completed the avoiding turn he saw a B737 dead ahead descending from L to R about 2 NM away and about 300 ft below. He assessed the risk of collision as low.

**THE B737 PILOT** reports that he was heading 340° at 320 kt and descending to his cleared level of 5000 ft under the control of Glasgow

APC. The visibility was 60 km in VMC. When about 15 NM S of LANAK and passing 9800 ft, ATC instructed him to turn L immediately and to increase his rate of descent. He complied and almost immediately saw traffic at his 1 o'clock range 2 NM about 600 ft higher and climbing from R to L. Although he subsequently received a TCAS TA, his compliance with the ATC avoidance instructions was successful in ensuring separation and he thought the risk of collision had been low.

**ATSI** reports that both controllers concerned had felt fit and adequately rested and no other factors likely to have adversely affected their performance on the day were identified during the course of the investigation. The Galloway Executive (E) controller assessed his workload as medium to high and the Talla E as high.

The B737 was inbound to Glasgow, nominally following the LANAK 1A STAR which terminates at LANAK. This routeing is contained within the Talla Sector and the Standing Agreement with Glasgow requires inbound ac to be at the Minimum Stack Level (MSL), in this case FL 70, on reaching LANAK. The ATP was to depart from RW 24 at Edinburgh on a TALLA 5C SID, which requires a L turn after departure, climbing to cross the 'TLA' VOR at 6000 ft. Again, this route is contained within the Talla Sector. Both the TALLA 5C SID and the LANAK 1A STAR route via 'TLA' (17 NM S of Edinburgh and 23 NM SE of LANAK) and, under normal circumstances, any conflicts between inbound and outbound ac would be resolved by the Talla controller.

The crew of the B737 established communication with the Talla Sector at 0623 and were given descent clearance to FL 180 and told to expect to be at FL 70 by LANAK. At 0629 the crew of the ATP reported airborne on the frequency, climbing to 6000 ft on the SID. The Talla 'E' controller instructed the flight to continue straight ahead (i.e. to track the extended runway centreline) and cleared it to climb to FL 120. Because of his high workload and traffic congestion, the Talla 'E' controller elected to arrange for his colleague, on the adjacent Galloway Sector, to take control of the

ATP climbing straight ahead to FL 120. This revised routeing resulted in the subject ac converging on LANAK. At 0630:50, the pilot of the B737 requested further descent and was cleared to FL 70, to be level by LANAK. Just over a minute later, at 0631:50, the ATP was transferred to the Galloway Sector in accordance with the agreement made earlier. At that stage, the ac were more than 30 NM apart with the ATP just approaching FL 50 in the climb. Aware of the convergence, the Talla 'E' controller continued to monitor the ATP's climb and recalled seeing it passing FL 78. This was when the flight was about 8 NM E of LANAK and, being aware that the B737 was required to be level at FL 70 by LANAK, the Talla 'E' controller assessed, wrongly as it turned out, that the flight profiles would not conflict. He then turned his attention to other sector traffic.

The pilot of the ATP established communication with the Galloway 'E' controller at 0632:10 reporting passing FL 50 for FL 120 on a heading of 245. The Galloway controller, quite reasonably, assumed that the flight would be 'clean', i.e. free of any conflicts within the Talla Sector, and, after instructing it to continue on the radar heading, turned his attention to other traffic under his control. The B737 was transferred to Glasgow Approach at 0635:20, with the ATP in its 1 o'clock about 3000 ft lower at a range of about 11 NM. The ScACC controllers remained unaware of the developing conflict until it was drawn to their attention by the activation of the STCA. The Galloway 'E' controller reacted well, issuing a turn instruction to the ATP, prefixed by the words 'avoiding action', onto heading 180 and providing traffic information. The pilot of the ATP complied with the turn instruction and reported visual with the traffic adding "...he's below us".

Meanwhile, the pilot of the B737 had established communication with Glasgow at 0635:40. Again, the Glasgow APR was entitled to expect the ac to be 'clean' with respect to ScACC traffic, and she focused her attention on the B737. Initially, she did not notice the ATP on a converging track and, having provided the standard information and advised the crew that there was no ATC speed restriction, she started

to clear it to descend to 5000 ft. She then noticed the ATP and, midway through the transmission, corrected the descent clearance by instructing the B737 to "...maintain flight level one hundred on reaching". By the end of the transmission, the B737 was through FL 100 and descending through FL 96, with the ATP in its one o'clock position at a range of about 6 NM climbing through FL 91; the pilot asked for the message to be repeated. Nevertheless, the ac promptly arrested its descent and climbed back to FL 100. The APR instructed the ac to turn L onto heading 280° at which point the pilot advised that he had traffic in sight in his 1 o'clock position. The APR confirmed that this was the traffic and told the crew to turn hard L. She also reversed the earlier instruction and told them to expedite descent to 5000 ft altitude. The pilot again confirmed that he had the traffic in sight and, a short time later, reported that he was clear and below it. The APR apologised for the incident and explained that the other traffic was unknown to her. She then resumed normal vectoring of the flight and the remainder of its approach was uneventful.

The radar recording indicates that after it had re-commenced its descent the B737 passed ahead of and 600 ft below the ATP. Standard 1000 ft vertical separation was quickly re-established as the ac continued their respective climb and descent. Subsequent analysis of the encounter shows that the Glasgow APR actually aggravated the situation by instructing the B737 to maintain FL 100. Vertical separation would still have been compromised but only briefly. Technically, the APR acted in contravention of the MATS Pt.1 section (Page 3-5/6, para. 9) dealing with "ARRIVING AIRCRAFT - Released From area Control", which states : "Approach control may issue any instructions to an aircraft released to it by area control. However, that aircraft must not be instructed to climb above, or stop its descent to, the level at the holding point agreed with area control and passed in the release message, without prior co-ordination with area control." On this occasion, however, it is accepted that her initial reaction was instinctive. At the time the B737 was still above the ATP, whose intentions she was not aware of and who she

thought would level at FL 90. The Glasgow unit report on the Airprox notes that the APR did not employ the appropriate 'avoiding action' phraseology and goes on to say that the importance of using this phraseology, under such circumstances, has been stressed, unit wide, in a safety digest publication.

The Galloway 'E' controller commented that the STCA had activated at a late stage, by which time separation had already been eroded. He was under the impression that the system had recently been "de-sensitised" by modifying the triggering parameters. However, enquiries have shown that this was not the case. NATS' TRD1 Section have provided a STCA Analysis Report which shows that the system gave only about 6 seconds warning because the triggering parameters were only infringed when the B737 arrested its descent and climbed back to FL 100. Since the Airprox, the system parameters have been modified so that the system would now provide about 34 seconds warning in the event of a similar encounter occurring.

UKAB Note: Pictures of the Scottish radar at 0635:10 show the B737 tracking NW and descending through FL 114 some 8 NM SE of LANAK, and the ATP heading SW and climbing through FL 90 just 3 NM NE of LANAK. At 0636:10 the B737 arrests its descent, having reached FL 96, and at 0636:20 is indicating FL 100 which is maintained until about 0636:40, at which point the Mode C again shows a descent. At about 0637 the B737 passes 1.4 NM ahead of and 600 ft below the ATP from L to R.

SMF data indicates separation distances of 2.34 NM and 100 ft at 0636:43, and 1.69 NM and 600 ft at 0636:55 as the ac pass. Analysis suggests that had the B737 been allowed to continue its original descent to 5000 ft it would have been passing about FL 70 at LANAK. (The SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data).

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

A controller member of the Board who was very familiar with the airspace in question explained that a crossing scenario such as this was commonly encountered within the TMA. Here both ac had left the TALLA E controller's frequency at the time of the Airprox, but the incident occurred in TALLA's airspace, and it was the TALLA controller's responsibility to ensure that the ATP was 'clean' when it was transferred to GALLOWAY. The TALLA controller had seen the ATP climb through FL 78, and as the B737 had to be level at FL 70 by LANAK, the controller believed erroneously that the flights would not conflict. Because of the busy scenario TALLA switched the ATP as mutually agreed to GALLOWAY and assumed the rate of climb would take it clear of the B737, which he subsequently transferred to Glasgow. Both ac had significantly differing performance and so the TALLA controller should have ensured that both would be separated. His

options were either to keep control of both ac until they had crossed, or, take appropriate action to ensure standard separation would be maintained and advising the receiving controller of those measures before transfer. The Board agreed that both GALLOWAY and Glasgow APR would have expected the B737 to be separated from the ATP, indeed the GALLOWAY controller is to be commended on the way he reacted when alerted to the conflict by the STCA. Members considered the actions of the Glasgow APR controller. In hindsight, standard separation may not have been eroded if the B737 had not been levelled at FL 100, but most acknowledged her reactions were probably instinctive and quite understandable when confronted unexpectedly with the conflict. It was disappointing to note that the term 'Avoiding Action' was not used. The Board agreed, therefore, that the incident happened because the TALLA E controller did not ensure standard separation between both ac before transferring each to their separate controllers. Members noted that the B737 pilot saw the ATP 600 ft above him and had kept it in sight throughout the avoiding action manoeuvre, before TCAS alerted him. Similarly both ac had crossed when the ATP pilot spotted the B737 2 NM away descending below his ac. Like both pilots, members agreed that there had not been a risk of a collision.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The TALLA Executive Controller did not ensure standard separation between the subject ac before transferring each to separate agencies.

## AIRPROX REPORT No 135/99

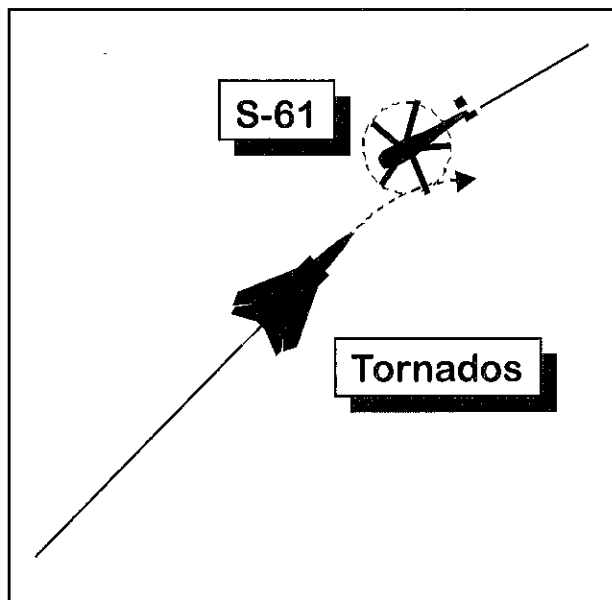
Date/Time: 26 Jul 0907  
Position: N5729 W0519 (5 NM NE of  
Strathcarron)  
Airspace: LFS/FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tornado GR S61  
Operator: HQ STC Civ Comm  
Alt/FL: 270 ft 700 ft  
(Rad Alt) (RPS 1022 mb)  
Weather VMC CLNC VMC CAVK  
Visibility: Unltd Unltd  
Reported Separation:  
100 m/100 ft H/< 100 ft V  
Recorded Separation: NK

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

**THE TORNADO PILOT** reports heading 040° at 430 kt carrying out a simulated attack at 250 ft MSD in a narrow valley. Approaching the target, he spotted a helicopter closing on an opposite track at close range and just above. He broke right and up at 4g and narrowly avoided a collision by about 100 m and 50-100 ft. He initially thought the S61 was on SAR Ops, but was surprised, on discovering otherwise, that it was transiting at such low level in the LFS. He thought it was a dangerous situation but there was only a moderate risk of collision because he saw it in time.

**THE S61 PILOT** reports heading 240° at 110 kt en route between Aberdeen and Benbecula at 700 ft agl when he saw a Tornado approaching from about 3-4 NM ahead. It altered course to the right passing 200 ft away and less than 100 ft above and a second Tornado, 60-90 sec behind the first, passed below and to his left rocking its wings as he turned to the right. There was a low to moderate risk of collision.

**THE S61 PILOT'S COMPANY** advised UKAB that there was no particular reason for the S61 to have been flying at low level on the sortie in question. The FSO said he would issue a bulletin advising pilots on such overland routes



to fly above 1000 ft unless there were overriding reasons to fly lower.

**HQ STC** comments that there is a noticeable discrepancy in the pilots' reports concerning the height of each aircraft, an issue which will most likely remain unresolved. However, regardless of the precision of the height assessment, the wisdom of low flying along a recognised helicopter route should be questioned. The principal lesson to be learned is one of good airmanship, which should, in this instance, have begun at the mission planning stage.

### PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB 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 incident occurred in a valley marked on the LFC as a helicopter route through the HRA so members thought that the Tornado pilot should not have been surprised to find a helicopter there. Members discussed whether the cause of the Airprox was late sightings by both parties, but the helicopter pilot had seen the Tornado

several miles ahead. On the helicopter route, the Tornado pilot should have been keeping a sharp lookout for the possibility of meeting one but it was possible that in fact he was, and saw the helicopter as early as could be expected. It would not have stood out particularly well nearly head-on with a terrain background. A majority of members considered that the pilots had seen the other ac as early as could be expected and that the incident was a conflict of flightpaths which was resolved by the Tornado pilot. Nevertheless, the ac passed fairly close in the

opinion of both pilots, with little time for reaction, and the Board concluded that the safety of the ac had been compromised.

Members noted and agreed with the comments of the S61 pilot's company. While there was no regulation to bar a helicopter pilot from flying where he was at that level, and on a fine day such a transit through majestic scenery had much to recommend it, a higher transit would undoubtedly reduce the chance of a dangerous encounter with a fast jet on a low level task.

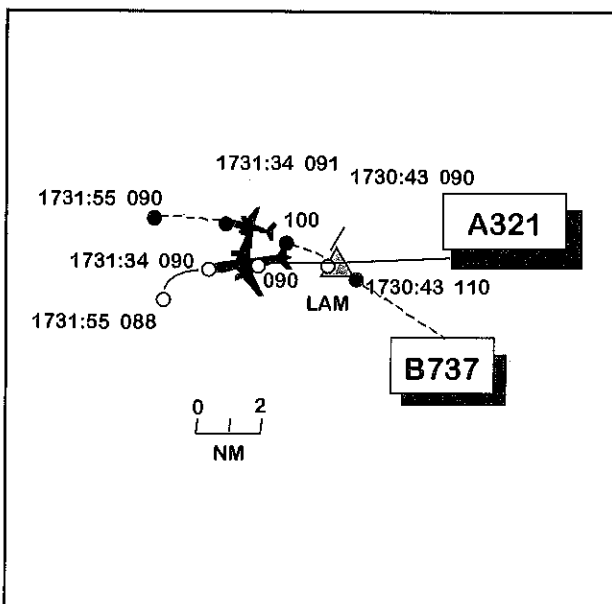
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Conflict of flightpaths resolved by the Tornado pilot.

**AIRPROX REPORT No 136/99**

Date/Time: 13 Jul 1731  
Position: N5139 E0005 (2.5 NM W LAM)  
Airspace: LTMA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: Airbus A321 B737-300  
Operator: CAT CAT  
Alt/FL: FL 90 ↓ FL 90  
  
Weather VMC  
Visibility: 10 km  
Reported Separation: 1 NM/same level  
Recorded Separation: 1 NM/600 ft



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

**THE AIRBUS PILOT** reports that he was on a radar vectored heading of 270° at 220 kt having left the LAM VOR at FL 90 under the control of the Heathrow DIRECTOR. When about 5 NM W of the VOR, a TCAS TA was received on traffic indicating 800 ft behind and above him, descending. The TA indication reverted to normal but then ATC instructed him to turn L onto 180° and advised him that there was

traffic conflicting with him which was not in RT contact with ATC. Although the visibility was 10 km in VMC he did not see the other ac but TCAS indicated that it passed about 1 NM away on his starboard side at about the same level. He thought there had been a possible risk of collision and reported an Airprox to DIRECTOR on 119.72.



**THE B737 PILOT** submitted a brief explanatory letter in which he reports as Captain that he approached LAM descending to his cleared level of FL 90. The frequency then became blocked. He had been talking temporarily on VHF box 2 to another agency and on returning to VHF box 1 was asked by the F/O to contact ATC for instructions. ATC then asked him to which FL he had been cleared and advised him that a report would be made concerning an Airprox. No further instructions were issued and he was preparing to enter the LAM holding pattern when he saw an Airbus, believed to be the subject of the incident, as it passed down his port side. He therefore chose to remain on a heading of 285°, which ATC then instructed him to maintain.

**THE HEATHROW INTERMEDIATE DIRECTOR** reports that he was operating the N/S DIRECTORS' positions in banded mode with a Support controller. The Airbus was leaving the LAM hold at FL 90 on a heading of 270° as instructed. The B737, which had been released at FL 110, was directly above the Airbus and not in RT communication, so the Support controller attempted to ring TC LAM to ask them to pass instructions to the pilot to leave LAM; no reply was received. The data blocks of the Airbus and B737 had become garbled and then, as their tracks began to diverge, the STCA flashed red with the Mode Cs of both ac showing FL 90. The pilot of the Airbus reported that he could see the B737 on his R and was given a L turn onto 180°. In his first transmission the B737 pilot reported that he had the Airbus in sight and that he was heading 285° at FL 90. Avoiding action was not given as both ac had each other in sight and the acs' tracks were by then diverging. Minimum separation was believed to be in the order of 1 NM at the same level. The B737 pilot said that he had been given descent clearance on the previous frequency.

**LATCC INVESTIGATIONS** reports, with RT transcript, that the RT workload on the TC LAM sector, described as moderate, very quickly became extremely high. The Airbus, inbound to Heathrow from Vienna, contacted the Heathrow DIRECTOR at 1728:30 descending to FL 100

and was immediately cleared to FL 90 on a heading of 270°. At 1729:30, the TC Lambourne trainee SC had instructed the B737, inbound to Heathrow from Brussels, to change frequency to the Heathrow DIRECTOR on 119.72; this ac was slowly overtaking the Airbus on a westerly heading and had been instructed to descend to FL 110, its stack level. RT recordings subsequently revealed that this transmission was blocked by another ac which was having severe difficulty establishing two-way contact with TC Lambourne. Consequently, no clear acknowledgement of the change of frequency message was received by ATC. The B737, unknown to TC Lambourne, remained on his frequency and continued towards the LAM VOR. The B737 pilot's report indicates that at this point only one crew member on the ac was monitoring the LAM frequency, which may partially explain what followed.

When, at 1730:12, the TC LAM SC cleared another ac (UKAB Note 1: this was subsequently identified by UKAB as an ATR) on the frequency to descend to FL 90, it was immediately apparent that more than one ac responded to the instruction. The trainee therefore re-transmitted the instruction, emphasising the callsign of the ac for which it was intended, but again there were two unintelligible overlapping responses. In view of the rapid escalation in RT workload due to this and other communication difficulties (described in the next paragraph) the situation had become confused to the point where neither the TC LAM mentor nor his trainee was entirely certain which ac were on the frequency and which were not. Under these circumstances it was perhaps less than surprising that the blocked readback by the B737 pilot escaped the controllers' attention.

Significantly, in the previous few minutes there had been several communications difficulties, ranging from broken calls with unreadable callsigns to crossed transmissions, which probably involved the subject B737. Recognising the possibility of ac radio unserviceability and a lack of RT discipline, and in an effort to resolve what was by then a

worsening situation, the TC LAM mentor took control of the position from his trainee and requested all stations to listen out before transmitting. He then requested confirmation from the pilot of the ATR that he had heard and complied with the descent instruction to FL 90; the pilot acknowledged. RT recordings have since revealed that during the course of the crossed transmissions, the pilot of the B737 had in fact taken the descent clearance intended for the ATR in the mistaken belief that it was meant for him. However, this was not apparent at the time of the incident, and before the communications difficulties could be resolved the B737 pilot, again with a broken beginning to his transmission and no callsign heard, transmitted ...*"passing Lambourne....which heading?"* The SC transmitted ...*"say again"* and only then realised that the B737 had not transferred to the Heathrow frequency as instructed some 2 min earlier. Overlapping data blocks prevented both the Heathrow DIRECTOR and TC LAM from detecting that the B737 had also descended below its released level of FL 110. Assuming the B737 would take up the hold at LAM in the absence of any instructions to the contrary, TC LAM quickly transferred it to Heathrow. The B737 pilot's report indicates that the ac did not take up the hold at LAM (although he was *"preparing to do so"*) but continued on a heading of 285° because by then the pilot could see the Airbus on his LHS. This was fortuitous because any L turn into the holding pattern would almost certainly have further eroded lateral separation. On contact with the Heathrow DIRECTOR both pilots reported having the other ac in sight.

The Heathrow controllers were presented with an existing loss of separation and responded well to ensure that standard separation was restored soon after first contact.

The very large number (12) of RT problems over a 2 min period significantly disrupted the operation of the TC LAM sector and this was felt to be a major contributory factor in the incident, albeit there were no adverse post-flight reports from pilots or controllers concerning the RT difficulties. The Airprox was also aggravated by the fact that only one crew member on the B737

monitored the TC LAM frequency in the crucial descent period and in the moments before the ac was transferred to Heathrow for Intermediate Approach. The Company concerned has since advised that new cockpit procedures have been introduced to prevent recurrence of such problems.

**ATSI** comments that overall there can be little criticism of the ATC performance in the period leading up to this Airprox. Following the instruction to the B737 to contact Heathrow, the TC Lambourne (LAM) Sector controller should have pursued a satisfactory readback from the flight, rather than settling for an ambiguous one word acknowledgement, especially in view of the communication difficulties being experienced on the sector frequency at the time.

The response to a second attempt at clarifying the ATR's descent clearance to FL 90 resulted again in a part simultaneous transmission, this time containing a partly blocked response from the B737. While undoubtedly it would have been desirable if the controller had detected the B737's presence, it would only have been fortuitous if he had done so. The controller's priority at the time was eliciting a correct readback from the ATR pilot to whom the descent instruction to FL 90 had been addressed.

On the positive side, the Heathrow Intermediate DIRECTOR reacted promptly to the STCA warning of the deteriorating situation and took action to restore the required lateral separation. Fortunately by this time each flight had acquired the other visually.

UKAB Note (2) On 25 August the B737 pilot's company operations circulated a letter to all pilots with the following instructions:

1. The non-flying pilot will carry out all RT functions with the appropriate ATC centre. The handling pilot will always cross-check the actions of the non-flying pilot when frequency changes are required.

2. Immediately RT communication is established with LATCC no further communications with ground handling agents should be made ..... and both pilots shall monitor RT instructions and frequency changes continuously.
3. No frequency changes will be undertaken by the handling pilot, to help the non-flying pilot unless he is off RTF.

No standby frequency changes shall be carried out during final approach and landing. This shall only be done when instructed by ATC and/or when vacating the runway.

UKAB Note (3): Pictures of the LATCC radars at 1728:49 show the subject ac tracking W towards LAM. The Airbus is about 13 NM due N of the B737 and the ac are indicating FL 109 and FL 120 Mode C respectively. At 1730:43 the Airbus is passing overhead LAM level at FL 90 with the B737 at its 7 o'clock position range 1 NM indicating FL 110, and heading WNW on a track which will take it just behind the Airbus. At 1731:09, the ac are about 1 NM apart with the B737, now having crossed in trail of the Airbus, indicating FL 100 descending. By this time the tracks of the 2 ac are diverging and shortly afterwards, at about 1731:42, minimum separation occurs as the ac pass abeam each other by 103 NM at the same level (FL 90). Shortly afterwards the Airbus turns L into the holding pattern while the B737 continues on a westerly course and standard lateral separation is quickly restored.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It was evident to the members that one of the major cause factors in this Airprox was RT difficulty. The instruction addressed to the B737

crew from TC LAM to change to the Heathrow DIRECTOR's frequency was blocked by another ac not involved in the Airprox, but whose transmissions caused severe RT difficulties over the Sector. Consequently, and unbeknown to TC LAM, the B737 did not switch to DIRECTOR. Members fully understood the difficulties that confronted the TC LAM controllers when an ATR was instructed to descend to FL 90 and apparently two pilots responded at once. Despite a re-transmission, an incorrect acknowledgement from the B737 crew seemed to go undetected by TC LAM in the ensuing RT confusion. Consequently, the B737 crew descended to FL 90 in the erroneous belief that they had been cleared so to do. It appeared to the members that the B737 captain's frank acknowledgement that the PNF was on the other VHF box indicated misplaced priorities. Indeed, the high density of air traffic encountered in the vicinity of the LAM hold demanded rapt attention from both crewmembers all the time. However, members noted with approval the welcome revised cockpit procedures issued after this Airprox, that demonstrated the company's resolve to reduce the potential for a recurrence. They also believed it was understandable that TC LAM would press for a correct level acknowledgement from the actual ac crew to whom it was addressed. Hence, the controllers were unaware of the B737 crew's error until they requested a heading from LAM. Overlapping SSR data blocks also hid the true situation from DIRECTOR. TCAS again proved its worth, by alerting the Airbus crew to the situation just before DIRECTOR transmitted the avoiding action L turn. Evidently the B737 crew were unaware of the situation until they sighted the Airbus on a gently diverging heading away from their ac. Weighing all of the information, members determined that this Airprox was caused by the B737 pilot, who reacted to a descent instruction not addressed to him and subsequently flew into conflict with the Airbus. A CAT pilot member believed it was sheer luck that the B737 crew had not turned L into the LAM Holding pattern which would probably have resulted in a very close quarter's situation indeed. Despite the TCAS TA, the eventual sighting by the B737 crew and the

avoiding action turn, the members agreed that since the situation had developed unknown to the B737 crew the safety of both ac had been compromised.

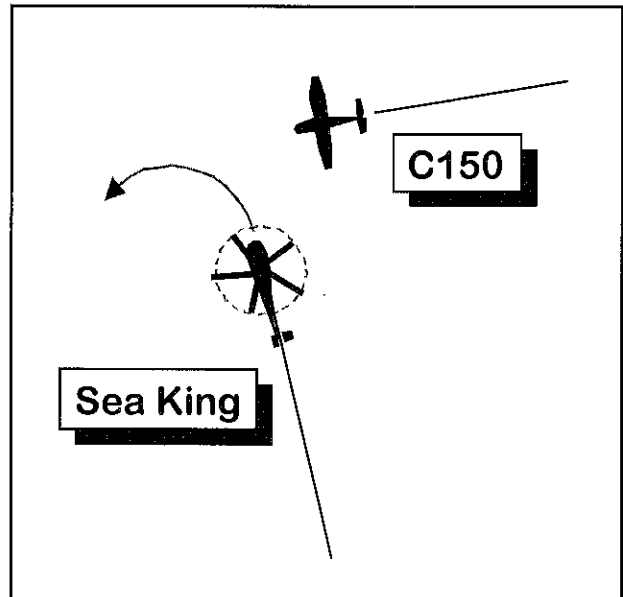
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: The B737 pilot reacted to a descent instruction not addressed to him and flew into conflict with the Airbus.

**AIRPROX REPORT No 137/99**

Date/Time: 26 Jul 1415  
Position: N5016 W0500 (10.5 NM S of St Mawgan - elev 390 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Sea King Cessna 150  
Operator: HQ FONA Civ Pte  
Alt/FL : 2500 ft 2700 ft  
 (RPS 1015 mb) (QNH)  
Weather IMC CLBH VMC CLNC  
Visibility: 10 km+ 15 km  
Reported Separation: 500 m/300 m  
Recorded Separation: NK



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

**THE SEA KING PILOT** reports heading 330° at 90 kt, level at 2500 ft RPS and receiving a RIS from St Mawgan on UHF while about to start a PAR on an IF training sortie; the PF was in the RHS under visor and PNF (safety pilot) was in the LHS. He was given information about civilian traffic 11 NM to the NE at 3000 ft and elected to continue on track due to its range. A further call indicated it had closed to 1 NM and the captain terminated IF simulation immediately to look for it. He saw a light ac 1000 yd away at the same level and turned steeply left through 360° and descended to avoid it. He then regained sight of it; it did not appear to have deviated. There had been a

high risk of collision; the light ac had passed 500 m away at the same level.

**THE C150 PILOT** reports heading 262° at 85 kt and receiving a FIS from St Mawgan on VHF, at 2700 ft. He was concentrating his lookout towards Truro, his next turning point. Being under FIS he did not expect traffic information and he first saw the Sea King, approaching from his left, when it was 500 m away. It turned left and descended; at its closest it was 300 m away and he thought the risk of collision low. He regretted not seeing the Sea King earlier; but was inexperienced and found the workload on the sortie to be high, exacerbated by a constantly slipping throttle friction nut.

**HQ MATO** reports that the C150 pilot was en route from Exeter to Perranporth and receiving a FIS from St Mawgan Approach (APP) on frequency 126.5. On his initial call to APP, the pilot had advised that he was at 3000 ft on 1016 mb (Wessex RPS) and was not transponder equipped. The C150 was not formally identified.

Between 1410:43 and 1411:22, APP accepted a radar handover from Culdrose on the Sea King which was inbound for 2 PARs.

The Sea King pilot established contact with DIR at 1411:43 and requested a RIS. This was provided, but limited from all around due to poor radar performance. The Sea King was the only ac on frequency and had been handed over at 2500 ft on the Scillies RPS, 1015 mb. At 1413:18, DIR turned the Sea King L heading 330°, and shortly afterwards, at 1413:41, passed traffic information (TI) *"...traffic north, four miles, south-westbound, believed to be at 3000 ft."* The Sea King pilot replied *"...roger, nothing seen as yet."* DIR then passed the Sea King pilot TI on another contact. APP called the C150 pilot at 1414:33, the intention being to pass TI on the Sea King, but received no reply. APP made a second attempt at 1414:40 and a third at 1414:57, again with no response. As APP was making the second call to the C150 pilot, DIR transmitted *"(Sea king c/s) update on the traffic, traffic left 11 o'clock, two miles, southbound indicating fifteen hundred feet and right one o'clock, one mile at three thousand feet, southbound."* At 1414:58, while APP was making the third call to the C150, the Sea King pilot transmitted *"c/s roger, suddenly visual the one to the north, taking avoiding action, ah, left onto south, he's at the same level."* APP finally re-established 2-way communication with the C150 pilot at 1416:30 and briefly discussed the C150's radio, the pilot commenting *"Er, it is quite (distorted word – probably weak), affirm, the (distorted word – probably readability) is quite low....."* The C150 pilot was told to freecall Perranporth at 1417:46; at about the same time the Sea King pilot filed an Airprox with DIR. At the time of the Airprox, the workload for both APP and DIR was assessed

as low, although APP had 6 speaking units (all FIS) on frequency.

The LATCC Burrington radar recording shows the Airprox occurring at 1415:05. The Sea King is seen squawking 0460 without Mode C (ac not fitted), tracking NE and then turning NW as vectored by DIR. The non squawking C150 is seen tracking about 250°, from St Austell to Truro. At 1413:41, the time of the first TI call, the C150 is 010° from the Sea King at 3.5 NM, the Sea King having just begun a L turn. At the time of the second TI call, the C150 is in the Sea King's 2 o'clock at 1 NM, still tracking 250°. The closest point of approach occurs at 1415:05, as the radar returns merge; the Sea King (tracking 330°) has the C150 (tracking 245°) between its 3 and 4 o'clock positions. The returns are still merged at 1415:14, as the Sea King commences a L turn. The Sea King is then lost from radar for several sweeps but reappears as an SSR only contact at 1416:20, tracking 330° with the C150 about 1.5 NM SW. The C150 does not noticeably change heading.

DIR's first TI call was an accurate one, given that the Sea King was turning, and the altitude information *"..believed to be at..."* was passed correctly. The decision to pass an update was also sound, although the information passed proved to be less accurate; *"one o'clock, southbound"* was passed whereas the ac was actually '2 o'clock, heading south-west'. It should be noted however, that as the ac were only separated by a distance of 1 NM at the time, the difference between 1 and 2 o'clock on a 40 NM radar display is rather difficult to judge accurately. The phrasing of the C150's altitude in the second call *"..at 3000 ft"*, was also inaccurate; co-ordination had not been effected, nor had any further traffic information been obtained from APP. Nevertheless, it was only after this second call that the Sea King pilot saw the C150 and therefore the content of the call was probably sufficient to achieve the required aim, although slightly later than intended. It is clear from the RT transcript that the Sea King pilot was surprised to see the C150 at the same level. The timing of DIR's positioning L turn to 330° was unfortunate as it placed both ac on converging tracks; this turn however, combined

with the TI call that followed, was acceptable under the radar service being provided.

Although not formally identified, the C150 pilot's position report overhead St Austell and the ac's subsequent track made it reasonably certain that the C150 was the ac in conflict with the Sea King. APP therefore attempted to advise the pilot of the helicopter's presence, but without success. The C150 pilot's report implies that he had not intended to descend from his planned cruising level of 3000 ft; had APP been able to contact the pilot, the information passed may well have prompted the pilot to check his altitude and return to 3000 ft, thus resolving the conflict. Under a VFR FIS however, the pilot was not obliged to tell APP about his descent.

**HQ FONA** comments that if the ac captain had requested a RAS he would have received the separation he possibly expected. Under a RIS the onus to see and avoid the conflicting traffic remained with him and not the controller.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Late sighting of the other ac by both pilots.

recordings, and reports from the appropriate ATC and operating authorities.

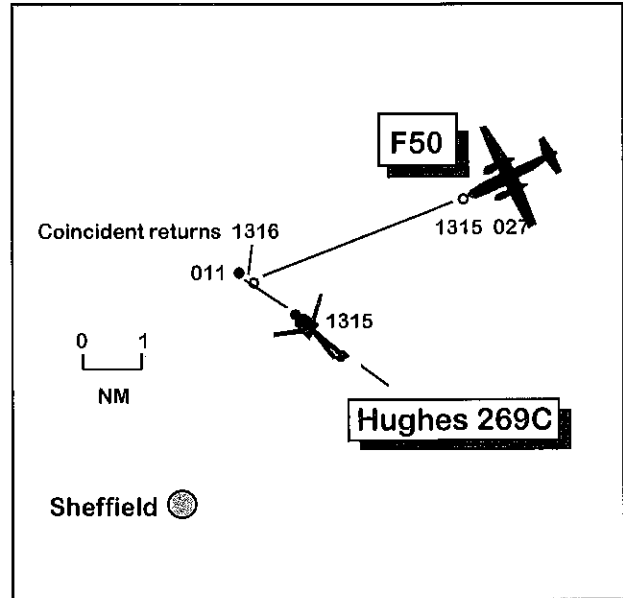
Members agreed that the cause of this encounter was a late sighting of the other ac by both pilots. Members with some surprise learned that in the Sea King the safety pilot was not the captain, which seemed a less than ideal arrangement. Sitting in the LHS the safety pilot would have had a less clear view in the direction of the advised traffic but as captain he might have been more inclined to incorporate a lookout turn into the IF training task.

The Cessna's radio problems added to St Mawgan ATC's difficulties at a crucial stage; the pilot appeared to be aware that his RT was substandard. The GA members hoped that the fault had been reported and dealt with after landing and not just been accepted as a known problem with that ac. Faulty radios can be a flight safety hazard.

In discussing the risk level, members considered that although the sudden sighting after discontinuing IF must have startled the Sea King pilot somewhat, both pilots had become aware of the other ac in time to remove any risk of the ac actually colliding.

**AIRPROX REPORT No 138/99**

Date/Time: 27 Jul 1316  
Position: N5327 W0126 (305 NM NNE Sheffield)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: F50 Hughes 269C  
Operator: CAT Civ Pte  
Alt/FL: 1500 ft 1500 ft  
(QNH 1026 mb) (QNH 1026 mb)  
Weather VMC VMC CAVOK  
Visibility: >10 km 10 km  
Reporting Separation:  
0.5 NM/0 ft V 1 NM/0 ft V  
Recorded Separation: <0.5 NM



**BOTH PILOTS FILED**

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

**THE F50 PILOT** reports that he was heading 260° at 200 kt while positioning downwind LH for RW 10 at Sheffield and in contact with Sheffield ADC/APC on 128.52 squawking 0224 with Mode C. The visibility was over 10 km in VMC. Traffic information was passed to him on a PA28 at 2000 ft overhead the airport routeing N to S. While levelling the ac at 1500 ft (QNH 1026), he saw a white Hughes helicopter at his 12 to 1230 position 0.5 to 0.75 NM away tracking N at co-altitude. He turned L to ensure that he passed behind the ac and reported its presence to ATC; however, as he had seen and avoided it he thought there had been a low risk of collision. It became apparent that the helicopter was in RT contact with Sheffield on the same frequency but the controller had not advised either pilot about the other's presence.

**THE HUGHES PILOT** reports that he first contacted Sheffield ATC on 128.52 while flying VFR over Worksop disused airfield en route from Gamston to a private site near Huddersfield. He was instructed to report east abeam Sheffield airport, which he did. Shortly afterwards he was told to squawk 7000 (Mode C was not fitted to his ac) and continue with his next frequency; he thought this was rather

premature so decided to remain with Sheffield. There were only 3 ac on the frequency at the time including the F50, whose pilot he heard being advised of traffic transiting overhead the airfield; no information was passed to the F50 pilot about the subject helicopter. While heading 310° at 75 kt and level at 1500 ft (QNH 1026) in CAVOK conditions, the F50 passed from R to L behind him at the same level about 1 NM away. Avoiding action was unnecessary as the ac was already passing him when he first saw it; nevertheless, he felt there had been a high risk of collision.

**ATSI** reports that the Hughes helicopter initially called Sheffield ADC/APC at 1306:30 requesting a FIS at 1500 ft. The controller approved the FIS, issued the current Sheffield QNH and, from the route information given, determined that the ac would pass E of the airfield on a NW track. The pilot was instructed to report "east abeam" the airport and asked to squawk 0224. (Although no radar service is available from Sheffield, this dedicated squawk enables adjacent radar equipped units to see which ac are receiving a service from Sheffield.)

At 1308:30, while still under the control of Manchester ACC, the F50 pilot called Sheffield ADC/APC to advise them that he would be released by Manchester in about 10 min time and would be planning to position LH downwind

for RW 10 at Sheffield. The Sheffield MATS Pt 2, section 4, para 1, states that all arriving IFR flights are to be provided with traffic information on "known relevant VFR flights". Therefore, after acknowledging the call, the controller advised the pilot that there was traffic (the helicopter) passing east of the airfield at 1400 ft but that it would be "well clear" by the time the F50 was released. Neither the ac type nor its direction of flight were stated in this transmission. The Hughes pilot reported "east abeam" at 1309:30 and was informed that there was "...no known traffic to the NW, report leaving the frequency". Moments later, another flight (a PA28 not involved in the incident) contacted Sheffield and was given approval to transit overhead the airfield from N to S at 2000 ft VFR en route to Gamston. The pilot of this ac was passed traffic information on the Hughes helicopter, and confirmation was received from the latter's pilot that he had copied the PA28's details.

Following his release from Manchester ACC, the F50 pilot contacted Sheffield at 1313:30, some 5 min after his first informatory call. He reported descending to FL 40 and "...establishing ten miles left hand downwind runway one zero"; the controller cleared the ac to descend to 3000 ft on the Sheffield QNH. (There is no evidence from the RT recording that the F50 pilot reported receiving the current ATIS message or that the controller issued the latest weather and RW in use, as required by the MATS Pt 1). The F50 pilot read back the clearance to 3000 ft but indicated that, because of his range from touchdown, he required descent below this altitude. Before approving this request, the controller issued the pilot with traffic information on the PA28, including a position report which placed the latter in the airfield's overhead. At 1314:30, the F50 pilot was cleared for a visual approach to RW 10 with the proviso that descent should not be below 1500 ft on the downwind leg. At no stage, however, did the controller update the traffic information on the Hughes helicopter to the F50 pilot, or seek details of the helicopter's current position; to have done so would have been particularly relevant in view of the F50 having been released some 5 min earlier than

its pilot had originally indicated. The controller concerned reports that he cannot account for this omission other than that he had assumed the helicopter was now clear of the F50's anticipated track and he had, therefore, transferred his attention to the position of the PA28 in relation to the IFR traffic. In hindsight, he appreciates the value of reviewing a flight's progress in the process of maintaining an up-to-date picture of the traffic situation.

At 1315:30, the pilot of the F50 reported that he had helicopter traffic in his 12 o'clock position less than a mile away. The controller responded by requesting the F50's level; the pilot replied 1500 ft and asked if the traffic was known to Sheffield. The controller responded that it was but he thought it would have been well clear by now and apologised. The helicopter pilot made no comment about the incident, however, the F50 pilot said that he would be filing an Airprox report.

UKAB Note (1): The radar recording shows the ac on converging tracks to the NE of Sheffield airport, the Hughes tracking NW and the F50 tracking W. At 1316, about 4 NM NNE of the airfield, the F50 passed less than 0.5 NM astern of the helicopter with the F50's Mode C indicating 1100 ft (equivalent to 1450 ft on QNH 1026).

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording, and a report from the appropriate ATC authority.

A member reminded the Board that the instrument approach procedure for Sheffield is conducted within the FIR where the onus for maintaining separation from other ac rests with pilots on the 'see and avoid principle'. Members noted that the F50 pilot fulfilled his responsibility in this respect. As in previous similar incidents, members commented that commercial pilots in these circumstances often



appear not to appreciate that they are no longer under the protection of CAS. However, pilots of IFR ac are entitled to expect information on any known traffic which might affect them; although the Sheffield controller did tell the F50 pilot about the helicopter he mistakenly assumed it would be clear of the area at the time the F50 was expected to arrive. A controller member had some sympathy for the Sheffield controller who had made this assumption on the basis of the arrival time given by the F50 pilot; in the event the ac arrived 5 min early. Nonetheless, it was the Sheffield controller's responsibility to ensure that accurate information was passed to

the F50 and he should have kept track of the helicopter to enable him to do this. Despite these points, members did not consider that the lack of information was a direct causal factor in the incident as in Class G airspace it was the pilots' ultimate responsibility to see and avoid. The Board concluded that the Airprox resulted from a conflict of flight paths in the FIR resolved by the F50 pilot. With regard to risk, members noted that, having spotted the helicopter, the F50 pilot ensured that he passed well behind it while maintaining visual contact, so removing any possibility of a collision.

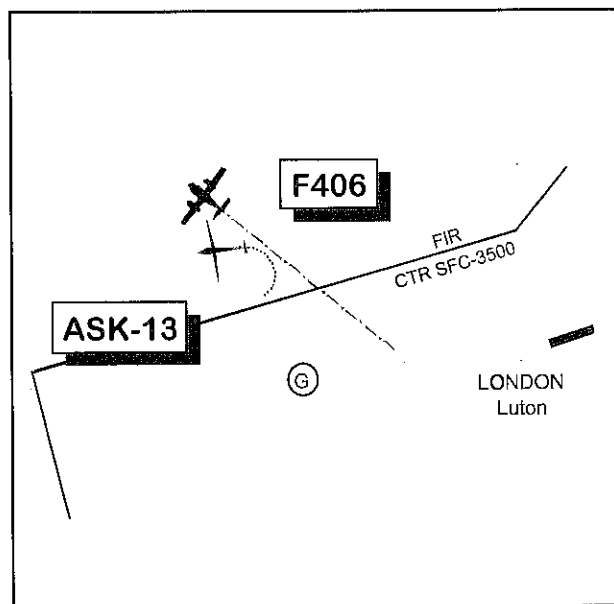
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: A conflict in the FIR resolved by the F50 pilot.

**AIRPROX REPORT No 139/99**

Date/Time: 27 Jul 99 0936  
Position: N5155 W0033 (3 NM N of Dunstable Down glider site - elev. 500 ft)  
Airspace: London FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: K13 Glider F406 (Caravan II)  
Operator: Civ Trg Civ Comm  
Alt/FL: 2400 ft 2400 ft  
 (QNH) (QNH 1024)  
Weather VMC CLBC VMC  
Visibility: NK  
Reported Separation: <2-300 m  
Recorded Separation: NK



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

**THE K13 GLIDER PILOT** reports that he was descending from 2500 ft (QNH) after release from an aerotow in a clearing L turn at a TAS of 40 kt, just before the commencement of a spinning exercise. During the turn both occupants of the glider were alerted to the

presence of another ac by the sound of an engine. A white twin engined ac was first seen 2-300 m away in the glider's 4 o'clock, having passed astern flying at the same level, or slightly below. No avoiding action was taken as the risk of collision had subsided by the time the other ac was seen; its pilot appeared to be

following the A5 road from Luton to Milton Keynes. An Airprox report was subsequently telephoned to Luton ATC by the glider pilot after landing, who opined that there was a “fairly high” risk of collision if the pilot of the other ac had not seen his glider.

**THE F406 PILOT** reports just over one month after the occurrence, that he was in receipt of a RIS, he thought, from Luton APPROACH on 129.55 MHz, whilst cruising at 2400 ft (QNH) in VMC at 200 kt. A shoulder wing glider, believed to be an ASK-13, was sighted at a range of 3-4 NM in a thermalling R turn, which took the glider clear of the F406’s track. Hence, he passed behind the glider by about 1100 m and considers that there was ‘absolutely no risk of a collision’. He informed Luton that Dunstable glider site was active. Subsequent to clarification by the UKAB, the pilot stated that the glider might have been turning L.

**LUTON ATC** report that the F406 transited the Luton CTZ and passed abeam Luton Airport at 0934, on a north-westerly track from the BPK VOR inbound to Coventry. A FIS was provided when the F406 exited the CTZ and no conflicts were reported by the pilot prior to leaving the frequency at 0938. The Luton METAR for 0920 gave a visibility of over 10 km, scattered cloud at 2700 ft and broken cloud at 3200 ft, QNH 1024 mb.

UKAB Note: (1) At ENR 5-5-1-2 dated 17 Jun 99, the UK AIP lists Dunstable Downs (elev 500 ft) as a winch and tug launch glider site, active sunrise to sunset to 2000 ft agl.

UKAB Note: (2) A review of the LATCC Debden radar recording shows the F406, identified from its assigned Luton squawk, maintaining a steady north-westerly track at 2000 ft Mode C (1013 mb). At 0936, as the F406 approaches the Luton CTZ boundary, a very intermittent primary contact, which is believed to be the glider, is shown in the F406 pilot’s 12 o’clock at a range of 1.5 NM. When the F406 crossed the CTZ boundary into Class G airspace, the glider was 12 o’clock at 0.5 NM. The contacts merged at 0936:30, when the F406 indicated 1900 ft Mode C, equating to

2230 ft QNH (1024 mb). The minimum horizontal separation could not be readily determined when the contacts merged, but it is probably of a similar magnitude to that reported by the glider pilot. At the same time a second primary contact is shown 1.5 NM to the south of the F406, which recovered rapidly to Dunstable Down and is believed to be the aerotow tug. The F406 continued north-west bound with no discernible alteration of track and the glider fades from radar contact.

## **PART B: SUMMARY OF THE BOARD’S DISCUSSIONS**

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

Given the apparent geometry of the encounter, the Board believed that a late sighting by the glider pilot was not unreasonable in the circumstances that pertained. Furthermore, they noted the F406 pilot’s revised recollections in that he had agreed the K13 glider he saw may have been in a L turn and not R as he originally reported. A CAT pilot member, who is also an experienced Glider pilot, reaffirmed that this was indeed a very busy and popular glider flying area. Moreover, he explained to the Board that when released from an aerotow the normal procedure is for the tug to turn to the R and the glider to the L, as in this instance. Nevertheless, it was reported that no other K13 gliders were airborne from Dunstable Down at the time of the Airprox. There remained a remote possibility that the F406 pilot had seen another K13 and not the subject glider, but given the intervening period between the occurrence and the reported pilot’s report, this was discounted by the Board who were satisfied that the subject ac had been identified. Therefore, members agreed that the F406 pilot had flown sufficiently close to cause the glider pilot concern and this was the cause of the Airprox. However, as the F406 pilot had spotted the glider at a range of 3-4 NM and had been able to monitor the situation throughout,

there had not been a risk of a collision between the subject ac.

### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

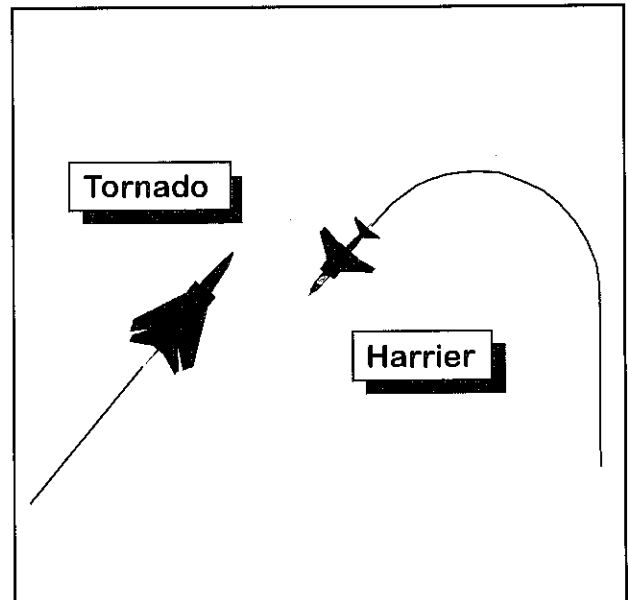
Cause: The F406 pilot flew sufficiently close to cause the glider pilot concern.

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### **AIRPROX REPORT No 140/99**

Date/Time: 28 Jul 1448  
Position: N5159 W0240 (3 NM SE of Hereford)  
Airspace: LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Harrier Tornado GR  
Operator: HQ STC HQ STC  
Alt/FL: 300 ft 500 ft  
(Rad Alt) (Rad Alt)  
Weather VMC CLNC VMC CLNC  
Visibility: 20 km 20 km+  
Reported Separation: 30-50 m/1000 ft H  
Recorded Separation: NK



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

**THE HARRIER PILOT** reports flying as part of a formation but split up by 5 NM for IP target runs. While heading N at 450 kt he saw a Tornado cross left to right 2 NM ahead doing what looked like a loft attack. Shortly afterwards he began a planned left turn onto 230° whilst searching for a possible second Tornado. On rolling wings level he glanced in for 0.5 to 1 second to check his position and track on his map display and, on looking up, was aware of a grey ac passing very close (30-50 m) down his right side at the same level; it was in sight for too little time for him to identify it. With no time for avoiding action, the risk of collision was very high.

**THE TORNADO PILOT** reports flying as No 2 in a 2 v 1 evasion sortie. While heading 040° at

480 kt he saw what he thought was the bounce at 12 o'clock 8 km away. He attempted a missile lock and then moved gently to the left to achieve a minimum separation pass to the left of the other ac. As he crossed at 1000 ft range and 100 ft below the other ac he realised it was a Harrier, not the bounce. There was no risk of collision as he was visual with the other ac from 8 km away.

Note: LATCC radar recordings show intermittent returns from several fast moving ac heading in various directions, squawking 7001 or without squawks. It is not possible to correlate the pilots' reports with any of these. The general direction of movement is not possible to determine. It seems probable that what the Harrier pilot saw and what the Tornado pilot saw were not the same occurrence.

**HQ STC** comments that the large discrepancy in reported miss distances suggests that the pilots are referring to separate incidents. There is no reason to believe that the Tornado pilot did anything other than a safe head-on attack against a Harrier, which he initially mis-identified as the bounce aircraft from his own formation. His break-out was safe and expeditious, achieving the statutory 1000 ft minimum separation distance. It seems most likely, therefore, that whichever Tornado was the true subject of the Airprox it merged with the Harrier without any knowledge of the incident.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, and reports from the appropriate operating authorities.

Members agreed that this was a very near miss, whatever the interpretation put on it, which undoubtedly contained a risk of collision. The Board considered that the experienced Harrier

pilot, despite obtaining only the briefest of sightings of the other ac, was unlikely to have misassessed the miss distance to the extent of the Tornado pilot's assessment. Whether or not the Tornado pilot actually passed somewhat closer to 'his' Harrier than he had stated, only he would know. Members agreed that in the absence of useable information from a radar recording, they could only draw conclusions from the statements as they stood, taking due note of the possibility raised by HQ STC that the pilots might be referring to separate incidents. It was clear that part of the cause was that the Harrier pilot saw the Tornado late. This was simply a fact; it did not imply criticism. The Tornado, unless it was skylined, would not have been a visually observable object at a 900 kt closing speed at the range required to take effective avoiding action. Whichever Tornado pilot was involved, he had either not seen the Harrier or had seen it and had flown close enough to the Harrier to cause its pilot concern for his safety. A majority of members chose the latter option in the absence of any information either way, and concluded that this was also part of the cause.

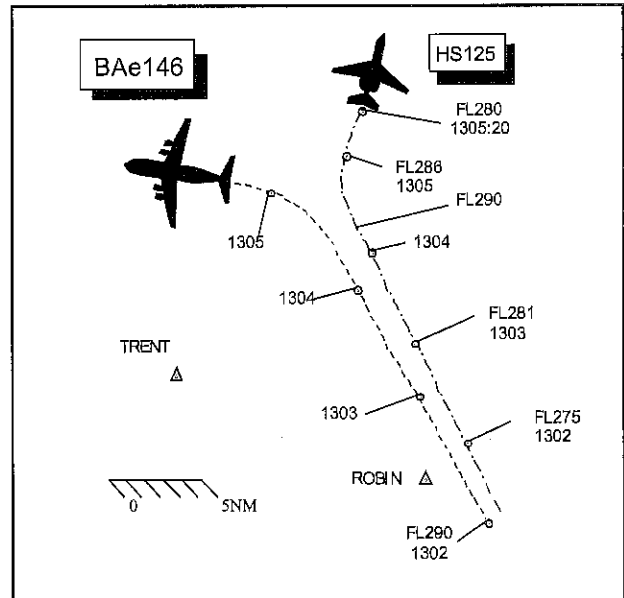
## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: A Tornado flew close enough to the Harrier to cause its pilot concern, and a late sighting by the Harrier pilot.

## AIRPROX REPORT No 141/99

Date/Time: 29 Jul 1304  
Position: N5311 W0125 (11.5 NM NE of TRENT)  
Airspace: UAR UB4 (Class: B)  
Reporter: LATCC - LAKES S3 Sector Controller  
First Aircraft      Second Aircraft  
Type: HS125              BAe146  
Operator: Civ Pte              CAT  
Alt/FL: FL 290              FL 290  
  
Weather      IMC CLBC              VMC  
Visibility: 8km  
Reported Separation:  
1.76NM Horizontal  
Recorded Separation: 1.9NM Horizontal



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

**THE LATCC LAKES S3 RADAR MENTOR** reports that he had just taken over the Sector as OJTI with a trainee, when the HS125 crew reported in on the Sector frequency climbing to FL 280, heading 350°; the trainee instructed the crew to turn L heading 335° and climb to FL 290. The BAe146 crew (shown erroneously as a SAAB2000 on the FPS) then checked in on the frequency, reported level at FL 290 and also heading 335°. The Mentor then concentrated his attention on six other ac on the sector, all at FL 310, of which 3 were in potential conflict. His attention was subsequently drawn back to the HS125 and BAe146 by the STCA, the respective SSR labels were flashing but the Mode C was garbled, so the levels were not readily apparent. Upon realising that the HS125 and BAe146 were in conflict he took over the RT from the trainee (after the latter had issued a L turn onto 310°) and instructed the BAe146 pilot to turn L onto 290°; he then instructed the HS125 pilot to turn R onto 020° and to descend to FL 280. He did not recall using the phrase 'avoiding action'. Standard separation was subsequently re established between the subject ac.

**THE HS125 PILOT** reports flying a radar vector of 335° at 350 kt, level at FL 290, which he

understood to be the final cruising level; the climb instruction had been acknowledged. Sometime later, LATCC instructed him to turn R 30° he thought and after completion of the turn, to descend to FL 280. He states that it was not clear at the time that a hazard existed. No other ac was sighted. Therefore, he was unable to assess either the risk or minimum separation.

**THE BAe146 PILOT** declined to file a report as he was completely unaware of the occurrence. However, the company did advise that the subject ac was a BAe146 and not a SAAB2000 as originally reported and erroneously indicated on the LATCC FPS.

**ATSI** comments that the Lakes Mentor described his workload at the time of the Airprox as moderate, although he expected it to increase considerably in the following period. The Mentor had been involved in his trainee's training for about three months and at the time of the incident 230 hours of instruction had been completed. About 5 minutes after the Mentor and his trainee took over the sector the HS125 crew contacted the Lakes Sector. The crew reported heading 350 and was instructed to climb to FL 290 by the trainee; the previous clearance had been to FL 280. Approximately 40 seconds later, the BAe146 crew established contact on the frequency at FL 290 on a radar

heading of 335. The flight was instructed to continue on the radar heading.

The Mentor explained later that shortly after taking over the sector, he had concentrated his attention on the developing traffic situation elsewhere in the sector, which involved a number of ac on potentially conflicting tracks at the same level. To facilitate this task he had been repositioning the FPS in the display to highlight the conflicts. Because of the trainee's experience he assumed that he could leave him to deal safely with the subject ac. He added that he was aware his trainee had told the HS125 crew to climb to FL 290, the same level as the BAe146, but he had not monitored the progress of the two flights.

At 1300, the trainee instructed the HS125 to turn L heading 335°, the same heading as the BAe146, informing the pilot that his cruising level would be FL 290. The flight had requested FL 310, but this level was not available. When he instructed the HS125 to turn, the trainee stated he believed he had the requisite 5 NM horizontal radar separation between the tracks of the subject ac. After a radar replay of the incident his only explanation for the close proximity of the ac was that he had possibly mis-identified the BAe146 with another ac, positioned to its left. This comment is supported by the radar recording, which at 1300:00 shows another ac on a north-westerly heading about 5 NM to the west of the BAe146.

No further transmissions were made to, or by, either flight until the STCA activated. During this period the radar recording reveals that the BAe146 was closing on the HS125. At 1300:26, the two ac were about 8 NM apart and by 1303:55, the distance had reduced to about 2 NM. The radar recording also shows the ground speed of the two ac, information that is not available to controllers in the ACR; the HS125 was flying at 280 kt and the BAe146 at 400 kt. It is evident that neither the Mentor, nor his trainee, monitored this over-taking situation and were only alerted by the STCA. When this activated the trainee instructed the BAe146 crew to turn L onto 310°. However, before they could reply the Mentor took over the RTF and

instructed the HS125 crew to turn R immediately onto 020°. After receipt of a correct readback the BAe146 crew were then instructed to turn L onto 290. Subsequently at 1304:20, the HS125 was cleared to descend to FL 280. During the immediate remedial action to control the situation the term avoiding action was not used. The Mentor explained that when STCA activated, the SSR labels of the two ac were overlapping and his initial actions were addressed more to ensuring that he instructed the correct ac to turn the appropriate way, in a clear manner, rather than using the term avoiding action. He considered that, although the flights were in close proximity, there was no risk of collision as they were on parallel tracks about 2 NM apart. Consequently, he did not pass traffic information to either flight.

The radar photograph timed at 1304:21, the time the HS125 was given descent clearance to FL 280, shows both ac indicating FL 290, still on parallel tracks, with the BAe146 1.9 NM SW of the HS125. By 1305:01, the turns given to both ac had taken effect, with the flights on diverging tracks 4.5 NM apart and the HS125 passing FL 286 in descent.

It was discovered later that the ac type printed on the FPS corresponding to the BAe146 showed it incorrectly as an SB20. The message changing the ac type had been received at LATCC and investigations have been unable to ascertain why the information had not been processed correctly. Nevertheless, the Mentor thought that the incorrect ac type had very little effect on the incident.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the air traffic controllers involved, a report from the HS125 pilot, transcripts of the relevant RT frequencies, radar recordings and reports from the appropriate ATC authority.

It was clear to Board members that this Airprox report resulted from an erosion of standard

separation between both ac, but some questioned whether this was an Airprox at all. Undoubtedly it fell within the parameters of a reportable occurrence in the MOR scheme, however, despite the flights being close together the reporting Controller believed that there was no risk of a collision as the ac were on parallel tracks about 2 NM apart. This view was shared by a controller on the Board; whilst not wishing to inhibit or prescribe when or when not to report, he questioned the need for an Airprox classification in this instance. Other members believed the advent of SMF, whilst a useful flight safety tool, could result in the overzealous classification of some occurrences and a loss of separation did not automatically warrant an assessment by the Board. The question to be addressed was how close together should 2 ac be allowed to fly, on

parallel tracks, in CAS without compromising their safety. Most agreed this 'line' had been crossed and it was far better to report such an occurrence as an Airprox, rather than lose a potentially valuable flight safety lesson. It was rapidly agreed that this Airprox was caused by the trainee's instruction to climb the HS125 to the same level as the BAe146, without ensuring that horizontal separation would be maintained. This situation went unnoticed by the Mentor who did not take corrective action until alerted by the STCA. The Board noted the omission of the term 'Avoiding Action' and was concerned at the absence of traffic information that would have alerted the respective crews to the situation. But members also agreed that the recorded minimum horizontal separation of 1.9 NM coupled with the slightly diverging tracks removed the risk of a collision

### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The LATCC LAKES Sector Controller mentor allowed his trainee to climb the HS125 into conflict with the BAe146, without monitoring his actions.

### **AIRPROX REPORT No 142/99**

Date/Time: 27 Jul 1454

Position: N5254 W0108  
(Bicester - elev 267 ft)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	Discus glider	PA28

<u>Operator:</u>	Civ Club	Civ Trg
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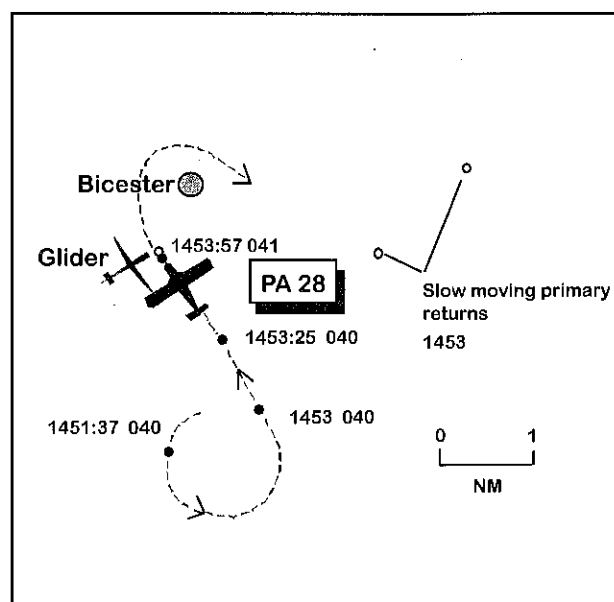
<u>Alt/FL:</u>	3800 ft (QFE 1014 mb)	variable n/k
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<u>Weather</u>	VMC CLEAR	VMC
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<u>Visibility:</u>	>40 km	>10 km
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Reported Separation:  
0 ft H/100 ft V >0.5 NM/6-800 ft V

Recorded Separation: not seen



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

**THE DISCUS PILOT** reports that she was thermalling in a R turn in the vicinity of Bicester town at about 3800 ft (QFE) and 45 kt, and in contact with Bicester radio on 129.975. The visibility, flying out of sun, was over 40 km in VMC. Although keeping a good lookout, she did not see a white/orange low wing single engined ac until it passed about 100 ft directly over her from R to L. She was able to read the first and last two letters of the ac's registration. There had been no time to take avoiding action and she felt there had been a possible risk of collision. She believes that the other pilot had not seen her at all.

UKAB Note (1): In a subsequent telephone conversation with UKAB staff, the glider pilot said that the other ac passed her very quickly but she was nevertheless able to read most of its underwing registration marking. Having tracked over her in a northerly direction, the ac then made a reciprocal R turn in the vicinity of Bicester airfield and headed SE towards the Oxford area.

**THE PA28 PILOT** reports that he was carrying out an instrument sortie with a student from Oxford Kidlington. Approved IF screens were in place. His ac is white with orange stripes. The exercise took place to the S, E and N of Bicester gliding site and involved climbing and descending turns at various rates and airspeeds, and position fixing, during which both he and his rear seat observer kept a vigilant lookout at all times. He was aware that such manoeuvres, which entailed continuous changes in all flight parameters, might be confusing to any other pilot observing nearby. He maintained a respectable distance from the gliding site and was at no time aware of being close enough to another ac to warrant an Airprox. When about 2 NM S of the site, a white low wing glider was spotted in a R turn about 2 NM away towards his 10 o'clock position and some 600 to 800 ft lower. This ac eventually passed at least 0.5 NM down his port side without any need for him to take avoiding action. He did not regard the encounter as an

Airprox and consequently did not feel there had been any risk of collision.

UKAB Note (2): A replay of the Clee Hill radar at the reported time of the Airprox (1430) shows considerable primary activity in the Bicester area but no returns which might equate to the subject incident. However, a return squawking 7000 can be observed leaving the Oxford area at 1426, flying at a Mode C level of around 4000 ft through the Airprox position at 1453 to 1454, then turning R onto a reciprocal track, keeping the gliding site about 0.5 NM to its R, before fading from radar cover in the vicinity of Oxford at 1520. This flight profile fits the description given by the responding PA28 pilot, as does the livery and registration of his ac. Moreover, departure and landing times at Oxford also corroborate its identity. A single stationary primary return does show very briefly at about 1454 in the area of Bicester town, merging with the PA28 as it tracks NW just before turning R around the gliding site, but this cannot be positively identified as the subject glider. However, primary cover is good in the area and the only other returns seen at the time are manoeuvring some 2 to 3 NM E of Bicester airfield.

UKAB Note (3): Bicester gliding site is notified in the UK AIP at ENR 5-5-1-1 for winching and towing during daylight hours up to 3000 ft above the aerodrome level of 267 ft. The site is also marked on the ICAO 1:500 000 topographical chart with a warning of intense gliding activity and cables up to 3000 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac and a radar video recording.

A member familiar with the PA28's operating company said that he had checked the ac's flight times for the Airprox period from the aerodrome log and was satisfied that it had been airborne and in the general area of Bicester at the time. He added its pilot said he



had not come close enough to another ac to cause him alarm. The colour scheme of the PA28 matched the glider pilot's description and its manoeuvres following the Airprox accorded with tracks seen on the radar recording. Members were therefore satisfied that the ac had been correctly identified, but noted the considerable disagreement between the pilots about the distances between them. As the glider pilot was able to part-read the PA28's registration from beneath as it passed above her, members agreed that it must have been considerably closer than the 2 NM/600-800 ft estimated by the PA28 pilot. This led members to conclude that the PA28 pilot was probably watching a different glider and was unaware of the confliction; his non-sighting of the glider was assessed as a part-cause of the Airprox. The glider pilot saw the PA28 but not until after it was passing overhead, thus denying any opportunity for avoiding action. The Board concluded that this amounted to an "effective" non-sighting which was also a causal factor in the Airprox.

Members debated the risk factor at some length. Several felt the vertical distance estimated by the glider pilot was enough to remove the risk of an actual collision, but others disagreed. They argued that as neither pilot had effectively seen the other, despite the excellent reported visibility, there was no

opportunity for either to take evasive action, and the reported 100 ft of vertical separation was therefore purely fortuitous. The Board concluded by a small majority that there had been an actual risk of collision.

GA members noted that both ac were going about their lawful business. However, Bicester was well known for its intense gliding activity – the Board was told that at any one time in summer up to 30 gliders could be expected in the vicinity – and fixed wing pilots should bear this in mind when planning training exercises in the area. A member familiar with training operations at the PA28's base said that this ideal was often extremely difficult to achieve owing to the hazards and general aerial congestion encountered in almost every direction in the Midlands area. Apart from Bicester and its associated gliders, other sites such as Weston-on-the-Green to the W and the Wescott NDB to the E had to be considered. In this case the PA28 was legitimately operating at levels above the notified cable heights at Bicester and crews at the flying training school concerned were always briefed to be on the lookout for gliders. The member commented that IF screens considerably obstruct the view of rear seat observers in the PA28; however, this did not detract from the crew's prime responsibility to keep a good look out.

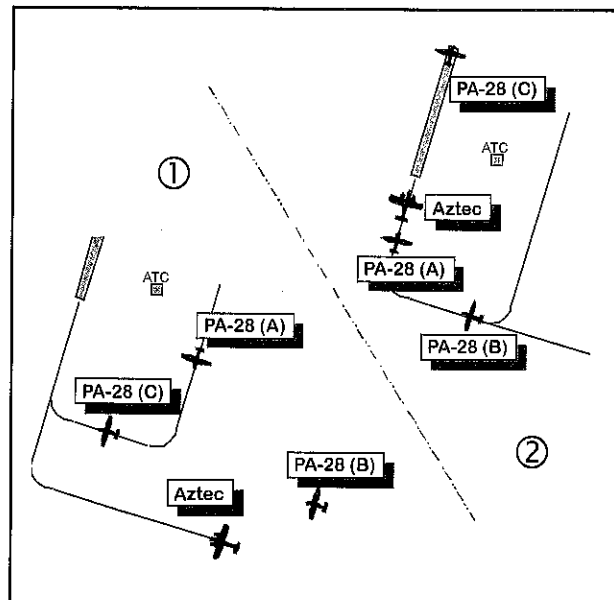
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: Effectively a non-sighting by the glider pilot and a non-sighting by the PA28 pilot.

## AIRPROX REPORT No 143/99

**Date/Time:** 30 Jul 1530  
**Position:** N5148 W0119 (2 NM S of Oxford  
Apt - elev 270 ft)  
**Airspace:** ATZ (Class: G)  
**Reporting Aircraft** **Reported Aircraft**  
**Type:** PA28 (A) PA23 Aztec  
**Operator:** Civ Trg Civ Comm  
**Alt/FL:** 500 ft ↓ 500 ft  
(QNH) (QFE)  
**Weather** VMC CLOC VMC CAVK  
**Visibility:** 10 km 10 km+  
**Reported Separation:**  
< 25 m/1 NM, 1000 ft  
**Recorded Separation:** NK



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

**THE PA28 (A) PILOT** reports that having taken off and flown a normal circuit, he was heading 020° at 70 kt on finals to RW 02 at Oxford. He was aware of one ahead and one to join right base which was well out of the circuit. After he had turned and called final, ATC asked another pilot if he was visual with his PA28; the other pilot replied negative and was sent around. He then saw this ac, a twin, appear in a climb from below his nose; it climbed through his level about 25 m ahead with its gear retracting. Although separation was increasing when he saw it, he considered the risk of collision was high. In a later telephone conversation the reporting pilot added that his student, on a solo check, had flown a normal circuit at 1200 ft until the base turn and descended fairly steeply on base leg, as is required to achieve a normal glidepath on final. The circuit was well flown on the normal circuit track, and he had concluded that his presence in the ac would no longer be necessary when the Aztec made its sudden appearance. It was diverging slightly to the right of his track so its wake was not encountered. As to its range from him; he was used to rifle shooting at 25 and 50 m ranges and was confident in his estimation of 25 m.

**THE PA23 PILOT** reports that on contacting ADC to join right base for RW 02 he had contact

with a small PA? to his right about 1 NM away and above. It looked as if it was on an overhead join heading towards the downwind position. He therefore continued on base leg and began to turn final (2 NM, 800 ft QNH), keeping it in sight until on short final, at about 120 kt, when ATC told him to go around. He did not see the other ac while overshooting. He thought that the ac he saw did not fly to a downwind position but continued a spiral turn onto final; he watched it right up to the time it turned behind him and estimated it would have been about 0.5 NM behind. Since it was much slower he anticipated no conflict with it behind him and saw no reason to go around as the path ahead of him was clear. It appeared the tower controller was not aware that his was the faster ac.

**OXFORD ATC** reports, with RT transcript, that while the PA28 (A) pilot was upwind in the RH circuit another PA 28 (B) called and was cleared to join base leg from 5 NM to the E at 1527:30. Half a minute later the Aztec pilot called and the controller (ADC) told him to "Call established on right base, one PA28 (B) ahead of you also joining right base and I've got 2 in the circuit" (A & C). (UKAB Note: It appears that the Aztec was closer to the airfield and first to join. The incident occurred below recorded radar coverage.) The Aztec pilot acknowledged and at 1528:30 asked how far ahead the other

joining ac was; the controller responded by asking PA28 (B) "Report your range" but there was no reply. (The controller did not pursue this and responded to another ac (helicopter?) which called to cross from the N boundary.) At 1529 the reporting PA28 called downwind and was advised: "Report final one ahead (PA28 C) and 2 to join right base". The pilot replied "One ahead c/s". At 1529:30 the 'one ahead' traffic (C) called final and was cleared to touch and go. Just before 1530 the Aztec pilot called "Right base" and was told "Report final, one ahead on final". At 1530 2 ac transmitted together; "???" just above me as well" can be heard. The controller advised '2 ac together' and asked PA28 (B) for its position; its pilot replied "right base, one ahead on base". The controller asked him if he had one below him; the reply was "not visual". ADC asked PA28 (A) for his position; the reply was "I'm on right base, I'm ahead of the ac that's just joined right base", he was told to continue. The Aztec pilot then said he was turning onto final and asked who was the No 1 who landed (C). Stations transmitted together and then ADC told the Aztec pilot "There's a PA28 low level ahead of you". "Roger looking, can't see it", he replied. ADC told him to go around which he acknowledged. ADC asked (A) if he was still visual with the one going round and the pilot replied "Negative he's er I've now got him he's gone around from underneath me c/s".

**ATSI** comments that apparently ADC gained the impression that the joining Aztec was No 2 to PA28 (B) and the traffic information given was based on this. ADC did not regain a true picture of the situation until the Airprox was taking place.

From the transcript, it is evident that the Aztec ended up below (A) on final, with (B) some way behind, still on base leg. The ADC's initial belief, that (B) was ahead of the Aztec, clearly confused her and affected the way in which she dealt with the ac. Although moderately busy, the workload was not excessive and the situation could have been better handled. Certainly a better lookout from the tower should have alerted the controller to the developing problem at an earlier stage. The ADC then

mistook the Aztec for (A) and made an error by sending it, the lower of the 2 ac, around. The Aztec, being twin engined, larger and faster should have been readily distinguishable from the PA28s. Nevertheless, the pilots' lookout must also be called into question. The traffic information provided was not wholly accurate but the Aztec was advised, correctly, that there were 2 ac in the circuit and (A) was warned, again correctly, of 2 ac joining on right base.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members were advised that the UK AIP (AD2 EGTK-1-4) includes in Flight procedures for Oxford at (b) that the circuit height is 1200 ft. Also, at (c) (v), that ac joining on base leg or on straight-in approaches should give way to traffic already established in the circuit. Members with experience of the airfield agreed that this was not easy especially in ac of dissimilar performance and required a great deal of circumspection. However, it appeared that the Aztec pilot had not recognised that the ac he saw, apparently doing an overhead join, was in the normal circuit at the normal height. He had been advised of 2 ac in the circuit (of which PA28 (A) was one) so it appeared he had not properly ascertained the whereabouts of these before pressing on with his own base leg join and had lost situational awareness of the PA28 (A)'s position once it was obscured by his cabin structure. It was his responsibility, as stated in the AIP to integrate himself safely into the circuit and he did not achieve this. The Board agreed that this was the main cause of the Airprox.

Members also agreed that ADC could have handled things better and considered that a lack of positive control of the situation, as outlined in Part A, was also a part of the cause.

Members considered that the PA28 pilot's estimate of the miss distance was the more likely since he saw the Aztec, while the latter pilot's estimate was an unsighted guess. Since

the pilots were clearly unaware that they were almost superimposed, until the Aztec went around, the Board considered that there had been a risk of collision.

### PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: The Aztec pilot did not integrate himself safely into the circuit, compounded by a lack of positive control by ADC.

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### AIRPROX REPORT No 144/99

Date/Time: 2 Aug 1019

Position: N5157 W0130 (2 NM NE  
Chipping Norton)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Super Dimona PA 34

Operator: Civ Club

Alt/FL: FL 34↓

Weather VMC CLBC

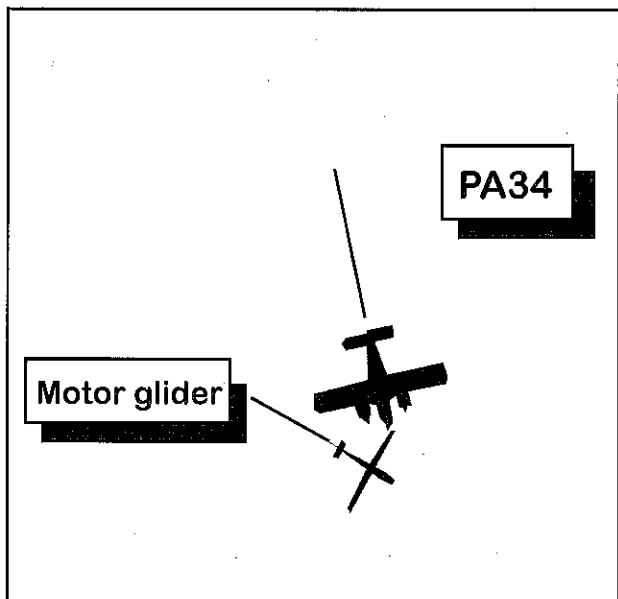
Visibility: 15 NM

Reported Separation: 150 ft H/150 ft V

Recorded Separation: NK

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

**THE SUPER DIMONA** motorglider pilot reports that he was flying about 2 NM NE of Chipping Norton with a student pilot on a local flight from Enstone. The visibility, 4000 ft below cloud, was about 15 NM. Having climbed up from Enstone, he had switched off the engine and was descending in glide mode with transponder and radio off to conserve battery power. At 1119 BST, when heading about 120° at 60 kt and descending through FL 34, he saw a red and white Piper Seneca about 3000 ft away as it approached from his L on a southerly heading at about co-altitude. He immediately dived in avoidance and the ac passed about 150 ft away with a high risk of collision. After landing he reported an Airprox to the UKAB. The pilot



comments that vision to the L had been obscured by the pupil in the LH seat.

UKAB Note (1): AIS (Mil) spent some considerable time analysing radar recordings in an attempt to capture the Airprox and identify the Seneca involved. This included examining recordings for an hour later (1119) because the reporting pilot could not be absolutely certain whether the time he stated on his report was UTC or BST. Although a good deal of activity is observed in the Airprox area on all recordings, the only ac whose flight profile comes close to matching the description given by the motorglider pilot is indicating a level of 2100 ft Mode C as it passes the Airprox position

tracking SE. UKAB staff questioned the motorglider pilot about the accuracy of his reported level but he was adamant that the figure given was, to the best of his recollection, correct. He said that when he first saw the Seneca it was heading straight at him from the LH side; he was fairly certain that its pilot had seen him because it turned R a little to fly about 150 ft behind him and then turned L slightly after passing as if to watch him, before again resuming a south easterly track towards Oxford. On the UTC based recording at 1020 a transiting ac passes within 0.5 NM to the W of a brief primary return, which could be the motorglider, at 2100 ft Mode C. The primary return is about 0.5 NM NNE of the reported Airprox position at 1019. While the other ac's track is generally south easterly, there is a faint indication of a R then L deflection while passing through the Airprox area.

Through a combination of radar and procedural information, AIS (Mil) traced the transiting ac described above to Oxford who gave an ATD on the ac of 0922. A return believed to correspond to this ac was first observed on the radar recording at 0933 and subsequently followed until it faded at 1025, just SE of the reported position, heading towards Oxford. When questioned, the pilot said that he had been on a general handling sortie and would probably have flown in the Airprox area at some stage, though he did not recall seeing any motorgliders. He was willing to submit a report but the only details he was able to complete were that the flight took place in VMC, he was squawking 7000 with Mode C selected, and his ac was white with orange stripes.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac and a radar video recording.

Despite extensive efforts by AIS (Mil) to trace the light twin ac involved, members agreed that the information available was insufficient positively to identify the ac. However, they were satisfied that the motorglider pilot was certain that it was a PA34 Seneca. The colour scheme described resembled that of a flying school in the vicinity; however, a member of the Board familiar with operations at the school's base subsequently informed UKAB staff that none of its ac could be accounted for in the area at the reported time. A radar recording for the period shows a return tracking through the area at the right time and in the right direction but, crucially, its Mode C reading (2100 ft) put it over a thousand feet below the motorglider. This meant that either the motorglider pilot's reported level was in error, or the other return could not be the ac he described. Later discussion with him produced no change to the original information given; he remained adamant that he had selected standard pressure on his altimeter because, prior to the incident, he had been flying towards the base of CAS in that area (FL 85). (UKAB Note: the RPS was 1022 mb at the time).

The Board concluded that the Airprox was caused when an untraced PA34 flew close enough to the motorglider to cause concern to its pilot. While appreciating the feelings expressed by the motorglider pilot, members felt that in the absence of any corroborative information with regard to miss distances they were unable to arrive at an objective assessment of risk.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: D

Cause: An untraced PA34 flew close enough to the Super Dimona motorglider to cause concern to its pilot.

## AIRPROX REPORT No 145/99

Date/Time: 3 Aug 1336

Position: N5024 W0404 (2NM SE Plymouth City Airport - elev 474 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: DHC-8 Grob 115D2

Operator: CAT HQ FONA

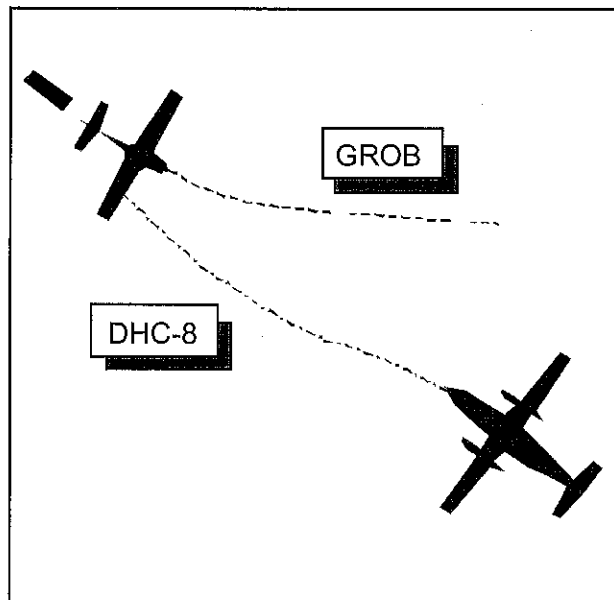
Alt/FL: 1500 ft ↓ 1000 ft ↑  
(QNH 1011 mb) (QFE 994 mb)

Weather VMC CLBC VMC CLBC

Visibility: 25 km 20 km

Reported Separation: 0.5 - 1 NM/0.5 NM

Recorded Separation: Not recorded



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

**THE DHC-8 PILOT** reports heading 310° at 120 kt on a visual approach to RW 31 at Plymouth City Airport. A Grob ac was sighted as it turned L at a range of about 2 NM and which subsequently passed down the STBD side at a range of 0.5 – 1 NM in a slight right bank. A TCAS TA was received. The DHC-8 was turned slightly L to increase horizontal separation and a normal visual approach resumed to landing. He considered the risk to be low.

**THE GROB PILOT** reports heading 135 (M)°, at 100 kt in a climb to 1000 ft QFE, whilst departing VFR from RW13. Although the view directly ahead was impaired by the ac's climbing attitude, he was aware of the DHC-8 joining for the opposite direction RW 31 from the crew's RT call changing their type of approach from an ILS to a visual join via Ashburton. On levelling at 1000 ft QFE whilst maintaining RW heading, the DHC-8 was sighted R 12:30 at about 1.5 NM. The Grob was turned 30° L to give the DHC-8 crew "...some space..." and visual acquisition reported to ATC. Whereupon, the DHC-8 crew also reported sighting his ac.

**ATSI** reports that the Plymouth City Aerodrome and Approach control positions were bandboxed together and that the controller's workload was increasing to moderate/busy just prior to the occurrence. Another controller was

available if it was considered necessary to split the positions. The relevant METAR gave a surface wind of 170 7 kt; visibility 25 km and 3 oktas cloud at 3500 ft.

The DHC-8 crew contacted Plymouth at 1330, descending to FL 40. The controller considered that though RW13 was in use he anticipated that the Captain would elect to use RW 31 to save time in the southerly wind. Consequently, he instructed the crew to report established on the 266 radial BHD at 13 NM DME from the PY, for an ILS to approach to RW 31. A visual approach was then requested to RW 31, which was approved and the crew cleared to join R base for RW 31 and report at 8 NM DME. The controller believed that the only traffic which would possibly conflict with a RW 31 arrival was a locally based Grob. This ac had departed from RW13 for a local sortie away from the circuit just before the DHC-8 crew reported at 8 NM DME and thereafter instructed to report at 3 NM. The controller had considered instructing the Grob pilot to turn R after departure, to ensure that it remained clear of the DHC-8, but he assumed that the ac would turn L after departure to leave the circuit on a downwind heading and thus away from the track of the inbound DHC-8. This assumption was based allegedly on the usual Unit SOP for the flight, although it is not quoted as a written procedure. However, this particular sortie was flown by a

pilot, recognisable from his callsign, who was not normally based at Plymouth but had been operating out of the airport for a couple of weeks. In the event the Grob did not turn L after departure but continued on runway heading.

Before the DHC-8 crew reported at 3 NM DME, the controller became busy with other traffic and ATC tasks to the extent that he did not pass traffic information to either flight. MATS Part 1 states that: *"Aerodrome control is responsible for issuing information and instructions to ac under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between aircraft flying in, and in the vicinity of, the aerodrome traffic zone"*. Also, because of this increase in workload, he was distracted from monitoring the progress of the two ac. When the DHC-8 crew reported at 3 NM, the controller checked that the runway was clear and cleared the pilot to land. Though he could see the DHC-8, he was not aware at the time of the position of the Grob, but shortly afterwards its pilot reported *"visual"* with the DHC-8. This was followed by a report of a visual sighting by the DHC-8's pilot, together with a comment about the close proximity of the ac. Both pilots subsequently reported the minimum horizontal separation at the time of the Airprox as 0.5 NM, at the same level.

