



UK AIRPROX BOARD



**Analysis of
Airprox in UK Airspace**
Report Number 5
July 2000 to December 2000

Report by the UK Airprox Board,
'Analysis of Airprox in UK Airspace'

(July 2000 to December 2000)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

This report covers full annual statistics for 2000, together with findings on Airprox filed during the second half of that year. Like the four reports that precede it, this document is aimed primarily at UK pilots and air traffic controllers, both civil and military. Its purpose is to promote air safety awareness and understanding by sharing widely the lessons to be learned from UK Airprox; in this instance those encounters between July and December 2000. If lessons are to be learned, this book needs to be made available to pilots and controllers at the working level – ideally it should be placed for use in crew rooms and rest areas. I encourage you to make this happen.

Surprising to some, the picture on total Airprox numbers throughout the 1990s was one of relative stability. This was particularly evident in the second half of the decade, when the annual variation, up and down, amounted to little more than 3%. Indeed, the overall trend is a downward one, sustained further by results for 2000. At 198 incidents, this is the lowest annual Airprox total recorded since 1990.

Seeing the big picture gives perspective, but knowledge of the underlying detail is what counts. That detail is addressed here in three sections - Commercial Air Transport (CAT), General Aviation (GA) and Military results.

During 2000, there were 99 Airprox involving CAT aircraft – co-incidentally the same count as in 1999 and just one more than in 1998. Of these 99 cases, 85 were assessed as 'no collision risk', 8 as 'safety compromised' and 6 as 'collision risk existed'. Significantly, the risk bearing rate for CAT incidents in 2000 fell to an all time low of 1.01 cases per 100,000 flying hours - down 62% on the figure for 1990. This indicator points out better safety.

Results for GA aircraft in 2000 showed a step improvement. Total incident numbers reduced by 20% from 135 to 107 encounters, comprising 56 = 'no risk', 33 = 'safety compromised' and 18 = 'collision risk'.

Military totals during 2000 were broadly in line with the previous year's figures. There were 97 Airprox (94 in 1999) of which 60 = 'no risk' (59 in 1999) and 37 assessed as risk bearing (35 in 1999).

Further details on these headline points and more are contained in the body of the report, which can also be accessed through the UKAB web site at www.ukab.org.uk.

Findings on the 103 Airprox that took place between July and December 2000 are set out in full after the statistics section and form the bulk of this fifth UKAB report. There are 14 cases where a collision risk existed; 24 where safety was compromised; 62 instances where there was no collision risk; and 3 incidents where risk could not be determined owing to insufficient information being available. Additionally, the final report on 47/00 - delayed from Report Number 4 pending further information being gathered - is now included in this document.

Gordon McRobbie

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Director, UKAB

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INTRODUCTION

UKAB COMPOSITION

The UKAB is an independent organisation 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
- 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 the Safety Regulation Group (SRG) of the CAA and/or Military HQs.
- Determining what happened and analysis of the main causal factors.
- Assessment of risk levels involved.
- Making recommendations where appropriate to prevent incident recurrence.
- Publishing and distributing full reports twice a year so that lessons can be learned.

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 agreed categories as follows:

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

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. Causal factors are shown in the Statistics section of this report, under each of the three aircraft classification groups (i.e. CAT, GA or Mil).

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 information that follows updates Recommendations published in Report Number 3 and lists new ones.

219/99	B75-2 and a B73-4	11 Dec 99	Risk Category: C
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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 — Accepted

NATS Action: NATS accepts this Recommendation and is currently reviewing the issues associated with the vectoring restriction, which is a DETR requirement. If considered appropriate, an approach will be made to the DETR to remove or modify the restriction as considered necessary in the interest of safety. The review is expected to be complete by the end of January 2001 and the outcome will be reported to the UKAB.

39/00	Shorts 360 and an F3	20 Mar 00	Risk Category: A
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RECOMMENDATION: That the MOD considers including a 'Minimum risk corridor/s' for non exercise traffic, including Commercial Air Transport, as a standard part of the planning process for major exercises.

Status — Open

MOD Action: The MOD is currently processing this Recommendation.

75/00	Harrier and a PA28	7 Jun 00	Risk Category: A
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OBSERVATION: Clear definitions of air traffic services are set out in concise terms in a number of aviation documents, yet misunderstanding continues amongst many General Aviation pilots. The most common misconceptions are those attaching to a Flight Information Service. Accordingly, the CAA is invited to consider all effective means of overcoming this apparent 'education blockage'.

Status — Accepted

CAA Action: Composite programme that includes:

- a. A winter programme of CAA Safety Evenings with Presentations to GA pilots.
- b. An update of AIC 20/1998, plus Safety Sense leaflet 8D, both entitled 'Services to Aircraft Outside Controlled Airspace' (see www.srg.caa.co.uk).
- c. Articles placed in GASIL, the UK Flight Safety Committee publication, 'Focus' and RAF 'Airclues'.

83/00	B767 and a B737	15 Jun 00	Risk Category: C
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OBSERVATION: Neither crew reported reacting to a TCAS alert on the RT either during events or subsequently. The Flight Operations Department of the Safety Regulation Group is invited to consider using this Airprox to remind the UK industry of the need to notify ATC as soon as possible when reacting to a 'TCAS RA'.

Status — Not Accepted

CAA Action: The Flight Operations Department of the CAA Safety Regulation Group believes there is currently sufficient guidance available.

94/00	SAAB 340 and a Tornado	28 Jun 00	Risk Category: A
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RECOMMENDATION: That the CAA considers providing controllers with guidance and instructions on bandboxed operations with the aim of ensuring that controllers are able to fulfil the obligations of the relevant ATC task.

Status — Partial Acceptance

CAA Action: The CAA partially accepts this Recommendation. It is considered to be the ATS service provider's responsibility to provide guidance and instructions on the bandboxing of positions. Nevertheless, the Authority will issue an Air Traffic Services Information Notice (ATSIN) which will reiterate this responsibility to UK ATC providers. The CAA will continue to assess the relevant unit procedures during inspection audit. It is planned to issue the ATSIN by the end of July 2001.

NATS Action: NATS ScOACC has issued Safety Instruction 32/00a, which proscribes the provision of RAS and RIS in bandboxed situations, except where the subject aircraft is displayed on a radar console immediately in front of the controller or controller team.

108/00	B733 and a Global Express	21 Jul 00	Risk Category: C
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RECOMMENDATION: That NATS considers including Cambridge TMA departures on TMA N CDIS displays.

Status — Not Accepted

NATS Action: The TMA N CDIS display for Stansted is now driven by Departure Sequence Information that is input into the system by Stansted staff. These staff have no knowledge of Cambridge departures and would not wish to be involved in extra telephone calls that notification of such information would impose.

148/00	B737 and a G4	15 Sep 00	Risk Category: C
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RECOMMENDATION: That the CAA considers conducting a review of the LATCC TC Traffic Managers' Training Programme.

Status — Accepted

CAA Action: A review by LATCC of the Traffic Manager training and competence is underway. The possibility of adapting the Group Supervisor Proficiency Scheme (which currently includes the Traffic Manager, but not exclusively so) will be further examined. In addition, it is intended to create a Traffic Manager section in the LATCC MATS. Once created, it is proposed that any further changes to the Traffic Manager hardware or software, together with any procedures, will be formally promulgated. Inevitably this whole process will take some time, but it is envisaged that it will be introduced by the end of the Summer.

149/00	BAC 1-11 and a B747	16 Sep 00	Risk Category: B
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RECOMMENDATION: That the CAA considers:

- a. A review of the way that ATC instructions are given in sequence to aircraft so that a change of frequency is not given in the same transmission as an instruction requiring an acknowledgement.
- b. Adopting as policy that controllers should issue either a landing clearance or a go around instruction by 2 NM finals at Manchester and other busy airports.

Status - Open

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

159/00	A330 and an A340	2 Oct 00	Risk Category: A
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RECOMMENDATION: That the CAA considers putting forward recommendations to the appropriate international bodies:

- a. To review overtaking procedures, taking into account the different lateral separations used in radar and non-radar ATC environments.
- b. To consider adopting lateral track offset procedures that are independent of wind direction, with a view to introducing them as standard.

c. To reconsider the need for aircraft commanders to inform ATC of all lateral offset manoeuvres of less than 2 NM in Oceanic airspace, irrespective of the reason for the manoeuvre.

d. That the 'turbulence induced' capture of a prot law (in circumstances such as those encountered in this Airprox) should be introduced in Airbus flight simulator training, firstly to establish a norm for the size of level deviations across the Airbus pilot population, and secondly to train pilots to cope promptly with the situation.

Status —Open

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

172/00 G4 and a SB20 11 Oct 00 Risk Category: B

RECOMMENDATION: That NATS considers the following for Thames Radar:

- a. Fitting STCA equipment.
- b. A review of the number of posts needed to carry out its day-to-day function.

Status — (a) Not Accepted (b) Accepted

NATS Action:

- a. STCA is technically incompatible with the existing HARPS radar, which would need to be replaced with a new radar system to meet the Recommendation. Since the life expectancy of HARPS is no more than 5 years and the location of Thames radar in 2006 remains undecided, NATS believes that, in the interim period, procurement of a new radar system would be an expensive and partially nugatory activity.
- b. New procedures have been incorporated within Heathrow Unit Policy Statements. These ensure that sufficient levels of ATCO staff remain available to open all Thames Radar positions at the end of morning and afternoon shifts. Additionally, a Working Group as been formed that has reviewed low level holding facilities and routeings within Thames Airspace. Changes are being progressed urgently in association with LATCC Terminal Control staff.

192/00 B757 and an F15 22 Nov 00 Risk Category: A

RECOMMENDATION: The UKAB supports the conclusions reached by the AAIB and asks the CAA and the MOD to consider the following for action:

- a. Military and civil aircraft should each transmit SSR information, particularly in controlled airspace, to enable STCA and/or TCAS equipment to warn controllers and pilots of conflicting flight paths that hold the potential for a mid-air collision.
- b. Introduce procedures that provide safety assurance, based on the use of SSR, for aircraft operating in formation.
- c. Introduce specific procedures that prevent transponding aircraft, flying in formation in controlled airspace, from triggering unnecessary STCA warnings owing to the proximity of their SSR returns.

Additionally, it is recognised that a full technological answer to resolve all the problems involved may be some way off. Therefore, the UKAB supports strongly any interim solution on procedures for aircraft formations flying in controlled airspace under radar control that *ensures both the controller and the formation leader knows jointly the height or flight level of each aircraft within that formation.*

Status —Open

CAA and MOD Action: Both the CAA Safety Regulation Group and the MOD are currently processing this Recommendation.

201/00	A319 and an A320	9 Dec 01	Risk Category: C
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RECOMMENDATION: That the MOD and the CAA considers a review of mandatory checks to be carried out by controllers, on communications continuity, whenever Sectors/Control positions are bandboxed or split.

Status —Open

CAA Action: The CAA Safety Regulation Group and the MOD are currently processing this Recommendation.

STATISTICS SECTION

The UKAB Data Set

Unless otherwise stated, all of the Airprox statistical information presented in this report has been taken from the UKAB database and is set out at two levels for ease of reference. The first level gives a broad overview on general trends. This is followed by second level detail where more specific results are shown for each of the three airspace user groups set out below.

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

- GA → Executive and Company aircraft
 → 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)

Notes:

(1) CAT flying hour totals are supplied by the Safety Regulation Group (SRG) of the CAA. They include figures from Eurocontrol on hours flown by commercial aircraft in transit through UK airspace as well as departures and arrivals to UK destinations.

(2) GA flying hours are based on aircraft with less than 5700 kg maximum take-off weight authorised; they include Microlights and Gliders, but exclude Gyroplanes and balloons. GA data is supplied by the British Gliding Association and the Registration Department of the CAA. The latter organisation has recently updated their figures and changes have been incorporated in this report.

(3) Military flying hours include elements flown outside UK airspace.

AIRPROX RESULTS FOR 2000

Monthly Distribution

Fig 1(right) and Table 1 (below) show the distribution of Airprox during 2000 and reveal significant peaks and troughs at different times of the year. Whereas results in March, September, and November were all well above the five-year average, they were in turn offset by low returns in April, May, July and December. Clement British weather appears to have exercised considerable influence on these profiles, and in the end the total number of incidents came to 198.