**HQ FONA** comments that this is another example of a TCAS initiated Airprox report occurring in Class G airspace. More positive control from ATC would have been prudent, particularly as the DHC-8 was being allowed to join 'against the flow'.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It was apparent to members that the ADC/APR controller had assumed the Grob would turn L

after departure and clear the circuit thereby removing the potential for conflict. This was not the case and it was an unwise assumption to make. The lesson here is clear and applies across the whole spectrum of aviation; assumptions can be dangerous and must be avoided. The Grob pilot was aware of the inbound DHC-8 from the RT calls and although the DHC-8 pilot had spotted the Grob at a range of 2 NM, he was clearly concerned. Whilst conforming with his IFR Flight plan, albeit on a visual approach, the DHC-8 pilot could reasonably have expected to receive traffic information on the VFR Grob. Indeed, neither the Grob nor the DHC-8 pilot had done anything technically wrong and the Board felt that the lack of traffic information from the ADC/APR controller contributed to this occurrence. A GA member put forward the view that by assuming the DHC-8 pilot would request an approach to RW 31 'against the flow', ATC was instrumental in setting the scene for the Airprox. This was an opinion with which several military members concurred and highlighted another 'watch point'; when clearing traffic to make an approach to the opposite runway from which traffic had recently departed, extreme care must be exercised when going against the flow. Therefore, the members agreed that the cause of this Airprox was that the controller had not successfully integrated the arrival of the DHC-8 to RW 31 with traffic departing from RW13. Nevertheless, the DHC-8 crew had sighted the Grob at a range of 2 NM, and the Grob's pilot had taken positive steps to maintain horizontal displacement; the separation reported by both pilots was 0.5 NM. Therefore, the Board agreed unanimously that there had not been a risk of a collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Plymouth City Aerodrome/Approach Controller did not integrate departing and arriving traffic.

### **AIRPROX REPORT No 146/99**

Date/Time: 6 Aug 1025

Position: N5614 W0539 (43 NM SE of Tiree)

Airspace: ADR N573D (Class: F/G)

Reporting Aircraft Reported Aircraft

Type: B767 Tornado GR

Operator: CAT HQ STC

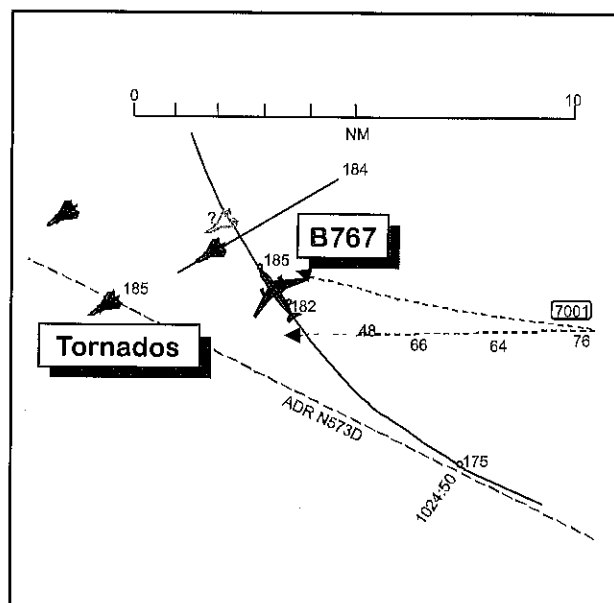
Alt/FL: FL 185↑ FL 185

Weather VMC VMC CLNC

Visibility: Umltd

Reported Separation: 100 ftV, 2000 ft H

Recorded Separation: 0.85 NM



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

**THE B767 PILOT** reports heading 290° at 310 kt, climbing from Glasgow en route to N America, receiving a RAS from ScOACC on 127.275 and cleared to FL 250. At about FL 190 he was warned of traffic closing from the right at a similar level. It appeared that this traffic was not identified or in communication with ScOACC who then directed him to turn 90° right for separation. At this time traffic appeared on TCAS indicating slightly above and to the right; a TCAS RA (climb) followed with which the crew complied. The crew then saw 2 flights of 2 ac which flew through their flightpath directly ahead and while they were complying with the avoiding action; the second pair (of Tornados) was very close, passing 2000 ft away and 100 ft above.

**THE TORNADO LEADER** reports heading SW at 300 kt maintaining FL 185. The formation had recently terminated a RIS with Scottish Mil

and were operating autonomously in class G airspace in preparation for an affiliation exercise with Tornado F3s. 2 airliners were seen climbing to pass behind the formation but no ac were seen which were in conflict with their track.

**ScOACC** reports, with RT transcript, that the B767 pilot came on frequency at 1018 and was cleared to climb to FL 250. At 1022 the pilot passed a revised estimate for 10°W and when requested, advised he was VMC; he was then given traffic information on military ac which had changed from a Scottish Mil squawk to a conspicuity code (7001) just to the NW of the STMA and converging on the B767 from the right, 3 o'clock 10 NM, and initially showing FL 220. (This unidentified flight was not involved in the Airprox except in so far as the controller subsequently had to take account of it when assessing how the B767 should avoid the Tornados.) The pilot said he was looking, asked



to be kept advised and received an update (3 o'clock 6 NM and "no height information available"). At 1023:50 the controller advised the traffic was showing FL 90 unverified and then, seeing a 2/3 ac formation (the Tornados) converging from the NE indicating under the control of Scottish Mil at FL 185, with their callsign, advised that there was more military traffic "coming into your 2 o'clock range of 10 miles right to left." He called the indicated Scottish Mil console but there was no answer so, at 1024:30, he passed "Avoiding action turn right 90°" to the B767 pilot and updated the traffic information (1 o'clock 5 NM right to left showing FL 185). The controller then saw a further squawk behind the leading pair of Tornados, showing a similar level, and passed further traffic information (1 o'clock 2 NM right to left at the same level), adding "Avoiding action turn further right another 90°". The avoiding action was towards the first (7001) traffic as it was by then showing FL 70↓ which he said in his report had been previously verified, although he had given it as unverified in his 1023:50 transmission. The pilot advised he had seen all 4 Tornados and had followed a TCAS RA, estimating he passed 100 ft and 0.5 NM from the rear pair. The B767 was then cleared direct to 57°N and 10°W.

**HQ MATO** advised that the Tornados had terminated service with Scottish Mil and been advised to squawk 7000, but not all the ac deselected their Scottish squawk. Their previously used console was then unmanned when called by ScOACC.

UKAB Note: ScACC radar recordings show 3 ac of the Tornado formation tracking towards the B767 with the front right hand ac showing its code-converted callsign and the others squawking 7000, all at FL 185. Three returns are clearly visible, the third of which appears from the trail dots to be a close pair. From 1025:20 all 3 returns and that of the B767 are flashing with Conflict Alert. Another (7001) squawk is also converging towards the point of conflict, on a westerly track, but some 11000 ft below; this splits into 2 returns, one of which is primary-only. The B767 starts a very slow right turn at 1024:50 when 6.75 NM from the

nearest Tornado and passes 0.85 NM from the left rear Tornado at 1025:40, having changed heading by 30°. Label overlap obscures the B767's Mode C which reads FL 185 10 sec before the ac pass and FL 198 30 sec afterwards.

**HQ STC** comments that it would appear in this instance that the B767 captain was not provided with a wholly satisfactory RAS. Although the controller passed the bearing, distance and estimated level of the conflicting, non-participating traffic, advice on the action necessary to resolve the conflict was not immediately forthcoming. Consequently, the prescribed separation of 5 NM or 5000 ft was not attained.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board discussed the differing opinions which this incident demonstrated between civil and military controllers' interpretations of the urgency with which the separation required under a Radar Advisory Service in Class G/F airspace should be maintained. The words used to describe this service and how it should be applied are exactly the same in military and civil ATC orders, but as admitted by civil and military controllers on the Board, while that may be so, it was not the way they were applied in practice. It appeared that the approach amongst civil controllers was to try to minimise the deviation of civil commercial traffic and to achieve some separation, while military controllers were expected to achieve the required separation minima except when their efforts were negated by the manoeuvres of other ac not under service.

It was accepted that the retention of a ScACC Mil squawk by the Tornados was a significant factor in the way the incident was handled.

However, military controllers on the Board felt that at the time the controller called the military console, the B767 was approaching FL 175, 10 NM from the Tornados, which was already too late to effect co-ordination. The military ATC view was that avoiding action should have been taken first, possibly followed by an attempt to co-ordinate. Not all members accepted this view, pointing out the 7001 traffic to the right of the B767 whose significance the controller also had to take into account. (In fact this traffic was descending and its squawk indicated it was entering the low flying system and ultimately the controller turned the B767 across it.) Following much debate, the Board could not agree unanimously that late avoiding action by the controller was a part of the cause in the pertaining circumstances.

The Board also discussed the action of the B767 pilot in response to being asked to turn right 90° in avoiding action. Some members considered his response as hopelessly inadequate for avoiding action and that it put the controller in an almost impossible position. Indeed the request for a further 90° produced no change in the B767's rate of turn. The pilot gave his speed as 310 kt, (approx 400 kt TAS at FL 180) and the radius of the turn was in the

order of 15 NM; this would have required less than 10° AOB. While this 'avoiding action' response may have been all the autopilot would give him on rotating the heading selector, some members considered that this was not the way to respond to the controller's request and in this case was instrumental in the B767 passing so close to the Tornados. However, members did not agree that this was part of the cause of the incident but was more a feature of it. The Board had earlier made a recommendation to the CAA that airline pilots should treat avoiding action given by a controller when flying under a RAS as full avoiding action (as they would in controlled airspace). The CAA had not accepted this recommendation, saying sufficient information was already given in the UK AIP.

Members eventually arrived at the conclusion that the Airprox was a confliction on the ADR between participating and non-participating traffic; also that the resolution of the confliction had not been entirely satisfactory. There was no clear evidence that this B767 was one of the 2 airliners seen by the Tornados while they were exercising in the area and the Board concluded that the safety of the ac had been compromised.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Confliction on the ADR between participating and non-participating traffic.

Observations:

1. The Chairman agreed to ask IFS (RAF) to re-publicise the need to deselect an ATC squawk when asked to.
2. The Chairman agreed to draw the attention of SRG, NATS and MATO staff to the apparent continued differences in interpretation, between civil and military controllers, on separation under a RAS.

## AIRPROX REPORT No 147/99

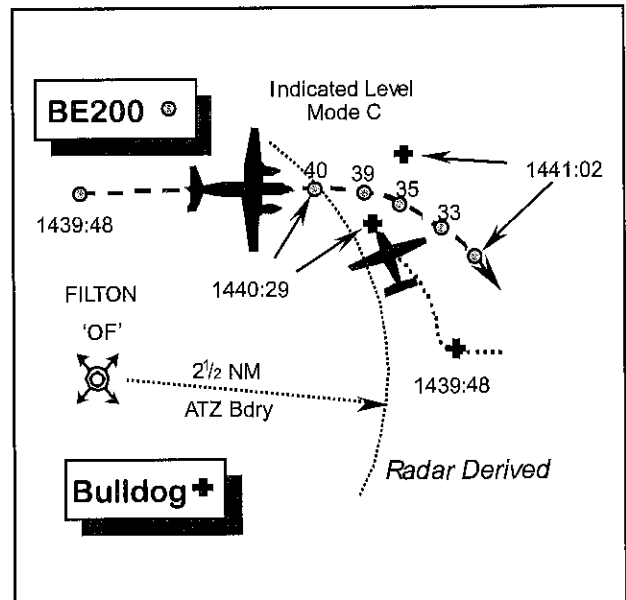
Date/Time: 10 Aug 1441  
Position: N5133 W0232  
(2.75 NM NE of Filton - elev 226 ft)  
Airspace: London FIR (Class: G)  
Reporting Aircraft Reporting Aircraft  
Type: BEECH 200 Bulldog  
Operator: Civ Trg HQ PTC  
Alt/FL: FL 40 FL 38  
Weather VMC CLBL VMC CLBC  
Visibility: 10 km 18 km  
Reported Separation:  
nil V/3-500 ft H Not Reported  
Recorded Separation:  
V Not Recorded H <0.5 NM

### BOTH PILOTS REPORTED

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

**THE BEECH 200 PILOT** reports flying at FL 40, 140 kt whilst in receipt of a RIS from Filton Approach and squawking the assigned code with Mode C. The ac colour scheme was white and blue and HISLs and anti-collision beacons were illuminated; the ac was not fitted with TCAS. Whilst heading 095 (T)<sup>o</sup> in the hold for RW 09 at Filton, a Bulldog ac was sighted crossing ahead in level flight from R to L, at the same level. A descent was executed to avoid the other ac and the minimum horizontal separation was about 3-500 ft. An Airprox was subsequently filed with Filton Approach. She adds that it was an IR renewal flight and if the IF screens had been in place, the crew of two would not have seen the Bulldog at all.

**THE BULLDOG PILOT** reports flying at FL 38, 110 kt whilst conducting a dual air experience sortie and in communication with Colerne Approach on 277-275. The assigned squawk of 3/A 4576 was selected with Mode C; his ac colour scheme was red/white and HISLs were on. Whilst heading 330<sup>o</sup> a low-wing twin was first sighted at L 9 o'clock at a range of 400 m, heading about 070<sup>o</sup> at the same level. The 'twin' passed astern and slightly below, descending wings level; it was impossible to



estimate the relative distances at the CPA. A climbing turn to the right was initiated, even without this minimal avoiding action there was no risk of a collision. Colerne Approach subsequently advised that an Airprox had been filed.

He adds that it is usual for Filton to advise Colerne if their IFR pattern is active, whereupon the area is avoided or communication established with Filton. No such notification had been received and it was deemed safe to operate in this area.

UKAB Note (1): The UK SSR code allotment plan within the UK AIP, at ENR 1-6-2-4 dated 15 Jul 99, allocates 4576 to RAF Colerne as an unverified conspicuity code. It is for use within a 25 NM radius of Colerne in the FIR, up to FL 100 outside CAS.

**FILTON ATC** reports that the BE200 crew was in receipt of a RIS from Filton Approach (APR), established in a hold at FL 40 overhead the 'OF' NDB, waiting to commence a procedural ILS approach for RW 09. At about 1441:30, APR instructed the BE200 pilot to descend to 3000 ft QNH, cleared the pilot to commence the approach and to report the beacon outbound. After acknowledging the instructions, the BE200 pilot declared an Airprox. The APR controller reports that no primary or SSR

contact was observed on radar at the time of the Airprox and adds that the traffic loading was moderate to high, with outbound traffic and a number of ac in transit which required co-ordination with adjacent ATSU's.

The weather was reported as: surface wind 030/10 kt, 15 km Nil Wx, few @ 1500 ft Broken @ 3000 ft, +18° C; QNH 1015 mb.

**HQ MATO** reports that the Bulldog pilot was operating VFR to the N and NW of Colerne. On this day, as had been the case for a number of days previously, a local agreement had been made between ATC and the Bulldog operator, that ac would only operate on the Colerne Tower (TWR) frequency 258.975. However, the Approach frequency, 277.275, was available as a quiet frequency, but manned by the same controller. At 1441:22, the Bulldog pilot transmitted to TWR, "*C/S, I think we might have (to).. file on an airmiss on an aircraft... just to the north of Bristol (it) has just passed underneath me*". When asked whether he wished to file an Airprox he replied, "*..I'm not, I'm just wondering just in case he does*". Prior to this RT exchange, the Bulldog pilot had been operating on the Approach frequency. Subsequently, Filton ATC informed TWR by landline that an Airprox had been filed by a BE200 pilot in the Filton instrument pattern against a Bulldog. On asking why TWR had not been informed about the instrument pattern activity, Filton ATC advised that it was because RWY 09 was active and '*out of your area*'.

The majority of Colerne traffic operates to the N of the airfield, either VFR or under a radar service from Lyneham. Colerne ATC is not equipped with radar, but ATC and the ac operators are well aware of the proximity of the Filton instrument patterns. There is no formal Letter of Agreement (LoA) in place between the two ATSU's, but it has become a routine practice for Filton ATC to inform Colerne ATC by landline when any instrument activity is taking place. This information is then relayed on RT and landline to the Bulldog operators, whose pilots endeavour either to avoid the area, or call Filton on RT. As a result of this Airprox, Colerne is renewing its efforts to agree an LoA with Filton.

In this instance TWR was unaware of the BE200's existence and thus could have done nothing to prevent the Airprox.

**ATSI** reports with RT transcript that there is no way of establishing whether the Filton Approach Radar Controller (APR) could see the Bulldog on his radar display at the time of the Airprox. However, from the information available, it would appear that there was no reason why the Bulldog should not have been displayed on the Filton radar display. Under the terms of a RIS, the BE200 should have been provided with traffic information on any displayed unknown traffic in its vicinity.

**HQ PTC** comments that they welcome a fresh move by Colerne towards a more formal agreement with Filton ATC. However, it might have been prudent for the Bulldog pilot to have called Filton, before approaching quite so closely to their ATZ.

UKAB Note (2): This Airprox is not clearly shown on the LATCC Cleve Hill radar recording, which reveals that it occurred just after 1440:29, about 2.75 NM NE of Filton. The BE200, identified from its assigned Filton squawk, is shown as it steadied outbound on an easterly track N abeam the 'OF' at 1439:48, indicating FL 40; the Bulldog is shown as a primary contact as it turned onto a westerly track about 3 NM E of Filton. At 1440:03, about 30 sec before the Airprox, the Bulldog turned northerly and is shown at 1 o'clock 2.75 NM to the BE200, which maintains its easterly track at FL 40. At 1440:29, the Bulldog is still shown at 1 o'clock, at about 0.5 NM from the BE200; after this point the BE200 commenced a descent and turned R, the Bulldog is not displayed again until 30 sec later.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

Some members were surprised at the BE200 pilot's admission that IF screens were not used on this IR renewal flight and her remarks on obscuring safe look-out if they had been. A GA member confirmed that screens were required for IR renewal flights, and should comply with requirements so as not to hinder the 'safety pilot's' look out. A military pilot questioned whether the Safety pilot should have been the ac Captain; wherefore a GA member explained that the Captain could be the PF who must obey the Safety pilot's instructions.

Filton is one of many airports situated throughout the FIR where associated IFR holding patterns lie wholly within Class G airspace and where the overriding principle is that of 'see and avoid', which eventually worked in this instance. A GA member was very surprised that the Bulldog pilot was operating so close to the Filton ATZ boundary without RT contact. Whilst the pilot was allowed to fly where he did, Filton were clearly best placed to provide an ATS in this vicinity particularly as the Bulldog had crossed the climb-out from RW09. Indeed, a call to Filton, would have alerted ATC and thereby the BE200 pilot, to the presence of the Bulldog in the vicinity of the hold.

On this point a member thought that the apparent absence of SSR information, although selected by the Bulldog pilot, was a significant factor. It was not apparent on the radar recording and members believed that this did not help the Filton controller. Although

unverified, this 'squawk' aids conspicuity in a radar environment, which, for whatever reason and unbeknown to the Bulldog pilot, it did not provide in this instance. Furthermore, given the track flown by the Bulldog relative to the Filton SRE, controller members noted the considerable potential for tangential fade of a primary radar return. The Marconi 264 SRE, as used at Filton, has been known to be susceptible to this particular characteristic; this means ac may not be picked up when they fly tangentially to the radar beam. Members speculated that this could have been another reason why the Filton controller did not see the Bulldog on his radar display, thereby denying the BE200 pilot traffic information under the RIS that pertained.

An ATSI advisor thought Filton had not considered the hold to be a strictly IFR procedure and perceived that Colerne traffic would not be concerned, perhaps wrongly, about IFR approaches to RW09. Therefore, members were encouraged to hear an update from the MATO advisor; an accord had been reached between Colerne and Filton as a result of this Airprox, leading to a better flow of information between the two ATSUs.

Members were in agreement that this Airprox resulted because both pilots had seen each other's ac at a late stage. Nevertheless, the BE200 pilot saw the Bulldog in sufficient time to descend, while the Bulldog pilot had made a climbing R turn to clear the BE200. 'See and avoid' had worked and the Board concluded there had not been a risk of a collision.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Late sighting by both pilots.

## AIRPROX REPORT No 148/99

Date/Time: 11 Aug 0830

Position: N5234 W0219 (4 NM S of  
Cosford)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: C172 Bulldog

Operator: Civ Pte HQ PTC

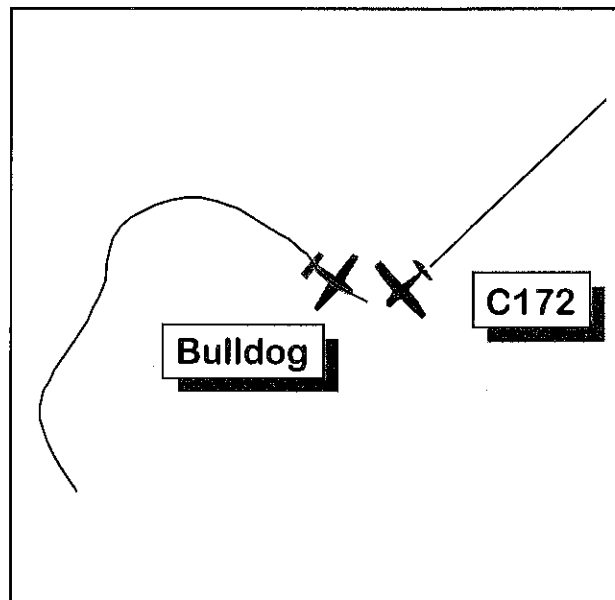
Alt/FL: FL 35 3000 ft  
(RPS 1017 mb)

Weather VMC CLBC VMC CLBC

Visibility: 20 NM 20 km

Reported Separation: 150 m/200 yd

Recorded Separation: NK



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

**THE C172 PILOT** reports heading 230° at 115 kt en route to Swansea at FL 35 and receiving a FIS from Birmingham on 118.05 at FL 35. He had heard other ac being refused a radar service so he did not ask for one; the controller was busy with Birmingham traffic and other ac in transit to see the sun's eclipse. He first saw the Bulldog 200 m away in his 2 o'clock at the same level and turned steeply to the left and descended, noticing the Bulldog also turning left and climbing. It passed 150 m away and he considered there had been a very serious risk of collision. He reported the Airprox to Birmingham but the controller misunderstood the purpose of his message, saying he was in the FIR and it was up to him to see other traffic.

**THE BULLDOG PILOT** reports heading 120° at 100 kt in a gentle left turn when he saw the Cessna at the same height on a SW heading 200 yd away. He tightened the turn and lowered the nose which enabled him to keep it in sight. Some seconds later the Cessna pulled up and turned left. He did not consider there was a risk of collision.

**BIRMINGHAM ATC** reports, with RT transcript, that the Cessna was under a FIS, had been asked to remain clear of controlled airspace and had not been identified. At about 0831 the pilot reported an Airprox with a Bulldog and the

controller replied *"I'm sorry we're not able to help you with an Airprox, you're outside controlled airspace and it's see and be seen VFR traffic I'm afraid"*. The pilot managed to explain that he understood all that and merely wished the controller to log the incident. Appropriate details were subsequently taken.

UKAB Note: LATCC radar recordings show the incident as described by the pilots. The Cessna has no Mode C and the Bulldog shows FL 34 up to the closest point of approach; separation between the ac at that point is too small to measure from the recording.

**HQ PTC** comments that the Bulldog appears to have been operating legitimately under VFR when it encountered the C172 and took reasonable avoiding action. Without Mode C readings to compare it is difficult to find the incident as serious as the C172 perceived.

### PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From the information presented, the Board considered that there was very little vertical separation between the ac; the C172 was maintaining FL 35 and the Bulldog was showing FL 34 Mode C. The latter's pilot had appeared less concerned about the horizontal separation, but his sighting range indicated he was only about 3 seconds away from the Cessna when he saw it. Although both pilots had seen each other in time to avoid a collision, there was very

little time to assess the situation and both ac had descended in avoidance. The Board concluded that the safety of the ac had not been assured. Members agreed that the cause of the Airprox was a late sighting of the other ac by both pilots. The incident indicated the difficulty of detecting an ac on a collision course in one's peripheral vision and emphasised the need for a careful and continuous all round lookout.

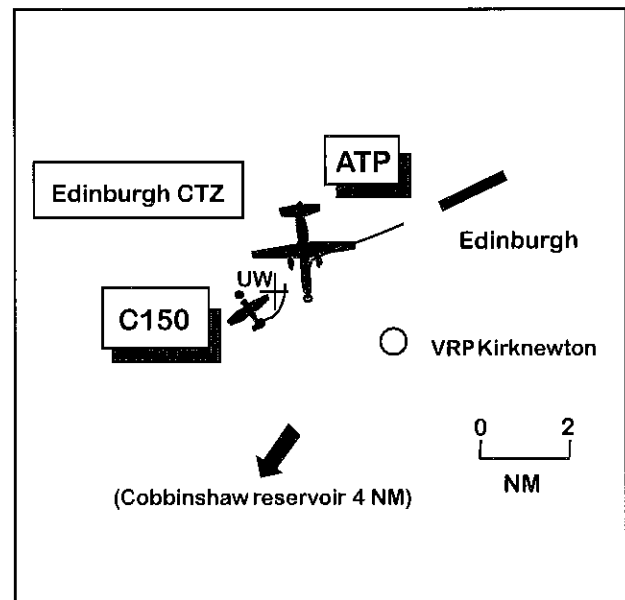
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Late sighting of the other ac by both pilots.

### **AIRPROX REPORT No 149/99**

Date/Time: 11 Aug 1111  
Position: N5554 W0330 (4.5 NM SW Edinburgh airport)  
Airspace: CTZ (Class: D)  
Reporter: Edinburgh  
Type: ATP C150  
Operator: CAT Civ Club  
Alt/FL: ↑6000 ft 2000 ft (QNH 1020 mb) (QNH)  
Weather: VMC HAZE VMC  
Visibility: 6 km 25 km  
Reported Separation: 1 NM/200 ft  
Recorded Separation: 1.4 NM



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

**EDINBURGH ATC** reports, with RT transcripts, that the C150 was given take-off clearance from RW 24 by ADC at 1107, routing VFR via Kirknewton and Cobbinshaw reservoir. The student pilot read back the take-off clearance and the instructor added "left turn out". The ATP was then instructed to line up on RW 24. As there was VFR traffic inbound to the airfield from the S, and ADC could no longer see the

C150, he asked the C150 pilot for a position report to which the reply was "south of Kirknewton"; traffic information was given to him on the inbound VFR ac and he was transferred to the APC frequency. The ATP was cleared for take off at 1110 (UKAB Note (1): The departure track was non-standard owing to airfield DME unserviceability. The ATP therefore climbed straight ahead after take-off via the UW NDB and TLA, to 6000 ft).

The C150 pilot reported on the APC frequency giving his position as "south of Kirknewton en-route to Cobbinshaw". There was no radar contact on the ac but the DRDF indicated 252°, which meant that it was N of not only Kirknewton but also the RW 24 centreline. APC therefore instructed ADC to turn the ATP L immediately and then turned the C150 R onto 270°. The ATP was climbing through 1400 ft altitude at this time and the C150 pilot reported he was at 2200 ft. Eventual minimum separation was estimated at 1 NM with the ac at similar levels. Had the ATP been transferred to ScACC prior to the confliction being detected, it was felt there might have been a possible risk of collision. The Tower controller reported that he did not use avoiding action phraseology or pass traffic information to the ATP pilot because the C150 was not showing on the ATM.

**THE ATP PILOT** reports that he had been given a non-standard clearance to route straight ahead from RW 24 to the UW NDB and then to turn L for TALLA climbing to 6000 ft. The visibility was a hazy 10 km. When passing 2500 ft (QNH 1020), the Tower controller instructed him to turn L onto 030°, which was quickly amended to 180°, to avoid VFR traffic which had mis-reported its position. This traffic was not seen and no information regarding its range or altitude was passed to him. After transfer to Scottish he was advised that reporting action would be taken by Edinburgh ATC.

**THE C150 PILOT** reports that his student was briefed for a Navex (his second) the first leg of which routed to Lanark via Cobbinshaw reservoir. This was his first exercise using wind calculations and actual headings. The flight was booked out with ATC as a VFR departure via Cobbinshaw, as is standard procedure at Edinburgh. The ac was not equipped with SSR.

At about 1104 a clearance was passed by GMC to depart VFR via Cobbinshaw not above 3000 ft after which he was transferred to the Tower frequency, 118.7. At 1106 he was given take-off clearance from RW 24 with a L turn out. There was a tailwind of about 5 kt which put him a little further W than expected before he turned L onto

his required track at about 1000 ft agl. He told the student to turn onto track; the student looked at his flight plan and saw that his first heading was 227°, which confused him at first because he thought he should be turning R. He reassured the student that his planning had been correct and that he should now turn L onto 227°, which he did. At about this point he was instructed to change to APC. The student advised the APC controller that he would report at Cobbinshaw and was told to look out for helicopter traffic joining the field from the SW. While they both looked for this, he could see the reservoir at his 12 o'clock at about 6 miles which confirmed that they were on track towards Cobbinshaw. The controller then asked his position and he told the student to report that he was abeam Kirknewton airfield. This was done but he (the instructor) became a bit confused as to what the controller was asking because at that point he was satisfied they were on track for Cobbinshaw. Next, the controller asked if they were over the UW NDB; the ac was not equipped with ADF, so he was about to check his position using the chart when the controller instructed him to turn R. He took control from the student and turned the ac onto a northerly heading, whereupon ATC told him that an ATP was turning L behind him; at this time he was very slightly S of the 24 centreline and on looking he could see the ATP turning onto a southerly heading about a mile away. This was the first he knew about the ATP; had the controller passed him information about it at the same time he was told about the inbound helicopter, he would have turned onto a southerly heading sooner and been well clear of the traffic. Moreover, had he been advised of the departure earlier, as he had in similar circumstances before, he would have made certain that he remained S of the 24 departure track. As the ATP had not come onto the APC frequency, he was unaware of it and therefore not able to anticipate a possible confliction. He felt strongly that the Airprox occurred because insufficient traffic information had been passed to him.

UKAB Note (2): Examination of the RT transcript for 118.7, Edinburgh Tower, shows that the C150 was given take-off clearance at



1106 with a "left turnout"; this was acknowledged by the pilots. At about 1108:50, ADC asked the C150 pilot for his present position to which he replied "er c/s just south of Kirknewton". Traffic information then followed on a Sea King helicopter inbound from the S and, at about 1109:10, the C150 was transferred to the APC frequency. Ten sec later the ATP was cleared for take-off, after which the ADC and APC were engaged on the intercom for about 40 sec. No relevant transmissions are made in the minute 1110 to 1111, at which time the (intercom) transcript reads:-

*"c/s (the C150) is over the UW at two thousand and two"*

*"what!"* (emphasised)

*"Turn the (ATP) left now immediately"*

The C150 pilot reports on the APC frequency at about 1109:40 saying.... *"...we'll call you Cobbinshaw reservoir"*. A min later the pilot is asked his position to which he replies .... *"c/s we're er just south over Kirknewton this time on track towards er Cobbinshaw"*. The controller acknowledges briefly and then transmits.... *"c/s you are DF'ing two five zero and er you appear to be approaching the Uniform Whiskey is that correct?"* The pilot replies .... *"c/s affirm I'm just ????? to turn er further left"*. Traffic information was then passed on the departing ATP and the C150 instructed to turn R immediately (the appropriate avoiding action phraseology was used).

**ATSI** comments that the C150's clearance was to leave CAS at Cobbinshaw routeing via Kirknewton not above 3000 ft VFR. The Edinburgh MATS Part 2 quotes this routeing as a commonly used track using the Cobbinshaw VRP. However, the level stated is not above 2000 ft. TNG/OPS at Edinburgh said it was common practice to give the pilot the option of climbing to a higher altitude than the 2000 ft for terrain clearance purposes. ADC was advised accordingly and the ac transferred.

ADC was a TWR only controller. The ATM is not SSR equipped. Ac do not show very clearly

on the ATM to the west/southwest, therefore ADC relied on pilot reported position. VDF is available in VCR but it is not known whether it was in use at time of Airprox. The C150 transferred to APC after reporting south of Kirknewton and the ATP was cleared for take-off with APC's agreement. Because of DME unserviceability the ATP was cleared via UW and Talla climbing 6000 ft. ScACC usually agree a routeing direct to Turnberry after departure for these flights. Bearing in mind the respective routeings of the two ac and the perceived relative climb performance of the ATP and C150, the APR did not anticipate a problem between them but would monitor the situation. The C150 reported Kirknewton with APC. Although a primary return was not seen on radar (reportedly the C150 has no transponder) the APR noted that its D/F indicated that it was still on runway centre-line. This was a good spot by the APR; the C150 was given avoiding action right turn and ADC was instructed to turn the ATP left immediately.

**THE CAA GENERAL AVIATION DEPARTMENT** comments that Edinburgh ATC issued a take-off clearance to the ATP on the basis of an erroneous position report by the student pilot, which passed unnoticed by his instructor. The latter acknowledges the error and it is understood he will discuss the incident with the airport flight safety committee.

UKAB Note (3): Pictures of the Lowther Hill radar show the incident. At 1111:00, a slow moving primary return, believed to be the C150, is seen over the UW NDB with the ATP, identified by its code-converted callsign, tracking 240° and climbing through 1500 ft Mode C at its 6 o'clock range 2 NM. At 1111:30 the range has decreased to 1.3 NM with the ATP indicating 2100 ft and the C150 just beginning a R turn about 0.5 NM WSW of the UW. By 1111:40, both ac are established in their respective turns and lateral separation begins to increase as the ATP passes abeam the C150 by 1.4 NM on a southerly heading.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs, reports from the air traffic controllers involved and a comment from the appropriate ATC authority.

An ATSI member commented that the APC controller had to rely on accurate position reporting because of poor radar coverage in the Airprox area. In this instance he issued a zone clearance for the ATP on the basis of a report from the C150 pilot confirming that he was S of Kirknewton and thus well clear of the runway centre line. As the C150 was not considered to be traffic to the ATP it was not necessary to pass traffic information to the C150 pilot about the latter's departure.

The Board was advised that the ADC did not hold an APC or APR validation and the significance of DF bearings might not have been apparent to him, though it was not known whether this equipment was available to him at the time. Members commended the APC for astutely noting from his DF that the C150 was still indicating close to the centreline, thus enabling both controllers to pass timely avoiding instructions.

A GA member said that the C150 pupil was evidently at a fairly early stage of his training and it was likely that his instructor was giving him room to 'sort himself out'. However, it was the instructor's responsibility to ensure that his pupil was thoroughly briefed about immediate post-departure routeings, and to ensure that the ac flew S of the main RW centre line after take

off in accordance with ATC departure instructions. The instructor should have been alert to his inexperienced pupil's RT calls and anticipated possible errors in position reporting. In the event, he did not notice the student's erroneous report or that the C150 had still not diverged significantly from the extended centreline of the RW. The Board concluded that the C150 pilot had caused the Airprox by not flying his zone departure clearance accurately, and giving an erroneous report.

Noting that the C150 student said he thought he ought to be turning R after departure, an ATCO member wondered whether he had mistaken KIRKNEWTON for KIRKLISTON, which is a VRP to the N of the airfield; on balance, however, most members thought this somewhat improbable. Several members commented on the need to promote 'situational awareness' among some GA pilots on what was going on around them. Intelligent interpretation of other RT transmissions was an essential element in providing an understanding of the overall traffic situation. On this point members were surprised that the C150 instructor appeared to be taken unawares by the ATP whose presence should have been evident to him at some stage during the start up and taxi phase. Indeed, the Board noted that the ATP was instructed to line up and wait on the RW only one minute after the C150 had been cleared for take off and while both ac were still on the ADC frequency.

With regard to risk, members were satisfied that both ac were given timely avoiding instructions and this was supported by the radar recording which showed a minimum lateral separation of not less than 105 NM between the ac. The Board concluded that there had not been a risk of collision.

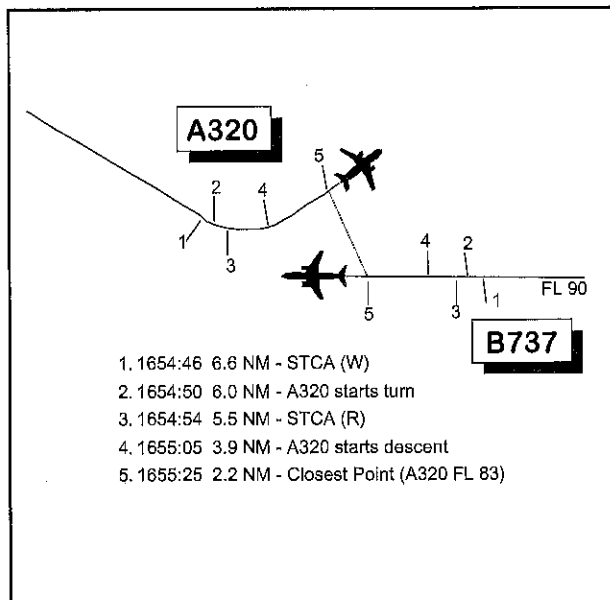
## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The C150 pilot did not fly his zone departure clearance accurately and gave an erroneous position report.

## AIRPROX REPORT No 150/99

Date/Time: 13 Aug 1655  
Position: N5140 W0017 (8 NM SW of BPK)  
Airspace: TMA (Class: A)  
Reporter: LATCC TC  
First Aircraft      Second Aircraft  
Type: A320              B737-300  
Operator: CAT              CAT  
Alt/FL: FL 90              FL 90  
  
Weather      VMC CLOC      VMC  
Visibility: 30 km  
Reported Separation:  
Recorded Separation: 2.2 NM, 800 ft



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

LATCC TC reports that the LHR Intermediate Director N was controlling all four LHR stacks in a light traffic situation, with the assistance of a support controller. The B737 was told to leave the Lambourne hold heading 270° at FL 90; the pilot acknowledged and the ac did as instructed. The A320 was instructed at 1650:25 to leave the Bovington hold heading 130° at FL 90. After leaving Lambourne the B737 was instructed at 1651:55 to descend to FL 80. There was no reply to multiple transmissions to this ac. As the B737 would eventually conflict with the A320 the controller decided to descend the A320 to FL 80 instead. Again, despite multiple transmissions to the A320 there was no reply from this ac either. Multiple transmissions were made to both ac using normal equipment and the emergency handset. The support controller also tried to contact both ac to no avail. Attempts were made to see if the ac were on other frequencies. Another company flight was also asked to try and see if the A320 could be contacted on the company frequency. However, neither ac responded to these attempts to contact them. In 10 years of controlling at Heathrow this was the most helpless the controller had ever felt; he thought he was going to witness a mid-air collision without being able to do anything about it.

Investigation showed that by 1654:31 the ac had closed to 8.8 NM, still converging, when the A320 broke through a Heathrow Director transmission with "are you still there?" Director instructed the A320: "C/s turn left immediately heading 060 – it's avoiding action". This call was acknowledged at 1654:43 and traffic information was passed. The pilot was then given a descent to FL 80. The ac were still on a collision course at the same flight level until about 6 NM apart when the A320's avoiding action began to take effect. By 1655:11 the A320 had left FL 90 and lateral separation was 3.4 NM. Minimum horizontal separation was in the region of 2.2 NM; vertical, initially zero, increased as the A320 descended.

Meanwhile, the B737 continued to the west at FL 90 until 1656:30 when the pilot transmitted "C/s with you again now we had a problem with the radio". On asking why the B737 had left the frequency the pilot replied "Yes sir it's a wrong input into the radio until we discovered we were on the wrong frequency, we apologise for that". The A320 was not asked at the time why (or if) he had left the frequency but a short conversation later between the captain and group supervisor suggested there had been no errors in the A320 cockpit. However, for some reason the A320 had simply not received any transmissions from the Director. During this time other ac had been receiving transmissions

with no problem, in hindsight they could have tried a relay via another ac to see if this worked. At the time of the incident they thought they had tried all they could.

The A320 was out of radio contact for 4 minutes 5 seconds and the B737 was out of radio contact for 6 minutes 36 seconds. The Captain of the A320 stated that he had made no adjustments to his radio, and 'had simply not received any transmissions' after the heading instructions. It was the 'unusually quiet frequency' which alerted the crew and prompted the call, "are you there"? LATCC Engineering Investigations report that there have been a number of Aircraft Radio Fault Reports (ARFR) received regarding problems relating to modifications to ac communications fit for 8.33 KHz operation. Reports suggest that loss of contact may occur because receivers have either 'drifted' or have not been "*exactly on the centre frequency in an offset carrier environment*". Investigation continues.

**THE A320 PILOT** reports being instructed to leave BNN heading 130° at 220 kt at FL 90. He acknowledged the instructions but heard nothing else on the frequency for 2-3 minutes. He made a brief check RT call and ATC then ordered an immediate turn onto 060° for avoidance and descent to FL 80. TCAS gave a brief TA only. (ATC also questioned the other ac pilot as to why he had not replied to RT calls.) He suggested that since there was always a lot of RT on approach to LHR, any unusual silence should prompt an RT check.

**THE B737 PILOT** reports leaving LAM at FL 90 heading 270° at 220 kt, on an arrival to LHR. Having heard the next frequency allocated to previous ac, the FO set this, he thought, in the 'standby' window to facilitate the next frequency change. Unfortunately, by mistake he had set the frequency in the 'active' window which meant they were out of communication with the LHR INT DIR (N) for some minutes until they realised they had lost RT contact. He did not see the A320 and his ac was not TCAS equipped.

**THE A320 PILOT'S COMPANY** reports that there had been a number of incidents over the last year (all fleets, all types of radio) where the radios have apparently gone into a mode where they are neither receiving nor transmitting, having effectively 'gone to sleep'. These incidents started before the introduction of 8.33 KHz frequency separation and are not believed to be an '8.33 issue'. Because the company and the radio manufacturers were fully engaged in the '8.33' modification, and could not immediately continue with the investigation, a Flight Crew Notice was issued outlining the problem and instructing pilots who find the RT unexpectedly quiet to check switch selections and operate the PTT or request an RT check. Investigation of the RT problem is still 'open'.

**THE B737 PILOT'S COMPANY** reports that following this incident and another in the same area on 13 Jul (Airprox 136/99) the chief pilot issued instructions on RT handling which included a ban on standby frequency changes being made during final approach or landing until instructed by ATC.

UKAB Note: LATCC radar recordings show the ac on collision courses at FL 90 from 1653:30 until 1654:59 when the A320 starts to turn left and descend. The ac pass by 2.2 NM with the A320 passing FL 82 at 1655:29. The B737 maintains its track and level (FL 90) throughout.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

Airline pilot members of the Board (one an A320 captain) said they also had experienced radios that went dead for short periods and that this was not an 8.33 KHz issue. The answer was, as specified in the A320 company's FCN, to make an RT check if there was an unusual silence on a normally busy frequency. As to the

mis-setting of the frequency on the wrong selector in the B737, members' views varied. Most agreed, however that a prime utility provided by a standby selector was to permit the next radio frequency to be selected. Sometimes it was essential to pre-set it; if the next frequency was passed with other information and only then set it was easy to forget the figures passed and this could give rise to mistakes or requests to say the frequency again. On the whole, the Board agreed that pre-setting the next frequency was a sensible procedure, but pilots needed to be careful and have good cockpit procedures to monitor what each other was doing. Another airline captain said that some new radio selector designs made this difficult. The Board concluded that the cause of the Airprox was that the B737 had inadvertently left the frequency at a time when, co-incidentally, there was a temporary loss of RT reception on the A320.

In assessing the risk level, members understood how unpleasant the incident was for

the INT DIR N and agreed that his performance during it was thoroughly professional; he had continued calmly to control other ac in the stacks while at the same time, as stated above, trying every conceivable way of overcoming the problem. While agreeing that the potential outcome of the incident could have been very serious indeed, the Board agreed that in the event the A320 had regained communication in time to accept avoiding action which resulted in a separation of over 2 NM and 700 ft vertically. Members therefore assessed that, as the incident turned out, there was no risk of the ac colliding.

The Board also observed that this satisfactory outcome was in no small part due to the A320 pilot's very prompt reaction to the avoiding action instructions, and this was a lesson for others to copy. Unhappily, there remained too many examples of pilots leaving the autopilot engaged during avoiding action which greatly limited effectiveness.

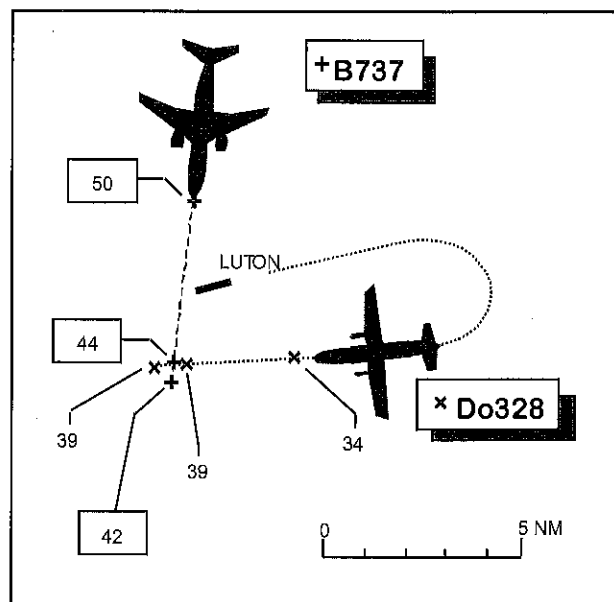
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk:: C

Cause: Incorrect frequency selection on the B737 and a temporary loss of RT reception on the A320.

## AIRPROX REPORT No 152/99

Date/Time: 30 Jul 1013  
Position: N5141 W0022 (2 NM SSW Luton – elev. 526 ft)  
Airspace: LTMA (Class: A)  
Reporter: Luton APR  
First Aircraft      Second Aircraft  
Type: B737-300      Dornier 328  
Operator: CAT      CAT  
Alt/FL: 4000 ft ↓      4000 ft ↑  
(QNH 1017 mb)      (QNH 1017 mb)  
Weather: UNK      UNK  
Visibility: UNK      UNK  
Reported Separation: Not reported  
Recorded Separation:  
0.3 NM H & 500 ft V



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

**THE LUTON APPROACH RADAR CONTROLLER (APR)** reports that the Do328 departed from Luton on a CPT 3C SID, climbing to 4000 ft westbound under a Radar Control Service (RCS). The B737 was also under RCS and inbound through the 'Luton Gate', descending to 4000 ft on a radar vector to pass astern of the departing Do328. Co-ordination for a further climb for the Do328 was delayed by a protracted conversation between the APR and LATCC TC on an unrelated issue. Eventually, co-ordination for the Do328 to climb to 5000 ft was agreed. Inexplicably however, the APR did not issue the climb instruction to the Do328 crew, before a conflict with the B737 developed. Standard separation was subsequently eroded as the ac tracks crossed 3 NM SSW of Luton.

UKAB Note (1): The 1020 UTC Luton METAR gave a surface wind of 030/10; visibility 8 km nil Weather and no significant cloud. QNH 1017mb.

UKAB Note (2): After the Airprox was filed by the Luton APR, both pilots were appraised of the situation. However, they both reported that they had been completely unaware of the erosion of separation and were unable to make

a constructive contribution to the investigation. Consequently, neither crew filed a report.

ATSI comments that the Airprox occurred in Class A airspace within the London TMA, directly above the Luton CTZ. Both ac were in receipt of an Approach RCS from the Luton APR, who assessed his workload as medium to high, with a complex medium traffic loading. Owing to staff shortages, only 2 ATCOs were available to man the Approach Room and consequently the Intermediate and Final Director roles were combined. Although the APR had felt fit and adequately rested, 2 minutes before the Airprox occurred he had been involved in an altercation with a LATCC TC controller over an unrelated matter, which had been a considerable distraction. The relevant ATC equipment was serviceable.

This Airprox was unusual in that the APR and the crews of the subject ac all stated that they were unaware of it at the time. Luton is not equipped with STCA and neither ac was TCAS equipped. However, investigation revealed that the loss of separation did trigger the SMF equipment at LATCC TC.

The B737 was inbound to land RW 08 at Luton and was transferred from LATCC TC to Luton Approach in accordance with a Standing Agreement, whereby Essex Radar position

Luton inbound traffic through the 'Luton Gate', an imaginary line extending northwards from LOREL, at, or descending to an altitude of 5000 ft QNH.

The crew of the B737 established communication with Luton Approach at 1008 and reported level at 5000 ft (1017 mb). The Do328 departed from RW08 at 1009, on a CPT 3C SID. The SID required the flight to climb initially to 4000 ft (1017 mb), and cross the Bovington (BNN) VOR 036 Radial at, or below, 4000 ft and subsequently to climb to cross the Henton NDB at 5000 ft. Because the top of the Luton Radar Manoeuvring Area (RMA) is only 4000 ft to the south of the airfield, the B737 would have to be at 4000 ft, or below, by the time it was about 1 NM S of the extended runway centreline. Airspace constraints dictate that RHD circuits are the norm for IFR traffic when RW 08 is in use at Luton. This situation, where procedures require that inbound traffic be descended to the same level to which outbound traffic following a SID will be climbing, is far from ideal. Nonetheless, it is a scenario which Luton controllers are faced with more and more often as traffic levels increase and highlights the confined and complex nature of the airspace within which they have to operate. However, on this occasion, the APR had foreseen the potential conflict which might arise between these ac and he instructed the Aerodrome Controller (ADC) to restrict the Do328's initial climb to 3000 ft. The crew of the Do328 contacted Approach, on transfer from ADC, at 1010:30. Despite his initial plan for dealing with this ac, the APR immediately cleared the flight to continue its climb to 4000 ft. Approximately 30 seconds later, Approach instructed B737 to turn left onto heading 190. At that stage, the B737 was about 10 NM NNE of Luton airport and the APR thought the heading would ensure that the B737 would pass behind the Do328 as the latter turned R towards Henton.

At 1011:30, a LATCC TC controller telephoned the APR to discuss a previous Luton departure. The conversation lasted for over a minute. At the conclusion of the discussion, the APR sought permission to climb the Do328 above

4000 ft, the intermediate SID altitude, in order to resolve the potential conflict with the B737 which, at that stage, he still clearly had in mind. The TC controller authorised the APR to climb the Do328 straight to 5000 ft, the final SID altitude.

Shortly after the telephone conversation ended, at 1012:30, Approach cleared the B737 crew to descend to 4000 ft. At the time, the B737 was approximately 5 NM NNW of the Do328, which had completed its R turnout and was established on a westerly heading. Thus the ac were on converging headings and both cleared to the same altitude. Despite having obtained approval for the Do328 to climb to 5000 ft, the APR apparently remained unaware of the developing conflict and did not issue the clearance to 5000 ft until after the Airprox had occurred. The APR recalled that both ac had been continuously displayed on radar despite the B737 routeing close to the airfield overhead. At 1013:41, the B737 passed almost directly over the Do328 with the respective Mode C indicating a vertical separation of 500 ft. It appears that neither crew was aware of this. When interviewed, the APR confirmed that he had not been aware of this erosion of standard separation and on the RTF recording, his voice does not betray any of the usual signs exhibited by a controller who realises that he or she has been, or is about to be, involved in an incident. At the time of the Airprox, two other ac were in the vicinity, one at low level and one at medium level, so it is possible that the radar returns from the subject ac may have been partially obscured. It follows therefore, that the APR had foreseen the potential conflict and initiated appropriate measures for its resolution but he did not follow his own plan of action and did not notice when vertical separation was eroded.

Following the Airprox, the B737 was turned onto a downwind heading, to take up a track parallel and to the south of the Do328, and given descent clearance to 3000 ft. The Do328 was cleared to climb to 5000 ft and once levels had crossed and 1000 ft vertical separation had been established, the APR cleared the flight direct to Henton. The B737 was subsequently vectored for an uneventful ILS approach.

This was an unusual Airprox, in that neither the controller nor the crews of the subject ac were apparently aware that it had occurred until some days after the event. It was purely fortuitous that about 500 ft vertical separation existed when the B737 overflew the Do328. It is thought likely that the telephone conversation with the LATCC Controller disrupted the APR's concentration and diverted his attention from the problem with which he was faced. The investigation did not reveal any alternative explanation for this most unusual sequence of events. But common sense should dictate that controllers in operational positions do not initiate or become involved in such exchanges. Indeed, with hindsight, it would have been prudent for the Luton APR to have terminated the conversation on becoming aware of its nature. Accordingly, ATSI made a safety recommendation that the circumstances of this Airprox be circulated to all civilian ATSU's, possibly by means of an Air Traffic Services Operational Memorandum (ATSOM), and that the dangers inherent in initiating, or becoming involved in, contentious exchanges while at an operational position be strongly emphasised.

UKAB Note (3): The aspects of the altercation between the APR and a LATCC TC controller referred to in the ATSI report were covered in greater depth in an accompanying Human Factors assessment, that concluded: The controller was evidently very shaken by this call and the only reasonable explanation for his subsequent performance appears to be the after-effects of the stress and upset generated by it. This appears to have been so distracting to the controller that he failed to maintain an adequate awareness of the traffic situation or the close proximity of the subject ac which would have been evident from the radar display.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included transcripts of the relevant RT frequencies, radar recordings, a report from the air traffic controller involved and a report from the appropriate ATC authority.

Members agreed that this was a very unusual occurrence; firstly because the controller was completely unaware that it had occurred; secondly, because neither crew actually saw the other ac and apparently both were completely oblivious to the conflict at the time. The Board was advised that the most likely explanation for the controller's inattention was the telephone altercation described between the APR and the LATCC TC controller. Although this was not a heated discussion and did not involve the subject ac, (rather a previous traffic scenario) the exchange was accusative in nature. Some members thought that because the LATCC TC controller had called APR on the landline the latter was, in effect, a captive audience. Moreover, the APR had to 'suffer in silence', with the unhappy foreknowledge that he would still have to agree co-ordination regarding the climb of the subject Do328 with the LATCC TC controller at the end of the conversation. The APR was apparently very shaken by this unpleasant discussion which had a very significant effect on him. Clearly, the APR had already planned to remove the potential for a conflict when he instructed the ADC to climb the Do328 to 3000 ft QNH. But it appeared that in his agitated mental state he then overlooked or forgot his original plan to separate the two ac. Consequently, the Board was in no doubt that the fundamental cause of this Airprox was that the APR did not ensure that standard separation was maintained. He had allowed the B737 to descend to, and the Do328 to climb to, the same altitude with less than the requisite horizontal separation between the two. Drawing on information from a comprehensive human factors report, members believed that this omission was the result of a mental aberration brought on by the content of the telephone conversation which apparently still lingered in the mind of the APR. Members noted and agreed with the safety recommendation made by ATSI. Indeed, this was a salutary lesson to all, of the dangers that can accrue by distracting controllers at operational positions.

A pilot member was very concerned that the existing operating procedures effectively brought arrivals and departures into procedural



conflict as a result of the very confined airspace within which Luton controllers work. An advisor said it was recognised that this was not an ideal situation, but the many constraints on the very limited airspace available in this vicinity do not permit an easy solution. He briefed the Board that the airspace and ATC procedures in the northern and western portions of the London TMA were under review with a view to restructuring the airspace.

Post UKAB Meeting Note: ATSI advise that as far as Luton is concerned, due to recent and planned future growth, changes to both the Radar Manoeuvring Area and procedures for the use of the airspace are to be introduced on 25 Feb 00. Furthermore, on 10 Feb 00, a NAS link between Luton and LATCC became operational. This provides 'live' inbound and pending departure FPS's for Luton Approach and Tower. Collectively, these and future planned actions should lead to significant improvements in the area.

Turning to risk, members were not so quick to reach agreement. Many members believed that it was purely fortuitous that the two ac were about 500 ft apart when the B737 descended and passed marginally ahead of the Do328. They pointed out that none of the commonly encountered 'safety nets' were in place to forestall this conflict. The controller had not

seen it, as evinced by the foregoing and Luton does not have the benefit of STCA. Moreover, neither ac was fitted with TCAS. Because of the relative ac attitudes, some members believed that the crew of the B737 would have been unable to see the Do328 below them at all, as they descended toward it. Finally, the Do328 crew did not spot the B737 and may not have been able to, because it was so close above them. Either way, like the B737 crew they did not seem to have appreciated the reduced vertical separation that pertained anyway. A civil controller member proffered a reason for this. The crews of the ac involved could reasonably have expected the protection of standard separation in the IFR environment that pertained. This could understandably induce a more heads-in bias to scan instruments rather than a visual scan outside the cockpit, in weather conditions where the crews might reasonably be expected to see each other's ac. Drawing all of this together, some members believed the lack of safety nets and no guarantee of separation meant that a high risk of collision had existed. Other members were not convinced that such a risk had existed to such a great degree because in the end both ac had passed each other by 500 ft. Consequently, the Board finally concluded by a narrow margin that in the circumstances that pertained, the safety of the subject ac had not been assured.

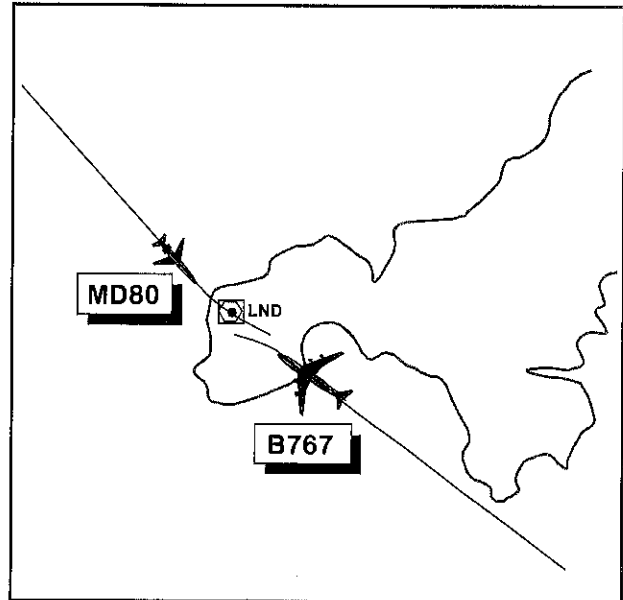
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Following a distracting telephone call, the Luton APR did not ensure standard separation between the subject ac.

**AIRPROX REPORT No 153/99**

Date/Time: 20 Aug 0952  
Position: N5002 W0532 (1.5 NM SE of  
Lands End)  
Airspace: UAR UG4 (Class: B)  
Reporter: LATCC LND SC  
First Aircraft Second Aircraft  
Type: MD80 B767-300  
Operator: CAT CAT  
Alt/FL: ↑ FL 330 FL 330  
Weather VMC VMC  
Visibility:  
Reported Separation:  
Recorded Separation: 1.07 NM



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

**THE LATCC LND SC** reports operating as mentor to a trainee controller who had cleared the MD 80 to climb to FL 290 with opposing traffic at FL 310 on UG4. The pilot called level and was advised to expect further climb after passing Land's End (LND). Once the ac had crossed, the MD80 was cleared to FL 310, this time with the B767 as opposing traffic climbing to FL 330, reporting level at 0948:25. The trainee cleared the MD80 pilot to climb to FL 310 at 0949:45 and the pilot acknowledged correctly. As the ac approached LND the conflict alert activated and the MD80 was seen to be climbing through FL 312 to FL 313. He alerted the trainee who told the MD80 pilot to maintain FL 310; the pilot acknowledged and the SC, noticing the MD80's Mode C now showing FL 315, took the RT and gave the MD80 avoiding action "left turn now onto heading of 110 you were cleared to 310 there's traffic in your 12 o'clock 15 miles 330". The pilot replied "Yeah we have it in sight c/s we're very sorry about that". The controller then passed avoiding action to the B767, left onto 300°, with traffic information on the MD80, now showing FL 317. The MD80 pilot reported clear of the other traffic with profuse apologies at 0952:45; both ac were then cleared to resume navigation and the MD 80 cleared to FL 330.

**THE MD80 PILOT** reports heading SE on UG4, expecting an odd level, and requested FL 330 when asked his preference. This level was occupied and he was cleared to FL 290. When LATCC next called his FO (PNF) was using the PA and he (PF) was occupied with ACARS; they were cleared to FL 310. He confirmed this but probably because he was thinking about his ACARS task and was "odd FL minded" he dialled FL 330 on the altitude selector. When passing FL 314 LATCC called and asked about his FL and he immediately realised his mistake and apologised. He was advised of opposite direction traffic at FL 330 and saw it far away on the horizon as he turned left 15° and advised when he had passed it. In a covering letter his company FSO also apologised for the trouble caused.

**THE B767 PILOT** reports heading NW on UG4 at FL 330 en route for the USA and became aware from the RT of a possible altitude deviation but received no TCAS warnings. The pilot remembered being given a heading change and heard that the other ac had reached FL 317 but did not see it although the visibility was good.

UKAB Note: LATCC radar recordings show the 2 ac equidistant from LND on reciprocal tracks and closing at a rate of 907 kt. The ac are on precisely closing tracks until they are 5 NM

apart when both begin to turn left, passing 1.07 NM apart at 0952:53. The MD80 is descending through FL 314 as the ac pass, having reached FL 317 when 8.3 NM in the B767's 12 o'clock. The latter is at FL 330 throughout.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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 MD80 company had advised that their procedures for setting and checking the altitude alert/preselect system stated that the pilot who acknowledges the ATC clearance is responsible for setting the cleared FL/altitude, but did not include specific procedures as to how the other pilot should check this. The company's operating procedures specified that one pilot should fly the ac and the other should assist with RT, checklists etc, and that both pilots should cross check each other's actions. However, in the circumstances of this Airprox, with the other pilot making a PA announcement, it would have been difficult for him to confirm

that what the controller had said matched what the PF had set. Airline pilot members of the Board agreed that there were times when 2 pilots were not available to check on each other's actions. A pilot could be using the PA or on another RT frequency or even temporarily absent from the flight deck. The only answer to this problem that members could suggest was for the remaining pilot consciously to recognise that he was 'on his own' and to exercise the greatest possible care and caution in listening to ATC instructions and in setting altitude and heading selectors. Board members agreed that errors of this nature were all too easy to make; in this Airprox members considered that the PF had been distracted by the ACARS task at the time of his clearance to FL 310 and had not paid full and conscious attention to what was said on RT. The consequence of this was that the MD80 climbed above its cleared level, and the Board agreed that this was the cause of the Airprox.

The 2000 ft separation of FLs above FL 290 meant that there was more room to recover the situation and the warning provided by the STCA, followed by the timely action of the controllers, led the Board to conclude that there had not been a risk of the ac actually colliding in this potentially serious incident.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

*Degree of Risk:* C

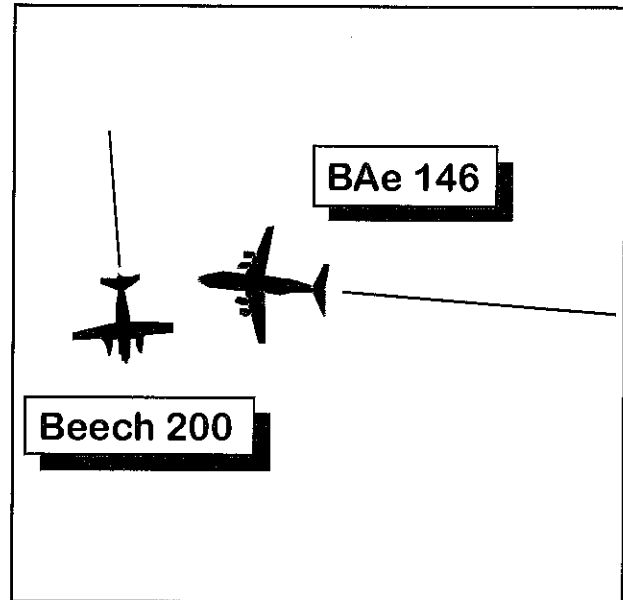
*Cause:* The MD80 climbed above its cleared level.

**AIRPROX REPORT No 154/99**

Date/Time: 24 Aug 0629  
Position: N5331 W0307 (7.5 NM Nof WAL)  
Airspace: Airway A25 (Class: A)  
Reporter: Manchester ACC

	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	BAe146	Beech 200
<u>Operator:</u>	CAT	Civ Comm
<u>Alt/FL:</u>	FL 160 ↑	FL 170

Weather VMC CLOC VMC HAZE  
Visibility: Poor  
Reported Separation:  
0.5 NM, 700 ft/NK  
Recorded Separation: 0.26 NM, 600 ft



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

**THE MANCHESTER IOM SC** reports that he was acting as mentor to a 240-hr-check trainee, with a Co-ordinator also on the sector. It was a very busy session. The Beech 200, southbound, was cleared to join CAS N of WAL and cleared to climb to FL 170 at 0624. The BAe146, en route to Belfast, was cleared to climb to FL 160 and put on a radar heading of 280° at 0626:30. The pilot acknowledged "Climb one six zero left onto 280 c/s". The STCA highlighted a potential confliction and at 0627:40 the trainee reminded the BAe146 pilot "C/s maintain FL 160 on reaching" and the pilot replied "Will do c/s". Seeing a continuing STCA alert the controller saw the BAe146 continuing to FL 162 then 164. He pointed this out to the trainee who, at 0628:50, asked the pilot to confirm maintaining FL 160; the pilot replied "Affirm c/s its er six sixteen point 2 we've erred by two hundred". The ac continued to FL 165 before descending quickly to FL 160. The Co-ordinator reported having a very high workload exacerbated by problems with the FPS printer and the physical distance from the ATSAs. His tactical awareness was therefore limited and he was unable to pay close attention to the RT.

**THE BAE146 PILOT** reports heading 300° at 250 kt, cleared to climb to FL 160. (UKAB Note: He had subsequently been put on a radar

heading of 280°.) An apparent voltage spike giving a quick flash, too quick to recognise immediately, resulted in the altitude selector disarming during the level out at FL 160. It was noticed that TR1 had fallen to zero output. At the same time a member of the cabin crew had entered the flight deck and it was suddenly noticed that the ac was passing FL 163. Corrective action was taken simultaneously with a TCAS TA and the crossing ac was seen to pass 700 ft above and 0.5 NM away. The TA cleared almost immediately. He thought the risk of collision was low. During shutdown further electrical problems were identified. These were not apparent on subsequent start-up, but reappeared again on shutdown back at Manchester.

**THE BEECH PILOT** reports heading 190° at 265 kt, maintaining FL 170. He heard the BAe146 being cleared to FL 160 and later heard ATC query its level. The reply did not appear threatening and since no incident was mentioned on RT he was unaware that an incident had taken place.

UKAB Note: LATCC radar recordings show the BAe146 stopping its climb at FL 165 0.6 NM before crossing the Beech 200's track, and passing just over 0.25 NM behind it at FL 164. The Beech 200 is at FL 170 throughout.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board agreed that the cause of the Airprox was that the BAe146 pilot had exceeded his cleared level despite receiving and acknowledging a reminder from ATC to level at FL 160 just beforehand. Although electrical problems and an unexpected visitor to the flight deck may have distracted the pilots, their

specific job at that moment was to make sure the autopilot levelled the ac at FL 160 and to do it manually if the system failed. The reminder from ATC was given because the 2 ac would coincide in plan; UK airspace is so busy that a level infringement will almost always result in a confliction with the traffic for which the level restriction has been applied. For this reason the Board considered any level infringement as a serious matter.

Because the controller had managed partially to pre-empt the infringement, and the BAe 146 pilots had thereafter reacted in time to stop the ac at FL 164, the Board concluded that the risk of collision had been removed.

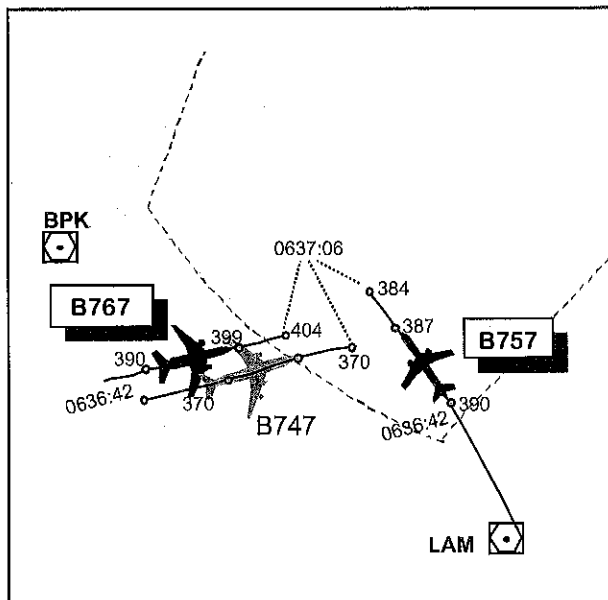
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The BAe146 pilot exceeded his cleared level.

**AIRPROX REPORT No 155/99**

Date/Time: 27 Aug 0636  
Position: N5142 W0000 (5 NM SE BPK)  
Airspace: LUIR (Class: B)  
Reporting Aircraft Reported Aircraft  
Type: B757 B767  
Operator: CAT CAT  
Alt/FL: FL 390 FL 390  
Weather VMC VMC  
Visibility:  
Reported Separation: 1000 ft  
Recorded Separation: 3.2NM/1200 ft



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

**THE B757 PILOT** reports that he was at his cruising level of FL 390 at M 0.80 inbound to Manchester from Europe. Several minutes before the incident LATCC had instructed him to

route LAM – TNT; while in a fully banked R turn over LAM an instruction was received to turn L 45°. During the reversed turn, which was made in Hdg select, a TCAS “traffic” advisory aural

was received on traffic indicating level at his 10 o'clock on the edge of the TCAS display. A more urgent ATC instruction to turn L for avoiding action was then received. The autopilot was disconnected to increase the rate of turn and the conflicting traffic was seen below at about 10 o'clock. ATC then instructed an immediate descent to FL 380. As he began the descent, watching the ac below, the FO saw another ac also converging from the 10 o'clock position and at the same level as himself; at the same time a TCAS "monitor vertical speed" sounded with descent commanded on the visual display. The latter ac began climbing and passed about 1000 ft overhead while the lower ac also passed a similar distance below. After the ac had passed he maintained FL 380 and resumed normal navigation towards TNT. The TCAS equipment had provided a useful warning and he thought there had been a low to moderate risk of collision.

**THE B767's COMPANY** were unable to reach the pilot immediately but he sent them a faxed report which states the ac was heading 078° at M 0.81 and cruising at FL 390 towards REDFA. The flight visibility, into sun, was over 8 NM. A TCAS RA to "climb" was received and this was made up to FL 403. The other ac came from the E, crossing his path at about a 20° angle. No estimate of risk is given.

**ATSI** reports that all equipment relevant to the task was serviceable and the 2 Chief Sector Controllers (CSCs) involved reported their respective workloads as light. The 2 SCs involved commented that traffic loading was moderate to the W of the sector and light to the E. The four controllers concerned in the incident were the London Upper Sector Chief Sector Controller (AC LUS CSC) - LUS CSC A (handing over), the LUS CSC B (taking over), and the LUS SC 1 and LUS SC 2, who were also handing over and taking over the position respectively.

CSC A took over the bandboxed LUS sector, together with the SC 1, from the night shift at about 0600 and remained there until 0608, when she handed over to CSC B. As the FPS for the B757 was not printed until 0609, a min

after the handover, the potential confliction between this ac and the B767 would not have been apparent to her at the time. It was explained that the early handover was to cover staff shortages, allowing the CSC A to be released for radar duties on the sector. CSC B said that he had not been rostered as LUS CSC for the duty concerned as he was due to attend an interview later that morning concerning a previous incident. He was concerned about this interview and spent some time discussing the forthcoming interview with CSC A, who had remained by the suite in case the sector needed to be split. Although this presented a distraction, he did not consider it impaired his ability to carry out his duties effectively, especially bearing in mind the light workload during the period. While in position, at 0603, the CSC A accepted the B767 into the LUS sector at the "Opposite Direction Level" (ODL) of FL 390. In the same telephone call with the Bristol CSC another ac, a B747 eastbound to Amsterdam (not a subject ac in this Airprox but relevant) was accepted at FL 370. Both ac were reported as being 3 min late on their FPS times.

CSC B took over the position and, at 0616, accepted the B757 into the sector from the CLN CSC en route to LAM, opposite direction to the B767 at the same level (FL 390). The B757's BPK FPS was annotated accordingly and it is the only strip for this flight which is displayed in the LUS sector. All the controllers concerned commented that it was not unusual to accept ODLs into the LUS sector. The LATCC AC MATS Pt 2 does not specify any FPS annotation requirements to indicate flights at ODLs, though custom and practice would suggest that some strip marking does take place. On this occasion, CSC A had written "ODL" on the B767's WOD FPS but not on the subsequent CHT or BPK strips. The B767's strips reveal that the 3 min time revision was marked on its WOD and CHT strips but not on the one for BPK. CSC A could not recall why she had not marked all 3 strips, as would have been normal practice, but commented that she might have been distracted before completing the task, possibly even by the handover.

CSC B said that he did not realise the potential conflict between the B767 and the B757. The only explanation he could offer was that, possibly, the B767's BPK FPS was not displayed under the appropriate designator but was in position in the DET bay. Thus, the conflict would not have been readily apparent at the time (although a further 20 min were to elapse before the incident occurred). He suggested such a misplacement of the B767's FPS could explain why the time revision was not annotated on this particular FPS by CSC A. None of the controllers concerned could recollect the positioning of the strip and there is no way of ascertaining its actual position. The SC 2 commented that all she could recall was that the strips for the B767 and B757 were not together in the BPK bay. It was established that the B767's FPSs were printed at 0546 and would, therefore, have been placed in position by the night shift. The LATCC AC MATS Pt 2 GEN 7-6 states in para 7-1, under "Responsibilities", that: "the SC will maintain an up-to-date strip display".

At 0625, The B767 pilot contacted the LUS inbound to REDFA and, immediately afterwards, the B747 pilot called, maintaining FL 370, also on course to REDFA. At 0627, the B757 pilot reported on the sector maintaining FL 390 to LAM (westbound). All 3 ac were answered by SC 1 with "roger". Neither he nor the CSC B were aware of the potential conflict between the B757 and B767 and the SC could offer no explanation for this. When the SC 2 took over the sector at 0632, with the ac some 80 NM apart, the conflict was still undetected. Owing to their close lateral proximity, the SSR blocks of the B767 and the B747 were overlapping which reduced the possibility of the conflict being recognised from the radar display.

SC 1 said that his usual method of handing over a position, which he followed in this instance, was firstly to point out potential conflicts and then use the radar and FPS displays, emphasising the former, to show the traffic situation. He commented that some SCs go through every FPS for every ac but he tends to restrict his handover procedure to one FPS per

ac to save time; also, he does not necessarily specify each ac's level during the handover. He explained that on this occasion he handed over the sector by splitting it into its E and W constituents. Consequently, although all the ac were mentioned, there was no correlation between the conflicting flights. The oncoming SC recalled that there were only 2 ac to the E of the sector but several to the W.

Having taken over the position, the SC 2 recalled the CSC B asking her if she wished to split the sector. At this point, there was a misunderstanding between them; CSC B believed, erroneously, that SC 2 concurred with the action. The SC 2 said she was surprised when the split took place, but did not query the decision and assumed the CSC had decided it was necessary on the information presented to him. She explained that, because the splitting of the sector took place soon after taking over the position, she was not able fully to assimilate the traffic before becoming involved in the mechanics of the split, including requesting ac to change frequency and co-ordination with the oncoming SC (who was CSC A).

At 0635 (just before the STCA activated) CSC B co-ordinated the B747 out of the sector with the CLN CSC. The latter then enquired about the B767. CSC B could not immediately find its FPS, which may be another indication that it was in the wrong bay of the strip display, and could not remember where he found its details to pass to the CLN CSC. The significance of this flight relative to the B757 was not appreciated at the time.

The SC 2 first became aware of the situation when the STCA activated; immediately (at 0636:20) she instructed the B757, which was turning R at LAM, to turn L 45°, followed by avoiding action descent to FL 380. Realising that separation with the B747 would be compromised she attempted to pass traffic information to its pilot. However, although she had instructed the B747 to change to her frequency it had remained on the split frequency and so did not react to the call. Before she could contact the B767, its pilot reported reacting to a TCAS RA and was

leaving FL 390 climbing. A picture of the LATCC radars at 0636:33 shows the B767 9.5 NM W of the B757 with the ac on conflicting tracks at the same level. The B747, at FL 370, is leading the B767 by about 1.25 NM. At 0637:00, the B757, indicating FL 387, is crossing through the projected track of the B767 at a distance of 3.2 NM. By this time the B767 has climbed to FL 399; subsequent radar pictures show that it climbed to FL 406 before descending. (Minimum separation distances of 3.2 NM/1200 ft between the B757 and B767 (at 0637:00), and 1.1 NM/1400 ft between the B757 and the B747 (at 0637:06), were recorded).

The MATS Pt 1, page 8 – 2, addresses the responsibilities of controllers involved in handing over an operational position.

“The responsibility for the accuracy of a handover lies with the person vacating an operational position. This does not remove all responsibility from the controller taking over, who must be aware that the controller being relieved may well be fatigued. The controller taking over should be alert to the possibility of errors and omissions in the information being given to him and must verify the data transferred by a thorough check of the radar display, FPSs and any other relevant information. He must also clearly indicate to the controller handing over when he is ready to accept responsibility for the operational position.”

CSC B said that with hindsight he should have split the sector prior to SC 2 taking over. Since this incident, the MATS Pt 1 has been amended (on 29 Sep 99) to give guidance as follows in the timing of splitting a position: “If the traffic levels are very high or the traffic situation complex, consideration should be given to splitting the position, where this is possible, before the handover takes place.”

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

An ATSI adviser said that the positioning of the B767's BPK strip was an important factor in the incident. However, it had not been possible to determine its exact location on the strip display and such evidence that it may have been positioned wrongly was circumstantial. If the strip was not displayed correctly when CSC B accepted the B757 into the sector at the same level as the B767, the potential confliction would not have been readily apparent to him. Nonetheless, the Airprox did not occur for a further 20 min after acceptance, during which time CSC B would have been expected to assess the traffic situation, expose the potential confliction and resolve it.

As for the 2 sector controllers involved, both were responsible for maintaining an up-to-date strip display and ensuring an accurate handover; it was, therefore, incumbent on them either to note and correct the error if the B757's strip was incorrectly positioned, or to spot the confliction if it was not. Arguably, because the night shift SC was responsible for handing over the FPS display to the oncoming watch, he could also be accountable if the B757's strip was incorrectly positioned. However, some 35 min had elapsed between the handover and the incident and such an error should have been spotted and rectified by the oncoming watch in that time.

ATCO members confirmed that the issuing of ODLs was a normal procedure and the circumstances surrounding this Airprox were not unusual. While the positioning of the FPS was significant, the controllers concerned had plenty of time to recognise and correct any error. Members agreed that without knowing the precise location of the B757's BPK strip, the breakdown of control could not be attributed to a specific controller. It was concluded, therefore, that the LUS team had a corporate



responsibility to ensure the safety of ac under their control and in this instance did not provide the required standard separation between the 3 ac concerned. Members were satisfied, however, that although the 2000 ft vertical separation was compromised, the ac were never less than 1200 ft apart and that there had

not been a risk of collision. The Board acknowledged the important part played by TCAS on both the B767 and the B757, albeit the latter was already responding to ATC avoiding instructions when the TCAS alerts were received.

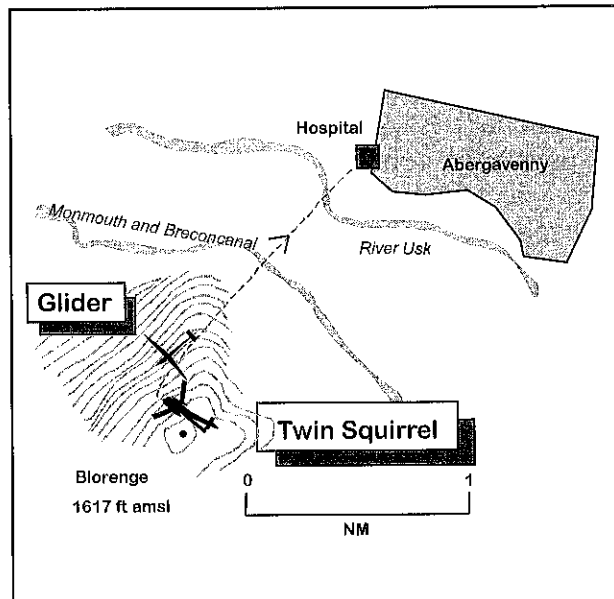
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The LATCC AC LUS team did not provide standard separation between the 3 ac concerned.

**AIRPROX REPORT No 156/99**

Date/Time: 30 Aug 1422  
Position: N5148 W0303 (105 NM SW Abergavenny)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: AS355 Slingsby glider  
Operator: Civ Comm Civ Club  
Alt/FL: 10 ft ↑ 2300.ft  
 (agl) (amsl)  
Weather VMC VMC CAVOK  
Visibility: 40 km 40 km  
Reported Separation:  
 15 FT V/30 ft H//50 ft V/ 300 ft H  
Recorded Separation: Not recorded



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

THE AS355 PILOT reports that he was scrambled to Casevac an injured hang glider pilot from Blorenge (a hill 1617 ft amsl 105 NM SW of Abergavenny), a known and marked hang gliding site; the casualty had severe neck injuries. The helicopter landed at the scene with HISLs on, although the visibility was 40 km in VMC. About 23 min later he was ready to lift off from the NW side of the hill with the casualty on board when a glider came around the corner and passed within 25 ft of the helicopter. It

made a second pass heading S and was waved away. He started his engines, whereupon the glider made a third pass, tracking NE, again passing within 25 ft of him, and was again waved away, this time by 7 policemen and about 30 bystanders. While the glider was tracking NE he decided to take off in order to get his casualty to hospital. As he transitioned from the side of the ridge, the glider turned hard about and came directly towards him causing him to make an avoiding action R turn with 45° AOB. The glider passed within 15 ft vertically and 30 ft horizontally and he felt there had been

a very high risk of collision. Moments later the glider also appeared to take avoiding action. Some 20 min later, on his return to the site, the glider was still airborne, flying back and forth along the ridge.

UKAB Note (1): In a subsequent telephone conversation the helicopter pilot was asked to confirm his estimates of miss distances. He said that on his initial arrival at the scene he was standing on the ridge when the glider passed over him by about 18 ft; he could clearly see its pilot and distinguish the colour of the baseball hat he was wearing. When ready to lift, with the casualty aboard, he saw that the glider was tracking towards the NE about 300 to 400 ft away and decided this was a good opportunity to take off, his intention being to pass behind the glider before setting course for the hospital at Abergavenny, some 10.5 NM to the NE. However, as he was transitioning and attaining safe single engine speed, the glider made a very abrupt R turn (the pilot was adamant about the direction) and flew straight towards him. He immediately turned sharp R in avoidance and was aware of the discomfort this manoeuvre caused to his injured passenger. The glider passed so close he fully expected to hit its port wing. The pilot comments that he now makes a point of listening out on the glider frequency, 130.1, when operating in a known glider environment.

UKAB Note (2): The UKAB received witness reports from two police officers who were part of the helicopter's crew. One accompanied the casualty as he was air-lifted to the hospital and the other remained on the ridge. The latter described a light blue glider which was approaching the hill from the direction of Abergavenny; the ac came alongside the ridge and he pointed it out to the Captain of the helicopter. It was no more than 20 – 30 ft from the ridge and he could hear the sound of the air rushing over its wings; the pilot's features and clothing could be clearly distinguished; he was wearing a light brown coloured baseball cap and a headset or ear protectors which appeared to have blue ear muffs. He could also read the large white registration markings on the ac's rear fuselage. People around him began

waving and shouting to attract the attention of the pilot but the ac made several more passes in close proximity. He had no doubt that the glider pilot had seen the helicopter and must have been aware that a serious incident had taken place. The helicopter's engines started, at which time the glider was at a considerable distance and flying away from the area. However, as the helicopter lifted, the glider turned and flew directly into its path causing the helicopter pilot to make an abrupt evasive manoeuvre to the R. The ac passed within 20 – 30 ft of each other and without the avoiding action he felt a collision would have occurred. In his opinion the glider was being flown in a dangerous manner, far too close to the people, ac and vehicle present, and was also a serious hazard to any foot-launched ac which might have been operating from the site.

The second constable, on board the helicopter, gave a similar report, including identical descriptions of the glider pilot's headwear and colour of the ac's registration. He said that following lift-off he observed the glider make a tight R turn. The helicopter pilot banked to starboard to provide separation when the glider levelled out and flew at them on a collision course, causing the helicopter pilot to take violent avoiding action, to the obvious discomfort of the casualty; the glider passed no more than a rotor width away. On returning to the site some 40 min later, the glider was still in the area but had climbed about 500 ft and was eventually seen heading off in a westerly direction. He felt that the helicopter pilot's quick actions had undoubtedly averted a collision.

**THE GLIDER PILOT** reports that after departing from Talgarth airfield (12 NM to the NW) he arrived at the NW face of Blorengge hill where a light NW wind was giving weak lift, supplemented by an occasional weak thermal; flying conditions were CAVOK. His altimeter was set to the Talgarth (elev 970 ft) QFE and on arrival at the ridge indicated 1100 ft (2070 amsl). He had previously observed from a distance that there was no paragliding or hang gliding activity at the hang gliding site. He then noticed a police helicopter stationary on the ground with its rotors stopped and realised that

there had been an accident. He was climbing slowly but committed to the ridge in order to maintain height; however, he realised there was some urgency to vacate the area and he intended to do so as soon as possible. While flying to the SW he noticed the helicopter's rotors start turning and realised it was about to take off. For a short time after this he lost sight of it as he turned away from the ridge to commence a northeasterly track. Having turned, he saw that the helicopter was still on the ground and he expected it to take off parallel to the ridge, descending towards the hospital. In order to give it more room for manoeuvre he flew further away from the hill beyond the optimum lift area, which meant that he was unable to maintain height. At the end of the beat he turned L and then saw the helicopter was climbing towards him from his 10 o'clock position about 400 m away. He immediately turned R and it passed about 50 ft below and 200 – 300 ft away on his port side. It was certainly further away than the 160 ft distance he was accustomed to between a tug and a glider on aero-tow. These distances are commonly encountered between soaring gliders and he did not feel there had been any risk of collision or any need to submit an Airprox report.

UKAB Note (3): In a subsequent telephone conversation the glider pilot said that he was quite certain he had turned 'Left' at the NE end of the beat because this was standard procedure for safety reasons; to turn in towards a hill under such conditions was patently unwise, particularly as the wind was from the NW. However, having begun the L turn, he became aware that the helicopter had now lifted off and, instead of tracking along the ridge as he expected it to, was heading straight towards him. He therefore reversed his direction of turn to pass behind it. In his opinion the helicopter crew should have ensured their track did not conflict with him on lift-off. In the event, although he had to take avoiding action he was satisfied that the separation distance was considerably greater than the 25 ft reported by the helicopter pilot. After the incident he remained at the ridge for another 10 – 15 min before heading W to find another hill; soon

afterwards he set course for Talgarth but was forced to land just W of Crickhowel due to loss of lift. He was definitely not at the Blorengge hill when the helicopter later returned to the site.

The glider pilot refuted the claims of the helicopter pilot and witnesses regarding his headgear and registration details. He was not wearing a baseball cap; in fact, the wearing of this type of headgear by glider pilots is specifically forbidden because the long peak inhibits upward view. Also, he was not wearing a headset of any kind – it is not necessary in a glider. Moreover, the registration marking of the glider is in large black lettering on the tail fin.

**THE SAFETY OFFICER** of the gliding club concerned investigated this incident and provided a report to the BGA and UKAB. It was established that the glider's flight was properly authorised and within the competence of the pilot. The weather was considered safe for flight, albeit soaring conditions were not good. The pilot flew to the northwest Blorengge ridge having observed from a distance that there was no hang or paragliding activity. He was unaware at the time that there had been an accident at the hang gliding site. Although just able to maintain height he was unable to climb sufficiently in the weak ridge lift and some time later landed in a field near Crickhowell (some 5 NM NW of the ridge in the Usk Valley).

The Safety Officer comments that there appears to be a conflict of opinion about the height at which the glider was operating. The span of the ac is 59 ft, therefore 25 ft would be less than half the span. The ac would be flying in and out of ground effect. To gain height in weak lift it is essential to fly at the speed which gives the minimum risk – this is just above the stall. Lateral control with the wings in and out of ground effect would be very difficult when flying at this speed. Moreover, at very low heights the boundary layer effect just above the ground reduces the energy in the airflow and therefore it is easier to gain height if the glider is flown further from the ridge face in less disturbed air. Thus, while the glider may have been lower than the 200 – 300 ft reported by the pilot, it is

unlikely to have been as low as described by the helicopter pilot.

The glider pilot was complying with club rules and was not in breach of any Air Regulations (the 500 ft Rule does not apply to gliders when soaring). In hindsight, having observed the accident site and helicopter, he should have considered leaving the area sooner; however, in his judgement it would have been hazardous to attempt a landing in one of the very small fields at the base of the ridge and he therefore decided to try and remain airborne in the weak lift offered by the ridge. No Airprox could have been possible until the helicopter's rotors started turning and there was, in the Safety Officer's opinion, some doubt as to whether the helicopter took the most expedient route while transitioning from the ridge.

Had the helicopter operator been aware of the glider air-to-air frequency the problem might have been resolved by RT. He recommends that gliding frequencies be made known to such operators, as is already the case in mid-Wales.

The Safety Officer submitted a report from an eye witness experienced in gliding and paragliding, and in both helicopter and fixed wing operations; he had also been a senior Captain with a major international carrier. Having attended the paragliding event prior to the hang gliding accident, he was sitting about 75 yd from where the medivac helicopter took off to his L, and about 200 yd from where the Airprox took place to his R. The glider had been slope soaring for about 10 to 15 min prior to the incident and was not as close to the ridge as it might have been. The pilot reduced his beat so that he was not flying past the helicopter but then extended it to the NE by about 300 yd as the helicopter was about to lift off; at this point it was not closer than about 100 yd from the helicopter. The helicopter lifted off and accelerated into the airspace occupied by the glider, which was then at the far end of its beat and turning back; the glider turned sharply to avoid the helicopter. In his opinion the helicopter had flown unnecessarily close to the glider, however, owing to the former's

manoeuvrability he was not sure whether there had been any real risk of collision.

UKAB Note (4): A replay of the Clee Hill radar at 1421:30 shows the helicopter, identified by its 7015 squawk, stationary on the hill indicating 1400 ft Mode C. At 1422 the Mode C reduces to 1200 ft, indicating that the ac has lifted off; no primary returns are apparent in the area throughout the period. The helicopter heads NNE and fades in the vicinity of the hospital, reappearing some 25 min later at the hill where it remains for about 2 min before setting course southbound.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac and a radar video recording.

The Board took some time to draw out the root causal factors for this incident. Both pilots, in their different ways, experienced a degree of emergency and did not entirely appreciate each other's problems. The helicopter pilot viewed the glider's behaviour as unnecessarily intrusive, delaying his departure to the hospital with the injured man. He was not to know that the glider pilot was actually having difficulty staying airborne and was flying close to the hill in order to get what little lift he could from the ridge. Moreover, it was a pity that he did not make use of the radio to speak to the glider pilot. The latter, meanwhile, although well aware of the emergency in progress, could not leave the area without jeopardising his own safety. Some members felt that he ought to have made an attempt to clear earlier, perhaps by flying to the E and accepting he would have to make a forced landing. However, others disagreed and pointed out that, as the powered element in the conflict and therefore the more flexible, the helicopter's options were greater; furthermore, the possibility of a conflict could not have arisen until the helicopter became airborne and it was therefore the helicopter pilot's responsibility to time his lift off to avoid the glider which, in any case, had

right of way under the Rules of the Air. The Board accepted that this was indeed what the helicopter pilot tried to do, having waited until the glider had passed in front of him before lifting off into wind to pass behind it prior to setting course for the hospital. Some members commented that if he had waited just a little longer, until the glider had reversed and cleared to the SW of him, he could have departed unhindered. The glider pilot, meanwhile, was working on the assumption that if he gave the helicopter enough room to manoeuvre behind him, a L turn away from the ridge to the NE would allow it to depart along the ridge line, thus keeping well S of him. Unfortunately, the expectations of both pilots were confounded because the helicopter pilot, whose attention would have been focused ahead as he transitioned from the ridge, had not noticed the glider begin its L turn, and the glider pilot

suddenly realised, as he was entering the turn, that the now airborne helicopter was actually tracking away from the ridge towards him. At this point – judging from reports - the helicopter pilot saw the glider, apparently turning R into conflict, and felt it necessary to make a sharp R turn in avoidance. Taking this scenario into account, the Board decided on balance that the Airprox occurred because of an unexpected conflict of flight paths, which was resolved by the actions of both pilots. Owing to widely conflicting information concerning the miss distances, members found it difficult to assess the degree of risk. Nonetheless, they recognised that both ac were in critical stages of flight and there was little scope for manoeuvre by either pilot. The Board therefore concluded that the safety of both ac had been compromised.

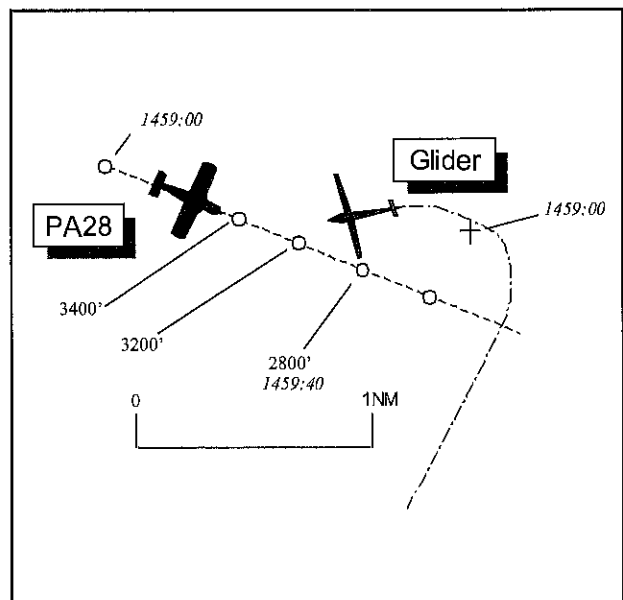
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

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

**AIRPROX REPORT No 158/99**

Date/Time: 28 Aug 1459 (Saturday)  
Position: N5139 W0125  
 (9 NM SE of Brize Norton)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: PA28 Untraced Glider  
Operator: Civ Trg NK  
Alt/FL: 3500 ft NK  
 (RPS 1020 mb) NK  
Weather VMC CAVOK NK  
Visibility: <10 km NK  
Reported Separation: 2-300 ft V & H  
Recorded Separation: Not Recorded



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE PA28 PILOT** reports routeing VFR direct from Gloucestershire Aerodrome to White Waltham at 100 kt, whilst in receipt of a FIS from Brize Norton. A white low wing glider was sighted in level flight 5 NM ahead, crossing from R to L, the glider then turned onto a reciprocal heading to pass, he thought, clear down the port side. Knowing of his responsibility to 'Give Way', he was content that safe separation existed and executed a 'wing-waggle' to indicate to the glider pilot that his ac had been sighted. His student then advised that the glider had turned and was heading straight towards them. An "emergency" descent was immediately initiated and the glider passed 2 - 300 ft above and 2 - 300 ft astern of the PA28, a collision would have occurred if avoiding action had not been taken. An Airprox was filed with Brize immediately after the event.

**AIS MILITARY** reports that despite exhaustive enquires, the identity of the reported glider remains unknown. Tracing action suggests that the glider landed at either Nymphsfield or Aston Down and the occurrence has been publicised by local clubs and the BGA to no avail. Exceptionally, therefore, the glider remains untraced.

**HQ MATO** reports that at 1447:37, the pilot of the PA28 freecalled Brize ZONE on 119.0MHz in the climb to 3500 ft requesting FIS and 'MATZ' penetration. ZONE provided FIS, assigned a squawk of 3730 and cleared the pilot to transit the Brize CTR VMC, at 3500 ft Cotswold RPS (1020mb). The airspace was extremely busy at the time and ZONE was working up to 8 ac on frequency. After leaving the CTR, at 1459:34 ZONE advised the PA28 pilot to change frequency en route. The PA28 pilot replied *"we'd actually like to file an Airprox....I just had to take avoiding action....descending 1000 ft to 3000 ft 1020 to avoid a glider"*. As ZONE was still very busy, the controller transferred the PA28 pilot to a quieter frequency, in order to pass details of the occurrence. A few minutes later the PA28 pilot reported that at an altitude of 4000 ft, he had

encountered a glider in his *"...10 o'clock, 2 - 900 ft"* and had lost 1000 ft whilst taking avoiding action. The type of glider could not be established, nor did the pilot notice any distinguishing features. Brize Norton ATC was not in RT contact with any gliders in the PA28's vicinity. Owing to the intensity of traffic in the area, it proved impossible to identify or track the reported glider.

Brize Norton were aware that a number of gliding competitions were taking place on Saturday 28 August 1999 and with the good weather there were a large number of VFR flights operating in the area. Gliders are notoriously difficult to detect on radar and under the FIS it was the responsibility of the PA28 pilot to maintain separation from other ac. Considering ZONE's workload, even if he had been able to see the glider on radar, it is unlikely that the controller would have passed traffic information to the PA28 pilot in this instance.

UKAB Note: This occurrence is not shown clearly on LATCC radar recordings. However, the PA28 identified by its 3/A 3730 squawk may be seen tracking SE through the Brize CTR at 3300 ft Mode C, which equates to its cleared crossing altitude of 3500 ft RPS. At 1457:29, an intermittent primary contact, which may be the reported glider, is shown briefly 9.5 NM SE of Brize Norton and about 4.5 NM ahead of the PA28. This contact then fades but reappears at 1458:52, 1.5 NM ahead of the PA28, fading again 10 sec later. The PA28 is shown to descend from 3400 ft, initially to 2800 ft at 1459:40, before finally levelling at 2700 ft. An intermittent primary contact reappears at 1459:55, about 0.75 NM astern of the PA28. There is no significant deviation of the PA28's track discernible on radar.

## PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the PA28 pilot alone, transcripts of the relevant RT frequencies, radar video recordings, a report from the air traffic controller

involved and a report from the appropriate ATC authority.

A Pilot member explained that 4 gliding competitions had been held on the weekend in question. It was therefore entirely feasible that there may have been as many as 500 gliders within 20 NM of the Airprox position, which was in the vicinity of Didcot Power Station and a magnet for those seeking thermal lift. Clearly the Board had only one side of the story and it was regrettable that extensive tracing action had proved so fruitless. Nonetheless, the PA28 pilot had spotted the glider in good time and ensured that safe separation existed initially. It

was, therefore, fortunate that the student was able to warn the PA28 pilot when the glider suddenly turned toward their ac, which enabled him successfully to evade the glider. Members agreed that it was unlikely that the glider pilot would have turned toward the PA28 if he had seen it. However, in the absence of a report this would only be conjecture. Consequently, members concluded that the cause was a conflict in the FIR with an untraced glider resolved by the PA28 pilot. Given the reported emergency descent by the PA28, as evinced by the radar recording, the board also agreed that the safety of both ac had not been assured.

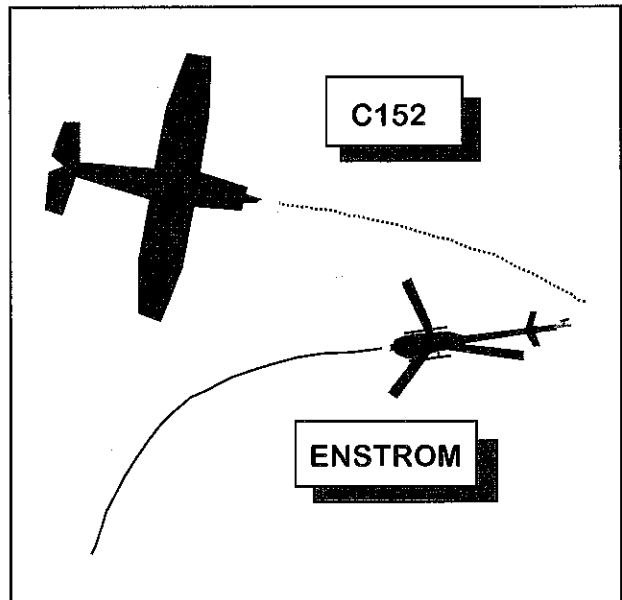
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Conflict in the FIR with an untraced glider resolved by the PA28 pilot.

**AIRPROX REPORT No 159/99**

Date/Time: 29 Aug 99 1411 Sunday  
Position: N5114 W0023 (2 NM W of Dorking)  
Airspace: FIR (Class: G)  
Type: Reporting Aircraft Reported Aircraft  
 Enstrom F28C C152  
Operator: Civ Pte Civ Trg  
Alt/FL: 1500 ft 1700 ft ↓  
 (QNH 1020 mb) (QNH)  
Weather VMC CLBC VMC CLBC  
Visibility: <10km 8km  
Reported Separation:  
 Virtually Nil/70 ft V & H  
Recorded Separation: Not Recorded



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

**THE ENSTROM PILOT** reports that after departure from a private HLS he was heading 260°M, 2NM W of Dorking and flying VFR at an altitude of 1500 ft London QNH (1020 mb). A

free-call had just been initiated to Farnborough for an ATS when a single engine ac was sighted at 1 o'clock about 1 NM, flying towards him in level flight 500 ft above his helicopter. The starboard wing of the ac then dropped sharply as it commenced a spiralling dive towards him.

Perceiving that the other pilot might not be able to manoeuvre in time, the transmission to Farnborough was broken off. An impact seemed inevitable as he banked L as hard as he could, watching the other ac through his upturned skids. By the time he recovered from this unsafe attitude, the fixed wing ac had gone. He judged the minimum separation as "virtually nil" with "maximum" risk. An Airprox was immediately reported to Farnborough on RT and later filed with Goodwood after landing.

**THE C152 PILOT** reports that he was conducting a general handling sortie and in receipt of a FIS from Redhill TOWER, whilst operating 3 NM W of Dorking. Before executing a spin, a 270° clearing turn was conducted and he believed the area below to be clear. The spin was initiated and 2 rotations completed before it was stopped. Whilst easing out of the dive heading 100° at 120 kt, as the nose approached the horizon a helicopter was sighted between 12 and 1 o'clock, 200 ft away, initially in level flight before it banked he thought to the R. Avoiding action was taken and a hard R turn initiated before pulling up into a climb after the helicopter had passed 70 ft to the L he thought, and 70 ft below his ac, with a high risk of collision. A wide left turn was then initiated to keep the helicopter in sight.

UKAB Note: 1 A review of the RT recording reveals that the Enstrom pilot checked in with Farnborough at 1410:30. During his subsequent transmission at 1410:40, he reported "... interrupting this (transmission) there's a fixed-wing making a dive directly above me". About twenty seconds later the pilot reported a "...Nearmiss" (sic) to Farnborough, adding "...I was just transmitting to you I saw a fixed-wing directly above me I saw it entering into a dive and it's only just missed me".

UKAB Note: 2 This Airprox is not shown clearly on recorded radar. Therefore, it is difficult to resolve the differing perceptions of the relative geometry of this close quarters encounter. Analysis of the LATCC Pease Pottage radar shows a single primary contact corresponding to the Enstrom helicopter at 1410:00, which then fades and is not evident again until 1?

minutes after the Airprox. Also at 1410:00, the C152 is shown as a primary contact tracking about 100° and approaching the reported Airprox position, before turning north-east at 1411:10, and completing a wide L turn.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members believed that the location where the Airprox occurred was too busy an area to be conducting such manoeuvres in, especially as the "Dorking Gap" is a commonly used VFR route through to London. Nonetheless, it was recognised that the area is also heavily used by local 'training' aerodromes, who would otherwise be faced with significant transits to clearer airspace away from the London TMA. These points aside GA members were amazed that the C152 pilot was practising spin recovery manoeuvres at such a low altitude. Whilst there are no specific rules to prohibit this, good airmanship would suggest that such manoeuvres are completed and recovery effected at a minimum of 3000 ft agl. Military members of the board were aghast at the execution of spins at such altitudes that were within the UK LFS. Indeed a military pilot member explained that the minimum recovery height prescribed for the Bulldog was much higher. However, this was predicated on establishing a safe height at which to abandon the ac if the pilot was unable to recover from the spin. Within the sphere of general aviation parachutes are not mandated. Hence, the predicated recovery heights are consequently much lower and there are few rules prescribed specifically for the conduct of aerobatic manoeuvres by GA pilots. Whilst an Enstrom may be difficult to detect at a distance when seen from above, the onus was certainly on the C152 pilot to ensure that the area within which the spin would be executed, together with that



of the recovery, was clear before initiating the spin. Members agreed unanimously that the Airprox stemmed directly from an inadequate clearing turn by the C152 pilot before entering the spin. The Enstrom pilot's description of the encounter, especially his violent avoiding action, caused some members considerable angst. Moreover, the full and commendably

frank report from the C152 pilot emphasised that he also took positive avoiding action. This, coupled with the minimum separation reported by both pilots led the board to agree unanimously that there had been an actual risk of a collision between the subject ac, avoided only by chance rather than judgement.

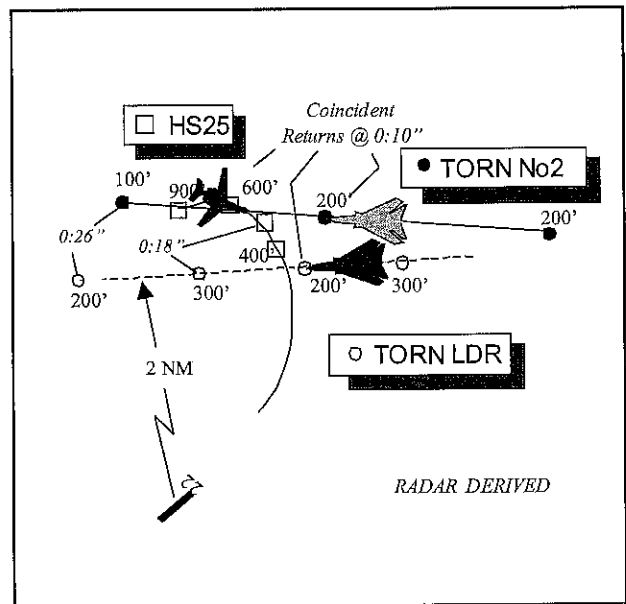
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: In executing a low-level spinning manoeuvre the C152 pilot flew into close conflict with the Enstrom, which he had not seen beforehand.

**AIRPROX REPORT No 160/99**

Date/Time: 1 Sep 1500  
Position: N5405 W0115 (2 NM NNE of Linton-on-Ouse - elev 53 ft)  
Airspace: MATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Dominie Tornado GR  
Operator: HQ PTC HQ STC  
Alt/FL: 700 ft ↓ 500 ft  
 (QFE 1018 mb) (Rad Alt)  
Weather VMC CAVOK VMC CAVOK  
Visibility: 10 km 10 km  
Reported Separation:  
 <0.5 NM h + 200 ft V  
Recorded Separation:  
 Ldr < 0.75NMH +400 ftV  
 No2 Not recorded



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

**THE DOMINIE PILOT** reports descending through 700 ft and turning R at 30-35° AOB, passing 070° onto finals at 140 kt to land RW 22RH at Linton. Suddenly, a Tornado was unexpectedly sighted at 2 o'clock, low and fast on a steady track that passed 200 ft below crossing from L to R with less than 0.5 NM horizontal separation. No avoiding action was

taken, nor was any possible, as the Tornado was not seen until after it had flown under the Dominie. He adds that the TWR MATZ Crossing broadcast was received whilst at 1000 ft downwind, just prior to the finals turn. But not all of the details were "registered".

**THE TORNADO PILOT** reports flying as a pair of GR1s in close arrow formation whilst crossing the Linton MATZ under FIS from Linton Zone at 500 ft agl on a heading of 270° at 420 kt. Both ac were squawking 3/A 7001 with

Mode C and could see the Linton visual circuit traffic. Though avoiding action was issued by Zone it was considered untimely and the turn toward the Dominie would have resulted in a conflict. He thought that the Dominie pilot had probably seen the No 2 Tornado, which was to the north of the leader. (UKAB Note: It was actually the leader.)

**HQ MATO** reports that the Dominie pilot, was flying circuits to RW 22RH at Linton-on-Ouse and in communication with Linton Tower (TWR) on 300.42 MHz. There were 2 other ac in the circuit. The Tornado Formation freecalled Linton Zone at 1456:56, on 292.8 MHz *"...looking for a MATZ crossing, East to West about 2 miles north of your field 250 ft."* Zone replied *"Roger .... it'll be East to West, 3 miles North, not below 500 ft on Linton QFE 1018, squawk ident please."* This was acknowledged by the formation leader, *"3 miles North at 500 ft."* The MATZ crossing was then coordinated within Linton ATC and Zone confirmed the clearance to the Tornado crews at 1458:47, *"...your MATZ crossing is approved, East to West, 3 north, 500 ft"*. Shortly afterwards, Zone identified the Tornados on radar. At 1459:33, TWR made the requisite broadcast *"MATZ crosser, East to West, 3 North at 500ft,"* whilst at about the same time Zone transmitted *"(Tornado C/S), visual circuit at Linton is active"*. The Dominie pilot reported *"finals"* 20 seconds later and was told to *"continue"*. Concurrently, in compliance with an instruction from the ATC Supervisor (SUP), Zone transmitted to the Tornado Leader *"... avoiding action to clear the traffic late downwind turn right heading 360"*. The Tornado Leader responded *"...we are visual, we'll stay below"*. Zone passed this information by landline to TWR, who at 1500:20, advised the Dominie pilot *"...the Tornados are visual with you, crossing to the North East this time"*. Five seconds later, the Dominie pilot reported *"...Tornado across the nose whilst we were on finals"* and then, after repeating the message, requested an acknowledgement of an Airprox. As the Tornado formation departed the MATZ, the leader was informed that the Dominie pilot had reported an Airprox.

Analysis of the LATCC Claxby radar recording reveals that the Airprox occurred 2 NM NNE Linton-on-Ouse just before 1500:18. The Tornados are shown initially to the SE of Linton, squawking 3/A 7001 (with ident at 1457:17) and indicating 1-200 ft Mode C as they track NW. The Dominie is shown within the Linton circuit squawking 3/A 4501 with Mode C. The ground speed of the Tornados is about 3 times that of the Dominie. When TWR made the MATZ crossing broadcast at 1459:33, the Tornados are 5.5 NM ENE Linton, tracking 265° in a 1 NM trail and indicating 3-400 ft Mode C with the Dominie in their 12 o'clock, 5.5 NM as it approached the end of the downwind leg at 800 ft Mode C. The Dominie commences the final turn at 1459:54, when it is 2.5 NM N of Linton indicating 900 ft; the Tornados are shown 2 o'clock, range 3 NM and appear as a single radar contact, (most likely to be the wingman) indicating 200 ft. The closest point of approach (CPA) occurs between 1500:10 and 1500:18. At 1500:10, the Dominie is in a R turn, passing about 120°, with the lead Tornado at 1 o'clock, heading 265° and the No.2 at 11:30, heading about 275°, both at a range of 0.75 NM. The Dominie is indicating 600 ft, whilst both Tornados indicate 200 ft. In the following frame, the Dominie appears to have briefly steadied on 120° at 500 ft, with the lead Tornado in its 4 o'clock, 0.75 NM indicating 300 ft. The No.2 Tornado is not shown; but interpolation from later radar sweeps suggests it would have been in the Dominie's 6 o'clock at 0.25 NM, having passed directly beneath. The No.2 Tornado reappears on the next sweep indicating 100 ft. The lead ac passes just under 2 NM N of the airfield and the CPA between the No.2 and the Dominie is just under 2.5 NM NNE of Linton.

At the time of the Airprox the Linton weather was cc BLU, CAVOK. The MATZ crossing was handled appropriately, in accordance with local orders and accepted ATC procedures. Although a crossing 2 NM N was requested, when the visual circuit is active, Linton controllers are required to route MATZ crossers more than 2 NM from the airfield in order to avoid disruption. In this instance, Zone instructed the Tornado Leader to pass 3 NM N and advised that the visual circuit was active as

the formation entered the MATZ, which was acknowledged. This added an additional 'buffer' for the slightly wider circuit of the Dominie. TWR made an appropriate broadcast as the Tornados entered the MATZ but from the Dominie pilot's report, it is fairly clear that the finer details of the crossing were not taken onboard, hence his apparent surprise at seeing the Tornado. Having seen the Dominie continue further downwind than anticipated and the Tornados tracking closer to the airfield than cleared, Zone issued an avoiding action R turn on a prompt from the SUP. The Tornado pilot's report states that the crews were in visual contact with the circuit traffic and that this was an untimely call as the turn would have been towards the Dominie. This turn however, was intended to put the Tornados N of the turning Dominie and hence, would have necessitated an initial turn towards. With the benefit of hindsight however, having noted the high speed of the Tornados, the turn would probably have had little effect in the time available. Having stated that they were visual with the circuit traffic and, presumably, aware of the relative position of the airfield, it is a little surprising therefore that the Tornado crews elected to continue on their original track. By comparison of the Dominie pilot's report and the radar recording, it is also evident that the reported ac was the lead Tornado and that the No2, who passed almost directly beneath, was not seen.

**HQ PTC** comments that whilst Linton ATC seem to have done their level best to deconflict the traffic and inform all concerned, in this case it was nullified by the Tornados cutting their clearance by a mile. By the time this became apparent, avoiding action had become nugatory and they came nose to nose with the Dominie. Although this incident is regrettable, zone-crossing is a VFR procedure reliant in the main on lookout, as is all visual circuit work. It worked in this case, but not by a comfortable margin.

**HQ STC** comments that the Tornado formation had requested a MATZ crossing from Linton Radar and was cleared to pass 3 NM to the N, not below 500 ft. However, the radar recording clearly shows the lead aircraft passing 2 NM to

the N of the airfield, the wingman displaced 0.5 NM further to the N, and both ac indicating significantly lower than 500 ft.

Although there was no risk of collision, since both Tornados were visual with the circuit traffic at an early stage, the Dominie captain was understandably concerned for the safety of his ac. With the benefit of hindsight, the avoiding action given by the controller may not have been the most appropriate but, had the Tornado crews complied with their original clearance, the safety of the Dominie would have been assured.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

Some members were not convinced that the clearance, as transmitted by ZONE and acknowledged by the Formation leader, was appropriate and even at 3 NM from the aerodrome the Tornado formation was still too close for comfort from the visual circuit. Moreover, some military controller members thought in hindsight that routeing the Tornado formation at 500 ft just north of the active circuit was unwise and it would have been better instead to route the formation south of the RW, through the 'dead-side'. Several civil controller members of the Board, understood that the MATZ crossing clearance conformed to accepted military doctrine, but were uneasy that it did not guarantee appropriate separation from circuit traffic. However, if the Dominie pilot had paid more attention to the MATZ broadcast he may not have been taken 'off guard' by the sudden appearance of the other ac. Many members questioned the need for the Tornados to pass through Linton's MATZ at low level. This point was reinforced by the STC member who said the formation was not conducting an airfield attack. Consequently, cutting straight

across the final approach a mile closer than cleared, on the live side of the circuit was probably the worst place to be at such a height and certain to cause disruption to circuit traffic. Most members considered that this Airprox could have been avoided at the flight planning stage by routing either over or round the MATZ.

There was no difficulty in reaching agreement on the cause of the Airprox; the Tornado leader had passed 2 NM to the N of Linton, inside the

stipulated range of 3 NM E to W, thereby leading to a conflict in the visual circuit with the Dominie as it turned finals. The Board noted that although the Dominie pilot apparently did not see the No 2 Tornado at all when it passed below his ac, both Tornados were visual with the circuit traffic throughout and the Leader passed about 400 ft below the Dominie. Therefore, in the circumstances that pertained, the Board considered there had not been an actual risk of collision between the subject ac.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Tornado formation leader did not comply with the MATZ crossing clearance.

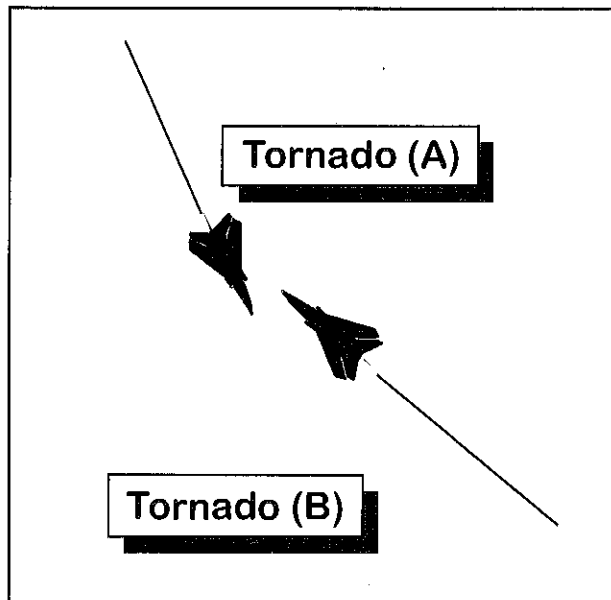
**AIRPROX REPORT No 161/99**

Date/Time: 3 Sep 1048  
Position: N5531 W0221 (5 NM SE of Kelso)  
Airspace: LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tornado GR (A) Tornado GR (B)  
Operator: HQ STC HQ STC  
Alt/FL: 250 ft 400 ft  
(Rad Alt) (Rad Alt)  
Weather VMC CLBC VMC CLBC  
Visibility: 20 km 20 km+  
Reporting Separation:  
50-100 ft V <500m H, 150 ft V  
Recorded Separation: NK

**BOTH PILOTS FILED**

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

**THE TORNADO (A) PILOT** reports heading 170° at 420 kt on a low level exercise at 250 ft agl. Following a brief period of evasion he was trying to RV with his leader, believed to be in his 10-12 o'clock about 5 NM ahead. He saw an ac cresting a hill about 5 NM ahead which he took



to be his leader on a similar track. He then searched for the bounce ac last seen to the left of his leader but 5 sec before the Airprox he realised that the previously seen ac was head on to him 1 NM ahead and about 100 ft above in a slight descent. He descended immediately to avoid a collision but the other ac also appeared to bunt and a collision seemed imminent. He pushed full forward stick,

overstressing the ac by -1g. He did not think he had done enough to avoid a collision but just before colliding the other ac appeared to stop descending and passed about 50-100 ft above and slightly to his left. There had been a very high risk of collision.

**THE TORNADO (B) PILOT** reports heading 290° at 480 kt on an evasion training sortie; he was the right-rear ac in an escort formation which was entirely separate from (A)'s. The leader had called 'buster' regarding an ac in his 3 o'clock, no range given, on a reciprocal track; when crossing a ridge at 400 ft agl he first saw Tornado (A) about 500 m ahead and slightly below. There was insufficient time to take avoiding action before it passed about 150 ft below and 500 m to his left; the risk of collision had been high. (His diagram showed the formation on a more northerly track.)

**HQ STC** comments that in this incident both crews were participating in well briefed missions and were relying on the see and avoid principle as the primary method of deconfliction. The importance of disciplined and effective lookout has once again been highlighted but in the absence of a Collision Warning System the conflict of 2 fast-jet flightpaths in the UK LFS remains a factor in military ac operations.

UKAB Note: The incident took place below the coverage of recorded radar so the actual tracks of the ac cannot be confirmed but the pilots' reports of the geometry of the encounter indicate they were more head-on than the headings given would indicate. The closing speed could have been in the order of 900 kt.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Tornado (A) pilot had first seen (B) at a reasonable distance, but had not realised it was a threat. When he next saw it, it was too close for safe avoiding action and the Board concluded that the cause of the Airprox, which contained a very high risk of collision, was a late sighting of the other ac by each pilot. As in another similar set of circumstances, in a separate incident, this was not a criticism of their lookout (which in both cases had obviously been heightened by the activity of their respective 'bounce' ac) but was more a statement of fact. A 900 kt closing speed, ac camouflage and a terrain background all played a part. Added to that was an acknowledgement that lookout cannot cover 360° in 2 planes and 180° in the third simultaneously which meant that, occasionally, conflicting ac would not necessarily be seen at the instant they became visually observable objects. The two pilots in this incident had little more than 4 seconds to react and they did.

The Board agreed with HQ STC that the incident could only lend weight to the argument in favour of a CWS. The last reorganisation of the LFS had greatly reduced the frequency of head-on Airprox, where fast jet closing speeds rendered a timely sighting so unlikely, but the remainder of the LFS allowed encounters such as this, which remained an operating risk.

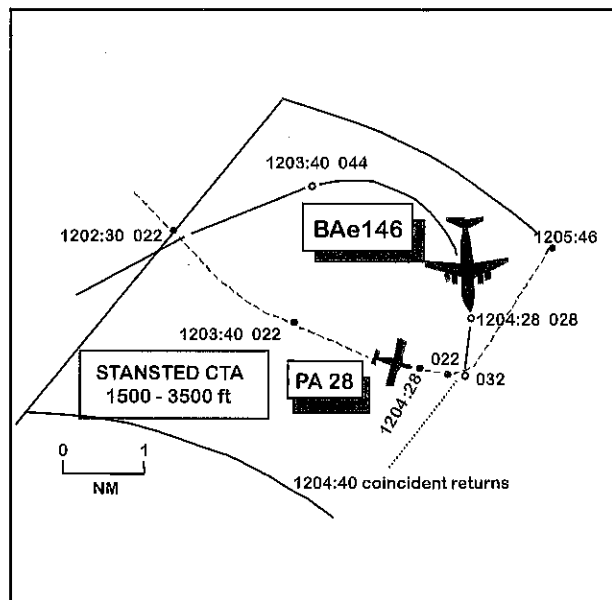
## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: Late sighting by both pilots.

## AIRPROX REPORT No 162/99

Date/Time: 7 Sep 1205  
Position: N5201 E0025 (10.5 NM NE Stansted)  
Airspace: CTA (Class: D)  
Reporting Aircraft Reported Aircraft  
Type: BAe146 PA28  
Operator: CAT Civ Pte  
Alt/FL: ↓ 2000 ft 2000 ft  
(QNH 1011 mb) (QNH 1011 mb)  
Weather VMC CLBC VMC  
Visibility: 10 km >5 NM  
Reported Separation:  
0 ft H/400 ft V // 500 ft V  
Recorded Separation: 1000 ft V



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

**THE BAE146 PILOT** reports that he was being vectored for the localiser for RW 23 at Stansted under the control of Stansted Radar. The visibility, 400 ft below cloud, was 10 km in VMC. When about 10 NM NE of the airfield and descending through 2400 ft (QNH 1011) at 200 kt, he saw a low wing single engined ac at his 2 o'clock 0.5 NM away as it tracked from R to L at about 2000 ft. ATC instructed him to climb immediately to 3000 ft, which he did, and the other ac passed about 400 ft below him. He thought there had been a medium to high risk of collision.

**THE PA28 PILOT** reports that he departed from Cambridge for Lydd with the intention of climbing to 2000 ft and routeing via Haverhill and Braintree. The visibility was over 5 km in VMC. He expected Cambridge Approach to transfer him immediately to Essex radar but they did not. After about 3 min he requested a frequency change to Essex and on first contact was told to 'standby'. A few min later he realised that he was positioned too far to the S of his intended route, so he turned towards the NE on a heading of 060° at 105 kt in order to keep clear of CAS. He then heard the pilot of another ac describing an ac he was avoiding and, on looking up to his L, he saw a high wing jet ac climbing about 2 NM away. Avoiding

action was not considered necessary as the other ac was already above him when he first saw it. It passed 500 ft above him with a low risk of collision.

**THE LATCC STANSTED INT DIRECTOR** reports, with RT transcript, that he was vectoring the BAe146 for the ILS to RW 23. The pilot of a PA28 called on the frequency (126.62) but was asked to 'Standby' while he dealt with other traffic under his control. He cleared the BAe146 to descend to 2000 ft and, as the ac was turning onto a closing heading for localiser, he noticed a return squawking 7000 tracking towards it at an indicated 2000 ft Mode C. This return, which was inside the Stansted CTA, had not been given a clearance to enter. He gave the BAe 146 avoiding action (UKAB Note (1): This was a climb to 3000 ft, using the correct phraseology) and traffic information. The BAe146 pilot reported visual contact with the other ac and advised that he would be submitting an Airprox report. The traffic was subsequently identified as the PA28 he had earlier instructed to 'standby'; its pilot was advised of the Airprox. The STCA did not activate.

**ATSI** comments that the Essex controller was late picking up the presence of the PA28 but he had his primary task to attend to and would not have been expecting unknown traffic above

1500 ft in the area. When he did notice the developing conflict he reacted well, providing avoiding action instructions and traffic information, thereby eliminating the risk of collision. STCA did not activate because the base of STCA coverage in this area is 2500 ft and the equipment will only activate if both ac are at 2500 ft or above. Following this Airprox, NATS TRD 1 Section recommended changes to the STCA coverage area. These recommendations have been accepted and the changes, including lowering the base of STCA coverage, were included in a system rebuild on 15 Feb 2000.

UKAB Note (2): A recording of the Debden radar shows the BAe146 making a RH radar circuit to RW 23 at Stansted. A 7000 return, believed to be the PA28, enters the CTA on a southeasterly track 11 NM NE of the airport at 1202:30, indicating 2200 ft Mode C. At 1203:40 the PA28 is about 3 NM due S of the BAe 146 as it descends through 4400 Mode C in a R turn towards the ILS localiser. By 1204:28 the BAe146 is indicating 2800 ft on a S heading with the PA28 at its 2 o'clock 008 NM tracking from R to L at 2200 ft. Twelve sec later the BAe146, having climbed to an indicated 3200 ft, passes about 400 m ahead and above the PA28 which has maintained 2200 ft throughout; minimum vertical separation as the ac tracks cross is therefore measured at 1000 ft. Following the incident the PA28 turns 90° L and exits the CTA 13 NM NE of Stansted at 1205:46.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The radar recording showed that the PA28 was displaying Mode C, and its track throughout the incident was clearly seen on radar before and after the encounter. Members were surprised, therefore, that the Stansted Director had not

spotted it earlier, but they accepted that workload was high and his priorities were probably directed elsewhere. Several members felt unhappy with the unqualified use of the term "standby" on the PA28's first call; they thought that to some inexperienced GA pilots this could often be mis-interpreted as tacit approval to enter CAS. Members felt that controllers should anticipate the possibility of such an eventuality and add a suitable precautionary phrase, such as "...and remain clear of CAS at all times".

GA members familiar with the area said that with the abundance of ground features available the PA28 pilot should have had no difficulty keeping to his planned route. In the event, his track made good diverged to the S to the extent that within 10 miles of his departure point, in good VFR conditions, he was already some 4 miles off track. As a lesson to others, members stressed the importance of accurate navigation and RT discipline in this complex and busy airspace. Moreover, they believed there was a tendency among some inexperienced GA pilots to abrogate navigational responsibilities once contact had been made under the umbrella of ATC. Noting the PA28 pilot's comment about the frequency change to Essex, members said that it was the pilot's responsibility to take the initiative and not rely on Cambridge ATC to tell him when to transfer. The PA28 pilot had not received a clearance from Stansted and, despite eventually recognising that he was S of his planned route, apparently remained unaware that he had entered Stansted's airspace. The Board concluded that the PA28's unauthorised penetration of the Stansted CTA took it into conflict with the BAe146 and caused the Airprox. Members assessed there had not been a risk of collision as the radar recording showed that vertical separation of 1000 ft had been achieved by the time the paths of the ac crossed.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Unauthorised entry of the Stansted CTA by the PA28 pilot.

### **AIRPROX REPORT No 164/99**

Date/Time: 8 Sep 0851

Position: N5422 W0009  
(15 NM SE of FAMBO)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado F3 BAe146

Operator: HQ STC CAT

Alt/FL: 23000 ft FL 230

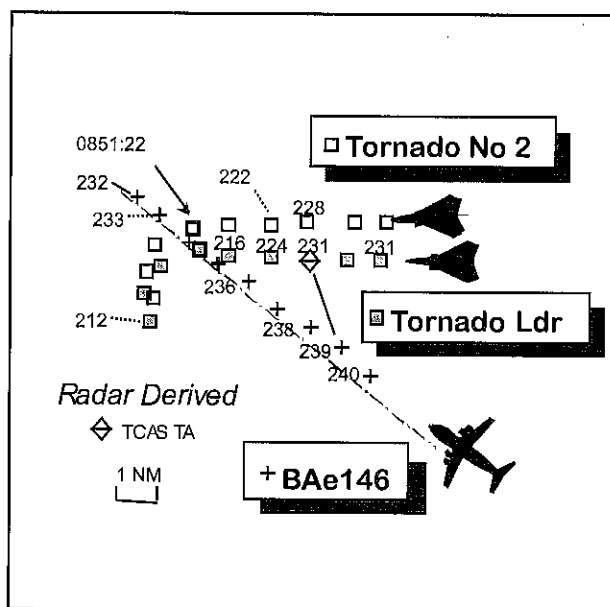
(RPS 1011 mb)

Weather VMC CAVOK UNK

Visibility: 30-40 km

Reported Separation: 3-500 ft V

Recorded Separation:  
@ 2 NM H/800 ft @ < .75 NMH/2000 ft



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE TORNADO F3 PILOT** reports he was the leader of a pair of F3s heading 270° at 400 kt, returning to a CAP station after a practice intercept. His formation was in receipt of an Air Defence Information Service (ADIS) from CRC Neatishead. Both ac were grey overall with HISLs illuminated. Another ac was first sighted slightly above the horizon at L 9 o'clock, range 1-1.5 NM on a converging heading of about 300°. The stranger was about 3-500 ft above his altitude in a gentle descent. He immediately descended his formation to 21000 ft, passing about 1000 ft directly below the other ac, whose crew took no apparent avoiding action. He believed that the risk of collision had been low, owing to the disciplined lookout and resultant avoiding action. However, he had received traffic information on a stranger about 2 minutes before the Airprox occurred and believed his formation had been co-ordinated not above

24500 ft against this traffic which he believed should have been at FL 260.

UKAB Note (1): When contacted, the company advised that the BAe146 pilot was unable to make a constructive contribution to the investigation and declined to file a report.

**ATSI** reports with an RT transcript that both the LATCC N SEA CSC and the Pennine Radar Controller described their respective workload as moderate. The N SEA CSC received a telephone call from RAF Neatishead at 0842, requesting co-ordination on military traffic, under its control, against the BAe146. The latter was tracking NW along UL 602 and at the time of the call was about 25 NM SE of SILVA, passing FL 270 in descent. The CSC told Neatishead that the flight was descending to FL 260 and would be transferred to Pennine Radar in the next 5 NM. Whether the Neatishead Controller misunderstood the BAe146's cleared level is not known but he told the CSC that: "....



will not be above er flight level two six zero against that traffic". The CSC reiterated the fact that the ac would be transferred to Pennine Radar who would clear it to descend inbound to Newcastle. In reply Neatishead asked if he could "co-ordinate those levels with you now". The CSC answered that FL 260 was a good level with him adding "but once he's transferred to Pennine I'm not going to know what they're going to do with that you know that don't you". The CSC said, at interview, he could not explain why he agreed FL 260, as that was the level occupied by BAe146. The following dialogue, an extract of the transcript of the telephone call between the N SEA CSC and Neatishead, then took place:

Neatishead: "I know they're going to want to descend it but yeah if you can not above er we'll not be above two s—(part word)".

CSC: "Yeah that's coor - it's co-ordinated with me".

Neatishead: "What's this level are you descending to again".

CSC: "Twentysix".

Neatishead: "Yeah we'll not be above two five zero".

CSC: "Okay".

The N SEA CSC did not believe that he had agreed co-ordination against the BAe146 once it had been transferred to Pennine Radar. Any co-ordination agreed was intended to be only whilst it was under the control of the N SEA Sector. In fact, the CSC was under the mistaken impression, at the time, that he had told Neatishead to co-ordinate directly with Pennine Radar. It was possible that he may have been preoccupied with finishing his conversation to continue with other tasks and did not assimilate exactly what he said.

At the time of the telephone call from Neatishead, the CSC explained that the N: Sea Sector was in the process of being handed

over. This involved four staff at the suite, as both the off-going and on-coming SCs had trainees. For this reason, he said, he did not involve the SC in the co-ordination process on this occasion. Usually he would have agreed a level with Neatishead and then informed the SC accordingly, who could have co-ordinated the flights with Pennine RADAR. (UKAB Note (2): The FPS for the BAe146 had not been marked to indicate that it was subject to co-ordination) The LATCC, AC, MATS Part 2, NOR 3-22, states that: "LATCC is to descend Newcastle and Teesside inbounds to FL 260 level 80 DME NEW VOR and transfer ac to Pennine Radar, released for further descent, otherwise a radar handover must be given. Pennine Radar will descend traffic out of UL602 to be FL 240 or below by FAMBO and provide radar advisory service until handover to the respective approach control". Because the CSC had no reason to believe that the BAe146, at FL 260, would conflict with the military traffic, he did not monitor the flight or mention it to the SC. The radar photograph, timed at 0847:11, shows the military ac operating close to the centreline of UL602, about 11 NM ahead of the BAe146. The latter was instructed to contact Pennine Radar at 0848.

The BAe146 crew contacted Pennine Radar and reported maintaining FL 260. The flight was given a change of squawk, in accordance with procedures and cleared to descend when ready to FL 140. The Pennine Controller believed at the time that he had requested the crew of the BAe146 to report leaving FL 260, but he did not actually do so. This was his usual method of operation and he used the call as a trigger to inform the ac that on passing FL 245 it would be outside CAS and, therefore, the ATC service would be changed to a RAS. The MACC, MATS Part 2, Page 2-11, states, with reference to ac descending from FL 260 in UL602, inbound to Newcastle and Teesside, that: "ATSOCA (Air Traffic Service Outside Controlled Airspace) is to be provided until handover to the respective ATSU". He commented that he could see military activity in the area but assumed that the BAe146 was maintaining FL 260 on UL602, because it had not reported leaving the level. Consequently,

he concentrated his attention elsewhere on the sector.

The Pennine RADAR Controller first became aware of the developing situation when the BAe146 crew reported, at 0850:50, receiving a TCAS TA on traffic at 2 o'clock at a range of 4 NM. When he turned his attention to the flight on his radar display, its data block was overlapping with that of the military ac to the extent that he could not see their levels. Using the trail history of the ac involved, he instructed the BAe146 crew to turn left for avoiding action, heading 280°. The radar photograph, timed at 0851:00, shows the BAe146 at FL 239 with two ac in formation to the N of it by about 2 NM. The nearest ac, squawking 2421, is at FL 231, the other, squawking 2422, at FL 228. The BAe146 does not appear to respond to the avoiding action and at 0851:10, the radar photograph shows the military ac about to pass just ahead of the BAe146 at FL 224 and FL 222 respectively, whilst the BAe146 indicates FL 238. At 0851:30, the Pennine Radar Controller asked the BAe146 crew to confirm their level, to which the pilot reported passing FL 232 descending to FL 140. In response, the Pennine Controller informed the pilot that he was now under RAS, the service he would have provided had he realised the ac was outwith the vertical limits of UL602 and had descended into Class G airspace. The Pennine Radar Controller believed that the STCA did not activate during the incident. However, local investigations reveal that a 52 second alert should have been displayed against the ac squawking 2421 and a 40 second alert against the 2422 squawk.

**HQ 11/18 GP ASSU** reports with an RT transcript that the Tornado pair were part of a 2v2 split-frequency sortie operating against another F3 and a Hawk, in the height block 5000 ft to FL 350. All ac were operating under a RIS below FL 245 and RCS at FL 245 and above. The controller of the Tornado pair, Weapons Controller 3 (WC3), was the senior of the 2 fighter controllers, the other being a student operating with an instructor. WC3 was responsible for carrying out co-ordination for both elements of the 2v2 sortie and was,

therefore, operating under a high workload in airspace where the traffic density was relatively high. The BAe146 was tracking NW along UL602 from SILVA under the control of LATCC N SEA Sector initially, prior to handover to Pennine Radar.

At 0838, WC3 initiated co-ordination with the N SEA CSC against the BAe146. The tape transcript reveals that during co-ordination the N SEA CSC pointed out on two occasions that the BAe146 would shortly be handed to Pennine for descent into Newcastle. It seems clear that the vertical separation co-ordinated against the Neatishead traffic was not passed on to Pennine, who unbeknown to the controller allowed the BAe146 to descend into conflict with the Tornado pair. The subsequent conflict was, in the event, less serious than might have been the case due to the prompt action of the F3 crew, which resolved the conflict of flight paths and the Pennine controller who ordered avoiding action following a TCAS alert call from the BAe146 ac.

It is significant that the Neatishead Fighter Allocator filed a Safety Occurrence Report immediately following this Airprox, as he was convinced that the N SEA CSC had broken co-ordination. The applicable regulation within JSP318A requires the agreement between controllers on a proposed course of action to be expressed in "unambiguous terms" during co-ordination. The transcript shows that this was far from the case.

Although it is clear that the Neatishead controller requested co-ordination rather than merely traffic information .....*"Co-ordination please..."* and later ...*"but can I co-ordinate those levels with you now?"* The N SEA CSC reluctantly agreeing to co-ordinate, *"Er you...you can (garbled) you probably can"...* provided the additional information that the track would be descending into Newcastle after handover to PENNINE. Following this verbal exchange WC3 was satisfied that co-ordinated vertical separation had been agreed, whilst the BAe146 was transferred to Pennine by the N SEA Sector without reference to any such agreement. Though both WC3 and the N

SEA CSC were busy, there were warning signs which both should have picked up. The initial reluctance of the N SEA CSC to co-ordinate due to the imminent transfer of the BAe146 to Pennine and the notified descent into Newcastle should have heightened the Neatishead controller's situational awareness, whose subsequent belief that no further co-ordination would be required was short sighted. Having agreed to co-ordinate vertical separation with Neatishead, however, the North Sea controller had an obligation to hand this co-ordination on to the Pennine controller; had he done so this incident would not have occurred.

Some years ago it was mandatory for co-ordination to be concluded with the exchange of the words 'co-ordination agreed' which acted as a final safety check to both controllers that they were happy with the agreement. This requirement was, at some stage, removed from JSP 318A and, presumably, the equivalent civil control regulations. On this occasion it is feasible that if these 2 words had been used at the end of the exchange between controllers both parties would have been aware of their agreed responsibility unambiguously or else mental "alarm bells" would have been activated. With their greater appreciation of the 'big picture' in terms of Airprox trends, the UKAB may therefore wish to consider whether the rate of occurrence of 'co-ordination ambiguity' in Airprox reports merits a recommendation that a simple, standardised, form of words for co-ordination agreement should be reintroduced.

**HQ STC** comments that although it is clear that Neatishead WC3 requested co-ordination, the N SEA CSC provided the additional information that the BAe146 would be descending into Newcastle after handover to PENNINE. Following that particular exchange, WC3 was satisfied that co-ordinated vertical separation had been agreed, whilst the N SEA CSC transferred one of the subject ac to another agency without any reference to it. Contrary to the requirements of JSP318A, the agreement between the 2 controllers on the proposed course of action was not expressed in unambiguous terms during co-ordination. To

that end, it appears that co-ordination was never actually agreed.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included a report from the pilot of the Tornado F3, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC, Air Defence and operating authorities.

It was apparent to the members that the co-ordination effected with LATCC N Sea CSC by Neatishead, at their behest, was open to considerable misinterpretation. Nonetheless, ATSI advised that such as it was the co-ordination was only effective whilst the BAe 146 was with LATCC N Sea Sector and the words used by the CSC "...it's co-ordinated with me", plainly signified this. The CSC had been very busy and wanted to progress other urgent tasks – a point acknowledged by the Board - but some members perceived that the same held true for the Neatishead WC3 controller who had endeavoured to avoid calling Pennine to escape going through the co-ordination process once more. Arguably, this was not required once operating in the Open FIR; once the BAe146 was clear of the UAS, Neatishead's responsibility would be limited to passing traffic information to the F3 crews under the ADIS.

In the event the BAe146 had been transferred from the LATCC N Sea SC to Pennine Radar, level FL 260 and it was Pennine who descended the ac out of the UAS, into Class G airspace. It seemed the Pennine controller had not spotted the Tornado F3s on radar when he issued this instruction, or, if he had, discounted the potential for a conflict with them. Moreover, the conflict continued to go unnoticed by the Pennine Radar controller until the BAe146 pilot reported a TCAS TA. One Board member, very familiar with this particular busy airspace, said Pennine should have expected to encounter DAT in the FIR. For whatever reason, the controller had not



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

**THE ATP PILOT** reports that on passing 1600 ft after departure from Luton on an OLY 1B SID, ATC instructed him to level off immediately due to unknown traffic 1000 ft above. He levelled at 1700 ft and shortly afterwards was cleared by ATC for further climb. The other ac was not seen.

UKAB Note (1): The foreign pilot of the LA4, routeing from Elstree to Dundee, went abroad after this incident and all attempts to make contact have failed despite repeated efforts by UKAB. Consequently, no report is available from the crew of the LA4, which is an amphibious ac with a single engine mounted over the fuselage.

**LUTON APR** reports that the ATP was released on an OLY 1B departure at 1158. There was no other traffic to conflict and the ac was transferred to LATCC TC NW on 119077. At 1159 the pilot of an LA4 called and an intermittent unknown return was seen about 3 NM SW of the airfield with the ATP climbing towards it. The LA4 was instructed to squawk 4661 and was then identified. Traffic information on the ATP was passed and avoiding action given, whereupon the pilot reported having the ATP in sight. Meanwhile, ADC had contacted LATCC TC to advise them of the unknown traffic; both ac then became visible to the Tower controller. Following the incident, the LA4 pilot was instructed to leave the CTZ on a northerly heading and reminded of the requirement to obtain an ATC clearance before entering CAS.

**LATCC TC** reports that the ATP pilot called on departure from Luton and was cleared to climb to 6000 ft. As the ac was passing through about 1500 ft, a radar return tracking N was seen in close proximity to it indicating 2400 ft Mode C. He instructed the ATP to stop climbing immediately and advised its pilot of the unknown traffic. At about the same time the co-ordinator took a call from Luton ATC asking for the ATP's climb to be stopped. The ac passed

abeam each other by 005 NM with 700 ft vertical separation.

UKAB Note (2): Pictures of the LATCC radar at 1158:22 shows the ATP passing 800 ft just after departure from RW 26 at Luton; at the same time a return believed to be the LA4, squawking 7000 and indicating 2400 ft, is tracking NNW 302 NM SW of the airfield. The ATP begins a L turn and at 115906 passes about 800 m to the W of the other ac on a southerly heading while indicating 1600 ft Mode C.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included a report from the pilot of the ATP, transcripts of the relevant RT frequencies, radar photographs and reports from the air traffic controllers involved.

The Board was disappointed at the lack of response from the LA4 pilot whose report could have added more substance to the investigation. As it was, members were left with an impression that the pilot's approach to flight safety was too casual. One member commented that a request from Luton by RT to the LA4 to telephone ATC after landing might have elicited the required action. On the basis of the information available the Group quickly concluded that the Airprox was caused by the unauthorised penetration of the Luton CTZ by the LA4. The Board commended the actions of all the ATCOs concerned which resulted in a minimal loss of vertical separation. The Board concluded that there had not been a risk of collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Unauthorised penetration of the Luton CTZ by the LA4.

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### AIRPROX REPORT No 166/99

Date/Time: 9 Sep 0918

Position: N5154 W0210 (Gloucester Airport  
- elev 95 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA28 Harrier

Operator: Civ Trg HQ STC

Alt/FL: 1100 ft 750 ft ↑

(QNH 1024 mb) (Rad Alt)

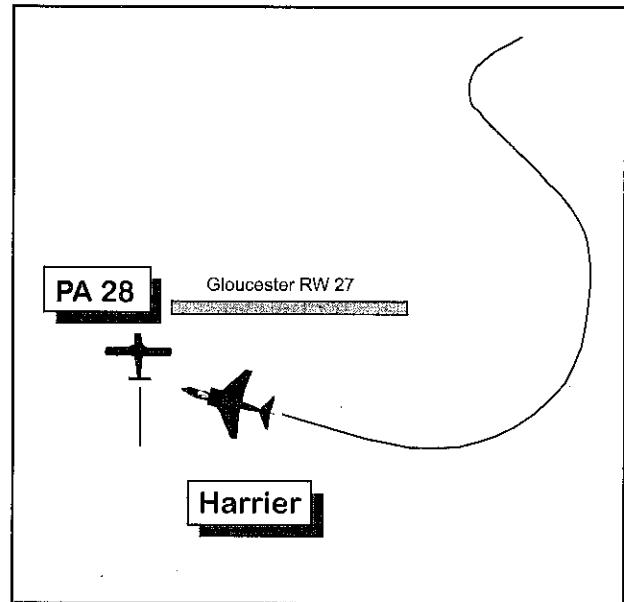
Weather VMC CLNC VMC CLNC

Visibility: 40 km Poor

Reported Separation:

100 ft/4000 ft H, 500 ft V

Recorded Separation: NK



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE PA28 PILOT** reports heading 360° at 95 kt, crosswind for Gloucester's RW 27 RH at 1100 ft, when ATC broadcast a warning and he saw a fast jet approaching from the NE. It turned steeply away to the SE and then circled right at low level. He then saw it, a Harrier, turn back towards the runway; as it reached the airfield boundary it climbed steeply and passed 100 ft behind and above him with a high risk of collision.

**THE HARRIER PILOT** reports flying a tactical LL sortie with a bounce; while manoeuvring hard to evade the bounce he mistook Gloucester town for Cheltenham and he inadvertently flew into the Gloucester ATZ. Visibility into sun was poor. He was heading 290° at 400 kt when he realised his mistake and ceased manoeuvring and climbed to exit the ATZ to the NW. He passed behind the light ac and levelled 500 ft above it; his HUD video

recording showed he passed 4000 ft behind it and 500 ft above it. He called Gloucester to identify himself and apologise for the incursion.

UKAB Note: LATCC radar recordings show the PA28 starting the crosswind leg from an overhead join as the Harrier pops up into radar cover, co-incident with it, at 1400 ft Mode C (1700 ft QNH). There is no discernible plan separation; it is certainly less than the 2/3 NM estimated from the HUD video. This may have been a slant range estimated before the PA28 passed out of the narrow field of view of the HUD camera.

**HQ STC** comments that this was a regrettable incident which occurred when the Harrier pilot, during a period of high cockpit workload, made a navigational error after evading a visual bounce. Having realised his error, the pilot made all efforts to recover the situation as expeditiously and safely as possible and called Gloucester Tower to identify himself.

The PA28 is clearly visible on the HUD video, from which the separation was assessed as approximately 4000 ft laterally and at least 500 ft vertically at 0918:14. Nevertheless, the potential for a collision was clear and the pilot of the PA28 was understandably concerned. The Harrier pilot has acknowledged his mistake and, in his commendably open and frank report, has apologised for any alarm that may have been caused.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic

controllers involved and reports from the appropriate operating authorities.

The Board commended the frank report from the Harrier pilot and agreed that the cause of the Airprox was his unauthorised penetration of the Gloucester ATZ following a navigational error. The miss distance was disputed but members could not see that any more than a general idea could be derived from the Harrier's HUD video unless the PA28 was 4000 ft right of track before passing out of the HUD picture. This was not supported by the Clee Hill radar recording or the PA28 pilot so members concluded that the miss distance was probably somewhere between the 2 pilots' estimates. However, both pilots had seen the other ac in time to avoid each other if necessary and the Board concluded that there had therefore not been a risk of collision.

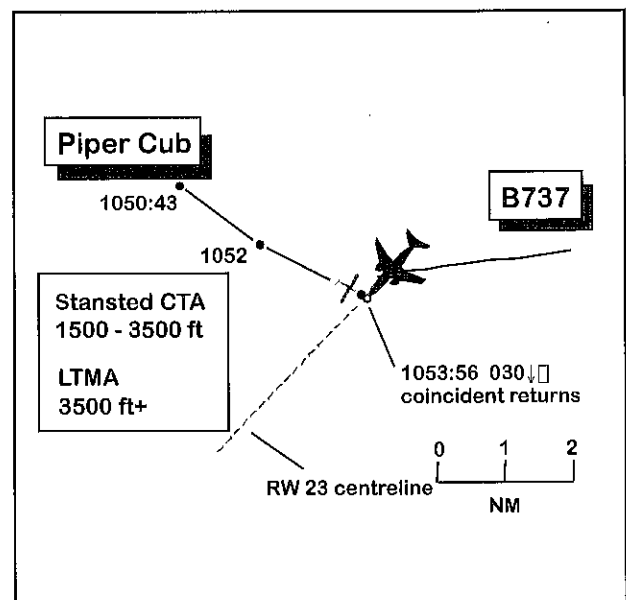
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Inadvertent penetration of the Gloucester ATZ by the Harrier pilot.

**AIRPROX REPORT No 167/99**

Date/Time: 11 Sep 1054 (Saturday)  
Position: N5200 E0025 (9.5 NM NE Stansted)  
Airspace: CTA (Class: D)  
Reporting Aircraft Reported Aircraft  
Type: B73 - 8 Piper Cub  
Operator: CAT Civ Pte  
Alt/FL: ↓ 2000 ft 3500 ft (QNH) (QNH 1015 mb)  
Weather VMC HAZE VMC  
Visibility: 5-10 km 5-10 NM  
Reported Separation: 200-400 ft V // 500 ft V  
Recorded Separation: zero lateral



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

**THE B737 PILOT** reports that as he was turning through a heading of about 230° and descending to 2000 ft to intercept the localiser for RW 23 at Stansted, he noticed a Piper Cub close at his 2 o'clock high position tracking from R to L. The pilot comments that despite being in VMC, he felt conditions were not ideal for VFR flight because of the hazy 5-10 km visibility. There was no time to take avoiding action and the ac passed 200 – 400 ft above and 100 – 200 m to his R. However, he did not feel there had been any risk of collision.

**THE PIPER CUB PILOT** reports that he had departed from Hinton for Clacton in VMC and was in contact with Earls Colne radio on 1220425. He was using a hand-held GPS to assist with navigation. His passenger, who was operating the radio, was a PPL and RT licence holder. The visibility was 5-10 NM. SSR was not fitted to his ac. When 3.5 NM NW of Wethersfield, cruising at 3500 ft (QNH 1015) and heading 120° at 80 m.p.h, he saw a B737 3-5 NM away below him. He immediately climbed but levelled off again after perceiving that the other ac would pass beneath him, which it did by about 500 ft; he was shocked to see it, but he thought the risk of collision had been low.

The pilot goes on to explain that he had misread his chart during planning and believed that by maintaining 3500 ft he would be above Stansted's CTA and therefore clear of CAS; he did not notice that the airspace above 3500 ft was designated LTMA. Thinking he was clear of CAS, it did not occur to him to call Essex Radar. He mentions that he had not yet obtained an RT licence and had accumulated only 70 hours total flying time. He apologises for his error and gives an assurance that he will concentrate on improving his flight planning and RT procedures.

**STANSTED ATC** reports that the B737 pilot made his initial call to ADC at 6 NM for RW 23 and reported seeing a light (Auster type) ac 150 ft above him. Nothing was seen on radar

initially, but soon afterwards a slow moving primary return could be seen about 1 NM NE of the B737 tracking ENE. The LATCC Stansted FIN controller and TC Group Supervisors were informed.

UKAB Note (1): LATCC subsequently reported that the primary return was tracked and found to be in contact with Earls Colne. The ac was transferred to the Stansted FIN Director's frequency (126.95) and its identity established.

**ATSI** comments that there were no ATC implications in this incident. The Cub was not squawking, so even if ATC had noted its primary radar return they could legitimately assume that it was below the base of the Stansted CTA. The Cub pilot did not contact Essex Radar until about 9 min after the Airprox had occurred, when he was overhead Earls Colne at 3500 ft.

UKAB Note (2): A recording of the Debden radar at 1050043 shows a slow moving primary radar return 10 NM NE of Stansted tracking SE. At the same time the B737 is 20 NM ENE of Stansted on a WNW heading descending through 4300 Mode C. At 1052 the B737 turns W to intercept the final approach RW 23 at Stansted with the primary return at its 12 o'clock, range 9 NM. At 1053, as the B737 intercepts the localiser passing 3000 ft Mode C (equivalent to 3054 ft on QNH 1015), the radar returns merge on the RW 23 extended centre line at 9.5 NM. Given the reported 3500 ft altitude of the Cub, vertical separation was therefore in the order of 500 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

GA members expressed concern at the pre-flight planning inadequacies which had caused the Cub pilot's entry into the LTMA. All the topographical charts clearly define the



boundaries of CAS in the area concerned, and members were at a loss to understand how he could possibly have mis-read them to the extent that he did. The big lesson in this incident was the importance of thorough pre-flight planning, particularly when negotiating airspace of such complexity as the LTMA. In this case, it was evident that the Cub pilot knew where he was but did not realise the significance of his actions because of a serious oversight. His consequential unauthorised penetration of the LTMA brought him into conflict with the B737 and caused the Airprox. Members noted that neither pilot had felt particularly threatened by the encounter, and radar information indicated that vertical separation was in the region of 500 ft. It was therefore concluded that despite the cause there had not been a risk of collision.

While he was by his own admission an inexperienced pilot, members wondered at the role of his PPL/RT qualified passenger, who was presumably there as a support and ought to have noticed and been able to alert his companion to the error he was making. GA members aired some concerns on the sort of problems which might arise from operating with hand-held GPS equipment. While this was undoubtedly an extremely useful and accurate aid, members stressed that GA pilots should not regard it as a substitute for map reading and normal navigational procedures and practices; one member wondered whether the Cub pilot was actually carrying a map in the ac. This was another watchpoint, of which less experienced aviators in particular needed to be aware.

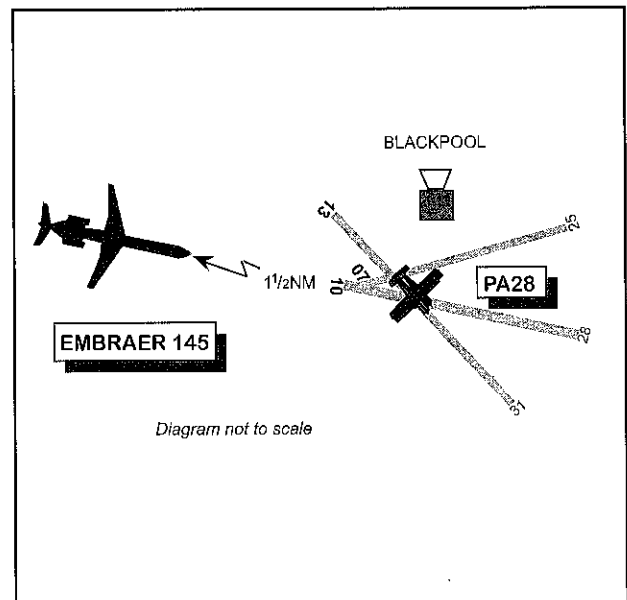
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Unauthorised penetration of the LTMA by the Piper Cub pilot.

**AIRPROX REPORT No 168/99**

Date/Time: 10 Sep 1351  
Position: N5346 W0302 (Blackpool Airport - elev 34 ft)  
Airspace: ATZ (Class: A)  
Reporter: Blackpool ADC  
Aircraft No 1 Aircraft No 2  
Type: EMBRAER 145 PA28  
Operator: CAT Civ Pte  
Alt/FL: ↓ 450 ft ↑ 0 ft  
(1022mb) (1022 mb)  
Weather VMC CAVOK VMC CAVOK  
Visibility: 10 20  
Reported Separation:  
1.5 NM H & 450 ft V  
Recorded Separation: Not recorded



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE BLACKPOOL AERODROME CONTROLLER (ADC)** reports that the PA28 was lined up on RW 13 holding for instrument traffic making an approach to RW 28. After this traffic had cleared, attempts to contact the PA28 on RT proved unsuccessful. In the belief that the PA28's radio had failed, the ADC issued a further instruction by 'White' Lamp Signal, which was also unsuccessful. Another controller was then dispatched in the ATC vehicle to escort the PA28 off the runway. However, as the vehicle vacated RW 13 onto RW 07 the PA28 departed, thereby crossing in front of the EMBRAER which was about 1 NM final to land on RW 10. After one circuit the PA28 landed on RW 13. It is reported that 'Purple' airspace was in force at the time.

UKAB Note (1): The controller who was dispatched in the ATC vehicle also submitted a supplementary report. She stated that the vehicle was pulled up adjacent to the PA28 and she gesticulated to the pilot to follow the vehicle. The pilot gesticulated back, she thought, in acknowledgement. Upon moving off down RW 07, anticipating that the PA28 would follow, the engine was heard to rev-up and it then took-off.

**THE EMBRAER PILOT** reports heading 100° at 140 kt on final to RW 10 at Blackpool. At about 4 NM, he thought, TWR issued a clearance to land. As he approached 1.5 NM from touchdown another ac took off from RW 13 and crossed the intersection with RW 10. The ac was called by the TWR but had apparently suffered a radio failure.

UKAB Note (2): The RTF transcript reveals that the EMBRAER reported at 3 NM and was cleared to land on RW 10 at 1350:40. It is apparent that the PA 28 took-off one minute later.

**THE PA28 PILOT** reports that after experiencing RT problems at start-up, equipment adjustments were made and headsets changed which 'appeared' to rectify

the problem. Following checks at the Holding Point, TWR instructed him to enter RW 13 and hold, because another ac would be executing a 'go-around' on RW 28. This ac was seen at 1500 ft but did not appear to make an approach. Whilst he waited for departure clearance ATC twice apologised for the delay, caused it seemed by an ac executing a missed approach. After about 10 minutes, a Land Rover drew up alongside, whose driver pointed forwards. He repeated the forward hand movement given, to clarify, he thought, that it was to take off. She repeated the movement vigorously, causing him to assume that there was an ac that needed to land behind him. Consequently, he applied full throttle and commenced a take-off run. On seeing the Land-Rover driver put her head in her arms he perceived a problem and considered braking, but in the belief that there may still be an ac landing behind him he continued the take-off run. Once airborne at 30 ft, he looked back and saw the EMBRAER landing on RW 10. He considers that, if he had braked, his ac would have stopped at the runway intersection.

UKAB Note (3): The RTF transcript reveals the PA28 was cleared for T/O at 1344:30, 5 minutes after he reported ready for departure, which the pilot did not acknowledge and may not have heard. Nevertheless, the T/O clearance was not subsequently cancelled over the RT. The PA28 subsequently completed a circuit and 1 go-around non RT before landing on RW 10. Once airborne in the circuit blind calls were made by the pilot, who did not apparently receive the broadcasts made by the ADC.

**ATSI** comments that the ATCO in the Land Rover was convinced that the actions taken would convey the correct meaning to the PA28 pilot. However, the pilot was still able to misconstrue their meaning and hence there must have been some measure of ambiguity. The ADC confirmed that it was a White lamp signal from the Tower but that in daylight it is not always easy to see. To facilitate easier understanding should a similar situation arise in future, a flashing follow-me sign is to be fitted to the ATC vehicle.

UKAB Note (4): Rule 46 of the Rules of the Air Regulations state that "White Flashes" ...to an ac on the aerodrome should be interpreted as "return to starting point on the aerodrome".

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

From the information presented it was readily apparent to members that this Airprox was the result of a combination of unusual circumstances. However, the fundamental catalyst was the apparent RT failure, either of headset or receiver, experienced by the PA28 pilot. GA members suggested that it was fortunate that nothing more serious developed, and pointed out several lessons emerging from the investigation of this Airprox. First was the danger of making assumptions. The vehicle-borne ATCO had assumed that a clear message would be conveyed when using hand signals for which no recognised standard form existed. Conversely, the PA28 pilot had assumed that he was being urged to take-off into the circuit without positive approval from the responsible authority, ie the TWR controller. Unfortunately, the PA28 pilot had not seen the 'White' light-signals from the TWR and clearly he did not understand the meaning that the controller in the Land Rover was trying to convey by hand-signals. Indeed, the PA28 pilot perceived an entirely different meaning to that intended and some members believed that he was led into this situation. Moreover, the T/O clearance transmitted at 1344:30, though not acknowledged by the PA28 pilot, was not rescinded. Furthermore, it was suggested that if ATC had done nothing he would not have taken off without a further clearance. GA members thought the PA28 pilot would have realised, eventually, that his RT problem persisted and would have expected him to taxi back to dispersal to have the fault examined. This was basic airmanship. But that did not

happen and in attempting to resolve the situation through the use of hand signals that were apparently inappropriate in this situation, the controller, acting with the very best of intentions, managed to confuse the PA28 pilot into doing perhaps the very thing that ATC was trying to prevent.

Further debate ensued about the best course of action in such circumstances, including the use of 'Red' light signals, parking the vehicle so as to obstruct a potential T/O or whether indeed an ATCO is empowered to give such hand signals. None of these altered the third big lesson that needs to be highlighted from this incident. There are no circumstances that would justify taking-off without two-way RT contact with ATC – especially when more than one RW is active. An ATSI advisor informed the Board that, subsequent to this occurrence the ATC vehicle has now been fitted with an appropriate 'FOLLOW ME' sign which should eradicate the potential for a recurrence. Members agreed wholeheartedly with the observation made by ATSI, that there had indeed been a measure of ambiguity in the hand-signals given, which allowed the PA28 pilot to misconstrue their meaning. Some members advised the board that the hand signal reportedly given by the controller was the same as the recognised one used by formation leaders to take-off. They acknowledged, however, that the PA28 pilot was unlikely to know that. According to GAD, no standard hand signal seemed to exist for this specific situation. Consequently, it would be inappropriate for the PA28 pilot to figure entirely in the cause of this most unusual occurrence. Moreover, members were in agreement that this event might be termed a reportable occurrence rather than an Airprox, since it was debatable, in the circumstances that pertained, as to whether the safety of the subject ac was indeed compromised. On balance, the Board finally agreed that this occurrence was a controller perceived conflict and that no risk of a collision had existed.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Controller perceived conflict.

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### AIRPROX REPORT No 169/99

Date/Time: 14 Sep 1447

Position: N5751 W0356 (Tain Range)

Airspace: Danger Area (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR C172

Operator: HQ STC Civ Club

Alt/FL: 600 ft  
(Rad Alt)

Weather VMC CLBC VMC

Visibility: 50 km

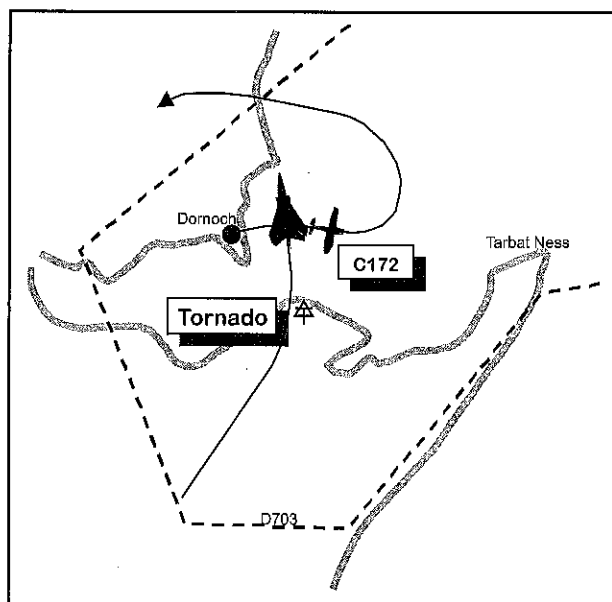
Reported Separation: 400 ft, 0.25 NM

Recorded Separation: NK

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

**THE TORNADO PILOT** reports that he had just made a shallow dive attack on Tgt 2 at Tain Range on a track of 035°, recovering into a climb to 600 ft and a left turn onto 355°, at 510 kt. As he rolled out he looked right and saw a light ac 400 ft above and 0.25 NM away in his 2 o'clock on an easterly heading. He continued straight on as the safest option. There was no risk of collision when he saw the other ac; however, had his recovery off the target been less positive there would have been a high risk. The ac did not appear to be in communication with Tain and was about 0.5 NM E of the target area.

**THE C172 PILOT** submitted a report on 26 Jan 00 having been abroad for much of the time since the incident. He was aware of the requirement to call Tain range on the way to/from Dornoch and had called on the way in. Before take-off from Dornoch he had tried to contact Tain but had had no reply. After take-off he completed his after take off checks, called



Tain passing 300 ft and was immediately told to clear the range. He was flying at 85 kt but could not remember his heading when he saw an ac in a left turn passing on his right 200 ft away. There did not appear to be a risk of collision when he saw it. (UKAB Note: The operator of the ac advises that the comms fit in the ac, as inherited, included a facility to enable passengers to listen to the RT. This appeared on occasions to impair the function of the RT and he was investigating the possibility of changing it.)

**HQ MATO** reports that the Tornado crew called the Tain Range Primary Range Controller (PRI) at 1443:19 on the Tain ICF. After passing their attack details (attack heading 035°), the crew then changed to the Range Primary Frequency 358.675, also manned by PRI, to join the range. At 1446:33, the C172 pilot free called the Secondary Range Controller (SEC) on 122.75. Using a different callsign from that used earlier on his way into Dornoch, he stated, “..outbound

from Dornoch to Inverness, I think we're heading towards Tarbat Ness. We request permission to route along Tarbat Ness back to the airport." SEC requested the C172 pilot to repeat his transmission; at 1446:55 he repeated his request to route Tarbat Ness/Inverness but did not repeat that he was airborne from Dornoch. Whilst this message was being repeated, PRI issued the Tornado crew a clearance to attack their target. At 1447:00, SEC asked the C172 pilot to "...say your position", to which the pilot replied, "We're one mile south of Tarbat Ness at present time." SEC then advised the C172 pilot "Roger, I've got three aircraft running in from the south at the moment, are you visual with them?" to which the C172 pilot replied "Negative." The Tornado's first attack was completed at 1447:20. Six sec later, the C172 pilot reported "One aircraft is right, at the present time" and, almost simultaneously, the Tornado pilot transmitted ".....there's a light aircraft just gone over the top of us at about one thousand feet." PRI then explained to the Tornado crew that the C172 pilot had only just called the range, while at the same time, SEC established the C172's altitude (1500 ft) and instructed the pilot to clear the range. The Tornado continued operations at and below 1000 ft until it was known the range was clear. The controllers first saw the C172 about 2 min after the incident, as it crossed the coast near Dornoch on a westerly track.

Range control at Tain is provided from 2 adjacent control positions, PRI and SEC, neither of which are radar equipped. PRI has executive control of ac in the range patterns while SEC deals with inbound ac on the ICF. SEC normally controls all VHF transit movements, although the transmissions are audible to both controllers. This task includes the routine co-ordination of range activities with movements at Dornoch airfield, liaising with PRI as necessary. During quiet periods, all frequencies can be bandboxed to the PRI position, as was initially the case in this instance, however the duties are split as soon as the range becomes active.

The UK AIP entry concerning Tain Range states "Aircraft wishing to use Dornoch or Fearn aerodromes during range operating hours are to contact Tain Range on 122.75 prior to entering the range." Both aerodromes are within the boundary of D703, Dornoch airstrip being 2.5 NM NW of the targets in use. About 45 min prior to the Airprox, the C172 pilot had called SEC whilst inbound to Dornoch and had been instructed to report overhead the town of Tain. No other RT calls were received however, but after several attempts to call the ac, SEC observed the C172 on the ground at the aerodrome. The next communication with the C172 pilot was the one at 1446:33, after the ac had become airborne and just prior to the Airprox.

Inverness is almost Due S of Tain Range and hence an ac routing from Dornoch to Inverness via Tarbat Ness, as stated in the C172 pilot's initial call, is almost certain to overfly the range target area. Although both controllers were listening to VHF, the significance of the C172 pilot's transmission went unregistered at the time. In mitigation however, the C172 pilot's subsequent position report "We're one mile south of Tarbat Ness at present time," which was passed about 25 sec prior to the conflict, places the C172 about 6 NM E of the target area. Combined with the known direction of approach of the Tornado (from SW), this would not therefore have indicated any imminent conflict. The C172 pilot had also used a shortened form of his c/s but had transposed the 3rd and 4th letters of the registration. Given the position of the Airprox however, it is clear that the C172 pilot's position report was incorrect and it is more likely that he was actually 1 NM S of Dornoch and heading for Tarbat Ness at the time. Had the C172 pilot called prior to departure from Dornoch and thus prior to entering the range, the range controllers would have had ample opportunity to co-ordinate the movements of both ac.

The C172 pilot's lack of full communication with the Range Controllers, both on his inbound and outbound flights, would appear to indicate a lack of adequate planning and/or awareness of the nature of activities within Danger Areas.

UKAB Note: Tain Range (EG D703) is nominated in ENR 5-1-3-23 as a danger area unauthorised entry to which is prohibited by Byelaws as stated in ENR 1-1-5-1 para 1.3.1.3; the relevant SI being 1940/684.

HQ STC comments that the workload for Tornado crews established in such a range pattern is extremely high and it is fortunate that, through good awareness and airmanship, a potentially serious accident was prevented. Why the civilian ac did not contact Range Secondary before departure from Dornoch is unclear but all operators, civilian and military alike, should be alert to the risks of flying in or through notified danger areas.

### **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members agreed that the Cessna pilot caused the Airprox by taking off into D703 without authorisation and flying into conflict with the Tornado. While the Cessna pilot had contacted Tain range before entering it, thereby satisfying

the letter of the instructions in the UK AIP, some shortcomings were evident; he had been asked to call passing Tain town but did not do so, nor did he actually receive permission to enter the range. Fortuitously he did not conflict with range traffic on the way in. Once on the ground at Dornoch, within the danger area, it was suggested to members that there was nothing written to say he should obtain permission before leaving the range. The Board rejected this argument believing that no pilot would be so insensitive to his safety as to interpret the rules this way, and that a take-off constituted a re-entry into D703. Indeed the pilot said he had attempted to call before take-off. However, his failure to follow instructions on the way in, the fact that he called so late after take-off and gave such a dangerously inaccurate position report led members to wonder if he knew his N from his S and question if he was competent safely to conduct the sorties to and from Dornoch. Some suggested that the appropriate authorities should be invited to consider expanding the wording in the Air Pilot for the benefit of flight safety and less experienced aviators, but the majority thought this was unnecessary.

Fortuitously the Cessna was well above the Tornado's flightpath and diverging from it and the Board agreed that in the event there had not been a risk of the ac actually colliding.

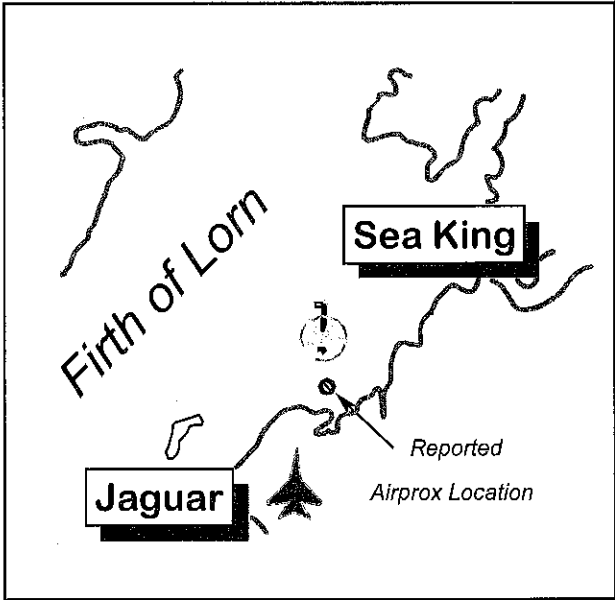
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Cessna pilot took off into D703 without authorisation and flew into conflict with the Tornado.

**AIRPROX REPORT No 170/99**

Date/Time: 15 Sep 1046  
Position: N5619 W0536  
 (11 NM SW of Oban )  
Airspace: LFS/Scottish FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Sea King Mk 6 Jaguar  
Operator: HQ FONA HQ STC  
Alt/FL: 200 ft 250 ft  
 (QNH 1011 mb) Rad Alt  
Weather VMC CLBC VMC CLBC  
Visibility: >10 km >10 km  
Reported Separation:  
 Nil H/200 ft V 200 yd H/400 ft V  
Recorded Separation: Not Recorded



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

**THE SEA KING (SK) MK 6 PILOT** reports heading 180° whilst transiting the Firth of Lorn at 95 kt. His helicopter colour scheme was camouflage grey; anti collision lights and high visibility forward floodlights were on, but HISLs are not fitted. Another ac was sighted at 2 o'clock on a northeasterly heading on the western edge of the Firth, which it was assessed would pass well clear. However, the crew immediately scanned for the wingman, which was then sighted by the P2 'dead-ahead' on a collision course at a range of 2 NM. The pilot initiated immediate avoiding action, descending rapidly to 100 ft asl Rad Alt. The other ac was identified as a Jaguar when it passed directly overhead 200 ft above the SK and opened rapidly to the north. The Jaguar pilot only appeared to take avoiding action after the jet had passed. The helicopter remained at an altitude of 100 ft until the crew was content that there were no further ac following the subject Jaguar. The transit was then resumed at an altitude of 200 ft.