2000 MONTHLY COMPARISON

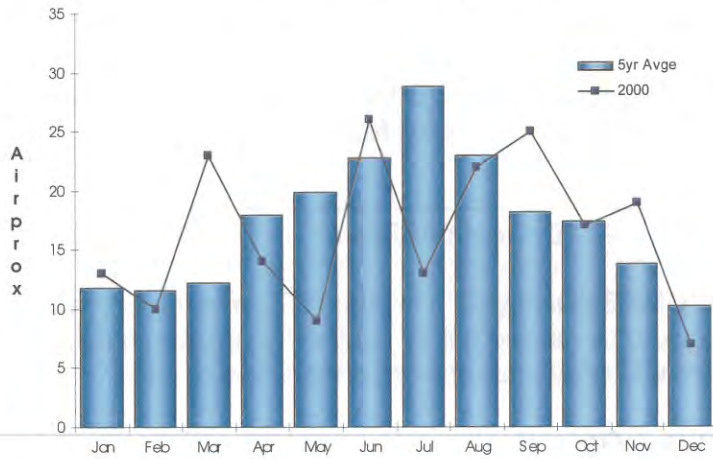


Figure 1: Airprox distribution during 2000

Table 1: Airprox distribution in 2000 against the 5-year average

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
5yr Avge	11.8	11.6	12.2	18.0	19.8	22.8	28.8	23.0	18.2	17.4	13.8	10.2	207.6
2000	13	10	23	14	9	26	13	22	25	17	19	7	198

Trends By User Groups

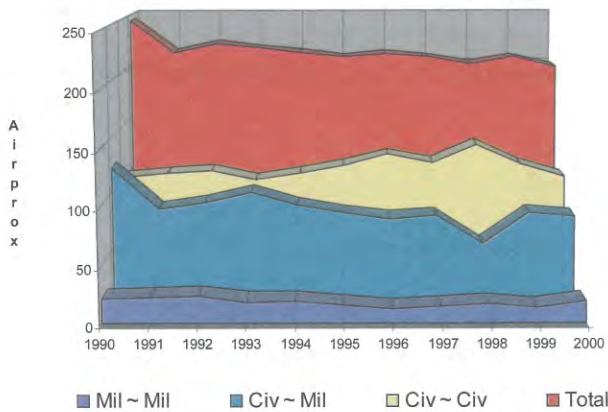


Figure 2: Airprox totals by user groups

The chart at Fig 2 (left) shows how the Airprox profile for each airspace user group has varied since 1990. Data comes from Table 2 (below).

Mil~Mil results show the least altered trend, with low numbers producing a stable, flat profile. Civ~Mil encounters were much higher and, apart from the 'blip' down in 1998, the steady reduction in numbers is evident. A rising trend in Civ~Civ incidents was reversed at last in 1999 and results for 2000 kept this welcome downward recovery going.

These underlying results produce a stable 'total' profile with a gentle downward trend that ends in 2000 at the lowest figure recorded since 1990.

Table 2: Airprox totals by user groups

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mil ~ Mil	21	22	23	18	19	15	12	14	16	13	19
Civ ~ Mil	122	85	91	100	88	81	76	79	53	81	78
Civ ~ Civ	101	105	107	99	105	112	123	115	132	114	101
Total	244	212	221	217	212	208	211	208	201	208	198

Airprox Mix Components

There are two components to the Civ user group, namely CAT and GA. Together with the Mil element they form the basic component 'mix'

These components can meet in six possible ways and the pie chart at *Fig 3a (right)* shows what happened in 1999. Figures are expressed as a percentage of the annual Airprox total.

In 1999, GA aircraft were involved in most incidents (66%), whereas CAT aircraft (47%) and Mil aircraft (45%) were roughly equal on a lower scale.

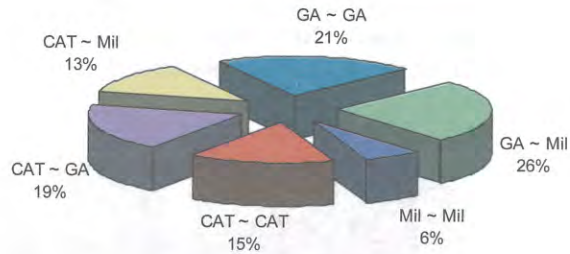


Figure 3a: Aircraft groups making up the Airprox mix in UK airspace 1999

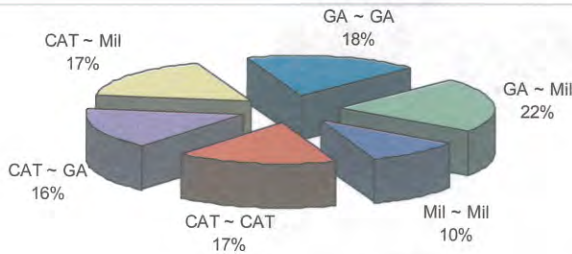


Figure 3b: Aircraft groups making up the Airprox mix in UK airspace 2000

Fig 3b (left) shows similar results for 2000. Comparing these with those above exposes a number of changes.

The most notable shift in balance was GA's 'share of the pie' compared with the other two users. A commendable reduction of 10% took place in GA aircraft involvement. This decline, however, meant bigger slices for both CAT and Mil elements; CAT involvement went up 3 points to 50%, while Mil involvement rose 4 points to 49%.

What Type Of Airspace Was Involved?

Fig 4 (right) depicts the type of airspace in which incidents occurred during 2000 and the number of aircraft involved.

Over 60% of Airprox took place in uncontrolled airspace (Class G) and involved mostly GA and Military aircraft. However, 22% of CAT aircraft shared the same experience.

In controlled airspace, 21% of incidents happened in airways and control zones (Class A) where IFR applies at all times. Aircraft featured were mainly CAT. Next was Class D airspace - control zones and areas with mixed IFR and VFR traffic - but here the number of cases were less than 10%. The remaining 9% of cases were in Class B, E & F.

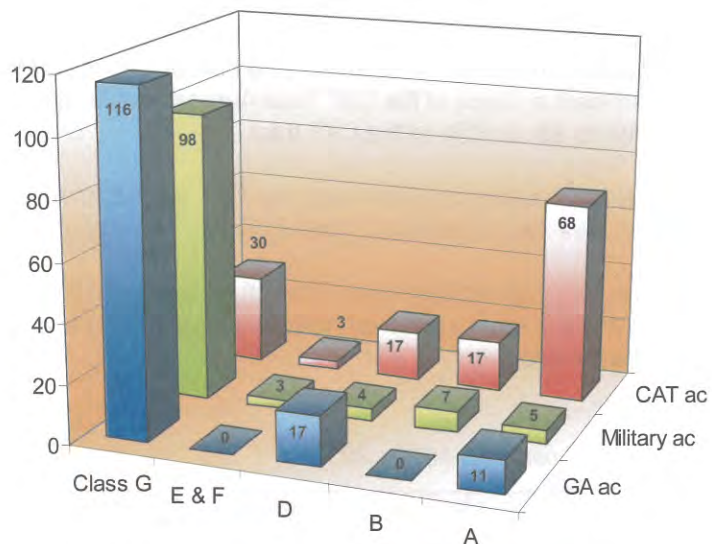


Figure 4: Aircraft by airspace

COMMERCIAL AIR TRANSPORT (CAT) SECTION

CAT Risk Results

Fig 5 (below) portrays the spread of risk results for CAT aircraft since 1990, set against the backdrop of overall Airprox numbers. Note should be taken of the year-on-year ramp like rise in commercial flying hours in UK airspace. The chart was compiled from the figures set out in Table 3 (below).

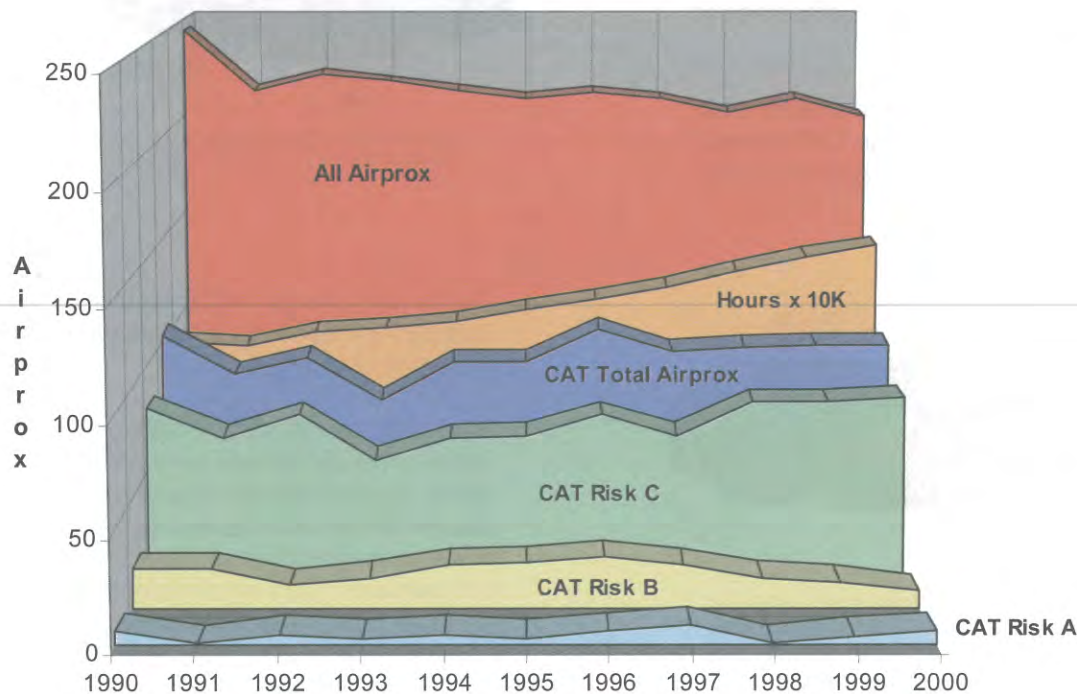


Figure 5: CAT Risk distribution 1990 - 2000

A common but understandable assumption exists that more commercial passenger flying in a given volume of airspace must mean more risk. The data suggests otherwise. Despite the steady increase in flying hours over the last three or four years, incident numbers in that period involving CAT aircraft have remained virtually unchanged. This plateau in numbers stands out in contrast to results prior to 1997.

Risk C assessments continue to form the bulk of CAT results and these “no risk of collision” findings tend to determine the shape of the CAT ‘Total Airprox’ profile. In 2000, the number of CAT Risk C cases edged up slightly to 85, or 85% of the CAT total.

Risk B results (safety compromised) for CAT aircraft have been in decline for a number of years and in 2000 they reached a new low of just 8 cases. This equates to 8% of the overall CAT incident tally.

CAT Risk A results (collision risk existed) increased to 6 during 2000. Only one case involved 2 x CAT aircraft; 4 of the others involved military aircraft - one of which was a glider - and the sixth incident was against a GA glider.

Table 3: CAT risk data 1990 - 2000

CAT Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CAT Risk A	6	1	5	3	5	3	6	9	1	4	6
CAT Risk B	18	18	11	14	20	21	24	20	14	12	8
CAT Risk C	80	66	77	55	66	67	77	67	83	83	85
CAT Total Airprox	104	85	93	72	91	91	107	96	98	99	99
Hours x 10K	89.3	87.4	94.6	96.8	100.4	106.1	111.8	117.9	125.9	133.2	138.9
All Airprox	244	212	221	217	212	208	211	208	201	208	198

CAT Airprox Rates

An accepted indicator used in aircraft accident statistics is 'rate' - the number of times an event occurs in a given time span. Rate results help to judge if trends are getting better or worse.

Fig 6 (right) shows rates for all CAT Airprox together with risk bearing ones. Table 4 (below) gives the data used to construct the chart.

Since 1990 the rate for all CAT Airprox has come down by over one third - from 11.65 cases every 100,000 flying hours to 7.13.

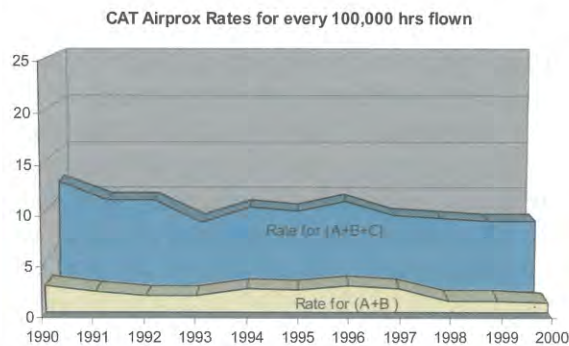


Figure 6: CAT Risk bearing rates

Of more importance, in the same period the rate for risk bearing cases has reduced by more than 60%. It was 2.69 in 1990 and in 2000 reached an all time low of just over 1 incident every 100,000 flying hours. This points towards better safety standards. Many of the resulting safety benefits derive from technological 'safety nets' such as TCAS in the air and STCA (Short Term Conflict Alert) equipment on the ground. High professional standards by pilots and air traffic control officers add to the package.

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

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CAT Rate (A+B)	2.69	2.17	1.69	1.76	2.49	2.26	2.68	2.46	1.20	1.21	1.01
CAT Rate (A+B+C)	11.65	9.73	9.83	7.44	9.06	8.58	9.57	8.14	7.85	7.51	7.13
Hours flown in K	893	874	946	968	1004	1061	1118	1179	1249	1318	1389

CAT: Pilot & Controller Causal Factors

Finding out why incidents happen is a crucial part of the Airprox assessment process. Learning from mistakes and lessons should enable a reduction in the number of repetitions in future.

An analysis of the 99 incidents involving CAT aircraft during 2000 revealed many common reasons, or causal factors behind these incidents.

42 separate factors were identified and these produced a total of 145 'counts'. The most common factors are shown in the chart at Fig 7 (right), together with the 'count' or number of times each factor was repeated. The remaining 77 'counts' were spread over the other 36 factors; none exceeded 5 repetitions and there were quite a number of isolated single 'cause' situations.

Level busts still feature, but come a long way behind the main cause of CAT encounters. The remainder in the top 6 are evenly spread, but notice the final one which still manages to influence the picture.

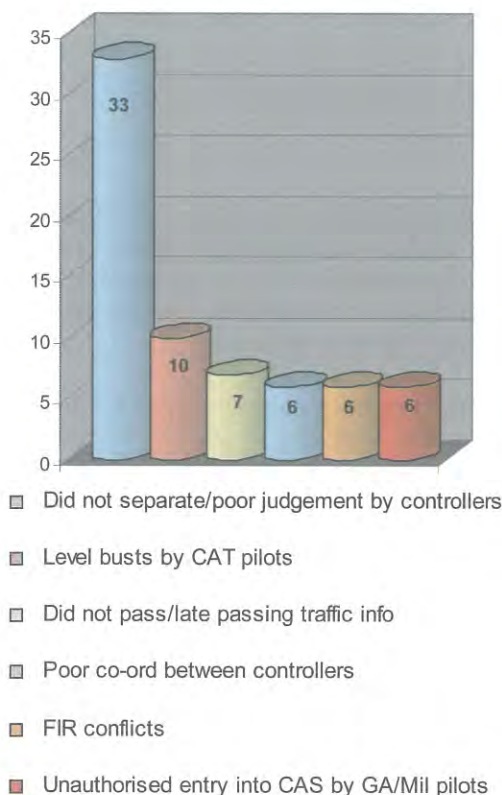


Figure 7: CAT causal factors

GENERAL AVIATION (GA) SECTION

GA Risk Results

The GA user group is the largest of the three analysed and comfortably outstrips the other two in terms of both numbers and flying hours. It is hardly surprising, therefore, that GA aircraft feature more frequently than any other in Airprox statistics. In 1999 there were 135 encounters involving GA aircraft, but this number fell sharply to 107 during 2000 - a reduction of 20%. This slope shows up clearly in the chart at *Fig 8 (below)*, which also allows a comparison of GA Airprox totals against grand totals year-on-year. Similarly, the chart allows comparisons between each of the risk categories achieved. All of the data is taken from *Table 5 (below)*.

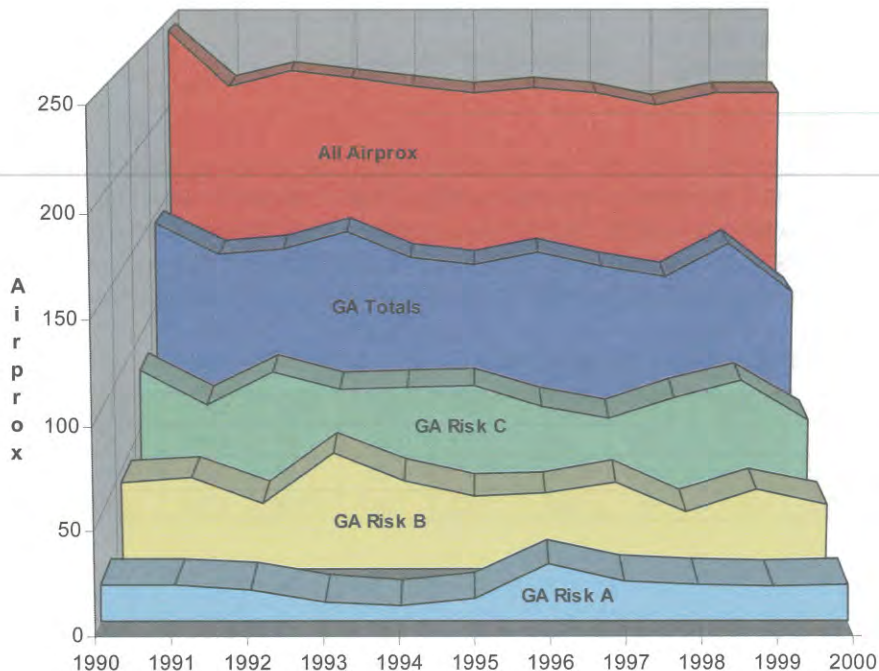


Figure 8: GA Risk distribution

Just over half of the GA encounters in 2000 were assessed as Risk C cases (no collision risk), reaching a low last seen in 1997. In general the GA Risk C profile has undulated over the years, but the trend is a downward one.

Risk B results (safety compromised) fell by 8 cases from 41 in 1999 to 33 last year. These 33 conflicts represent one third of the GA Airprox total. Undulations in the 'safety compromised' profile are more pronounced than in the Risk C one, but a similar downward trend is still apparent.

The mean *safety compromised* figure for the 1990s was 42, so the 33 Risk B cases recorded in 2000 is a positive step in the right direction.

Risk A cases involving GA aircraft has been very similar in number for the last few years and 2000 was no exception. The 18 recorded incidents represent just under 17% of the GA Airprox total. Adding Risk A and B results together produces a risk bearing tally for 2000 of 51 encounters, or 47% of the GA total.

Table 5: GA risk data 1990 -2000

GA Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GA Risk A	18	18	16	10	8	11	28	20	18	17	18
GA Risk B	45	47	34	60	46	38	39	45	30	41	33
GA Risk C	83	64	82	72	73	74	63	57	68	77	56
GA Totals	146	129	132	142	127	123	130	122	116	135	107
All Airprox	244	212	221	217	212	208	211	208	201	208	198

GA Airprox Rates

Raw data is helpful in understanding the volume and spread of incidents, but does little to explain if things are getting better or worse - or staying the same. To get this information 'rates' have to be calculated that determine the number of times an event occurs in a set period.

The time often selected in aviation matters is 100,000 flying hours and this has been used here. *Fig 8 (right)* shows the rate at which GA results have happened since 1990. Both risk bearing and total incidence figures are covered, drawing on the details set out in *Table 6 (below)*.

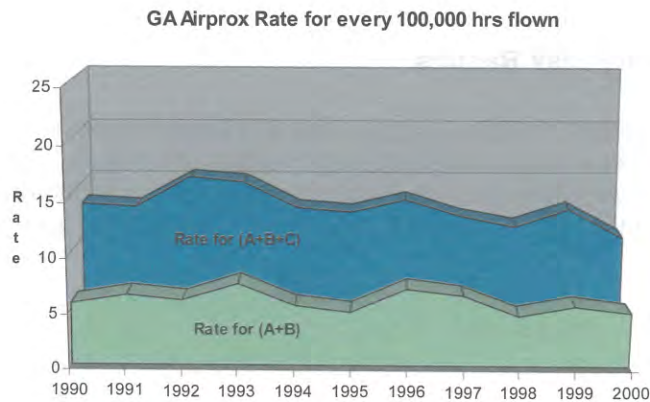


Figure 8: GA Risk bearing rates

The risk bearing rate has been stable for the last 4 years and in 2000 was almost half the rate for 1990. Because of fewer GA Airprox last year, but an increase in flying hours, the outcome produced a drop in the total rate to 6.3 incidents every 100,000 flying hours; this too was half the figure for 1990.

Table 6: GAAirprox rates per 100,000 flying hours

GA Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rate for (A+B)	5.62	4.39	3.52	5.04	3.68	3.34	4.50	4.14	3.13	3.86	3.00
Rate for (A+B+C)	13.02	8.71	9.28	10.22	8.65	8.37	8.74	7.78	7.56	8.98	6.30
Hours flown in K	1121	1481	1422	1389	1468	1469	1488	1569	1534	1503	1699

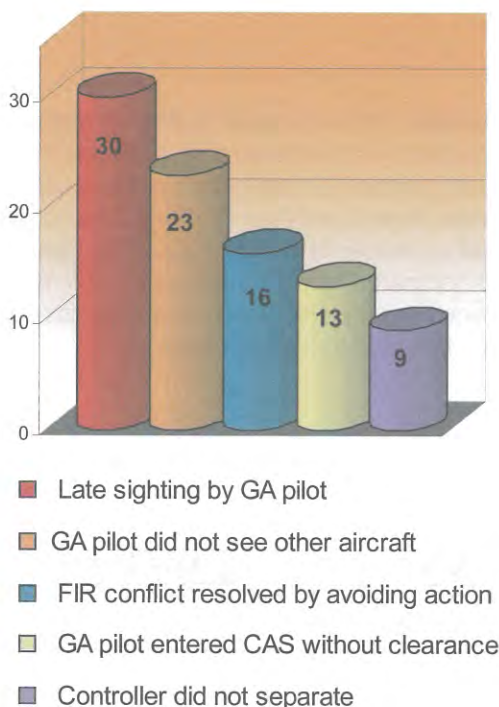


Figure 9: GA Causal factors 2000

GA: Pilot & Controller Causal Factors

The way to reduce Airprox numbers is to understand what causes them and then take steps to avoid repeating the same mistakes again in future.

Analysis of the 107 GA encounters in 2000 exposed 29 separate causal factors, many of which were repeated. *Fig 9 (left)* shows the top 5 factors and the number of times each one happened. The other 24 factors attracted a spread of 54 'counts', none of which exceeded 6 examples.

As might be expected, seeing the other aircraft late, or not at all, dominated the picture and these incidents happened mostly in Class G airspace where 'see and avoid' prevails.

Entering controlled airspace without clearance is an avoidable factor that needs to be reduced; it nearly always has a knock-on effect for CAT aircraft.

The final cause relates to flights inside CAS.

MILITARY SECTION

Military Risk Results

The Military aircraft user group, which includes foreign visitors, is the smallest of the three but is generally involved in almost half the annual number of incidents. *Fig 10 (below)* shows this graphically, allowing direct comparisons to be made with total profiles and the relationships between the various risk levels over the years. Supporting data for the chart is taken from *Table 7 (below)*.

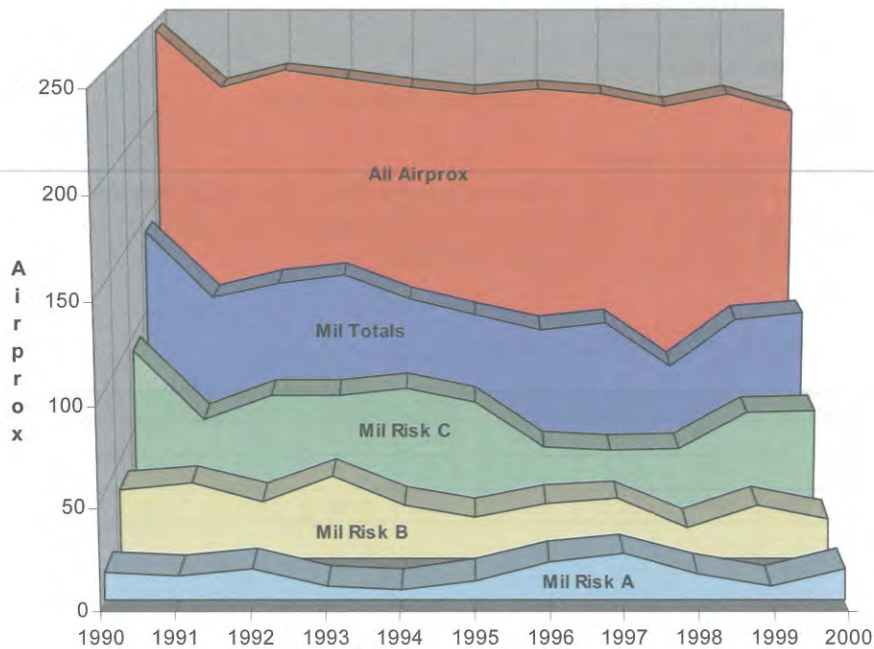


Figure 10: Military risk distribution

On Military totals, the trend from 1990 began as a downward one that bottomed out subsequently around 1996 ~ 1997 and then started to edge up again; the notch in 1998 looks like a statistical 'blip' that is best disregarded for the time being. Scrutiny of the Risk C results (no collision risk) shows that these followed the total profile reasonably closely throughout the period, with results in 2000 differing only by a single case from the previous year.

However, Risk B cases (safety compromised) reduced by 7 compared with 1999 and the trend overall since 1990 has also been one of decline. Unlike Risk B and Risk C results, the number of Risk A assessments during 2000 rose; there were 16 compared with an average of 12 ~ 13 in the preceding 10 years. This brought the risk bearing tally last year to 38% of cases.

Table 7: Military risk data 1990 - 2000

Military Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mil Risk A	14	12	16	7	5	10	19	23	13	7	16
Mil Risk B	36	39	30	43	28	22	29	31	16	28	21
Mil Risk C	92	55	68	68	72	64	40	38	39	59	60
Mil Totals	142	106	114	118	105	96	88	92	68	94	97
All Airprox	244	212	221	217	212	208	211	208	201	208	198

Military Airprox Rates

The reason for and the application of 'rates' for Military incidents are identical to CAT and GA needs.

Table 8 (below) reveals that Military flying hours have been reducing against stable returns on incident numbers. This trend pushes rates up.

Variations in rate profiles are readily evident from Fig 10 (right). Despite fewer incidents in 2000, the overall rate was more than that for 1990. In similar fashion, risk bearing numbers were down on 1990, but the rate for 2000 was higher owing to fewer hours flown.