**THE JAGUAR PILOT** reports heading 360° straight and level at 450 kt and the No 2 of a two ac formation flying at 250 ft Rad Alt, VFR, out of sun. His ac was camouflage grey; HISLs were on. The SK was first sighted at a range of 0.5 NM, at R 12' 30 and about 150 ft below his ac.

A climbing L break was initiated, but due to the relative proximity of the SK this did little to increase separation. He added that if no avoiding action had been taken, his ac would have passed 150 ft above the SK with 200 m horizontal separation.

UKAB Note (1): The Jaguar pilot perceived that the encounter occurred at 55° 55'N 005°21'W, within Loch Fyne some 45 NM SSE of the position reported by the Sea King crew and at a later time of 1055. As this Airprox occurred below the coverage of recorded radar, we are unable to resolve this anomaly.

**HQ FONA** comments that the Jaguar pilot's interpretation of what may have happened had he not manoeuvred are exactly as the SK reports events. It appears likely that the Jaguar pilot reacted instinctively when attention was drawn to the SK as it initiated its rapid descent, and it may well have manoeuvred upwards and to the left once past the CPA. Such encounters highlight the need for good look out when operating in the UKLFS.

**HQ STC** comments that both crews were participating in well briefed and correctly authorised missions and were relying on the principle of see-and-avoid as the primary method of deconfliction. The importance of disciplined and effective lookout has once again

been highlighted and timely avoiding action by both pilots averted a more serious incident.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The naval Board member reported that although this specific Sea King was not fitted with HISLs, a programme of retro fitment was now in progress to equip some but not all ac within the Fleet. This Airprox proved that the Sea King's camouflage grey is an exceptionally effective colour scheme for its operational environment. However, the use of HISLs for routine operations and training within the UK LFS could have improved the conspicuity of this helicopter significantly. This would benefit all airspace users, civil or military, in the low level environment where 'see and avoid' is the primary means of preventing collisions.

Turning to the difference of opinion on the Airprox position, STC informed the Board that the Jaguar was a two-seater and both members of the crew were convinced that it had occurred in the vicinity of Loch Fyne. However, the crew of four within the Sea King believed that it

occurred on the eastern side of the Firth of Lorn; they had been routeing to a specific point in the Firth, which is within their local operating area. On balance the Board thought the Sea King's version more likely, but this was largely irrelevant in the determination of the cause and risk in this encounter. Indeed, there was little to dispute in the geometry of the incident and the Board agreed that crews in both ac would probably have been unable to spot each other's ac any earlier than they did. Some members thought that 200 ft amsl was not a good transit altitude for a helicopter in the LFS and that 100 ft would provide a greater margin of safety, insofar as the helicopter crew should have expected to see fast jets at 250 ft. This observation was a matter of airmanship.

Weighing the information presented, members agreed unanimously that this Airprox resulted from a conflict in the LFS resolved by the prompt avoiding action of both pilots. The Sea King crew had seen the Jaguar at a range of 2 NM and in sufficient time to allow descent to 100 ft; the Jaguar pilot had also seen the helicopter and had effected an avoidance manoeuvre. Although this may have been an uncomfortable encounter for those concerned, the Board concluded there had not been an actual risk of collision between the two ac.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

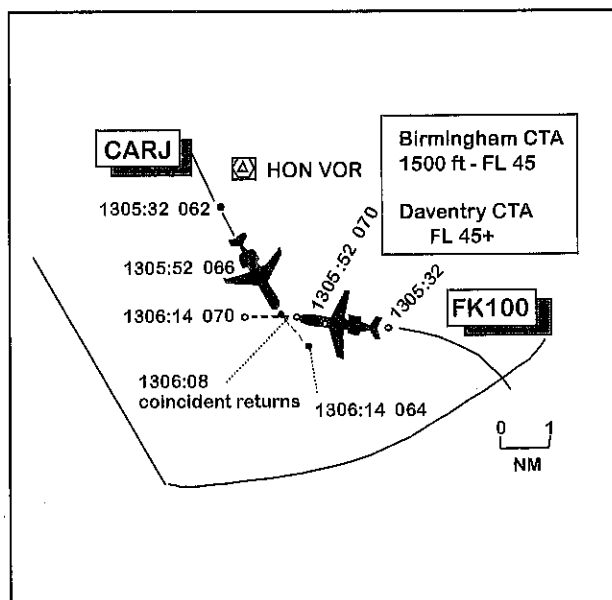
Degree of Risk: C

Cause: Conflict in the UK LFS resolved by both pilots.



## AIRPROX REPORT No 172/99

Date/Time: 17 Sep 1306  
Position: N5218 W0138 (3 NM SSE HON VOR)  
Airspace: CTA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: CARJ FK100  
Operator: CAT CAT  
Alt/FL: ↑ FL 140 FL 70  
Weather VMC CLBL VMC  
Visibility: 10 km  
Reported Separation: <1000 ft V  
Recorded Separation: 500 ft V



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

**THE CARJET PILOT** reports that after departure from Birmingham for Geneva on a COWLY 1E SID, he levelled at FL 60 heading 162°. On transfer to LATCC on 133.075 he was given clearance to climb to FL 140 with no speed restriction. Climb was initiated, and when on the 158°/7 DME HON radial a TCAS RA was received on an ac closing rapidly from his 1130 position at FL 70. The handling pilot followed the TCAS descent command and ATC were advised of the action. A Fokker 100 was then sighted 500 – 800 m away at 11 o'clock tracking L to R. A L turn was made to improve separation and the F100 passed overhead into their 4 o'clock position with less than 1000 ft vertical separation. ATC avoiding action instructions were received after the crew's actions were completed. He felt there had been a medium to high risk of collision.

The pilot comments that this was the first actual TCAS alert experienced by the crew outside the simulator. He wondered whether TCAS was fitted to the FK100 (UKAB Note (1): subsequent enquiries through the K100's company established that it was not). He also wondered what might have happened in IMC had neither ac taken avoiding action. He assumed that the other ac was working Birmingham ATC, and comments that Birmingham's CTA seems to be getting very busy these days.

**THE FK100 PILOT** reports that he was inbound to Birmingham at his cleared level and, as far as he could recall, following radar vectors to avoid weather. ATC told him that an outbound ac had climbed above its SID level, but he was not given any avoiding action instructions. The controller subsequently asked if he intended to file a report; after consultation between the crew it was decided that this was unnecessary.

**LATCC INVESTIGATIONS** report, with RT transcript, that the FK100 was inbound to Birmingham from Amsterdam. At 1259 the ac was transferred to Birmingham APC descending to FL 70, in accordance with the standing agreement. The Carjet departed from Birmingham on a COWLY 1E SID at 1303 climbing to FL 60.

A new SC took over the COWLY sector at 1303 and reported that he was organising his FPS display board when the Carjet called at 1305, levelling at FL 60. He did not notice the FK100, which was in its 11 o'clock at 8 NM crossing from L to R, and instructed the Carjet pilot to climb to FL 140. At 1305:41 the STCA triggered as the Carjet climbed through FL 63 with the FK100 not yet through its 12 o'clock and maintaining FL 70 at a range of 3.2 NM. At 1305:49 the SC tried to transmit avoiding action but crossed with the Carjet whose pilot announced that he had received a TCAS alert

and was turning L. The Carjet pilot was then instructed to descend to FL 60 and passed traffic information; he reported visual contact. (UKAB Note (2): the RT transcript shows that the controller's transmission indicated urgency, but avoiding action phraseology was not used).

**ATSI** endorsed the LATCC unit report.

**BIRMINGHAM ATC** reports that the CARJ had departed from RW 15 at Birmingham on a COW IE SID. The FK100 was inbound to Birmingham maintaining FL 70 on a heading of 270° to route through HON for a RH circuit to RW 15. As the CARJ approached FL 60 it was transferred to LATCC TC so that they could climb it once clear of the FK100. Shortly afterwards it was noted that the CARJ was climbing through FL 60 and into conflict with the FK100. The latter's pilot was given avoiding instructions and the CARJ passed behind the FK100 descending back to FL 60. LATCC advised that the TC controller had climbed the CARJ before realising that it was in conflict with the FK100.

UKAB Note (3): A recording of the Clee Hill radar at 1305:52 shows the Carjet tracking 160° about 2 NM S of HON and climbing through FL 66, with the FK100 in its 10 o'clock 3.2 NM tracking from L to R at FL 70. At 1306:05 the contacts merge but the Carjet's Mode C is not received at that time, however, the next reading, at 1306:14, after the ac have passed, shows FL 64. (SMF data indicates that the ac were at their closest at 1306:02 with lateral separation at 0.39 NM and vertical 200 ft. However, it should be noted that SMF recorded separation may differ slightly from the true separation because it is based on processed and predictive radar data).

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It was noted that this incident occurred shortly after the COWLY SC took over the sector, which prompted the Board to question the effectiveness of the handover he had received only a few minutes before. It was also noted that he was concentrating on his FPS display when the outbound CARJ called him and that he had immediately cleared the ac to climb to FL 140. Members wondered if he had referred to his radar at all before taking this action as the potential conflict would have been readily apparent. The Board concluded that the COWLY SC had caused the Airprox by climbing the CARJ into conflict with the FK100, which was known traffic.

Members carefully considered the information with regard to separation distances, noting that the outbound CARJ pilot reacted to a TCAS RA descent and had subsequently turned visually to increase separation; although the alert effectively deconflicted the ac, he still felt there had been a medium to high risk of collision. Contrary to his recollection, the FK100 pilot received an avoiding action turn L onto 240°, but this instruction was given only some 10 sec before the ac's paths crossed, and there was no discernible change to either ac's course. The COWLY SC's attempt to transmit avoiding action following activation of the STCA was thwarted by a cross-transmission from the CARJ pilot. Finally, the radar recording did not show the Mode C of the CARJ at the closest point, however SMF data suggested that the ac climbed to FL 68, thus giving only 200 ft of vertical separation; at the time the ac were less than 0.5NM apart. Although the SMF was based on predictive data, interpolation of the recorded radar information suggested that vertical separation was at best around 300 – 400 ft. Taking all these factors into account, the Board concluded that the safety of the ac had been compromised.

An ATCO member familiar with TC operations on this sector said that control of Birmingham outbound and inbound ac through the sector was split between two TC controllers, the COWLY SC working the COMPTON and COWLY outbounds and the WELIN SC, sitting a few feet away, handling the inbounds. An active

inbound strip on the FK100 should have been present on the COWLY SC's display board but for some reason he may have overlooked it. The ATCO member said that in his opinion it would be better in such circumstances for the (single) Birmingham controller to retain the outbound ac on his frequency and co-ordinate further climb clearance with TC against the inbound, subsequently transferring the outbound to TC only after the ac had passed each other. An ATSI advisor told the Board that

the LATCC and Birmingham MATS Pt 2 procedures were not completely in accord with respect to control of such traffic. While the Birmingham MATS Pt 2 clearly laid out the procedures to be followed in these circumstances, he felt that a review of the LATCC MATS Pt 2 was necessary in order to bring the two documents into alignment. The Director UKAB undertook to ask LATCC management to consider such a review.

**PART C: ASSESSMENT OF RISK AND CAUSE**

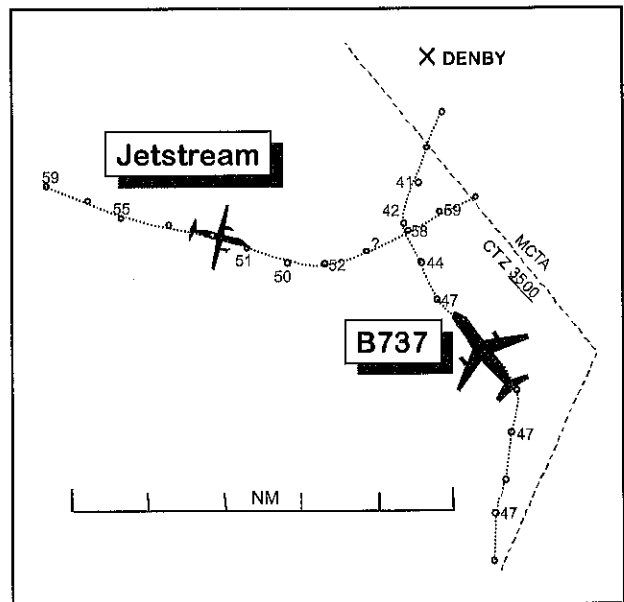
Degree of Risk: B

Cause: The LATCC COWLY SC climbed the outbound CARJ into conflict with known inbound traffic.

Observation: That the LATCC and Birmingham MATS Pt 2 entries on Birmingham inbound and outbound procedures should be aligned.

**AIRPROX REPORT No 173/99**

Date/Time: 20 Sep 1527  
Position: N5329 W0158 (2 NM S of DENBY)  
Airspace: Manchester TMA (Class: A)  
Reporter: Manchester Ribble SC  
First Aircraft      Second Aircraft  
Type: B737-200      Jetstream 41  
Operator: CAT      CAT  
Alt/FL: 4000 ft      FL 50  
                   (QNH 988 mb)  
Weather VMC CLBC      IMC IICL  
Visibility: 10 km  
Reported Separation:  
                   400 ft, 0.3 NM 700 ft, 1 NM  
Recorded Separation: 1500 ft V



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

THE MANCHESTER RIBBLE SC reports that the Jetstream pilot, inbound to Sheffield from the NW, advised of a sick passenger and

requested a direct route and descent for RW 10, requesting FL 40 by 15 NM from Sheffield. The ac was descended to FL 60 with a B737 heading N for a base leg to RW 24 at Manchester, working Manchester APR. He then saw the B737 level at FL 40 and cleared

the Jetstream to FL 50. Having advised the pilot to set the QNH (988 mb) he then saw it descend below FL 50 and confirmed with the pilot that his cleared level was 5000 ft. The pilot confirmed this and as the ac was still descending he passed avoiding action and traffic information. The pilot called visual with the B737, was subsequently cleared to 4000 ft and transferred to Sheffield.

**THE B737 PILOT** reports heading N at 4000 ft and 190 kt when he was cleared to turn left onto 270° and descend to 3000 ft. As he started to do this he was given avoiding action to turn right onto 050° and to maintain 3500 ft. During the turn he briefly saw conflicting traffic in his 9 o'clock about 5-700 ft above. It passed 400 ft above and 0.3 NM away; he considered the risk of collision was high and advised he would be filing an Airprox report. TCAS would have helped but was not fitted.

**THE JETSTREAM PILOT** reports heading E at 200 kt in a descent for Sheffield having informed Manchester of a medical emergency on board and been granted an expeditious routeing. He was cleared down to FL 50 and began a descent. Shortly afterwards he was passed the QNH (988 mb). When about to level in intermittent IMC at FL 50 he was asked to confirm that he was maintaining 5000 ft so he set the QNH, began adjusting his height, while advising that his last clearance had been to FL 50. At this point he was given avoiding action against an ac at 4000 ft inbound to Manchester; he climbed and turned left onto 030° and saw the traffic pass with 700 ft/1 NM separation. He considered the risk of collision was low. His ac was not fitted with TCAS. (The pilot added: 'Please note that the controller was very helpful in aiding our expeditious routeing with a medical problem'.)

**ATSI** reports that the Ribble SC had felt fit and adequately rested and the relevant ATC equipment was serviceable. The workload and traffic loading were both described as 'light'.

The B737 was being radar vectored from the south for a LH circuit onto the Manchester RW 24 ILS, by the Manchester SCMA 2 Final

Director. The Jetstream was inbound to Sheffield and in receipt of an area control service from the MACC Ribble Sector. Normally, such flights would route to leave CAS to the south of UPTON; however, on this occasion the pilot of the Jetstream reported a sick passenger and requested to route direct to Sheffield at 1520. The request was approved immediately; the controller pointed out that Manchester Airport was a closer option if the situation warranted it but the pilot declined a diversion.

The Jetstream was given descent, in stages, to FL 80. At 1524:00, the pilot of the Jetstream advised: "...we are aiming for a straight in on er runway one zero there so if we can be about er flight level four zero by about fifteen miles from Sheffield we really appreciate that." This transmission may well have been crucial because the 'R' controller took this request at face value. At the time, the Manchester QNH was 988 mb, which meant that the transition level in the Manchester TMA was FL 60. The Manchester transition altitude is 5000 ft, therefore FL 40 was not available within controlled airspace. Sheffield is outside controlled airspace, where the transition altitude is 3000 ft, so FL 40 (i.e. 3250 ft based on the Sheffield QNH 988 mb) would technically have been available once the flight left controlled airspace. However, in the NW quadrant, from which the Jetstream would be approaching, the Sheffield MSA is 3800 ft so Sheffield ATC should not have allocated FL 40 as an acceptance level. Unfortunately, the Sheffield RT recordings were not retained but the Manchester recording indicates that, at 1518, Sheffield allocated an appropriate level (FL 50) as an acceptance level when the Ribble Co-ordinator telephoned to co-ordinate the flight. At 1525, after the pilot of the Jetstream had requested the straight-in approach for RW 10, the Co-ordinator telephoned Sheffield once again and agreement was reached for the Jetstream to be accepted at 4000 ft QNH.

On its direct routeing, the Jetstream would pass through the Manchester RW 24 final approach track at a range of about 10 NM. It was clear to the MACC 'R' controller that, to achieve the

descent profile requested by the Jetstream, it would be necessary to integrate the flight with Manchester inbound traffic such as the B737. Accordingly, at 1524:20, the Co-ordinator telephoned approach to carry out the necessary co-ordination. It was agreed that the Jetstream could descend "...on top of..." the B737 i.e. that the 'R' controller could descend the Jetstream using Mode C to ensure at least 1000 ft vertical separation from the B737. The approach controller undertook to keep following inbound traffic clear of the Jetstream.

The B737 had established communication with the SCMA2 Controller at 1522:10. When the Ribble Sector Co-ordinator telephoned to co-ordinate descent for the Jetstream, the B737 was on left base for RW 24, heading 020° and descending to 4000 ft. At 1524:40, shortly after the B737 had vacated 5000 ft for 4000 ft, the Ribble 'R' controller cleared the Jetstream to FL 60. This was a procedurally safe clearance; however, a minute later, when the pilot reported approaching FL 60 for further, the 'R' controller cleared it to FL 50. This equated to an altitude of approximately 4250 ft and consequently would not provide the required 1000 ft from the B737 at 4000 ft. The 'R' controller then checked the QNH and made a quick calculation which showed that FL 50 was not available within controlled airspace. At 1526:10, he instructed the crew of the Jetstream to "...set the Manchester QNH nine eight eight." He hoped that they would infer from this instruction that they should only descend to 5000 ft but did not specify this. Subsequent events indicate that the crew did not make this interpretation and they descended to FL 50.

In the area where the Airprox occurred, the Mode C of ac at or below the transition altitude (5000 ft) is displayed as an altitude using 2 digits, whereas, above 5000 ft the Mode C is displayed as a flight level using 3 digits. When the 'R' controller cleared the Jetstream to FL 50, the B737 was level at 4000 ft so its Mode C would have been displayed as "40". As the Jetstream descended, its Mode C would have 'jumped' from FL 55 or 56 (055/056) to 5000 ft (50). The 'R' controller noticed the Jetstream continuing its descent below 5000 ft and asked

the pilot: "...confirm you're level at five thousand." The pilot responded: "... we will be level at five thousand ft c/s, stand by." Nevertheless, at 1526:50, the flight was instructed to make an 'avoiding action' left turn onto heading 030° and passed traffic information: "... traffic twelve o'clock at a range three miles a thousand below." 10 seconds later the traffic information was updated: "... right two o'clock range of two miles descending." The pilot reported the traffic in sight.

In the meantime, shortly after the B737 had been instructed to turn left onto heading 270°, to intercept the ILS, and cleared to 3000 ft, the SCMA 2 controller was alerted to the conflict by the activation of the STCA. At that stage, the Jetstream was about 3 NM WNW and 500 ft above the B737. The SCMA 2 controller issued an 'avoiding action' instruction to turn right onto heading 050° and advised that the traffic was 2 NM W at 4300 ft. The pilot sought clarification of his cleared level and was told to descend to 3500 ft. By 1527:10, standard vertical separation had been re-established and the B737 was instructed to continue the right turn onto heading 270° to intercept the ILS. The pilot reported seeing the other ac pass overhead. At the same time, the Ribble 'R' controller instructed the crew of the Jetstream to reverse their turn and roll out heading 110° and, a short time later, they were cleared to resume their own navigation direct to Sheffield. Examination of the radar recording shows that vertical separation reduced below 1000 ft when the flights were about 6 NM apart. The ac continued to converge and vertical separation reduced to a minimum of 300 ft when the ac were about 2 NM apart; thereafter, vertical separation increased rapidly and standard vertical separation was restored when the ac were about 1 NM apart.

Clearing an ac to a flight level below the relevant transition altitude is an elementary error. The Ribble 'R' controller gave assurance that he was familiar with altimeter setting procedures. However, he was not often required to exercise this knowledge. On the day in question, he thought that he had

developed a 'flight level mind set'. This was reinforced, or possibly prompted, by the pilot of the Jetstream requesting descent to FL 40. The 'R' controller went on to explain that, apart from traffic inbound to Liverpool and Hawarden, Manchester area controllers are seldom required to descend ac to altitudes. Both the QNH and the Minimum Stack Level, (MSL - "the lowest whole flight level giving a minimum of 1000 ft separation above the transition altitude"), are displayed on the sector, however, the controller thought a reminder that the atmospheric pressure was relatively low at handover and a strip showing the transition level, in addition to the MSL, would have assisted in preventing his error.

The controller also mentioned that, following the Airprox, an SCMA controller came and stood behind him to enquire, in fairly forthright language, what was going on. He had found this distracting at a time when he needed to gather his thoughts in order to recover the situation. This was the second recent example of a controller in an operational position being distracted from his primary task by another controller wishing to discuss a potentially contentious issue which would be better resolved by personnel not in operational positions. (See Airprox Report 152/99).

The ATSI Human Factors specialist concluded that a major factor affecting the controller's performance in this incident was the fact that he was mentally "set" to think in terms of Flight Levels rather than altitudes, so much so that the significance of the low pressure setting did not register until the conflict was happening. Even then, the instruction given to the pilot in an attempt to resolve the conflict lacked completeness and clarity. The controller was clear regarding his intention but did not make this apparent to the pilot. On balance, it seems likely that the predisposing factors had the most significant effect on his performance although his efforts to facilitate the progress of an ac carrying a sick passenger may have served as something of a distraction and rendered him less focused on the task than he might otherwise have been.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members agreed that had the Ribble SC followed his instruction to the Jetstream pilot to set the QNH with a further instruction to "*descend to 5000 ft*" the incident would not have happened. Therefore they concluded the cause of the incident was that the 'R' controller descended the Jetstream into conflict with the B737. At the same time, a controller will not usually pass a QNH to a pilot in a descent without assigning an altitude to go to, and so the Jetstream pilot, who had time to query the controller's intentions, might reasonably have been expected to ask for clarification.

The Board discussed the 'low QNH' issue and the whole subject of a transition altitude low enough to be a factor to a terminal controller. Members were advised that the subject was under review anyway and agreed that checking the QNH should be a fundamental part of any controller's handover/takeover process. Controller members did not see a need to suggest a specific FPS to show a low QNH.

Fortunately the Ribble SC and the SCMA2 noticed the problem and reacted commendably quickly to the STCA. The Board agreed that their respective actions and the pilots' responses had been in time to remove any risk of the ac actually colliding.

The Board also considered that to remonstrate with a controller in an operational position was an error of equal magnitude to the Ribble SC's. While the latter was an honest mistake by a professional controller, the remonstrations were a deliberate and very unprofessional act.

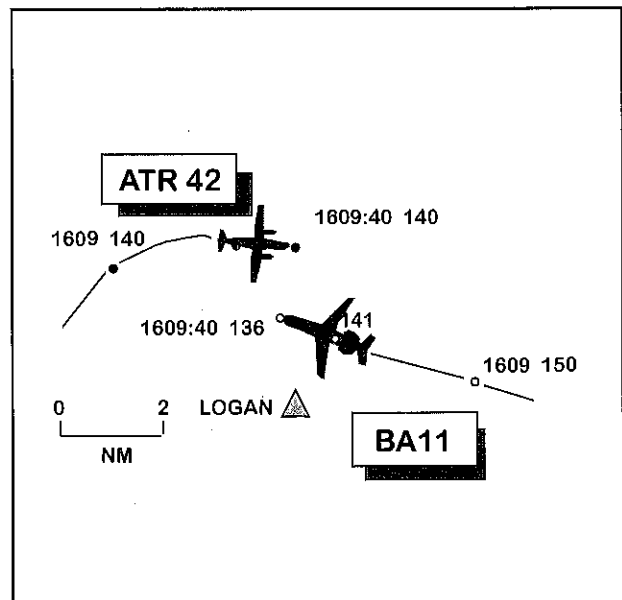
## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Ribble SC descended the Jetstream into conflict with the B737.

### **AIRPROX REPORT No 174/99**

Date/Time: 24 Sep 1610  
Position: N5148 E0137 (2 NM N LOGAN)  
Airspace: Airway (Class: A)  
Reporter: LATCC  
First Aircraft      Second Aircraft  
Type: ATR42              BA11  
Operator: CAT              CAT  
Alt/FL: FL 140              ↓ FL 130  
  
Weather      VMC              VMC  
Visibility: Not given      Not given  
Reported Separation:      1 NM/500 ft  
Recorded Separation:      1.5 NM/@400 ft



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE LATCC TC (SABER) SC** reports, with RT transcript for 129.6, that he was mentor to a trainee in a very busy weather-avoiding situation, with a flush of Heathrow inbounds which necessitated implementation of the holding pattern at BRASO. While engaged in inter-sector telephone co-ordination, his attention was drawn to a confliction when the STCA activated red on the labels of his ac, an ATR 42 routing to Rotterdam from Gatwick at FL 140, and a BA11 tracking W to the NE of LOGAN. His trainee immediately gave appropriate avoiding action instructions to the ATR whose pilot complied, advising that he had the other ac in sight. The ac passed each other with an estimated 1.38 NM lateral separation. After they had passed, he relieved his trainee, cleared the ATR to climb to its cruising level and transferred it to its en-route frequency.

**THE LATCC TC (DAGGA) SC** reports that the BA11 pilot called descending to FL 180 towards

LOGAN. He cleared the ac to FL 130 and then turned his attention to various co-ordination tasks. He became aware of a confliction when he heard the SABER SC giving avoiding action instructions to the ATR. He immediately instructed the BA11 to turn L heading 180° for avoiding action but quickly amended this to resume normal navigation towards CLN as it was apparent that the confliction had resolved itself. The ATR was working the SABER sector on a non-standard route to the S side of the danger area (D138) and he had not expected it to be in the LOGAN area at FL 140.

**THE ATR 42 PILOT** reports that he was outbound from Gatwick to Rotterdam and was cleared to route direct to REDFA at FL 140 after completing weather avoidance. His speed was 210 kt. About 1 min later he was given an avoiding action L turn onto 050°. He complied, with the autopilot disengaged, and the other ac – he thought it was a Fokker F100 – passed

about 1 NM away on the starboard side 500 ft below.

UKAB Note (1): The pilot of the BA11 could recall nothing of significance about the event and therefore did not submit a report.

**ATSI** reports that the AIRPROX occurred in Class A LATCC TC East sector airspace in the vicinity of LOGAN. TC East is a multi-layered sector up to FL 245 situated to the E of Lambourne and divided into two parts: the Saber sector, which mainly handles ac inbound to the LTMA, and the Dagga sector which handles outbounds from Birmingham, Coventry and the LTMA, and inbounds to Stansted and Luton via LOREL. It was introduced in early 1998 in response to the increasing demand being placed on the AC CLACTON (CLN) sector. The ATR 42 was working the TC East Saber sector and the BA11 the TC East Dagga sector. The manning level was 1 sector controller on Dagga and 1 sector controller with a controller under extension training on Saber. There was no co-ordinator.

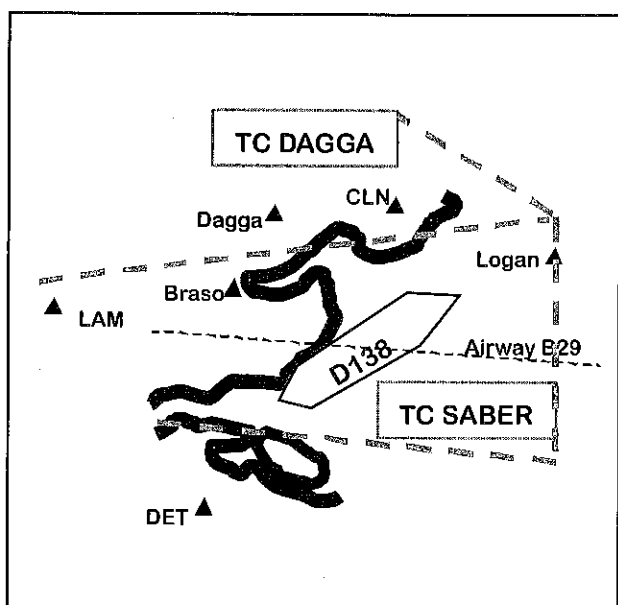
Air traffic operations were being affected by extra workload being generated by ac needing to avoid weather. Although the appropriate reduced rate flow regulations were in force, TC Saber sector was handling a heavy demand inbound to London Heathrow which had necessitated stack switching to be employed and also holding at BRASO. This is an intermediate holding point 20 NM before LAM which provides extra holding capacity at higher levels.

The ATR42, en route from Gatwick to Rotterdam, was handed over to the Saber sector to the E of Danger Area EGD138 at 1558.30 and was instructed to continue on its radar heading. At 1600:40 the pilot was instructed to climb to FL 130 and at 1602 he requested a L turn onto heading 050° to avoid weather, which was approved. At 1604 the controller enquired of the pilot when he would be able to take a R turn and also issued him a clearance to climb to FL 140. At 1604.30, the pilot confirmed that he would need another 20 NM on the heading before turning R. At

1606:30 the pilot was instructed to route direct to Haamstede, a VOR near Rotterdam, when he was clear of the weather; at this point the ac was in the middle of the Saber sector and moving towards the northern boundary. At this time the BA11, from Cologne to Stansted, reported on the Dagga sector frequency in accordance with normal practice, level at FL 180 and routing direct to CLN. The controller immediately instructed its pilot to descend to FL 130.

At 1607.50 the Saber controller again requested confirmation from the ATR 42 pilot that he was turning for Haamstede; the pilot responded that they would need another 10 NM on the heading of 050° before turning, and he reported doing so a min later. The ac was now close to the boundary between the 2 sectors and converging with the BA11.

At 1609.30 the Saber controller issued avoiding action instructions to the ATR pilot, without traffic information. This was acknowledged and 20 seconds later the pilot reported that he had the conflicting traffic in sight. Simultaneously the Dagga controller also issued avoiding action, without traffic information, to the BA11 pilot, followed immediately by amended instructions to continue towards Clacton as the confliction had by then passed.





The LATCC TC MATS Part 2 states that the route for Gatwick outbound ac via CLN is through Detling and northeast to DAGGA, so as to assist separation between ac inbound to the LTMA via the LAM holding area; this route passes to the W and N of Danger Area EGD138. Ac normally pass through the control of TC SE, TC LAM and TC Dagga, to whom it may be handed on a radar heading against traffic which may be unknown to the Dagga controller. Any change to the ac's clearance may only be effected after co-ordination with TC LAM or when the ac is in TC East airspace. TC Dagga is also required to co-ordinate any climb above FL 170 in Saber airspace.

The FPS distribution on TC East for a Gatwick departure via CLN is one CLN strip, which is retained by Dagga as the sector which works the ac after having warned Saber sector of its presence. This necessitates Saber controllers retaining in their memory agreements reached in the joint management of the TC East sector.

In the case of Stansted inbounds, the MATS Part 2 states that ac are handed to Dagga sector by the CLN sector routeing LOGAN - Clacton - ABBOT. These ac, which cut through the corner of the Saber sector, are descending to FL 180 to be level by LOGAN, and are released for descent to FL 130 subject to co-ordination with TC Saber. It is also stated that it is the responsibility of the Dagga controller to separate LOREL inbounds from all LTMA outbounds.

The controllers concerned agreed that in the case of Gatwick outbound ac to Rotterdam cruising at FL 150 and below, it is common practice not to follow the MATS Part 2 procedures; this was confirmed in the Watch Manager's report. As soon as TC East become aware that one of these ac is airborne, the requisite co-ordination is agreed, including appropriate information to Dagga sector. The ac is routed from Detling to the S of EGD138 to intercept B29, and thence E until able to route direct Haamstede; this also has to be approved by AC CLN. The ac is retained under the control of the Saber sector and, under normal

circumstances, should never come into conflict with inbound ac descending towards LOGAN.

On the day of the Airprox, arrangements were made for the ATR to follow the non-standard routeing. However, ac were also requesting weather avoidance headings and the ATR pilot, having requested a heading of 050°, started to go towards the northern boundary of the Saber sector. By the time the ac turned E towards Haamstede at FL 140, it was just short of the Saber/Dagga boundary. On the new heading it conflicted, unexpectedly, with the BA11 which had been cleared to descend to FL 130 by the Dagga controller.

The controllers also agreed (again confirmed in the Watch manager's report) that the requirement for the Dagga controller to co-ordinate with Saber all traffic descending in Saber airspace below FL 180 via LOGAN was also largely ignored. Instead, it is the practice to check thoroughly on the radar for potential conflicts and then descend the inbound ac. The Dagga controller said that when he issued the descent clearance to the BA11 he did not see the ATR on radar, although he did admit it may have been obscured by other traffic. He also stated that he would have expected the Saber controllers to have warned him that the ATR was straying to the N of the expected track. The Saber sector mentor agreed that he would have taken the same action but that he would have checked the radar thoroughly before issuing descent instructions.

Workload and manning levels were discussed with the sector team. The Dagga controller stated that his workload was medium to high and although there were only 2 ac on frequency at the time of the Airprox there had been a peak shortly beforehand. He was also of the opinion that, in the circumstances pertaining that afternoon, there should have been a Co-ordinator in position. The Saber trainee stated that she was working hard but did not really have time to manage all tasks. She has held a Certificate of Competence on TC South, which abuts TC East, for 5.5 months but she has only just started training on TC East. She was controlling the traffic whilst her mentor

performed all the co-ordination tasks. The mentor agreed that was the way they were operating but was not sure whether having a co-ordinator would have significantly reduced their workload. He also expressed doubt as to whether by having more time to devote to monitoring the trainee he would have prevented the Airprox. Examination of the RT recording does suggest, however, that he was not fully aware of everything that the trainee was doing.

The ATSI report recommends that action should be taken either to require staff to adhere to the MATS Pt 2 or, if appropriate, the MATS Pt 2 should be amended to reflect current practice. It also recommends that the FPS distribution on the TC East sector should be reviewed so as to support sector staff more fully in their control task.

UKAB Note: A recording of the Debden radar at 1609 shows the BA11 tracking about 280° and descending through FL 150 4 NM E of LOGAN. At the same time the ATR42 is beginning a R turn from a NE heading and maintaining FL 140 5 NM to the NW of LOGAN. At 1609:30 the BA11 is indicating FL 141, still descending, with the ATR42 now tracking due E at its 1 – 1:30 position at 3 NM. At 1609:40 the ac pass starboard to starboard 2 NM N of LOGAN at a distance of 1.5 NM, with the BA11 indicating FL 136.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

An ATSI adviser told the Board that the incident resulted from the DAGGA SC's uncoordinated descent instruction which took the BA11 into conflict with the ATR42 in SABER's airspace. Members concurred that this was the cause of the Airprox. Given the separation distances of around 1.5 NM and 400 ft, as shown on the radar recording, the Board concluded that there

had not been a risk of collision. The adviser added that had the DAGGA SC checked with SABER before descending the BA11, as was required by the MATS Pt 2, the incident would probably have been avoided. Furthermore, a significant contributory factor was that neither the DAGGA nor SABER SC was operating wholly in accordance with the MATS Pt 2 or even within the terms of the unofficial procedure they had adopted. This, in conjunction with the unpredictable manoeuvres of ac avoiding weather, caused a conflict to occur where it was not expected. This incident brought to light a significant divergence between operating practices and written procedures which has now been addressed through an Operational Notice (OPNOT) at LATCC TC.

Despite the SABER mentor's assertions to the contrary, members felt strongly that under the given circumstances a co-ordinator should have been in position. It was noted that this incident bore some similarities to another Airprox (127/99) in which the question of manning levels and split sectors had been a contributory factor. As a result of that incident, a recommendation was made and accepted – to consider a review of arrangements and guidance on how to decide when sectors should be split. An ATCO member pointed out that manning arrangements often depended on the availability of suitably qualified staff. The Director said that he would draw NATS attention to these matters, but it would be for NATS to decide if some general guidelines would be useful.

Few were happy that the SABER mentor had carried out coordination duties on behalf of his trainee, thus leaving her to perform the control function without the necessary supervision. Members felt strongly that a mentor's sole task should be to oversee his trainee's actions, particularly under the adverse conditions which prevailed here. Had the SABER mentor been fully attentive to his busy trainee he might have spotted the unusual situation developing and been able to alert the DAGGA SC to the ATR's position.

The Board endorsed the ATSI recommendation that the provision of FPSs on the TC East sector should be reviewed so that strips are available on the both SABER and DAGGER display boards. As well as acting as a reminder to both controllers, this would dispense with the need for one or other of the SCs to rely on memory alone.

Post-UKAB meeting Note: The LATCC TC OPNOT 112/99, dated 3 Dec 1999, reads as follows:

Following an incident on TC East where a LRL 1D arrival was descended by TC DAGGA

without co-ordination with TC SABER, this OPNOT has been produced to remind TC EAST controllers of their responsibilities.

When CLN S14 transfers a LRL 1D arrival to TC DAGGA descending to the standing agreement level of FL 180 level LOGAN, TC DAGGA will not turn this traffic south of the initial track or descend below FL 180 unless co-ordinated with SABER.

If TC DAGGA has not co-ordinated descent with TC SABER, then descent should not be given until the SABER/DAGGA sector boundary.

**PART C: ASSESSMENT OF RISK AND CAUSE**

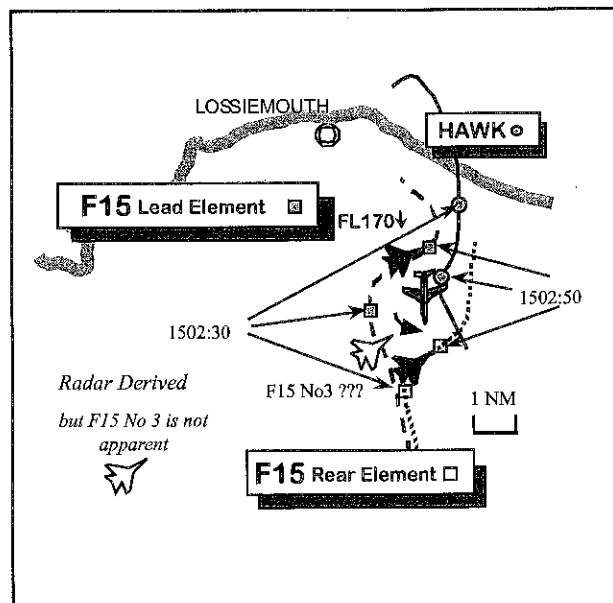
Degree of Risk: C

Cause: The DAGGA SC descended the BA11 into conflict with the ATR 42.

Observation: 1. UKAB endorses the ATSI recommendation on FPS distribution on the TC East Sectors.

**AIRPROX REPORT No 175/99**

Date/Time: 27 Sep 1503  
Position: N5737 W0310 (7 NM SE of Lossiemouth - elev 42 ft)  
Airspace: Scottish FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Hawk T1A F15E  
Operator: HQ STC Foreign Mil  
Alt/FL: FL 123↑ FL 160  
Weather VMC CLAC VMC CAVOK  
Visibility: 10 km >30 km  
Reported Separation: 200 ft V/50 ft H/UNK  
Recorded Separation: 0.5 NM H Rear F15



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE HAWK PILOT** reports that he was climbing out from Lossiemouth at a TAS of 398 kt and about 2000 ft above an altostratus layer, with good visibility above. His ac was black in colour; landing lights and HISLs were on. He was in receipt of a RIS he thought from Lossiemouth Departures and although the assigned ScATCC (Mil) squawk was selected with Mode C, the transponder was apparently unserviceable, as he had recycled it several times to no avail. He had been advised of a stranger, he thought at a range of 10-12 NM, away to his R, but had been instructed to turn R for identification. Whilst continuing to recycle the transponder he felt 'uncomfortable' at heading toward the stranger which he could not see and consequently requested a L turn back toward his desired heading which was approved. Whilst turning L through S, looking into sun and climbing through about FL 123, he thought, an F15 was sighted at a range of 0.5 NM on a reciprocal heading with little or no displacement. He immediately overbanked and pulled down whilst observing vortex trails off the F15's wing tips, which he thought indicated an aggressive pull-up by its pilot. The F15 was in sight for 1-2 seconds at most and he believed that a high risk of collision existed.

UKAB Note: The RAF FLIP FPD Section 4, UK National Procedures para 7, which was extant at the time of the Airprox, stipulates that the carriage of Mode A & C is mandatory for all flights within UK airspace operating at and above FL 100. Should the transponder fail after departure, then flights operating as OAT "*...may continue to operate.... when not to do so would seriously inhibit the flying task*". Furthermore, "*...pilots should seek a radar service compatible...*" with their task.

**THE F15E FORMATION LEADER** reports leading a 4-ship Box formation with 2 NM spacing between ac. The formation was flying VFR at 450 kt, northbound at FL 160 and approaching Lossiemouth from the S. They had just been switched from one ScATCC (Mil) frequency to another, which facilitated direct co-

ordination with another flight of F15s that they were designated to operate with to the N. of Tain Range. Upon rolling out of a turn, he thought L, onto N, the Nos 2 & 3 overflew a Hawk ac by about 500 ft. The formation No 3 passed closest to the Hawk, which aileron rolled and continued southbound. There was a slight horizontal offset, which the crew could not quantify, and a minimum of 500 ft vertical separation. No traffic information had been received from ScATCC (Mil) prior to the occurrence and both F15 crews sighted the Hawk at a late stage leading them to conclude that there was a medium risk of a collision.

**HQ MATO** reports with relevant RT and landline transcripts, that Lossiemouth Departures (DEPS), which was manned by a trainee controller and mentor, had observed a northbound ScATCC (Mil) track (the subject F15 formation) about 35 NM S of Lossiemouth indicating FL 240, just before the Hawk departed. DEPS traffic loading was light. When the Hawk departed from RW 05 at Lossiemouth, it turned R onto 175° and was climbing to FL 240; its pilot called DEPS and requested a RIS. The Hawk was displayed neither on primary nor secondary radar, even after recycling the transponder. So the pilot was asked for his TACAN range and bearing from Kinloss, there being no TACAN at Lossiemouth. At 1501:58, he replied "*...east at 5 miles, Flight Level 75*". Seeing a weak radar return with a corresponding D/F trace to the E of Lossiemouth, DEPS instructed the Hawk pilot to turn R onto 215° for identification at 1502:18. The Hawk pilot complied immediately and in a garbled message added "*...5 miles to the southeast.*" The ScATCC track (UKAB Note: the subject F15 formation) was now about 5 NM SW of the Hawk; the Mentor remarked to the trainee that turning the Hawk towards it was not the most logical action and instructed the trainee to pass traffic information to the Hawk pilot. At 1502:37, DEPS reported "*...traffic believed to be you has traffic south west, 3 miles, northbound indicating Flight Level 180 descending.*" The pilot acknowledged and asked "*..am I cleared to come back left?*" This was approved and the pilot requested to report steady heading 175°, which would then confirm

radar identification. The next transmission from the Hawk pilot was at 1503:08, "... would like to report a near miss with an F15."

The F15 was part of a formation of 4 F15E ac, receiving a RIS from ScATCC (Mil) Console 2 (CON2); the formation had recently been handed over from another ScATCC (Mil) controller. At 1500:08, almost immediately after checking in on the frequency, the F15 formation leader advised "...good victor mike, happy to go en route at this time". But CON2 advised the leader to remain on frequency to allow communication with another F15 formation, also under the control of CON2. The leader of the subject F15 formation then requested approval to operate "...surface to flight level 245 if able" and added "...after passing Lossie we'll turn north east." A Danger Area on their projected track was active and CON2 recommended a minimum level of FL 160, before permitting the two formation leaders to exchange messages on his frequency. CON2's workload was high at the time and his attention then turned to the other tracks under control, two of which required immediate co-ordination. During this process, the controller briefly noticed a non-squawking radar contact tracking S from the vicinity of Lossiemouth. As the F15 leader had previously indicated a willingness to continue VFR, CON2 felt that his priorities lay with his other tracks at the time, and did not pass T1 on the primary contact. The F15 leader made no mention of a Hawk, or any other ac, on RT at all.

The recording of the ScATCC Aberdeen Radar as used by CON2, reveals that the Airprox occurred at about 1503:00, 145° Lossiemouth 7 NM. At 1500:30, the F15 formation can be seen as 2 distinct elements in a 2 NM trail, 22 NM SE of Lossiemouth tracking about 340°, with the lead ac squawking 3/A 4626 and in descent through FL 190 Mode C. At 1501:20, when 15 NM SSE Lossiemouth, the formation turns R 10° to track directly towards the Lossiemouth overhead; at this point, the lead ac indicated FL 163. The Hawk first appeared as a primary contact at 1501:40, 4 NM ENE Lossiemouth and 1 o'clock to the F15 leader at 10 NM; it steadies on a track of about 172° at 1502:10. At

this point, the Hawk and F15's projected tracks are virtually parallel, 4 NM apart, with the Hawk and the lead F15 in each other's 1 o'clock, range 8 NM. The lead F15's Mode C varies between FL 178 and FL 164 during this period. The Hawk's R turn onto 215° is seen to take effect at 1502:40, when the lead and rear F15 formation elements are at 245°/2.5 NM and 200°/5 NM respectively. Ten sec later, both F15 elements turn 90° sharply R, which appears to be a co-ordinated turn within the formation but called on a different RT frequency; as they turn, the lead element appears as 2 distinct radar contacts, however the rear element can only be seen as 1 contact. At 1503:00, the Hawk turned back onto 175° and passes about 1 NM S of the lead F15 pair who indicate FL 170 and about 0.5 NM NW of the rear elements, which can still only be seen as 1 contact. As the ac open from the 'merge' in the subsequent radar sweep, the F15s have turned L onto a northerly heading. The 'missing' F15 of the trail element first appears at 1503:10, tracking NNW in a 'battle port' position to the other ac. About 15 sec prior to this, a primary contact appears adjacent to the Hawk for 1 radar sweep. The edges of the displayed primary returns are touching, one contact being just N of the other; interpolation of the Hawk's track would suggest that it is the southerly of the 2 contacts. Although the northerly contact may be a spurious return, if it was the reported F15, the relative positions and the Hawk's track would suggest an almost head on encounter, as indicated in the Hawk pilot's report.

Following the apparent failure of the Hawk's transponder, DEPS was obliged to utilise an alternative method of radar identification prior to commencement of a radar service. DEPS requested a TACAN range and bearing from Kinloss. However, the response "...east at 5 miles..." given relative to Lossiemouth does not fall within the stipulated requirements for ac identification. From his report it would appear that the Hawk pilot had been using GPS derived information rather than TACAN, therefore, DEPS resorted to the 'Turn Method' of identification. Normally, a minimum of 2 turns of at least 30° are required, but in this case, because a position report and DF information

were available, the Hawk could have been identified after just one turn and the flight placed under an ATS before the incident occurred (UKAB Note: which it was not). Turns for identification alone do not constitute a radar service, and as pointed out by the mentor at the time, a more appropriate turn would have been 30° L, away from the ScATCC (Mil) track into an area devoid of contacts. However, the F15 formation was northbound, on a parallel track 4 NM to the west of the Hawk at the time of their turn and the trainee, who had intended to turn the Hawk back on track as soon as it was steady, felt that the Hawk would always remain comfortably to the E of the F15s. At that stage, the 30°R & 30°L process displaced the Hawk no more than 1 NM W of its original track and the traffic information given by DEPS at 1502:37, was accurate. Unfortunately, the F15 formation then executed their R turn that brought the ac even closer together. The elapsed time from the start of this 90° 'jink' becoming apparent on radar until the contacts merged was less than 20 sec.

CON2's workload, and that of the unit as a whole, was very high at the time. Two of his tracks, one under RAS and one under RCS, required co-ordination with 2 different radar units. In contrast, the F15s had declared their willingness to continue VFR and to turn NE after passing Lossiemouth; they were not in direct conflict with the non-squawking Hawk at the time. The F15 formation was only on frequency, at the request of another formation leader in order to exchange weather and sortie information and the subsequent co-ordinated R turn instruction was not transmitted on CON2's frequency. Nonetheless, if traffic information on the very small primary contact had been passed, this would probably have prompted a more thorough visual and radar search by the F15 crews before their R jink.

In summary, the lack of an SSR response from the Hawk delayed its identification by DEPS and denied CON2 the Mode C information, which may have warned him about the looming conflict. DEPS' subsequent R turn instruction for identification was ill advised and

CON2's omission of TI denied the F15 crews warning of a conflict to their R.

**HQ STC** comments that the Lossiemouth Departures controller's decision to identify the Hawk by turning it towards a possible conflict may not have been the most appropriate and the pilot was justifiably concerned about the traffic to the SW. Distracted, however, by a malfunctioning IFF, the subsequent tally on the F15 formation was exceptionally late and an extreme manoeuvre was required to resolve the conflict. A traffic information call to the F15 formation may well have alerted them to the presence of another ac but it is possible that, eager to continue VFR and co-ordinate with their playmates, their attention may not have been sufficiently focused on clearing their flightpath as they descended and manoeuvred on to NE.

**HQ 3 AF** comments that it would appear that the F-15 formation was concentrating on their soon to commence training perhaps to the slight detriment of their situational awareness leading to a late sighting of the Hawk. However, it would appear that the vertical separation of the ac was greater than the estimate of the Hawk pilot who possibly misjudged the separation given the size of the F-15 airframe.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

When the facts of an incident are laid bare they often reveal several factors, which individually seem harmless but in combination conspire to produce the very circumstances for an Airprox. Initially, the Hawk's transponder fault provided the catalyst for the identification turn. It appeared to the Board that the DEPS Mentor had accepted the trainee's unwise decision, to turn the Hawk R for identification instead of L

away from the F15 formation, without immediately countering this action. The efficacy of the direction of this turn was an error of judgement in members' eyes and this was agreed by the MATO advisor. In a 'live' training environment a trainee's errors had to be corrected promptly if they were not to impinge on the service provided and be detrimental to overall flight safety, albeit that the Hawk remained on heading for only about 20 sec.

In this incident, with ac flying on virtually parallel but reciprocal tracks about 4 NM apart, events occurred very quickly, with little time to react to the unexpected, e.g the R turn by the F15 formation, unannounced to ScATCC (Mil) CON2. The Board agreed that the controllers were not responsible for effecting separation in either case. The Hawk pilot had not been formally placed under an ATS but what belatedly applied was a RIS – like that provided to the F15 formation. The lack of traffic information from CON2 about the Hawk's primary radar contact was also significant although members acknowledged it may have been difficult to spot. Nonetheless, traffic information on the Hawk might have caused the F15 formation leader to delay the formation R 'jink', that reduced the separation even more and resulted in the very close quarters situation. Another point was that if the F15 formation leader had called the turn on frequency it might

have prompted a further scan by CON2 who may then have detected the Hawk's primary return.

In the event none of these 'hind sight' points applied, which left individual crew members of the respective ac to detect the confliction. This worked, but very late. Some members were surprised that eight pairs of eyes in the F15 formation had not spotted the Hawk earlier, from their tactical 'Box' formation. Others added that the Hawk had climbed up from below, was a small target and thus managed to close unseen.

Weighing all these factors together the Board agreed that the fundamental cause of this Airprox was that neither the lone Hawk pilot, nor the individual crews of the formation of four F15s saw each other until a late stage, which compounded the risk of a collision. The members perceived that the speed of the encounter, owing to the high closure rate, severely limited the available time to react which, according to the Hawk pilot, was at most 1-2 sec and his energetic avoiding action was probably instinctive. This, coupled with the relative miss-distances as the Hawk flew through the formation led members to conclude that the safety of the ac had been compromised.

### **PART C: ASSESSMENT OF RISK AND CAUSE**

*Degree of Risk:* B

*Cause:* Late sighting by all ac crews.

## AIRPROX REPORT No 176/99

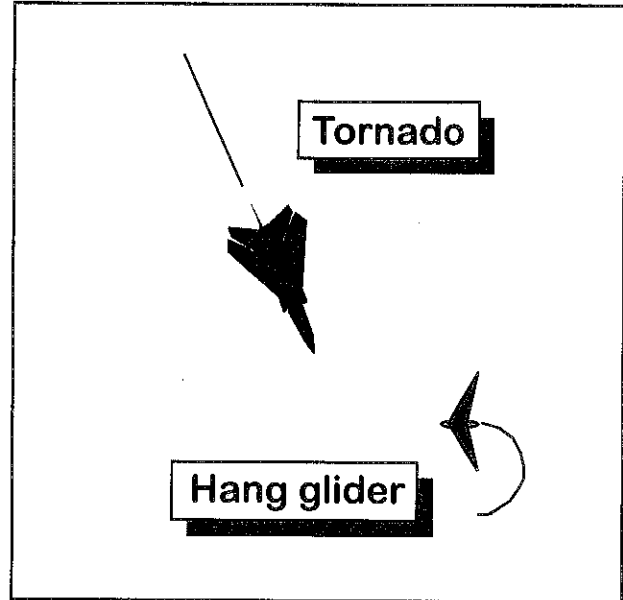
Date/Time: 28 Sep 1322  
Position: N5316 W0136 (3 NM SW of Sheffield)  
Airspace: LFS/FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tornado GR Hang Glider  
Operator: HQ STC Civ Pte  
Alt/FL: 300 ft 400 ft  
(Rad Alt) (agl)  
Weather VMC CLNC VMC  
Visibility: 10 km  
Reported Separation: 500 ft H/300 ft H  
Recorded Separation: NK

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

**THE TORNADO PILOT** reports heading 150° at 420 kt on a low level exercise. In the vicinity of Curbar hang gliding site he was looking out for activity when he saw a yellow hang glider in his 9 o'clock as he passed it at the same level about 500 ft away; it was heading W. He instinctively broke away from it but was past it by then and any risk of collision was over.

**THE HANG GLIDER PILOT** reports soaring Curbar Edge at 400 ft agl when he saw a Tornado coming straight towards him at the same level. He manoeuvred to make himself more visible, but the Tornado did not alter heading until the last moment when it was 2-300 ft away. It had to bank sharply to miss him and he considered there had been a high risk of 'wipe out'.

**HQ STC** comments that the Tornado crew were well aware of the proximity of the Curbar site to their route and, although the site was not notified as active, had noted the general warning laid down in the UK LFHB, to expect activity at any time. In spite of heightened awareness as they approached the site, the crew came perilously close to the hang glider, causing them significant concern and, undoubtedly, considerable fear to its pilot.



Despite high visibility markings, and any efforts by the pilots to increase conspicuity, hang gliders, by virtue of their size alone, are particularly difficult to see. Although this occurrence can be considered an operating hazard, it will serve as a graphic warning to all military aircrew that hang gliding sites should be avoided by as wide a margin as possible and that the most meticulous lookout must be practised in their vicinity.

**THE BHPA** comments that the potential for incidents such as this will remain until ALFENS OPS will accept for distribution a warning of fewer than 5 hang/paragliders at a location. It is almost impossible for any hang or paraglider pilot to manoeuvre out of the way of an approaching fast-jet.

### PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board discussed whether or not the pilot could have avoided the HG site by a greater margin, but he was in a LFS choke point marked by a flow arrow, with another site close by. Members considered that hang gliders are



so hard to see in time for a fast jet to avoid them that it is worth avoiding their sites if at all possible. This incident demonstrated the difficulty of seeing hang gliders in time to take action; some members considered that the cause of the incident was that the Tornado pilot did not see the hang glider early enough, whether or not he could have. However, others suggested, since he could not have necessarily been expected to see it any earlier, that the incident was therefore a confliction of flightpaths. The Board discussed the problem

of deconflicting these types of aerial activity at some length without reaching any specific conclusions and eventually accepted that this was a confliction of flightpaths in the vicinity of a notified hang glider site. It was an unsatisfactory situation with the possibility that one day such a confliction will not end so fortunately. In this case because the ac passed fairly close with neither pilot able to affect the outcome significantly, members agreed that their safety had not been assured.

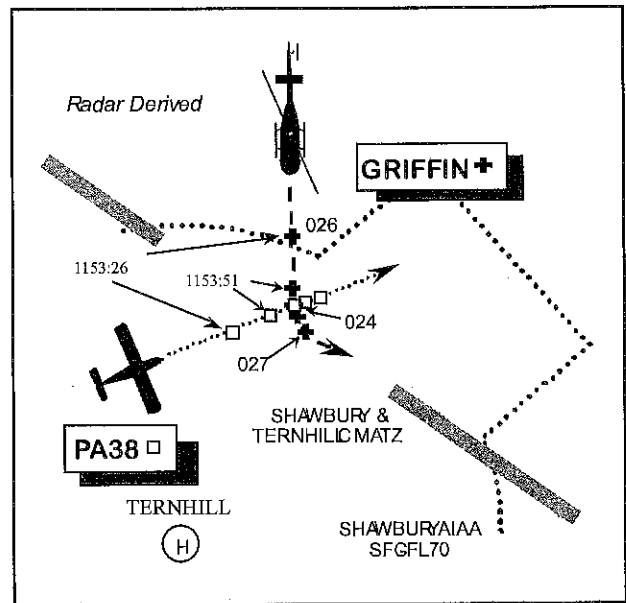
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Confliction of flightpaths in the vicinity of a notified hang glider site.

**AIRPROX REPORT No 177/99**

Date/Time: 04 Oct 1154  
Position: N5256 W0230  
 (4 NM NE of Ternhill - elev 272 ft)  
Airspace: MATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Griffin HT1 Piper PA38  
Operator: HQ PTC Civ Trg  
Alt/FL: 2400 ft ↓ 2000 ft  
 (QNH 1012mb) (RPS 1011mb)  
Weather VMC CLOC VMC CLBC  
Visibility: 50 km 60 km  
Reported Separation:  
 H nil/300 ft V Not reported  
Recorded Separation: H nil/340 ft V



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

**THE GRIFFIN PILOT**, a QHI conducting an instructional sortie, reports receiving a FIS from Shawbury APPROACH and squawking the assigned Mode 3/A code with Mode C. The helicopter colour scheme was standard PTC high conspicuity black & yellow; HISLs fitted to the upper and lower fuselage were on, as was

the landing lamp. The helicopter was heading 165° into sun, at 80 kt and decelerating with a 10° nose-up attitude, prior to commencing a 180° autorotation from a downwind southerly heading, L onto N, from 2400 ft (QNH). After completing an updated 'HASELL' check the autorotation was entered and the throttles retarded to idle. At this point the crewman, a QHCI, spotted a low wing light piston ac at 2

o'clock, about 200 m away and 400 ft below the helicopter on a 'collision course'. Immediately, the crewman called "*overshoot overshoot*" and the QHI responded by instantly advancing the throttles and initiating a climb ahead. The light ac passed about 300 ft directly below the helicopter with no horizontal separation and no apparent change of altitude or heading. Although the pilot did not see the other ac, he adds that an autorotation/practice forced landing is a very high workload activity and the risk of collision was very high.

**THE PIPER PA38 PILOT** reports returning to Manchester from Sleaf after conducting a student circuit training detail and in receipt of a FIS from Shawbury ZONE. The assigned Mode 3/A code was selected, but Mode C is not fitted to the ac. The ac has a navy blue/grey and white colour scheme and HISLs were on. Whilst flying a northeasterly heading at 2000 ft, she thought on Shawbury QFE (1009 mb) in a level cruise at 90 kt, a black & yellow helicopter was seen. (UKAB Note: The Barnsley RPS was issued by ZONE and acknowledged by the pilot moments before the Airprox). However, she considered the helicopter to be well clear as it crossed ahead of her ac from L to R and above. Consequently, heading and altitude were maintained. She did not believe "in any way" that there had been a risk of a collision and 'permission' had been obtained to transit the Shawbury MATZ.

**HQ MATO** reports that the Griffin helicopter departed RAF Shawbury on a VFR flight to operate in the Dedicated User Area (DUA) of LFA9. In accordance with local orders, the ac was squawking 3/A 0251, signifying that it was operating in LFA9 under a FIS, and operating on 300.225, a quiet frequency used by helicopters engaged in VFR instructional training in the DUA. The Shawbury Approach Controller (APP) monitored this frequency, providing a FIS, although track identity on the helicopter was not maintained. Two hours after landing, the pilot contacted the ATC Supervisor (SUP) to advise that he was filing an Airprox, following discussions with the crew during the sortie debrief. Subsequent tracing action by AIS (Mil) revealed the ac to be a PA38, which

had been in receipt of an ATS from Shawbury ZONE.

The PA38 pilot free-called Zone on 120.775 at 1145:28, routeing from Sleaf to Manchester and requested a FIS. The ac was heading 060° and climbed to 2000 ft Shawbury QFE (1009 mb). At about 1153:17, Zone transmitted "*...keep a good lookout.....*" and advised of manoeuvring rotary wing traffic operating in the vicinity, which was believed to be at a similar altitude. The PA38 pilot replied 10 sec later "*...that's copied, we're visual with one rotary and we'll keep a good lookout for others.*" Zone then instructed the PA38 pilot to fly on the Barnsley RPS (1011 mb) and asked for confirmation of the ac's altitude about 30 sec before the Airprox; which the pilot stated was 2000 ft. The PA38 pilot freecalled Manchester at 1156:38.

Zone fulfilled the requirements of the requested FIS and appropriately advised the PA38 pilot of the presence of helicopters operating in the area at a similar altitude. APP was working a number of ac undergoing VFR training in LFA9 at the time of the incident, however these were operating on a specified quiet frequency and the controller was not required to maintain track identity on such ac. The radar recording does not show any other traffic in the area at the time of the Airprox. The PA38 pilot's report states that the helicopter was not considered to be a collision risk at the time. Hence, it is possible that the Griffin was sighted whilst straight and level, just prior to commencing its autorotative descent.

**HQ PTC** comments that both ac were carrying out legitimate activities under a FIS in suitable airspace. The encounter was resolved through the alertness of the QHCI and his pilot's prompt reaction. It is possible that the PA38 pilot dismissed the Griffin as a threat prematurely, not anticipating the autorotation manoeuvre. Equally, it is possible that the Griffin crew could have cleared the area a little more thoroughly prior to entering the autorotation manoeuvre. Whilst it might be that they could have had warning of each other's proximity under a better

ATC service, this would probably have been counter to their purposes.

UKAB Note (1): It is reported that a broadcast relating to the PA38 crossing the combined MATZ was not made on the Griffin pilot's operating frequency, in accord with local operating practise agreed between ATC and the ac operators.

UKAB Note (2): A review of the LATCC Cleve Hill radar recording reveals that this Airprox occurred about 1154:08, 4 NM NE of Ternhill, within the combined Shawbury/Ternhill MATZ. At 1153:26, the PA38 is shown squawking 3/A 0230, without Mode C, tracking ENE, whilst the Griffin maintains a southerly track at FLO 26 Mode C until just before the contacts merged at 1154:08. Wherefore, it is difficult to discern the indicated level of the Griffin owing to SSR label overlap, but perceived to be FL 024 (1013 mb), possibly after the commencement of autorotation. Therefore, minimum vertical separation between the ac is estimated to be 340 ft, when the PA38 was flying at 2000 ft (1011 mb). After the ac passed and opened astern of each other, the Griffin climbed to an indicated FL 027, and commenced a L turn, whilst the PA38 maintained track throughout.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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 viewed this Airprox as unusual because the filing Griffin pilot did not actually see the PA38 at all during the encounter, which was sighted instead by the helicopter crewman. Some members were surprised that it was not normal practice for ATC to make a broadcast call about traffic crossing the MATZ and this generated considerable debate. It was pointed out that normal DHFS operations were not restricted to within the MATZ and the Griffin's

manoeuvre could just as equally have been flown outwith the MATZ boundary, where no broadcast would have been made.

A PTC member explained that DHFS crews did not want such information and under a working agreement with ATC broadcasts were limited to information about low-flying traffic in the vicinity and pipe-line inspection helicopters. This was confirmed by the MATO advisor. The Board discussed whether this arrangement was reasonable. Some civilian members were surprised in view of entries in the UK AIP at ENR 2-2-4-1, relating to MATZ crossings. These entries detail the ATS which may be provided and the application of standard separation. The PA38 pilot had called Shawbury ZONE and though under a FIS had received traffic information which may have helped her to sight the helicopter. However the MATO advisor reaffirmed there was no intention to apply standard or reduced vertical separation between MATZ crossers and DHFS traffic. He believed the information in the UK AIP on this matter was under review by DAP and the chairman requested feedback on the outcome in due course. Many members believed that if the Griffin pilot had received traffic information on the PA38 he would have been more circumspect during his HASELL(Look-out) checks before the practise autorotation was initiated. However, it was explained that the operators found such broadcasts hampered their training task and these interruptions could be counter-productive. This opinion was also expressed by a GA instructor member. In the end members concluded that in this 'see and avoid' scenario, albeit within a MATZ, the cause of this Airprox was that the Griffin pilot descended into conflict with the PA38, which he did not see.

Turning to risk, the members speculated why the PA38 pilot had not been more concerned about the helicopter's descent. Given the early sighting and the relative geometry of the encounter, the PA38 pilot may not have appreciated that the Griffin was in autorotation. It had not been mentioned in her report, and the Griffin pilot had not initiated the descent until at very close quarters as evinced by the radar

recording and only a matter of seconds before the contacts merged on radar. Hence, the PA38 pilot was probably unaware of the helicopter's true flight path and several members advocated this view. Some believed that safety had not been assured because resolution had relied upon sighting by a crew member, followed by a reaction by the pilot to stop the descent, open the throttles and climb away. All this took time.

Nonetheless, the alert crewman had seen the PA38 and the pilot had reacted promptly. Moreover, the PA38 had apparently kept the Griffin in sight while this took place. Owing to these differing perspectives, determination of risk was not clear cut, but it was finally determined by a narrow margin that there had not been a risk of a collision.

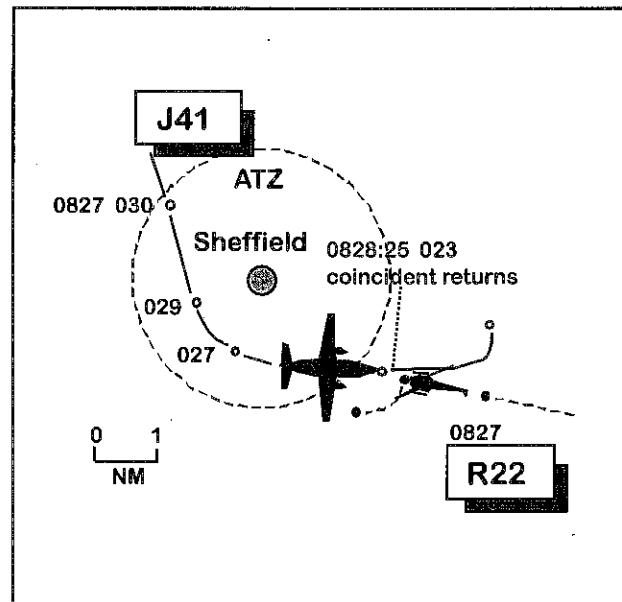
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Griffin pilot descended into conflict with the PA38, which he did not see.

**AIRPROX REPORT No 178/99**

Date/Time: 4 Oct 0832  
Position: N5222 W0119 (2.6 NM SE Sheffield City airport - elev 231 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: BA41 Jetstream R22  
Operator: CAT Civ Trg  
Alt/FL: ↓1500 ft 2000 ft (QNH 1014 mb) (QNH)  
Weather: VMC VMC CAVOK  
Visibility: 10 km >10 km  
Reported Separation: 200 ft/1.5 NM // 800 ft V  
Recorded Separation: <500 m



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

**THE JETSTREAM PILOT** reports that he was inbound to Sheffield City from Belfast and had been advised of transiting VFR traffic routing E of the M1 motorway towards Blackpool at 1500 ft. Having initially approached the airfield from the N, he flew to the overhead at 3000 ft and commenced a L turn and descent for a visual LH circuit to RW 28; ATC had instructed him not to descend below 1500 ft until on the final approach track. Whilst turning and descending

through 2200 ft (QNH) a Robinson helicopter was spotted to his R 105 NM away and 200 ft below on a reciprocal track. Visual contact was maintained and the ac passed down his starboard side; no avoiding action was necessary but he thought there had been a medium risk of collision. It was suspected that the helicopter pilot was unsure of his position and had climbed to 2000 ft without advising ATC of any altitude change until prompted.

UKAB Note (1): UKAB staff subsequently asked the pilot to confirm his estimate of lateral separation, as a radar recording of the incident suggested the encounter was considerably closer than he had thought. He said that the estimate was based on his judgement at the time, but he agreed that, with an ac as small as an R22, there was considerable room for misperception. He added that as far as he was concerned, from the RT transmissions heard between the Tower and the R22 pilot, he expected the helicopter to route to the 'E of the M1 motorway at 1500 ft'; in the event it climbed and tracked towards the airfield without any advice to ATC. Despite being aware of the ac and actively looking out for it, he did not spot it until it appeared at about his 2 o'clock position tracking W. While accepting that pilots are responsible for maintaining their own separation in the Class G airspace surrounding Sheffield's ATZ, the pilot commented that, in his opinion, the provision of radar at the airfield was essential to avoid repetition of this type of incident.

**THE R22 PILOT** reports that he was conducting a basic navigational exercise from Gamston to Blackpool in CAVOK. He was heading 300° at 80 kt and receiving a FIS from Sheffield City ATC on 128052. The controller passed him the QNH and a squawk (0224) and advised him that a Jetstream ac would be passing him from L to R. He saw the ac at his 12 o'clock about 800 ft above and made a descending L turn to ensure that he passed behind it. In his opinion the risk of collision was negligible. When overhead the airfield he heard the pilot of the other ac ask ATC for the helicopter's callsign.

**SHEFFIELD ATC** reports that the R22 pilot called at 0814 routeing VFR from Gamston to Blackpool. He was provided with a FIS and asked to report passing E abeam the airport. The Jetstream pilot reported positioning for a visual LH circuit to RW 28 from the W and was given traffic information on the R22 at 1500 ft. As the Jetstream turned base leg the pilot reported seeing the R22 about 1 NM to his R at about circuit height. The latter then advised that he was at 2000 ft.

**ATSI** comments, with RT tape recording, that there are no ATC implications in this incident. The R22 was en route VFR from Gamston to Blackpool and the Jetstream was inbound to Sheffield for RW 28 via the airfield overhead. Both pilots were in contact with Sheffield APC and traffic information was passed to them with respect to each other; both reported visual contact with no requirement to take avoiding action. (UKAB Note (2): Sheffield airport is not equipped with radar).

UKAB Note (3): A recording of the Claxby radar at 0827 shows a slow moving primary return, believed to be the R22, tracking in a westerly direction about 4 NM ESE of Sheffield airport. At the same time the Jetstream is heading SSE about 1075 NM to the NW of the airfield indicating 3000 ft Mode C; shortly afterwards it commences a descent and L turn which takes it towards the R22 on a reciprocal track. At 0828:25, when the ac are head-on under 005 NM apart with the Jetstream indicating 2300 ft descending, the R22 makes an abrupt L turn to pass S of the other ac. It is not possible to measure from the radar precisely what the lateral separation was as the ac pass, but it is likely to have been within a few hundred m. 2300 ft Mode C equates to 2327 ft on QNH 1014. If the R22 was at 2000 ft as reported, vertical separation would have been in the order of 200 - 300 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a radar video recording and a report from the air traffic controller involved.

The essential elements of this incident were that it took place in a non radar environment in Class G airspace and both pilots had been given information about each other. Although not a specific requirement under VFR, members thought that a rather more precise description of the R22's route would have been helpful from its pilot. With regard to its altitude, the Board was informed that the RT tape

recording showed that the R22 pilot had in fact transmitted that he was at 2000 ft but this had occurred just before the incident and was not acknowledged by Sheffield or, apparently, heard by the Jetstream pilot. Members could understand why the latter was surprised to see the R22 when its pilot had reported his intention to track E of the M1. A GA member familiar with the Sheffield area pointed out, however, that the M1 turns through nearly 90° just to the E of the airfield and the complexity of the road system generally in the area could give rise to misleading position reporting. Nonetheless, a call from the R22 pilot to say that he was routing in a more westerly direction would have been helpful, especially as he knew about the Jetstream and should have anticipated that it would be 'traffic' to him in the Sheffield circuit.

The Board concluded that the Airprox occurred as a result of conflicting flight paths in the FIR, where pilots are ultimately responsible for their own separation. In the event, both pilots reported seeing each other and only the R22 pilot felt the necessity to widen his track to improve separation, assessing the risk of collision as negligible. However, members felt

that both pilots may have misjudged the separation distances, probably because of the relative sizes of their ac. Several recent Airprox involving R22s have demonstrated that it is one of the most difficult flying objects to see, and its small size seems to give pilots the impression that it is further away than it is. In this instance the ac would have presented an almost head-on aspect to the Jetstream making it even more difficult to spot. On balance the Board was satisfied that the R22 pilot had taken action to ensure his separation from the Jetstream and that there had not been a risk of collision.

The Board noted the Jetstream Pilot's concerns over the absence of radar at Sheffield. Members commented that similar conditions exist at other locations in the UK where CAT ac make their approaches in the FIR, albeit some of these airfields are equipped with radar and are therefore able to provide radar-derived traffic information on known or observed returns. They went on to say that the provision of such radar equipment was a matter for negotiation between operating companies and the airfield management concerned.

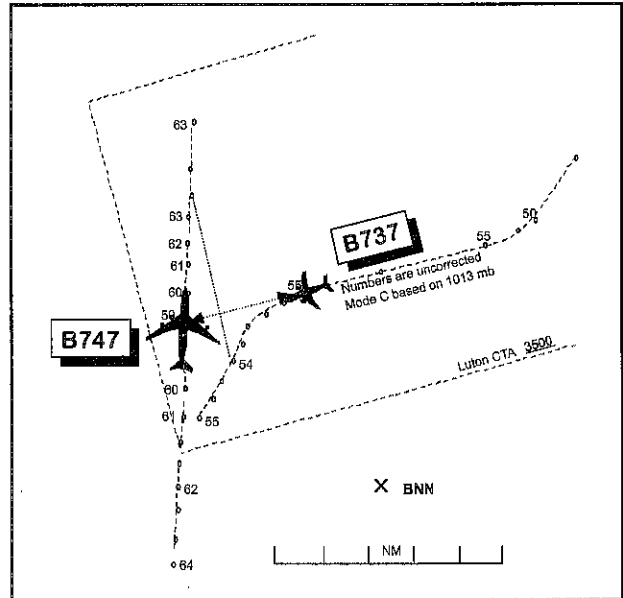
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: A confliction in the FIR resolved by the R22 pilot.

**AIRPROX REPORT No 179/99**

Date/Time: 1 Oct 1915 NIGHT  
Position: N5147 W0039 (5 NM NW of BNN)  
Airspace: LTMA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: B737-300 B747-200  
Operator: CAT CAT  
Alt/FL: ↑ 5000 ft 5600 ft  
(QNH) (QNH 999 mb)  
Weather VMC VMC  
Visibility:  
Reported Separation: 2 NM/NK  
Recorded Separation: >2 NM, 400 ft



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

**THE B737 PILOT** reports heading 290° at 300 kt, tracking towards Henton at 5000 ft on a Compton 2B SID from Luton. He saw another ac in his 11 o'clock crossing left to right and slightly above but descending. His TCAS gave an aural 'Traffic' alert and he turned onto 240° to avoid it visually. LATCC cleared him to turn onto 220° and asked if he could see the ac in his 12 o'clock; when it had reached his 1 o'clock it appeared to be at the same level. Shortly afterwards there was a severe buffet as they flew through its wake. ATC advised that it should have been at 6000 ft and he told the controller he would file an Airprox. He thought the other ac had passed 2 NM away at the same level and considered the risk of collision was high.

**THE B747 PILOT** reports heading 355° at 270 kt on a WOBUN 2F SID from Heathrow. On reaching 6000 ft on the SID (transition altitude) they set 1013 mb and flew at FL 60 (QNH was 999 mb). They received a TCAS TA on traffic at an unknown distance in their 2 o'clock, about 600 ft below; they did not see it. They then climbed to 6000 ft.

**LATCC** reports, with RT transcript, that the B747 departed Heathrow and called 119.77 (NW DEPS) on a WOB2F climbing to 6000 ft. In reply the controller reiterated "maintain 6000

ft". The B747 later called "maintaining 6000 ft". A short time thereafter NW DEPS asked the B747 pilot to confirm maintaining 6000 ft on 999 mb. The pilot read back: "we're (?) 6000 ft 999 millibars". NW DEPS: "c/s your height readout says you're descending – 55". The B747: "OK understand OK 6000 999 millibars".

Meanwhile the B737 had departed from Luton and climbed to 5000 ft as per the SID. When the BNN controller saw the B747 at 5900 ft and then 5800 ft apparently descending, she transmitted "(B737) c/s". She stopped her transmission as she saw the Mode C at 5900 ft. The B737 immediately responded "we've got the traffic 12 o'clock sighted". BNN: "OK it seems to be descending at the moment turn left heading 220". The B737: "Left heading 220 and we're passing behind him now". The BNN controller then approved a descent if the pilot deemed it necessary. In later transmissions the B737 opined that the B747 descended to "our level" and that without a turn there was a distinct confliction and the ac had just flown through its jetwake "with a distinct and violent bang".

It is of note that FL 60 on 999 mb is approx. 5500 ft and that the radar replay shows that, on the climb to 6000 ft, the B747 appears to stop at 5500 ft briefly before reaching 6000 ft then descending again. It may be there was

confusion on the flightdeck about pressure settings.

UKAB Note: The time on the RT recording at which the B737 pilot reports the B747 crossing his 12 o'clock matches the time when it is seen to do so on the radar recording, 500 ft above the B737. At the time the pilot reports hitting wake, the B737's return is just under 1 NM E of the track flown by the B747 and 700 ft below the level at which the B747 passed that area. The 6000 ft wind was 250/40 which would account for the wake being encountered so far from the B747's track.

**THE CAA** has asked DAP to consider publishing in the UK AIP the fact that the UK uses the transition altitude as an assigned altitude on some SIDs. The B747 operator is also being asked to confirm that their crews are aware of this and of what is required when asked to fly an altitude or a FL..

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It seemed to members that the cause of the incident was confusion on the B747 flight deck about the need to fly at an altitude until cleared

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The B747 pilot departed from his cleared altitude.

to a flight level. The crew had set 1013 mb prematurely and then attempted to fly at a FL without clearance. This resulted in the B747 departing from its cleared altitude and conflicting with the B737. There was some discussion as to whether the existing regulations were sufficiently clear and the Board was briefed on DAP's research into this as requested by the CAA.

DAP pointed out that UK Air Pilot entries reflect the ICAO PANS-OPS procedures (Vol 1 part VI ). There is nothing in ICAO Documents (PANS-OPS or PANS-RAC) that precludes the use (or even recommends the non-use ) of Transition Altitude as an allocated level in ATC procedures/clearances. It is a normal practice world-wide. The AIP (ENR 1-7-1, para. 3.4 & ENR 1-7-2, para. 5.1.4) already spells out that vertical positioning when at or below any transition altitude will normally be expressed in terms of altitude, and there is no need for further publicity. The SIDs are expressed in altitudes throughout.

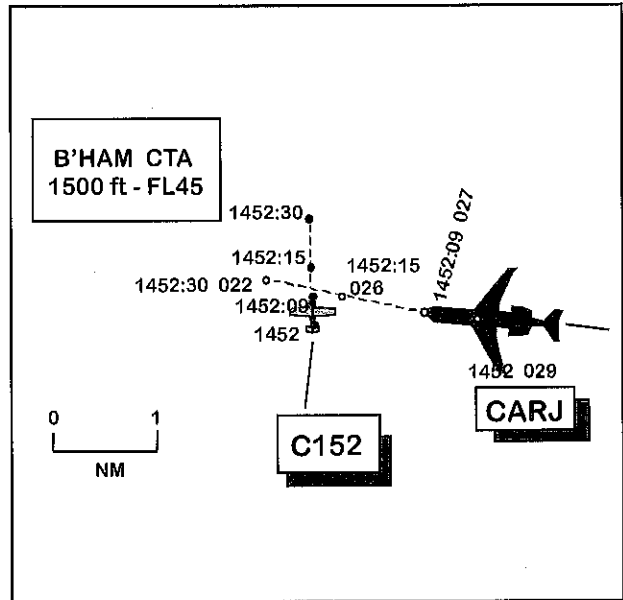
As to the risk level, members appreciated that at night it would have been difficult for the B737 pilot to judge the range and height difference between the ac and that the radar recordings showed that in fact there was no risk of the ac actually colliding.

Assurance had since been received from the airline that the B747 pilot appreciates his mistake in prematurely setting standard pressure.



**AIRPROX REPORT No 180/99**

Date/Time: 12 Oct 1452  
Position: N5250 W0133 (4 NM SE HON VOR)  
Airspace: CTA (Class: D)  
Reporter: Birmingham ATC  
First Aircraft Second Aircraft  
Type: CARJ C152  
Operator: CAT Civ Club  
Alt/FL: 2500 ft 2400 ft  
(QNH 1030 mb) (QNH 1030 mb)  
Weather VMC VMC  
Visibility: >10 km >10 km  
Reported Separation:  
not given // not seen  
Recorded Separation: @ 0.5 NM



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

**BIRMINGHAM APR** reports that the CARJ was being radar vectored for an ILS approach to RW 33. When it was approaching the localiser at HON a primary return was seen in its vicinity but was assumed to be below the base of the CTA. The CARJ pilot then reported that a high wing Cessna type ac had just crossed in front of him at the same level. The primary return was then observed tracking towards Coventry, whose ATC was advised. As it passed directly overhead Coventry airport LATCC D & D telephoned to advise that a C152 pilot had reported lost in the vicinity of Birmingham. The ac was transferred to the Birmingham radar frequency (118.05), and the pilot was given a squawk and advised of his position. After ensuring that he was visual with Sywell for a landing there, the pilot was permitted to leave the frequency.

The CFI of the C152's flying school was contacted and the incident described to him. He apologised for the student's error, explaining that he had been on a qualifying cross-country exercise, and said that he would be comprehensively debriefed as soon as he had been collected from Sywell.

**THE CARJ PILOT** reports that he was heading 290° at 210 kt and flying at 2500 ft (QNH 1030) while making an ILS approach to RW 33 at Birmingham under the control of Birmingham radar on 131.32. The visibility was over 10 km in VMC. He was squawking 4137 with Mode C. When on the HON 100°/R at 4 NM, a light ac appeared at his 11 o'clock position and passed very close in front of him from L to R. The FO also saw it and reported the incident to Birmingham ATC.

The pilot does not estimate separation distances or give an assessment of risk.

**THE C152 PILOT** reports that he was on a qualifying cross-country exercise with landings at Gloucester, Sywell and Denham. He was squawking 7000 with Mode C off. During the second leg, flying at 90 kt and cruising at 2400 ft on QNH 1030, he became uncertain of his position and flew in a wide circle in an attempt to find Banbury, his next landmark. He saw a town and flew towards it, believing it to be Banbury but it was not. On contacting Sywell to obtain a position check he was advised to call D & D on 121.5. He did not see any other ac and believes that the Airprox occurred during the time he was in contact with D & D.

**ATSI** comments that the primary radar return of the C152 was in an area where the base of the

Birmingham CTA was 1500 ft; Birmingham ATC were therefore entitled to assume it was below CAS and could not reasonably have been expected to take any action with respect to it.

UKAB Note: A recording of the Clee Hill radar at 1452 shows the CARJ tracking W towards the 33 localiser about 12 NM from touchdown with a slow moving primary return tracking N at its 1130 range 1.5 NM. At this point the CARJ's Mode C indicates 2900 ft (equivalent to 3350 ft QNH).

At 1452:09, the primary return passes 1 NM ahead of the CARJ. By 1452:15 lateral separation has reduced to 0.5 NM as the CARJ descends through 3060 ft altitude with the C152 now tracking away to the N at its 1030 position. At 1452:20 the CARJ passes about 800 m behind the C152 while descending through about 2800 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a radar video recording, and a report from the air traffic controller involved.

An experienced GA member said that a qualifying cross-country was a particularly stressful exercise for an ab initio pilot, calling for careful planning and a very thorough briefing. Supervision arrangements should have covered all aspects of the flight, but in particular what to do in case of emergency or becoming lost. While it was assumed that such a brief would have been given to the C152 pilot prior to take off, members agreed that his subsequent actions demonstrated a general lack of awareness, especially in terms of navigational technique and RT discipline. However, these were probably brought about by the stress of the situation. From a navigational point of view, his planned track from Gloucester to Sywell passed some 17 NM to the S of HON. Hence, in the 30 NM or so flown since departing from Gloucester he had deviated very considerably N of this – some 16 NM - despite the good flying

conditions and an abundance of ground navigational features. Having become uncertain of his position, the pilot elected to call his destination airfield, Sywell, which has only air/ground RT facilities, in the erroneous belief that they could provide him with a 'position check'. No consideration was apparently given to the obvious, and presumably briefed, action to call LATCC D & D until he was advised to do so by Sywell, by which time the ac was well inside Birmingham's and Coventry's airspace. Alternatively, a call to Birmingham ATC would have helped to resolve his difficulties, though at his reported altitude and range, and with no SSR indications apparent on radar, only DF information would probably have been available to them. Noting that the C152 pilot had reported not selecting his Mode C, members emphasised the importance of using this facility, which enables ATC to provide more accurate traffic information. Although the ac successfully transmitted SSR information at D & D's request following the encounter, none was seen prior to it.