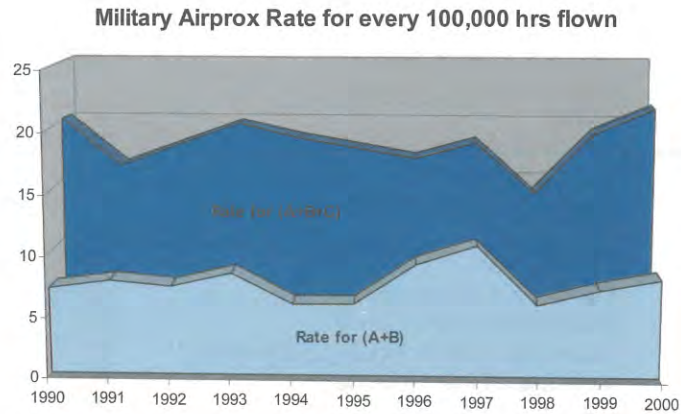
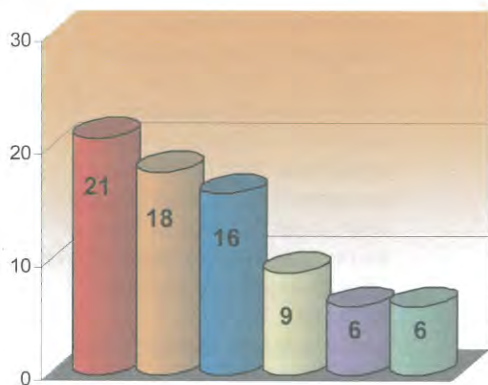


Figure 10: Military risk bearing rates

Table 8: Military Airprox rates per 100,000 flying hours

Military Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rate for (A+B)	7.10	7.77	7.28	8.40	5.87	5.94	9.27	10.78	5.97	7.13	8.07
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	21.16
Hours flown in K	704	656	632	595	562	539	518	501	486	491	458



- Late sighting by military pilot
- Military pilot did not see other aircraft
- FIR conflict resolved by avoiding action
- Military pilot entered CAS without clearance
- Military pilot flew too close
- Controller did not pass/late passing traffic info.

Figure 11: Military Causal factors 2000

Military: Pilot & Controller Causal Factors

Analysis of the 97 incidents, some involving foreign, Military aircraft, revealed 30 separate reasons, or causal factors behind these Airprox. Many of those that were repeated frequently were well known problems and 133 'counts' emerged overall.

Fig 11 (left) shows the top 6 causal factors by pilots and controllers of Military aircraft during 2000. Seeing the other aircraft late, or not at all, remain the major contributors to Military encounters. Many of these encounters - particularly the FIR conflicts - were in Class G airspace against GA aircraft. Entering controlled airspace without clearance takes fourth place, just ahead of not giving a wide enough berth when passing other airspace users. Sitting in fifth equal place is a controller based factor.

The other 24 reasons behind the Military Airprox tally attracted a further 57 counts that were spread widely. None, however, exceeded 4 or 5 in any one example.

GLOSSARY OF ABBREVIATIONS

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

MEDA	Military Emergency Diversion	TMA	Terminal Manoeuvring Area
MHz	Megahertz	TTA	Tactical Training Area
MRSA	Mandatory Radar Service Area (Military Area)	UAR	Upper Air Route
MSA	Minimum Safe Altitude	UAS	Upper Airspace Service
MSD	Minimum Separation Distance	UASRA	Upper Airspace Special Rules Area
MTA	Military Training Area	UDA	Upper Advisory Area
MTRA	Military Temporary Reserved Airspace	UDF	Ultra High Frequency Direction Finder
NATS	National Air Traffic Services	UDR	Upper Advisory Route
NDB	Non - Directional Beacon	UKAB	UK Airprox Board
NM	Nautical Mile(s)	UIR	Upper Flight Information Region
NOTAM	Notice to Airmen	UKLFHB	UK Military Low Flying Handbook
NVG	Night Vision Goggles	USL	Under-slung Load
OAC	Oceanic Area Control	UTC	Co-ordinated Universal Time
OACC	Oceanic Area Control Centre	VCR	Visual Control Room
OAT	Operational Air Traffic	VDF	Very High Frequency Direction Finder
ODL	Opposite Direction Level	VFR	Visual Flight Rules
OJTI	On-the-Job Training Instructor	VMC	Visual Meteorological Conditions
PAR	Precision Approach Radar	VOR	Very High Frequency Omni Range
PFL	Practice Forced Landing	VRP	Visual Reporting Point
PI	Practice Interception	WIP	Work in Progress
PIC	Pilot in Command	WRDA	Weapons Range Danger Area
PINS	Pipeline Inspection Notification System		
PTC	Personnel & Training Command		
QDM	Magnetic heading (zero wind)		
QFE	Altimeter setting to give height above aerodrome, or runway threshold		
QGH	Controlled descent through cloud		
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		
TA	Traffic Alert (TCAS)		
TANS	Tactical Air Navigation System		
TBC	Tactical Booking Cell		
TC	Terminal Control		
TCAS	Traffic Alert & Collision Avoidance System		
TDA/TRA	Temporary Danger or Restricted Area		
TFR	Terrain Following Radar		

AIRPROX REPORT No 47/00

Date/Time: 27 Mar 1125

Position: 5125 N 0210 E (ESE of NORTH POINT)

Airspace: UAR - UL610

(Class: B)

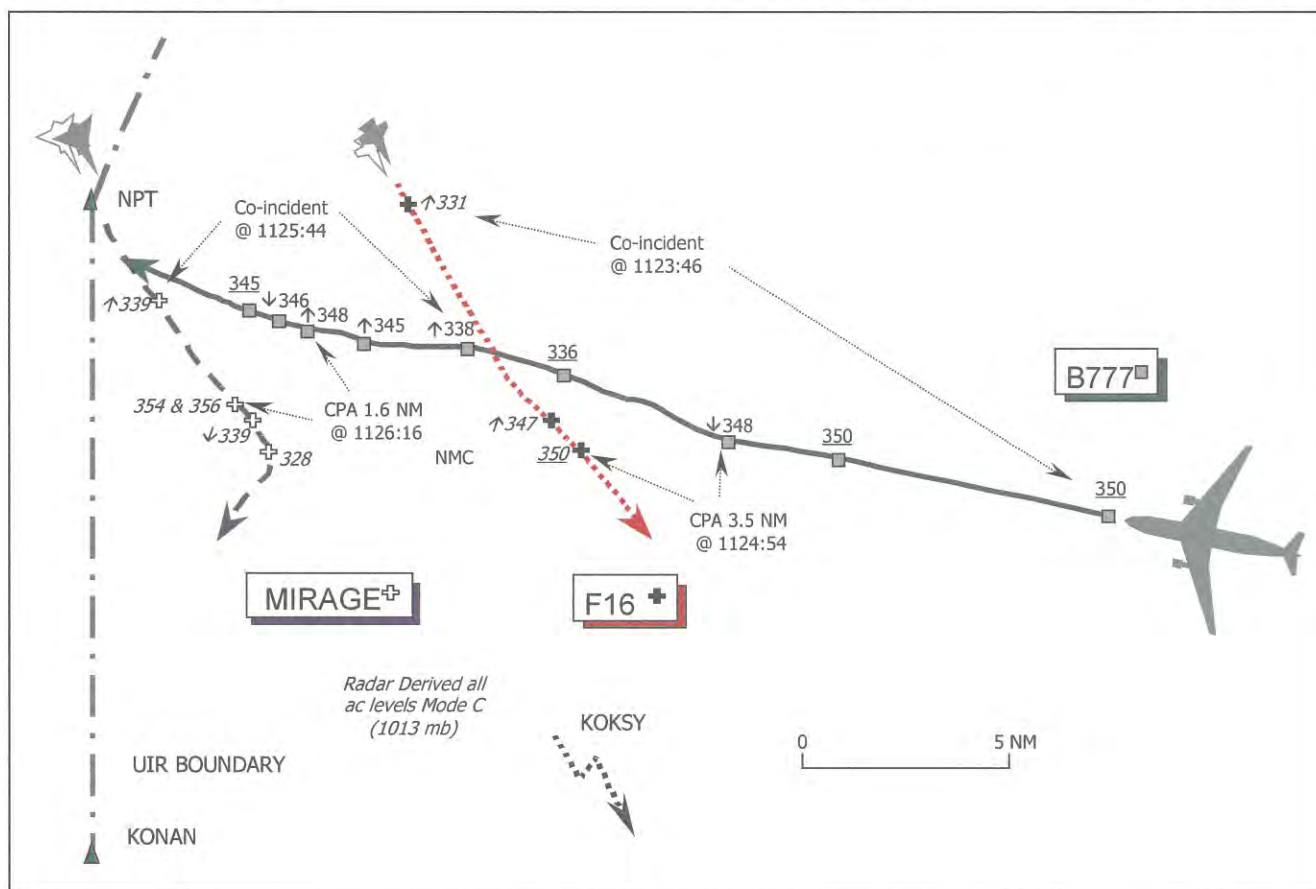
Reporter: LATCC CLACTON SECTOR

	<u>First Aircraft</u>	<u>Second Aircraft</u>	<u>Third Aircraft</u>
<u>Type:</u>	B777-200	F16s x2	Mirage x2
<u>Operator:</u>	CAT	Foreign Mil	Foreign Mil
<u>Alt/FL:</u>	FL 350	FL 330	FL 330
<u>Weather</u>	VMC NR	VMC NR	VMC NR
<u>Visibility:</u>	NR	NR	NR
<u>Reported Separation:</u>	v F16s 300 ft V	NR	1.5 NM H
	v Mirages 1000 ft V		

Recorded Separation:

3.5 NM H, 200 ft V

1.6 NM H, 600 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC CLACTON CHIEF SECTOR CONTROLLER (CLN CSC) reports that FL 190 and FL 330 had been blocked because Tactical Leadership Program (TLP) NATO exercise traffic

had been co-ordinated through the Sector. Furthermore, he had called in another controller (SC2) to split CLN Sector positions 13 and 14, because of potential emergency traffic, which would also transit the sector but had not yet called. Therefore, the second controller was plugged in and monitoring the SC when he spotted the 3/A 4732

squawk, the F16s, at FL 350 and in conflict with the B777 cruising westbound on UL610 at FL 350. The second controller advised the CLN SC of the conflict as the B777 descended to FL 330 following a TCAS RA and into further conflict with another TLP track squawking 3/A 4714 at the co-ordinated level. The B777 climbed back to FL 350 eventually and reported a multiple Airprox. He added that separation was eroded to 2 NM and 1500 ft.

THE LATCC CLACTON SECTOR CONTROLLER (CLN SC) reports the B777 was cruising on UL610 at FL 350 above the co-ordinated TLP traffic. She was beginning to split the Sector when the SC2 suddenly pointed out that one of the military crossers, squawking 4732, was at FL 350 and crossing about 5 NM ahead of the B777. They shouted to the LJAO CLN Mil controller to ascertain what the military ac was doing but he did not respond. Meanwhile, the B777 crew commenced a descent, she thought in response to a TCAS RA, which placed the B777 in conflict with the next pair of military ac. She immediately passed traffic information on this next contact and instructed the B777 crew to climb back to FL 350 without delay. The B777 was then turned to avoid the crossing traffic, she thought N, whereupon the crew reported they would be filing an Airprox against the other ac. She added that STCA did not activate throughout the encounter.

UKAB Note (1): The SC2 also filed a report and added that it appeared that the TLP traffic at FL 330 also climbed when the B777 descended toward them. The RT transcript reveals that the B777 was given an avoiding action R turn onto 325°.

THE B777-200 PILOT reports that they had departed Frankfurt/Main westbound for Newark NJ and entered UK airspace E of TEBRA. About 5 min after LATCC had cleared them direct LAM at FL 350, they received a TA followed by an RA, which required them to descend to about FL 330, he thought. Whereupon, another TA was received for two more ac conflicting head-on. An RA was then enunciated and he began a rapid climb, he also thought he turned R, to avoid two delta-wing fighters, which passed to port as the jets broke R and descended about 1000 ft. The first contact they had avoided by about 300 ft was later reported to be a military fighter, and the second pair by about

1000 ft. London CONTROL advised that the first conflict was "uncoordinated". He reported the Airprox to LATCC and surmised, (incorrectly) that the other ac might have been conducting air combat manoeuvres; the first ac may have been the practice target for the second two and that his B777 may have been mistakenly acquired as their target when it got between them.

UKAB Note (2): The Airprox initially reported by the B777 pilot was subsequently withdrawn by him. However, LATCC also filed and the investigation was continued on that basis.

THE F16 FLIGHT LEADER reports some two months after the event that he was leading a pair, heading SE, returning from a TLP mission over the UK. They had just been handed over to BELGA RADAR and were flying IFR above 30000 ft, but he could not recall the exact level. The B777 was displayed on the ac's AI radar from over 20 NM away and he was visual inside 10 NM. Visual contact was maintained with the B777 the entire time and they passed close enough that he remembered thinking that it would probably set off the airliner's TCAS. Since they were VMC at that level and had the B777 in visual contact the entire time, there was no danger of an actual collision. However, had the conditions been IMC and they had not seen the airliner, they would have been extremely nervous because to him it seemed that the situation was not under positive control.

THE MIRAGE 2000 SECTION LEADER reports some two months after the event, that he was leading a pair of Mirages returning to Florennes at FL 330 heading 150° under an RCS from LJAO CLN Mil. When crossing the channel the controller instructed them to climb immediately to FL 350 and turn R, during the manoeuvre they spotted the B777, about 1.5 NM he thought, outside of their turn. They had no radar contact because the AI radar was switched off. He added that a lot of avoidance instructions were issued in a short period with no traffic information from ATC to help them spot the B777 and avoid it visually.

UKAB Note (3): Attempts to contact the crews of the respective TLP ac were frustrated because the Airprox occurred at the end of the TLP. The

participants had dispersed throughout Europe before reports could be obtained from those concerned.

LATCC reports with RT transcript that the CLN SC's workload was heavy and an additional controller - SC2 - was monitoring the SC in preparation for splitting the sector. The CLN CSC had agreed cleared flight paths at FLs 190 and 330 for the TLP ac below the B777 routeing UL610 to LAM at FL 350. Shortly before 1124 the leading formation of F16s commenced a climb from FL 330 and by 1124:36 had reached FL 347 passing 6 NM ahead of the B777. The SC2 drew the attention of the SC to this at the same time as the B777 started to descend. This descent took the B777 into conflict with the second formation at FL 330. As the first formation was passing clear, at 1125, the CLN SC instructed the B777 crew to "*climb back up to 350 now*". The crew acknowledged by callsign and after the SC reaffirmed "*...climb back up to flight level 350*" advised "*...we had to descend...we had traffic at our same altitude*". The CLN SC acknowledged this and at 1125:20, passed traffic information on the second formation, the Mirages "*...1 o'clock - 10 NM at 330*". The B777 crew then reported climbing to FL350 for the first time after they had to descend "*because of our TCAS*" - the first time TCAS had been mentioned on RT. This was acknowledged by the CLN SC who updated the traffic information on the Mirages - "*...12 o'clock 10 miles FL330*". At 1125:45, she instructed the B777 crew to turn right onto 325° and again passed information on the traffic - "*...1 o'clock 5 miles*". The B777 crew reported having the Mirages in sight at 1126, when the No2 Mirage is shown at FL 339 and crossing 6.4 NM ahead of the B777, passing FL 343 in the climb. At 1126:16, the Leader and No2 Mirage are shown at FL 354 and 356 respectively, at the CPA passing 1.6 NM S of the B777, indicating FL 348.

Although nothing was said at the time on the RT the B777 descended again at 1126:21, reaching FL 345 before climbing again to FL 350. At 1126:50, the SC instructed the B777 crew to resume their own navigation for LAM.

The B777 Captain later spoke to the SC on another frequency and stated that he DID NOT receive an RA on the F16s, contrary to his report, and had a TCAS RA on the second formation only. It would

appear therefore, that the B777 pilot may have descended in the first instance of his own volition. Neither the SMF nor STCA, activated.

UKAB Note (4): ATSI endorsed the LATCC report.

MIL ATC OPS filed an extensive report with RT transcripts. However, it was noted that some specific conversations occurred during vocal exchanges across the LATCC AC Ops Room and were, therefore, not recorded on tape.

Because of the large number of mixed nationality military ac anticipated during the egress phase of the TLP exercise over East Anglia, a controller (CLN Mil) and a planner/co-ordinator (PLN) manned LJAO CLACTON. Prior to the exercise the applicable Airspace Co-ordination Notice (ACN) promulgated for TLP UK-Belgium recoveries had been activated. Exclusive use of FL 190 and FL 330 had been agreed and blocked within the appropriate UK airspace (following a general track from Honington to KOKSY) for use by CLN Mil. The LJAO Central (Mil) Co-ordinator had personally briefed the CSCs on the CLN, DVR, LUS and NSEA Sectors.

The F16s and Mirages were all level at FL 330 under a RCS from CLN Mil tracking SE. The Mirages were about 17 NM behind the F16s; there were also 3 other flights on the frequency at FL 190, plus a pair at FL 390, which had been tactically co-ordinated through the sector. PLN prenoted the F16s to BELGA RADAR (BELGA) at 1114, agreeing to call back with the radar handover as the ac approached NORTH Point (NPT), which is on the common boundary between the London and Brussels UIRs. Following the handover, the F16 flight left the CLN MIL frequency at 1123:00, maintaining FL 330.

At about 1125, as the Mirage pair approached NPT, squawking 3/A 4714, the CLN CSC shouted across the suite at the LJAO controllers "*The (B777 company name)'s descending for a TCAS RA on the one at thirty five.*" This completely perplexed CLN Mil, as he had no traffic at FL 350 and PLN advised the CSC accordingly; after a quick search of the radar, a track whose SSR label showed the same company name, was seen to the SE of the Mirage pair. This track - the B777 - was below FL 350, still in descent, and in direct conflict with the Mirages. At 1125:40, CLN Mil instructed the

Mirage flight to "... expedite climb FL 350, expedite" which was immediately acknowledged. During this period, PLN advised the CSC that the "4714 squawk" - the Mirages - were climbing to avoid the descending B777 and he requested the level that the B777 was descending to; the CSC and both SCs however, were unresponsive. After seeing the B777 descend to FL 336, the LJAO controllers then noticed its Mode C indicated it was climbing, whilst at the same time the CSC told PLN that the B777 was climbing again. At 1125:54, CLN Mil transmitted to the Mirage leader "C/S avoiding action, turn right heading 220." The pilot responded almost instantaneously that they were level FL 350 and following confirmation of the turn reported "Copied, coming right 220." At 1126:00, CLN Mil instructed the Mirage Leader to "...descend now, expedite Flight Level 330, apologies, the other traffic climbed", which was acknowledged. Whilst CLN Mil was still controlling the remaining TLP formations, the CSC and one of the SCs said he had caused the incident by crossing unco-ordinated traffic through the Sector at FL 350. The tone used was such that PLN had to intervene to enable CLN Mil to concentrate on the ac under his control.

To the LJAO controllers, the TLP egress was going smoothly, although PLN was just becoming aware of a problem developing on the Continent, and CLN Mil's attention was being drawn to some 'bunching' of the FL 190 transits. The CLN CSC's announcement of an ac descending, directed at the LJAO controllers was the first indication of a problem. However, only the name of the B777's company was given and that it was avoiding an ac at FL 350 apparently by TCAS. Presented with this scant information, CLN Mil could not react immediately and it took time to locate on radar the ac concerned. As the B777 descended towards the Mirages, CLN Mil considered the best course of action was to climb them above it and issued a clear instruction to "...expedite climb.." to FL 350, unaware that the CLN SC had also instructed the B777 crew to return to the same level. However, the B777's subsequent climb presented CLN Mil with a dilemma since the overall situation and rapport with the CLN Sector staff had deteriorated rapidly. He had little option but to react to what he saw and therefore issued further avoiding action - a turn, closely followed by a descent back to FL 330. Only 30 sec had elapsed since the Mirage pair had first been instructed to climb to avoid the

B777. However, the Sector was now extremely busy and it was quite reasonable for CLN Mil to seek the sanctuary of a 'known' blocked level, whilst doing his best to achieve some horizontal separation. The CLN Mil controller's actions, therefore, cannot be criticised. Moreover, by the time the turn had been issued, the Mirage pair had already passed through the B777's 12 o'clock, and with respective ac tracks now diverging the risk of any collision had already passed.

The trigger for this sequence of events was the F16s' climb to FL 350 initiated by BELGA (see Note 6) after the F16s had been transferred to them and the B777 pilot's subsequent reaction. BELGA had issued this climb instruction because of a confliction with further traffic routeing UG1 which apparently had not been blocked, between KONAN and KOKSY also at FL 330. At the time of the incident, it is understood that BELGA Radar Controllers were only required to obtain 3 NM horizontal separation against GAT in the Upper Airspace. This anomaly has since been removed and their horizontal separation criteria are now harmonised at 5 NM.

With hindsight, it became evident that BELGA had experienced problems co-ordinating the TLP traffic with MAASTRICHT UACC. Just prior to the handover of the F16s, PLN had become involved in a protracted landline conversation with the BELGA Supervisor who had requested that as many of the TLP ac as possible be descended below FL 200. However, both the F16s and Mirages had been co-ordinated through UK airspace at FL 330 and it would not have been possible to descend either section safely. Later, towards the end of the recovery, the LJAO controllers noticed eastbound GAT approaching KONAN on G1 at FL 190, which they found rather surprising given that FL 190 had been blocked for the TLP traffic through UK airspace.

Following a previous occurrence (ATCOR 199906997), staff from the then HQ MATO, AUS, LJAO and the TLP Planning organisation, had devised procedures to enable a structured egress that reduced the impact on the busy LATCC CLN Sector. The procedure covered exit/entry gates/marshalling points, planned levels, with a general brief contained in a recurring ACN, plus a specific update provided to appropriate LATCC AC Staff on

the day. These new procedures were combined with the existing Letter of Agreement (LoA) between LJAO and BELGA Radar concerning the transfer of OAT crossing the London/Brussels FIR/UIR boundary. The LoA required handovers to be complete by the "Common Boundary", a line joining NPT and KONAN. The actions of LJAO staff were entirely in accordance with both the LoA and the ACN. Within Belgian airspace, BELGA are responsible for OAT, liaising with Maastricht and Brussels ACCs as required. However, the control of westbound GAT on UL610, W of 3° E has been ceded to LATCC, thereby resulting in GAT and OAT in the same airspace being controlled by different ATCCs. Following this Airprox a further meeting was held between UK/Belgian ATC (Mil and Civ), Maastricht ACC and the TLP Operators, to help resolve the co-ordination problems experienced by BELGA controllers within their own airspace. Consequently, the TLP recovery procedures, specifically the transition from LJAO to BELGA control, have been revised for a trial period, pending a permanent change.

Furthermore, HQ STC (ATC) Staff conducted a review of civil/military airspace boundaries throughout the UK, to determine whether a more common civ/mil boundary could be effected. However, it was concluded that aligning the LJAO boundaries to correspond with civil ones would not solve the problem. Instead amendments to the TLP procedures have been introduced and these now suitably address the issue.

Difficulties in Belgian airspace led BELGA to climb the F16s to FL 350 ahead of the B777, whose pilot then descended in response to (undeclared) TCAS indications. The minimum resulting horizontal separation was at least 3.5 NM. Whilst CLN Mil, and the CLN SC, did their best to resolve the ensuing conflict, the breakdown in communication between the controlling teams, following an unfounded assumption that LJAO had climbed the F16s, resulted in both military and civilian controllers reacting individually rather than together.

UKAB Note (5): The SSR codes displayed by military ac participating in the TLP were assigned for use throughout the flight and did not change when ac were transferred between LJAO CLN Mil and BELGA RADAR.

UKAB Note (6): The LATCC radar recording shows a constant flow of TLP traffic through the CLACTON sector, tracking SE towards KOKSY in pairs at FLs 330 and 190; the tracks cross into the Belgian FIR/UIR in the vicinity of NPT, mid-way between reporting points XAMAL and RAPIX, where the FIR/UIR boundary 'turns' NE. The B777 is shown tracking 280° at FL 350, following UL610. The F16s, squawking 3A 4732, commenced a climb from FL 330 at 1123:46, 6 NM E of NPT, with the B777 16.5 NM ESE. The F16s climbed through FL 347 whilst crossing 6 NM ahead of the B777, at 1124:36. The B777 is shown descending through FL 348 at 1124:54, with the F16s now level at FL 350 and crossing into the B777 crew's 11 o'clock - 3.5 NM but opening to the SE. This is the CPA between the F16 and B777. Meanwhile, the Mirage pair, squawking 3/A 4714/5, are in the B777 crew's 1 o'clock - 18 NM, tracking 170°. At 1125:25, the B777's descent is arrested at FL 336 with the Mirage pair now slightly R of the nose at 11.5 NM; the SSR labels of the Mirages are overlapped with a number of tracks at lower levels, but the Mode C of one ac still appears to be FL 330. After apparently turning about 30° L onto a more south-easterly track the Mirages pass 7.5 NM ahead of the B777 from R to L, as the latter climbed through FL 338 at 1125:44. Ten sec later CLN Mil issued the avoiding action R turn onto 220°. The Mode C of the No.2 Mirage is briefly shown at FL 339, although due to SSR label overlap it is difficult to determine the Mode C. The B777 then appears to turn about 10° L which has the effect of keeping the Mirages in its 12 o'clock for a further 15 sec, thus reducing the horizontal separation to about 3.5 NM, as the airliner reached FL 345. The second CPA occurs at 1126:16, as the Mirage pair indicate FL 354 & 356 respectively as they pass 1.6 NM SW of the B777, indicating FL 348 and appearing to turn very slightly R. The avoiding action turn and rapid descent of the Mirage pair starts to take effect in the following radar sweep, by which time they are 2.1 NM S of the B777 passing FL 339. The B777 meanwhile, has also recommenced another descent and passed FL 346. After the CPA, the Mirage pair roll out on a heading of about 220°, whilst the B777 bottoms out at FL 345 before resuming its original track of 280° and eventually reaching FL 350.