The Board concluded that the Airprox was caused by the C152's inadvertent entry into the Birmingham CTA after the pilot became lost. Members noted that the CARJ pilot did not give any assessment of risk, although he said it was 'close', and the C152 pilot did not see the CARJ at all. This led some to believe that there had been a possible risk of collision. However, radar evidence showed that the C152 had passed about 1 NM ahead of the CARJ on a 90° crossing track and lateral separation then increased rapidly as the C152 cleared to the N. On this basis a majority of Board members concluded that there had not been a risk of collision.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: An inadvertent penetration of the Birmingham CTA by the C152 pilot while lost.

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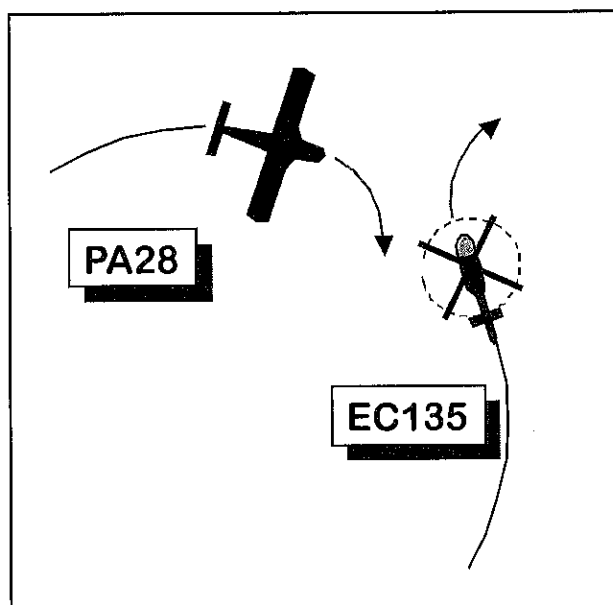
### AIRPROX REPORT No 181/99

<u>Date/Time:</u>	12 Oct 1918	NIGHT
<u>Position:</u>	N5150 W0120 (Oxford Airport - elev 270 ft)	
<u>Airspace:</u>	ATZ	(Class: G)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	EC135	PA28
<u>Operator:</u>	Civ Trg	Civ Pte
<u>Alt/FL:</u>	1000 ft	1500 ft
	(QFE)	(QNH 1030 mb)
<u>Weather</u>	VMC CLNC	VMC CLBC
<u>Visibility:</u>	10 km+	10 km
<u>Reporting Separation:</u>	< 100 m/< 100 m	
<u>Recorded Separation:</u>	NK	

### **BOTH PILOTS FILED**

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

**THE EC135 PILOT** reports flying a night circuit training detail using a LH circuit at 1000 ft QFE to RW 02 at Oxford. Before a helipad takeoff he saw a fixed wing ac performing an overhead join. After take off he 'froze' one engine at max take off power giving a high initial rate of climb. His student took the appropriate actions and began to level off at 800 ft, starting a left turn whilst levelling at 1000 ft. Passing 350° at 65 kt, a conflicting ac was then seen 0.25 NM away converging from the left within the LH helicopter circuit. He took control and made a hard right climbing turn and reduced power on the 'frozen' engine; the other ac also appeared to turn right. He resumed his circuit; while at 1200 ft QFE he saw the other ac over the centre of the airfield and below his level. The other ac had passed about 1-200 ft away with a high risk of collision.



**THE PA28 PILOT** reports that on returning from a night cross country he was cleared to the Oxford overhead at 2500 ft QNH. He called overhead and was cleared to descend on the dead side for RW 02 RH. He flew 2 orbits and rolled out at circuit height (1500 ft) to cross the upwind end of the runway, heading 110° at 95 kt. The helicopter came into view less than 100 m away, crossing right to left in a slight climb. He turned right to avoid it, passing less than 100 m from it at the same level with a very high risk of collision. He subsequently advised that he was aware that the helicopter circuit was active but was not warned of the position of any ac in it. He was also unaware that the night helicopter circuit was flown higher than by day.

**ATSI** reports that the Oxford Controller said that he was providing a combined Aerodrome/Approach service from the VCR, operating without any support staff. This was usual for the time of day and was considered acceptable for the amount of traffic rejoining

and operating locally within the circuit. The incident occurred outside the airport's notified hours of operation. Because it took place at night, the subject ac were operating under IFR.

There are specified areas at Oxford Airport within which helicopters can perform auto-rotations and circuit training. They are determined by the fixed-wing runway in use, which on this occasion was RW 02. The EC135 was operating in Helicopter Training Area 1, which is situated west of RW 02/20. Because of noise abatement, helicopters carry out left hand circuits at night at 1000 ft agl instead of 700 ft agl by day. Once a helicopter is established in the training area, no routine calls are made by the pilot until he wishes to leave the area. He is expected to maintain a listening watch on the frequency.

The PA28 contacted Oxford Approach at 1909, reporting eleven miles N of the airport for rejoin. The controller said that because of departing IFR traffic which would be routing outbound through the overhead, he instructed the PA28 to remain to the N of the airfield. Subsequently, once the outbound had cleared the overhead to the S, at about 1910:30, the PA28 was given clearance to join at an altitude of 2500 ft. The standard procedure is for ac to join overhead at 2300 ft but the controller commented that he tends to use 2500 ft at night, in order to ensure 1000 ft vertical separation from the fixed-wing circuit, which is at 1200 ft (QFE) and 1500 ft (QNH). (UKAB note: At about 1911 the controller advised an ac on base leg: *"c/s I think the ac you see is actually a helicopter that's operating to the west of the runway . . ."*) The PA28 reported overhead at 1915 and was instructed: *"..... descend on the dead side report downwind right hand runway zero two, three school ac in the circuit."* The controller believed that he had passed traffic information on the helicopter and was surprised to learn, subsequently, that it had not been passed. He confirmed that he had not overlooked the presence of the helicopter, to the extent that he had informed the previous arrival of its presence, passing additional information about it operating W of the runway when the ac was on base leg. Although the controller admitted

that he should have passed traffic information about the helicopter to the PA28 as he intended, in his opinion the pilot of the latter should have been aware that the helicopter area was active. He explained that a Noise Amelioration Scheme has been adopted at Oxford Airport. This results in the normal right hand fixed-wing circuit being changed to a left hand circuit on Tuesday and Thursday evenings, unless, as on this occasion, a Tuesday, the helicopter operating area is active. The controller added that he had received a telephone call from the flying school earlier in the evening, querying why ac were carrying out right hand circuits, as the school had not booked the helicopter area for their ac. (The EC135 is not operated by the school.)

The controller said that he saw the PA28 approaching the overhead but did not see the ac route to the dead side, as he was concentrating his attention on the circuit traffic right hand downwind. He added that he first became aware that an incident had occurred at 1918, when the EC135 reported an "Airmis" with an ac which had transited the helicopter area at "1000 ft." The PA28 called immediately confirming its altitude as 1500 ft. The controller said that, although he could see the helicopter, he did not see the fixed-wing ac. He recollected that at the time the helicopter was crosswind, in Helicopter Area 1, near the threshold of RW 12.

MATS Part 1, Page 2-1, 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". Also, Page 3-1, states that: "An air traffic control unit at an aerodrome outside controlled airspace (Class F and G airspace) shall provide approach control services to ac, as determined by the aerodrome operator and approved by the Authority, from the time and place at which arriving ac place themselves under the control of approach control until control is transferred to aerodrome control." This statement is repeated in the Oxford MATS Part 2, Page 4-1. MATS Part 1, Page 1-11, confirms that : "Standard

vertical or horizontal separation shall be provided, unless otherwise specified, between IFR flights in Class G airspace being provided with a service by an approach control unit." However, Oxford ATC is authorised to use reduced separation in the vicinity of the aerodrome as stated in MATS Part 1 and the Oxford MATS Part 2. "In the vicinity of aerodromes, the standard separation minima may be reduced if: (a) adequate separation can be provided by the aerodrome controller when each ac is continuously visible to this controller; or (b) each ac is continuously visible to the pilots of other ac concerned, and the pilots report that they can maintain their own separation, or (c) when one ac is following another the pilot of the succeeding ac reports that he has the other in sight and can maintain separation."

The advisability of ac descending on the dead side to 1500 ft at night, when helicopters are operating in the Helicopter Training Area at 1300 ft QNH, was discussed. The controller commented that, in his opinion, although fixed-wing ac descend to 1500 ft on the dead side, they tend not to level off until crossing the upwind end of the runway. The CSE Flying Order Book informs its pilots that helicopters fly night circuits at Oxford Airport at 1000 ft agl. It states that: "Fixed-wing ac joining at night are to remain both vertically and horizontally clear of helicopters in the circuit at Oxford." It is considered that the use of the overhead join at night, when the Helicopter Operating Area is active, should be reviewed locally to reduce the possibility of any conflicts, especially as the standard overhead join altitude of 2300 ft does not provide standard vertical separation from the fixed-wing circuit.

Having placed himself under the control of the combined ADC/APP ATC service, the PA 28 pilot was entitled to standard separation or reduced separation in the vicinity of the aerodrome. In the event, the controller did not comply with the rules applicable to the latter as he did not pass sufficient traffic information to allow the pilots to provide their own separation, nor was he able continuously to monitor the flights visually. Therefore, standard separation

was required. Accordingly, it is assessed that the controller must take some responsibility for the Airprox. However, although this lapse occurred, it would appear that the operation was conducted in accordance with normal operating procedures at Oxford Airport.

UKAB Notes:

1. LATCC radar recordings show the PA28 approaching from the N and orbiting to the right in a descent to the N of the field on the dead side. As it rolls out crosswind at 1000 ft Mode C a primary only return appears close in its 6 o'clock for one sweep only. 1000 ft Mode C equates to 1460 ft QNH, 1190 ft QFE.
2. The ATC and flying operators at Oxford carried out a review of procedures, which concluded that the school was using a join which did not take account of the additional rules required for night IFR and associated separation. Also, many pilots thought if they declared VMC, responsibility for separation shifted to them. A revised night/IFR standard join has been agreed with other measures for separation and safe integration; a TOI reflects the agreed pilots' and controllers' responsibilities while night flying under night IFR, and the school has issued appropriate instructions for pilots. Changes will be incorporated in the MATS Pt 2 at the next amendment.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members were advised that the comment in the ATSI report that the standard procedure was for ac to join overhead at 2300 ft was a misperception; pilots are taught to join 1000 ft above circuit height, which may vary.

Members agreed that the PA28 pilot and the controller played a part in the cause of this Airprox but the extent to which each was involved provoked a lengthy discussion. The PA28 pilot flew a non-standard join; it was not known why he flew 2 descending orbits to the N and W of the runway unless his earlier restriction to remain N of the airfield for departing traffic had been a factor. The Board considered that if he had come over the threshold of RW 02 at 2500 ft and flown a wide descent to circuit height at the upwind end he would have had a better chance of seeing and avoiding the helicopter. However, members had reservations in that it was still only by chance that he might have seen the helicopter earlier, and while critical of him for not flying a standard overhead join, they did not believe this factor to be the primary cause of the incident. What was required, members agreed (especially in the light of the small vertical separation between the 2 circuit heights) was this: the PA28 pilot should have been given specific traffic information on the helicopter; the

pilot should have acknowledged seeing it and accepted responsibility for avoiding it, before he was cleared into the circuit. Controller members stressed that, at night, the ADC was required to separate the ac as stated in Part A before clearing the PA28 into the circuit. His options were (with both ac in sight from the VCR) to give them instructions to keep them clear of each other or to satisfy himself that the pilots could see each other and could maintain their own separation. This was not done and the Board agreed that this was the cause of the Airprox.

It had appeared to the pilots that they had passed at the same level, but their respective bank angles and the lack of a horizon at night may have made it seem so. The pilots' reported altitudes, confirmed by radar in the case of the PA28, indicated that the ac were vertically separated by 200 ft. However, in view of the relatively late sightings and lack of time for avoiding action, the Board assessed that the safety of the ac had been compromised.

### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Oxford ATC allowed the PA28 to descend into conflict with the EC135 without establishing the required separation.



helicopter was over banked outside the flight envelope in order to achieve separation. The pilot estimates that the nearest of the Tornados passed about 700 m away and 300 ft above the helicopter, in a climb, with no apparent indication that its crew had seen his helicopter nor taken any avoiding action.

**THE TORNADO GR 1 LEAD NAVIGATOR** reports leading a pair of GR1s, which were the forward element of a large multi ac formation transiting at low-level underneath the western stub of the Newcastle CTA (UKAB Note (1): Class D 1500 amsl – FL 75). The ac was standard camouflage Grey/Green, navigation lights and HISLs were on. The weather deteriorated rapidly as they flew SW and necessitated a low-level abort to fly above their safety altitude. The leader climbed on 200°(T) at 350 kt and attained VMC at 4000 ft Tyne RPS (1026 mb), whereupon the crew spotted a helicopter L 10 o'clock in excess of 1.5 NM away. This was reported to the No 2, who had apparently entered the Class D CAS surrounding Newcastle and declared a PAN on 'Guard'. The No 2 also climbed to 4000 ft and reported sighting the helicopter in his L 9 at more than 1 NM. The pair re-joined in formation at about 5000 ft and throughout maintained visual contact on the helicopter. The minimum horizontal separation between the Sea King, the lead GR1 and the No 2 he thought was 1.5 NM and 1 NM respectively, whilst all three ac were at the same altitude.

UKAB Note (2): From the radar recording it is possible that the relative position of each Tornado may have been erroneously transposed.

**THE NEWCASTLE RADAR CONTROLLER** reports that the Sea King crew, flying under a RCS, was instructed to head 290° for a tear-drop pattern to position for the ILS to RW 07. When the helicopter was about 9 NM W of Newcastle an 'emergency' squawk was observed, but garbled with another SSR contact, about 3 NM N of the helicopter. He advised the Sea King crew of this traffic as it climbed towards them but believed no avoiding action could be given owing to the slow speed

of the helicopter and high speed of the jets, which climbed rapidly to the same level. Moments later the helicopter crew reported sighting the ac and turning hard right to avoid it. He perceived the conflicting ac had entered the CTA and estimated the horizontal separation to be 0.5 NM, at co-altitude. Once clear of the other traffic the Sea King was turned back into the pattern.

UKAB Note (3): The 0950 Newcastle weather was reported as surface wind: 020/2; visibility: 8 km; Nil Weather; SCT 800 ft; OVC 1000 ft.

UKAB Note (4): A review of the Newcastle RT transcript reveals the following sequence: At 1000:00, RADAR transmitted traffic information "...unidentified traffic just N of Stagshaw showing 2,500 ft...", which was acknowledged by the Sea King crew. This was followed by a further update from RADAR, "...maintain FL 50 for the moment that traffic's squawking emergency now about 3 miles N of you - standby". The Sea King crew responded "...we're visual traffic in our 2 o'clock about 4 miles, 2". To which Radar reported "...one of them's at 45 climbing now...unable to give you avoiding action they're too close". At 1001:00, the Sea King crew advised "...we'll take a visual avoidance and there's traffic coming down our left-hand side". Thirty seconds later Radar added, "...there's a second one just passing on your left hand side 3 miles", which the Sea King crew acknowledged, "...2 Tornados...we're just going behind the second one now".

**HQ MATO** reports that the Tornado No2 made a PAN call on UHF GUARD, saying they had aborted into CAS at the western edge of the Newcastle CTA. The crew declined further assistance from D&D and changed frequency to continue en-route. The RT exchange took under 30 sec, during which the D&D controller only used the UDF Auto Triangulation Facility; the Emergency squawk was not seen on radar.

**HQ STC** comments that bad weather precluded VMC operations and resulted in the formation correctly initiating a low-level abort. Despite the reported separation, there appears to have



been little risk of collision as the formation had seen the helicopter and reported its position to all other players. A low-level abort is an emergency procedure that cannot, by definition, guarantee deconfliction from other ac.

UKAB Note (5): A review of the LATCC Great Dun Fell radar recording at 1001:10, reveals that the Sea King, identified from the assigned 3/A 3760 squawk, at FL 51 Mode C, tracking toward the western boundary of the Newcastle CTA. At the same time the lead Tornado is shown squawking 3/A 1315 tracking southerly at FL 53 Mode C and just outside CAS, about 2.5 NM NNW of the helicopter. Meanwhile, the Tornado No. 2, identified earlier from the 3/A 'emergency' squawk, is shown at 1000:45, turning westbound barely clipping the NW extremity of the Newcastle CTA. He indicates FL 47 Mode C, before turning southbound on a parallel track in the leader's 4 o'clock at about 3 NM. The Sea King meanwhile can be seen turning onto N, maintaining FL 51 Mode C as the lead Tornado tracks S. They pass at about 0.7 NM, port to port, with the helicopter indicating FL 56 at about 1001:25. At that point the No 2 steadies southbound indicating FL 47. With the lead ac now clear to the S, the No 2 indicating FL 45 then passes 2.3 NM W of the Sea King indicating FL 50. Throughout the whole encounter the Sea King is shown inside the CTA while the Tornado pair remain entirely within Class G airspace.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It was apparent to the Board that in the busy traffic situation within and outwith the Newcastle CTA/CTR, it was necessary for the controller to vector the Sea King for the ILS traffic pattern outside Class D airspace. (See Airprox 184/99, which occurred 3 minutes later and also

involved the Sea King). The STC member reinforced the dominant role played by the weather, which had not been at all as forecast, but had changed very rapidly and locally; very poor conditions had forced the Tornado crews to execute low-level weather-abort climbs. Their main priority had been to gain altitude, get clearance above the local terrain and attain a safe transit level above their planned safety altitude. With due regard to the importance of avoiding CAS, which they did, their priorities were correct in gaining space between themselves and climbing straight away, wings level. Clearly the No 2 did well to avoid CAS. Indeed, a civil controller member commented that the call from the No 2 on Guard was wise and especially the emergency squawk, which was very beneficial in alerting controllers to unpremeditated incursions into CAS should they occur. Some members asked if it was reasonable for the helicopter pilot to exceed the ac limitations when he turned to avoid the Tornado. A helicopter pilot member believed that this was indeed reasonable in the circumstances, when confronted with a potential close quarter's situation. It seemed from the geometry in this case that a conflict resulted between the respective ac close to the boundary of CAS; the Sea King pilot's own avoiding action had kept him within the Class D CTA, whilst the Tornado pair had remained just outside the boundary. Therefore, members agreed that the cause of the Airprox was a conflict near the boundary of the Newcastle CTA. Turning to risk, the controller's timely traffic information had alerted the helicopter crew to the presence of the Tornado pair as they climbed and, significantly, had allowed the Sea King crew time to turn and avoid the fast jets. Similarly, both Tornado crews spotted the helicopter and kept it within sight throughout, thereby enabling them to manoeuvre if need be within Class G airspace. In the end the members agreed that there had not been a risk of a collision.

The military low-flying advisor to the Board then briefed members on actions taken as a result of concerns expressed by Newcastle regarding military involvement in 3 Airprox (182, 183 & 184/99) that had occurred in this vicinity within

a short period of time. Following consultation between MOD AS21, DAP, Newcastle Operations and ATC staff, a number of measures had been agreed to reduce the potential for conflicts between military exercise traffic and GAT in the vicinity of Newcastle. For a trial period, during major exercises where exclusive use of LFA12 is granted, a temporary additional airspace buffer will be placed around the Newcastle CTR/CTA. This 'buffer' must be avoided by exercise participants (unless prior permission has been obtained from Newcastle) but does not apply to normal day to day operations in the LFS and will

be promulgated to exercise participants by the Co-ordinating authority when appropriate. Additionally, crews of all military ac within the LFS intending to transit the specified 'Flow' through the Hexham Gap W of Newcastle, are now required to call Newcastle APPROACH 2 minutes before the Gap and advise them of their transit. Similarly, when transiting E of Newcastle crews should also make an advisory call to Newcastle APPROACH. These measures aim to enhance flight safety in this particularly busy area and the trial procedures will be reviewed toward the end of 2000.

**PART C: ASSESSMENT OF RISK AND CAUSE**

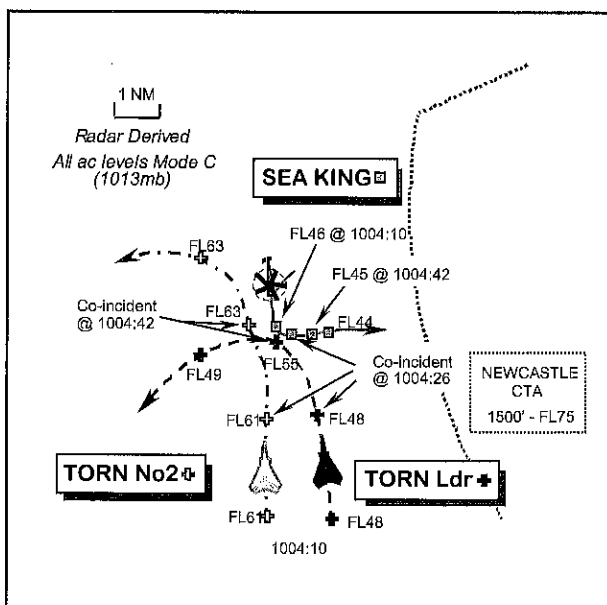
Degree of Risk: C

Cause: Conflict near the boundary of the Newcastle CTA.

**AIRPROX REPORT No 184/99**

Date/Time: 14 Oct 1004  
Position: N5500 W0204 (14 NM W of Newcastle - elev 266 ft)  
Airspace: FIR (Class: G)  
Reporter: Newcastle ATC

<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u> Sea King Mk 3	Tornado F3
<u>Operator:</u> HQ STC	HQ STC
<u>Alt/FL:</u> 5000 ft (QNH 1030 mb)	6000 ft (RPS 1026 mb)
<u>Weather</u> IMC	VMC CLAC
<u>Visibility:</u> Not reported	10 km
<u>Reported Separation:</u>	1 NM H
<u>Recorded Separation:</u>	0.8 NM H/800 ft V



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

**NEWCASTLE ATC** report that about 3 minutes after a previous encounter (Airprox 183/99) the Sea King was being vectored for an ILS approach to RW07. Whilst under a RAS from Newcastle RADAR, outwith CAS, the Sea King

crew was instructed to descend when ready to 3500 ft and turn onto 170°. The pilot reported flight conditions as 'IMC shortly entering cloud'. The controller observed unknown traffic closing at high speed from the S. Traffic Information was given to the helicopter crew on what he perceived was a four-ship formation indicating

FL 50 Mode C and an avoiding action L turn onto 090°. The minimum horizontal separation was reported as 1 NM. The Sea King then continued with the ILS.

UKAB Note (1): The RT recording reveals that just after the initial traffic information was issued at 1004, a further call was given “...as you turn that traffic coming into your half past 2 at a range of 3 miles coming toward”. The Sea King crew immediately responded “...we’re visual with that traffic now turning away”. After RADAR acknowledged, the helicopter crew added “...only have one ac is there any other traffic?” RADAR responded, “...the closest one 2 o’clock range of a mile”, which the crew reiterated that they had seen before they reported leaving 5000 ft 1030 mb in descent.

UKAB Note (2): The 0950 Newcastle weather was reported as surface wind: 020/2; visibility: 8 km; Nil Weather; SCT 800 ft; OVC 1000 ft.

**THE SEA KING PILOT** reports that he was engaged in an IRT and receiving radar vectors from Newcastle RADAR at 90 kt whilst sequencing for an ILS approach to RW07. Whilst descending from 5000 ft to 3500 ft QNH (1030 mb), he thought IMC in cloud, RADAR issued avoiding action which was complied with. He reports that no other ac was sighted and did not assess the risk of a collision.

UKAB Note (3): It is evident from the RT transcript that a Sea King crewmember did see the reported traffic and that the Airprox occurred before descent was initiated from 5000 ft QNH.

**THE TORNADO F3 PILOT** reports heading 360° at 400 kt as a pair, whilst flying straight and level at 6000 ft RPS, after a pre planned intercept with Tornado GR1s. Another ac was spotted and identified as a Sea King helicopter heading E, just above the cloud tops as they closed from the S. They turned L to pass astern of the Sea King by about 0.5–1 NM, whilst 500–1000 ft above it. There had not been a risk of a collision as the helicopter had been seen and avoided.

**ATSI** reports with RT transcript that there were no apparent civil ATC causal factors. The Newcastle controller passed timely avoiding action and traffic information which enabled the Sea King crew to acquire the closest Tornado visually. The Sea King was outside CAS at the time of the Airprox; its training detail resulted in it entering and leaving periodically. On this occasion the crew was not advised that the helicopter had left CAS, but had been advised that it was under a RAS when outside CAS.

**HQ STC** comments that the Tornado crew, operating in VMC, was visual with the helicopter at long range and manoeuvred to ensure what they considered to be safe separation. However, it is understandable that, given the flight conditions in which the helicopter was operating, the Newcastle controller considered the separation between the subject ac to be less than ideal and that the safety of the ac that he was controlling had been compromised.

UKAB Note (4): The LATCC Great Dun Fell radar recording reveals this Airprox occurred at about 1004:34, entirely within Class G airspace. The Sea King, identified from its assigned squawk is shown shortly after 1004, turning eastbound at FL 46 Mode C (1013 mb). Meanwhile, a Tornado pair is the closest of a group of four contacts that transit northbound, with the leader and No 2 indicating FL 48 and FL 61 Mode C respectively. The ac converge and the Tornado leader commenced a L turnabout and climbed to FL 53 at 1004:34, whilst passing 0.8 NM astern and 800 ft above the eastbound Sea King at FL 45. The leader attains 1000 ft vertical separation above the Sea King 8 sec later, whilst also turning to pass behind the No 2 Tornado indicating FL 63, which also turns about. The CPA between the Sea King and the No 2 was 1.1 NM and >1500 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

There was little debate over this Airprox, the third in this vicinity in a short space of time. However, in this instance all the ac involved were in Class G airspace. It was clear to the members that the Sea King pilot had forgotten he had seen the Tornados, as evinced by the RT transcript, which was not surprising in the light of subsequent events. Members agreed that the Newcastle controller had provided timely traffic information and avoiding action which enabled the Sea King crew to spot the Tornado approaching from the S. Similarly, the Tornado crews had sighted the Sea King at range and had turned to pass astern of the helicopter by a suitable margin. Moreover, it was entirely understandable that the Controller had reported the situation especially in light of preceding events and members supported the comments by STC. But in the end it was clear that the respective crews had all seen each other in plenty of time and that this reported Airprox resulted from a controller perceived conflict; there had not been a risk of a collision.

The military low-flying advisor to the Board then briefed members on actions taken as a result of

concerns expressed by Newcastle regarding military involvement in 3 Airprox (182, 183 & 184/99) that had occurred in this vicinity within a short period of time. Following consultation between MOD AS21, DAP, Newcastle Operations and ATC staff, a number of measures had been agreed to reduce the potential for conflicts between military exercise traffic and GAT in the vicinity of Newcastle. For a trial period, during major exercises where exclusive use of LFA12 is granted, a temporary additional airspace buffer will be placed around the Newcastle CTR/CTA. This 'buffer' must be avoided by exercise participants (unless prior permission has been obtained from Newcastle) but does not apply to normal day to day operations in the LFS and will be promulgated to exercise participants by the Co-ordinating authority when appropriate. Additionally, crews of all military ac within the LFS intending to transit the specified 'Flow' through the Hexham Gap W of Newcastle, are now required to call Newcastle APPROACH 2 minutes before the Gap and advise them of their transit. Similarly, when transiting E of Newcastle crews should also make an advisory call to Newcastle APPROACH. These measures aim to enhance flight safety in this particularly busy area and the trial procedures will be reviewed toward the end of 2000.

### **PART C: ASSESSMENT OF RISK AND CAUSE**

*Degree of Risk:* C

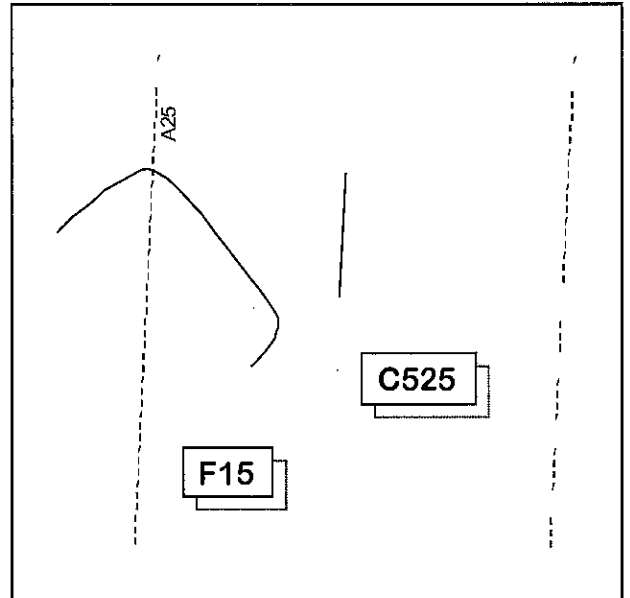
*Cause:* Controller perceived conflict.

## AIRPROX REPORT No 185/99

Date/Time: 14 Oct 1505  
Position: N5305 W0310 (18 NM S of WAL)  
Airspace: Airway A25 (Class: A)  
Reporter: Manchester W RC

<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u> Cessna 525	F15
<u>Operator:</u> Civ Exec	Foreign Mil
<u>Alt/FL:</u> FL 175 ↑	↓ FL 140

Weather VMC CLAC VMC CLNC  
Visibility: 50 km  
Reported Separation: NK/NK  
Recorded Separation: 1 NM



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

**THE MANCHESTER W RC** reports that he was aware of a number of military radar contacts in the FIR S of Wallasey which were repeatedly coming in close proximity to A25. This gave him some concern and he ensured that ac in the airway were kept well away from the W edge of it. His co-ordinator contacted London Mil to express their concern. The C525 was southbound on the airway and, having transferred it to LATCC on a radar heading against other similar traffic, about to be transferred, a high speed return was seen tracking towards the Cessna. This prompted his co-ordinator to warn the CSC at LATCC but the unknown ac entered the Airway and flew in close proximity to the Cessna. It was subsequently traced as an F15.

**THE CESSNA 525 PILOT** reports heading 210° at 340 kt and was advised after the flight that a military ac had flown close to his ac as he was climbing through FL 175. He did not see it but heard that one of his passengers had seen it pass by on the starboard side about 1 NM away and slightly above. He considered the risk of collision as slight.

**THE F15 PILOT** reports flying a descending right turn at 400 kt during an air combat training sortie when passing the given Airprox position

in clear sky. He was on a discrete RT channel and did not see the Cessna 525.

#### UKAB Notes:

1. LATCC radar recordings show the F15 entering the airway at FL 179 on a NE track; it turns SE towards the C525. When just under 1 NM from it, the F15 turns sharply right and exits the airway to the SW. It shows FL 149 just after the CPA and continues its descent.
2. The F15 wing expressed concern that this was one of several recent infringements of airspace and violation of rules in UK airspace recently. The wing has spent much time on Balkan operations and is out of recent touch with a training as opposed to an operational environment. Remedial action is ongoing.

### PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate operating authorities.

Members noted that although the Manchester controller had filed the incident, the C525 had been transferred to LATCC by the time the incident occurred. ATSI advised that the conversation between the LATCC CSC and Manchester occurred at the same time as the incident and that there had been insufficient time to apply avoiding action to the C525. It was unclear if the C525 had actually made contact with then with LATCC. There was no

doubt in the Board's mind that the cause of the incident was an unauthorised penetration of A25 by the F15, whose crew did not see the C525. The degree of risk provoked some debate; while the minimum separation was about 1 NM, members took account of the fact that neither pilot saw the other ac at all and concluded that the safety of the ac had been compromised.

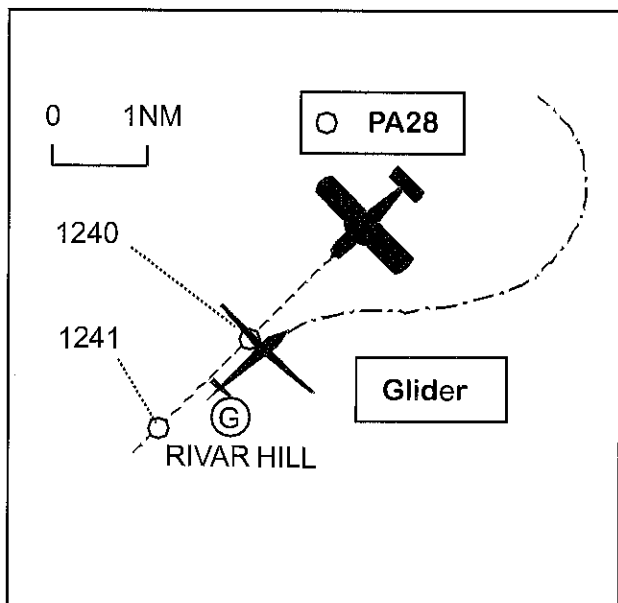
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Unauthorised penetration of A25 by the F15 crew, who did not see the C525.

**AIRPROX REPORT No 186/99**

Date/Time: 13 Oct 1240  
Position: N5121 W0132.5 (1NM ENE Rivar Hill elev 730 ft)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Ka8 Glider PA28  
Operator: Civ Pte Civ Pte  
Alt/FL: 2800 ft 3000 ft  
 (aal) (QNH 1031 mb)  
Weather VMC VMC CLBHZ  
Visibility: 15 Km 15 Km  
Reported Separation: 50-100 ft H & 50 ft  
 V400 m H & 100 ft V  
Recorded Separation: Not recorded



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

**THE KA8 PILOT** reports that he had just completed a thermal climb and was in level flight at 2800 ft above Rivar Hill Glider Site at 40 kt, heading 075°. Whilst scanning, another ac was sighted ahead at a range of about 2 NM and approaching head-on in level flight at about the same height. Vigorous 'wing wagging' conducted to aid conspicuity had no apparent effect and as the ac closed he considered it was

necessary to move out of its way. He turned R and then reversed the turn as the other ac, which he identified as a PA28, passed down the port side about 50 –100 ft away and 50 ft below his glider. The ac registration was noted as it flew past about 1 NM NNE of Rivar Hill. The L turn was resumed to keep the PA28 in sight, which then flew directly above another glider circling to the W of Rivar Hill glider site, without any apparent alteration of course.

**THE PA28 PILOT** reports routing via the COMPTON (CPT) VOR to Compton Abbas at 3000 ft on a heading of 233° (M) at 115 kt. He was trying to make contact with Boscombe Down for a MATZ crossing but they seemed very busy and he was becoming concerned as he got closer. Aware of gliding activity in the vicinity, the subject glider was first seen 4-500 m away at L 11 o'clock, heading in the opposite direction with the range opening away. Though the look-out ahead and to port had been impaired by the sun he considered that the glider would pass clear to port and that an avoiding action R turn was not required. The glider subsequently passed about 400 m away to port and 100 ft above his ac, with no risk of collision. The encounter was not considered at the time to warrant an Airprox.

UKAB Note (1): At ENR 5-5-1-4, the UK AIP promulgates Rivar Hill, elevation 730 ft amsl, as a winch launch glider site active during daylight hours to 3000 ft agl.

UKAB Note (2): This Airprox is not clearly shown on recorded radar as the subject glider is not evident. Analysis of the LATCC Pease Pottage radar recording shows the identified PA28 tracking south-west from CPT and squawking 3/A 7000 without Mode C. At 1240, coincident with the time of the Airprox reported by the Glider pilot, the PA28 is shown about 1 NM NNE of Rivar Hill with a primary contact 2 NM ahead, but to the WSW of the glider site. Hence, the primary contact is perceived to be the second glider allegedly overflowed by the PA28; the subject glider is not displayed. The PA28 passes less than 0.5 NM NW abeam Rivar Hill at 1240:40, on a steady course.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board as a whole was disappointed to be presented with yet another Airprox occurring in the immediate vicinity of a promulgated winch

launch glider site. The PA28 pilot had been endeavouring to contact Boscombe Down on RT, which may have concentrated his mind inside the cockpit rather than out. As an aside one GA member believed that the PA28 pilot had left it exceedingly late if he had not established communication until the point of the reported Airprox location. Of course this may have been indicative of the general level of activity in the area at the time if Boscombe was that busy. The lesson here was that pilots should be aware that ATSUs can be very busy with a multitude of responsibilities and may not be able to provide services instantaneously. Therefore, ATSUs should be contacted early, especially when operating in confined airspace, as in this case, in the vicinity of many danger areas. If need be pilots should be prepared to detour from planned routes if ATSUs are unable to answer requests for MATZ/ATZ/danger area crossings etc.

A member experienced in gliding explained that, in general, the least experienced glider pilots will be encountered in the immediate vicinity of, or overhead, glider sites. It was important, therefore, for pilots of powered ac to afford as wide a margin as possible. A GA member agreed in principle with this viewpoint but given the crowded nature of the lower airspace, especially across the busier areas of the London FIR thought this was sometimes difficult to achieve. The Board was advised that many flight safety publications do try to publicise this whole matter. However, the positions of active glider sites are clearly marked on CAA Charts and should be avoided by an appropriate margin. In this instance the PA28 pilot was aware of gliding in the vicinity, as stated in his report, and he did eventually spot the subject glider, albeit at a late stage. Members noted that the glider's 'wing waggle' had little apparent effect in attracting the PA28 pilot's attention. It is accepted that gliders are notoriously difficult to spot, and their small cross-section makes this especially so when approaching them head-on. Conversely, the glider pilot had reported seeing the PA28 at a range of 2 NM. Consequently, many members were surprised that he left it so late to take any action to avoid the PA28, which he reported still

got to within 50-100 ft horizontally to his glider. In mitigation it was recognised why, in a thermal climb, the glider pilot would be reluctant to manoeuvre away and lose the available lift. Rules of the Air required the PA28 pilot to 'give way' to the glider, but the Board still thought the glider pilot had left his avoidance turn too late.

Members concluded, therefore, that this Airprox resulted from a late sighting by the PA28 pilot of the glider, whose pilot left his own avoiding action too late. Turning to risk, the PA28 pilot clearly did not view the encounter as risk

bearing and there was a significant difference of opinion between the pilots on separation, which unfortunately could not be resolved from the radar recording. It was noted that the separation reported by the PA28 pilot was probably judged whilst the glider pilot was manoeuvring away. Given the continual observation of the PA28 by the Glider pilot throughout the encounter and his manoeuvre away from the PA28's track, members were persuaded that there had not been an actual risk of a collision in the circumstances that pertained.

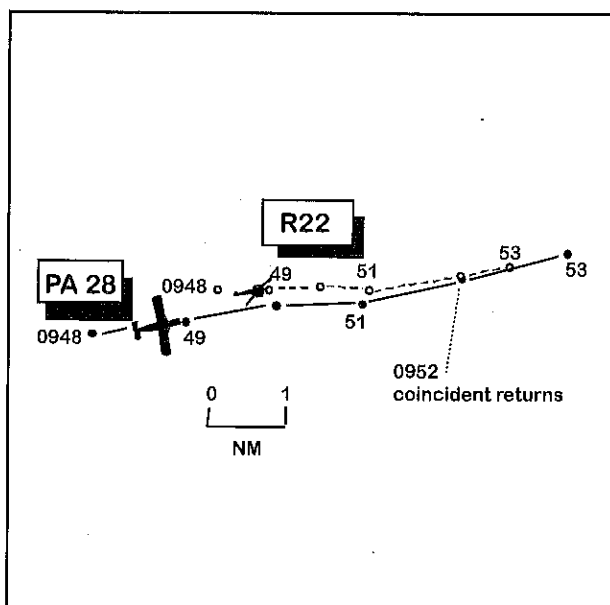
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Late sighting by the PA28 pilot and late avoiding action by the Glider pilot.

**AIRPROX REPORT No 187/99**

Date/Time: 17 Oct 0952 (Sunday)  
Position: N5051 W0003 (205 NM W Lewes)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: R22 Helicopter PA28 Archer  
Operator: Civ Trg Civ Club  
Alt/FL: 1800 ft 2000 ft  
 (QNH 1018 mb) (QNH 1018 mb)  
Weather VMC NIL CLOUD VMC SKY  
 CLEAR  
Visibility: 5 NM 5 - 7 km  
Reported Separation:  
 75 - 100 ft H // 005 NM H  
Recorded Separation: <200 m H



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

**THE R22 PILOT** reports that he was routing from Shoreham to Lydd in VMC with a student under training. He was in contact with Shoreham APC on 123015 and squawking 7000 with Mode C off. The visibility, under a high sun, was a hazy 5 NM. When about 2 NM

W of Lewes, heading 100° at 80 kt and cruising at 1800 ft (QNH 1018), a PA28 appeared without warning from his rear starboard quarter, behind his student, 75 – 100 ft away and 20 – 30 ft above. There was no opportunity to take avoiding action due to its sudden appearance, and he felt there could have been a high risk of collision.



UKAB Note (1): The pilot was subsequently asked if he could read the registration of the other ac. He said that it passed him too quickly to enable him to do this.

**THE PA28 PILOT** reports that he was routing from Shoreham to Calais in VMC at 2000 ft (QNH 1018) at 115 kt with 2 passengers on board. The visibility was 5 – 7 km. He was receiving a FIS from London Information on 12406 and squawking 7000 with Mode C. Between Lewes and Hailsham he saw a Robinson helicopter 3 – 4 NM away to his L as it tracked on a similar heading about 500 ft below him. There appeared to be little convergence of tracks but he turned onto a SE heading to widen the separation and passed the helicopter 005 NM away and 500 ft above with an overtake speed of about 40 kt. The ac was under continuous observation, vision was good and there were no cockpit distractions. At no time did he or his passengers even remotely consider that this could be a reportable incident. The pilot adds that the helicopter was far enough away not to be able to read its registration.

UKAB Note (2): The PA28 pilot's report was accompanied by a witness statement from a PPL passenger which corroborates his description of the encounter.

UKAB Note (3): A large scale recording of the Pease Pottage radar shows both ac, identified on departure from Shoreham, on easterly headings to the E of Shoreham, the PA28's track very slowly converging with that of the R22; both ac are squawking 7000 but neither shows Mode C. At 0948 the PA28 is 108 NM from the R22 at its 5030 position. By 0952 the PA28 has caught up with the helicopter about 205 NM W of Lewes, and the radar returns of the 2 ac have merged such that it is impossible to measure the separation; this would suggest that the ac were considerably closer together laterally than the PA28 pilot had estimated, probably within 200 m or less.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac and a radar recording.

The Board noted from the radar recording that the tracks of the 2 ac gradually converged towards the point of closest passage. Contrary to the PA28 pilot's belief that they had passed the R22 by some 005 NM, it is evident that the lateral separation attained was considerably less than that. This mis-perception of distance, and the crew's inability to read the R22's registration, was probably due to the latter's very small size. Furthermore, members thought it unlikely that the small R22 would have been visible to the PA28 pilot at the 3 – 4 miles initial sighting distance he reported.

Rule 17 (2) (4a) of the Rules of the Air states that an ac being overtaken has right of way and it is the responsibility of the overtaking ac to keep to the R until the ac are clear of each other. While no minimum separation distances are specified under the Rules, good airmanship would dictate that a pilot overtaking another ac should do so in a manner least likely to cause alarm to its pilot. In this case, members felt that the PA28 pilot, having approached the R22 unseen from behind, misjudged his distance and overtook the R22 close enough to cause its pilot concern for his safety. However, as he had maintained continuous visual contact with the helicopter and was always in a position to take avoiding action if it became necessary, the Board concluded that there had not been a risk of Collision.

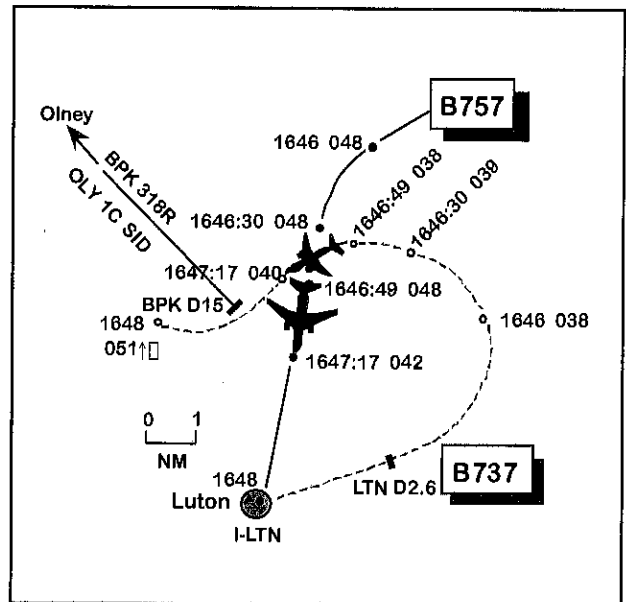
## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The PA28 pilot flew close enough to the R22 to cause concern to its pilot.

### AIRPROX REPORT No 188/99

Date/Time: 16 Oct 1647 (Saturday)  
Position: N5156 W0021 (305 NM N Luton airport)  
Airspace: LTMA (Class: A)  
Reporter: Luton ATC  
First Aircraft Second Aircraft  
Type: B73-3 B75-2  
Operator: CAT CAT  
Alt/FL: ↑ 6000 ft ↓ 3000 ft  
(QNH) (QNH)  
Reported Separation: N/A  
Recorded Separation: @1.6 NM/200 ft



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LUTON ATC reports that the Luton radar controller on duty was unaware that a loss of separation had occurred at the time. The Airprox was subsequently brought to light following analysis of the SMF data at LATCC.

The Luton radar INT controller reported retrospectively that the B757 was inbound for RW 08 at 5000 ft altitude and being vectored overhead the airfield prior to positioning for a RH circuit to this ILS. The B737 was outbound on an OLY IC SID, whose route conflicted with that of the B757. In order to resolve the confliction, the controller's plan was to restrict the B737's climb to 4000 ft against the B757 at 5000 ft and then give further descent/climb clearances (the B737 up to 6000 ft and the B757 down to 3000 ft) as soon as their paths had crossed. This plan was initiated, but instead of routeing direct to OLY as expected, it appeared that the B737 turned to the SW before regaining its northwesterly track. The controller asked the B757 to expedite descent

in order to achieve separation from another ac departing outbound on a CPT SID. Unfortunately, in complying with this request the B757 descended more rapidly than he had anticipated which, together with the B737's unexpected turn to the SW, caused a loss of separation; however, this did not occur until after the acs' tracks had crossed.

The controller said that it came as some surprise to learn of the loss of separation because he noticed nothing amiss at the time. A complex interaction of routes laced the area and prompt climbs and descents were essential if traffic was to be kept within CAS. However, he accepted that in this case, even though the paths of the ac had crossed, their tracks were not diverging enough for separation to be assured.

UKAB Note (1): Neither of the pilots concerned were aware that an incident had occurred and they were therefore unable to submit a report.

However, some time later UKAB staff spoke to the Captain of the B737 and described to him the SID flight path of his ac as seen on radar. Having discussed this with his FO on the day, who was flying the ac at the time, he contacted UKAB and said that he now recalled the flight because he remembered being given what he thought was an unusual heading to fly shortly after departure. Noting that the B757 was turning L at about 1646, he thought there was a possibility that he had responded to the B757's heading which resulted in their prolonged turn onto a SW heading; this was quickly rectified, however, when ATC instructed them to route directly to Olney. (This theory is supported by the RT transcript for 129.55, which shows that at 1645:30 the B757 was instructed to ...turn L heading 200°...and at 1647:30 the B737 pilot was instructed to...*route direct to Olney*...). However, the B737 pilot went on to say that out of interest he had monitored the ac's FMS on 2 recent OLY 1C departures off RW 08. On both occasions the flight path flown showed that the ac turned as far L as about 240° - 250° before intercepting the BPK 318 radial. He pointed out that the profile flown would in any case vary, according to the wind strength and the ac's speed. Furthermore, the OLY 1C SID instructions require only a L turn at LTN/D205 to intercept the BPK 318R. No heading restriction is specified in the execution of this procedure.

**ATSI** reports that there is a Standing Agreement between LATCC - TC and Luton ATC; ac arriving via LOREL are not subject to a tactical Full Release and Essex Radar is responsible for transferring control of such traffic to Luton Approach. Among other things, this means ac need to be at or descending to 5000 ft (Luton QNH), and level by the eastern edge of airway B4. These ac are then required to be on a W heading to enter and remain within the Luton Radar Manoeuvring Area (RMA) when passing through the 'Luton Gate' (defined as a line running N from LOREL to the boundary between the LTMA 4500 ft and LTMA 5500 ft. The 'Gate' is also the inbound release point from Essex Radar in accordance with the Standing Agreement). The Luton Director is responsible for providing separation between inbound traffic, transferred to Luton by the

Standing Agreement, and Luton departures released by TC North.

The Luton Radar INT Director described his workload as light to moderate at the time of the incident. The B757 pilot contacted Luton Approach at 1643, reporting, in accordance with the Standing Agreement, reaching 5000 ft on a radar heading of 270°, at a speed of 250 kt. The Director explained that because of the restricted airspace to the NW of Luton airport, normal operating practice when RW 08 is in use is to route inbound ac through the Luton Gate to the Luton overhead, preparatory to vectoring them RH downwind. Accordingly, the B757 was instructed to turn L heading 245° to commence the routeing to the overhead.

The B737 departed from Luton on an OLY 1C SID, contacting Luton Approach at 1644 approaching 3000 ft. Routeing for this SID reads: "Climb straight ahead to I-LTN d2.6 then turn left onto BPK VOR R318 to Olney". Altitudes are to: "Cross BPK d15 above 3500 ft, BPK D21 at 6000 ft". In accordance with local instructions, the GMC controller had passed the flight a restriction to its initial cleared altitude of 4000 ft, with further climb being issued by radar; this is to ensure separation between the outbound ac and inbounds through the Luton Gate at 5000 ft. The B737 was instructed to maintain 4000 ft on reaching and warned of traffic shortly crossing at 5000 ft. The B757 was instructed to turn L heading 200° towards the overhead, and was warned of traffic crossing underneath at 4000 ft. The pilot replied: "Roger got him on TCAS".

The Director said that his plan was to wait for the flight paths of the subject ac to cross, then climb the B737 to 6000 ft in accordance with the SID, and descend the B757 to 3000 ft. He explained it was important to start the B737 climbing to keep it within CAS, and also to commence the B757's descent because of a conflict with an ac on a Compton SID, which had been released for departure. (This routeing involves a R turn after departure onto a westerly heading, climbing to 4000 ft).

At 1646:39, observing that the tracks of the subject ac had crossed, the Director instructed the B757 to descend to 3000 ft with a "good rate through four". The B737 was then given clearance to climb to 6000 ft. A radar photograph at 1646:43 shows the ac approximately 1.5 NM apart, with the B737 turning onto a westerly heading to the NE of the B757. The Director said that he judged that the lateral distance between the ac would increase significantly as the B737 continued westbound on the SID and the latter routed southbound. However, he did not ensure that the requisite 3 NM lateral separation was achieved before issuing the respective descent/climb clearances. Believing that the situation was resolved satisfactorily, he did not continue to monitor the two flights and was unaware that a loss of separation had occurred; as far as he could recall the data blocks of the ac were overlapping as they passed, which, he commented, would have made any loss of separation difficult to notice. The B757 descended quickly as requested, and the B737 was transferred to London Control at 1647 with instructions to route direct to Olney. The radar recording reveals that after climb clearance was passed to the B737 it continued its L turn onto a southwesterly direction, which resulted in both lateral and vertical standard separation being eroded. However, by that time the ac were on diverging headings and there was no risk of collision. Good ATC practice requires ac to be put on radar headings before they are cleared to climb/descend through each other's levels, and the Director agreed that in hindsight this is what he should have done with the B737. Luton is not equipped with STCA.

It is of note that a loss of separation between an inbound ac through the Luton Gate and an outbound ac occurred recently in similar circumstances at Luton. This resulted in the filing of an AIRPROX (152/99).

UKAB Note (2): A recording of the Debden radar shows the outbound B737 turning L after departure from RW 08 and climbing to an indicated 3800 ft Mode C. Meanwhile the B757 is approaching the airport from the NE maintaining 4800 ft. The ac are still maintaining

these levels at 1646:49, by which time the B757 has passed ahead of the B737 on a southerly heading, the latter now being at the B757's 7 o'clock range 102 NM. The B737 then performs a climbing 'S' turn through W and SW before resuming a NW track during the course of which it closes on the now descending B757. Separation briefly reduces to about 106 NM laterally and 200 ft vertically; however, there is no risk of collision as the tracks begin to diverge rapidly from this point and standard separation is quickly regained.

### **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included a transcript of the relevant RT frequency, a radar video recording, and a report from the appropriate ATC authority.

The Board quickly concurred with the ATSI adviser that the Airprox occurred because the Luton INT Director had not ensured that standard lateral separation was maintained between the ac after he had dispensed with vertical separation. Had the B737 been placed on a radar heading until vertical separation was achieved the incident would not have occurred. That said, there was considerable sympathy among members for the controller in that he did not issue the climb/descent instructions until after the B757 had crossed ahead of the B737, and had made the not unreasonable assumption that the acs' tracks would quickly diverge from that point. The subsequent loss of separation came about essentially because of the controller's desire to expedite the progress of each ac. However, the Board was satisfied that, given the geometry of the encounter, there had been no possibility of a collision.

A pilot member commented that flying the SID procedure on the FMS would result in a wider than expected turn as the ac would fly at a reduced AOB of about 25°. However, there was nothing to preclude a pilot from doing this, and nothing explicit in this particular SID restricting the intercept heading for the BPK 318R. Consequently, the B737's brief southwesterly

detour might have occurred whether or not the pilot had taken the other ac's turn instruction. Controller members agreed that there was no need to amend the SID procedure in question. The problem only arose on this occasion

because the Luton Controller did not apply fundamental ATC practices when climbing/descending the subject ac on crossing tracks and this was the main lesson to emerge from this incident.

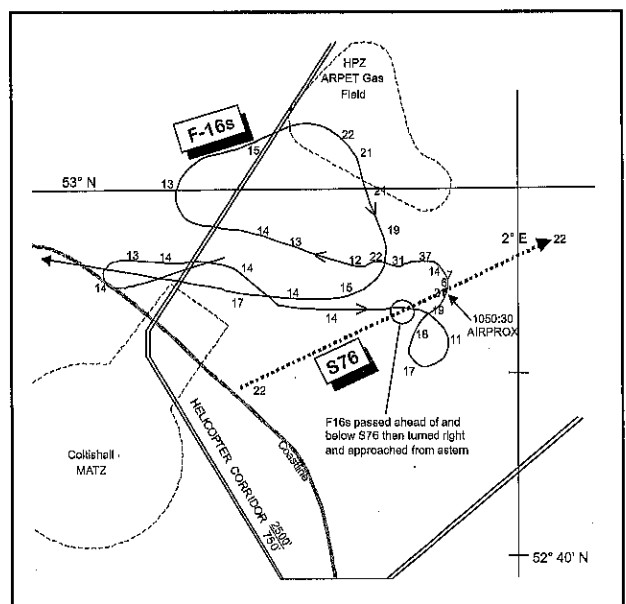
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Luton Radar INT Director did not provide standard separation between the B737 and the B757.

**AIRPROX REPORT No 189/99**

Date/Time: 26 Oct 1050  
Position: N5254 E0153 (21 NM E of Cromer)  
Airspace: FIR/SNSC (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: S76 F16  
Operator: CAT Foreign Mil  
Alt/FL: 2000 ft ↑ 2000 ft ↓  
 (RPS 1006 mb)  
Weather VMC CLBC VMC  
Visibility: Unltd  
Reported Separation: 300 ft V, 200 yd H  
Recorded Separation: 200 ft



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

**THE S76 PILOT** reports heading 068° at 145 kt en route to a Southern N Sea gas platform at 2000 ft and receiving a RAS from Anglia Radar on 125.275. The controller warned him of approaching military traffic and he saw a pair of F16s 6 NM to the N of him and 1000 ft below. These ac flew parallel to his track then crossed left to right below and ahead, continuing to turn right into his 4:30. From there they closed on him in a climb while Anglia Radar provided continuous traffic information, passing 300 ft below and 200 yd across his stern before descending again in his 9 o'clock. He was

unable to assess the risk of collision, but neither ac gave any indication that he had been seen.

**THE F16 PILOT** reports flying in the area when he gained radar contact with the helicopter some 5 NM away. He flew an intercept on it, with it in sight, remaining, he believed, more than 1 NM from it and 1000 ft below it. When advised that Mode C on the radar recording showed that he was within 200 ft of its level he said that this was not the case when he passed it. His operating authority advised that the pilot appeared to be unaware of the status of the airspace for military ac and should have

checked before flying in it. A reminder has been issued and this should not recur.

**THE ANGLIA RADAR** controller's report and RT transcript confirms the details in the S76 pilot's report.

UKAB Notes:

1: The Cromer ATC radar recording shows the F16 formation manoeuvring for some 20 minutes in the Southern N Sea Helicopter Corridor in the area to the W of the Camelot HPZ and in the Arpet HPZ. The formation is mostly at 12-1400 ft Mode C with excursions above 2000 ft and down to 600 ft. The S76 tracks 065° at 2200 ft Mode C and the F16s close on it from the W some 800 ft below, pass it on the left in a right turn and cross ahead L to R. They then perform a wide right orbit to the S of it onto NE and close on the helicopter in a climb to pass close astern of it within 200 ft of its level. After that they manoeuvre extensively in the vertical plane before wandering off via the Arpet HPZ and eventually are seen recovering to Lakenheath who provided their identity.

2: The RAF Planning Document (current at the time, and available to the F16s' Operating Authority) P 203 para 43 d (2) describes the military operating procedures for the S North Sea Helicopter Corridor whose vertical extent is from 750 ft to 2500 ft amsl. Pilots wishing to penetrate or underfly the Corridor are to call Anglia Radar at least 10 NM before arrival. Transit will normally be cleared below 500 ft. A penetration can be approved but continuous operations in it will not normally be approved. HPZs are to be avoided.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The ill-planned and apparently unprofessional conduct of the F16 pilots gave considerable concern to the Board. Members were dismayed at their uncleared flight in the Southern North Sea Helicopter Corridor, their acknowledged interception of what they knew was a civilian helicopter, and their operation in the UK Low Flying System without the necessary clearance, during 20 or so minutes of flight with little apparent military training value. Furthermore, the air force concerned had been asked to investigate the circumstances and to report in accordance with STANAG 3570, but repeated requests by telephone and fax had produced no proper written explanation of the circumstances, and expressed no regrets or apology. This detracted from the credibility of a statement that it should not happen again, and the UKAB eventually had had to make contact directly with the pilots to obtain what few details appeared in Part A. The Board suggested the the UK MOD should be invited to follow the matter up with the F16 operator, along with other issues concerned with the F16s' sortie which had been investigated by HQ P&SS; the adviser from HQ MATO undertook to process these points with the MOD.

The Board concluded that the cause of the incident was the unapproved penetration of the SNSHC by the F16 pilot who flew close enough to the S76 to cause its pilot grave concern for the safety of his ac. While members accepted that, since the pilots had the S76 in sight, there was probably no risk of a collision with it, they appeared unaware of how close they had flown to it.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Unapproved penetration of the SNSHC by the F16 pilot who flew close enough to the S76 to cause its pilot grave concern for the safety of his ac.

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### **AIRPROX REPORT No 190/99**

Date/Time: 20 Oct 1432

Position: N5255 E0003 (3 NM SE of Boston)

Airspace: PMR/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Jaguar JetRanger

Operator: HQ STC Civ Comm

Alt/FL: 390 ft ↓ 1000 ft

(Rad Alt) (RPS)

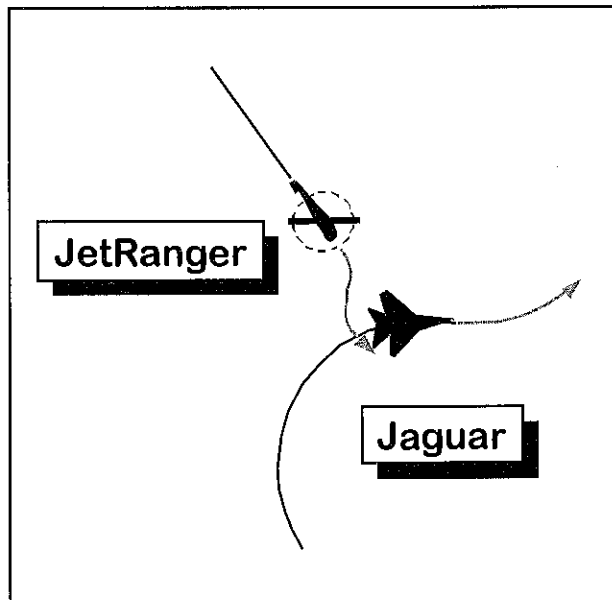
Weather VMC HAZE VMC HAZE

Visibility: 9 km 3-5 NM

Reported Separation:

200 m, 20 ft/300 m

Recorded Separation: As reported



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

**THE JAGUAR PILOT** reports heading 010° at 450 kt while descending into Wainfleet range 10 seconds behind his leader. His navigation kit had failed and he was unfamiliar with the range so his workload was high. While in a 45° AOB right turn he saw what he believed to be a dark blue Twin Squirrel in his 11 o'clock, slightly above and 200 m away, tracking easterly. He tightened his turn and climbed to avoid it, by about 200 m, and considered the risk of collision was high. His leader had not seen the helicopter.

**THE JETRANGER PILOT** reports heading 150° at 105 kt at 1000 ft and receiving a FIS from Coningsby on 120.8. Coningsby warned him of the Jaguars when they were 8 NM away (this was a good call despite being on a FIS) and he saw them at 2 NM. The leader passed well clear and initially he appeared to be in the wingman's 12 o'clock. He considered turning

right but delayed, not knowing what the Jaguar would do; it then turned right slightly to pass about 350 m ahead at the same level. He assumed he had been seen and considered the miss distance commensurate with visual avoiding action in the low level environment. The risk of collision he described as moderate if the Jaguar had departed from the track it was flying.

**HQ MATO** reports that the Jaguar was receiving a FIS from the Wainfleet Range Primary controller on 340.05. There was no mention of an Airprox or a helicopter on RT.

The JetRanger pilot was receiving a FIS from Coningsby Zone on 120.8, at 800 ft on the Coningsby QFE 1007 mb, having just crossed the MATZ. As the helicopter's southerly track would take it through PMR225A (The Wash), Zone informed Holbeach range about the transit at 1429:40. Normally, Zone would have also

advised Wainfleet range of the transit (although there was no formal requirement to tell either range). However, landlines to Wainfleet were not working and, as the JetRanger was tracking well to the west of the Danger Area, the controller felt that there was no need to pursue the matter. At 1430:56, Zone transmitted to the JetRanger pilot "C/S, range traffic indicating similar altitude, right one o'clock, eight miles reciprocal heading, I'll keep you advised." The pilot's reply is not clear on the RT recording. Zone updated the traffic information (TI) at 1431:33 "...previously reported traffic right one o'clock, four miles, maintaining a northerly heading and turning back towards you, inbound to the range." Having established that the pilot was not visual yet, further TI was passed at 1431:49 "Roger, right one o'clock, two miles, reciprocal heading indicating similar altitude." After a further request as to whether he was visual, the JetRanger pilot responded "And C/S contact" at 1432:07.

The Claxby radar recording shows the JetRanger, squawking 3757 without Mode C, on its southeasterly transit through the Wash PMR; its track passes 5 NM SW of the western edge of the Wainfleet range boundary. The Jaguars approach in a 2 NM trail tracking NW. At 1432:06, the lead Jaguar passes 0.5 NM directly ahead of the JetRanger at an indicated 700 ft Mode C, having just rolled out of a R turn onto a heading of about 040°. The trailing ac is then at 2 NM in the JetRanger's 2 o'clock in a R turn passing about 020° and also indicating 700 ft Mode C. The closest point of approach seen on radar occurs 16 sec later at 1432:22, as the second Jaguar passes within 0.25 NM ahead of the JetRanger. There is no height readout on this radar sweep; in the previous sweep the Jaguar is indicating 600 ft and, in the subsequent sweep, has climbed to 1400 ft as it tightens its turn onto 080°. The helicopter may have turned very slightly R as the first Jaguar passed ahead of it. The JetRanger pilot last reported his height (on RT) as 800 ft QFE which equates to 980 ft on the Mode C datum of 1013 mb, with 1000 ft QFE (which he gave in his report) equating to 1180 ft. Coningsby is 25 ft amsl.

The JetRanger's transit took it through PMR225A, a military restriction, which comprises the majority of the lower 3500 ft of the Wash AIAA (SFC-FL 50). Civilian ac are not restricted from entry to the airspace, which is not marked on civilian charts (although the larger Wash AIAA is shown). In providing a FIS, Zone was not required to separate ac; the service, however, is to supply information to aid the safe and efficient conduct of flight. In this case, the controller became aware of a potentially unsafe situation and alerted the JetRanger pilot; the radar evidence indicates that the TI passed by Zone was reasonably accurate throughout.

The Wainfleet controller remained unaware of both the conflict and the Airprox itself. Had he received information about the helicopter transit in time, he could have informed the Jaguars on their initial call. Whilst this would not have solved the conflict in a 'see and be seen' environment, it might have alerted both pilots. The helicopter actually went much closer to Holbeach than Wainfleet and therefore Zone did not consider it more pressing to call the latter. Consequently, Coningsby ATC orders have been amended to include a requirement for both ranges to be informed of all PMR transit ac. Contingency plans to cover periods of landline unavailability have also been included.

**HQ STC** comments that both ac were operating legitimately. However, given that PMR225A is established to enhance the safety of military ac operations close to the ranges of Wainfleet and Holbeach, there may be some value in wider recognition of the benefits of such airspace by military and civilian operators alike. As this Airprox so clearly demonstrates, the existence of an AIAA alone seems insufficient to draw the attention of all operators to the diverse nature of military ac operations in this area.

Nevertheless, at the time of the incident, both Jaguars were operating in the open FIR and even a successful call from Coningsby Zone to Wainfleet would not necessarily have prevented this Airprox. Although the workload for FJ aircrew joining a range pattern is extremely



high, the responsibility for maintaining a good lookout at all times still remains.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board did not agree with HQ STC that this incident demonstrated a civilian unawareness of military activity in the Wash. The JetRanger pilot had contacted Coningsby for an ATS and been offered a FIS. While it could be argued that he should have asked for a radar service, the controller had immediately started passing radar information, which eventually led him to see the Jaguars in time to take avoiding action, had he deemed it necessary.

Members noted the action taken by HQ MATO and Coningsby to formalise the passing of traffic information to the ranges which may in future lead to fast jets being given a 'heads-up' on such passing traffic. In the absence of this, in not the best visibility, the Jaguar pilot saw the JetRanger somewhat late and was only just in time to avoid it. Members agreed that this was the cause of the Airprox. This was not a criticism of the Jaguar pilot; it was simply a matter of fact. An earlier sighting while joining an unfamiliar range pattern on a murky day could not always be obtained.

The degree of risk provoked some debate. While some members considered that because the JetRanger pilot may have been in a position to ensure his safety, he made the proviso about the Jaguar not doing something unpredictable. The late sighting and close miss distance made this a possibility and the Board concluded that the safety of the ac had not been assured.

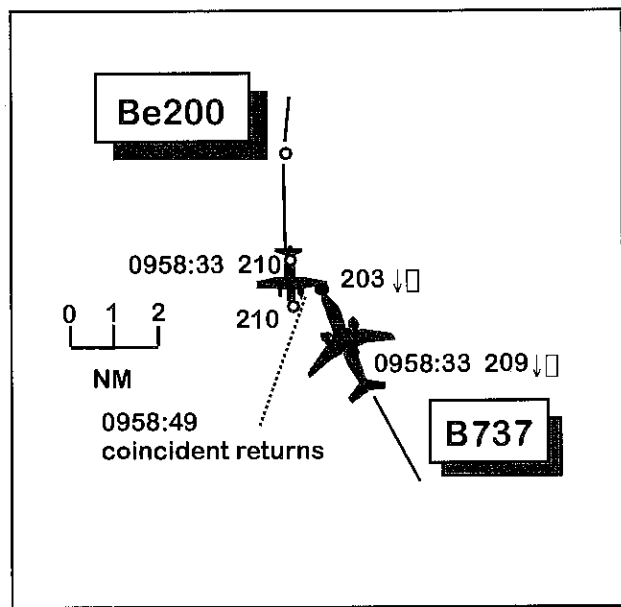
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Late sighting by the Jaguar pilot.

**AIRPROX REPORT No 191/99**

Date/Time: 27 Oct 0959  
Position: N5510 W0319 (20 NM S Talla)  
Airspace: Airway (Class: A)  
Reporter: ScACC Talla P and E controller  
First Aircraft      Second Aircraft  
Type: B73-2              Be200  
Operator: CAT              Civ Comm  
Alt/FL: ↓ FL 200          FL 210  
  
Weather      NK              NK  
Reported Separation:  
                  Well clear/Not seen  
Recorded Separation:              1 NM/700 ft



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

### **THE SCACC TALLA P AND E CONTROLLER**

reports that he was discussing a control point with his trainee when he noticed the B737 descending through FL 224 and the STCA starting to flash against the Be200, which was level at FL 210. He had previously missed his trainee's descent instruction to the B737 but was not unduly concerned because the trainee was an experienced controller and he assumed that the ac would only have been cleared to FL 220. However, on checking the FPS he noticed that it was annotated FL 200. He immediately asked the trainee to confirm the level he had cleared the B737 to and on receiving the reply 'FL 200' instructed him to turn the ac, using the correct avoiding action phraseology. The pilot of the B737 then reported seeing the Be200. There was insufficient time to pass avoiding action instructions to the Be200 before the ac had passed abeam each other by 105 NM and 500 ft.

**THE B737 PILOT** reports that while descending inbound to Glasgow from Birmingham under the control of Scottish ATC, he was instructed to turn R heading 030° for avoiding action. The turn was executed with 30° AOB and the other ac was seen to pass down his port side well clear and well above. The risk of collision was low.

**THE Be200 PILOT** reports that he was heading about 200° at 240 kt and maintaining FL 210 on a flight from Dundee to Fair Oaks under the control of Scottish radar on 126030; he was squawking 5452 with Mode C. After arrival at Fair Oaks he was asked to telephone the Scottish supervisor who advised him that he had been involved in an Airprox near Carlisle. He recalled hearing another ac being given avoiding action instructions but was not aware that he had been involved; no information was received from ATC at the time, and the other ac was not seen.

**ATSI** reports that the controller concerned described his workload as moderate when he took over the position about 15 - 20 min before

the incident, decreasing to light at the time it occurred. He was performing both the P and E Controller tasks on the TMA Talla Sector but he did not consider this was a contributory factor to the incident. He was acting as a mentor to a trainee (who was an experienced controller previously from a non-area unit) both at the time of the Airprox and in the period leading up to it. Initially, he took over the E position but immediately afterwards agreed for the trainee to "plug-in" and asked him if he was happy to perform both the P and E functions; with the trainee's agreement, the P controller was relieved from his position after he had completed the remaining co-ordination.

The Be200 pilot contacted the Talla Sector at 0939, climbing to FL 90 and was given progressive clearances to FL 230, its requested cruising level. Although neither mentor nor trainee was sure of the time they took over the sector, the RT transcript indicates that there was a change of controller at 0949, when the Be200, still climbing to FL 230, was cleared on its own navigation for Dean Cross. The trainee recollected that he had made this transmission.

The B737 pilot established communication with the sector at 0952 and was cleared direct to LANAK at FL 260, to report ready for descent. Shortly afterwards the Be200 pilot asked for and got clearance to maintain FL 210. The mentor explained that both the P position and the E (radar) position in the TMA Sectors at ScACC are provided with strips. The ScACC MATS Part 2, Page TMA 1-5, states that: "The E controller shall ensure that both the E controller's and P controller's strips are updated with all cleared levels." The mentor confirmed that his trainee had done so.

At 0956 the B737 pilot requested descent. In the intervening period, the mentor and his trainee had dealt with another situation near Edinburgh which the trainee could have handled better; instead of doing a 'hot' debrief the mentor decided to make notes and discuss it later. He said he must have been concentrating on making these notes when the B737 called, as he could not recollect either the ac's transmission or his trainee's response.

Investigation confirmed that the B737 was cleared by the trainee to descend to FL 200, which took it into conflict with the Be200 at FL 210. The trainee said he had overlooked the presence of the Be200 and admitted that, although he did annotate the FPS with the correct cleared levels, he did not examine the FPS display to check for conflicts. Usually, he added, he relied on the radar display but on this occasion he cleared the B737 to descend without making any checks, as he had forgotten about the Be200 and assumed that there was no conflicting traffic. He commented that FL 200 is normally a safe level to use for ac on the B737's routeing.

Neither mentor nor trainee was aware of the developing situation until the STCA activated at 0958:00. The mentor saw the warning but the trainee remained unaware that it had activated. The former recalled that the B737's Mode C was showing between FL 224 and FL 227 at the time and he was surprised to see it descending. He immediately looked at its radar FPS and saw that its cleared level had been annotated FL 200. Although the radar FPSs of the subject ac were together, he could not recollect which one was placed above the other. The trainee could not recall whether he had moved the B737's FPS (below that of the Be200) at the time he gave the former descent. There is no set procedure at ScACC, for determining how the radar FPS should be positioned. The mentor's first reaction was to ask his trainee if the FPS was correctly annotated as he assumed a controller of such experience would not have made such a basic ATC error. When FL 200 was confirmed as correct, he immediately instructed his trainee to pass avoiding action instructions to the B737. He thought it quicker for the trainee to pass the avoiding action instructions than to do it himself; owing to the ergonomics of the sector, he would have had to move the trainee physically away from the display in order to reach the switch to change over the transmit position. For technical reasons it has not been possible to provide training boxes at ScACC.

The trainee transmitted: "*C/S (the B737) turn R head er zero two zero avoiding action*". No

reply was received so the call was repeated.. "*c/s... avoiding action turn right head zero three zero*". The B737 pilot acknowledged the instruction and reported visual with the traffic. The mentor said that he considered it was too late to pass any avoiding action instructions or traffic information to the Be200.

The mentor explained further that he had not been expecting to act as an OJTI to the trainee on the day in question. Consequently, he was not able to familiarise himself with the trainee's progress record prior to monitoring him on the sector although he had worked with him on previous occasions. He understood that there was no reason to suggest that the trainee would make the type of error that occurred on this occasion.

UKAB Note: A recording of the Great Dun Fell radar at 0958 shows the Be200 on a southerly heading maintaining FL 210 with the B737 tracking NW and descending through FL 230 at its 1030 position range 9 NM. At 0958:33 the ac are still in opposition 2.5 NM apart as the B737 descends through FL 209. Sixteen sec later the B737 passes about 1 NM E abeam the Be200 while passing through FL 203.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members agreed that the Talla mentor appeared to have left his trainee unsupervised for a few moments on the assumption that such an experienced controller, albeit under training, would not make the sort of fundamental error which led to this Airprox. Teaching involves judgement and although it is often beneficial to trainees approaching validation status, to promote confidence, remote supervision should always be exercised with caution; any errors made by the trainee are ultimately the mentor's responsibility. In this case it was apparent that

the mentor had been caught out. Furthermore, knowing the adverse ergonomics of the sector the mentor should have allowed for the possibility of having to assume control of the RT at short notice. In this respect members wondered why the unit was not equipped with RT 'splitter' boxes to enable mentors to intervene quickly when necessary. The Board was advised that although such devices are in common use at many other ATC units, it has so far proved technically unfeasible to install them at ScACC. Moving on, an ATCO member commented on the effectiveness of the STCA,

which had alerted the mentor – but not the trainee – to the deteriorating situation.

After further brief discussion, the Board concluded that the Airprox occurred because the Talla Sector P and E mentor controller, having not noticed his trainee's error, allowed the B737 to be descended into conflict with the Be200. Noting the recorded radar separation distances, however, members were satisfied that there had not been a risk of collision.

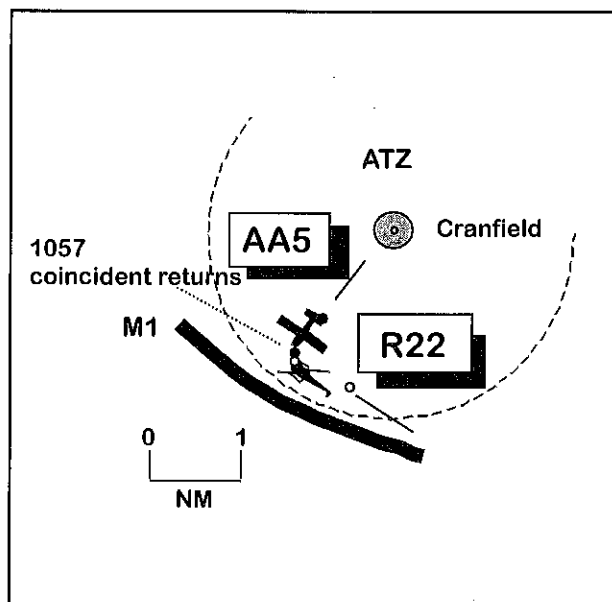
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Talla P and E mentor controller allowed his trainee to descend the B737 into conflict with the Be200.

### **AIRPROX REPORT No 192/99**

Date/Time: 27 Oct 1057  
Position: N5203 W0039 (1.8 NM SW Cranfield - elev 364 ft)  
Airspace: ATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: R22 Helicopter AA5  
Operator: Civ Pte Civ Trg  
Alt/FL: 1100 ft ↑1000 ft  
 (QNH 1023 mb) (QFE 1010 mb)  
Weather VMC CLBC VMC CAVOK  
Visibility: >30 NM 25 km  
Reporting Separation:  
 10 m H 2 M V / 50 ft H 0 ft V  
Recorded Separation:  
 Radar returns merged



### **BOTH PILOTS FILED**

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

**THE R22 PILOT** reports that he was heading 303° at 80 kt and cruising at 1100 ft (QNH) en

route to Coventry from North Weald. He was receiving a FIS from Cranfield APC on 122.85 and squawking 7000; Mode C was not fitted. The visibility, 1000 ft below cloud, was over 30 NM.

When about 2 NM SW of Cranfield, and keeping the M1 motorway to port as a navigational feature, a single engine low wing ac suddenly appeared to his R about 20 m away on a collision course. It had climbed from below in an area where vision was obstructed by the floor of the helicopter and the lower, non-transparent, section of the door. There was an extreme and immediate danger of collision and he banked hard R in avoidance. He estimated that the other ac passed within 10 m horizontally and about 7 ft below him.

**THE AA5 PILOT** reports that following a touch and go landing at Cranfield he was climbing straight ahead on heading 216° at 80 kt to 1000 ft (QFE 1010). The visibility was 25 km in VMC. Normal lookout was being observed and a L turn into the circuit was about to be made when his student uttered an exclamation and banked violently to the R. He just had time to see an R22 helicopter about 50 ft away on a collision course. There had been no time for him to take control but he was satisfied that his student had done everything possible; without the evasive action he was in no doubt that a collision would have occurred. The pilot adds that vision to his 10 o'clock, from whence the R22 came, was degraded by the sun.

**CRANFIELD ATC** reports that the traffic situation was busy, with about 15 ac receiving an Approach Control Service under a FIS. A trainee under supervision was operating on APC (122.85) when a Robinson R22 helicopter called at about 1043 routing from North Weald to Coventry at 1200 ft with 2 S0B. The pilot was passed the Cranfield QNH (1023), informed that RW 22 LH was in use and instructed to report S abeam Cranfield; he did not request penetration of the Cranfield ATZ. The Tower controller was informed of the R22's position, altitude and proposed route. On reporting S abeam the airfield at 1055, the R22 pilot was instructed to report passing Milton Keynes. On this route an ac should follow the M1 motorway keeping just outside the ATZ. Although searching carefully, no one in ATC could see the R22 at this stage. Subsequently, an AA5 pilot in the circuit reported his intention to file an Airprox. The R22 pilot telephoned after landing at Coventry,

having been advised earlier that the AA5 was taking reporting action. He said he was over the M1 motorway and outside the Cranfield ATZ when he saw the AA5 and took avoiding action; he was undecided about making an Airprox report.

**ATSI** comments that the R22 was receiving a FIS from Cranfield APC and the AA5 an aerodrome service from Cranfield Tower. The R22 pilot did not request permission to enter the Cranfield ATZ and none was issued. He was advised that the RW 22 circuit was active with a LH pattern. APC understood that the R22 would be following the M1, which skirts that western edge of the ATZ, and accordingly asked the pilot to report S abeam the airfield and abeam Milton Keynes; the pilot complied. The pilot then advised ATC that he had...*"come close to a Cessna just N of Milton Keynes"*. All the controllers involved looked out for the R22 but did not see it until after the Airprox had occurred. In hindsight it is unfortunate that the pilots were not passed specific information on each other. However, it is acknowledged that, based on the information available, there was no clear indication that the ac might conflict and therefore traffic information was not considered necessary.

**UKAB Note (1):** A recording of the Debden radar at 1055 shows a return believed to be the R22 squawking 7000 and tracking slowly W about 2 NM SE of Cranfield. At 1056 another return, also squawking 7000 and believed to be the AA5, is observed 1 NM SW of Cranfield tracking SW. The ac are converging at 90° and at 1057 their returns merge 1.8 NM SW of Cranfield. (The R22's altitude of 1100 ft is equivalent to about 750 ft on the Cranfield QFE).

**UKAB Note (2):** Cranfield has a notified ATZ of 2 NM radius active up to 2000 ft aal from 0830-1900 (UK AIP AD2 – EGTC-1-3).

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording, a report from the air traffic controllers involved and comment from the appropriate ATC authority.

Topographical charts show that the M1 motorway, an obvious navigational line feature, passes less than 0.5 NM tangentially from the SW boundary of the Cranfield ATZ. Members questioned the wisdom of planning a route so close to the Cranfield ATZ boundary at an altitude likely to conflict with this airfield's frequently busy circuit traffic pattern. While the helicopter pilot appeared to have kept the line feature (the M1) to his left, as required by the normal rules of flying, he should have recognised the high probability of infringing the ATZ by so doing. A better solution would have been to co-ordinate his flight appropriately with Cranfield ATC as required by Rule 39 of the Rules of the Air. The helicopter pilot had been warned that the circuit was active (LH) and ought to have been concentrating lookout to his R in anticipation of encountering circuit traffic at a similar altitude. Furthermore, if part of the ac limited his vision in that direction then positive manoeuvring should have been used to counter any obstruction. In the event, he entered the ATZ and, despite the excellent reported visibility, saw the AA5 only just in time to take avoiding action. The Board concluded that this very late sighting was a part cause of the Airprox.

With respect to the AA5, a GA member commented that the ac had fairly low performance and he was not surprised at its extended circuit. Therefore, members felt that the locally based pilot ought to have been aware of the possibility of traffic following the motorway (using it as a navigational aid) and, notwithstanding the bright sun, should have paid more attention to lookout in that direction. Members agreed that his very late sighting of the helicopter was also a part cause of the Airprox.

Noting the graphic descriptions by both pilots of the closeness of their encounter, the Board agreed that there had been an actual risk of collision.

Turning to ATC aspects, it was noted that the presence of both ac were known to Cranfield and members felt it was unfortunate that the possibility of a confliction apparently did not occur to either controller. This was in spite of the ADC being advised about the R22's intended route close to the ATZ, and APC being aware of the active circuit. Had both pilots been passed more specific information about each other their heightened vigilance might have prevented this very serious encounter. One ATCO member suggested that a general broadcast on the Tower frequency, warning of such M1 transits near the ATZ boundary, would help to achieve this. Another said that it might even be prudent to consider transferring traffic transiting in these circumstances to the Tower frequency. Either of these actions might have reduced the likelihood of such a serious confliction.

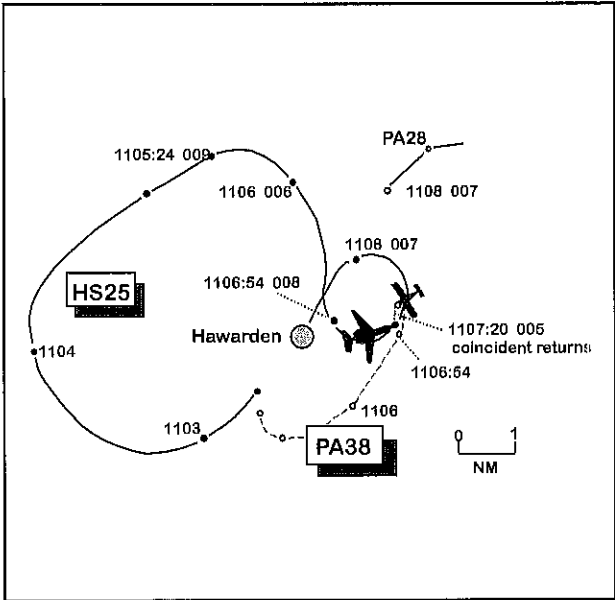
## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A

Cause: Inadvertent penetration of the Cranfield ATZ by the R22 and very late sightings by both pilots.

**AIRPROX REPORT No 193/99**

Date/Time: 29 Oct 1107  
Position: N5311 W0257 (1.75 NM E  
Hawarden - elev 35 ft)  
Airspace: ATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: PA38 HS125  
Operator: Civ Trg Civ Exec  
Alt/FL: 800 ft 1000 ft ↓  
(QFE 1021 mb) (QNH 1022 mb)  
Weather VMC VMC  
Visibility: 5 NM 10 km  
Reported Separation: 500 m/100 ft  
Recorded Separation: 500 m H



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

**THE PA38 PILOT** reports that he taxied then held at point 'N' for RW 23 at Hawarden while an HS125 landed. This ac then backtracked the RW for a take-off into a RH circuit. Following the HS125's departure, he was given take-off clearance into a LH circuit. The visibility was 5 NM in VMC. Once airborne, he became aware that language difficulties between the HS125 crew and the Tower were leading to control problems. He continued his LH circuit accepting that he was number 2, and at the end of the downwind leg, at 800 ft (QFE1021), asked for permission to orbit so as not to overfly Chester (see UKAB Note 1 below). Whilst orbiting L (passing through about 250°) at 90 kt the HS125 crossed some 500m away and 100 ft below him from R to L in a L turn. He felt there had been a high risk of collision and reported an Airprox to Hawarden Tower by RT and later by telephone.

UKAB Note 1: analysis of the Tower RT transcript shows that the PA38 pilot's request to orbit was made just after 1106:30 immediately following a transmission from the HS125 pilot that he was 'turning left...descending'. The tower controller did not have time to acknowledge the PA38's message before the HS125 pilot advised that he was 'now turning left for final approach'. Immediately afterwards, at about 1107:15, the PA38 pilot reported that

he could see the HS125. Tower acknowledged and instructed the pilot to continue orbiting in his present position.

**THE HS125 PILOT** reports that he was cleared by ATC for a RH visual circuit on RW 23. On turning towards finals at 140 kt he realised that he was too high and advised the Tower of his intentions to carry out a LH orbit to lose height, which was approved. At this point traffic (he believed it to be the PA38) was observed on TCAS 400 ft above. He could not see this ac but heard its pilot requesting to orbit at the downwind LH position. On landing he was advised that the PA38 pilot was filing an Airprox report. As the other ac had been observed on TCAS some 3 – 4 NM away and 400 ft higher, there was, in his opinion, no compromise of safety and no risk of collision.

**HARWARDEN ADC** reports that the foreign crewed HS125 took off from RW 23 into a RH circuit, as requested by the pilot. The PA38 was then cleared to take-off from the same RW into a LH circuit. As the HS125 was much the faster ac it was expected to be on finals before the PA38 turned downwind. However, it carried out a very wide circuit, to the extent that the pilot was asked to report turning downwind as a reminder that he was still on the crosswind leg. When the pilot reported downwind he was given traffic information on a PA28 which was on the

APC frequency and at that time about 10 NM from touchdown. The HS125 pilot then reported turning base leg, apparently somewhat prematurely bearing in mind the wide circuit flown up to that point; the ac was very high and the pilot reported turning into a LH orbit before re-commencing approach. On hearing this, the controller quickly liaised with APR about what to do with the HS125, because of a possible conflict with the PA28 on finals, and transferred the ac to them. The PA38 pilot then reported an Airprox with the HS125.

**HARWARDEN APC/APR** reports that he was vectoring a PA28 for RW 23 at Hawarden. ADC called and requested a RH visual circuit for an HS125 carrying out an airtest. This was approved, and the ac was observed departing into a very wide circuit. Meanwhile, the PA28 was vectored wide onto a 5 NM final No 2 to the HS125. Shortly after this, ADC called to inform him that the HS125 had gone around and asked what he should do with the ac. In view of the PA28 on finals and the deteriorating weather, he instructed ADC to give the pilot a heading of 180° climbing to 2500 ft (alt), and to call on the APC frequency (123.35). On observing the HS125 turning L, he instructed the PA28, now on a 4.5 mile final, to turn R and climb immediately to 2500 ft (altitude). The HS125 pilot then called, advising that he was turning onto final and requesting permission to return to the Tower frequency; this was approved, as it was obvious that by now he had become No 1 in the traffic sequence. The PA28 was content to position visually behind the HS125 and was transferred to the Tower Frequency.

**THE CAA GENERAL AVIATION DEPARTMENT** comments that the HS125, having been cleared for a RH VFR circuit ahead of the PA38, carried out a wide circuit and then, finding himself high on final, carried out an unauthorised LH orbit. This brought the ac into conflict with the PA38 which was orbiting, with ATC approval, at the end of the LH downwind leg. Concerned that the HS125 would now conflict with a PA28 inbound on the ILS, the ADC attempted to transfer it to APC. Initially the pilot declined to do this but did then contact APC and the conflict with the PA28 was resolved. It is believed that

the HS125 crew did not see the PA38, having confused it with the PA28 on final. The former was not squawking (and therefore would not show on TCAS) but the latter was.

UKAB Note (2): A recording of the Clee Hill radar shows the HS125 departing from RW 23 at about 1101 and carrying out a wide RH circuit to RW 23, while the PA38 follows it shortly afterwards into a LH circuit. At 1105:24, about 5.5 NM NNW of the airfield, the HS125 commences a R turn towards base leg position as the PA38 enters its downwind leg about 2 NM to the S of the airfield. At 1106:54, having passed through the RW 23 approach path 1 NM from the airfield heading S, the HS125 begins a L turn indicating 600 ft, with the PA38 1.5 NM to its E. At 1107:20, the HS125, now showing 500 ft and turning L through a heading of about 030°, passes about 500 m to the S of the PA38 which itself has begun a L turn a few seconds before; it is not possible to estimate the PA38's heading at this time.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording, reports from the air traffic controllers involved, and a report from the appropriate operating authority.

This Airprox generated considerable debate, particularly among controller members. Some felt that the ADC should have taken the initiative by instructing the HS125 pilot to go around while the ac flew a high and fast base leg from which a successful approach looked unlikely. They thought this might have prevented the HS125 from turning unbidden against the circuit direction. However, most felt that the ADC's attempt to co ordinate a go around with the APR was reasonable and would have been successful had it not been for the HS125's completely unexpected and unauthorised self-initiated orbit. The ac was travelling fast and was already into its L turn when the pilot announced his intentions, thus thwarting any



possibility of complying with the APR's go-around instructions, which ADC did not even have time to pass to the pilot. A further departure from orderly control was introduced when the HS125 pilot, apparently believing that he was conducting a VFR circuit, queried ADC's instruction to contact APR. The APR tape transcript showed, however, that he did call briefly on the frequency, but only to report that he was making a L orbit towards final. By this time the ac was already re-established on final, and ahead of all other traffic, so the pilot was given landing clearance and then immediately transferred back to ADC (from whom he had previously received landing clearance some two and a half minutes earlier while on base leg, before commencing the L turn).

Pilot members unanimously censured the HS125 pilot's actions, pointing out that not only was his turn contrary to the circuit direction, but the ac's resulting flight path took it S of the RW centreline and into the PA38's circuit. Despite

having heard the latter's pilot requesting an orbit in the downwind LH position, the HS125 pilot mistakenly assumed that this was the ac he observed on TCAS some 400 ft above him and 3 – 4 miles away to the E (this was in fact the PA28). In the execution of his orbit, subsequently, he never did see the PA38 despite coming to within 500 m of it.

The Board concluded that the HS125 pilot's turn against to the circuit direction caused the Airprox; moreover, as he did not see the PA38, and the latter did not see the HS125 in time to take avoiding action, it was assessed that the safety of both ac had been compromised.

A pilot member warned of the dangers of making assumptions based on TCAS information, pointing out that visual and TCAS observations may not necessarily be co-related, and also that the target observed may not be the only one in the vicinity.

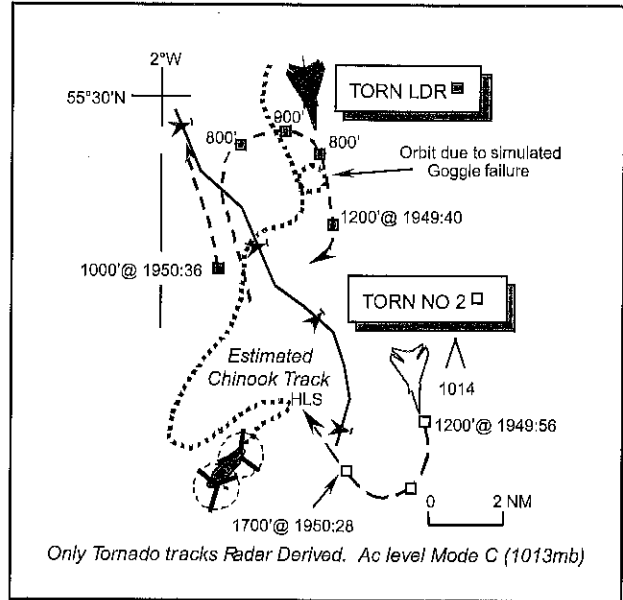
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: The HS125 pilot turned against the circuit direction and flew into conflict with the PA38 which he did not see.

**AIRPROX REPORT No 194/99**

Date/Time: 2 Nov 1949 NIGHT  
Position: N5528 W0152  
 (10 NM NW of Boulmer)  
Airspace: LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Tornado GR4 Chinook  
Operator: HQ STC HQ JHC  
Alt/FL: 800 ft <150 ft agl ↓  
 Rad Alt RPS (1001 mb)  
Weather VMC CLOC VMC CLOC  
Visibility: >10 km 40 km  
Reported Separation: <5 NM  
Recorded Separation: Not recorded



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

**THE TORNADO GR4 PILOT** reports leading a pair of GR4s on a low-level night vision goggles (NVG) sortie involving two fighter affiliation runs against an F3. Navigation and anti-collision lights were on, but HISLs were off. During the second run against the F3, about 10 NM NW of Boulmer at 450 kt, a 180° R turn evasive manoeuvre was executed. As they rolled out of the turn and steadied on a heading 180°, at 800 ft rad alt, a light was spotted through NVG at 12 o'clock below the horizon, which he suspected to be that of another ac. The navigator confirmed the sighting and a R break was initiated to ensure separation. The light subsequently climbed vertically but was lost when he turned through W onto N. Minimum separation was extremely difficult to judge owing to the NVG, but in retrospect, was estimated at less than 5 NM and certainly below the level of his ac. He perceived the risk to be low owing to the early sighting, but the crew were working hard and extremely surprised to encounter another ac in a night LFA, which had been booked for their exclusive use.

UKAB Note (1): During the R turn evasive manoeuvre the No 2 Tornado was about 6 NM to the SSE.

**THE CHINOOK PILOT** reports leading a pair of Chinook helicopters on a tactical night troop

insertion sortie. Both ac were squawking and red anti collision lights and the HISLs of the No 2 were on as they completed the final phase of the drop off at three different grid references in the area. This involved nap of the earth flying between 10 ft and 100 ft agl, except to cross N-S high tension wires at 250 ft agl. Whilst flying in arrow formation, the separation between ac was up to 300 m and headings, altitudes, and attitudes varied considerably as the ac landed and took-off from landing sites and fire positions during the sortie. The leader opines that the crew workload was high during the final run in, but no other ac was sighted or detected on the Radar Warning Receiver, which is normally very reliable in detecting a Tornado. He adds that the risk would have been low, as they were not operating above 150 ft agl.

UKAB Note (2): Although the Chinook formation's approximate track through the area has been ascertained and included on the diagram, exact timings along that track were not available.

UKAB Note (3): This Airprox is not illustrated clearly by the LATCC Great Dun Fell radar recording. The Chinook formation though squawking is not shown at all in the Airprox location and the Tornado pair is only shown intermittently. Nevertheless, the lead Tornado identified from the assigned squawk is shown at

1948:50, tracking NNW indicating 900 ft Mode C (1013mb) shortly before turning about for the described R turn evasive manoeuvre. The ac is shown southbound initially at 800 ft and at 1949:40, climbed to 1200 ft Mode C. Radar contact is then lost for just under 1 min until 1950:36, whereupon the Tornado leader is shown at 1000 ft, tracking about 350° and presumably just after the avoiding action right turn onto W and then N described by the reporting pilot. About 16 sec after radar contact on the Tornado leader is lost, contact is established with the No 2, which is shown at 1949:56, in a R turn at 1200 ft Mode C, some 6 NM to the SSE. The No 2 climbed to 1700 ft Mode C and steadied on a NNW track more than 6 NM astern of the leader, radar contact is then lost.

**HQ STC** comments that the Tornado sortie had been correctly planned, briefed and authorised; an appropriate night sector booking had been submitted and confirmed. Therefore, it is understandable that the crew was alarmed at seeing another ac in an area of which they believed they had exclusive use.

Electro-optical flying is a demanding operation that requires a considerable degree of skill, situational awareness and continual practice. The requirement to reserve areas of the night low flying system to reduce the risk of collision serves to enhance the safety of such operations but clearly caters only for military ac. Civilian operators will continue to undertake their legitimate night flying activities and this incident is a valuable reminder to maintain an effective look-out scan at all times, irrespective of the cockpit workload. The Tornado crew should be commended for their vigilance and airmanship. Nevertheless, it is of some concern that this Airprox occurred in spite of all efforts procedurally to deconflict the differing sorties.

**HQ JHC** comments that this Airprox stemmed from a procedural error. The Chinook sortie had been correctly planned and the Chinook Sqn believed they had been allocated the correct night sector, Area 4, for their use from 1930 – 2000; prior to that a Tornado Sqn was thought to have been allocated the area up until 1930.

However, the ALFENS OPS night sector booking records for 2 Nov 99, shows the area was allocated to the Tornado Sqn until 2000.

It would appear that there was a change in the priority allocation between the Gp allocation document dated the preceding week and the actual evening of 2 Nov 99. HQ JHC has been unable to ascertain when the change was made, or if the Exercise detachment staff had managed to contact ALFENS OPS to confirm the allocated slot times by 1200 the previous day, as per UK Mil AIP, Sect 3, para 46b.

All JHC units have been reminded that priority allocations should be confirmed by 1200 hr on the previous working day. However, JHC believe that procedures should be available for ALFENS OPS staff to contact major flying detachments' headquarters if they have not received confirmation of a major block booking. Nonetheless, the onus remains on the user unit to confirm the booking. Workload and the necessity to operate from a field location can sometimes make it difficult to contact ALFENS OPS, or it may even be that the standard call is missed as an oversight. In this case there was potential for two uncoordinated users to be in the area at the same time. JHC recommended that the possibility of ALFENS OPS contacting a user unit, if allocated night sector slots for a major exercise have not been confirmed by 1200 hr the previous day, be investigated by Ops (LF).

Mil Ops (LF) reports that any breakdown of the procedural deconfliction required in the UK Military Low Flying System (UKLFS) Night Fixed-Wing Region has serious flight safety consequences, and hence a thorough investigation of this incident was carried out. The breach of procedural deconfliction occurred because of a breakdown in communication at some stage between the exercise sponsor and the Chinook aircrew. Night Sector 4A for the time period 2 Nov 99, 1930Z – 2000Z (originally allocated to the Chinooks' exercise) was handed back by the exercise sponsor and subsequently allocated to a Tornado Sqn. All procedures in ALFENS Ops and Ops (LF) were in order. However, it seems that the Chinook

aircrew were not aware of this procedural airspace change. The problem was exacerbated when the Exercise sponsor was granted retrospective LF booking for exercise ac within the allocated airspace (a practice rarely employed but detailed in the Mil AIP Vol 3 Part 1 Sect 1 para 52). Hence the requirement for the Chinook crew to make a pre-flight LF booking was waived and the confliction could not be detected and averted by ALFENS Ops.

The suggestions made by HQ JHC concerning changes in working practices within ALFENS Ops are not feasible as exercise airspace allocation is outside their remit; furthermore the functionality of their suggestions is already covered by existing procedures within Ops LF. However, the night UKLFS and associated booking procedure is generally regarded as cumbersome and is currently under review by MOD.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video recordings and reports from the ac operating authorities.

Although the Tornado pilot had reported the range of the other ac as less than 5 NM, the Ops LF advisor explained to the Board that it was virtually impossible to be more exact on range discrimination when using NVG. The STC pilot member added that 5 NM was a good demarcation point as sources of light will 'bloom' in NVGs at closer ranges. The Tornado pilot's good scan had detected the presence of the Chinook ahead, albeit that the range could not be determined accurately and he had acted correctly by turning away from it. Although civilian traffic will always be a factor at night in the LFS and pilots should expect the unexpected, neither crew should have been placed in this situation. It was clear from the thorough investigation conducted that poor communication in allocation procedures caused this night encounter. If the message had got to the Chinook squadron in the field that the night

low flying sector was no longer available to it they would not have flown in it and surprised the Tornado crew. Board members were appraised of the procedure for arranging the use of night low flying sectors. This was a matter for the Gp HQ to sort out, or the exercise sponsor in consultation with the Ops LF office up until 1200 hrs on the day before the flight. Thereafter, arrangements passed to ALFENS Ops. Some members questioned the odd sounding aspect of retrospective bookings and it was explained this allowed the essential flexibility that exercise planners needed to achieve their aims. Nonetheless, members were in no doubt that all these arrangements still placed the responsibility fairly and squarely on the exercise sponsor to tell flying units what airspace is available for the exercise and when, especially after late notice changes. Furthermore, members shared the view expressed by Ops LF that it was impractical for ALFENS Ops to check back with user units as suggested by JHC. It was agreed unanimously that the cause of this incident was a breakdown in communication between the exercise sponsor and the helicopter operator, which resulted in the Chinook formation operating in a night low flying sector allocated to another user.

Unfortunately, the absence of recorded radar information or any accurate timings for the Chinook's route through the area meant that the positions of the helicopter pair and hence the relative geometry, could not be determined with any certainty. This made assessment of the risk particularly difficult. However, the Tornado pilot had detected the helicopter formation at some distance and this, coupled with his prompt and effective avoiding action, resolved the situation. The absence of a radar contact near the Tornados and the reported maximum transit height of the helicopter formation, led members to conclude that there had not been a risk of a collision.

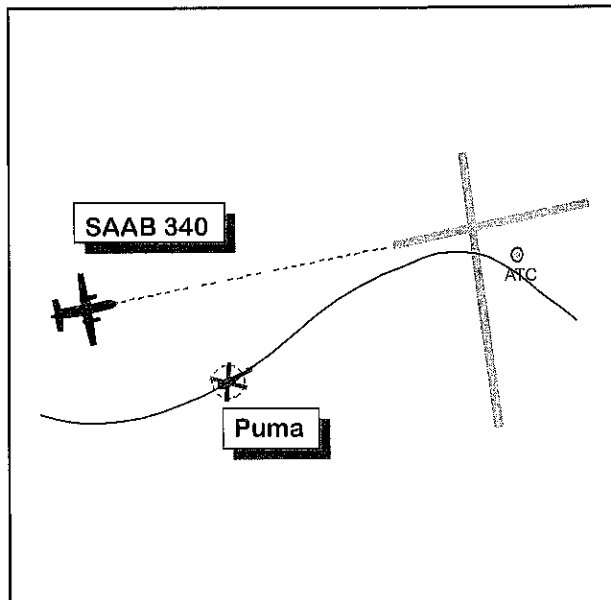
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: A breakdown in communication between the exercise sponsor and helicopter operator resulted in the Chinook operating at night in a low flying sector allocated to another user.

**AIRPROX REPORT No 195/99**

Date/Time: 18 Oct 1359  
Position: N5440 W0615 (1 NM SW of Aldergrove)  
Airspace: CTZ (Class: D)  
Reporting Aircraft Reported Aircraft  
Type: SAAB 340 Puma  
Operator: CAT HQ STC  
Alt/FL: 500 ft ↓ 50 ft  
(QNH) (Rad Alt)  
Weather VMC CLBC VMC CLBC  
Visibility: 15 km 10 km+  
Reported Separation:  
300 m, 150 ft 1.5 NM, 600 ft  
Recorded Separation: NK



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

**THE SAAB PILOT** reports heading 080° at 120 kt on finals for RW 07 at Aldergrove. He saw a Puma somewhat late apparently flying towards the final approach track in a westerly direction but turning to its left. It was probably assisted into the final approach path by the 15 kt tailwind. The Puma's turn took it away from his track and so he did not have to take any avoiding action. While he assessed the risk of collision as low, he suggested that ATC should encourage orderly and disciplined flying in the vicinity of the airfield.

**THE PUMA PILOT** reports heading 260° at 80 kt having been cleared to remain S of the Tower en route to Langford Lodge and advised of traffic at 2 NM on finals to RW 07. He had this traffic in sight; they were on the same frequency and he heard its pilot call visual with him in his

1 o'clock. He suggested the SAAB pilot might have been surprised to see him departing in the opposite direction to circuit traffic but he should have heard his clearance to Langford Lodge whose position is quoted on ATIS. There was no risk of collision and the SAAB passed 1.5 NM away and 600 ft above.

**ALDERGROVE ATC** reports, with RT transcript, that the SAAB 340 pilot was cleared to land at 1358:35 and shortly afterwards TWR cleared the Puma pilot "C/s ? ? ? ? airborne south of the tower and then proceed westbound well clear of the inbound traffic er presently 2 miles runway 07". The pilot replied "Clear take-off remaining to the south of the er inbound c/s". The pilot was given the WV: 120/13. At 1359:35 TWR having seen the Puma route N of the tower, and track outbound further N than normal, reminded the pilot "C/s remain well clear of that inbound traffic and report at

*Langford*". The pilot replied "*Remaining clear .*" 10 seconds later the SAAB pilot said "*C/s visual chopper quite close to er about 1 o'clock*". When advised that the Puma had been told to stay clear he added "*Thanks, quite close to be honest with you*". The Puma pilot apologised later and said he had flown further N than intended.

**ATSI** comments that MATS Part 1, Page 2-1 states that: "Aerodrome control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between:

Aircraft flying in, and in the vicinity of, the aerodrome traffic zone,

Aircraft taking off and landing."

Also, MATS Part 1, Page 1-3 states that the minimum services to be provided by an ATC Unit in Class D airspace in respect of the subject aircraft are: "Pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested and to pass traffic information to VFR flights on IFR flights and other VFR flights."

The RT transcript shows that the ADC Controller gave the Puma pilot traffic information and instructions to keep him clear of the SAAB 340. Arguably, he should have passed traffic information to the pilot of the SAAB 340, although it is understood that the latter was aware of the departing Puma, whose departure clearance had been passed whilst both ac were on the same frequency.

**HQ JHC** comments that they concur with the Squadron Commander's comments that no breach of flight safety occurred in this incident. The manoeuvrability of an airliner on finals is clearly limited in contrast to a VFR military helicopter, and this may account for the difference in perception of this incident between the 2 crews. When questioned, the Puma pilot declared that he departed south of the tower, but he may have briefly flown north of an east/west line through the tower, to avoid

overflight of buildings on the west of the airfield. This flight path probably explains his unusual proximity to the SAAB 340 approach.

The fact remains that the proximity of the Puma gave cause for concern to the airliner crew, and Aldergrove military helicopter crews will be reminded of the requirement both to adhere strictly to ATC clearances and to ensure healthy separation from civilian ac, particularly when at critical stages of flight.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

There was no recorded evidence on the precise track flown by the Puma; the diagram in the report is an interpretation of the pilots' reports. The Board agreed that there was no risk of collision in the event (for which an Airprox report did not seem entirely appropriate) because both pilots could see the other ac and knew they had been seen. However it appeared that the Puma pilot had flown close enough to the runway centreline to cause the SAAB 340 pilot some concern for the safety of his flight and members agreed that this was the cause of the report. It was as much a matter of good manners and consideration as flight safety and the Board was advised that a reminder to keep well clear of commercial ac had been issued to the helicopter crews.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Puma pilot flew close enough to the runway centreline to cause concern to the SAAB 340 pilot.

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### **AIRPROX REPORT No 196/99**

Date/Time: 3 Nov 1536

Position: N5228 W0117 (2 NM W of Lutterworth)

Airspace: LFS/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Harrier Beagle B121

Operator: HQ STC Civ Pte

Alt/FL: 1500 ft 1500 ft

(QFE 1008 mb) QNH

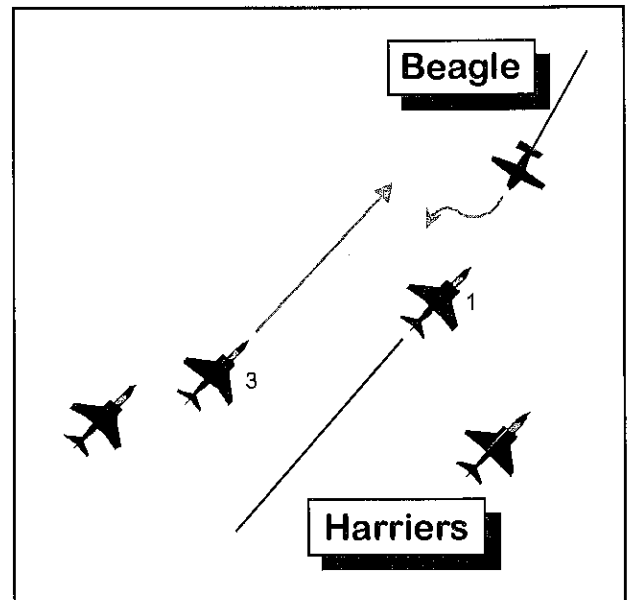
Weather: VMC CLBC VMC CLNC

Visibility: 15 km 20 km

Reported Separation:

500 ft/0.25 NM, 500 ft

Recorded Separation: NK



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

**THE HARRIER PILOT** reports heading 080° at 360 kt as No 3 of a 4 ac formation recovering to Wittering; they were flying at 1500 ft in close battle formation at 360 kt. His leader saw a light ac some 2 NM ahead, called it and bunted to avoid it, then he pulled up with No 4 to avoid it also by 500 ft with minimal horizontal separation. The white/red light ac passed on a reciprocal through the middle of the formation with a moderate risk of collision; the pilots described it as similar to a Bulldog, but not a Bulldog.

**THE BEAGLE PILOT's** description of an encounter with 4 Harriers almost exactly matched the reporting pilot's, but the axis of the encounter was different in that he was heading 210° (at 90 kt and 1500 ft). His ac is white/blue but it has a red beacon on the mainplane. He saw the Harriers head-on in plenty of time (10

km away), manoeuvred sharply right and left to avoid the 2nd ac on his left and then to pass between the pairs; he saw them take avoiding action. He did not consider there was any collision risk.

**UKAB Note:** There was some confusion over the reported position of the incident which initially led to the conclusion that the incident was a different encounter also seen on radar, where the Harriers were tracking 080° and bracketed a 7000 return at the position given on their signalled report. This, however, was a C182 on a local flight from Leicester and whose pilot did not see the Harriers. A complete radar plot of the sorties of the 2 ac was made which disclosed that the Harriers encountered the Beagle at about 31 NM from Wittering, close to the position they gave in their initial report on RT to Cottesmore, while they were tracking 045°. The Beagle pilot said he had tracked outbound from Leicester SW along the Fosse

Way and returned on the same route; the incident occurred 2 NM W of Lutterworth, just before he joined the Fosse Way.

**HQ STC** comments that following a relatively short-range tally, the lead ac alerted the formation to the threat and initiated timely avoiding action. Given the time available for manoeuvre, the resultant vertical separation was sufficient to ensure the safety of all the ac involved; the incident, however, serves as a salutary reminder to maintain an effective look-out scan when operating in the open FIR without a radar service, irrespective of the cockpit workload.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar video

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Confliction of flightpaths.

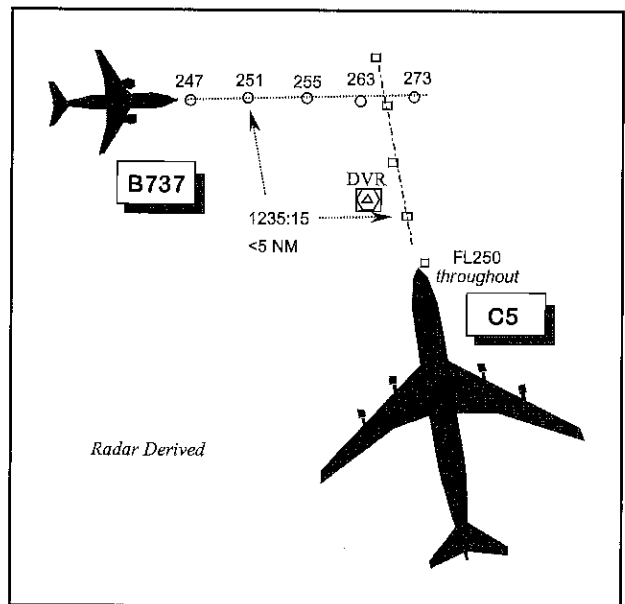
recordings, and reports from the appropriate operating authorities.

While the circumstances of the incident had defied explanation for some months due to discrepancies in the information reported to UKAB, it appeared to members that this was a fairly straightforward confliction of flightpaths in Class G airspace which was resolved in a reasonably timely manner by all the pilots involved. The closing speed had not left much time for avoiding action, or for a sighting of the Beagle by the Harrier pilots, but members considered that the pilots' actions had removed any risk of the ac actually colliding. It was noted, with approval, that the Harrier pilots had manoeuvred in the vertical plane to avoid the Beagle; it had often appeared to the Board that military pilots at low level were reluctant to use the vertical in circumstances where such a manoeuvre would produce a safer resolution of a confliction.

**AIRPROX REPORT No 197/99**

Date/Time: 3 Nov 1236  
Position: N5113 E0122  
 (3 NM N of DOVER VOR)  
Airspace: UAR (Class: B)  
Reporter: LATCC DOVER SC

	<u>Aircraft No 1</u>	<u>Aircraft No 2</u>
<u>Type:</u>	B737-400	C5 GALAXY
<u>Operator:</u>	CAT	Foreign Mil
<u>Alt/FL:</u>	FL 270 ↑	FL 220
<u>Weather</u>	VMC NIL	VMC UNK
<u>Visibility:</u>	10 km	UNK
<u>Reported Separation:</u>		
	SC	1.1 NM H/600 ft
	B 737-400 Pilot	Nil H/1100 ft V
<u>Recorded Separation:</u>		2 NM H/500 ft V





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

**THE LATCC DOVER/LYDD SC** reports taking over the 'Bandboxed' sector under a moderate traffic loading, 5 minutes before the occurrence. The B737 was climbed initially to FL 230 underneath northbound crossing traffic at FL 240. When standard horizontal separation of 5 NM was obtained, the B737 was climbed to FL 290. However, she had not noticed the C5 crossing northbound at FL 250, until the B737 indicated FL 247 and standard horizontal separation had been eroded. The B737 crew was instructed to expedite climb through FL 260 and traffic information on the C5 issued, to which the pilot responded with visual contact, the STCA then activated. Neither traffic information, nor avoiding action, was given to the C5 crew because she thought they would be unable to react quickly enough. Nonetheless, the pilot reported sighting the B737.

**THE B737-400 PILOT** reports flying a radar vector of 095° at 280 kt climbing to FL 290, 3 NM due N of DVR. Avoiding action was issued by LATCC to expedite the climb through FL 260, for the cleared level of FL 290, which was complied with. A TCAS TA was received indicating a vertical separation of 1100 ft; he considered the risk to the ac to be 'medium'.

**THE C5 PILOT** did not file a comprehensive Airprox report. However, he comments that they were flying at the assigned level and just passing the DVR VOR when a traffic call was received, he thought, from London CONTROL. They sighted the B737 at 9 o'clock, which appeared to be in a climb. When asked if it was 'too close for comfort' the pilot replied no, just a little late on the traffic call, his ac was not fitted with TCAS.

**ATSI** reports that the Airprox occurred moments before 1236, in the vicinity of the DVR VOR. The two flights involved were a B737, outbound from Gatwick to Zagreb and a C5 Galaxy, en route from Aviano, Italy, to Mildenhall. Both flights were receiving an Area Radar Control service from the LATCC DVR/LYD SC who was

operating the sector in a bandboxed configuration. The controller involved had only been operating the position for five minutes when the Airprox occurred and she assessed that in this brief period the traffic loading and workload level had been moderate.

At 1224, some 12 minutes before the incident, the C5 crew called the DVR/LYD Sector and reported descending to FL 250. The flight was routeing via the DVR VOR on a north-westerly track and had been given a joining clearance at DVR at FL 250. Its route through controlled airspace to the north of DVR for Mildenhall had been confirmed by the off-going SC who had placed the flight on a radar heading of 335°. The next flight to call the Sector was a BA46, cruising at FL 240. Though not involved in the Airprox it was placed on a radar vector of 330 degrees resulting in a transit 20 NM W of DVR. At 1229, the C5 crew was instructed to route direct to DVR. A minute later the B737 crew made contact with the Sector and reported climbing to FL 170 on a radar heading of 095°. The flight was instructed to maintain heading and climb to FL 230, the safe level beneath the BA46 overflying at FL 240. At about this time, the controller involved in the incident prepared to take over the DVR/LYD Sector. She reports that this process followed the normal format with traffic being pointed out and noted by her, which included the C5. She had no difficulty in assimilating the FPS information presented on the display boards and believes the appropriate FPS for the C5 and B737 were positioned close to each other.

As part of her review of the traffic situation, shortly after taking over the position, the SC noted that the BA46 was still inhibiting the climb of the B737 and confirmed with the latter's crew that it would maintain FL 230, when reached. Two minutes later, at 1235, the SC assessed that the prescribed horizontal separation had now been achieved with the BA46 and issued the B737 crew with a climb clearance to FL 290. However, in issuing this clearance the SC had not considered the presence of the C5 at FL 250 and on a converging course at a range of about 20 NM. The controller cannot readily account for her error but believes that a

combination of factors may have caused her omission. Firstly, as she had not communicated with the C5 during her brief tenure, her awareness of this flight was reduced especially in view of the flight's track at the eastern extremity of the Sector. Secondly, the major conflict areas of the combined sector tend to occur in the middle and the west side of the sector. Hence, she was concentrating her attention more in those areas where problems needed solving and less so on the eastern side, which generally requires little attention.

One minute after the B737 crew had been given clearance to climb to FL 290, the SC observed the flight climbing through FL 247 and converging with the C5 at FL 250. With the range between the two ac now less than 5 NM and decreasing, the SC immediately instructed the B737 crew to expedite the climb through FL 260, albeit without using avoiding action phraseology and issued traffic information, *".....traffic is maintain two five two five zero three miles passing right to left b-below maintain two niner zero on reaching expedite through two six zero"*. The pilot responded, *"visual with the...military traffic"*. The C5 pilot was then asked if he could see the B737, the pilot replied *"tally ho"*, which implied that he could. Radar derived data supplied by NATS indicates that the STCA activated as the SC instructed the B737 crew to expedite the climb.

UKAB Note: A review of the LATCC PEASE POTTAGE radar recording reveals that prescribed horizontal separation of 5 NM was eroded at about 1235:15, as the B737 climbed through FL 251. Vertical separation decreased

to 500 ft when the B737 passed above and through the C5's 10 o'clock at a range of about 2.7 NM. Prescribed vertical separation of 1000 ft was restored less than half a minute later, when the B737 is shown indicating FL 263 less than 1 NM W of the C5, which maintained FL 250 throughout.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included a comprehensive report from the B737 pilot and brief comment from the C5 pilot; transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

From the comprehensive information available, the cause of this Airprox was clear to the members who with unanimity quickly concluded, the DVR/LYD SC climbed the B737 into conflict with the C5 that she had not taken into account when issuing the clearance. Nevertheless, when she realised her error, prompt action was taken to resolve the problem. The B737 pilot had received a TCAS TA and both pilots had sighted each other's ac, which ensured that both crews were aware of the conflict. This, coupled with the vertical separation involved as the B737 climbed well above the C5 at the closest point of approach between the two ac, led the members to conclude there had not been a risk of a collision.

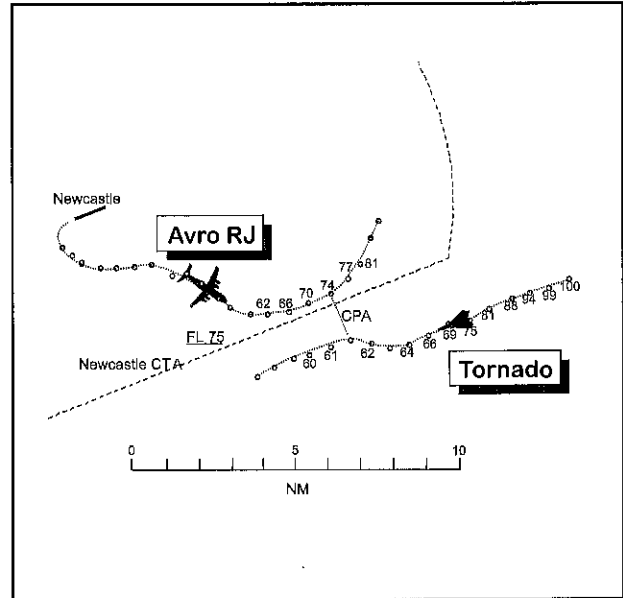
## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The LATCC DVR/LYD SC climbed the B737 into conflict with the C5.

**AIRPROX REPORT No 198/99**

Date/Time: 3 Nov 2004 NIGHT  
Position: N5458 W0127 (9 NM SE of Newcastle)  
Airspace: FIR (Class: G)  
Reporter: Newcastle ATC  
First Aircraft Second Aircraft  
Type: Avro RJ Tornado F3  
Operator: CAT HQ STC  
Alt/FL: ↑ FL 140 FL 100 ↓  
  
Weather IMC IICL VMC CLAC  
Visibility: NK  
Reported Separation: NK/1-2 NM  
Recorded Separation: 1.5 NM, 1200 ft



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

**NEWCASTLE ATC** reports, with RT transcript, that the RJ, cleared to FL 50 on a heading of 090°, called the Radar 1 (R1) controller in a left turn after take off from RW 25. No transponder was showing. The pilot advised he was climbing to FL 50 on course to FAMBO and R1 cleared him to climb to FL 140. R1 then advised him "C/s stop your tu - er correction turn left again heading 080 there's military traffic in your 12 o'clock range of 10 miles tracking towards you FL 85". The pilot queried if that was for him and R1 replied "C/s affirm left heading 090". He then passed traffic information "military traffic in your half past 11 range of 6 miles left to right FL 72 unverified, report your level, you're not transponding". The pilot advised that he had gained VMC at FL 58 and was looking. R1 then told him "C/s further left heading 050 avoiding action" (acknowledged as 060°). Further traffic information followed (2 o'clock 3 miles same level) and the pilot reported "Now we have him in sight". By then the pilot had turned on his transponder. R1 advised that the traffic was now turning towards him and told the pilot to turn further left onto 010°; the pilot then advised that the traffic was passing beneath in his 5 o'clock. Once clear the RJ was re-cleared to FAMBO and FL 140. R1 advised he would report the incident and the pilot thanked him for

the avoiding action, reporting that his TCAS had given a TA.

**THE AVRO RJ PILOT** reports that while climbing out of Newcastle in cloud he was given prompt avoiding action by the controller which kept him clear of a conflicting ac that passed some distance to his right as he was coming out of cloud. He had a brief TCAS TA on it but did not see it until it passed. He believed the controller's prompt action had removed any risk of collision.

**THE TORNADO F3 PILOT** reports heading 240° at 400 kt in a descent from FL 100 to FL 50 while receiving a RAS from Neatishead, starting a recovery to Leeming. At FL 70 a radar contact appeared on the nose at 6 NM at FL 50. He levelled at FL 65 and Neatishead confirmed the contact in the same position. He saw the ac as it came out of cloud; both on radar and visually it appeared to be on a collision course so he turned right to 'go behind' it. Once steady it was apparent the ac had turned left re-establishing a collision course so he broke left onto a southerly heading and descended as the other ac was climbing. He estimated the ac passed 1-2 NM away. There had been little risk of collision as he had gained timely radar and visual contact, and he continued for an uneventful recovery.

UKAB Note: LATCC radar recordings show the RJ turning left after takeoff and tracking to join the 131R for FAMBO, while the Tornado is tracking to pass parallel to the S side of the CTA in a descent from FL 100. The RJ turns right to follow the radial; by the time it is apparent to the Tornado pilot that the ac is turning into conflict, and he turns right to avoid it, the RJ is already reversing its turn in response to the avoiding action given. However, the exact point at which the RJ came out of cloud is not known and anyway a roll reversal would not have been apparent in the dark to the Tornado pilot who would only have become aware of it when the RJ started tracking left to right on radar. At that point the Tornado reverses its turn to pass 1.5 NM S of the RJ and 1200 ft below it.

**ATSI** reports that the Newcastle APR saw the conflict and initiated action, passing avoiding action instructions and traffic information. The controller elected to turn the RJ left, shortly after it had turned right on track for FAMBO, to keep it inside CAS. However, the Tornado crew turned right towards the RJ; the radar recording indicates that the RJ had already commenced its left turn when the Tornado turned right. There is no evidence that the Tornado levelled at FL 65 as reported, however, the RJ had continued climbing so that did not affect the outcome. The RJ was not transponding on departure and its Mode C was not displayed until it reached FL 62, possibly aggravating the situation. Passing this close to Newcastle, the Tornado crew or their control agency could have helped by giving them a call.

**HQ STC** comments that the military investigation into this incident indicates that Newcastle initially reported it to Neatishead as an unauthorised penetration of their CTZ by the Tornado. There is no evidence to support this allegation.

The Tornado pilot was under an ADIS from Neatishead (not a RAS as reported by the pilot). While recovering to RAF Leeming, having requested vectors to the ILS, he was the first to detect the conflict. With both radar and ultimately visual contact, he turned to resolve the conflict, a manoeuvre which

unfortunately was negated initially by a similar avoiding turn from the RJ. The lack of Mode C from the RJ seems largely irrelevant at this stage since both captains were equally committed to conflicting flight profiles. Nevertheless, both crews appear to have been visual by 3 NM. That alone would suggest that the risk of collision was low; both pilots were seemingly unperturbed by the incident and content with the conclusion, and the RJ captain said the timely avoiding action by Newcastle had resolved the conflict.

Neatishead has in the past attempted to co-ordinate Leeming recoveries with Newcastle where appropriate. However, unless such recoveries necessitated penetration of the CTA/Z, Newcastle have proposed that co-ordination is not required and therefore this is no longer the procedure. As an alternative, whenever practical, Neatishead attempts to establish a 5 NM buffer around the Class D airspace, and consequently turned the Tornado 10° left when the pilot asked to descend to FL 50. Given the relative geometry of the conflict, close to the edge of the CTZ, it is unclear why the Newcastle R1 controller did not take account of the Tornado approaching from the E when he released the RJ, by initiating co-ordination with Neatishead.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It appeared to the Board that all concerned in the incident had done as expected and that the potential conflict between the ac had been satisfactorily resolved by the Newcastle R1 controller and the pilots. It appeared that the potential conflict might have been avoided altogether if Newcastle ATC had noticed the Tornado earlier and held the RJ on its easterly heading until the Tornado had passed, but there

was no conflict until the RJ began its turn onto the radial for FAMBO. The avoiding action then given had kept the RJ inside the CTA thus providing acceptable separation from the Tornado. Members considered that this and the avoiding action taken by both pilots had

prevented an incident from occurring and that this was not an Airprox. However it had appeared as such to the controller at the time, leading him to submit an Airprox report. The Board therefore concluded that the cause of the report was a controller perceived confliction.

### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Controller perceived confliction.

### **AIRPROX REPORT No 199/99**

Date/Time: 3 Nov 1506

Position: N5123 W0326  
(1 NM S of St Athan - elev 163 ft)

Airspace: ATZ (Class: D)

Reporter: Cardiff

First Aircraft                      Second Aircraft

Type: Cessna C421c                      Hawk

Operator: Civ Comm                      PTC

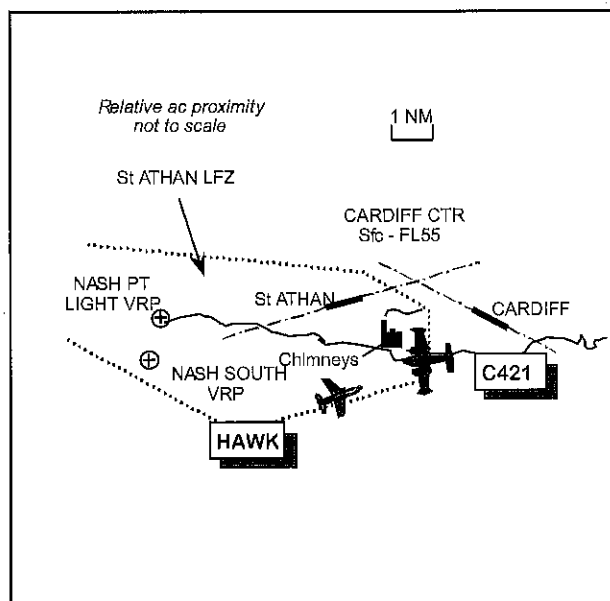
Alt/FL: 500 ft                      700 ft  
(QNH 1028 mb)                      (QFE 1023 mb)

Weather VMC CLBC                      VMC CLBC

Visibility: 25 km                      NR

Reported Separation:  
3-400 ft V & 1-2 NM                      300 ft V nil H

Recorded Separation: Not Recorded



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

**THE OFFGOING CARDIFF AERODROME CONTROLLER (ADC1)** reports that he was informed about the C421 inbound to St Athan by the Approach Controller (APR) when it was 10 NM E of Cardiff airport. It was co-ordinated with APR to follow the coast westbound to join the St Athan Local Flying Zone (LFZ) at 5-700 ft amsl. The C421 pilot subsequently called and was instructed to continue along the coast and report at Barry Docks, ADC1 then proceeded to hand-over the position to the oncoming ADC (ADC2) in a medium to high traffic loading.

ADC2 was informed that the C421 would be following the coast low-level to join the St Athan circuit and furthermore, that co-ordination with St Athan Tower (TWR) had not yet been completed. ADC1 estimated that the C421 was 5 NM due E of Cardiff airport when the watch hand-over was completed.

**THE ONCOMING CARDIFF AERODROME CONTROLLER (ADC2)** confirmed the foregoing and reports that although co-ordination was initiated with St Athan when the C421 was S abeam Cardiff Tower, St Athan ATC was not aware of the flight. Brief details on the Cessna were passed and the pilot was

instructed to call St Athan TWR on 122.1 MHz when abeam the Power Station, 1 NM SW of Cardiff. ADC2 was not aware of the Hawk ac at all.

**THE CARDIFF APPROACH RADAR CONTROLLER (APR)** reports that the C421 was told to route westbound along the coast, S of Cardiff and then to position downwind LHD for RW26 at St Athan. Following co-ordination, the ac was transferred to the Cardiff ADC about 12 NM NE of Cardiff airport.

UKAB Note: Following the C421 pilot's request for joining instructions the RT transcript records the following:

APR "follow the coast all the way round that'll bring you into downwind left position for 26 now".

C421 "that's copied and follow the coast round then for a LHD pattern for 26".

**THE CESSNA C421 PILOT** reports that a transit altitude of 500 ft over water was maintained whilst inbound VFR to St Athan at 160 kt. The ac has a white colour scheme; navigation, landing lights and HISLs were on and 3/A 7000 with Mode C selected. He thought he had been instructed to join for RW26 at St Athan by Cardiff TOWER, and whilst flying toward L base, was awaiting an instruction to switch to the St Athan TWR frequency. The black Hawk ac was first spotted at 10 o'clock at a range of about 2-2.5 NM heading straight toward him in a 45-60° L bank turning from downwind to finals. He maintained heading and immediately dived over water to 300 ft to avoid the other ac, which appeared to have rolled out of the turn to pass astern in avoidance. The minimum separation was assessed as about 1-2 NM as the Hawk passed 3-400 ft above heading 060°. When instructed, he switched to St Athan TWR immediately, but then held off in a LHD orbit. He believed that the Cardiff controller did not seem to have alerted St Athan "at the correct time", as it would have been about 5-7 min from calling Cardiff TOWER

before the Power Station at the edge of the St Athan circuit was reached. Whilst passing through the undershoot to Cardiff RW30 at 500 ft he believes he was cleared to enter the St Athan circuit by Cardiff TOWER. Furthermore, if St Athan had radar they could at least see what was approaching their circuit.

**THE HAWK PILOT** reports flying a dual sortie to St Athan and in receipt of an ATS from St Athan TOWER; the ac colour scheme was standard PTC Black, HISLs were on and the assigned squawk was selected with Mode C. Whilst at a height of 700 ft, he was making a 60° AOB level turn through 060°, at 350 kt when a C421 was sighted at a range of 600 m, 200 ft below the Hawk and about 20° L of the nose. To avoid the other ac the wings were immediately levelled and the ac climbed to increase separation, before going into a L bank in order to monitor the other ac. As a result of the avoiding action he believed the risk of a collision was removed but it was still uncomfortably close. He reported an Airprox to St Athan TWR, who had cleared him through initials but no traffic information had been given about the C421.

**ATSI** reports that Cardiff Approach provides an Approach Control service for Cardiff and St Athan under a LOA, which defines the specific co-ordination procedures to be followed by both units. Consequently, the subject ac both contacted Cardiff Approach initially.

At 1457, the C421 pilot established communication requesting a FIS and gave an estimate for St Athan of 1505, wherefore it was agreed that the flight would follow the coast offshore until it reached a position where it could join for RW26 at St Athan. Following internal co-ordination between APR and ADC, the C421 was transferred to Cardiff ADC, but APR did not pass details of the C421 to St Athan as required by the LOA. The Hawk pilot contacted Cardiff Approach at 1501, shortly after the C421 had been transferred to the Cardiff ADC and requested a standard 'Nash South Recovery' that was approved. Following the required co-ordination, the Hawk was transferred to St Athan TWR at 1503, after the

pilot had reported S of Nash South VRP. Meanwhile, the C421 pilot had reported at Barry, as requested by the ADC, and had been provided with traffic information on traffic inbound to Cardiff. The pilot was told to report "...south abeam..." (UKAB Note: but not where from) and informed that he would be transferred to St Athan shortly. No 'south abeam' report was received but the ADC was clearly aware of the C421's position because, at 1505, he rang St Athan to advise : "*C/s is just approaching the chimneys coming in for a standard LFZ join from there if you're happy to take him.*" (The chimneys are associated with the power station situated about 1.5 NM L base for RW26 at St Athan). TWR advised that he did not have any information on the C421 but accepted the flight, was passed brief details on the C421 and informed Cardiff ADC that the Hawk was joining from the W, who said that he could see the Hawk (probably on his ATM) but did not pass this to the C421 pilot. While this conversation was taking place, the pilot of the C421 reported: "*...at the chimney*", which was not acknowledged by the ADC. Approximately 30 seconds later, the pilot advised : "*...we require change now to Saint Athan Tower*" and was transferred. The Airprox occurred shortly afterwards but it was outwith the coverage of recorded radar. During this period, the Cardiff ADC had been experiencing a fairly high workload.

In the period before this Airprox there was a lack of traffic information from Cardiff to ac under circumstances in which the pilot could reasonably have expected to receive it. The Cardiff APR did not pass inbound details on the C421 to St Athan who were not expecting the flight and were surprised when the Cardiff ADC rang to advise that it was approaching the "chimneys". Nevertheless they accepted the C421, whose pilot was not advised of the Hawk joining from the west by the Cardiff ADC and the Airprox resulted. The RTF recording reveals the transfer of the C421 to St Athan was late, the ac being too close to the LFZ boundary and RW 26 circuit pattern.

A Cardiff Local Safety Notice was issued highlighting contributory factors and on 5

November 1999, a TOI was issued that introduced a trial procedure for dealing with civil aircraft movements at St Athan. It now requires all inbound ac to be given radar vectors to a PAR or visual approach and reinforced the requirement for Cardiff APRs to effect co-ordination on inbound traffic with both Cardiff ADC and St Athan TWR.

**HQ MATO** reports that the pilot of the Hawk called St Athan TWR at 1504:29 while joining the circuit for RW 26 and advised that he was "*1 minute to Nash South*" VRP about 4.5 NM WSW of the aerodrome, which TWR acknowledged. Shortly after 1506, the Cardiff ADC contacted TWR by landline advising, the C421 "*...is just approaching the chimneys coming in for a standard LFZ join from there if you're happy to take him.*" TWR replied "*Didn't know anything about him, but we'll take him.*" After the C421's details were passed the conversation ended with:

Cardiff ADC "*...he's coming over now. He's just approaching S abeam the power station.*"

St Athan TWR "*OK, Hawk joining from the W.*"

Cardiff ADC "*OK, I can see the Hawk thanks.*"

Just as ADC said "*Hawk*" at 1506:38, its pilot transmitted "*... left initials,....actually there is another.....a light aircraft... below at that point*". TWR then observed the Hawk climbing sharply and another ac descending. At 1507:11, the C421 pilot made his first RT call to TWR "*...one left hand orbit above the power station,....late release from Cardiff.*" St Athan ATC were later advised by the Cardiff ATS manager that an Airprox had been filed.

St Athan is 3 NM W of Cardiff airport and within the Cardiff CTZ. A LOA requires Cardiff ATC to co-ordinate St Athan inbounds with TWR. However, in this case the information was received too late to enable TWR to inform the Hawk pilot of the C421's presence. The Airprox took place in the vicinity of the power station 'chimneys' 2 NM SE of the aerodrome, just as ADC and TWR completed their landline

conversation. It would have required an extremely vigilant observer in the VCR to have noticed the C421 approaching almost 'head on' in time to forewarn the Hawk pilot. The St Athan visual circuit is embedded within the Cardiff CTZ and the Hawk pilot could reasonably have expected information from TWR about another ac joining the circuit, assuming TWR knew about it.

St Athan is not equipped with radar, nor does it have an Aerodrome Traffic Monitor (ATM). However, active consideration is now being given to procuring an ATM, using data from the Cardiff surveillance radar.

HQ PTC comment that the Hawk seems to have rejoined entirely IAW local procedures and met the C421 before St Athan ATC could reasonably anticipate its appearance. An ATM would seem to be a worthwhile safety investment as Cardiff gets busier and coordination more stretched.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It seemed that a communication breakdown, contrary to established agreements was the catalyst to this close encounter and by an overwhelming majority members reinforced ATSI's concluding comments. A member from HQPTC explained that the St Athan LFZ is very confined airspace and so can be tight when trying to manoeuvre fast jets. For visiting ac from the E the initial call to TWR should be made in good time before reaching the Chimneys and leaving it later would not do. It was clear that the C421 pilot realised this and was eager to switch to St Athan TWR, unfortunately without the benefit of traffic information on the Hawk. St Athan should have been given earlier notice of the inbound C421 by Cardiff but this did not happen. The PTC

member also reiterated that an ATM might have alerted the St Athan TWR controller to the confliction. There was general agreement with the opinions expressed by both ATSUs, who believed that the addition of an ATM facility for St Athan TWR would be valuable and certainly enhance flight safety. It was most unfortunate, therefore, that negotiations between MOD and NATS appeared to be stalled. The Military ATC Ops advisor commented that, contrary to what had been said there was no standard LFZ join from the E and this may have given rise to potential confusion in the past. That aside, the revised procedures drawn up subsequent to this occurrence seemed to be working satisfactorily; pilots unfamiliar with St Athan procedures were given a radar or visual straight-in approach, or a PAR, while those familiar with procedures were individually coordinated as required. The phraseology used by Cardiff to the C421 pilot in passing circuit-joining information for St Athan gave some controller members concern; they thought it was very confusing.

A civil ATC member highlighted a significant point - the Cardiff ADC was not aware of the Hawk in the St Athan circuit, until St Athan TWR told him about it moments before the C421 was transferred. Members felt the Cardiff APR should have told his ADC about it joining earlier. But having been told about it by TWR and spotted it himself, the Cardiff ADC should have advised the C421 pilot of the Hawk before transfer, then at least the pilot would have been forewarned and looking for it. Instead the C421 pilot was switched too late and too close. However, one pilot member familiar with the airspace did not believe it would have been a problem if the all important traffic information on the Hawk had been given to the C421 pilot, notwithstanding difficulties imposed by the confined airspace and overlapping traffic patterns. A GA member did not think it was ideal to expect pilots to turn R into a L base join, since this placed them 'belly-up' to any other traffic downwind in the L circuit for RW 26.

In the end, members agreed that the cause of this Airprox was that the Cardiff APR did not notify the Cardiff ADC and St Athan TWR in time



about the subject ac in accordance with the LOA. With regard to the risk inherent in this encounter there was little debate. Both pilots involved agreed that the vertical separation had been about 300 ft. The C421 pilot reported executing a fairly vigorous manoeuvre to avoid

the Hawk, whose pilot did not spot the other ac until they had closed to 600 m. With the high closing speeds involved there was little time to react and the members concluded therefore, that the safety of both ac had been compromised.

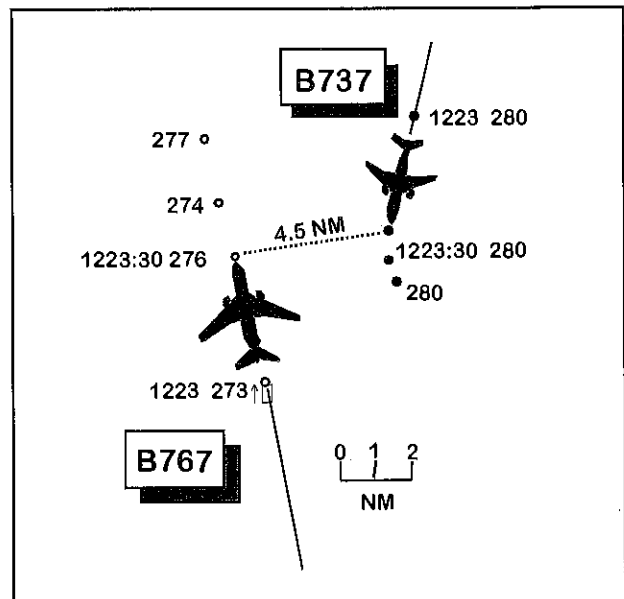
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: The Cardiff APR controller did not notify the Cardiff ADC and St Athan TWR controllers in time about the subject ac in accordance with the LOA.

**AIRPROX REPORT No 200/99**

Date/Time: 1 Nov 1223  
 Position: N5343 E0328 (MULIT) Airspace:  
 UAR (Class: B)  
 Reporting Aircraft Reported Aircraft  
 Type: B76-3 B73-2  
 Operator: CAT CAT  
 Alt/FL: FL 280 FL 280  
 Weather IMC VMC  
 Visibility: Not given >10 NM  
 Reported Separation:  
 1 NM/300 ft / NK  
 Recorded Separation: 405 NM/400 ft



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

**THE B767 PILOT** reports that he was cruising at M0.79 on UL74 at FL 280 in IMC under the control of LATCC on 121.32, en route to Orlando from Amsterdam. In the vicinity of TOPPA, a TCAS RA was received demanding descent against opposite direction traffic indicating at the same level. Descent was initiated at 1500 ft per min and the other ac, which was not seen, was estimated to have passed 1 NM to their R and 300 ft above. He thought there had been high risk of collision and reported an Airprox by RT to LATCC.

**THE B737 PILOT** reports that he was cruising at FL 280 and heading about 210° under the control of LATCC on a flight from Moscow to Gatwick. The ac was not TCAS equipped. ATC instructed him to turn L onto 177° but he was not informed about the position of the other ac and therefore was unable to assess the degree of risk.

**ATSI** reports that the incident took place at MULIT, a reporting point at the intersection of two Upper ATS Routes, UM604 and UL74, in class B CAS. Both ac were receiving an Area Control service from the LATCC North Sea

S11/S33 Sector controller (NS SC) who was operating in bandboxed configuration. The combined sector was moderately busy at the time, with a number of inter-dependent level changes required, but the workload was considered to be within manageable limits. No ATC equipment unserviceabilities were reported.

At 1211, some 12 minutes before the incident, the B737 made its first call to the NS SC and reported maintaining FL 310. The flight, which was tracking SW towards MULIT on UM604, was instructed to maintain FL 310 and issued with routing instructions and given the appropriate STAR for Gatwick. Meanwhile, the B767 was approaching MULIT on a NW track and established communications with the Sector. The pilot reported passing FL 180 in the climb to FL 280 and was instructed by the SC to maintain this level on reaching.

About 14 NM in trail of the B767 another B767 was cruising at FL 310 on a similar route. Recognising that this flight was on a converging track with that of the B737, also at FL 310, the SC elected to solve the potential conflict by instructing the latter to descend to FL 280, believing it to be a safe level. When he issued this clearance, however, he had not taken into account the presence of the subject B767, which was climbing to FL 280. A radar recording shows that at this point the ac were about 70 NM apart, with the B767 climbing through FL 202. The SC cannot account for his error and no reason for it is immediately apparent. The relevant FPSs had been correctly marked and, as far as can be established, were logically positioned on the Sector display board.

At 1221, the B767 was passing FL 248 and had just completed a turn to the R of about 30° as it adjusted its track to establish on the centreline of UL74. This adjustment had the effect of increasing the track convergence with that of the B737, now at a range of about 27 NM and having reached FL 280. A little under 2 minutes later, and following a routine scan of the radar, the SC realised the developing conflict and immediately instructed the B737 pilot to turn L

heading 180° and provided him with traffic information in terms of direction and range, but no level information; the pilot immediately correctly readback the instruction. The radar recording shows that at this point the B767 was in the B737's 1130 position, crossing L to R at a range of about 9 NM and passing FL 273.

Turning then to the B767, the SC instructed the flight to turn L on to a heading of 340°, advising that the other traffic was "*passing right hand side going behind you about 6 NM*". There was no reply and the flight was called again; once more no response was received. An unidentified voice then announced "*sir, we had a resolution advisory*". Following an enquiry by the SC it was established that the pilot of the B767 had reacted to a TCAS RA. The radar recording indicates that, during this period, separation reduced to a minimum of 4.7 NM laterally and 400 ft vertically as the B767 was passing through FL 276; the B737's level remained unchanged at FL 280 during the encounter. As the minimum lateral separation requirement is 5 NM, only a marginal loss of separation had occurred. Neither STCA nor SMF equipment was activated and no further comment was made by the crews of the flights involved. It is not surprising, therefore, that the controller involved believed at the time that his actions had been sufficient to prevent a loss of separation. Consequently both he and the ATC watch staff treated the occurrence as a TCAS event only and completed an ACAS Evaluation report form. It was not until a few days later that the incident was reclassified as an Airprox following the receipt by UKAB of an Airprox report from the pilot of the B767.

UKAB Note: A recording of the LATCC radar at 1223 shows the B767 on a NNW track climbing through FL 273 with the B737 tracking SSW and maintaining FL 280 at its 1.30 position range 8.5 NM. At 1223:30, passing MULIT, the B767 is abeam the B737 by 4.5 NM and indicating FL 276. Eight sec later the Mode C of the B767 indicates 274 briefly before a climb is recommenced. Minimum recorded separation is in the order 4.5 NM and 400 ft.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a radar video recording, and a report from the appropriate ATC authority.

It was noted that the pilot of the B767 did not see the B737 and filed his report on the basis of TCAS indications. His lateral estimate of 1 NM led him to believe it had been a high risk encounter. In the event, radar recordings showed that standard separation was only marginally compromised; members commented that pilots should be cautious in judging horizontal distances from TCAS derived

information alone as the equipment is known to be inaccurate and unreliable in this plane.

There was little further to discuss and the Board quickly concluded that the cause of the Airprox was straightforward; the NS SC issued a descent clearance to the B737 to FL 280 without taking into account the presence of the B767 climbing to the same level. However, the controller had subsequently recognised his error and had taken sensible action which he believed at the time was sufficient to resolve the situation. While it was later shown that he did not quite achieve the required 5 NM lateral separation, members agreed that there had not been any risk of collision.

**PART C: ASSESSMENT OF RISK AND CAUSE**

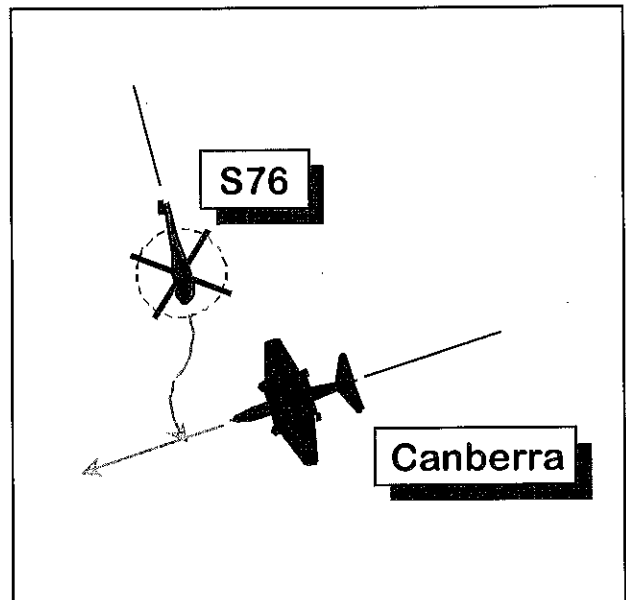
Degree of Risk: C

Cause: The LATCC NS SC did not take the subject B767 into account when he descended the B737.

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**AIRPROX REPORT No 201/99**

Date/Time: 4 Nov 1547  
Position: N5206 W0042 (1 NM N of Newport Pagnell)  
Airspace: FIR/LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: S-76 Canberra  
Operator: Civ Comm HQ STC  
Alt/FL: 2000 ft 2400 ft  
(RPS 1004 mb) (Rad Alt)  
Weather: VMC CLNC VMC CLOC  
Visibility: 10 km+ Unltd  
Reported Separation:  
0.25 NM, 300 ft/NK  
Recorded Separation: 0.5 NM, 100 ft



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE S76 PILOT** reports heading 170° at 140 kt on a 'selected helicopter flight' at 2000 ft for which the appropriate NOTAM had been issued, and he was on time. He was receiving a RIS from Luton on 129.55 and had earlier heard the Canberra ascertaining his whereabouts on Cottesmore's frequency. He could not remember Luton warning him of it and he first saw it in his 10 o'clock at the same level crossing left to right ahead, too close for comfort. He turned right and descended to 1700 ft; while the risk of collision was low, severe turbulence from the jet could have been a problem. He estimated the Canberra passed 0.25 NM away and 300 ft above.

**THE CANBERRA PILOT** reports heading 220° at 240 kt at 2400 ft Rad Alt. He was receiving a RIS from Cottesmore (the appropriate 'Safeguard' unit) in order to avoid conflicting with the helicopter. When Cottesmore asked him if he was happy to go en route he replied he was only happy to do so if there was no further conflict with the helicopter. At this point he was told it had been passed on to Thames Radar and was 5 NM to the S. He therefore went VFR, squawking 7000 with Mode C, and eventually called Boscombe Down. He did not see the helicopter. His flight planning had taken the notified helicopter fully into account, including the plotting of its track and timings, he had adjusted his take-off time to deconflict with it and had obtained a RIS from Cottesmore to help him avoid it.

UKAB Note: LATCC radar recordings show the Canberra, squawking ident, approaching the helicopter at the same level (2200 ft Mode C) and passing about 0.5 NM in front of it. The helicopter descends 200 ft before crossing the Canberra's track. The local QNH was 1018 mb; 2200 ft Mode C @ 2300 ft QNH, 2000 ft agl.

**ATSI** comments that the S76 pilot was under a RIS from Luton and was provided with traffic information on the Canberra albeit somewhat later than would have been ideal (10 o'clock, 2 NM, left to right, indicating 2300 ft). However,

there were a large number of radar returns in the area and information on a number of potential conflicts had been provided. The Canberra was operating at high speed compared with most of the low level traffic in the area and appeared on the scene rather quickly. The S76 pilot had reported good VMC and quickly spotted the Canberra.

**HQ MATO** reports that the S76 pilot was squawking the Selected Helicopter Flight (SHF) SSR code 0035 and receiving a RIS from Cottesmore Zone on 130.2. At 1534:52, the Canberra pilot freecalled Zone on the same frequency and transmitted "...a Canberra, 2 POB en-route to Boscombe Down. We're transiting at 2000 ft.....I'm just checking that you are controlling or have been speaking to (S76 c/s)." Having established that Zone was talking to the S76, the Canberra pilot requested confirmation that the S76 was on time and "...that we're not going to decon..er ..we're going to conflict." Zone passed traffic information (TI), on an unconnected ac, to the S76 pilot and then informed the Canberra pilot "...the (S76 c/s) is now east of Market Harborough, 5 miles, tracking south," at 1536:01. Zone then passed further TI to the S76 pilot before asking the Canberra pilot if he required a radar service, to which the pilot requested RIS. A squawk was allocated to the Canberra, but was not observed on Zone's radar; No other method of identification was attempted. Zone did not feel comfortable giving a RIS, but tried to give the best information he could and informed the Canberra pilot that a FIS would be provided instead. The pilot acknowledged, adding that he was "...recycling." The controller did however, subsequently make a number of TI calls to the Canberra, using the words "traffic believed to be you" during its transit. At 1540:10, Zone informed the S76 pilot "...Swell (the airfield) left 11 o'clock, 3 miles" and the S76 pilot confirmed "Roger, we're talking to him on the other box." Immediately after this, the Zone control position was handed over to a new controller. At 1541:30, the S76 pilot confirmed that he was in communication with Luton and Zone transmitted "(S76 c/s) roger, your position south of Sywell, one mile, continue with Luton 129.55, good day." At

1544:41, Zone requested the Canberra pilot to advise leaving the frequency to which the Canberra pilot replied "...advise we're now clear of (S76) and not going to conflict and we will go VFR en-route." Zone responded "...roger, I've handed (the S76) over .....presently estimated 10 south Sywell" (the SHF was no longer showing on radar) and the Canberra pilot transmitted "10 south Sywell copied and c/s switching en-route, many thanks good day, squawking 7000."

LATCC radar recordings show the S76 southbound and squawking 0035 at an indicated 2200 ft Mode C. The Canberra is seen tracking 250° from the Cambridge area with no SSR, and does not appear to alter course during its transit. At 1544:56, the time that Zone passed an estimate of the S76's position to the Canberra as it left the frequency, the S76 is about 8 NM SSE Sywell, or 11 NM W of the Canberra. At 1545:20, the Canberra squawks 4360 (previously allocated by Zone) with ident, before changing to 7000 (still with ident) in the next radar sweep, with a Mode C indication of 2300 ft. The appearance of the Canberra's squawk corresponds with the time that its pilot changed to his en-route frequency whilst squawking 7000 and thus the previous absence of SSR information may have been the result of an accidental mis-selection within the cockpit.

Although the Airprox occurred over 2 min after the Canberra had left Zone's frequency, the RT exchanges between Zone and the Canberra pilot were clearly significant in the incident. The Canberra had not been positively identified, therefore positional information regarding the SHF's progress had been given with reference to geographical features, initially a town, and later Sywell airfield. Sywell is 27 NM SSE of Cottesmore and thus, at the ac altitudes involved, the airspace to the S of Sywell was below the cover of the Cottesmore primary radar. Cottesmore's SSR coverage is also poor in that area. Knowing this, Zone prompted the helicopter pilot to change frequency to Luton as the S76 passed Sywell, although the RIS ought perhaps to have been limited earlier. Shortly afterwards, the S76 faded from Zone's radar

and thus, when asked by the Canberra pilot for a position update at 1544:41, the controller could only estimate it. This estimate was about 3 NM SW of the S76's actual position at the time, although both positions place the helicopter to the N of the Canberra's projected track, but heading towards it. The Canberra pilot believed that he was informed that the SHF was 5 NM to the S. Zone's estimate was reasonably accurate, but was apparently not absorbed by the Canberra crew. The S76's altitude was not passed to the Canberra pilot although, having heard the SHF on frequency, he could have requested this information. While the maximum transit altitude was promulgated in the SHF NOTAM, a simple information call from Cottesmore, indicating that the SHF was also at 2000 ft, might have been sufficient to prompt the Canberra pilot to select a different cruising altitude.

The Canberra pilot had originally requested a RIS, but was provided with FIS following a lack of SSR information. Arguably, the original Zone controller could, and indeed should, have made a greater effort to identify the Canberra by using an alternative method (such as a turn), and therefore provide the radar service originally requested, particularly as the pilot had expressed a specific interest in the SHF's progress in his initial call. Zone passed TI to what was believed to be the Canberra on several occasions and so, presumably, the controllers had a reasonable idea of its location. The Canberra's track took the ac no closer than about 28 NM from Cottesmore, but heading for the area of poor radar coverage. It is therefore most likely that had a radar service been provided, it would have been significantly limited or terminated at a fairly early stage and well before the Canberra reached the area of the SHF's track.

The first Zone controller did not get the impression that the Canberra pilot was particularly concerned about the SHF because he (the pilot) was obviously aware of it. As the controller had passed the position of the SHF, he thought he had done what was needed. The handover of the Zone position was routine. The positions of both ac were pointed out but,

because the off-going controller was unaware of the Canberra pilot's requirement to be kept clear of the SHF, he did not pass it on to his relief.

**HQ STC** comments that the Canberra was on a delivery flight from RAF Marham to DRA Boscombe Down and had contained more fuel than required for the transit. Mindful of the difficulty in defuelling the ac, the crew planned the transit at 2000 ft which would bring them below their maximum permissible landing mass on their arrival. The crew were fully aware of the SHF and planned to use the Safeguard system for en-route deconfliction from the helicopter. This plan, although sound in principle, was flawed in practice by a breakdown in situational awareness which resulted from a deteriorating radar picture, a degree of misunderstanding over the type of service and some misinterpretation of the traffic information which was subsequently passed to the Canberra pilot.

Given that the maximum transit altitude of the helicopter had been promulgated, simple deconfliction in altitude would almost certainly have proved more effective, with minimum disruption to the fuel plan. However, it would have been wiser to have avoided the planned route of the SHF altogether, in line with the guidance given at GAI J1001 and the FIH which states that "pilots should avoid flying near the promulgated route at the time notified".

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video

## **PART C: ASSESSMENT OF RISK AND CAUSE**

*Degree of Risk:* C

*Cause:* The Canberra pilot flew into conflict with the S76, which he did not see.

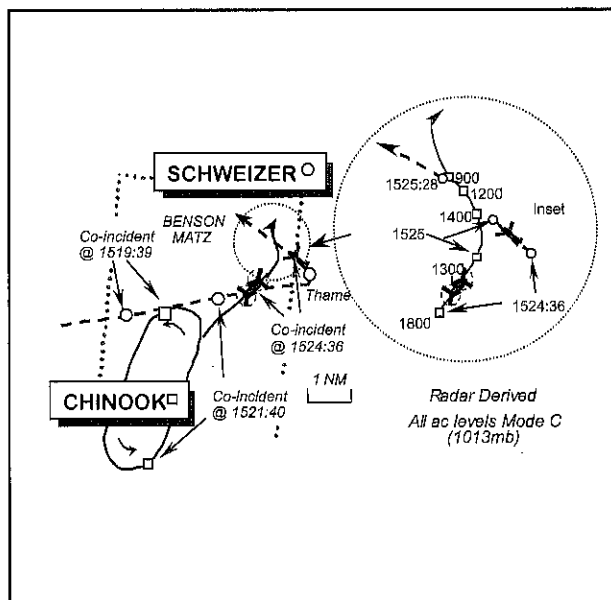
recordings, and reports from the appropriate ATC and operating authorities.

It appeared to members that there had been several misunderstandings first by the Canberra pilot, but also between him and the Cottesmore Zone controllers. The Canberra pilot said he had delayed his take off to avoid the helicopter, yet had coincided with it almost exactly. Within his crew there had been a misunderstanding of the Zone controller's position report for the S76 which should have disclosed to them that they were very much in conflict with it. Finally, there was the Canberra pilot's belief that he had specifically asked to be kept clear of the S76; the RT transcript showed that his request was not clearly framed in such terms. Controller members considered that what the pilot did say should have prompted more assistance from Zone or perhaps some attempt to find out what the pilot really expected. Against this background it was not surprising that the oncoming Zone controller was not told that the Canberra pilot wished to be kept clear of the S76.

Neither the controller nor the Canberra pilot had ensured that there was any vertical separation; again the Canberra pilot was under a misapprehension afterwards that he had been at 2400 ft agl. The Board concluded that the cause of the incident was that the Canberra pilot flew into conflict with the S76, which he did not see. However, it was agreed that the S76 pilot, with the assistance of a prompt from Luton ATC, had seen the Canberra in time to ensure that he could remove any risk of colliding with it. Members concluded that the incident would have been avoided best by the Canberra crew successfully complying with the instructions regarding SHF and avoiding its route altogether, by height or track.

**AIRPROX REPORT No 202/99**

Date/Time: 9 Nov 1525  
Position: N5145 W0102 (8.5 NM NNE of Benson - elev 226 ft)  
Airspace: MATZ (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Chinook Mk2 Schweizer 300  
Operator: HQ JHC Civ Trg  
Alt/FL: 1800 ft 2000 ft  
(QFE 1031mb) (QFE 1031mb)  
Weather VMC CLBC VMC  
Visibility: >10 km 20 km  
Reported Separation: Nil H 100 ft V  
Recorded Separation: Not recorded



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

**THE CHINOOK PILOT** reports flying a procedural IF training sortie and conducting a VOR/DME approach procedure for an ILS RW 19 at Benson, whilst under a limited RIS from Benson APPROACH (APP) and squawking the assigned code with Mode C. The ac colour scheme was camouflage green and top and bottom HISLs were on. He was flying on instruments from the R seat and wearing an IF visor, whilst his navigator occupied the L seat acting as safety lookout and radio operator. A further crewman covered lookout from behind the cockpit biased to the stbd side. Whilst in the hold a number of traffic information calls were given by APP, including one for the subject helicopter, he thought a Hughes 300, which passed more than 500 ft below flying NE. On completion of the hold, outbound from the fix, the ac was heading 046° at a TAS of 125 kt flying straight and level at 1800 ft QFE (1031 mb). Just before turning inbound to intercept the localizer, the rear crewman sighted another helicopter to stbd through the fwd bubble window, about 200 m away, he thought crossing from 1 o'clock to 7 o'clock. The aircrewman shouted "down down down" and an immediate emergency descent was initiated whilst reverting to flight by visual reference. He flew about 100 ft directly underneath the other helicopter with a high risk of collision. No warning of imminent convergence had been

received from APP to whom he reported the encounter.

**THE SCHWEIZER 300 PILOT** reports heading 040° at 70 kt as he passed about 3 NM NW of Chalgrove aerodrome at 1600 ft Benson QFE on a student navigational sortie. He was in receipt of a FIS from Benson and squawking 3/A 7350. His helicopter has a white colour scheme and anti collision lights were on. The Chinook had been spotted and visual contact maintained for about 5-8 min as it flew downwind, he thought, for RW19. He continued on track as the Chinook turned L toward him and closed. (UKAB Note (1): This was the Chinook's first turn after entering the LHD hold.) He descended from 2000 to 1600 ft to ensure separation against the Chinook, which passed about 6-700 ft horizontally to starboard heading SSW, not unduly close and there was no risk of a collision at any stage.

UKAB Note (2): Subsequent enquiries revealed that the Schweizer 300 pilot had faithfully reported the first encounter whilst the Chinook was in the hold. However, he was not aware of another encounter with the Chinook at all.

**HQ MATO** reports that the Chinook flew a holding pattern at 2500 ft QFE (1031 mb), prior to conducting an ILS to RW19 at Benson, under a 'limited' RIS from Benson APPROACH (APP)

- limited to SSR data only, because primary radar was out of service. APP was manned by a trainee controller and a qualified mentor. Traffic loading was light. Over 8 minutes before the Airprox, traffic information was given for the second time on the Schweizer at 4 NM W of the Chinook at 2000 ft as they slowly converged. Some 3 min later APP passed an update on this traffic *"...previously reported traffic due W 1 mile, tracking NE, last reported at 2000 ft QFE"*. The crew reported *"...visual"* with the Schweizer and continued in the hold. A further 2 min passed then APP instructed the Chinook pilot *"...clear the procedure report localiser established...."*. Thereafter, two transmissions of traffic information on unrelated ac were given to the Chinook crew, but at 1525:30, the Chinook pilot transmitted *"...we almost hit a very small helicopter.... yeah, we just got within about 100 ft of a small ...helicopter about 2000 ft"*. APP suggested that the ac sighted might have been the traffic that had been called previously. However, this was refuted *"...no we're visual with the previous, that's back in our 6 o'clock this one's err in our 330 radial, range about one mile"*. After landing the Chinook pilot declared his intention to file an Airprox and alleged that the reported ac was actually a Hughes 300 helicopter.

The Schweizer 300 pilot had called Benson ZONE earlier saying he was routeing from Grove to Thame and requesting a MATZ crossing. A squawk was assigned and approval given some 19 min before the Airprox to cross the MATZ at 2000 ft QFE under a FIS. Just under 3 minutes later, ZONE passed traffic information to APP on the Schweizer. About 2 minutes before the Airprox, the Schweizer pilot reported *"...overhead Thame turning L to Oxford"*; ZONE instructed him to report abeam Beckley which he duly did before changing frequency to Oxford.

Before entering the hold, APP made 3 calls to the Chinook crew relating to the position of the Schweizer before it was sighted. When the Chinook crew eventually called visual (1519:39) they had just entered the hold in a L turn. Four minutes then elapsed and just before the Airprox the Chinook crew started their descent.

While passing 1300 ft Mode C, traffic information was given on an ac to the W at FL 50 and this may have drawn the crew's attention away from the Schweizer now in their 1 o'clock. No traffic information was given to the Schweizer pilot by ZONE.

UKAB Note (3): The LATCC Heathrow radar recording does not completely illustrate this encounter in the Benson MATZ, as the Schweizer is not shown at the moment of the Airprox. The Chinook, squawking 3/A 7370, indicated 2000 ft Mode C (1013 mb), equating to 2540 ft QFE (1031 mb), as it tracked NE and entered the hold. The Schweizer, squawking 3/A 7350 but without Mode C, is shown tracking 050° and converging slowly with the Chinook until at 1519:51, the crew responded to the traffic information and called *"visual"* when the ac were about 0.25 NM apart. After the Chinook established the hold the Schweizer maintained its NE track toward Thame. When APP cleared the Chinook crew for the procedure (1521:40) the Schweizer was about 4 NM NNE of the Chinook. Two min later a primary radar return is shown 0.5 NM astern of the Chinook, corresponding with APP 's traffic information about another ac. One min after its pilot reported turning overhead Thame, the Schweizer is shown tracking steadily NW toward Oxford, with the Chinook 1.25 NM to the SW, tracking 057° downwind for the ILS. About 1524:32, the Chinook started a descent with the Schweizer 1 o'clock, less than 1 NM away, crossing from R to L. The Schweizer contact fades to a primary return and is then lost completely at 1525:00. Simultaneously, the Chinook turns left inbound indicating 1300 ft Mode C (1840 ft QFE), to intercept the localiser and merges with the projected track of the Schweizer which is not evident for 28 sec. At 1525:21, the Chinook indicated 1200 ft (1740 ft QFE) and 7 sec later 900 ft (1440 ft QFE), which may be indicative of the immediate avoiding action descent; contact on the Schweizer is re established almost coincident with the Chinook.

**HQ JHC** comments that whilst practising IF under simulated conditions during training a crew's lookout is bound to be degraded. While



we share concerns expressed by the Unit regarding the lack of traffic information from ATC, it is incumbent on crews to consider very carefully their choice of ATS before undertaking simulated IFR training. The Station has taken adequate procedures to highlight this incident amongst Chinook crews, and the final report will be used to widen the awareness of all JHC aircrew; we would urge our civilian counterparts to follow suit. Flight under VFR requires lookout to be paramount, and pressing to close proximity with another ac, notwithstanding the rights of way, can only increase the inherent risks. This incident occurred in a very busy area of military and civilian ac activity; we would urge all ac operators to question the necessity to operate under VFR through known instrument patterns and indeed to avoid them whenever possible. Steps should also be taken either to ensure military instrument approach paths are annotated on charts used by all aviators, or, MATZ are afforded Class D Status.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It was evident that the Chinook captain had considered the difficulties of lookout to starboard by ensuring that another crewman was scanning in this direction for other traffic - an important consideration when operating 'under the hood', especially bearing in mind the requirement to 'give way' to traffic closing from the R under the 'Rules of the Air'. However, members were surprised that the Schweizer pilot was completely unsighted when the Chinook underflew his helicopter at the time of the Airprox. The Chinook is a large helicopter, but with little change in the relative bearing/motion it might have been difficult for the Schweizer pilot to spot, as it closed from just abaft the port beam.

Although the Airprox occurred about 6 min after the Schweizer crossed the western MATZ stub boundary, civil controller members were surprised that Benson ATC had not provided positive separation to the ac. They were advised, that in the provision of a FIS to the Schweizer pilot, ZONE was neither obliged to identify the ac, nor track its progress. However, having assigned a squawk the controller had passed traffic information based on an SSR position to APP that included the routing via Thame. This placed the Schweizer close to the flight profile of the Chinook on the VOR procedure. Some members thought that it would have been more appropriate to have passed traffic information to both pilots about each other's ac, both SSR returns should have been visible to APP under the limited RIS that pertained. Even better an information call from ZONE to APP when the Schweizer pilot reported overhead Thame may have served to focus APP's attention on the civil helicopter and prompt further traffic information for the Chinook crew. The Chinook pilot had requested only traffic information from ATC, not separation from other traffic. Consequently, responsibility for maintaining separation lay with the pilot, whether or not the controller passed traffic information. Members noted the sage comments from JHC regarding the crew's choice of ATS. A group of members believed that flying IFR recoveries, especially when practising under a 'Hood', would be better done under a RAS, where separation can be provided against other traffic. Nevertheless, the military ATC advisor believed this Airprox stemmed from poor application of the RIS by the Benson APPROACH Controller. The controller had passed traffic information to the Chinook crew several times about the Schweizer, which they finally sighted when turning in the hold. In the intervening period from initial sighting until the Airprox a complete holding pattern had been flown and realistically the position of the Schweizer constituted an entirely different confliction. Although the conditions stipulated for a RIS do not require the controller to pass an update unless requested so to do, it appeared rather naive to assume that the Chinook crew would still be aware of the position of the other helicopter.

Moreover, just before the Airprox, traffic information was passed on an ac at FL 50, which was both irrelevant and potentially distracting. Conversely, the Schweizer constituted a definite hazard and updated traffic information about it would have been prudent - a point supported wholeheartedly by the majority of controller members. These factors all contributed to the fundamental cause of the Airprox, which the members agreed, was a late sighting by the Chinook crew and a non-sighting by the Schweizer 300 pilot, compounded by a lack of traffic information from Benson APPROACH.