UKAB Note (7): Despite a formal request to BELGA Radar for a report into this Airprox, to date, none has been received. However, OC LJAO received verbal acknowledgement from BELGA Radar (29

March 00) that the BELGA controller's actions had brought the F16s into close proximity with the B777. The BELGA controller concerned had been debriefed.

UKAB Note (8): Subsequent to this Airprox, revised co-ordination procedures have now been agreed and ratified for TLP traffic. Henceforth LJAO CLN Mil now co-ordinate 'cleared flight paths' through BELGA RADAR with MAASTRICHT UACC, in addition to the other LATCC Sectors. Furthermore the 'transfer of control' point of OAT from CLN Mil to BELGA RADAR has been revised and is now further E of the UIR boundary.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This complex 'compound' sequence of events occurred marginally outside UK airspace, but has been assessed for two reasons. First, initial reports from the B777 pilot placed the Airprox within UK airspace thereby triggering UKAB involvement. Second, LATCC and LJAO had provided an ATS to two of the ac involved, under delegated arrangements by Belgium. Unfortunately no report has been provided by the other ATSU involved – BELGA RADAR, despite formal requests and reminders.

The homebound TLP ac had increased traffic levels significantly through the CLN Sector and some members questioned the wisdom of routeing such traffic through one of the busiest sectors in Europe. However, such routeing seemed to be unavoidable for military jets returning to their base in Florennes. Fuel usage was a major influence on the route chosen. The Board noted the considerable work done by LJAO prior to this Airprox to smooth the flow of TLP traffic through the CLN Sector subsequent to the 1999 ATCOR. It seemed, however, that although the subsequent liaison and review had done much to ameliorate any problems in UK airspace, difficulties persisted E of the UIR

boundary. The unexpected short notice request from the BELGA RADAR Supervisor to descend the TLP traffic to FL 200, followed later by the climb of the F16s to avoid UG1 traffic, were both indicative of co-ordination difficulties deeper in Belgian airspace. This should have been resolved with better forward planning rather than relying on tactical co-ordination of OAT at the time. However, members acknowledged that BELGA RADAR also had to co-ordinate with adjacent ACCs, which illustrated the difficulties of effecting control in airspace where several ATSUs were providing an ATS.

The BELGA RADAR controller had climbed the F16s 2000 ft above the level co-ordinated through the airspace, which for GAT, LATCC CLN sector was responsible. Members wondered if the BELGA controller was aware of the B777 at the same level, but the lack of a BELGA report prevented an answer to this question. It was assumed that the BELGA RADAR controller had placed the F16 flight on a vector to establish just over 3 NM horizontal separation, which seemed to be the Unit's permitted minimum standard at the time. Why this reduced horizontal separation was used was difficult to reconcile since all other ATSUs used 5 NM in the UAS. Happily, this anomaly had since been corrected. Nonetheless, the BELGA controller's instructions caused the F16s to fly closer to the B777 than the CLN SC expected and resulted in a descent by the airliner crew to avoid the fighters, without forewarning the CLN SC. This was the catalyst that led eventually to the Airprox and so formed part of the cause.

Whether it was a TCAS RA, as reported by the B777 pilot, or, whether the crew elected to descend of their own volition and take visual separation, (as alleged from later RT conversations after the event) was unclear. However, for whatever reason, the radar recording revealed that the B777 pilot descended to FL 336, before the ac's TCAS generated a climb RA against the Mirage section. Significantly, the F16 flight leader had been correct in thinking events might "set off the airliner's TCAS" and the CLN SC found herself in a difficult position. Surprise was expressed by airline pilots on the Board that the B777 had bottomed out 1400 ft below its assigned level; they said TCAS would normally provide about 600 ft separation. Furthermore, the CLN SC had then instructed the B777 crew to climb

back to FL 350, before they had mentioned any TCAS enunciation. Fortunately throughout all of this the F16 pilots had acquired the B777, both on AI radar and visually, at an early stage and were always in a position to take greater avoidance if necessary. Consequently, the Board agreed that there had not been a risk of a collision between the F16s and the B777.

This incident started when the F16s climbed into conflict with the B777. The CLN SC assumed, naturally – but erroneously, that CLN Mil still had RT contact with the F16s and asked what the military ac were doing. CLN Mil staff, having previously transferred the F16s to BELGA RADAR, could not provide the information requested. As the situation rapidly became more urgent – between the B777 and the Mirage Section – both civil and military controllers saw no alternative but to seek independent solutions to the conflict. Members agreed that these unusual events had precluded a co-ordinated resolution of the conflict.

The second encounter, which was closer than the first, was the one on which risk should be determined. The Board agreed with the Mirage section leader's observation about the lack of traffic information; he saw the airliner at about 1.5 NM away and traffic information should have been issued if at all practicable. Furthermore, the Board noted that the phrase avoiding action was not used initially by CLN Mil or the CLN SC, but agreed that the controllers had done well in difficult circumstances. The avoiding action climb was probably the most sensible course of action of the limited options available.

Military pilot members wondered why the Mirage's radar was turned off. They suggested it was nearly always better to employ all the available sensors for just the sort of eventuality that transpired. Nevertheless, the Mirage pilots did eventually spot

the B777 when the CLN Mil controller realised the B777 was climbing again and issued the avoiding action R turn. Members commended the Mirage leader for quick compliance with the climbing and then descending avoiding action instructions; it had been a tense situation that could easily have gone awry. Although the B777 crew were reacting to the TCAS RA and had sighted the Mirage section which had been turned away from it by the CLN Mil controller's avoiding action, the lack of clear cut co-ordination between the two actions suggested to some pilot members that safety had not been assured. Others took a different view and believed that the minimum separation of 1.6 NM and 600 ft, as both ac diverged, was an adequate margin to prevent any risk of a collision. In the end it was finally concluded by the narrowest of margins that the safety of the B777 and Mirage had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

- a. The BELGA RADAR procedures allowed the use of 3 NM horizontal separation instead of 5 NM.
- b. The BELGA RADAR controller climbed the F16s into conflict with the B777, whose pilot descended, without informing ATC, into conflict with the Mirages.
- c. In the urgent circumstances that obtained, the CLACTON Sector civ/mil staffs were prevented from achieving a co-ordinated resolution of the conflict between the B777 and the Mirage Section.

Degree of Risk: B

AIRPROX REPORT No 98/00

Date/Time: 5 Jul 1412

Position: 5717 N 0545 W (Kyle of Lochalsh)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Dauphin 2 Untraced Mil
Jets

Operator: Civ Comm Foreign Mil

Alt/FL: 200 ft (Rad Alt) (RPS)

Weather VMC CLOC VMC

Visibility: 30 km

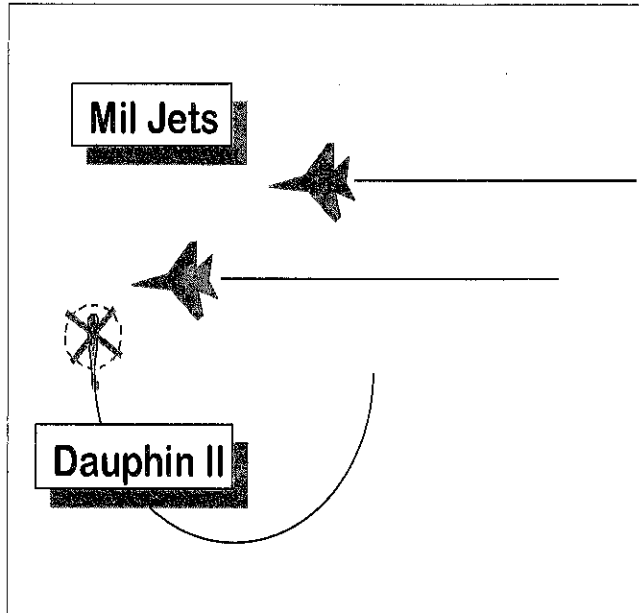
Reported Separation: 50-100 ft

Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DAUPHIN 2 PILOT reports that he had approached Kyle of Lochalsh from the N and turned right about while approaching to land there. When descending through 200 ft at 80 kt, he saw 2 fighters at his 2 o'clock the first of which was about 50-100 ft away crossing right to left above on a westerly track. The other was some 3-400 ft away. He then concentrated on his landing, after which he was advised by ground observers that the fighters had subsequently turned about and recrossed the landing area; they had appeared to be twin-finned ac. He considered the risk of collision had been high.

AIS MIL reports that an initial tracing action lasting several weeks produced no military ac which had been in the area at the time. It was then discovered that the incident time given by the reporting pilot was one hour out and so the whole process had to be repeated, but again without result. (Initially a pair of F18s, visiting from overseas, was thought to have been involved, but at the reported incident time they were on the ground.) No military ac was booked into that part of the LFS at the time, so whichever ac they were, they were illegally low flying. The incident area is below recorded radar coverage, but no military ac could be seen on tracks which would take them into the area, and the only



UK based twin-finned jets that were airborne at the time and N of 55 N could be seen on radar; they did not descend below 18000 ft. Foreign (NATO) air forces did not have any ac in the area and USN ac were discounted after confirming that none of their carriers was this side of the Atlantic N of Gibraltar at the time. Unfortunately no RAF, USAF or NATO AWAC ac were in a position to cover the area. The possibility that the incident had occurred on a date other than that reported was put to the company; the pilot flies this route on most days. The company researched the matter thoroughly and confirmed that it occurred on 5 Jul. Having searched all conceivable avenues, AIS (M) tracing action was discontinued.

In the absence of any other explanation it is probable that the above mentioned F18s were the ac involved, but it has been impossible to reconcile the timings. The F18s had been on a properly authorised detachment and had been briefed on the use of the UK LFS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted of the report from the filing pilot and the results of the tracing action, supported by radar recordings.

It was agreed that, at the point when it could only be assumed that the F18s were involved, there would have been little point in going back to the

pilots to ask them what they could remember about a flight 4 months earlier. It was regrettable that the tracing had failed but no discrepancy could be found in the timings recorded; this was one of only 8 Airprox out of 2246 involving military ac in the last 10 years in which a military ac remained untraced. Members commented on how important it was to report quickly and accurately to facilitate a successful trace, particularly if overseas based ac were involved.

Few conclusions could be drawn (particularly about the risk level) without knowing if or when the military pilots had seen the helicopter. It might have been a matter of late sightings by both parties; it might have been that the jet pilots flew inconsiderately close to the landing helicopter, but all that the Board could conclude was that there had been a confliction of

flightpaths. Members discussed the risk, commenting that if the helicopter had been at 200 ft descending, it was already diverging from the jets which were presumably at their msd of 250 ft. At the same time, if the military pilots had not seen the helicopter, and had indeed flown as close to it as its pilot had estimated, safety could well have been compromised. However, the Board declined to make any conclusions about the risk level on the limited information available.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction of flightpaths.

Degree of Risk: D

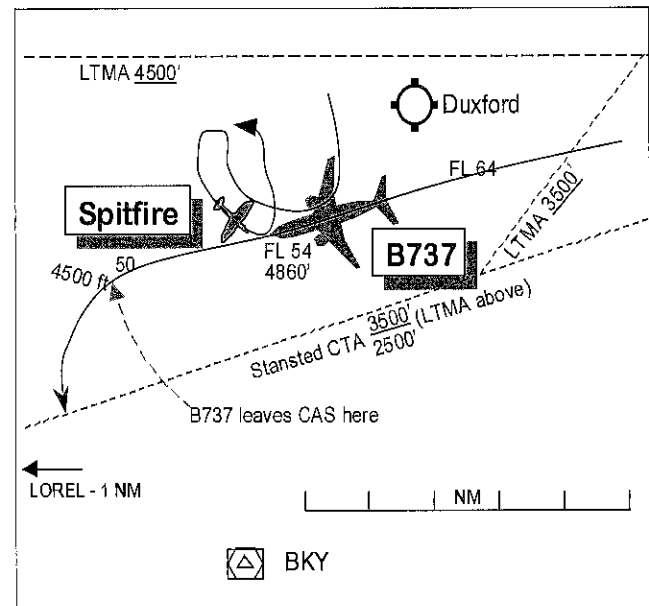
AIRPROX REPORT No 99/00

Date/Time: 9 Jul 1511 (Sunday)

Position: 5204 N 0005 E (3 NM WSW of Duxford - elev 125 ft)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	B737	Spitfire
<u>Operator:</u>	CAT ↓	↑ Civ Pte
<u>Alt/FL:</u>	4700 ft (QNH 993 mb)	4400 ft (QNH)
<u>Weather</u>	IMC CLBL	VMC CLBL
<u>Visibility:</u>	NK	
<u>Reported Separation:</u>	200 m/NK	
<u>Recorded Separation:</u>	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 265° at 220 kt in a descent into Luton from whom he was receiving a radar control service on 129.55. He was cleared down to 4000 ft QNH and was intermittently in cloud. Passing 4700 ft he saw a Spitfire come out of cloud head-on 0.5 NM in front of him at the same level in a steep left turn. It passed about 200 m to his right; both ac were out of cloud at the time but

definitely within IMC in a small clear gap. There was no time for avoiding action, no TCAS alert and a high risk of collision.