It was also pointed out that though JHC suggested marking military instrument

approach procedures on charts, they were in effect already there. If a MATZ stub is depicted this will accommodate instrument approach procedures.

Turning to risk, the lack of recorded radar information at the moment of the Airprox did not facilitate accurate assessment of the vertical separation. Therefore, the only indication was from the Chinook crew's visual estimate. Though the Schweizer 300 pilot did not see the Chinook, the Chinook crewman saw the Schweizer in time to warn his captain who reacted promptly. Nevertheless, this encounter was a close one and members agreed that the safety of the ac had been compromised.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: A late sighting by the Chinook crew and a non-sighting by the Schweizer 300 pilot compounded by a lack of traffic information from Benson APPROACH.

**AIRPROX REPORT No 203/99**

Date/Time: 10 Nov 1429

Position: N5256 W0400 (25 NM SSE of Valley)

Airspace: FIR (Class: G)  
Reporting Aircraft Reporting Aircraft

Type: Hawk x2 Hawk x2

Operator: HQ PTC HQ PTC

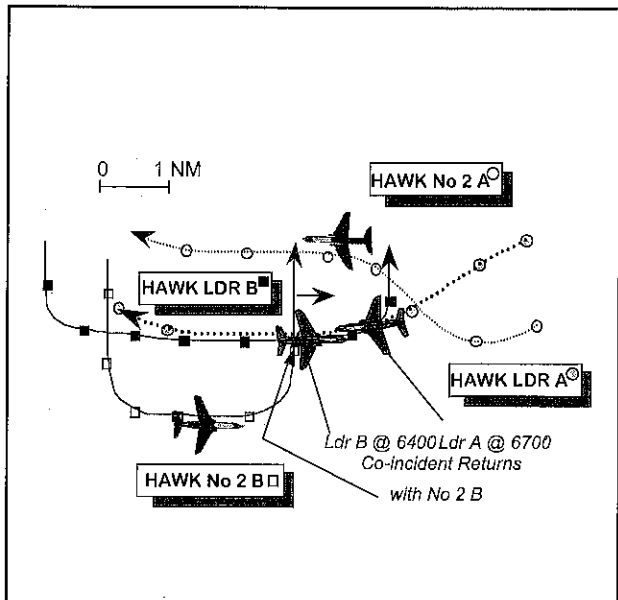
Alt/FL: ↓ 7400 ft 7000 ft  
 (QFE 1042 mb) (RPS 1043 mb)

Weather VMC VMC

Visibility: 10 km 10 km

Reported Separation:  
 <100ft H/100ftV <100 ft H/<100 ft V

Recorded Separation:  
 <300 ftV/indiscernible H



**BOTH PILOTS FILED**

## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**HAWK FORMATION LEADER (A)** reports leading a pair of Hawks VFR at FL 80; his ac was black in colour and HISLs were on. He had just completed a L turn from 325° onto 295°(M) he thought, at 350 kt whilst in a gentle descent. After rolling out of the turn he checked the formation spacing with the No 2, but as he looked ahead again he suddenly became aware of another ac flying towards them slightly below and slightly to the L, as his No 2 reported a 'Tally between them'. He had no time to take evasive action other than level his ac. The stranger passed 100 ft below and less than 100 ft to the left of his ac on a reciprocal heading, with a 'Very High' risk of collision. At the time it seemed as though the stranger was already taking avoiding action.

**HAWK FORMATION LEADER (B)** reports that he was leading a pair of Hawks on a medium level tactical formation sortie. He had planned to operate below FL 100 to remain clear of other VFR traffic, which he presumed, would be operating above. His ac was also black in colour and HISLs were on. Whilst heading 085° out of sun, after rolling out from a 90° L tactical turn at 350 kt, the rear seat occupant alerted him to another ac ahead, which had been obscured from his view by the front canopy arch. He immediately 'bunted' to avoid a collision with the other black ac, which flew past straight and level at less than 100 ft msd slightly to the L and slightly above his ac. He also assessed the risk of a collision as 'Very High'.

**HQ PTC** comments that at first sight this looks like an embarrassing organisational failure. However, the increasingly limited airspace available to 4FTS for such training does not permit rigid procedural deconfliction if the task is to be met. Moreover, one of the purposes of tactical formation training is to sharpen lookout and situational awareness, as much against the unexpected as the anticipated. In training there is always a risk that some will not show that aptitude. However, we are pleased that the Unit has aired the matter recently and all have been

urged to take the limited deconfliction measures available to them.

UKAB Note: A review of the LATCC Clee Hill Radar recording reveals that this Airprox occurred at 1429, 25 NM SSE of Valley. Hawk Ldr A is shown squawking 3/A 7000 with Mode C on a westerly heading in a gentle descent; his No 2 is shown as a primary contact and executes a 'Shackle' cross-over manoeuvre, moving to starboard of Leader A, who is shown indicating FL 067 Mode C immediately before the Airprox. The same frame shows Leader B eastbound maintaining FL 064 Mode C. At this point Leader A is shown 1 NM E of Leader B and his No 2, which had been on a parallel track 1 NM to starboard is now close up on the Leader's starboard quarter.

The reported 'bunt' of Leader B is not immediately discernible, as on the next return Mode C is not shown. But on the succeeding indication 16 seconds later it is shown as FL 058 as Formation B executes another tactical turn to the North. Minimum vertical separation at the CPA is perceived to be less than 300 ft.

The manoeuvres flown intra formation are not completely discernible. Therefore, the diagram above is based on a combination of radar-derived positions and the pilot's description of the manoeuvre. Given the Leaders' reports of passing 'Port to Port' with another ac, it is difficult to resolve the relative geometry of the encounter considering that the No2 of Formation A reported a 'Tally between them'. Further enquiries with one of the participants could not clarify the situation any further.

## PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the leaders of both formations, radar video recordings and reports from the appropriate operating authority.

These training sorties need a large tract of airspace to enable manoeuvres to take place. The available airspace in this vicinity, within

which crews may conduct training, is at a premium and can become very crowded all too quickly. The member from PTC advised that RAF VALLEY does take positive steps to de-conflict combat training. However, the available measures to separate tactical formation training are limited whilst still permitting the aim of the mission to be achieved. That said, members quickly reached an accord on the cause of this Airprox and noted the purpose of the training involved was to improve lookout and situational awareness. Although the geometry of the encounter could not be defined exactly, in every sense this was a late sighting, not only by each

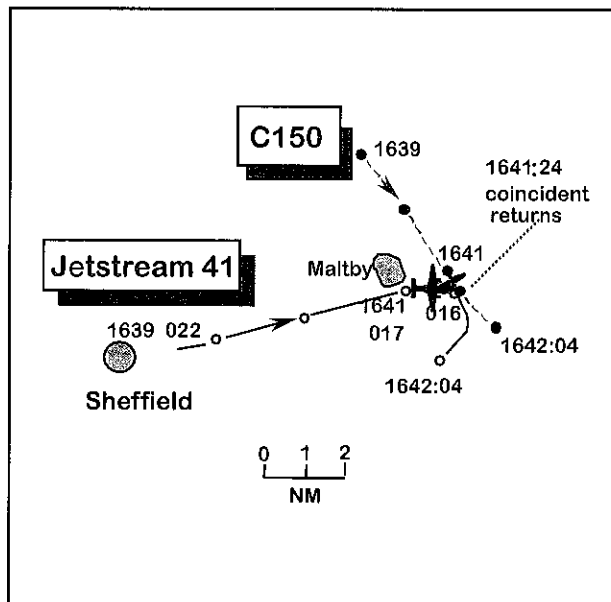
of the formation leaders but also by the respective No 2s. Moreover, from the information presented this was undoubtedly a close quarters encounter, (as evinced by the radar recording) and one that happened extremely quickly. A closing speed in the order of 700 kt does not leave much time to react and members believed that in this incident avoiding action was more an instinctive reaction than anything else. Hence, the 'bunt' and the 'level off'. With that in mind, coupled with the 'very high' risk assessment of both formation leaders, it was agreed that there had indeed been an actual risk of a collision.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: A  
Cause: Late sighting by both formations.

**AIRPROX REPORT No 204/99**

Date/Time: 14 Nov 1641 (Sunday) NIGHT  
Position: N5325 W0110 (8 NM E Sheffield airport)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: J41 Jetstream C152  
Operator: CAT Civ Pte  
Alt/FL: 1900 ft 2500 ft  
 (QNH 1023 mb) NK  
Weather VMC VMC CAVOK  
Visibility: 8 km 10 km  
Reported Separation:  
 0 ft V 200 m H 0 ft V 150 m H  
Recorded Separation: <500 m H



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

**THE JETSTREAM PILOT** reports that following transfer from Manchester radar, who had advised him of several radar returns to the E of Sheffield, Sheffield ATC instructed him to descend to 3000 ft and to join the ILS/DME

procedure for RW 28. Having established himself outbound on the 088°R at 180 kt, he commenced descent to 1880 ft (QNH 1023) in IMC. By 5.5 NM DME the ac was level and in VMC with a visibility of about 8 km. When at 6.5 DME and about 1 NM to go to the base leg turn, the FO called traffic at 12 o'clock. The

other ac was a Cessna type on a steady southeasterly track with nav lights and red beacon on. At 6.8 DME an avoiding R turn was made and the ac passed about 200 m to port at the same level with a high risk of collision. He informed Sheffield ATC about the other ac but they had no knowledge of it.

**THE C152 PILOT** reports that he was flying a local sortie from Gamston in CAVOK; the visibility was excellent. He was in contact with Gamston radio on 130.47 and squawking 7000 with Mode C off. Throughout the period he was displaying full navigation, strobe, and rotating tail lights. When about 1 NM SE of Maltby (8 NM E of Sheffield airport) heading 150° - 170° at 100 kt and cruising at 2500 ft (pressure unknown), he saw an ac 4 – 5 miles away at his 3 o'clock position at a similar level. His colleague, also a licensed pilot, took control of the ac while he concentrated on monitoring the other ac's progress. Heading was maintained in anticipation that the ac would pass behind them. However, it turned R and took up a position about 150 m to his R for about 5 – 10 sec and he now recognised it as a Jetstream; it then turned further to the R, he thought on an approach for Sheffield. As he was flying in the open FIR and had maintained visual contact throughout, he considered that there had been a low risk of collision. However, he was concerned about the Jetstream's turn as he had been expecting it to go behind him. He assumed that, in the good visibility conditions pertaining, the other pilot must have seen him before manoeuvring in this manner.

UKAB Note: A recording of the Claxby radar at 1639 shows a 7000 return, believed to be the C152, turning R onto a track of about 140° 8 NM ENE of Sheffield airport. At the same time the Jetstream is tracking 075° 2 NM E of the airport and indicating 2200 ft Mode C. At 1641 the Jetstream indicates 1700 ft (equivalent to 1970 ft QNH) with the C152 at its 12 o'clock position range 1.75 NM tracking from L to R. Fifteen sec later, the Jetstream commences a R turn and at 1641:24, 8 NM E of Sheffield airport, overtakes the C152 on its starboard side indicating 1600 FT (1870 QNH). The returns almost merge

which suggests that lateral separation was probably less than 500 m.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar photographs and a video recording.

Aspects of this incident invited a lengthy and controversial debate. Taking the C152 first, it was thought reasonable to suppose that the pilot was familiar with Sheffield's operations as he was based at and had flown from a nearby local airfield. He ought, therefore, to have been aware that he was flying in an area and at an altitude likely to conflict with Sheffield's instrument procedure; the final approach path is marked on the 1:500 00 ICAO topographical chart. A precautionary call to Sheffield to advise them that he was in the area would therefore have been prudent.

General aviation pilots expressed surprise that, having seen the lights of the other ac from some distance, the C152 pilot eventually allowed lateral separation to reduce to within a few hundred metres without taking any action. They added that it was the C152's responsibility to give way under the Rules of the Air. Other members, however, argued that the Cessna pilot had made a reasonable decision to monitor the situation in the belief that if both ac continued on their respective tracks, the other would pass well behind him. It was only when it turned R unexpectedly and positioned at close quarters off his starboard side did he recognise it as a Jetstream guessing it was probably inbound for Sheffield. By that time the relative positions of the ac were such that he had limited options for manoeuvring, other than to turn L, which might have unsighted him. Although both pilots indicate that they perceived each other at similar levels, a member commented that there should have been in excess of 500 ft between them if the C152 was at its reported cruising altitude of 2500 ft. The latter's pilot had not selected Mode C on his SSR, so his level, albeit unverified, could not be seen on the radar

recording. This omission drew critical comment from the Board, which on many past occasions had pointed out the importance of using this equipment if it is carried. Because the fitting of TCAS had now been mandated for all Civil Air Transport within UK airspace, Mode C assumed an even greater importance and GA pilots should ensure it was switched on whenever appropriate. Noting that it was dark at the time of the incident, the Board acknowledged the difficulty of estimating distances and relative positions in these conditions.

Turning to the Jetstream, members noted the pilot said he was in VMC some 2 to 2.5 NM from his base leg turn but the crew did not spot the other ac until it was about a mile away in their 12 o'clock, tracking from L to R. Many on the Board could not understand why, at this point, the Jetstream pilot elected to turn R as 'avoiding action', particularly as his considerably higher relative speed would quickly further reduce separation from the other ac. Furthermore, by turning R he ran the risk of unsighting himself from it. In their opinion his action had compounded the confliction rather than resolved it. It did not escape notice that the R turn coincided closely with the base turn position for the instrument pattern and some

members wondered, while others reasoned, that the Jetstream pilot may have opted to combine his 'avoidance' manoeuvre with the base leg turn so as to minimise disruption to the instrument procedure.

In the end it was concluded that, having seen the C152 late, the Jetstream pilot compounded the situation by his avoiding action turn and this caused the Airprox. However, as both pilots could see each other's ac, members were satisfied that they were always in a position to miss, using further action if necessary. It was therefore concluded that there had not been a risk of collision.

This incident could be used to remind pilots that all flights in class G airspace are conducted strictly on the principal of 'see and avoid'. Civil Air Transport pilots making instrument approaches to airfields in this type of airspace have an equal responsibility just like any other pilot in this respect, whether or not they are receiving a radar service. In particular, no protection should be assumed by dint of the published procedure. The Board was advised that radar is expected to be introduced at Sheffield in about August of this year and welcomed the news.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: A late sighting by the Jetstream pilot compounded by the Jetstream's avoiding action turn.

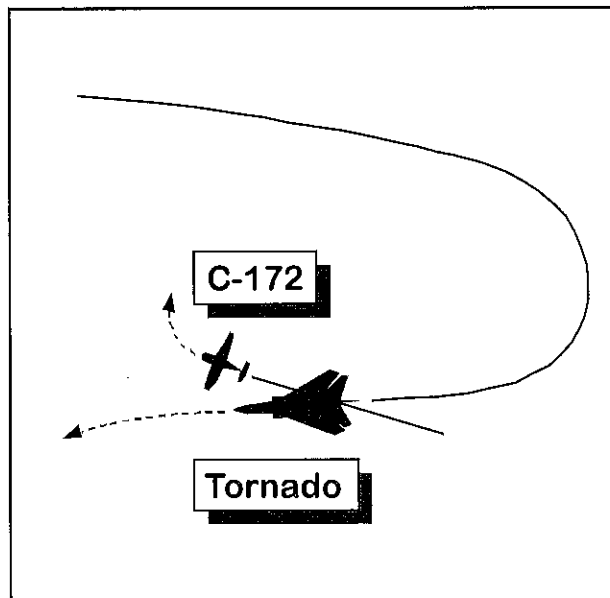
## AIRPROX REPORT No 205/99

Date/Time: 16 Nov 1355  
Position: N5557 W0208 (3 NM NE of St Abbs Hd)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: C172 Tornado GR  
Operator: Civ Club HQ STC  
Alt/FL: FL 65 5000 ft  
(RPS)  
Weather VMC CLOC VMC CLBC  
Visibility: 50 km+ 30 km+  
Reported Separation: < 100 m/2000 ft  
Recorded Separation: NK

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

**THE C172 PILOT** reports heading 320° at 100 kt, and cruising at FL 65; he was receiving a FIS from ScACC on 124.5 who advised him of conflicting traffic. He saw a Tornado in his 2 o'clock which passed on his right in the opposite direction. He watched it as it started a turn to the right and he could see it all the way round as it rolled out astern of him, pointing towards him. He started to turn left but saw it was going to pass close on his left; he then turned hard right as it passed, wings level, less than 100 yd away (it may have been as little as 30 m) at the same level with a very high risk of collision. It then started a turn away to the left. He reported the Airprox to ScACC. It appeared to him that the Tornado had deliberately flown close past him but he did not know the pilot's intentions and it may have been accidental. As he was taking avoiding action he had a thought that the Tornado pilot might not have known he was there and turned into his new track.

**THE TORNADO PILOT** reports flying a CAP to bounce other members of his section. He was at about 5000 ft. While rolling out from a right hand turn at 420 kt he saw a small ac slightly above and close to his flightpath; it had been concealed behind the canopy arch. He reversed his turn to the left and did not feel he had conflicted with the light ac's flightpath.



ScACC reports, with RT recording, that the C172 was receiving a FIS at FL 65 with no Mode C. (Note: The RT recording indicates that he was receiving a comprehensive RIS in light RT traffic conditions.) The TAY P/E controller provided traffic information on several contacts in the area of St Abbs Head, and advised him when a contact passed to his right on a reciprocal. The pilot advised that it was a Tornado and shortly afterwards that it was turning in behind him. With increasing concern the pilot said that it was "about to get me up the backside - I'm going right" and almost immediately added "\*\*\*\* that was close, can I file an Airprox on that please?"

**HQ STC** comments that having established a visual CAP at 5000 ft it is likely that the Tornado crew were concentrating their lookout at low level, hoping for an early sighting of their targets. Consequently the pick-up of the Cessna may have been later than desirable but the Tornado captain's report suggests that sufficient time remained for safe and effective avoiding action to be taken.

**UKAB Note:** The radar recording of ScACC radars shows much activity in the area around the Cessna just before the Airprox and there are only 2 returns between the Tornado heading easterly and the Airprox. The Tornado's Mode

C is intermittent, but both pilots agree they were at the same level.

**PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board was satisfied that this was not a deliberate close pass by the Tornado, but the

result of an unfortunate late sighting while the crew was concentrating on intercepting the rest of their formation. It was understandable that it might have looked deliberate to the Cessna pilot, and eventually more worrying as the possibility came to him that he may not have been seen at all. The sighting appeared to have been later than assessed by the Tornado crew as the ac was seen to pass the Cessna wings level and begin its avoidance only after passing. This led some members to consider there had been a very high risk of collision but the view prevailed that the Cessna was in a position to avoid the collision, and did so. However, the Board concluded that the safety of the ac had been compromised.

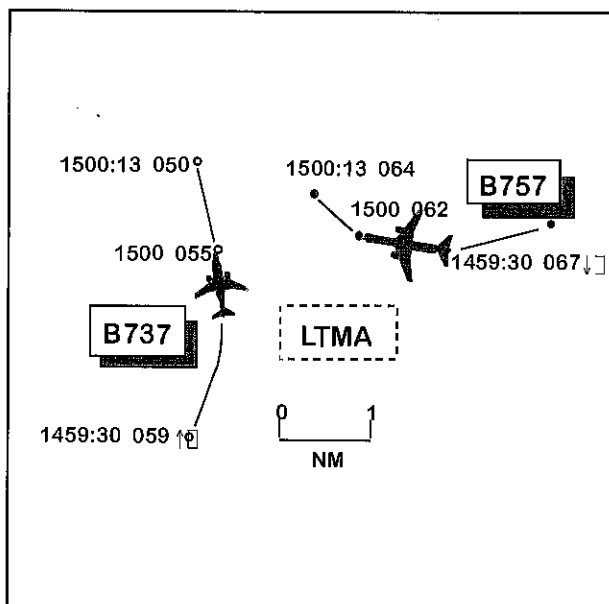
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: B

Cause: Late sighting by the Tornado Crew.

**AIRPROX REPORT No 206/99**

Date/Time: 19 Nov 1500  
Position: N5135 W0035 (8.5 NM NW Heathrow)  
Airspace: LTMA (Class: A)  
Reporter: LATCC TC  
First Aircraft      Second Aircraft  
Type: B73-4              B757  
Operator: CAT              CAT  
Alt/FL: 6000 ft              4000 ft  
                   (QNH 1019 mb)      (QNH)  
Weather VMC              VMC  
Visibility: 10 km              10 km  
Reported Separation:  
                   2 NM// 1 NM/500 ft  
Recorded Separation:              1.5 NM/700 ft



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

**THE LATCC TC NE DEPS CONTROLLER** reports controlling the B737, which had just

departed from RW 27R at Heathrow on a CLN SID climbing to 6000 ft. Heathrow then changed runways to RW 09L/R. The Heathrow INT N Controller advised him that the B757 was maintaining FL 70 on a LH circuit for RW 09L,



he therefore instructed the B737 pilot to fly a heading of 035° in order to expedite it clear of the B757's inbound track. Noticing that the B757 was now descending below FL 70 and into conflict with the B737, he instructed the latter to turn L onto 350° for avoiding action and to descend to 5000 ft as by now the STCA was activating. Standard separation was regained and the pilot of the B737 reported visual contact with the other ac.

**THE HEATHROW INT N CONTROLLER** reports that the B757 was heading 275° having left LAM for a landing on RW 09 at Heathrow. The B737 was the last departure from RW 27R prior to a runway change from 27 to 09. Having seen the last southbound departures clear the inbound routes and transferred the first 2 inbounds for the new runway to the Final Director, he instructed the B757 to descend to 4000 ft. After making some other calls he noticed the STCA flash red against the B737 and immediately gave avoiding instructions to the B757. The latter reported that he had the B737 in sight. Meanwhile the TC NW DEP controller had issued avoiding instructions to the B737 and standard separation was restored.

**THE B737 PILOT** reports that on departure from RW 27R at Heathrow he was cleared by LATCC on 118025 to 6000 ft, routing to the CHT NDB. Shortly before reaching CHT he was instructed to head 030°, followed by an "avoiding action" turn onto 350° and an instruction to descend to 5000 ft. The FO saw another ac about 2 NM away to their R in a R turn from a westerly heading at about the same level. He thought there had been a medium risk of collision. The pilot comments that he felt more urgency should have been injected into the ATC avoiding action instructions. (UKAB Note 1: The RT transcript shows that the correct avoiding action phraseology was used).

**THE B757 PILOT** reports that he was inbound to Heathrow RW 09L at 210 kt under the control of LATCC. While in descent and passing 6500 ft, TCAS signalled a TA, whereupon another ac was sighted at his 10 o'clock tracking from L to R. An RA demanding climb was then received

and complied with; having advised ATC of the TCAS event he subsequently followed their instructions and the other ac passed about 1 mile away and 500 ft below; the pilot does not give an assessment of risk.

**ATSI** reports that the relevant ATC equipment was serviceable and the controller had felt fit. However, the Heathrow INT Director did mention that he had been experiencing some disturbed nights due to the arrival of a new baby, and had been feeling particularly tired towards the end of shifts. Heathrow was in the process of changing from westerly to easterly operations. The Heathrow controller, who was carrying out both the INT Director North and South tasks, assessed both his traffic loading and workload as "moderate". A support controller had just plugged into the INT NORTH position when the Airprox occurred. The TC NE DEPS SC assessed both the traffic loading and his workload as "light".

The LATCC TC MATS Pt 2 contains detailed procedures for implementing runway changes at Heathrow. The section relevant to this Airprox (Page NEA 3-2, Para. 1.1) reads as follows:-

"The Heathrow Air Controller will advise the TC Heathrow INT N Controller of the callsigns and SIDs of the last 3 departures from the old runway.

An aircraft which has left the holding stack to make an approach to the new configuration runway must remain at Minimum Stack Level (at the time of the Airprox this was FL 70) until clear of the SID track of the traffic departing from the old runway, unless co-ordination takes place between the appropriate Director and TC Sector Controller.

All departures from the old runway will follow the SID track and altitudes. TC Departure controllers must not deviate departing aircraft from the SID route and altitude until the departing aircraft is clear of all inbound traffic that has left

the holding stack, unless co-ordinated with the appropriate Director.”

Group Supervisors are responsible for ensuring that all appropriate TC personnel are made aware of the details of the last 3 departures from the old runway and the first arrival to the new runway. These procedures are mirrored in the Heathrow section of the LATCC TC MATS Pt 2 and the Heathrow Airport MATS Pt 2. They are designed to minimise the operational disruption resulting from a runway change by enabling the first arrivals to the new runway to leave the holding stacks before the final departures from the old runway are airborne. This was the process which preceded, and gave rise to, the circumstances which led to the Airprox. Both controllers were aware that the B737 would be the final ‘westerly’ departure. The Heathrow INT Director confirmed that he had written down brief details of the final 3 departures, the first via CPT, the second via DVR and the third (the B737) via BPK. In addition, the NE DEPS SC was advised that the B757 would be leaving LAM for an ‘easterly’ arrival. Writing down the callsigns and SIDs of the final 3 departures is not required by the relevant written procedures but would appear to be a sound practice, even though it did not fully achieve its purpose on this occasion.

The Heathrow INT Director commenced vectoring ac for ‘easterly’ arrivals, the first 3 of which were from the southern stacks. The B757 was number 4 in the sequence and the first ac inbound from the northern stacks. Mindful of the fact that there were still ac departing from RW 27R, the inbounds were initially kept at or above the Minimum Stack Level (MSL). The B737 departed at 1456, at which time the B757 was about 10 NM NE of Heathrow, heading 275° and level at FL 70.

On establishing communication with the TC NE DEPS SC, the pilot of the B737 reported climbing to 6000 ft in accordance with the SID. The SC confirmed that the flight was to maintain 6000 ft, instructed it to squawk ‘ident’ and lifted the standard ATC speed restriction. At 1459:00, having overlooked the presence of the B737, the Heathrow INT Director instructed the B757

to descend to 4000 ft on the QNH (1019 mb). At 1459:10, the TC NE DEPS SC instructed the B737 to head 030°. By that stage, the ac was level at 6000 ft with the B757 about 7 NM to the NE, still indicating FL 70. In assigning the radar heading, strictly speaking, the SC was not complying with the runway change procedures. However, the new heading did not deviate the flight from the SID routeing significantly and the SC said that the intention had been to speed up the crossing of the 2 ac in order to permit further climb and descent clearances to be issued. This action is not considered to have had any bearing on the Airprox.

The TC NE DEPS SC became aware that the B757 was descending when he noticed the Mode C indicating that it had vacated FL 70; at about this time the STCA activated. Between 1459:30 and 1459:40, both controllers issued avoiding action instructions, prefixed appropriately. These actions were initiated independently and, unfortunately, both ac were turned to the N, the B737 L onto heading 350° with descent to 5000 ft, and the B757 R onto heading 360° with climb back to FL 70. Both crews reported the other ac in sight. The B757 arrested its descent at FL 63 before climbing back to FL 64/65. Thereafter, the B737 descended rapidly to 5000 ft, quickly re-establishing standard vertical separation. Although not evident from the RT recording, the report submitted by the commander of the B757 shows that the ac was ACAS equipped; the crew received a TA, sighted the conflicting traffic and then received a ‘climb’ RA, with which they complied.

The Heathrow INT Director was unable to explain why he had not taken the B737 into account when descending the B757 below the MSL; he considered the runway change procedures satisfactory. He thought while concentrating on sorting out the first easterly arrivals from the southern stacks with respect to the first 2 of the notified last 3 westerly departures, it was possible that the final departure (the B737) slipped his mind. During the course of the investigation, it was determined that the Heathrow Director, in accordance with what is understood to be

common practice, had radar filters set in such a way that the SSR labels on departures comprised only the Mode C readout and Sector Exit code (in this case 2 characters). This is done to avoid cluttering the screen with what is considered to be non-essential information. It is not possible to state with any certainty whether or not this was a factor in the incident. However, there is little doubt that the absence of a callsign associated with the label would have made it less conspicuous on radar.

UKAB Note (2): A recording of the Heathrow radar at 1459:30 shows the B737 tracking in a NNE direction following departure from Heathrow and about to level at 6000 ft, with the B757 at its 2 o'clock at about 4.5 NM tracking W and descending through FL 67 Mode C. At 1500 the B737, having begun a slow L turn to the NNW, is indicating FL 55 descending with the B757 1.5 NM at its 3 o'clock position indicating FL 62 and starting a R turn. Thirteen sec later the B737, having pulled slightly ahead of the B757, is at its 10 o'clock /1.3 NM; the ac are by now flying on almost parallel tracks and standard separation has been restored, with Mode Cs indicating FL 50 and FL 64 respectively. Minimum separation was in the order of 1.5 NM and 700 ft.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, a radar video

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Heathrow INT Director descended the B757 into conflict with the departing B737.

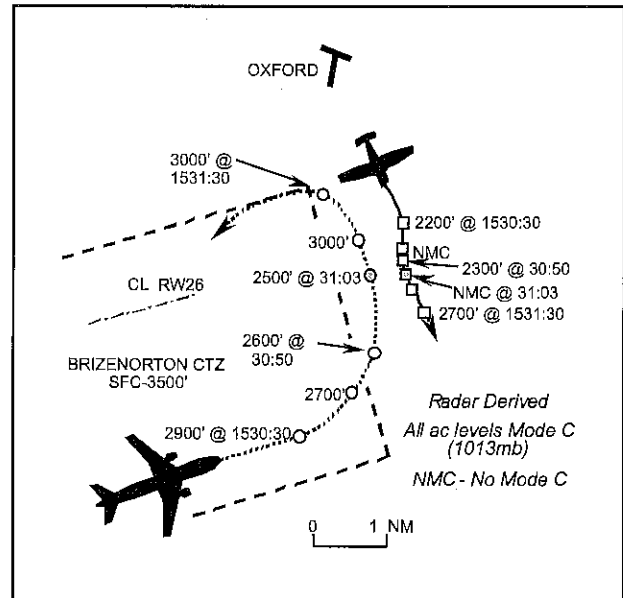
recording, and a report from the appropriate ATC authority.

An ATSI adviser to the Board said that the Airprox occurred after the Heathrow INT Director had issued descent clearance to the B757 (the first easterly arrival from the northern stacks) without taking the B737 (the final westerly departure) into account. The Board agreed this caused the incident. No reason for this error could be established with certainty, but it was assumed that, having simply forgotten about the final westerly departure, the Director's attention to radar derived information had not extended to ac beyond his control. The adviser added that these RW change procedures were long established; experience had shown that they worked well and did not need to be changed. However, he felt it might be prudent to display on radar screens the full SSR labels of the last 3 departures during runway changes to make their radar returns more conspicuous. In addition, the provision of individual strips for each of these ac, annotated with the callsign and SID, might help prevent this type of error being repeated. Commenting on the first suggestion, an ATCO member said that the volume of traffic showing on a radar display in this area was often such that if all ac displayed full SSR information their data blocks would merge and it would become difficult, if not impossible, to retain radar identification.

Despite the convergence of tracks following ATC avoiding action instructions, members were satisfied that lateral and vertical separation were not compromised to the extent that a collision risk existed.

**AIRPROX REPORT No 207/99**

Date/Time: 24 Nov 1531  
Position: N5147 W0118 (11 NM E Brize Norton - elev 288 ft)  
Airspace: L FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: A300-600 PA28  
Operator: Civ Comm Civ Trg  
Alt/FL: ↓ 2300 ft ↑ FL 50  
 (QNH 1021mb)  
Weather VMC CAVOK VMC CLOC  
Visibility: >10 km 20 km  
Reported Separation:  
 100 ft V 300 m H 0.5-1 NM H  
Recorded Separation: 0.5 NM H



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

**THE A300 PILOT** reports flying radar vectors to Brize Norton for an ILS to RW26 and squawking 3/A 4414 with Mode C. Whilst downwind heading 080° at 210 kt, in descent from FL 80 to 2300 ft QNH (1021 mb), he exited the Brize Norton CTZ and Director issued a L turn onto 350°. During the turn he thought Director advised that they were now back in the CTZ and reported traffic 1 o'clock – 2 NM at 800 ft. He saw traffic on TCAS in the reported position but 400 ft below his ac. When steady 350°, but still in descent passing 2500 ft QNH, TCAS enunciated “reduce vertical speed”. Director issued a further L turn onto 280° to establish on RW26 when the TCAS enunciated an RA, “climb climb”, followed by “increase climb”, which was complied with. A PA28 with lights on was then acquired visually at 2 o'clock - 300 m. He perceived that at the CPA the PA28 passed 300 m down the starboard side 100 ft below the A300, whilst he was still climbing and turning. The ac went through the centreline for RW26 and was levelled at 3300 ft before re-establishing from the R and completing a normal landing.

**THE PA28 PILOT** reports he departed Oxford Airport on an instructional sortie with a student. Whilst tracking 164°(M) from the OX NDB at 75

kt, they were climbing from 2500 ft (1021 mb) to FL 50 whilst under a RIS from Brize Norton LARS. The controller reported traffic 4 NM away but despite looking he could not see it owing to cloud in that quadrant. He looked back into the cockpit to monitor his student and then looked out again to see a large twin engine jet coming out of the cloud at 1 o'clock – 2 NM, slightly below and in a L turn. At the CPA the jet passed about 0.5 – 1 NM at the same altitude. As the other ac was already turning away there was no risk of a collision, so no avoiding action was taken.

**MIL ATC Ops** reports that the crew of the A300, were in receipt of a RAS initially from Brize Norton Approach (APP) on 127.25. The A300 was cleared down to 2300 ft QNH (1021 mb) on a heading of 080° whilst weather and airfield information were passed. The crew were told that they had entered the CTZ at 1529:35; a change of service was implicit with this call. At the end of the downwind leg, APP instructed the crew to turn L heading 300°. Nine sec later, at 1530:17, APP reported “... traffic NE, 3 miles, southbound, just outside the control zone indicating 800 ft beneath you”. The crew acknowledged, “Yeah, we have him on TCAS, looking.” As the A300 turned, APP observed it drifting outside the CTZ and at 1530:57 transmitted “continue L turn heading 270°.” The A300 crew acknowledged the turn

immediately and advised "...er we are TCAS avoidance at the moment" adding "that was one mile through our level."

At 1530:01 the PA28 pilot called the Brize Norton LARS 2 (LARS) controller on 123.55 whilst conducting a pre-notified departure from RW20 at Oxford. The pilot reported at 2500 ft and requested a climb to FL 50 under RIS. LARS identified the PA28 from its assigned squawk and also transmitted at 1530:13, "...climb FL 50, Radar Information, traffic right two o'clock, four miles converging, indicating 3000 ft" - the A300. The pilot acknowledged the climb but there was no mention of the A300's proximity thereafter.

The LATCC Heathrow radar recording shows the A300 within the BZN CTZ 'stub', about 0.75 NM N of the CTZ boundary, whilst tracking downwind L for RWY 26 and in a descent through 3200 ft Mode C (1013mb). The PA28 is shown squawking 3/A 3720, in a gentle climb through 2200 ft Mode C and about 1 NM to the E of the eastern CTZ 'stub' boundary, tracking SSE. At 1530:19, which was at about the time that both APP and LARS passed traffic information to their respective ac, the A300, whose crew had just been instructed to turn L, is 2 NM from the CTZ eastern edge with the PA28 4 NM NE indicating 1000 ft below. At 1530:39, 0.5 NM from the eastern CTZ boundary, the A300's L turn starts to take effect when indicating 2800 ft. At this point, the PA28 is just over 2 NM NE tracking S and on the subsequent radar return indicated 2200 ft. At 1530:57, as APP instructed the A300 crew to turn further L they reported the RA; the A300 is 0.5 NM outside the CTZ with the PA28 indicating 300 ft below it, 1 NM NE. For the 15 sec prior to this point, the A300 appears to be steady on a track of 030°, heading directly at the PA28. The CPA occurs at 1531:03, as the ac pass starboard to starboard at a range of 0.5 NM; the A300 is turning L through N at an indicated 2500 ft as the PA28 tracks 175°. No Mode C (NMC) is displayed by the PA28 at the CPA, although 10 sec before, it indicated 2300 ft and 23 sec after 2700 ft. A direct interpolation of these would place the PA28 between 2400 ft and 2500 ft at the CPA (ie less than 100 ft

vertical separation). The A300 continues the L turn, rolling out about 1 NM N of the RW centreline.

In providing a RIS to the light ac, LARS correctly identified the PA28 and passed accurate traffic information on the A300 to its pilot as early as possible. The PA28 pilot acknowledged the call but did not pass any comment about the other ac.

APP was vectoring the A300 with the intention of keeping it within Class D airspace throughout the recovery. Whilst the 'stub' of the CTZ is biased further to the S of the RW26 centreline, at most it provides only 3 NM of airspace in which to manoeuvre and this is not enough to accommodate a 180° final turn by a large civilian passenger carrying ac. Brize Norton controllers know this. (An airspace change proposal to 'square off' the SE and NW corners of the CTZ is being progressed). On 24 Nov 99, the 2000 ft wind was promulgated as 240/35, which was strong enough to widen the final turn. The radar recording shows that there was little traffic outside the CTZ and thus a wider recovery pattern could easily have been given.

Shortly after giving the turn instruction, APP passed traffic information, acknowledged by the crew, who added they had the traffic on TCAS. APP believed that the pilot would tighten his turn in order to avoid any potential confliction. Nevertheless, 30 sec passed before APP took any further action, by which time the A300 was drifting outside the CTZ boundary. It is disappointing that the controller had not anticipated this and had not asked the crew to tighten the turn accordingly. APP was responsible for ensuring the safe separation of the A300 from other traffic but did not prefix the turn onto 270° with "avoiding action", or inform the A300 crew they had left the CTZ. The combined effects of the wind and the ac's radius of turn, ultimately brought both ac into confliction.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Civil controller members were surprised that generally, speed control is rarely used in the military ATC environment to control IFR recoveries and some believed that the controller should have restricted the speed of the A300 below that of the 210 kt reported. Moreover, members agreed that the A300 pilot should have been informed when his ac left the 'sanctuary' of CAS. The military ATC advisor briefed the Board that in his view APP showed poor appreciation and exercised poor judgement when turning the A300 at the end of the downwind leg onto the finals turn. Although the Brize Norton CTZ is very confined and does demand a tightly controlled pattern in order to keep ac within CAS (hence the application to amend the shape of the CTZ), in this instance tight control was absent. Another solution open to APP, which the traffic situation would have allowed at the time, might have been to opt for a wider pattern downwind, albeit outside the CTZ. This would have allowed the turn onto finals to be accommodated more easily back inside the CTZ. With the benefit of hindsight – such consideration could or should have been part of the plan for handling the large visiting airliner. The military ATC advisor ended by saying that although the A300 pilot had advised that he would be filing an Air Safety Report (ASR), no mention was made of an Airprox. The importance of ensuring that all agencies are advised at the time that an Airprox is filed was stressed, which the members wholeheartedly endorsed. Military controller members noted that the term avoiding action was not used, but they believed it was entirely warranted in this situation. Its use may have reinforced the necessity for the pilot to tighten the turn, which the controller presumably desired but did not clearly convey. A consensus emerged fairly quickly that the controller should have 'taken charge' of the A300 and exercised

much more positive control over the recovery at an earlier stage, before TCAS reacted.

A civilian controller member remarked that if the A300 pilot had been asked to tighten the turn he probably would have done so. As it was the pilot had straightened on 030° for some 15 sec, suggesting that he might have been searching for the PA28 reported by APP and seen on his TCAS. By that stage things had gone too far to prevent the incident and the TCAS indication went to RA. A B747 pilot on the Board explained the technique used in reacting to a TCAS RA. Generally speaking pilots would roll to wings level then select an appropriate rate of climb/descent to satisfy the indicated demand until resolution was achieved. In this case, even if the A300's recovery had been wholly contained just within the CTZ, its proximity to the PA28 just outside the boundary (from which it might be 'deemed' to be separated) would probably still have caused the TCAS RA. This is something that military controllers must be prepared for. Recent changes to legislation meant that most CAT ac were now TCAS equipped and military transport/tanker ac might be similarly equipped in future, which will increase the potential for such events within military aerodrome patterns.

A GA member thought that the PA28 pilot could have been more helpful in his reply to the traffic information given about the A300 by telling ZONE that the reported ac had not been sighted. One of the civil ATC advisors to the Board queried if ZONE was required to achieve standard separation. This was not the case; traffic information was all that the pilot would have expected under the RIS requested and he was entirely responsible for separation from other ac. Overall, the Board considered that APP should have ensured that standard separation was afforded to the A300 pilot and that he should have been kept in the CTZ. Having weighed all of these matters for relevance, members agreed that the Airprox resulted from a lack of positive control by the Brize Norton APPROACH controller in endeavouring to achieve his aim. Turning to risk, the various 'safety nets' had each played their part in alerting pilots and keeping the ac

apart. The traffic information from both APP and ZONE, the TCAS RA and the sighting of the other ac by the respective pilots as the A300 turned away from the PA28 led members to conclude that in these circumstances no risk of a collision had existed.

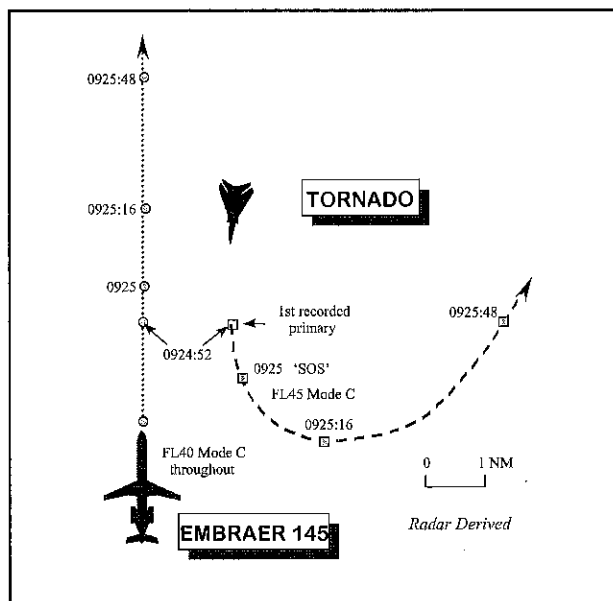
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Lack of positive control by the Brize Norton APPROACH controller.

**AIRPROX REPORT No 209/99**

Date/Time: 02 Dec 0925  
Position: N5550 W0301  
 (14 NM SE of Edinburgh - elev 135 ft)  
Airspace: Scottish TMA (Class: E)  
Reporter: EDINBURGH APR Controller  
First Aircraft      Second Aircraft  
Type: Embraer 145      Tornado GR 1  
Operator: CAT      STC  
Alt/FL: 4000 ft      ↑ 4000 ft  
 (QNH 1014mb)  
Weather: VMC CLAC      VMC  
Visibility: 10 km      10 km into sun  
Reported Separation: Nil V/1.5 NM H  
Recorded Separation:  
 500 ft @ >1.5 NM H



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

**THE EDINBURGH APPROACH RADAR (APR) CONTROLLER** reports that he was the OJTI to a controller under training, providing a Radar Approach Control Service to an Embraer 145, inbound to Edinburgh about 14 NM SE of the airport. The ac was on a radar vector of N and level at 4000 ft QNH, when a 3/A 7700 'Emergency' squawk was observed, indicating 4000 ft unverified Mode C, which merged with the SSR data block of the Embraer. The Embraer crew then reported a TCAS 'Alert'. The unknown 'Emergency' ac passed about 1.5

NM down the starboard side of the Embraer in a left turn and then climbed to about FL 100 in the TMA.

The APR comments that the trainee passed only traffic information to the Embraer crew as the 7700 squawk was sighted late, due to radar performance and coverage. The unknown ac was subsequently identified with the assistance of RAF Leuchars as a Tornado, which had sustained a 'bird strike' whilst at low-level.

**THE APR TRAINEE** adds that traffic information was passed when the emergency traffic was 4 o'clock to the Embraer at 1.5 NM

indicating 4100 ft and passing astern of the ac. Avoiding action was not considered appropriate as the traffic passed quickly and was climbing fast.

**THE EMBRAER 145 PILOT** reports heading 360° at 240 kt, whilst in receipt of radar vectors for an ILS approach to RW 24 at Edinburgh, when a TCAS "traffic" (sic) warning was received. As a result of the TA the traffic was sighted at 3 o'clock low, pulling up in a left turn 5 NM away, he thought. No avoiding action was taken nor was any given by ATC. He considered the 'risk' to be low.

**THE TORNADO GR 1 PILOT** reports flying at 400 kt, heading initially 240° (T) at 300 ft agl, when the ac sustained multiple bird strikes. An emergency climb-out from low-level was immediately initiated by a climbing left turn into sun and a PAN call transmitted to ScATCC (Mil). The ac was safely recovered to RAF Leuchars. No other ac was seen at the time of the climb-out and the pilot was subsequently advised of the Airprox after landing.

**HQ MATO** reports that at 0925, the crew of the Tornado free-called ScATCC (Mil) on the ICF, 249.475 MHz, and 15 NM SE of Edinburgh at 4000 ft, declaring a PAN after sustaining a birdstrike. The controller offered Edinburgh as a diversion. However, the crew elected to divert to Leuchars, whom the crew free-called at 0926.

**HQ STC** comments, given that the Tornado had sustained multiple birdstrikes at low level, the crew was left with no option other than to pull up. Having initiated an immediate emergency climb, they squawked 'Emergency' and called Scottish Mil on both the ICF and Guard (U). The crew did not see the other ac involved and, appropriately focused on handling their emergency, were unaware of the Airprox until after landing.

UKAB Note (1): A review of the LATCC Great Dun Fell radar recording reveals that the Airprox occurred at 0925, 14 NM SE of Edinburgh, within the Scottish TMA as described in the foregoing. The Embraer 145, identified from its

assigned squawk is shown tracking N and maintaining FL 40 Mode C throughout. At 0924:52, the Tornado is first displayed as a primary contact in the 3 o'clock of the Embraer at a range of 1.5 NM, which is perceived to be the closest point of approach horizontally between the subject ac. The subsequent return 8 sec later, reveals an emergency squawk (displayed as SOS), indicating FL 45 Mode C, which opens to the SE of the Embraer in a tight LHD turn and subsequently clears to the NE maintaining FL45 in the turn.

UKAB Note (2): The location of this Airprox was within Scottish TMA airspace, Class E where neither RT communication, nor ATC clearance, are required by VFR flights. An ATC service is provided to IFR flights and traffic information is given on VFR flights where practicable; separation is not afforded. The speed limit of 250 kt IAS does not apply to military ac.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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.

Some civil members wondered if the Tornado pilot had been faced with a difficult emergency situation requiring a fairly abrupt exit from low-level, but the HQ STC expert explained otherwise. He stressed that the reaction of a military pilot when confronted with a multiple bird-strike emergency was significantly different to actions taken for a low-level weather abort. This was not a high energy manoeuvre. Instead the pilot would ease the ac up steadily away from the ground to a safe level so that he could assess any damage to the ac and head for the nearest suitable airfield to land. All this was confirmed by the radar recording, which shows the Tornado crew levelled their ac at FL 45, 500 ft above the Embraer and then maintained that level whilst the pilot executed a steady L turn toward Leuchars. One advisor did



point out that it was preferable to make an emergency call on Guard, as prescribed, and not the ScATCC (Mil) ICF as occurred in this instance. A call on Guard would be answered by the D & D controller whose sole task was to provide immediate assistance to pilots in emergency, unlike the ScATCC (Mil) ICF. The message is clear, use Guard when appropriate not the ICF.

Some members thought it was fortuitous that this did not develop into a more serious occurrence, while others wondered whether this was in fact an Airprox. Undoubtedly, the controller was at liberty to report the occurrence and the Tornado certainly passed closer than the 5 NM reported by the Embraer pilot, who did not seem to be concerned by its sudden appearance on the starboard beam in Class E airspace. Conversely, the Tornado crew did not see the Embraer at all; perhaps this was

understandable, as they might have been concentrating on damage assessment and recovering safely to the nearest suitable diversion. They would have been clearing their flight path in their L turn, whilst 'belly-up' and looking away from the Embraer. Several pilot members believed that none of this constituted a close encounter at all. From the radar recording it is clear that the tracks of the respective ac did not cross and that the minimum horizontal separation was 1.5 NM whilst the Tornado was already established 500 ft above the level of the Embraer. Therefore a large majority of the Board did not consider that there was a definite confliction between both ac and in the end the members agreed that the Airprox resulted because the Edinburgh APR controller thought the Tornado had conflicted with the Embraer 145. Moreover, there had not been any risk of a collision.

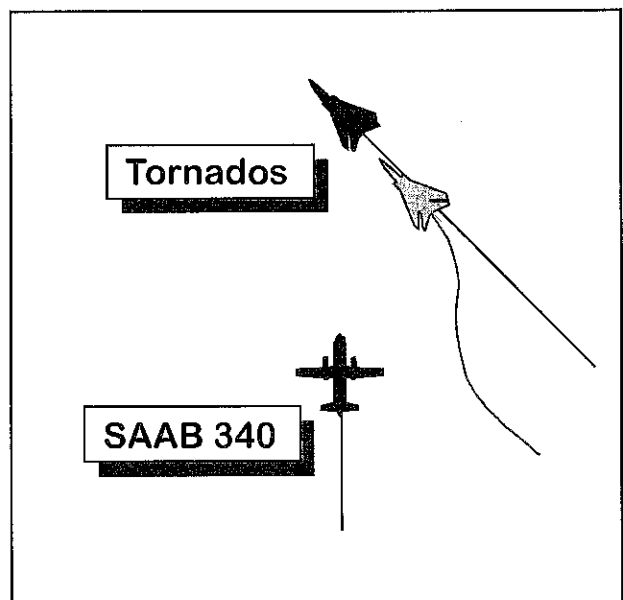
**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Edinburgh APR controller thought the Tornado had conflicted with the Embraer 145.

**AIRPROX REPORT No 210/99**

Date/Time: 2 Dec 1021  
Position: N5603 W0204 (10 NM NNE of SAB)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: SAAB 340 Tornado F3  
Operator: CAT HQ STC  
Alt/FL : FL 150 21000 ft ↓ (RPS)  
Weather VMC CLOC VMC CLOC  
Visibility: 50 km 100 km  
Reported Separation: 2 NM/2 NM  
Recorded Separation: 1 NM



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE SAAB 340 PILOT** reports heading 350° at 265 kt and receiving a RAS from Scottish Mil at FL 150, en route from Manchester to Aberdeen. The controller advised that there were military ac in the area co-ordinated not below FL 160 but then advised him to turn sharp left immediately in avoiding action as one fighter ahead was descending through his level. As it dived from his 1 o'clock position it turned and crossed his path about 2 NM ahead; since he had it in sight he maintained his heading, assessing the risk of collision as low. The controller said the fighter had broken its co-ordination agreement.

**THE TORNADO F3 PILOT**, one of a pair, reports heading 300° at 500 kt at 21000 ft when he suffered a pressurisation failure. He informed GCI that he could see the SAAB 340 (which was too far away to identify) and that he was descending to 3000 ft. He reckoned he passed about 2 NM ahead of the airliner in his descent. There was no risk of collision and no need for avoiding action. The pilot added that he understood the SAAB pilot had filed another Airprox with other military ac a few minutes later and commented that if the pilot was concerned about the risk of military ac flying within a mile or so of him in Class G airspace he could surely use controlled airspace on a flight from Manchester to Aberdeen.

**HQ MATO** reports that the SAAB 340 was receiving a RAS from ScATCC (Mil) Console 4 (CON4) on 134.475. Although providing a service to this ac only at the time, the large number of background tracks in the area and the resulting co-ordination and avoiding action gave CON4 a significant workload.

At 1015:45, CON4 made landline contact with Controller 6 at Buchan (BUC) and requested co-ordination on "...your 1561 and 62 squawks" (the Tornados) with the SAAB 340. Having checked with his ac, BUC responded "...they're going to maintain 16 or above until you're clear". At 1016:45, CON4 passed Traffic Information (TI), "c/s, ..further fast jet traffic in

*your right 2 o'clock, 15 miles, crossing right to left, co-ordinated not below FL 160",* which was acknowledged by the pilot. Three minutes later, at 1019:45, CON4 passed further TI, "*c/s, you have further unknown traffic in your 12 o'clock, range of 20 miles manoeuvring, possibly two contacts indicating similar level, if not sighted, turn left heading 280.*" The pilot acknowledged this call "...looking" but made no mention regarding the turn and the ac maintained its northerly track. (UKAB Note: These contacts, 2 Hawks, were involved in a subsequent Airprox with the SAAB 340 – 215/99.) CON4 then co-ordinated the SAAB 340 with an unrelated ac under the control of Leuchars. At about 1020:35, as this co-ordination ended, CON4 transmitted "*c/s, previously reported co-ordinated traffic's now eh north east of you, range of two miles, crossing right to left . . disregard, avoiding action, turn hard left heading 230.*" The SAAB 340 pilot replied "*..contact, yeh we've got 'em.*" Almost immediately afterwards, Buchan contacted CON4 by landline and apologised, adding that the ac squawking 1561 had maintained visual clearance whilst descending and "*was unable to maintain above.*" Almost simultaneously, the SAAB 340 pilot transmitted "*..contact just passing our right to left about a thousand feet below and two thousand above.*" The pilot went on to ask for a contact number of the agency controlling the other ac. CON4 then took a landline handover on another ac.

At about 1028:00, the SAAB 340 pilot advised CON4 that he was "*...going to file an Airmiss on that incident back there....*" which CON4 took to mean the broken co-ordination with Buchan. Later, the SAAB 340 pilot informed the ScATCC (Mil) Supervisor that he was also filing a second Airprox, to cover an incident (215/99) which occurred immediately afterwards. He was very complimentary of the service provided by his controller but expressed concern about the risks of routeing through Class G airspace with military ac not using an ATS and defeating the controllers' efforts to provide separation.

The Aberdeen radar recording, the radar being used by CON4, shows the SAAB 340, squawking 4674 converted to show its c/s,

tracking N at FL 150. The two Tornado F3's are shown ENE of St Abbs, squawking 1561 (No 1) and 1562 (No 2), tracking about 280° at FL 210 and 200 respectively, with the higher ac on the RHS of the formation. The first indication of a descent is at 1020:20, as the Mode C of the northerly (No 1) F3 indicates FL 205; this F3 is in the SAAB 340's 2 o'clock at about 4 NM at this point. The SSR labels of the SAAB 340 and the No 1 F3 begin to flash (STCA activation) just after the radar sweep timed at 1020:30 as the F3 passes FL 183; this corresponds with the time that CON4 updated TI, which became avoiding action, to the SAAB 340 pilot. The closest point of approach (CPA) on radar occurs in the sweep timed at 1021:00, as the No 1 F3 passes about 1.5 NM ahead of the SAAB 340, but its Mode C is not seen, presumably because of the high RoD. The second F3 appears to jink R and then follow the lead F3's track, passing just ahead of the SAAB 340 in a gentle descent (but not below FL 180 until clear to the W). The lead F3's Mode C reappears 50 sec after the CPA, by which time it is indicating FL 34. The SAAB 340 does not appear to alter heading.

CON4 successfully achieved early co-ordination with BUC and advised the SAAB 340 pilot accordingly. As the F3s descended, the geometry of all 3 ac was such that a hard L turn away from the threat, through at least 120°, was the only avoidance option available to the controller; in effect, given the timescale of the encounter however, this would only have made the SAAB 340 a stationary target rather than increase separation, although it would have prevented the SAAB 340 moving further into the path of the F3s. The information provided in the TI update however, was sufficient to allow the SAAB 340 crew to see the F3s.

CON4 experienced a rather difficult 5 min period of controlling, during which he was exposed to two rapidly changing scenarios at short notice, and his actions cannot be criticised. Ironically, had the SAAB 340 pilot taken the 'large' turn offered at 1019:45, the flight would have been incident free, albeit a little later at its destination.

**HQ STC** comments that this incident was precipitated by the Tornado's cockpit pressurisation failure and the requirement for an emergency descent. The crew were aware of their impending breach of co-ordination but, visual with the previously co-ordinated civilian traffic more than 2 NM away and satisfied that there was absolutely no risk of collision, cleared their flightpath and actioned their in-flight emergency appropriately. This descent, however, left the Buchan IC with insufficient time to re-negotiate with Scottish Military. In view of the scenario, therefore, and the probability of conflict with other traffic, the crew might have been afforded more latitude had they declared their emergency, however minor they deemed it. Their subsequent requirement to deviate from their agreed level could then have been reinforced by selecting an emergency squawk.

The SAAB 340 captain reports contacting Leuchars for confirmation of specific fast-jet activity in the area. Terminal controllers will only be able to provide accurate information on the ac under their control at the time of asking; they have neither the capacity nor the authority to offer tactical information to any ac which may, for any reason, require an improved air picture outside the MATZ or associated instrument pattern. On departure, military fast jets switch to a tactical frequency and squawk, and their movements, prior to recovery, will be unknown to terminal units. In this instance, Leuchars could not reasonably have been expected to provide any TI, unless under the auspices of a LARS; in this case ScACC (Mil) was the appropriate source of such information. If airline operators choose to route outside controlled airspace, they must be alert to the likelihood of their pilots encountering military ac engaged in high energy manoeuvring.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video

recordings and reports from the appropriate ATC and operating authorities.

It appeared that the SAAB pilot had perceived a dangerous situation with the Tornado descending through his level having been coordinated to remain above. He had no way of knowing at the time that the Tornado was descending VFR with him in sight. It passed over a mile away, as it was entitled to do in class G airspace, and the Board concluded there had been no risk of a collision. Members discussed whether a message from the F3 pilot to say he had the SAAB in sight, or an emergency squawk would have helped, but the Board concluded that there had been insufficient time for the F3 to take such actions before he had descended below the SAAB; actions which had a lesser priority than reacting to his emergency. The Board discussed whether this incident was a confliction of flightpaths but members considered that the flightpaths had not conflicted and concluded that the incident could only be classed as a sighting report.

Members went on to discuss at some length the relative merits of transiting inside or outside

controlled airspace on this route, where the choice existed. It was some 15 NM or 6% longer to route via TALLA and ANGUS than to route directly. With this in mind, most accepted that the safest option, which might incur ATC delays, should be to transit inside CAS. However, the Board agreed that it was perfectly acceptable to transit outside CAS, with a RAS, provided pilots followed the avoiding action offered by controllers, whose aim would be to provide, generally, 5 NM or 5000 ft separation from other traffic. Should pilots choose the least safe option of ignoring the proffered avoiding action they would then be responsible for their own separation from other traffic. Some thought it placed the controller in an invidious position to ask him for a RAS, which imposed responsibilities on the controller, and then not follow his advice. The Board agreed that in this incident and the subsequent one (215/99) the SAAB pilot's proximity to the other ac was partly of his own making by not following the avoiding action offered. Operators should not be surprised if expected savings did not materialise from 'direct routeing' because of the likelihood of having to avoid 'FIR' traffic.

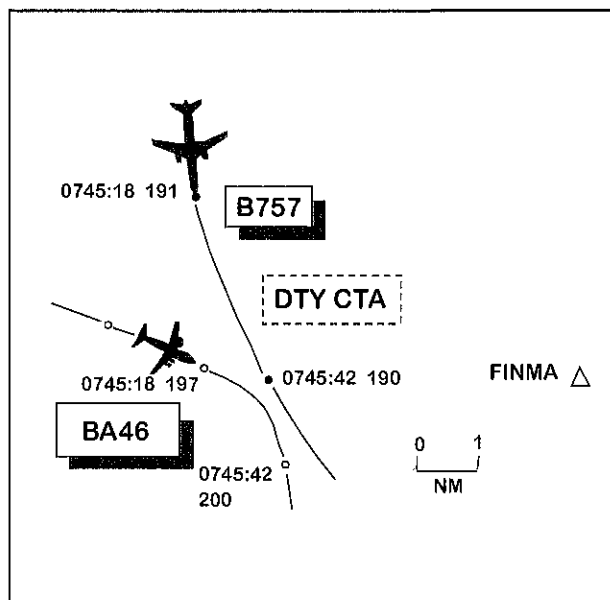
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Sighting report.

## AIRPROX REPORT No 211/99

Date/Time: 2 Dec 0745  
Position: N5202 W0114 (6.5 NM WNW  
FINMA)  
Airspace: CTA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: BA46 B75-2  
Operator: CAT CAT  
Alt/FL: FL 200 ↑ FL 270  
Weather VMC VMC  
Visibility: 10 km NK  
Reported Separation:  
not given/not given  
Recorded Separation: 2.75 NM/600 ft



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

**THE BA46 PILOT** reports that he was cruising at FL 200 at 210 kt under the control of LATCC on 133.07. The visibility was over 10 km in VMC. He was squawking 5401 with Mode C. ATC instructed him to steer a radar heading of 165° then 110°. Shortly after establishing on the latter a TCAS TA indicated traffic 600 ft below and climbing. An RA then demanded climb, simultaneous with an ATC avoiding action instruction to turn R onto 190°. The climb was initiated with autopilot disengaged and the ATC instruction followed. The other ac was not seen but TCAS indications suggested there had been a high risk of collision.

**THE B757 PILOT** reports that he was cruising at FL 190 on a radar heading from LATCC on 121.025. ATC then instructed him to turn L heading 140° and to climb to FL 270. However, he could see a BA46 at FL 200 crossing from R to L and therefore decided to wait until he was established on the heading before starting to climb. Almost immediately, on passing FL 191, a TCAS signalled an RA, demanding descent. While the autopilot was disconnected and the ac returned to FL 190, ATC simultaneously instructed an urgent L turn onto 100°. He advised ATC of the RA and informed them that the ac was not climbing. The controller accepted responsibility for the incident.

The pilot comments that in good VMC the confliction was not serious. When clear of the BA46 a climb instruction to FL 270 was received. He thought the significantly lower speed of the BA46 had contributed to the confliction.

**ATSI** reports that at the time of the Airprox the Cowly Sector was split into its two constituent parts, Cowly W and Cowly E. Sector responsibilities are not defined geographically but by route and function. These responsibilities, with reference to the subject ac, are that Cowly E is responsible for LTMA inbounds via Bovingdon, LOREL and ALKIN (the BA46) and also for East Midlands outbounds routeing via Compton, COWLY and FINMA (the B757). Both Cowly SCs described their respective workloads as decreasing from high to moderate at the time of the incident. During interview the Cowly W SC mentioned a domestic issue concerning himself. It is difficult, if not impossible, to quantify to what extent a domestic issue may detrimentally affect a controller's performance, or indeed, whether performance will be affected at all. Nevertheless, although the controller stated that he was not consciously affected by his domestic concerns, it is reasonable to suppose that it may have reduced his feeling of well-being prior to the incident and this, in itself, may have affected his concentration and,

consequently, his performance. He was operating as mentor to a trainee with about 100 hr operational training experience at the time of the Airprox. The SC said that he knew that the trainee had been rostered to work with him that day. He was one of the trainee's three main OJTIs and, consequently, was aware of his abilities. The trainee explained that he had operated the Cowly Sector in a split configuration only once before and on that occasion he had worked on the Cowly E Sector. However, he confirmed that he was fully conversant with the split sector procedures.

The B757 pilot contacted the Cowly E Sector at 0738, climbing to FL 90 on track Sapco-Daventry. The flight was instructed to continue on its heading of 190° and to climb to FL 140, the highest level available to the E Sector, without co-ordination with Cowly W. Following agreement between the two sectors, the B757 was subsequently transferred to Cowly W, climbing to FL 180 on the radar heading of 190°. This course of action was taken to assist in reducing the workload of the Cowly E SC.

The next call on the Cowly E frequency, following the transfer of the B757, was from the pilot of the BA46, who reported approaching FL 200 on a radar heading of 165° at 200 kt; the pilot reported later that he had reduced speed due to delays at Heathrow. This flight had already been warned to the W Sector as traffic to the B757. The BA46 was instructed to turn L heading 110° and to maintain FL 200. The E SC said that he advised the W Sector mentor/trainee of the ac's new heading by pointing at its return on the latter's radar display. He believed that he received an acknowledgement of this information but neither the mentor nor his trainee could recollect being given this advice and, consequently, they were unaware that the ac had turned onto the heading. Also, they did not realise that the BA46 had reduced to 200 kt. The E SC explained that he placed the BA46 on a heading of 110° to assist the W SC by routing the flight away from Gatwick inbound traffic that was to the W of the sector under the control of Cowly W.

The Cowly W SC said that he discussed the traffic situation concerning the 2 ac with his trainee prior to the B757 contacting his frequency, and the various options for handling the flights were explored. The trainee explained that his intention was to place the B757 on a south-easterly heading to parallel the expected track of the BA46, at a suitable distance, to ensure radar separation between the 2 ac. Then, following receipt of a higher level from the relevant sectors, he would instruct the ac to climb through the level of the BA46. Initially, at 0743, the B757 was cleared to climb to FL 190 on a radar heading of 190°. Both the mentor and his trainee stated that they believed that they agreed this level with the Cowly E SC but the latter said that he was unaware that this co-ordination had taken place. Consequently, the Cowly E SC believed that the B757 was still only climbing to FL 180. Because both this and the previous co-ordination took place face to face between adjacent sectors, there is no record of what was actually said.

With the understanding that the B757 would be maintaining FL 180 on reaching, the E SC said that he asked the Cowly W Sector if he could clear the BA46 to descend to FL 190. He explained that due to the amount of traffic holding at Bovingdon (BNN) it was necessary to utilise the secondary hold at WCO for Heathrow arrivals such as the BA46. The LATCC TC MATS Part 2, Page MID 2-4, states that: "... ac may be held at WCO (inbound track 157° LH) at FL 180 and FL 190." Therefore, to comply with the procedure, it was necessary to clear the ac to descend to FL 190. Both the W SC and his mentor confirmed that they agreed to the request for the BA46 to descend to FL 190. Although realising that this action resulted in both ac being cleared to the same level, they reasoned that, because a climb to FL 270 was already co-ordinated for the B757, it was anticipated that the flight would, subsequently, be able to climb through the level of the BA46, on a suitable heading to ensure that the requisite 3 NM radar separation was provided. Consequently, in accordance with his plan, the trainee cleared the B757 to climb to FL 270 at 0744, followed by an instruction to turn L heading 140°. The mentor said that he was not

happy that his trainee instructed the ac to climb first and then passed the heading instruction in the next transmission. However, still unaware that the BA46 had been given a turn onto a heading of 110° and assuming that it would be tracking about 140°/150° (the usual routeing inbound to Heathrow), he believed that separation would be maintained. The mentor commented that if he had not been operating with a trainee, he would have looked across at the BA46's strip, displayed on the E Sector, to note the heading annotated. However, because of the ergonomics of the sector, whereby he was positioned to the L of his trainee and, therefore, away from the E Sector display board, he did not check this information. The trainee confirmed that he did not look at the adjacent strip display. Good ATC practice requires that ac are established on radar headings before they are cleared to climb/descend through each other's levels, rather than relying on an ac's rate of turn to achieve the required lateral separation.

Meanwhile, the E SC instructed the BA46 to descend to FL 190, as agreed with Cowly W, in the belief that the B757 was still only cleared to FL 180. He commented that, if he had been aware that the B757 was climbing to FL 190, he would never have requested descent for the BA46. A radar photograph at 0744:24 (the time descent was issued to the BA46) shows the flight establishing on the 110° heading at FL 200 with the B757 at FL 180 about 10 NM to the NE. The E SC said that he then turned his attention to traffic in the BNN area and when he looked back at the BA46 shortly afterwards he noticed that the B757 was at FL 190. He did not have time to co-ordinate an action with the Cowly W SC and decided to give the BA46 an avoiding action R turn heading 190°. Initially, he instructed the ac to expedite its descent but, realising that the B757 was level at FL 190, he requested the BA46 to maintain FL 200. The pilot of the latter reported that his TCAS was giving him the same instruction. The pilot stated later that he had climbed 200 ft in response to a TCAS RA.

After the B757 had been given the L turn heading 140° by the Cowly W Sector, the

mentor, realising that the situation was tighter than he believed initially, took over the RT and instructed the flight to expedite its climb due to traffic 5 NM away going through its level. As this did not resolve the problem, he instructed the B757 to make an avoiding action L turn heading 100°. This instruction was passed simultaneously with the Cowly E SC issuing the avoiding action R turn to the BA46. Subsequently, realising that the latter had climbed back to FL 200, he instructed the B757 to stop its climb at FL 190. The pilot reported levelling at FL 190 and turning L heading 100°; although he did not report it at the time, he later commented that he had received a TCAS RA to descend as his flight was passing FL 191, and that he was visual with the traffic throughout the incident.

UKAB Note: A recording of the Debden radar at 0745:18 shows the BA46 tracking 110° at FL 197 with the B757 2.7 NM due N indicating FL 191 on a southerly heading. This is about the time of minimum separation. (SMF data gives minimum separation distances of 2.18 NM and 500 ft at 0745:23; however, it should be noted that SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data). By 0745:42 standard vertical separation has been restored, with the BA46 showing FL 200 and the B757 FL 190.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

A breakdown in co-ordination between the controllers concerned contributed significantly to this incident. The COWLY W SC and his trainee did not hear the E SC advising them that the BA46 was heading 110°, and the COWLY E SC did not realise that the B757 was climbing to FL 190. As these coordinations were conducted face-to-face no record existed of

what actually took place. In a previous similar Airprox (48/99), unrecorded face-to-face coordination had been a causal factor and prompted a recommendation from the Board that..."The CAA considers introducing a more formal approach to the dynamic process of face-to-face co-ordination between controllers so that an audit trail results". An ATM and PD Advisor present at the meeting told the Board that this recommendation was still under consideration.

Good basic ATC practice requires that ac should be established on radar headings before they are cleared to climb/descend through each other's levels, which had not been the case here. It was agreed the trainee COWLY W controller's instruction to the BA46 was the

main cause of the Airprox; he cleared it to climb through the level of the B757 before he had put these ac on parallel tracks to establish lateral separation of at least 3 NM. However, had the COWLY W mentor physically checked the BA46's heading on the E sector display board FPS the incident might have been prevented.

With regard to risk, members noted that the radar recording indicated only a marginal compromise of standard lateral separation. Moreover, the Board noted that the B757 pilot had been watching the BA46 for some time and was always in a position to take avoiding action should it have become necessary. It was therefore concluded that there had not been a risk of collision.

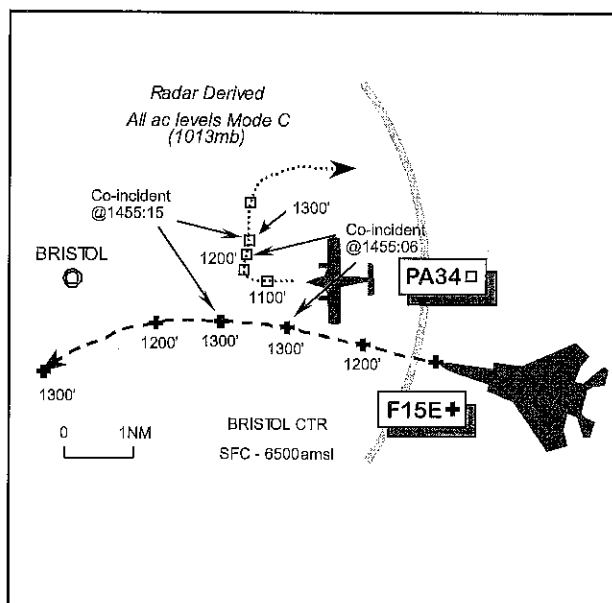
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The COWLY W SC mentor did not ensure standard separation between the B757 and The BA46.

### **AIRPROX REPORT No 212/99**

<u>Date/Time:</u>	02 Dec 1455	
<u>Position:</u>	N5122 W0240 (2.5 NM E of Bristol - elev 622 ft)	
<u>Airspace:</u>	Bristol CTR	(Class: D)
<u>Reporter:</u>	Bristol ATC	
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	PA34-200T	F15E
<u>Operator:</u>	Civ Trg	Foreign Mil
<u>Alt/FL:</u>	1500 ft (QNH 1023mb)	1800 ft (RPS 1018mb)
<u>Weather</u>	VMC CLOC	
<u>Visibility:</u>	20 km	8 km
<u>Reported Separation:</u>	nil V/0.5 NM H	Not seen
<u>Recorded Separation:</u>	1 NM H/100 ft V	





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

### **THE BRISTOL AERODROME CONTROLLER**

(ADC) reports that the PA34 had been transferred from the APR when established on the ILS to RW27 and a clearance to land issued to the pilot. As the ac approached 5 NM finals the APR called on intercom and warned him of fast jet traffic approaching from the SE without a Mode C indication. The unknown traffic was then spotted on the Aerodrome Traffic Monitor (ATM) at about 12 NM SE of the airport and heading toward it. When the conflicting traffic had closed to 6-7 NM SE, a Mode C indication was displayed at an altitude of about 1200 ft (Bristol QNH). ADC "warned" the PA34 pilot about the unknown traffic, that was now indicating 1100 ft. At 3 NM finals, the PA34 pilot was advised that the unknown ac was maintaining a conflicting heading at a similar level and that a R turn onto a northerly heading was considered to be the best form of avoiding action. The PA34 pilot broke off the approach at about 2.5 NM finals and turned N. Simultaneously, the unknown ac was observed on the ATM to turn L onto a southwesterly heading. The ADC estimated at this point that the minimum horizontal separation was about 0.75 NM and virtually nil vertically. The fast jet was acquired visually at a range of 4 NM SE of the airport and identified as an F15 type ac.

UKAB Note (1): The 1450 Bristol weather was reported as surface wind: 260/14 kt; 20 km Nil Wx; SCT 1500 ft; QNH 1023 mb; Cotswold RPS 1018 mb.

### **THE BRISTOL APPROACH RADAR CONTROLLER (APR)**

adds, that a radar contact was observed tracking 290-300° from the vicinity of Radstock toward the airport and the ADC informed. After the unknown ac passed 0.75 NM astern of the PA34, it departed the CTR to the SW.

**THE PA34 PILOT** reports squawking the assigned code of 3/A 0401 with Mode C whilst making an IFR approach to RW27 at Bristol; the ac colour scheme was white with black trim and anti coll and HISLs were on. Whilst on finals at

100 kt, ATC advised of conflicting traffic and advised a R turn onto N; when steady the other ac was seen as it passed about 0.5 NM astern, from R to L.

**THE F15E PILOT** reports that after crossing through the Cotswold CTA via Swindon Radar Corridor, he executed a VFR 12° descent down to about 1500 – 2000 ft agl at 450 kt. The ac was camouflage grey, red anti-collision lights were on and he had selected 3/A 7000 with Mode C; HISLs are not fitted. At about 1800 ft a L turn onto a heading of 220° was made, but he was unaware that he may have penetrated CAS until after landing. The PA34 was not sighted at all.

**HQ 3 AF** comments that this unfortunate penetration of Class D airspace came about following a partial failure of the moving map display, shortly after the pilot cancelled a radar service and continued the mission VFR. New software had been installed on the navigation suite of the ac prior to this flight, and an incompatibility caused the loss of information to the crew. Having identified the problem, a software modification subsequently cured the fault and no further malfunctions have been reported.

UKAB Note (2): A review of the LATCC Burrington Radar recording confirms that this Airprox occurred at 1455:06, 2.5 NM E of Bristol airport. The PA34, identified from the assigned squawk, is shown at 1454:48 approaching 2.5 NM finals to RW 27 and descending through 1100 ft Mode C (800 ft QNH), just after the F15E entered the Class D CTR at 1000 ft Mode C (700 ft QNH). The F15E closed rapidly as the PA34 turned N and climbed. At 1455:06, as the PA34 climbed through 1200 ft Mode C (about 900 ft QNH) heading N, the F15 was 1 NM SE westbound and indicated 1300 ft Mode C (about 1000 ft QNH). The F15E subsequently passed astern of the PA34, turned SW and exited the CTR, whilst the latter climbed to 2100 ft Mode C and turned downwind.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Board members were concerned that the reported partial loss of a moving map display should have had such a detrimental effect on the F15 crew's ability to navigate and their situational awareness. Clearly, they did not know that they had entered Class D airspace. An advisor from HQ 3AF believed that the crew was fairly new in the UK and thus not as familiar with UK airspace and national procedures as other UK based USAFE crews. That aside, they should not have relied completely on the ac systems and reference to a UK Low-Flying Chart (LFC) would have revealed that their track would take them into Class D airspace. However, in mitigation, it was not clear to members if this equipment failure had been apparent to the crew at the time, because it was not mentioned in their own report. It was learned only subsequently that the crew had been well aware of the moving map display malfunction, which increased their workload considerably whilst they tried to resolve it.

Some members suggested that over-concentration on their problem probably explained why the F15 crew had managed to fly 1 NM astern of the PA34 without two pairs of eyes detecting it at all. The Board was advised subsequently that regulations require USAFE crews to carry the appropriate 1:500,000 LFC and applicable DOD En-route chart (ERC), whilst most will also carry the applicable RAF ERC. Some members were, therefore, concerned that the crew had not seemed to refer to these charts at the time and it was stressed that help was readily available from D & D to any aviator who was unsure of their position, civil or military, using the UHF or VHF auto triangulation system. Some members commented on and applauded the good teamwork demonstrated by the Bristol APR and ADC. The APR's foresight and good appreciation of the traffic scenario detected the confliction and enabled the ADC to provide prompt avoiding action and turn the PA34 N out of the way of the F15 after it had infringed CAS. It was clear to the members that the inadvertent penetration of the Bristol CTR by the F15E crew whilst unaware of their position was the fundamental cause of this Airprox. However, the prompt warning by APR and effective avoiding action issued by ADC, coupled with the PA34 pilot's sighting of the F15 as it passed astern removed any risk of a collision that may have existed.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Inadvertent penetration of the Bristol CTR by the F15E crew whilst unaware of their position.

## AIRPROX REPORT No 213/99

Date/Time: 2 Dec 1553

Position: N5048 W0139 (7.5 NM ENE  
Bournemouth airport)

Airspace: CTZ (Class: D)

Reporting Aircraft Reported Aircraft

Type: ATR 72 PA28

Operator: CAT Civ Trg

Alt/FL: ↓2000 ft 1800 ft  
(QNH 1025 mb) (QNH)

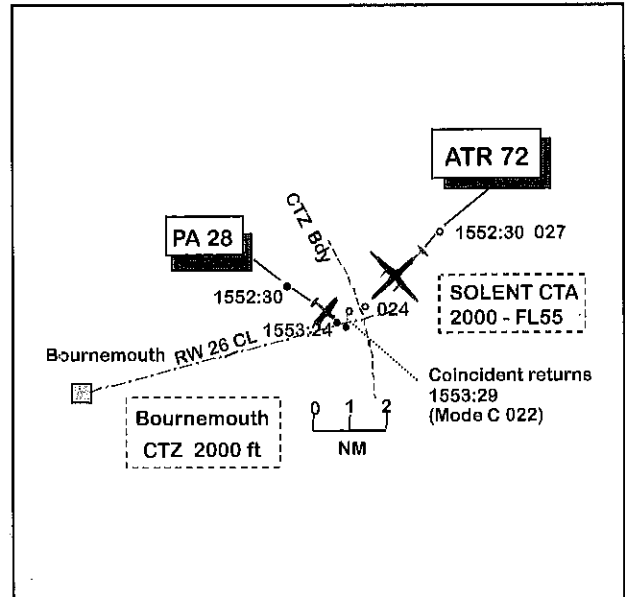
Weather VMC CLOC VMC

Visibility: 22 KM 10 km

Reported Separation:

400 m H/200 ft V not seen

Recorded Separation: @800 m H



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

**THE ATR 72 PILOT** reports that he was heading 260° at 190 kt and descending through 3000 ft (QNH 1025) while making an approach to RW 26 at Bournemouth Airport. The visibility, clear of all cloud, was 22 km in VMC. When about 7 NM from touchdown, the controller advised him of unidentified traffic to his R and he then saw a low wing, single engined ac about 400 m ahead and 200 ft below, crossing from R to L. Fortuitously, no avoiding action was considered necessary but the pilot comments that ATC's warning would in any case have been too late. He was surprised to see a light ac in such a position and wondered whether its pilot had been permitted to enter the CTZ.

**THE PA28 PILOT** reports that he was flying under VFR from Old Sarum to Shoreham via Alderbury, Stoney Cross and Beaulieu; the visibility was over 10 km. He was heading about 150° at 100 kt and cruising at 1800 (QNH unspecified) while receiving a radar information service from Solent on 120022. He was squawking with Mode C. Whilst on the leg between Stoney Cross and Beaulieu he discovered that he was about 3 NM R of planned track owing to a compass error. Solent had made no comment about his routing or warned him of the possibility of a conflict

between himself and another ac. He did not see the ATR 72 and was unaware that an incident had occurred until contacted the following week by the Airprox Board. He remained convinced that, despite being slightly W of track, he had not entered the Bournemouth CTZ.

**BOURNEMOUTH APC** reports that the ATR72 first called when 18 NM from touchdown for RW 26. An unknown return subsequently appeared on radar immediately N of the RW 26 final approach track at a range of 6 NM, displaying a 7000 SSR code but no Mode C. ATC was unaware of the traffic, therefore information was immediately passed to the ATR72 pilot... "C/S there's unknown traffic that's just in your 1 o'clock range of two and a half miles appears to be crossing the two six final approach at six miles, do you have him in sight – no height information." The pilot confirmed that he had visual contact and was happy to continue approach. However, he subsequently stated his intention to submit an Airprox report. The track of the unknown return was monitored as it turned towards Beaulieu. Solent Radar was contacted and they advised that they had previously approved a PA28's routing via Stoney Cross disused airfield to Beaulieu. After several unsuccessful attempts (owing to radio problems on the PA28) the PA28 pilot was

eventually contacted but the ac could not be positively identified.

**ATSI** comments that the PA28 appeared to be well W of track. On its intended route the ac would presumably have remained below the Solent CTA, clear of the CTZ and would not, therefore, have been traffic to the ATR72 which would have been at 3000 ft until descending on the ILS. Bournemouth ATC fulfilled their responsibility by calling the unknown traffic to the ATR72 pilot and ascertaining that he was visual with the traffic and content to continue his approach. Similarly, having undertaken to provide the PA28 pilot with a FIS (which is confirmed by the Solent RT transcript), and in the belief that the ac would be routeing clear of CAS, the Solent controller also fulfilled his responsibilities.

**UKAB Note:** A recording of the Pease Pottage radar at 1550 shows an intermittent secondary return, believed to be the PA28, squawking 7000 but with no Mode C, entering the north eastern corner of the Bournemouth CTZ on a southerly heading. At 1552:30 the return has turned onto a SE heading and is tracking almost at right angles to the ATR 72 which is just over 4 NM away to its E and establishing on the ILS. At 1553:24 the PA28 passes 0.8 NM ahead of the ATR from R to L, and a few sec later the ATR 72 passes about 800 m behind the PA28 indicating 2200 ft Mode C (equivalent to 2524 ft QNH). The encounter takes place on the RW 26 extended centre line 7.5 NM from the airfield. Shortly afterwards the PA28 appears to be making a L turn in the vicinity of the CTZ boundary when it disappears from radar cover at 1553:40.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording and reports from the air traffic controllers involved.

Some surprise was expressed that the Solent controller had not warned the PA28 pilot that he was deviating towards the CTZ. The ATSI adviser pointed out, however, that the ac was under a FIS which did not require it to be identified or kept under continuous surveillance. The PA28 pilot's comment concerning Solent's lack of a warning to him suggested that he was not fully aware of the provisions and limitations of a FIS. Had the PA28 been flying under a RIS, it would have been the controller's responsibility to monitor the ac and pass any relevant information to the pilot such as advice on proximity to controlled airspace. However, it was up to the pilot in the first instance to ask for an enhanced service if he felt it was necessary. Members cautioned GA pilots on assuming a heightened ATC service solely by dint of being on a radar frequency.

The Board has repeatedly emphasised to GA operators the importance of using SSR as an aid to flight safety, including Mode C if it is fitted. In addition to enabling ATC units to give more precise traffic information it is also crucial to the activation of TCAS, which is now mandated for CAT ac in the UK, albeit there are still some exemptions. Members noted that although the PA28 pilot reported that he had selected his Mode C, it was not showing on radar during the period of the conflict.

There was no doubt in the Board's view that, under the ATC service being provided to him by Solent, it was the PA28 pilot's sole responsibility to ensure that his route remained clear of CAS. By entering the Bournemouth CTZ unauthorised he flew into conflict with the ATR72, which was making an approach to Bournemouth, and caused the Airprox. Moreover, despite the excellent visibility he did not see the ATR despite passing within a mile of it. Noting this non-sighting, and that the ATR 72 pilot saw the PA28 late after receiving traffic information from ATC, some members thought that there had been a possible risk of collision. However, notwithstanding his late acquisition of the PA28, the ATR72 pilot had time to make a considered decision about the necessity for avoiding action, and the radar recording indicated a minimum lateral distance of about

008 NM as the PA28 passed ahead of the ATR 72. On this basis the Board concluded that there had not been a risk of collision.

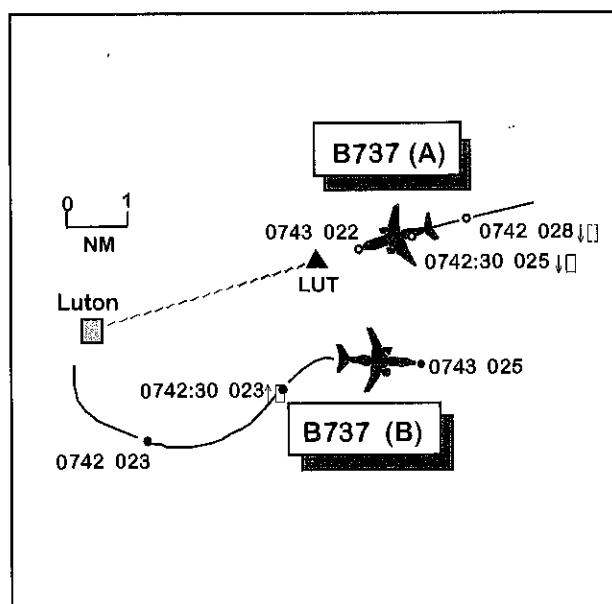
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Unauthorised penetration of the Bournemouth CTZ by the PA28 pilot who flew into conflict with the ATR72, which he did not see.

### **AIRPROX REPORT No 214/99**

<u>Date/Time:</u>	3 Dec 0743	DAY
<u>Position:</u>	N5153 W0015 (405 NM E Luton airport)	
<u>Airspace:</u>	CTZ	(Class: D)
<u>Reporter:</u>	Luton ATC	
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	B737 (A)	B737 (B)
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	↓ILS	↑3000 ft (QNH)
<u>Weather</u>	VMC	VMC
<u>Visibility:</u>	NK	NK
<u>Reported Separation:</u>	2 NM same level	
<u>Recorded Separation:</u>	2 NM/200 ft	



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

**LUTON ATC** reports that the pilot of B737 (B) reported a windshear alert in the cockpit on short finals to RW 26 and commenced a go-around; he was instructed to carry out a standard missed approach. After mistakenly calling LUTON GMC instead of APC following the go-around, the pilot was transferred to the radar frequency (129.55). By the time this call was made he was tracking towards B737 (A), which was established on finals for RW 26; lateral separation at this time was 3 NM. B737 (B) was given a heading to steer away from the other ac and instructed to climb to 3000 ft altitude and the pilot reported visual contact with B737 (A). The ac passed in opposite

directions at the same altitude with about 2 NM lateral separation.

UKAB Note (1): The pilot of B737 (A) was unaware that an Airprox had occurred and could add nothing of significance to the investigation.

**THE B737 (B) PILOT** reports that when descending through 300 ft on short finals for RW 26 at Luton, a windshear warning was received in the cockpit. He initiated a go-around and carried out a standard missed-approach procedure for RW 26, as instructed by ATC. While in the L turn he became aware of another ac making an approach; ATC gave him a heading to steer to avoid a conflict. However, there was no risk of collision as all

parties concerned were aware of the situation, and he felt it unnecessary to file an incident report. The pilot comments that later, in January 2000, he voiced concerns to his Company's management about the missed approach procedure for this RW (in particular the possible effects of a radio failure on go-around) and asked them to request a change in the procedure.

**ATSI** did not carry out a field investigation into this incident as they considered the problem lay with ATC procedures rather than the controllers' actions. In this instance, when B737 (B) was observed flying towards B737 (A), its pilot was instructed to turn R heading 100° and to climb to 3000 ft, and traffic information given. The ac subsequently passed 2 NM apart as the R turn took effect.

At the time of the Airprox, the standard missed approach procedure for the ILS DME NDB (L) LUT RWY 26 reads:

"Climb straight ahead to 1500 (991) then climbing turn to left to track 085°M. Continue climb to 2000, then turn to NDB (L) LUT, or as directed".

Luton ATC expressed their concern about this procedure in a letter to SRG on 18 May 1999. The letter commented that, in the opinion of LUTON ATC, the existing approach procedure was no longer appropriate because...."there is an increasing likelihood that an ac carrying out the procedure will come into conflict with another ac on final approach". It was suggested that a change should read...."Climb straight ahead to 1500 (991) then climbing turn left to 110°. Continue climb to 2000 then continue as directed".

Talks were begun with Luton. However, delays incurred by an internal CAA reorganisation in June 1999, involving the transfer of the relevant Section from Aerodrome Standards to DAP, meant that detailed discussions and correspondence with Luton were not resumed until December 1999. As a result an agreed missed approach procedure for RW 26 was promulgated through the ICAO AIRAC system,

effective from 23 March 2000. The revised procedure requires ac executing a missed approach to RW 26 to..."Climb straight ahead to I-LJ DME 1.5 outbound or 1500 (992) whichever is the later, then turn left onto track 090°M, continuing climb to 3000, then continue as directed".

UKAB Note (2): A recording of the Debden radar shows B737 (B) carrying out the missed approach procedure and climbing through 2300 ft Mode C at 0742:30 with the inbound B737 (A) at 12 o'clock range 3.4 NM descending through 2500 ft. Shortly afterwards B737 (B) turns E and at about 0742:50 the ac pass port to port by about 2 NM at similar levels (about 2100 ft QNH 1003), B737 (B) climbing and B737 (A) descending.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included a report from the B737(B) pilot, a transcript of the relevant RT frequency, a radar video recording, reports from the air traffic controllers involved and comment from the appropriate ATC authority.

An ATCO member familiar with Luton's ATC operations said that confusions such as this were almost invariably resolved by radar control. He explained that procedural separation under missed approach conditions was difficult to achieve within the restricted confines of the CTZ and by limitations imposed by the gliding activities at Dunstable, only 6 NM to the W of the airfield. This incident would probably not have arisen had it not been for B737(B)'s delayed transfer between frequencies. A pilot member surmised that this might have occurred if the crew had preset the GMC frequency prior to landing in anticipation that this would be their next change; following the unexpected go-around it was easy to see how the GMC frequency could then have been selected rather than the radar frequency.

Concern had been expressed to SRG about the inadequacy of this Missed Approach Procedure

(MAP) by Luton some months earlier, and members acknowledged the interruption and delays caused by the change of offices. Even so they expressed surprise and disappointment that it had taken this Airprox to bring about a change. In their discussion to determine why this incident happened members agreed that neither controller nor pilot actions had been at fault. This was a conflict of procedures that had been there for some time and had now been brought to light. The Board concluded that the Airprox had occurred because the conflicting Missed Approach and Approach procedures for RW26 resulted in B737(B) turning towards the

ac on finals before standard vertical separation had been established.

Turning to risk assessment members were satisfied that both ATC and the B737(B) pilot were fully aware of the confliction and took appropriate steps to resolve it. Although standard separation was not maintained, the ac were no closer than 2 NM apart as they passed and the Board concluded that there had not been a risk of collision. The Board noted that the new MAP for RW26 had been operational since 23 Mar 00 and believed no further action was needed at this juncture.

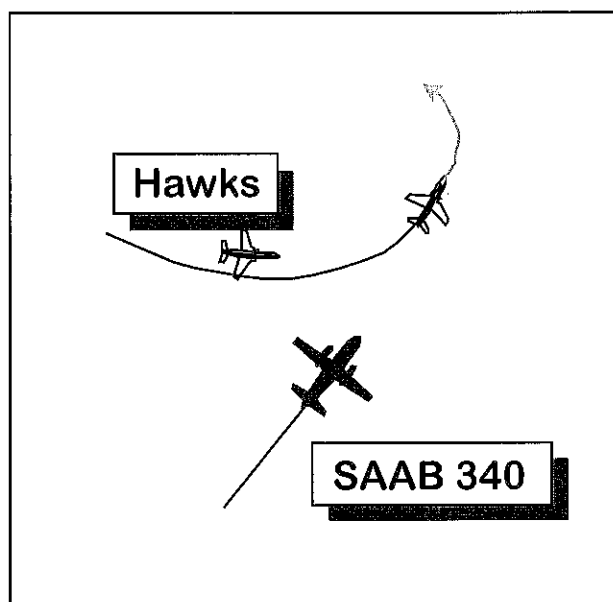
### **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Confliction between the Missed Approach Procedure and the Approach Procedure to RW26 at Luton.

### **AIRPROX REPORT No 215/99**

Date/Time: 2 Dec 1024  
Position: N5612 W0229 (17 NM NNE of SAB)  
Airspace: FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: SAAB 340 Hawk  
Operator: CAT HQ PTC  
Alt/FL: FL 150 NK (RPS)  
Weather VMC CLOC VMC CLOC  
Visibility: 50 km Unltd  
Reported Separation: 2 NM/NK  
Recorded Separation: < 1 NM



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

**THE SAAB 340 PILOT** reports heading 010° at 265 kt and receiving a RAS from Scottish Mil at FL 150. He was on a radar heading due to unseen traffic when he saw 2 jet fighters below in his 11 o'clock. They manoeuvred around and

then climbed towards him, one crossing his path 2 NM ahead from left to right. He advised Scottish Mil he had them in sight and took avoiding action; the risk of collision was low.

**THE HAWK PILOTS** reports flying a 1 v 1 air combat training sortie and were manoeuvring in the area at the time of the Airprox. They were not receiving an ATS and did not see the SAAB 340.

**HQ MATO** reports that the SAAB 340 was receiving a RAS from ScATCC (Mil) Console 4 (CON4) on 134.475. Although providing a service to this ac only at the time, the large number of background tracks in the area and the resulting co-ordination and avoiding action gave CON4 a significant workload. After co-ordinating the SAAB and a pair of Tornados with Buchan, CON4 passed further traffic information (TI) at 1019:45, "*c/s, you have further unknown traffic in your 12 o'clock, range of 20 miles manoeuvring, possibly two contacts indicating similar level, if not sighted, turn left heading 280.*" These contacts were the Hawks. The pilot acknowledged this call but maintained track.

During the next 2 minutes one of the Tornados departed from its co-ordination, leading to the SAAB pilot filing a separate Airprox (No 210/99). At 1022:00 CON4 passed TI to the SAAB 340 pilot, "*c/s you have traffic 12 o'clock, 10 miles manoeuvring, no height information, if not sighted turn right heading 040*" to which the SAAB 340 pilot replied "*Okay, right 040 . . . we're doing that,*" at 1022:15. This call referred to the Hawks. 30 sec later the SAAB 340 pilot transmitted "*c/s we've got two contacts now visual down our left at eh 1 o'clock.*" CON4 offered "*... if you're happy to continue, resume your own navigation..*" but the SAAB 340 pilot replied "*..OK, they're sort of manoeuvring about a bit, we'll eh we'll sort it out.*" The pilot then asked if he could telephone the controller after landing.

At about 1028:00, the SAAB 340 pilot advised CON4 that he was "*...going to file an Airmiss on that incident back there....*" which CON4 took to mean the broken co-ordination with Buchan. Later that afternoon, the SAAB 340 pilot informed the ScATCC (Mil) Supervisor that he was also filing a second Airprox, to cover the incident with the Hawks; he believed that the ac types were Tornados in both encounters. He

was very complimentary of the service provided by his controller but expressed concern about the risks of routeing through Class G airspace with military ac not using an ATS and defeating the controllers' efforts to provide separation.

The recording of the Aberdeen radar, which was the radar head being used by CON4, shows the SAAB 340, squawking 4674 converted to show its c/s, tracking N at FL 150. The Hawk pair can also be seen squawking 7000, with Mode C, and manoeuvring about 25 NM N of St Abbs. The radar sweep at 1022:00 shows the Hawks some 9 NM N of the SAAB 340 (12 o'clock) whilst manoeuvring as a close pair and indicating FL 129, although the Mode C disappears in the next sweep. Between the radar sweeps of 1022:20 and 1022:30, they quickly begin to track SE (groundspeed 2-3 times faster than the SAAB 340) indicating FL 115 for about 3 NM before, at 1022:40, making a R turn towards the SAAB 340, whose R turn onto 040° has only just started to take effect. At this point, the Hawks are 3.5 NM NE of the SAAB 340 and indicating FL 114; this is at about the time that the SAAB 340 pilot reported visual. The Hawks continue the R turn through 360°, rolling out on SE, whilst the SAAB 340 steadies on a heading of 050°. The CPA occurs at 1023:40, as the radar contact of one Hawk approaches from the SAAB 340's 10 o'clock; the Hawk is indicating FL 139 (ie 1100 ft below) and is in the process of reversing its turn, 180° L onto NW. The turn takes the Hawk into the SAAB 340's 12 o'clock at about 0.25 NM before opening N, although its Mode C indication is not seen. The Mode C reappears, as the Hawk passes a northerly heading, indicating FL 149, by which time it is in the SAAB 340's 10 o'clock at about 1 NM. The second Hawk remains about 2 NM clear of the SAAB 340 to the NNE.

CON4 first provided TI regarding the Hawks at 1019:45, some 4 min before the CPA, while the ac were separated by about 20 NM. The TI included an advisory L turn, but this turn was not taken. While an 80° turn might have seemed rather excessive to the pilot, the manoeuvring jets were significantly faster than the SAAB 340. The next call was given at 1022:00, as the ac were about 9 NM apart. The



Hawks were then manoeuvring tightly and it was a 50/50 choice between turning L or R for avoidance. In the event, the radar recording shows that it took at least 30 seconds for the SAAB 340 physically to start moving NE, during which time the Hawks proceeded SE (and so causing a greater conflict), before turning away. CON4 would have found himself in a difficult position as the Hawks moved SE and it could be argued that the SAAB 340's R turn should have been stopped and an avoiding action L turn applied instead. Realistically however, there were only 2 radar sweeps available to ascertain that the Hawks actually were tracking SE and, almost immediately after the second sweep, the SAAB 340 pilot reported visual with "...two contacts" therefore removing the need for further action from the controller. During the subsequent manoeuvres, one Hawk passed close to the SAAB 340, although it was initially 'belly up', and then, 'tail on' to the airliner; its pilot's attention was no doubt concentrated on the second Hawk, which was in the opposite direction from the SAAB 340.

CON4 experienced a 5 min period of controlling during which he was exposed to two rapidly changing scenarios at short notice, and his actions cannot be criticised. Had the SAAB 340 pilot taken the 'large' turn offered at 1019:45, the flight would probably have been incident free.

**HQ PTC** comments that the 2 Hawks were carrying out a student air combat training sortie out of Leuchars because of protracted poor weather at Valley. They were engaged in basic ACM, a QFI flying one ac and a solo student the other. They were not therefore receiving an ATS service but operating under VFR in VMC on a discrete frequency. At the student's stage of training it was natural to concentrate attention on acquiring and maintaining the other ac, despite the exhortations to all-round situational awareness, which can only develop as experience and capacity grows. It is unfortunate that neither Hawk pilot saw the SAAB 340 but neither did they approach within 1000 ft of it. The ScATCC (Mil) controller had foreseen the difficulty of trying to maintain separation against 2 manoeuvring FJ

formations and tried to give them a wide berth. If that had been clear to the SAAB pilot, perhaps he would have taken the advice offered.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

The Board concluded that this incident was a conflict of flightpaths in Class G airspace. Although the Hawk pilots did not see the SAAB 340, they had passed abeam some distance below and one of them had climbed to the SAAB's level when some distance ahead and drawing away. Before that, the SAAB pilot had the Hawks in sight and the Board concluded from all this that there had been no risk of the ac actually colliding.

Members went on to discuss at some length the relative merits of transiting inside or outside controlled airspace on this route, where the choice existed. It was some 15 NM or 6% longer to route via TALLA and ANGUS than to route directly. With this in mind, most accepted that the safest option, which might incur ATC delays, should be to transit inside CAS. However, the Board agreed that it was perfectly acceptable to transit outside CAS, with a RAS, provided pilots followed the avoiding action offered by controllers, whose aim would be to provide, generally, 5 NM or 5000 ft separation from other traffic. Should pilots choose the least safe option of ignoring the proffered avoiding action they would then be responsible for their own separation from other traffic. Some thought it placed the controller in an invidious position to ask him for a RAS, which imposed responsibilities on the controller, and then not follow his advice. Operators should not be surprised if expected savings did not materialise from 'direct routeing' because of the likelihood of having to avoid 'FIR' traffic.

## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Conflict of flightpaths in Class G airspace.

### **AIRPROX REPORT No 217/99**

Date/Time: 6 Dec 1522

Position: N5708 W0140 (15 NM E of Aberdeen)

Airspace: FIR (Class: G)

Reporting Aircraft: SAAB 340 Reported Aircraft: Tornado F3

Type: SAAB 340

Operator: CAT HQ STC

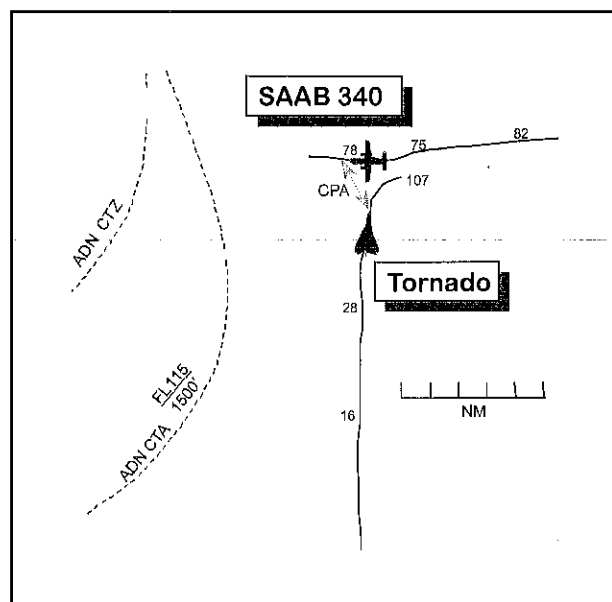
Alt/FL: 7000 ft ↓ (QNH 991 mb) NK

Weather: VMC CLBC VMC CLOC

Visibility: 35 km 10 km+

Reported Separation: 2 NM/NK

Recorded Separation: 1.8 NM



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

**THE SAAB 340 PILOT** reports heading 280° at 265 kt in a descent into Aberdeen from Denmark. When passing about 7000 ft Aberdeen ATC passed him information on military traffic in his 9:30 at about 3800 ft and advised him to stop his descent as a precaution. An avoiding action right turn was then given and as he started to turn he saw a Tornado heading straight towards him in a climb. It passed through his level and then turned right to pass behind him. It was 2 NM away when it passed through his level and there was a low risk of collision.

**THE TORNADO F3 PILOT** reports flying as part of a 2 v 2 air combat training sortie during which he did not see the SAAB 340. He was receiving an ADIS from Buchan and his was the ac identified from radar recordings as most likely to be the one involved.

**ATSI** comments that the Aberdeen controller spotted the Tornado in good time, assessed it did not pose an immediate threat but, nevertheless, called it to the SAAB which was under a RAS, conducting a visual approach to Aberdeen from some 30 NM to the E, descending to 4000 ft; the pilot had confirmed that he was good VMC. When the Tornado continued to converge, with its Mode C indicating 1000 ft unverified, the controller initially attempted to provide vertical separation by instructing the SAAB to stop its descent at FL 70. Then, when the Tornado started climbing, issued an 'avoiding action' turn instruction, at which point the pilot reported visual with the Tornado and added "we're okay".

**UKAB Note:** ScACC radar recordings show the SAAB descending on a westerly track while the Tornado converges on a track of 007°, initially descending and then climbing from 16000 ft through 28000 ft when it is 5 NM from the SAAB. Its Mode C then ceases to paint while the SAAB

stops its descent at about FL 78. The Tornado closes until the SAAB crosses its nose, at which point it starts to turn right. At its closest, it is 1.8 NM from the SAAB and its next return shows a Mode C of FL 107.

**HQ STC** comments that regrettably, because it could not easily be ascertained which Tornado had been involved, this Airprox was not notified to the military controlling unit involved until some 8 weeks after the incident and a clear reconstruction of the event proved difficult despite a study of the tape transcript. The Tornado most likely to have been involved was on an air defence training sortie under an Air Defence Information Service (ADIS)<sup>1</sup>

The tape replay shows the Tornado climbing from 015 to 118 on Mode C with both ac visible on radar but neither the Aberdeen or Buchan controllers initiated co-ordination. The Buchan controller passed the first stranger warning at 7 NM. At this point, the Tornado was receiving a FIS and the conflicting ac was showing more than 5000 ft of vertical separation on Mode C. In response to a query from the Tornado, Buchan updated the warning with "*your nose, range 4*". No further stranger warnings were passed and the Tornado appears to turn in response to the warning and pass behind the SAAB 340.

Whilst the Buchan controller fulfilled the terms of the ADIS, he should have had sufficient time, given that he had radar contact on both ac, to provide an earlier stranger warning to the Tornado.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Investigation had shown that the Aberdeen controller had seen the confliction early and passed traffic information and avoiding action to

the SAAB340 pilot who had consequently seen the Tornado in sufficient time to avoid it or not, as he saw fit. The Buchan controller had been somewhat late in drawing the Tornado pilot's attention to the confliction, but this still allowed the Tornado pilot to turn away in good time having not seen the SAAB340. The Tornado's climb had changed the circumstances for the controllers during the process, but the Board concluded that both pilots and both controllers concerned had done what they should have done to resolve this confliction of flightpaths in Class G airspace, and its resolution had removed any risk of the ac colliding.

The Board discussed the practical aspects of co-ordination between the controllers and agreed that initially there was no requirement for it. When the Tornado's climb became apparent, there was no longer sufficient time for co-ordination and the actions taken were the most appropriate.

**PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

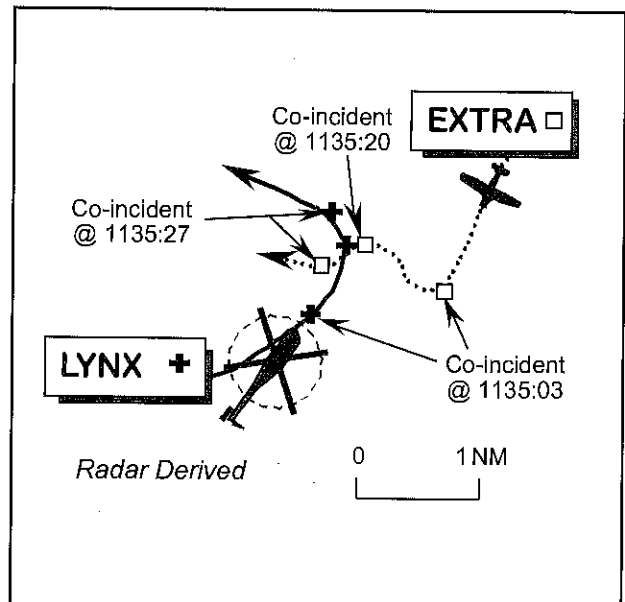
Cause: Confliction of flightpaths in Class G airspace, resolved by the actions of the pilots and controllers concerned.

1 This use of the term 'ADIS' was promulgated in HQ 11/18 Gp Air Staff Orders to obviate the need for an otherwise lengthy and complicated R/T exchange covering each permutation of the JSP318A service applicable throughout the extensive vertical block to be used for this sortie. In this scenario it represented a service as follows:

- a. FIS below 3000 ft (Base of radar coverage), limited RIS from 3000-5000 ft.
- b. RIS from 5000 ft to below FL 245, Radar Control from FL 245 and above.

**AIRPROX REPORT No 218/99**

Date/Time: 10 Dec 1135  
Position: N5114 W0045  
 (8.5 NM ESE Odiham - elev 405 ft)  
Airspace: L FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Lynx AH7 Extra EA260  
Operator: HQ DAAvn Civ Pte  
Alt/FL: 1500 ft 2500 ft  
 (QFE 989 mb) (QNH 1004 mb)  
Weather VMC CAVOK VMC CAVOK  
Visibility: 40 km+ 50 km+  
Reported Separation:  
 1-200 M H Nil V/800 ft V  
Recorded Separation:  
 Radar Contacts Merge



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

**THE LYNX HELICOPTER PILOT** reports flying radar vectors for a PAR to RW28 at Odiham under a RIS from Odiham DIRECTOR; Mode C is not fitted to the ac but HISLs were on. Whilst about 8 NM ESE of Odiham, at 1500 ft QFE heading 030° at 100 kt, a single engined light ac was sighted above and about 200 m to the R and converging rapidly. A 90° roll to port was executed to avoid the other ac, which passed about 1-200 m away at the same height. This was a high-risk encounter and they would have

collided had the pilot of the light ac not also taken, he thought, similar avoiding action. An Airprox was subsequently reported to Director on RT. He adds that the lookout from the Lynx was degraded because the RHS PF was "under a hood on instruments".

**THE EXTRA EA260 PILOT** reports departing Fairoaks for an aerobatics sortie in the vicinity of the Hogs Back, about 5 NM SE of Farnborough and flew to the practice area listening out with Farnborough on 125.25 MHz. During the transit she thought she heard an opposite direction army helicopter being given

information about her ac. (UKAB Note (1): The subject Lynx was operating on UHF and the helicopter referred to was not this one.) Some time was spent manoeuvring near the Airprox position, but before commencing aerobatics whilst heading 230° at 140 kt, 2500 ft QNH (UKAB Note (2): about 2050 ft QFE) an Army helicopter was sighted at 2 o'clock about 2 NM away. Subsequently, the helicopter passed about 800 ft below her ac, she perceived from 2 o'clock to 7 o'clock, but she kept it in constant view by making a tight R turn until it had opened to about 1.5 NM to the N. No avoiding action was taken, as none was necessary. She then called Farnborough, advised that she had sighted the traffic, whereupon they reported the Odiham Circuit to be active. In view of the amount of traffic in the vicinity she elected to reposition further to the E before commencing her aerobatics practice. She adds that there was absolutely no risk of a collision.

**HQ MATO** reports that the Lynx pilot, made a practice PAN call, simulating a 'No Compass No Gyro' (NCNG) procedure for a PAR to RW28 at Odiham and was under a RIS from Odiham Director (DIR), located at Farnborough, on 386.77 and squawking 3/A 0460. At 6 NM SE of Odiham, tracking ESE and descending from 2500 ft to 1500 ft QFE (989 mb), DIR passed traffic information on an unrelated ac not transponding Mode C. Shortly afterward, the Lynx pilot reported level at 1500 ft QFE and DIR instructed a L turn which was applied for about 25 sec. Traffic information was given at about 1135 as the Lynx tracked ENE, "*...traffic NE range of 2 miles manoeuvring, no height information*", the Lynx pilot responded "looking", whereupon DIR added "*should pass down your right hand side...turn left now*". When DIR updated the position of this ac at a range of 0.5 NM, the Lynx pilot reported visual and then 4 sec later transmitted "*...just carried out an avoiding action and wish to report an Airprox*". The pilot elected to continue the approach and reported further details upon landing. Subsequent tracing action by AIS (Mil) identified the reported ac involved as an Extra 260.

When DIR first advised the Lynx pilot of the presence of the Extra at about 1135, the ac

were 2 NM apart. Had they both maintained track, they would have passed clear of each other by about 1 NM. The L turn instruction to converge with the RW28 centreline should have increased horizontal separation. However, the Extra pilot's manoeuvre onto a converging NNW track brought it closer to the Lynx. When this happened, DIR quickly updated the position of the Extra to the Lynx pilot, who called visual 5 sec later.

The LATCC Heathrow Radar recording at 1133:38, shows the Lynx, identified from the assigned code, 5 NM SE of Odiham, tracking ESE. Meanwhile, the Extra is shown as a manoeuvring primary contact. At 1134:44, after a L turn had been applied, the Lynx is shown tracking ENE with the Extra 2 NM NE, heading SSW. At 1135:03, the Extra had closed to 0.75 NM in the Lynx pilot's 2 o'clock and is shown in a R turn toward the helicopter which, meanwhile, had again been instructed to turn L. When DIR updated the position of the Extra, the latter had closed to 0.5 NM, still in a R turn and converging with the Lynx. Just before the radar returns merge at 1135:23, the Extra appears to turn L to pass behind the Lynx and, as the radar returns separate, is shown tracking W while the Lynx continues to turn L onto a WNW track. The minimum horizontal separation between the subject ac is indiscernible and virtually nil when the contacts merge.

UKAB Note (2): The Lynx pilot did file a full confirmatory report but omitted to file a 765A Airprox report form with a full description of the geometry of the encounter before being posted overseas. Consequently, HQ DAAvn believed that they were unable to comment further on the Airprox.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB 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 military ATC advisor stressed that the Odiham DIRECTOR had acted reasonably in providing accurate traffic information to the Lynx pilot, which was quickly updated when the Extra was seen to turn toward the helicopter. Members were disappointed that the Extra pilot had been 'listening out' on the Farnborough frequency whilst transiting to the Hogs Back, which is a good area for aerobatics, but did not call the ATSU until after the encounter. The view was that merely listening to an ATSU's frequency can be misleading – as shown by the Extra pilot's erroneous perception that the helicopter pilot may have been informed about her ac. It would have been far better to have called and given accurate details to the controller, who could then have made best use of the information as appropriate.

The RHS Lynx pilot 'under the hood' had spotted the Extra at a late stage which probably introduced a 'fright' factor, but members were encouraged to note that the Extra pilot had spotted the helicopter at a range of 2 NM. Nevertheless, they could not understand why the Extra pilot then flew to such close proximity with the Lynx. There seemed no reason to fly so near just to keep sight of the helicopter and the radar clearly showed that the contacts merged horizontally at close quarters. However, without the benefit of recorded Mode C there was no evidence available to indicate the minimum vertical separation; this was reported as 800 ft by the Extra pilot and nil by the Lynx pilot. Such a large difference is impossible to reconcile without recorded radar

information, although some members believed that the Lynx pilot may have misinterpreted the height of the other ac, after he suddenly sighted the Extra and turned away with hard L bank to avoid it. From the respective heights and altitudes reported, both ac would have been about 550 ft apart, but the lack of a 765A from the Lynx pilot did not help in reconstructing events. Furthermore, it was also difficult to reconcile the relative geometry reported by the Extra pilot, which the radar recording did not replicate. In the end it was concluded that the combination of the Lynx pilot's hard L turn and that of the Extra pilot's R turn to keep the helicopter in sight resulted in the geometry reported by the Extra pilot when the helicopter was overflown. Whilst the late sighting by the Lynx crew was contributory to the cause, one view was that the encounter was still just a sighting report. Another suggestion was that the Extra pilot might have flown close enough to make the Lynx pilot concerned for the safety of his ac. However, one member was disinclined to this view, bearing in mind that IFR separation in the FIR under the quadrantal system afforded 500 ft, 50 ft less than what might have pertained here. It was recognised that in many circumstances 500 ft was ample separation, but unfortunately a precise miss distance could not be confirmed in this instance. With this in mind a majority view prevailed that the cause of this incident was that the Extra pilot had flown close enough to the Lynx to cause its pilot concern, compounded by a late sighting by the Lynx pilot, but that no risk of a collision had existed.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Extra pilot flew close enough to the Lynx to cause its pilot concern, compounded by a late sighting by the Lynx crew.

**AIRPROX REPORT No 219/99**

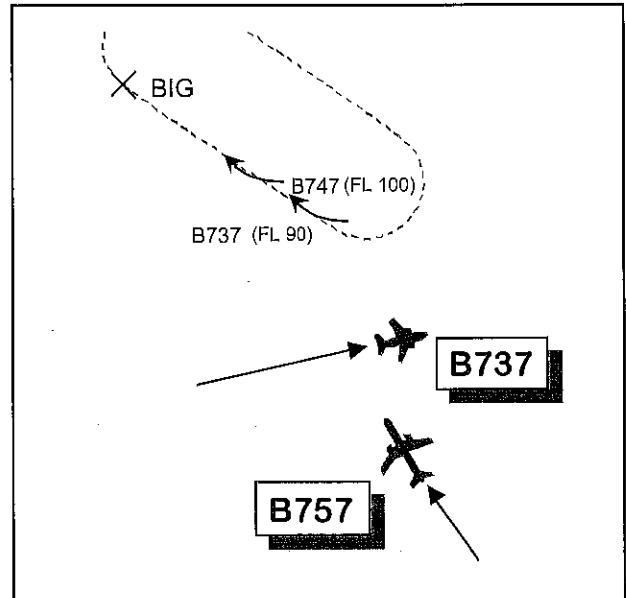
Date/Time: 11 Dec 1103 (Saturday)  
Position: 5114 N 0011E (8 NM SE of BIG)  
Airspace: LTMA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: B757-200 B737-400  
Operator: CAT CAT  
Alt/FL : ↓ FL 110 ↑ FL 130  
Weather IMC INCL IMC INCL  
Visibility: Nil Nil  
Reported Separation:  
500 ft V/400 ft V, 2 NM  
Recorded Separation: 400 ft, 2.1 NM

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

**THE B757 PILOT** reports heading 310° at 220 kt in a descent towards BIG, cleared to FL 110, in cloud. He received a TCAS TA on traffic crossing left to right ahead and climbing. This was followed by a 'climb' RA which he followed. The conflicting traffic moved away and so he descended again to level at FL 110.

**THE B737 PILOT** reports heading 080° at 300 kt; he had been cleared to climb to FL 130 and was climbing at 3500 ft/min. Passing FL 90 he received a TCAS TA on traffic in his 10 o'clock, 3 NM, 1000 ft above. He reduced his ROC and passing FL 99, LATCC told him to stop climb at FL 100 and turn right onto 130°. He disconnected the autopilot and levelled at FL 100 in a right turn. However, he then received a TCAS 'climb' RA; while following it, passing 100° and FL 103 the TCAS demanded a descent with new traffic 2 NM in his 2 o'clock and 700 ft above. He descended and steered 100° between the 2 contacts. He told ATC about both of them and when clear of them confirmed he was clear to FL 130.

**ATSI** reports that a B737 and a B747 were holding at BIG at FL 90 and FL 100 respectively; both flights were under the control of the Heathrow Director South. The B757, inbound to Heathrow, was cleared to descend to FL 110 by the Biggin/Timba SC, en route to BIG from the SE, restricted to 250 kt. Shortly



afterwards the B737 contacted the SC on departure from Gatwick on its flight to Manchester. Initially, the SC cleared the ac to climb to 5000 ft and subsequently to FL 130. He intended placing the ac on a radar heading that would take it behind the B757 and away from the traffic holding at BIG when Noise Preferential Routeing (NPR) constraints allowed. However, he was distracted by the traffic situation elsewhere in the sector and did not carry out his intention. Returning his attention to the B737 some 90 sec later, he realised that it was still on an easterly heading, between FL 94-97. This put it on a conflicting track with the B757 and also, potentially, with ac holding at BIG. The SC instructed the B737 to turn right heading 130° and to stop its climb at FL 100. The pilot complied initially with the level instruction but almost immediately received a TCAS 'climb' RA against the B747, which the ac followed. Subsequently, the flight received an RA commanding descent from the B757. A chain reaction ensued whereby the B757 reported climbing, in accordance with the RA it received, before descending again to its cleared level. In addition, at BIG, the B747 reported descending from FL 100 and consequently the holding B737 was descended to FL 80 by the INT DIR S. STCA activated during the incident. It activated, initially, between the B737 and the holding B747 and was triggered, subsequently, by the B737 against the B757 and by the 2

holding ac. Minimum separation between the subject ac was recorded as 2.1 NM laterally and 400 ft vertically, as the B737 passed north of the B757. The pilot of the latter ac reported the incident between his ac and the B737 as an Airprox. Separation between the holding ac reduced to about 0.6 NM horizontally and 600 ft vertically. Although an Airprox was filed for this loss of standard separation between these two ac, it was subsequently withdrawn. Lateral separation between the B737 and the B747 fell to a minimum of 2.7 NM, at which time the vertical distance was 700 ft. Standard separation, in the circumstances of this occurrence, is 3 NM laterally and 1000 ft vertically.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

TCAS undoubtedly complicated the resolution of the incident, but members agreed that it was not part of the cause. Although the initial effect of the TCAS TA was to slow the B737's rate of climb (without which it would probably have passed clear above all the other ac), members agreed that the cause of the Airprox was that the Biggin/Timba SC had cleared the B737 to climb without putting it on a heading which would have kept it clear of the B757 and the ac holding at Biggin. Members understood the constraint imposed on him by the NPR, which was the reason why the SC did not turn the B737 when clearing it to climb. This led him into an 'intention to monitor', an inherently 'fail-dangerous' procedure; the distraction elsewhere on his sector then demonstrated the point perfectly. Members asked what a controller should do in the circumstances and the instant response from some of those who worked in that environment was "Give the ac a heading at the same time as the clearance to climb", safety being more important than adhering to an NPR. For this reason the Board

heartily endorsed the ATSI recommendation for a review of the NPR vectoring restriction. There was, members were reminded, the fall-back option of keeping such ac on the SID to 6000 ft until they were clear of the sector; however this would be a major constraint on the customer.

The Board was briefed on the second ATSI recommendation to review the 15 NM restriction on establishing vertical separation from ac in holds and ac approaching them. Members understood the reasons but felt that the circumstances of this particular Airprox did not entitle them to express a view on it.

As to the risk level, members agreed that the horizontal separation had not become unduly unsafe and that TCAS, while complicating the incident, had ultimately resolved it; consequently there had not been a risk of the ac actually colliding.

As a flight safety point, pilot members agreed that the B737 pilot should have followed the SC's directional instructions, while following the TCAS RA in the vertical plane. All agreed that the directional aspects of TCAS should only be used as a pointer to assist in gaining sight of a conflicting ac, and that the B737 pilot should not have used TCAS to 'steer between the contacts'.



## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Biggin/Timba SC climbed the B737 through the levels of the other traffic without ensuring lateral separation.

Recommendation: The Board endorsed the ATSI recommendation that CAA/NATS – through LATCC Management staff - should review with the appropriate authorities the vectoring restriction for ac on right turn-out SIDs from RW 26L/26R at Gatwick.

### **ATSI ANNEX to 219/99 (Full details of ATSI investigation)**

All ATC equipment relevant to the task was serviceable. The SC explained that he was carrying out the duties of both the Biggin and Timba Sectors combined. He commented that he considered his workload was increasing from moderate to heavy, momentarily, as the Airprox occurred. He added that, at the time, he was discussing with a colleague the necessity of splitting the sector, although he did not consider that this provided a distraction from his task.

The B757 contacted the Biggin/Timba Sector at 1054, reporting descending to FL 160. The ac was restricted to 250 kt, and at 1057, was instructed to descend to FL 110. At this stage, the B737 had not taken off from Gatwick.

At 1058, the B737 established communication with the sector, after departure from RW 26L at Gatwick on a Lambourne (LAM) 4M SID which involves a right turn to intercept DET VOR R262 at 31 NM, following it to 10 NM for a left turn to intercept LAM VOR R161. The initial altitude restriction is to cross DET D29 at 4000 ft or below. The SC cleared the B737 to climb to 5000 ft as normal to provide vertical separation from Heathrow outbounds at 6000 ft. The LATCC TC MATS Part 2, Page SEA 2-4, states that the Standing Agreed Level for Gatwick LAM departures to TC LOREL is FL 130, level by the TC north/south boundary (this passes just to the south of London City Airport) with the condition that they are positioned west of the DET-LAM track. Accordingly the B737 was given further climb to FL 130 at 1100. The SC explained that,

although ac on a LAM 4M SID from Gatwick can be given clearance to climb above the SID altitude, there is a restriction as to when they can be vectored south of the SID routeing. The TC MATS Part 2, Page SEA 4-7, refers under the heading of "Noise Preferential Routes" to a dotted line on the video map which runs from Gatwick Airport to the NE, S of which ac may not be vectored below 3000 ft to keep them clear of Horley. This reduces the controller's tactical options in a complex and busy piece of airspace. Conversely, the obligations of Noise Preferential Routes, for ac departing Heathrow, cease when they are at, or above, 4000 ft. Effectively, this means that Heathrow departures routeing on SIDs to the SE i.e. via Dover and Detling, can be vectored over Horley by ATC. Additionally, the Mayfield SID from Heathrow routes ac from Epsom to Mayfield and, consequently, in the vicinity of Horley at 5000 ft. ATSI has therefore recommended that LATCC Management review with the appropriate authorities the necessity of retaining the vectoring restriction for ac on right turn-out SIDs from RW 26L/26R at Gatwick when above perhaps 5000 ft.

The SC commented that, because of the requirement to ensure that the ac reach FL 130 by the sector boundary, together with the restriction on turning ac to the south of the SID track, he cleared the B737 to climb to FL 130 as soon as possible i.e. before the dotted line on the video map, with the subsequent intention of issuing the flight with a turn to the SE, to pass behind the B757, as soon as it was permitted. These constraints meant that the success of this plan required constant monitoring and optimum timing of radar instructions to ensure

radar separation. The radar recording, at 1100:31, shows the B737 in its right turn to the north-west of Gatwick at 5000 ft, with the B757 tracking north-west at FL 134, about 16 NM SE of it. The 2 ac in the BIG hold are shown at FL 90 and FL 100. The tc mats Part 2, Page SEA 2-7, "Separation Between Holding and En-route Aircraft" states that: "Vertical separation between en-route ac approaching the holding facilities at OCK (TOMMO), BIG (WEALD), WILLO (ASTRA) or TIMBA/LUMBA, and ac already holding in the particular area is to be established before the approaching ac has reached the minimum distances, as determined by radar." This requirement is 15 NM from the holding facility for ac at FL 150 or below. In the SC's opinion this requirement is not practical in a busy Terminal Control Area environment. The area to the SE of Heathrow / NE of Gatwick contains several outbound routes from Heathrow and Gatwick, as well as the BIG stack and the vectoring area for ac inbound to Heathrow from the S. ATSI has therefore also recommended that LATCC Management review the 15 NM requirement to confirm its current applicability.

The SC said that shortly after clearing the B737 to climb to FL 130 his attention was focused on resolving a developing situation in the Detling area, to the extent that he did not monitor the progress of the B737. Consequently, he did not issue it with the intended right turn. The B757 reported reaching FL 110 at 1102. The SC said that he could not recollect if it was this transmission that returned his attention to the situation with the B737 or whether this occurred as a result of a routine scan of his radar display. Nevertheless, he noticed that the B737 was still heading E on the SID routeing, passing, he recalled, between FL 94-97. At the same time the STCA activated between this ac and the B747 about 6 NM away at FL 100 turning inbound in the BIG hold. His immediate reaction was to instruct the B737 to stop its climb at FL 100 and to turn right "now" heading 130°. He did not use the term avoiding action as he believed there would only be, at most, a minimal loss of separation. The pilot replied: "Stopped at one hundred right on to one three zero". The SC reasoned that this action would

not only resolve the conflict between the B737 and B747 but also that between the B737 and the B757. However, although the B737 levelled at FL 100 as instructed, it received a TCAS RA commanding a climb. The pilot reported this to the SC. Shortly afterwards the B737 reported descending and the B757 reported climbing in response to a TCAS alert it had received on the former ac. The B757 also reported turning left but this turn is not apparent on the radar recordings of the incident. The radar recording at 1103:37, i.e. just after STCA activated, shows the B737 at FL 104 about to pass north of the B757, which is now indicating FL 108, by 1.7 NM. It is not known why the latter is showing 200 ft below its cleared level. About 20 seconds later, the B757 reported descending to FL 110. The B737 is, subsequently, vectored clear of the BIG hold and recleared to FL 130.

TCAS undoubtedly had a major effect on this incident, not only between the subject ac of the Airprox but also on the two ac holding at BIG. The initial effect was a reduction in the B737's rate of climb (from 3500 to 1000 ft/min after passing FL 90) because of the TA on an ac 1000 ft above (the B747). Had the B737 continued at its original climb rate of 3500 ft/min, it would probably have been vertically separated from ac holding at BIG. Whether vertical separation would have been achieved from the B757 is open to conjecture, allowing for a reduction in its rate of climb as it began to level off. However, fortuitously, having reduced his rate of climb the pilot was able to level off at FL 100 as instructed, and thus standard separation against the B757 could have been maintained. Vertical separation was lost between the B737 and the B757 only because the pilot then received an RA to climb against the B747. Also lateral separation was not achieved between the B737 and the B747 because the former ac did not take the turn onto a heading of 130° but headed 100° to "steer between the two conflicts". This is not in accordance with what ATC would expect the pilot to do. The B737 climbed to FL 105 before descending again because of an RA relative to the B757. The latter, in the meantime, climbed because of a reciprocal RA, descending again

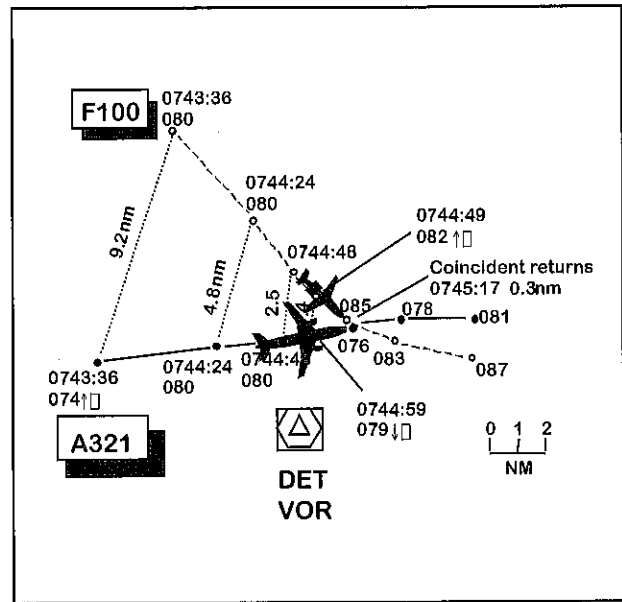
as the B737 descended. Meanwhile, at BIG, the B747 receiving a TCAS RA on the B737, reported, on the Heathrow frequency, descending from FL 100. The Director South immediately warned the flight about traffic 1000 ft below and in the same transmission he instructed the holding B737 to descend to FL 80. This ac was given traffic information relative

to the B747 and reported in the descent and visual with the traffic. It is understood that the holding B737 was not equipped with TCAS (pre Jan 2000 this was not a requirement). STCA activated between the B747 and the holding B737 at 1103:30, when the ac were 0.7 NM apart horizontally and 400 ft vertically. The former did not descend below FL 96.

**AIRPROX REPORT No 221/99**

Date/Time: 14 Dec 0745  
Position: N5122 E0038 (4 NM NE Detling VOR)  
Airspace: LTMA (Class: A)  
Reporting Aircraft Reported Aircraft  
Type: F100 A321  
Operator: CAT CAT  
Alt/FL: FL 80 FL 80

Weather VMC VMC NK  
Visibility: 25 km NK  
Reported Separation:  
 Nil H, 400 ft V/ Nil H, 500 ft V  
Recorded Separation: @ 1 NM/700 ft



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

**THE F100 PILOT** reports that he was heading 145° at 310 kt and cruising at FL 80 after departure from Stansted for Amsterdam. He was under the control of LATCC on 120.52 and squawking 0351 with Mode C. The visibility was 25 km in VMC. When in the vicinity of Detling, ATC instructed an avoiding action turn onto 080° which was immediately followed by a TCAS RA demanding climb. At the same time he heard the pilot of another ac telling ATC that they had received an RA to descend. As the F100 was passing FL 84, the other ac, an Airbus, appeared in the Captain's LH window about 400 ft below tracking away. The TCAS alert ceased but he felt that any continued turn or a return to FL 80 could have worsened the conflict, so he manoeuvred visually until ATC issued climb instructions which resolved the

situation. The pilot comments that a very high risk of collision was resolved by the prompt use of TCAS in both ac. He was belly-up to the other ac during the turn and thought that its crew ought to have been able to see him.

**THE A321 PILOT** reports that he had been cleared to FL 80 on departure from Heathrow for Frankfurt. TCAS detected traffic approaching from his L also at FL 80. A TA was quickly followed by an RA demanding descent. Simultaneously he heard ATC instruct the other ac to turn onto heading 080° which was followed by an instruction to him to turn onto 130°. He complied with the TCAS command and reported his action to ATC. TCAS indicated that the other ac, which was not seen, passed directly overhead by 500 ft; he believed its pilot had also responded to a TCAS alert and was

climbing. The pilot makes no assessment of risk.

**ATSI** reports that the TC SE sector was operating in the split mode during the period of the Airprox, with the TC BIG sector being manned by a Sector Controller under training, a Sector controller mentor, and a Co-ordinator. The latter played no part in the incident. The mentor had taken over the sector some 6 min before the trainee plugged in. After a handover and a period of observation, the trainee took over the sector at 0738; at that time she had completed approximately 70 to 80 hr of radar training and her mentor had every confidence in her ability given that level of experience. The traffic flow at the time was predominantly outbound (ie eastbound) and the task involved a reasonably complex stepped climb process.

The Airbus pilot first called the TC BIG sector at 0736:10; he was instructed to squawk 'ident', climb to 6000 ft, and informed that there was no ATC speed restriction. At 0740:40 he was told to turn L 10°, and at 0742:45 to climb to FL 80. Five sec later, the F100 pilot called the sector on handover reporting level at FL 80 and routeing towards DETLING; he was instructed to turn L 15°.

The next transmission by the TC BIG sector to either ac was at 0744:40 giving avoiding action. The mentor said that he became aware of the conflict through a series of events. He had dropped the training box, which is the device used to override the trainees' RT and telephones, and bent down to pick it up; one of the telephone lines was ringing, which the Co-ordinator answered; someone else called out that there were 2 ac at FL 80, and he thought that the STCA activated. As he issued the avoiding action (at 0744:40), first to the F100 to turn L onto 080° and then to the Airbus to turn R onto 130°, both pilots reported that they were responding to TCAS RAs; the latter descending and the former climbing. (UKAB Note 1: Examination of the relevant RT transcript shows that the words "avoiding action" were not used when issuing the turn instruction to the A321). Both radar and SMF data indicated that the ac were 3.5 NM apart on converging headings. At

0745:30 the Airbus pilot reported that the conflict was now clear, that he was level once again at FL 80 and turning onto heading 130°. However, the STCA still displayed an alert and so the TC BIG mentor had to ascertain verbally where the ac were in relation to each other. He queried the flight level of the Airbus, which was confirmed, and the pilot also gave a revised heading of 090°; he was then asked to 'standby'. Moments later the mentor asked the F100 pilot for his heading. The pilot replied that he was maintaining FL 85, in visual contact with the Airbus, and heading 110°. The F100 was then instructed to climb to FL 120 and the conflict was resolved. The mentor noted that the Airbus did not appear to make any alteration to its heading.

Although the mentor took the initial call from the Airbus, it was the trainee who told it to climb to FL 80. This was followed immediately by the initial contact call from the F100 pilot reporting at FL 80 on course to Detling which should have alerted both controllers to the fact that there were 2 ac in the sector cleared to the same level. The trainee said she planned to climb the Airbus beneath a Gatwick outbound to the Clacton sector until it was clear, and then continue the climb towards Dover. The plan also included climbing the F100 underneath these 2 ac. Both controllers were asked why the trainee had issued a series of heading instructions, the result of which brought all 3 ac into the same place at the same time. They said controllers attempt to edge ac routeing to Detling from the N round to the E in order to parallel them with Heathrow outbounds. From 0743:00 a series of ac had checked in on the frequency, including one which had a faulty transponder and which was producing a continuous ident feature. These could have been distractions to the control team.

From SMF and STCA data it appears that the Airbus descended to FL 75 and turned R approximately 5° onto 087°, and the F100 climbed to FL 85 and turned onto an easterly heading which was later reported as 110°. What had also happened, however, was that the F100 crossed the Airbus' track and ended up S of it. The mentor said he believed that

neither ac took the heading change instructed and that had they done so they would not have come so close. He also said that, when reviewing the radar recording in real time, it seemed as though the F100, which had been level for some time, was flying faster than would normally be expected. This is supported by the data block displayed on the radar recording which shows a groundspeed of 351 kt and might explain how the F100 crossed over with the Airbus during the avoiding action heading change.

It is noticeable, in this and other incidents investigated by ATSI, that pilots will respond to an avoiding action heading instruction until there is a TCAS RA, when the turn can stop while avoidance is taken in the vertical plane. In this case, the time between the TC BIG controller giving avoiding action instructions and the ac commencing a vertical manoeuvre was approximately 15 sec. Controllers are aware that the commander of an ac is permitted to deviate from an ATC clearance in response to a TCAS RA for the purpose of avoiding immediate danger. The CAA Flight Operations Division has advised that in certain types of operation this will mean that an ac is rolled wings level in order to perform the TCAS manoeuvre even though the controller has issued an avoiding action turn.

UKAB Note (2): Pictures of the LATCC radar at 0743:36 show the F100 tracking SE at FL 80 about 11 NM NW of DET, and the Airbus tracking easterly and climbing through FL 74 8 NM W of DET. The acs' tracks converge at about 60° on a constant relative bearing and at 0744:24 both are indicating FL 80 at a range of 4.8 NM. At 0744:48 the ac are about 2.5 NM apart and eleven sec later, at 0744:59 when 1.4 NM apart, both are reacting to TCAS alerts, the F100 indicating FL 82 climbing and the Airbus FL 79 descending. At 0745:17 the Airbus passes ahead of the F100 by 0.3 NM and the tracks cross over; Mode Cs at this time indicate FL 76 and FL 85 respectively. The F100 turns L about 30° and diverges about 20° to the S of the still eastbound Airbus. By 0746 the ac are 1.3 NM apart with lateral separation increasing slowly; at this point the F100 is climbing through

FL 87 and the Airbus is at FL 81. Recorded min radar separation is estimated to have been in the order of 1 NM and 700 ft at about 0745:03. (SMF data for this time indicates distances of 0.9 NM and 300 ft. However, it should be noted that SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data).

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, radar photographs, and a report from the appropriate ATC authority.

An ATSI adviser told the Board that the F100 had been handed over in accordance with a standard agreement and therefore the controllers involved should have been fully aware of it.

Members thought that the mentor had placed too much reliance on his trainee's ability because of her advanced stage of training and had not monitored her actions as closely as he should have. Consequently, he did not notice that she had instructed the A321 to climb to FL 80, which was already occupied by the F100. The Board concluded that this was the cause of the Airprox.

As the confliction developed, the Board noted that it remained undetected by the mentor until the ac were about 3 NM apart and closing at a high rate. By the time he gave the ac instructions to turn, both pilots were already reacting to their separate TCAS RAs, the result of which was about 900 ft of vertical separation as the A321 passed under the F100 some 37 sec later. While some members argued that there had been a possible risk of collision, the majority were satisfied that the TCAS resolution was timely and had removed any risk of collision.

Discussion turned to the interaction between the TCAS operation and the ATC avoiding turn

instructions, which had been almost coincident. Members noted that the term "avoiding action" had only been used in the instruction to the F100 pilot. It was understood that the TCAS RAs, executed with wings level, took precedence over the ATC instructions, thus explaining the absence of any turn by the F100 until after the event. Members doubted, however, whether in this instance a significant change of flight paths could have been achieved in the short time between the ATC instruction being given and the closest point of passage of the ac. While accepting that on this occasion the TCAS RA priority precluded an immediate turn by the F100, ATCO members were prompted to raise a general question as to what action was taken by pilots on hearing the phrase "avoiding action" directed at them. A pilot member explained that, depending on the flight profiles at the time of the encounter, various responses could be expected in most modern ac, where the FMS would probably be in operation at the time. There were three broad options: the first was to disconnect the autopilot completely and fly the ac manually – this was the only certain way of applying bank quickly and positively; the second was to select the new heading on the autopilot and at the

same time override the bank angle limiter, and the third was to select the new heading and allow the autopilot to turn the ac. The second option would result in a bank angle of about 25° and the third would give a varying bank angle, depending on the TAS of the ac, but likely to be less than 25°. In this instance the F100 was flying at 350 kt which would have produced a bank angle in the region of 10° with the bank angle limiter un-surpassed. Both the latter options would also be subject to a lag in autopilot response.

Members expressed considerable surprise that there could be so many alternatives, pointing out that the whole aim of the urgent ATC phraseology was to evoke an equally urgent response from the pilot. Controllers were continually reminded of the importance of using the words "Avoiding Action" whenever a situation demanded, and had often been criticised for not doing so. All this led members to wonder what guidelines, if any, were available to pilots on the matter. It was agreed that the Chairman should forward a recommendation if indeed no guidelines existed.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

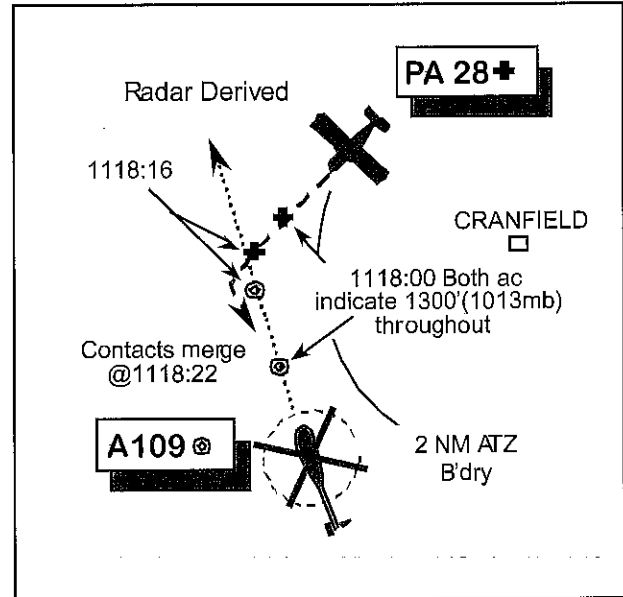
Degree of Risk: C

Cause: The TC BIG SC did not detect an instruction by his trainee which put both ac at the same level without standard separation.

Recommendation: That the CAA considers providing guidelines to operators on the response expected from aircrew when ATC gives instructions using the phrase "Avoiding Action".

## AIRPROX REPORT No 222/99

Date/Time: 15 Dec 1118  
Position: N5204 W0042 (2.75 NM W of Cranfield - elev 364 ft)  
Airspace: London FIR (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: Agusta 109E PA28-161  
Operator: Civ Comm Civ Pte  
Alt/FL: 1500 ft 1100 ft  
(QNH 1017 mb) (QFE 1004 mb)  
Weather VMC CLBC VMC CLBC  
Visibility: 7 km 8-10 km  
Reported Separation:  
2-300 ft V 200 yd H/NK  
Recorded Separation: Nil H/Nil V



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

**THE A109 HELICOPTER PILOT** reports heading 340° at 145 kt, returning single pilot from Battersea to Sywell and flying VFR at 1500 ft, Cranfield QNH. He was in receipt of a FIS from Cranfield Approach on 122.85 and his helicopter had a grey and silver colour scheme. Whilst approaching a position he thought was about 4 NM SW of Cranfield (UKAB Note (1): Actually, about 2.75 NM), below an overcast layer of cloud and over an area of recent snow, his eyes had been in the cockpit checking a flight publication. Upon looking out again he suddenly sighted another ac, which passed 200 yd ahead from R to L about 2-300 ft below, with a 'medium' risk of collision. The other ac was a single engined low-wing trainer, gunmetal grey in colour (possibly a PA28) and he estimated that it was about 3-400 yd away when first seen. It was only visible for about 3-4 sec and he was unable to take any avoiding action because it was sighted so very late. He did not perceive that the pilot of the other ac had either seen him or was in contact with Cranfield, to whom an Airprox was reported on RT. He believed that the significant 'blind spot' of the A109E at 10 and 2 o'clock (owing to the door pillars) and the colour scheme of the subject ac, which resulted in low contrast against the snow covered ground and the overcast cloud layer, were contributory factors.

**THE PA28 PILOT** reports heading 200°, 105 kt, about 3 NM SSE of OLNEY VRP whilst flying at 1100 ft QFE on a weather/fuel diversion into Cranfield. He joined L base for RW 04, whilst speaking to Tower on 134.92MHz. This resulted in a high workload for him because he had never visited Cranfield before. The helicopter was not seen and he learned of the Airprox from ATC after landing. His ac has a 'Pearl Grey' upper fuselage, with Royal Blue wings and lower surfaces; HISLs were on.

**THE CRANFIELD APPROACH CONTROLLER** reports that at about 1115, the A109 pilot, was under a FIS whilst transiting VFR 4 NM to the SW of the aerodrome. Traffic information was passed to the A109 pilot on the Approach frequency about the PA28 joining the circuit for RW 04; (UKAB Note (2): Albeit that no mention was made of the PA28's altitude), whose pilot had not yet called at OLNEY VRP, 5.75 NM NW of the aerodrome. About 5 minutes later the A109 pilot reported the Airprox, whilst the PA28 was approaching L base for RW 04 on the Tower frequency.

**ATSI** reports that the PA28 had just passed N of Cranfield en route from Goodwood to Sturgate when the pilot elected to divert into Cranfield. The pilot was under a FIS from Cranfield Approach (APP) and reported at Milton Keynes at 1107, heading 240° at 1200 ft. A further

report was made at Wellingborough at 1109:30, whereupon relevant airfield information was passed and the pilot instructed to report at OLNEY VRP which he did at 1114. Just as the PA28 was transferred to TOWER for joining instructions, the A109 called APP requesting a FIS whilst in transit SW of the airfield. The aerodrome QNH (1017 mb) was passed with confirmation of the FIS and the pilot instructed to report passing Milton Keynes. APP then passed the A109 pilot traffic information on the PA28 (albeit that it was described as a Tomahawk) advising that its pilot had just called at OLNEY southbound to join for RW 04.

The aerodrome controller (ADC) instructed the PA28 pilot to join downwind LH for RW04, however, about 2 min later the pilot advised "... *joining L base if possible*". ADC responded "... *roger report on L base following the M 1 motorway*". The pilot reported L base "... *along the M 1*", at 1118:30. The M1 is aligned NW - SE, just outside the boundary of the ATZ to the SW, so it would have been prudent to ensure that the PA28 was alerted to the presence of the A109 and to have provided updated, more detailed traffic information to the latter.

Nothing was reported by the PA28 until after landing when a passenger apparently reported having seen a helicopter.

UKAB Note (3): The 1050 Cranfield Weather was reported as surface wind: 340/13 kt; 25 km Nil Wx; FEW @ 1200 ft; BKN @ 1400 ft.

UKAB Note (4): The LATCC Debden radar recording reveals that this Airprox occurred at 1118:22, about 2.75 NM W of Cranfield. The A109 is clearly shown squawking 3/A 7000, tracking about 340° and indicated 1300 ft Mode C (1013 mb) throughout the encounter. At 1118:00, the PA28 is also shown squawking 3/A 7000, tracking about 220° wide downwind L for RW 04 with a Mode C also indicating 1300 ft and at R 2 o'clock 1.25 NM to the A109. The contacts merge at 1118:22, with no discernible horizontal separation. Subsequently, the PA28 maintained 1300 ft Mode C as its pilot turned L base and the A109 maintained its northerly track at 1300 ft Mode C.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

It seemed clear that lookout was the major factor in this Airprox. That said the A109 pilot was informed of traffic joining albeit the information was not entirely comprehensive. The PA28 pilot's join appeared to have been quite wide, which may have been a result of the pilot's unfamiliarity with the aerodrome and the A109 pilot may not have expected to encounter aerodrome traffic outside the Cranfield ATZ. Some members thought the wide join happened because the ADC advised the PA28 pilot to report on L base following the M1. This may have placed the PA28 on the wrong side of this prominent 'line feature' in relation to the RHD traffic rule, though this could not be confirmed. The A109 pilot reports that he was unable to effect any avoiding action because the PA28 was visible for only 3-4 sec. Although the PA28 had 'right of way' under the 'Rules of the Air', its pilot did not see the helicopter at all, so members quickly agreed that the Airprox resulted from a late sighting by the A109 pilot and a non-sighting by the PA28 pilot. It was also apparent to the Board that this was a very close encounter and luck played its part in keeping the ac apart. Radar contacts merged at the same indicated level and the Board agreed, therefore, that an actual risk of a collision had existed.



## PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Late sighting by the A109 pilot and a non-sighting by the PA28 pilot.

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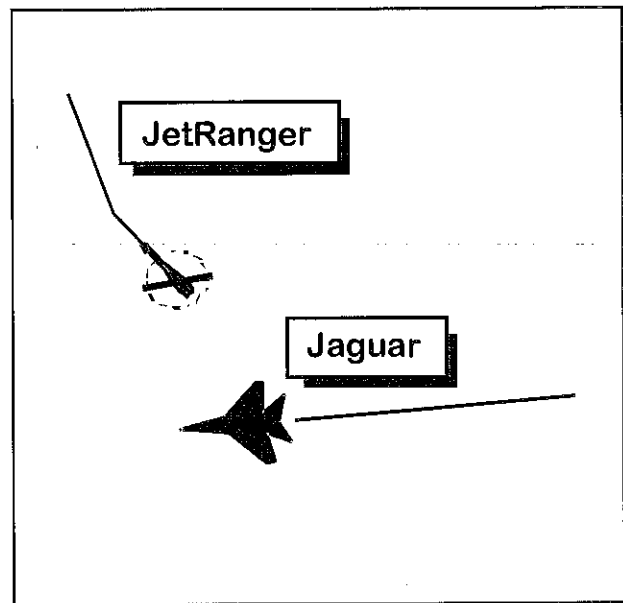
### **AIRPROX REPORT No 223/99**

Date/Time: 14 Dec 1452  
Position: N5056 W0016 (Henfield)  
Airspace: FIR/LFS (Class: G)  
Reporting Aircraft Reported Aircraft  
Type: JetRanger Jaguar  
Operator: Civ Comm HQ STC  
Alt/FL: 500 ft 800 ft  
(agl) (Rad Alt)  
Weather VMC CLNC VMC HAZE  
Visibility: 10 km+ 8 km  
Reported Separation: 500 m/NK  
Recorded Separation: 480 yd

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

**THE JETRANGER PILOT** reports heading 130° at 100 kt on a pipeline patrol for which PINS had been filed. He saw what he thought was a Harrier 1 km away in his 10 o'clock approaching rapidly on a westerly track at the same level; before he could react it had passed 500 m ahead and continued on track without deviation. It was flying into the low sun where the visibility was very poor and he suspected its pilot could not have seen him. He thought its speed was inappropriate for the conditions and if he had been turning away to check something on the ground neither pilot would have been aware of the other ac until they collided. The ac was camouflaged against the background of the S Downs, and he considered the risk of collision was high.

UKAB Note (1): While the helicopter pilot and his observer were convinced the jet involved was a Harrier, the incident can be seen on LATCC radar recordings exactly as described by the helicopter pilot, and the only military ac



booked into LFA 18 was a Jaguar. Its pilot confirmed that his route and timings were as shown on the radar recording. On the recording, the 2 ac show clearly and, in the area, no other is shown which could be a Harrier for many minutes either side of the time, which (with the position) agreed exactly with the details reported by the JetRanger pilot. Because of his continuing conviction, AIS (Mil) additionally checked with all Harrier operators to see if any had been S of Gatwick that afternoon; none had been.

**THE JAGUAR PILOT** reports heading 265° at 450 kt on a low level exercise at about 800 ft due to poor into-sun visibility. He did not see the helicopter.

UKAB Note (2): The ATC radar recording shows the Jaguar passing just under 500 yd ahead of the helicopter (squawking 0036) at 800 ft Mode C. The QNH was 999 mb; taking this and the terrain elevation in the area into

account, 800 ft Mode C equates to 360 ±100 ft agl.

**HQ STC** comments that the Jaguar pilot was correctly authorised and appropriately briefed, including PINS, for this singleton low-level recce sortie. Notwithstanding a sensible decision to climb slightly to improve into-sun visibility, and a heightened awareness of the pipeline inspection activity, he still did not see the conflicting ac.

A recent DERA study found the principle of 'see and avoid' to be better than 99% effective; however, numerous limitations, including the human eye, cockpit workload demands and both physical and environmental constraints combine to reduce its effectiveness. Even the most thorough of visual search patterns cannot always guarantee that other ac will be detected.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac, radar/video recordings and reports from the appropriate operating authorities.

It appeared that, at the time of the Airprox, the Jaguar pilot was flying lower than he recollected, or may have been on other sections of his route. If he had been at 800 ft he would still have been very close to the helicopter

operating band as specified in PINS and the Board did not consider the fact that the Jaguar was at 3-400 ft agl was significant to the cause. Members noted the helicopter pilot's comments on the flying conditions. The Jaguar pilot had not seen the helicopter and members agreed that this was part of the cause; it should have been more visible to him than his ac would have been to the JetRanger pilot, camouflaged against the Downs and more into sun. If the JetRanger pilot had seen the Jaguar earlier he would have been able to fly the orbit which he subsequently flew to avoid its wake somewhat earlier and the Airprox might have been avoided. The Board therefore agreed that the JetRanger pilot's late sighting was also part of the cause. Members pointed out that this was not a criticism of either pilot's lookout; it was simply a matter of fact. (The Jaguar may not have been a visually observable object any earlier and a sighting would depend a lot on where the helicopter pilots were looking at the time the Jaguar became observable.) Members discussed the DERA study mentioned by HQ STC into the see and avoid principle (upon which the ac involved solely depended for collision avoidance) and were advised that it applied only when ac were actually on collision courses. In this case, the ac would not actually have collided anyway. While members agreed that it must have been a startling experience for the helicopter pilot they concluded that, in passing some 500 m apart, there had not been a risk of the ac actually colliding.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: The Jaguar pilot did not see the JetRanger whose pilot saw the Jaguar late.

## AIRPROX REPORT No 224/99

Date/Time: 22 Dec 1110

Position: N5745 W0549 (32 NM SE of Stornoway)

Airspace: ADR/FIR (Class: F/G)

Reporting Aircraft Reported Aircraft

Type: ATP Tornado GR x 2

Operator: CAT HQ STC

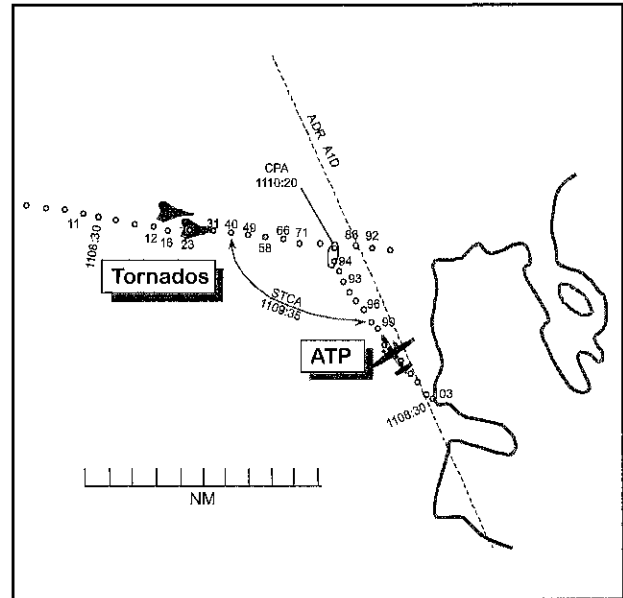
Alt/FL: FL 85 8200 ft ↑  
(amsl)

Weather IMC INCL IMC INCL

Visibility: nil nil

Reported Separation: NK/NK

Recorded Separation: 1300 ft V, 0.5 NM H



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

**THE ATP PILOT** reports heading 330° at 210 kt en route to Stornoway on A1D at, he believed, FL 85 and receiving a RAS from ScACC on 127.27, in cloud. He received a TCAS TA followed immediately by a 'Climb' RA. He disconnected the autopilot and climbed reducing speed to 195 kt before receiving 'Clear of Conflict' at FL 94. He advised ATC and descended back to FL 85. The minimum separation shown by the TCAS was 300 ft with the conflicting ac crossing left to right below.

**THE TORNADO PILOT** reports leading a pair heading 100° at 360 kt in a climb-out after exercising at low level with other ac and was climbing to 9000 ft to ensure separation from them. He called Scottish Military on the ICF requesting FL 135 and the controller passed information on traffic SE of him before he was identified and as he crossed the ADR. As he climbed through FL 81 he was informed of traffic in his 1 o'clock descending through FL 82. Realising that an Airprox had probably occurred he asked the controller how close the other ac was and was told that the returns had merged. He believed he had not been able to stay below the ADR as he was IMC below safety altitude. (UKAB Note: Safety altitude was in the order of 5700 ft which would have been FL 62 on the RPS of 995 mb. The base of the ADR is FL 65.)

**ScACC** reports that technically the incident happened after ScACC service had been terminated and the pilot had been transferred to Stornoway. It just happened that the incident occurred before the pilot had left the frequency and he reported it to the Scottish controller. The ATP had been receiving a RAS as he routed on ADR A1D towards Stornoway. The controller was utilising the Tیره radar (rather than the SSR-only Stornoway radar). As the flight approached RONAR, the controller advised the pilot that radar service was terminated and to contact Stornoway, squawking 7000. At this point, the Tornado was not visible on his display. At about the same time as the pilot was reporting traffic on TCAS, the military ac appeared in the ATP's 12 o'clock climbing but, apart from confirming its presence to the pilot, it was too close to be able to give further assistance. The pilot eventually reported clear of the traffic and leaving the frequency.

**HQ MATO** reports that the Tornado freecalled the ScATCC (Mil) Allocator (ALLOC) at 1109:51 on the ICF 249.475 "Two GR1's, west coast, pulling up low level, looking to climb FL 135, RTB Lossiemouth." ALLOC acknowledged, issued a squawk to the lead ac and shortly afterwards transmitted a 'fuel on the ground' message to them and to another Tornado also on the frequency. A squawk which ALLOC believed to be the Tornado appeared to the SE

of Stornoway but, on the radar range in use, the SSR label was overlapping with a 7000 code heading NW. This ac had been previously seen with an SSR code indicating its destination as Stornoway. At 1110:36, ALLOC transmitted *"....traffic passing overhead, civil traffic inbound to Stornoway, indicating FL 92 in the descent."* There was no opportunity to pass any suitable avoiding action. A short time later, the crew of the lead ac enquired *"..were we close?"* to which ALLOC replied *"...I couldn't really see, the labels were garbled."*

ALLOC was using the Stornoway (SSR-only) radar to identify the Tornados. The Tornado pilot gave a somewhat vague position report. In addition, the Allocator task requires the controller to be able to see as much as possible of the ScATCC (Mil) overland operating area and therefore a relatively large range scale is required on each of his/her radar displays during normal operation. The incident occurred during the identification process and therefore ALLOC had no opportunity to provide any form of separation.

UKAB Note: The ScACC Stornoway radar recording shows the ac converging, at least from 1108 when the copy furnished to UKAB starts, with the ATP descending from above FL 100 and the Tornado level at 1100 ft Mode C (about 600 ft RPS). The ac tracks are: Tornado, 098°; ATP, 324°. At 1108:55 the Tornado starts a climb and at 1109:35 the 2 ac returns start flashing with STCA as the Tornado passes FL 40, 7 NM from the ATP which is passing FL 98. The ATP changes squawk to 7000 at 1109:57, continues its descent to FL 93 and then climbs to FL 94 where it remains until the Tornado has passed below and about 0.5 NM ahead, at 1110:20. The Tornado's Mode C is unreadable for 2 returns but it is in a steady climb and by interpolation would have been passing FL 81 at the closest point to the ATP.

**HQ STC** comments that faced with a cloud structure which precluded a low-level transit, the Tornado crew initiated a climb to medium level. With an initial aim of climbing to their tactical sanctuary altitude of 9000 ft, in order to deconflict with other exercise ac, their attention

correctly transferred to achieving safety altitude having penetrated cloud in the climb. Nevertheless, other more manageable solutions were available and the crew were subsequently counselled as to the wisdom of approaching a Class F route in deteriorating weather conditions without an appropriate radar service.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

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

Members agreed that the Tornado leader appeared to have been less than 'ahead of the game'. If he had made an earlier call to Scottish Mil, with a more helpful position report, a safer outcome could have been achieved, rather than pressing on across the ADR in IMC without a radar service. Members asked why the ScACC controller was using the Tiree radar when the Stornoway radar was the one which showed the conflict developing. The Board was advised that the Tiree covered the controller's overall responsibilities better and that he had, anyway, just relinquished service to the ATP. In the event the Tornados happened to cross more than 1000 ft below the ATP, and would still have done so without the influence of TCAS. The risk had turned out to be more potential than actual and on this basis the Board concluded that the incident was a conflict on the ADR in IMC without a risk of collision.



500 and 900 ft Mode C. No other returns are observed in its vicinity during the period of the Airprox and consequently the incident is unrecorded.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available to the UKAB included reports from the pilots of both ac and a radar video recording.

This seemed to be a classic confrontation at the lower levels of the FIR where the pilots saw each other late despite the good visibility; members noted that the helicopter pilot had the benefit of two observers to assist with lookout and they felt the PA28 ought to have been spotted earlier. The Board concluded that the late sightings were the cause of the Airprox. The PA28 pilot saw the helicopter first and had time to assess that it would be safer to maintain

his flight path and allow it to pass beneath him; members were satisfied that he would have been able to take avoiding action had it become necessary. For the helicopter pilot's part, he was able to take timely avoiding action despite his late sighting. The Board concluded that there had not been a risk of collision.

Members commented that the helicopter should in theory have been following the coastline feature to its right in accordance with the Rules of the Air. However, it was accepted that operational requirements probably precluded this. The Board commended the PA28 pilot for his openness in admitting that he had forgotten to select his SSR. Nevertheless, members thought it appropriate once again to remind GA pilots that not only is SSR an effective aid to flight safety, but as TCAS (now mandated for all CAT ac within UK airspace) becomes more widely used it is also a vital element in airborne collision avoidance.

## **PART C: ASSESSMENT OF RISK AND CAUSE**

Degree of Risk: C

Cause: Late sighting by both pilots.

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106/99	1 Jul	B747/C12	2 NM NW of Newmarket	C	24
107/99	8 Jul	Kolibri 150/PA28	0.75 NM NW DTY VOR	A	26
108/99	8 Jul	Robin HR200/Tucano	7 NM NW of Harrogate	C	28
109/99	9 Jul	Tucano/Harrier	6 NM NW of Hexham	C	29
110/99	8 Jul	ATP/B737-200	1 NM E LYNAS	C	32
111/99	6 Jul	C172/Tornado F3	9 NM SSE of Dover	C	34
112/99	9 Jul	Puchacz glider/AS355 Twin Squirrel	Aboyne airfield	C	36
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117/99	14 Jul	C152/Tornado GR	10 NM N of LBA	C	47
118/99	15 Jul	B767-300/Jaguar	14 NM WSW of TALLA	C	48
119/99	15 Jul	Discus glider/GA7	1 NM S Halton	B	50
120/99	11 Jul	Hawk/Robin HR 200	2 NM SSW of Silverstone	B	52
121/99	15 Jul	EC 135/Hawk	4 NM S of Llandudno	C	55
122/99	7 Jul	Glider/PA28	The Park gliding site	B	56
123/99	16 Jul	F50/VANS RV6A	5.5 NM WSW LAM	C	59
124/99	19 Jul	Microlight/Bulldog	6 NM E of Fleetwood	B	61
125/99	19 Jul	B737-300/B767	3 NM W of WOD	C	63
126/99	14 Jul	Tucano/Harrier	2 NM SE of Coldstream	A	65
127/99	19 Jul	B757(A)/B757(B)	9 NM W REFSO	C	67
128/99	20 Jul	Shorts 360/CARJ	4.75 NM S HON	C	72
129/99	20 Jul	Super Puma (A)/Super Puma (B)	Beryl A platform	C	75
130/99	21 Jul	ATR72/Jaguar	12 NM NE of Yeovilton	A	77
131/99	21 Jul	PA28/C12	1.5 NM SE of Kidlington	C	80
132/99	22 Jul	B767/Beech 200	2 NM NW Liverpool airport	C	82
133/99	23 Jul	ATP/B737	LANAK	C	84
135/99	26 Jul	Tornado GR/S61	5 NM NE of Strathcarron	B	88
136/99	13 Jul	Airbus A321/B737-300	2.5 NM W LAM	B	89
137/99	26 Jul	Sea King/Cessna 150	10.5 NM S of St Mawgan	C	93
138/99	27 Jul	F50/Hughes 269C	3.5 NM NNE Sheffield	C	96
139/99	27 Jul	K13 Glider/F406 (Caravan II)	3 NM N of Dunstable Down glider site	C	98
140/99	28 Jul	Harrier/Tornado GR	3 NM SE of Hereford	A	100
141/99	29 Jul	HS125/BAe146	11.5 NM NE of TRENT	C	102
142/99	27 Jul	Discus glider/PA28	Bicester - elev 267 ft	A	104
143/99	30 Jul	PA28 (A)/PA23 Aztec	2 NM S of Oxford Apt	A	107
144/99	2 Aug	Super Dimona/PA 34	2 NM NE Chipping Norton	D	109
145/99	3 Aug	DHC-8/Grob 115D2	2NM SE Plymouth City Airport	C	111
146/99	6 Aug	B767/Tornado GR	43 NM SE of Tiree	B	113
147/99	10 Aug	BEECH 200/Bulldog	2.75 NM NE of Filton	C	116
148/99	11 Aug	C172/Bulldog	4 NM S of Cosford	B	119
149/99	11 Aug	ATP/C150	4.5 NM SW Edinburgh airport	C	120
150/99	13 Aug	A320/B737-300	8 NM SW of BPK	C	124
152/99	30 Jul	B737-300/Dornier 328	2 NM SSW Luton	B	127
153/99	20 Aug	MD80/B767-300	1.5 NM SE of Lands End	C	131
154/99	24 Aug	BAe146/Beech 200	7.5 NM Nof WAL	C	133

155/99	27 Aug	B757/B767	5 NM SE BPK	C	134
156/99	30 Aug	AS355/Slingsby glider	1.5 NM SW Abergavenny	B	138
158/99	28 Aug	PA28/Untraced Glider	9 NM SE of Brize Norton	B	142
159/99	29 Aug	Enstrom F28C/C152	2 NM W of Dorking	A	144
160/99	1 Sep	Dominie/Tornado GR	2 NM NNE of Linton-on-Ouse	C	146
161/99	3 Sep	Tornado GR (A)/Tornado GR (B)	5 NM SE of Kelso	A	149
162/99	7 Sep	BAe146/PA28	10.5 NM NE Stansted	C	151
164/99	8 Sep	Tornado F3/BAe146	15 NM SE of FAMBO	C	153
165/99	9 Sep	ATP/LA4	2.5 NM SW Luton airport	C	157
166/99	9 Sep	PA28/Harrier	Gloucester Airport	C	159
167/99	11 Sep	B73 - 8/Piper Cub	9(5 NM NE Stansted	C	160
168/99	10 Sep	EMBRAER 145/PA28	Blackpool Airport	C	162
169/99	14 Sep	Tornado GR/C172	Tain Range	C	165
170/99	15 Sep	Sea King Mk 6/Jaguar	11 NM SW of Oban	C	168
172/99	17 Sep	CARJ/FK100	3 NM SSE HON VOR	B	170
173/99	20 Sep	B737-200/Jetstream 41	2 NM S of DENBY	C	172
174/99	24 Sep	ATR42/BA11	2 NM N LOGAN	C	176
175/99	27 Sep	Hawk T1A/F15E	7 NM SE of Lossiemouth	B	180
176/99	28 Sep	Tornado GR/Hang Glider	3 NM SW of Sheffield	B	185
177/99	4 Oct	Griffin HT1/Piper PA38	4 NM NE of Ternhill	C	186
178/99	4 Oct	BA41 Jetstream/R22	2.6 NM SE Sheffield City airport	C	189
179/99	1 Oct	B737-300/B747-200	5 NM NW of BNN	C	192
180/99	12 Oct	CARJ/C152	4 NM SE HON VOR	C	194
181/99	12 Oct	EC135/PA28	Oxford Airport	B	196
182/99	14 Oct	B737/Tornado GR	6 NM NW of Newcastle (Still subject to Inquiry)	C	200
183/99	14 Oct	Sea King Mk 3/Tornado GR1	11.5 NM W of Newcastle Airport	C	200
184/99	14 Oct	Sea King Mk 3/Tornado F3	14 NM W of Newcastle	C	203
185/99	14 Oct	Cessna 525/F15	18 NM S of WAL	B	206
186/99	13 Oct	Ka8 Glider/PA28	1NM ENE Rivar Hill	C	207
187/99	17 Oct	R22 Helicopter/PA28 Archer	2.5 NM W Lewes	C	209
188/99	16 Oct	B73-3/B75-2	3.5 NM N Luton airport	C	211
189/99	26 Oct	S76/F16	21 NM E of Cromer	C	214
190/99	20 Oct	Jaguar/JetRanger	3 NM SE of Boston	B	216
191/99	27 Oct	B73-2/Be200	20 NM S Talla	C	218
192/99	27 Oct	R22 Helicopter/AA5	1(8 NM SW Cranfield	A	221
193/99	29 Oct	PA38/HS125	1.75 NM E Hawarden	B	224
194/99	2 Nov	Tornado GR4/Chinook	10 NM NW of Boulmer	C	227
195/99	18 Oct	SAAB 340/Puma	1 NM SW of Aldergrove	C	230
196/99	3 Nov	Harrier/Beagle B121	2 NM W of Lutterworth	C	232
197/99	3 Nov	B737-400/C5 GALAXY	3 NM N of DOVER VOR	C	233
198/99	3 Nov	Avro RJ/Tornado F3	9 NM SE of Newcastle	C	236
199/99	3 Nov	Cessna C421c/Hawk	1 NM S of St Athan	B	238
200/99	1 Nov	B76-3/B73-2	MULIT	C	242
201/99	4 Nov	S-76/Canberra	1 NM N of Newport Pagnell	C	244
202/99	9 Nov	Chinook Mk2/Schweizer 300	8.5 NM NNE of Benson	B	248
203/99	10 Nov	Hawk x2/Hawk x2	25 NM SSE of Valley	A	251
204/99	14 Nov	J41 Jetstream/C152	8 NM E Sheffield airport	C	253
205/99	16 Nov	C172/Tornado GR	3 NM NE of St Abbs Hd	B	256
206/99	19 Nov	B73-4/B757	8.5 NM NW Heathrow	C	257
207/99	24 Nov	A300-600/PA28	11 NM E Brize Norton	C	261
209/99	2 Dec	Embraer 145/Tornado GR 1	14 NM SE of Edinburgh	C	264
210/99	2 Dec	SAAB 340/Tornado F3	10 NM NNE of SAB	C	266



211/99	2 Dec	BA46/B75-2	6.5 NM WNW FINMA	C	270
212/99	2 Dec	PA34-200T/F15E	2.5 NM E of Bristol	C	273
213/99	2 Dec	ATR 72/PA28	7.5 NM ENE Bournemouth airport	C	276
214/99	3 Dec	B737 (A)/B737 (B)	4.5 NM E Luton airport	C	278
215/99	2 Dec	SAAB 340/Hawk	17 NM NNE of SAB	C	280
217/99	6 Dec	SAAB 340/Tornado F3	15 NM E of Aberdeen	C	283
218/99	10 Dec	Lynx AH7/Extra EA260	8.5 NM ESE Odiham	C	285
219/99	11 Dec	B757-200/B737-400	8 NM SE of BIG	C	288
221/99	14 Dec	F100/A321	4 NM NE Detling VOR	C	292
222/99	15 Dec	Agusta 109E/PA28-161	2.75 NM W of Cranfield	A	296
223/99	14 Dec	JetRanger/Jaguar	Henfield	C	298
224/99	22 Dec	ATP/Tornado GR x 2	32 NM SE of Stornoway	C	300
225/99	29 Dec	EC135 (Hel)/PA28	Rhyl	C	302