THE SPITFIRE PILOT reports holding before making a solo display at Duxford; the ac is not fitted with a transponder. He was entirely familiar with the structure of the LTMA around Duxford (UKAB Note: He is a practising airliner captain) and was using a ceiling of 4400 ft below the 4500 ft base section over Duxford. He was maintaining sight of

the ground between clouds and did not see the B737. He accepted that his was the Spitfire involved (although many were airborne at the time) because he knew what the others were doing at the time. When asked about his altimeter setting he said he had set and checked the Duxford QFE before take off and remained on it because of his forthcoming display and was using 4200 ft as his ceiling to give an extra buffer below the TMA. He had no reason to suspect when asked afterwards that he had flown above that height. When asked about the accuracy of his altimeter he confirmed that it passed the statutory engineering tests and read the same as other formation ac while transiting; he had no reason to doubt its accuracy.

UKAB Note: LATCC radar recordings show the incident as described by the B737 pilot; the B737 is tracking 258° in a descent while a primary return, assumed to be the Spitfire, turns left onto SE towards it. The Spitfire resumes its left turn in the B737's 12 o'clock, passing it at a distance too small to measure from the radar recording. The B737 shows 5400 ft Mode C as it passes the primary return; with a QNH of 993 mb, this would equate to 4860 ft amsl. While other primary-only contacts cross the B737's track earlier (while it is higher), they are in formation. The one assumed to be the reported ac is the only singleton.

ATSI reports that the Luton APR Controller described his workload level and traffic loading as light, both at the time of the incident and during the twenty minute period he had been in position prior to it. On the day of the incident, unknown to the APR Controller, Duxford was the site of an airshow and numerous ac were airborne in its vicinity at the time of the Airprox, but the controller did not consider that this absence of information had any bearing on the incident.

The B737 established communication with Luton Approach at 1510, on a heading of 265°, descending to an altitude of 5000 ft. This was in accordance with the Standing Agreement between Luton ATC and Essex Radar, for ac routeing through the "Luton Gate". This is a line running north from LOREL to the LTMA 4500/5500 ft boundary. The APR Controller explained that this flight was number two in traffic for landing on RW 26, behind an executive

jet. In order to reduce the B737's routeing, he decided to request an early release from Essex Radar i.e. before the gate. He asked the Essex controller if he (APR) could issue the B737 with a descent clearance to 4000 ft and a left turn instruction, straight away. This was agreed, subject to an ac airborne from Stansted on a Compton 3R SID which involves a right turn off RW 23 towards BKY, climbing initially to 3000 ft.

The APR Controller instructed the B737 to descend to 4000 ft at 1510:35. Radar recordings, for this time, show the B737 about 2 NM SE of Duxford Aerodrome at 5200 ft. A number of primary contacts are visible in the vicinity of Duxford. The APR Controller explained that he could not recollect why he had not issued a left turn at the same time as instructing the B737 to descend. He reasoned that it was probably partly because of the presence of the Compton 3R departure to the south and partly because it was necessary to pass an imminent ILS closure heading to the number one ac on approach. The result of leaving the B737 on a westerly heading, descending to 4000 ft was that it would shortly leave Controlled Airspace (CAS) by descent, as the base of the LTMA in its vicinity was 4500 ft. MATS Part I, Page 1-45, states that, except in certain circumstances not applicable to this incident: "Unless an ac has planned to leave controlled airspace, it is not to be vectored outside the horizontal or vertical limits."

APR said that after he gave the number one ac a turn towards the ILS, and before he could issue the B737 with a left turn towards the 3500 ft LTMA base, its pilot reported an Airprox with a Spitfire at his level, 200 yd away. The pilot of the B737 confirmed that his altitude at the time of the encounter was 4700 ft, i.e. within Class A LTMA airspace, 200 ft above the base. MATS Part 1, Page 1-54, under the heading of "Use of levels by controllers" states that:

"Except when aircraft are leaving controlled airspace by descent, controllers should not normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace".

The APR mentioned that there are times at Luton when it is not considered tactically possible to ensure this requirement. However, on this occasion, he had intended to instruct the B737 to turn in order to remain well within CAS.

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.

Members were surprised that the controller did not know about the Duxford air display and wondered if the briefing facilities/process for Luton controllers had been followed. It was agreed, however, that it was normal to see a lot of ac around Duxford at a weekend, and this should not have been a problem. Indeed, the Board agreed that it only became a problem when the Luton APR gave the B737 a descent clearance, without an associated left turn, that allowed the B737 to descend out of controlled airspace. Although the B737 was still just within controlled airspace at the time of the Airprox, the Board could not determine from the information available if the Spitfire pilot had been higher than he intended and had infringed controlled airspace.

There was a lot of cloud around which would have made the horizon difficult to determine, and the B737 was in a descent. These factors may have made the Spitfire, seen ahead, appear to the B737 pilot to be at the same level when it might actually have been somewhat below. However, when the Spitfire passed 200 m to the right of the B737 it appeared to be at the same level; if it had been significantly below, the Captain would probably not have seen it across the flight deck. The Spitfire pilot was both experienced and professional and while it would have been most unlikely that he would have flown above his self-imposed ceiling, members agreed that it was possible. Because members had no means of resolving this point, they agreed that it was not possible to assess the degree of risk in the encounter. The Board concluded that the cause of the Airprox was that the Luton APR had descended the B737 to an inappropriate altitude which resulted in a confliction near the base of controlled airspace.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Luton APR descended the B737 to an inappropriate altitude which resulted in a confliction near the base of controlled airspace.

Degree of Risk: D

AIRPROX REPORT No 100/00

Date/Time: 10 Jul 1310

Position: 5145N 0006W (BPK VOR)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA28 Sikorsky S76

Operator: Civ Trg Civ Pte

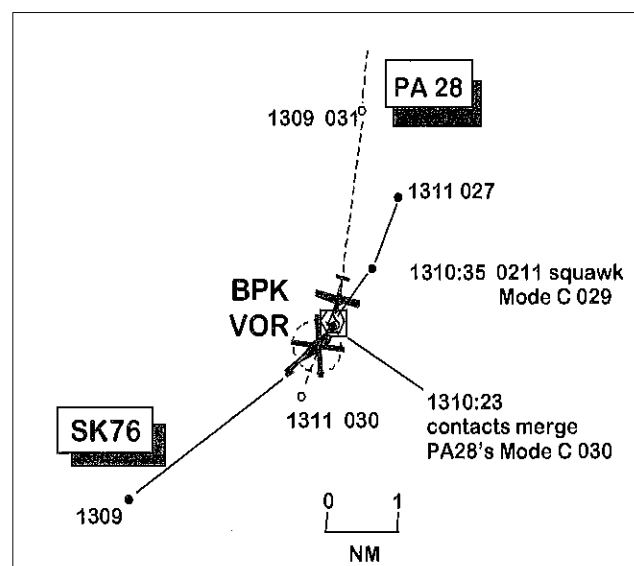
Alt/FL: 2400 ft 2400 ft
(QNH 991 mb) (QNH 991 mb)

Weather IMC Heavy rain VMC Heavy Rain

Visibility: 1 km 2 km

Reported Separation: 100 m same level // Not seen

Recorded Separation: Contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was returning to Elstree from Cambridge via BKY and BPK with 2 students on board following an IMC training exercise. He was receiving a RIS (limited due to weather clutter) from Luton Radar on 129.55 and squawking 4660 with Mode C. The visibility, between cloud layers, was about 1 km in heavy rain. When about 5 NM N of BPK, heading 190° at 100 kt and level at 2400 ft (QNH 991), information was passed to him on traffic at his 1 o'clock. On looking, he saw a helicopter at the same altitude on a collision course about 300 m away. He immediately took control and banked sharply L, and the helicopter passed some 100 m down his starboard side at the same altitude with no apparent avoiding action. He felt there had been a high risk of collision and reported an Airprox to Luton ATC by telephone on landing.

THE S76 PILOT reports that he was en route from a private landing site near Heathrow to Stansted at 2400 ft (QNH 991). When 10 NM W of BPK, contact was made with Essex Radar on 120.62 who issued his joining instructions which were to be at 1500 ft at Puckeridge VRP on Stansted's QNH (991). He was squawking 0211 with Mode C. Owing to controller workload and poor weather it was assumed that the ATC service would be limited to a FIS. Visibility in the area, below a broken cumulus base, was 2 – 3 km in heavy rain. After passing BPK, descent was commenced to 1500 ft in accordance with his instructions; his speed was 150 kt and ground contact was maintained throughout. A standard VFR join was made from Puckeridge and no other ac was seen at any time, nor was there any mention of traffic by the Essex radar controller, whose workload with IFR arrivals was high.

LUTON ATC reports that a RIS, limited by weather clutter, was being provided to the PA28 pilot. Full radar suppression was in operation. When the PA28 was 5 NM N of BPK, heading S, a radar return which had just emerged from an area of weather clutter was observed 2 NM SW of it heading NE. Owing to a call from another ac, traffic information could not immediately be passed to the PA28 and by the time a transmission could be made the unknown return was 1 o'clock to the PA28 at less

than 1 NM. The PA28 pilot reported visual with the traffic, which was a helicopter. No avoiding action was offered or requested.

LATCC (TC) ESSEX RADAR (120.62) reports that at about 1300 the helicopter was worked inbound to Stansted. The pilot was provided with a FIS, routed to the VRP at Puckeridge on a VFR clearance and transferred to Stansted Tower.

ATSI comments that RT transcripts and the radar recording confirm that the Airprox occurred almost directly overhead the BPK VOR. Luton ATC placed the PA28 under a RIS, limited because of severe weather clutter. The S76 (whose first call to Essex Radar was made about one min before the Airprox occurred) was not placed under any ATC service but was allocated a squawk just as its primary radar return merged with the return from the PA28. Essex radar informed the S76 pilot that he was identified about 70 sec after the Airprox had occurred. Under the circumstances, the Luton controller did well to pick up the radar return from the S76 and call it to the PA28, albeit the warning was very late. There are no perceived ATC implications in this incident.

UKAB Note (1): Referring to VFR flight in Class G airspace, the UK AIP states that... "helicopters may operate in less than 1500 m flight visibility at a speed which, having regard for the visibility, is reasonable".

UKAB Note (2): A recording of the Debden radar at 1309 shows a primary return, believed to be the S76, approaching the BPK VOR on a NE heading. The PA28, squawking 4660, approaches it from the NNE indicating 3000 ft Mode C (equivalent to 2400 ft on QNH 991). At this point the ac are some 6 NM apart. At 1310:23, as the returns merge directly over the VOR, the PA28 shows 3000 ft. Twelve sec later the S76's squawk (0211) first appears, with Mode C indicating 2900 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, reports from the air traffic controllers involved and comment from the appropriate ATC authority.

The Board noted this Airprox occurred had overhead a major navigational aid, the BPK VOR, in very poor weather conditions giving marginal visibility. Members cautioned GA pilots against the practice of navigating precisely towards such a 'honeypot' feature generally, but especially as in this instance where the extent of vertical airspace useable is limited to 2500 ft underneath the base of the LTMA. Some members thought that the S76 pilot was flying too fast for the poor weather conditions pertaining and they assessed his non-sighting of the PA 28 as a part cause of the Airprox. The PA 28 pilot saw the S76 late, having been alerted to it by Luton APC, and this was also seen as a part cause. Members unanimously commended the Luton controller whose traffic call, albeit late, enabled the PA28 pilot to spot the S76 just in time to take avoiding action; it was felt that without the

controller's warning the outcome of the encounter might have been considerably more serious. Although 2 members felt there had been an actual risk of collision because of the high closing speed and late avoiding action by the PA 28, the majority of the Board were satisfied that the PA28 pilot's last minute action had successfully averted a collision. Nevertheless, they concluded that the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non sighting by the S76 pilot and a late sighting by the PA 28 pilot overhead a VOR in very poor weather conditions.

Degree of Risk: B

AIRPROX REPORT No 101/00

Date/Time: 12 Jul 1051

Position: 5440 N 0334 W (10 NM WSW Dean Cross)

Airspace: UAR/MRSA (Class: B)

Reporter: ScACC DCS SC

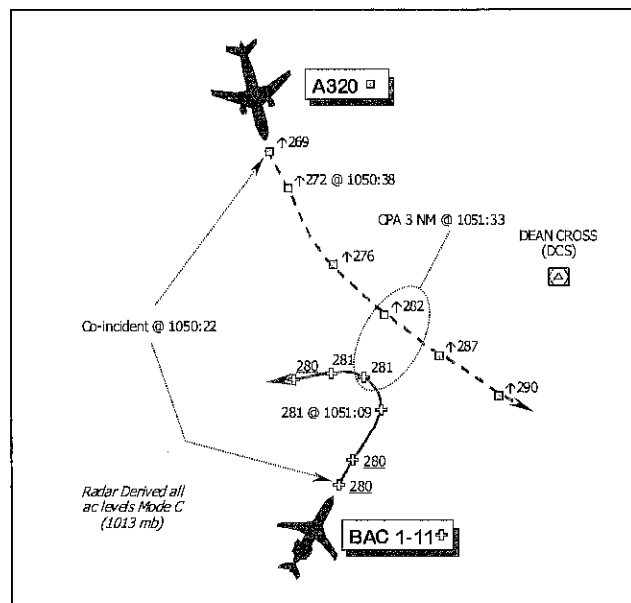
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	Airbus A320	BAC 1-11
<u>Operator:</u>	CAT	MOD DPA
<u>Alt/FL:</u>	FL 280	FL 280
<u>Weather</u>	VMC CLOC	VMC CLOC
<u>Visibility:</u>	NR	>5 NM

Reported Separation: 3.2 NM H, 100 ft V

Recorded Separation: 3 NM H, 100 ft V

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DEAN CROSS SECTOR CONTROLLER (DCS SC) reports that when the previous controller handed over the sector he pointed out a 6453 squawk (the BAC 1-11) operating in the vicinity of Eskmeals Range (EGD 406) and manoeuvring up to 10 NM SW of DCS. She was also advised that the LJAO controller was using an outside telephone



line for co-ordination, but she was not given any contact number. Consequently, she believed that LJAO NW (LOW) would co-ordinate any potential conflict with DCS Sector traffic individually and that the military ac would maintain FL 280.

The A320 was climbing to FL 290 on the W side of the sector while another ac to the E was climbing to FL 270 and this resulted in the A320 tracking W of DCS, southbound on UPPER ALPHA 1 (UA1).

(UKAB Note 1: At this stage it was diverging W of the UAR centreline). As the A320 passed FL 270 the STCA was triggered and she immediately issued a L turn, expecting the military ac to be turned away to the L also. When it appeared to her that it had not, a further avoiding action L turn and traffic information was passed to the A320 pilot. The A320's climb was not stopped as it had already passed FL 270; she thought it unlikely that the A320 would have been able to level-off before reaching FL 280 because of the rate of climb. Shortly after the STCA had triggered, the outside phone rang but she was unable to answer it immediately as she was speaking to the A320 crew. Unfortunately, the caller (LOW) rang off just as she answered, but called on another line and then called again on the first line, which she eventually managed to answer. In the intervening period LOW had also issued avoiding action instructions. She continued to pass traffic information to the A320 crew until the ac levelled at FL 290 and the confliction was resolved.

UKAB Note (2): The Offgoing DCS SC reported that before the sector was handed over, LOW had co-ordinated traffic against two individual TMA outbounds. On both occasions DCS SC had agreed to maintain his traffic at FL 270 until clear of the LJAO controller's BAC 1-11, and before climbs were continued to the 'standing agreement level' of FL 290. On handing over the sector, he advised the oncoming SC that LOW had traffic operating between 10 NM SW of DCS and the vicinity of Eskmeals Range at FL 280. He added that LOW was co-ordinating individually against DCS traffic as required, using the outside extension line and he pointed out a pink 'military' FPS, with the details that was available beside the display for use as required.

UKAB Note (3): Although the A320 was on a divergent track from the centreline of UA1 some 10 NM WSW of DCS when the Airprox occurred, ENR 3-2-1-1 stipulates that the portion of the UIR within the given co-ordinates is deemed to be part of UA1. Hence, the A320 was considered to be 'On-route GAT' for the purposes of the co-ordination of OAT.

THE AIRBUS A320 PILOT could not recall anything of significance and was, therefore, unable to contribute to the Airprox investigation.

THE BAC 1-11 PILOT reports he was conducting an experimental radar trial that required a LHD racetrack pattern at FL 280, to the southwest of DCS whilst in transit to the trials area. This pattern was briefed to LOW who instructed him to establish the racetrack, with the proviso that the northerly extent might have to be restricted because of civil traffic. The trial required very accurate track keeping on the northbound legs, using a GPS display mounted on the centre console, which degraded the crew's visual lookout. Following several racetrack patterns, at about 9 NM SW of DCS, LOW issued an avoiding action L turn onto 270°. He immediately abandoned the trial profile and complied. Once established on 270° he queried the position of the conflicting traffic and believed the controller responded "2 N of you heading S climbing through FL 278", but the other ac was not seen at all. They were then cleared to resume the trial profile.

ATSI reports that when the Airprox occurred the ScACC DCS N and S positions were combined and the controller concerned was performing both the Tactical (T) and Support (S) tasks. The SC described her workload as varying between light and moderate during the 20 minutes she was in position, before the occurrence.

Analysis of the DCS RT transcript confirmed that two telephone calls were received, by the off-going DCS SC, from the LJAO NW PLANNER (PLN), prior to the Airprox. The first at 1007, revealed that PLN passed traffic information about the BAC 1-11 flight at FL 280 in Eskmeals Range, which would be operating no further N than 235° DCS 10 NM. The SC advised LJAO of traffic climbing out of Glasgow and that he would separate it from the BAC 1-11. A further telephone call was made by LOW at 1016, asking if DCS SC had any more traffic to affect the BAC 1-11, which was requesting a similar track as before. Once again DCS SC advised he would separate a second Glasgow outbound from the BAC 1-11. No further telephone calls regarding the BAC1-11 were received by either the offgoing or oncoming DCS SCs until the incident occurred.

During the handover of the sector, the oncoming SC was informed of the BAC1-11 operating near Eskmeals Range at FL 280. Her recollection was that, if necessary, LOW would initiate the relevant

co-ordination if the military ac required to fly to 10 NM SW of DCS, otherwise it would remain clear of the sector's traffic. She confirmed that a pink FPS was displayed for the LJAO traffic, which showed the ac's squawk and flight level but no callsign.

The BAC 1-11's squawk was observed approaching within 10 NM of DCS at FL 280 when she took over the sector, but as she had no conflicting traffic at that time it was not a problem. Later, at 1047, the A320 crew called, climbing to FL 250 on a heading of 165°. The flight was cleared, on this heading, to climb to FL 290. The controller explained that she then turned her attention to a complex 'climb through' situation to the N of the sector and only became aware of the confliction between the subject ac when the STCA activated at 1050:40.

As soon as the STCA activated, from observing her radar display, the controller was aware that the A320 had passed FL 270. Consequently, as it was some distance from the BAC 1-11, she assessed that the best course of action was to allow the A320 to continue climbing to its cleared level of FL 290 and to give it a turn away from the conflicting traffic. She said that when issuing the turn, she was restricted by the presence of another ac, paralleling the track of the A320 to the E at FL 270. Accordingly, she instructed the A320 crew to *"turn left onto radar heading of 145°"*. Informing them in a follow-up transmission, that this was *"traffic avoidance...traffic in...your half past one a range of 10 miles should be turning away"*. The radar photograph, timed at 1050:40, shows the STCA activating, when the 2 ac were on conflicting tracks 12 NM apart, the A320 is passing FL 273 and the BAC 1-11 is maintaining FL 280. The A320 crew was instructed to turn further L heading 130° and traffic information was updated until the A320 was clear of the BAC1-11. The A320 pilot commented that he did not receive any information about the conflicting ac from TCAS.

The DCS SC said that, as soon as she became aware of the situation, she attempted to call LOW on the direct line, but without success. She noticed that the outside line was ringing and thinking that it might be the LJAO Controller she answered it but by this time it had been automatically transferred to another position. When telephone communication was eventually established between them at 1051:30, remedial action had already been taken. It appears that the LJAO

Controller believed that the DCS Sector would call him if there was any traffic to affect the operation of the BAC 1-11, as it had been operating in the area *"for quite a while at FL 280"*, but there is no evidence to support this belief.

MIL ATC OPS reports that the BAC 1-11 crew, was operating a racetrack pattern under their own navigation, near Eskmeals Range at FL 280 and in receipt of a RCS from LOW. The ac had been 'on task' for about 45 min before the Airprox occurred. When the pilot first established contact with the controller he said he was flying a trials sortie at FL 280, between two specific positions 235° DCS 10 NM and 225° DCS 25 NM. However, neither LJAO nor ScATCC (Mil) had been made aware of the full sortie requirements beforehand. Although the racetrack penetrated the Scottish MRSA, the majority lay within the LJAO NW (LOW) Sector's area of responsibility, hence it was decided that LOW would retain control throughout. Therefore, it was the LJAO NW PLN, a co-ordination position occupied during busy periods, that contacted the DCS SC at 1007. Traffic levels in the NW Sector then decreased and so the PLN position was closed. PLN briefed LOW on the co-ordination that had been agreed and gave him the telephone number of the DCS SC. LOW then co-ordinated a further track with DCS at 1017 and shortly after this, the LOW control position was handed over to another controller – including the contact number for further co-ordination with DCS.

The BAC 1-11 flew several runs monitored by the new LOW controller, during which the ac had been turning about 5 NM SW of DCS, but no further co-ordination had been required. At about 1046, LOW's workload began to increase significantly and he called for the PLN position to be manned again. As part of the 'in brief' to the new PLN, LOW pointed out the BAC 1-11, which was now tracking NE toward DCS. PLN observed GAT - the A320 - climbing through FL 265 on a conflicting track and drew it to the attention of LOW, who stated that this track had been co-ordinated and that the DCS SC would be avoiding the BAC 1-11 at FL 280. LOW was firmly in the belief that civil ac in the area were being kept at or below FL 270 and that FL 280 had, in effect, been blocked. However, the A320's Mode C continued to increase, so he transmitted *"...avoiding action, turn L heading 270, traffic N of*

you by 10 miles tracking S climbing through FL 275", which the BAC 1-11 pilot complied with. STCA activated at about the same time.

The Great Dun Fell radar recording shows the BAC 1-11 tracking about 025°, level at FL 280, with the A320 tracking about 155° and climbing through FL 269 at a rate of about 100 ft per radar sweep. The A320's track is diverging from the centreline of UPPER ALPHA 1 to the W. The BAC 1-11 starts to turn L at 1051:09, in a position 230° DCS 11 NM. At this point, the A320 is passing FL 278 Mode C, 275° DCS 11 NM, placing it in the BAC 1-11's 340° - 7.5 NM. The CPA is shown at 1051:33, as both ac pass starboard to starboard with a horizontal separation of 3 NM, the BAC 1-11, still in a L turn through 310° and indicating FL 281, whilst the A320 is passing FL 282.

On making landline contact with the SC straight after the incident, the ScACC controller immediately apologised to LOW and added that the BAC 1-11's track had not been seen, which reinforced LOW's impression that his actions had been correct. However, this was not the case; the BAC 1-11's flight had been tactically co-ordinated with two individual ac earlier and no long-term co-ordination had been agreed. Thus the responsibility for initiating co-ordination between on-route GAT and OAT lay with the military controller.

The controller concerned could not account for his belief that the flight had been co-ordinated; the most likely reason seemed to be that, for a trial of this nature, it was normal LJAO practice to negotiate a blocked level with the appropriate civil sector for the duration of the trial. The original Planner's decision to deviate from this 'norm', was a perfectly legitimate course of action, further influenced no doubt by the lack of any pre-sortie details - such as an ACN - on the BAC 1-11's flight profile prior to its arrival on frequency. However, once on frequency there was ample time during the sortie to negotiate a blocked level, a fact reflected in the original ScACC controller's report, where it was stated that a 'Pink' fps was available at the DCS Sector position.

With regard to the confliction, LOW's avoiding action instructions, combined with the BAC1-11 pilot's prompt response, ensured that there was no risk of collision. STCA also activated, but the A320 pilot stated on RT that "...we've got nothing

on TCAS" and thus it is assumed that the parameters of the confliction were outside the limits required to generate an RA. Finally without any long-term co-ordination arrangements in place it was LOW's responsibility either to initiate co-ordination with the DCS SC, or to ensure the BAC1-11 was manoeuvred clear of the A320 to maintain standard separation.

MOD (DPA) declined to make any comment.

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 Mil ATC Ops adviser explained that this Airprox stemmed from a false assumption on the part of the LJAO NW LOW controller - who even now could still not understand why he had made such a mistake. LOW thought that the DCS SC was going to stop off GAT below the BAC 1-11 and avoid it, when no such co-ordination had taken place. Members agreed that this omission was the root cause of the Airprox and had led to LOW's false sense of security when the A320 was climbing toward the BAC 1-11. It was explained that LJAO would normally seek the SC's agreement to a Cleared Flight Path (CFP) at an appropriate level for a trial of this nature and this could well have been in the controller's mind at the time. The previous PLN and LOW controllers had elected to deviate from this procedure, although they apparently had time to obtain a CFP, and in so doing promoted a situation in which, eventually, LOW was caught-out. A civil controller member asked if LJAO controllers utilised a standard system of fps marking for CFPs. It was subsequently ascertained that they do in the form of "CFPü" to indicate agreement reached. Consequently, the absence of such annotation on the fps should have signalled a warning to LOW. Fortunately, the oncoming PLN noticed the confliction whilst being briefed by LOW, enabling LOW to take decisive avoiding action as soon as he realised that the A320 was not levelling at FL 270 as he erroneously assumed.

A debate ensued about the importance of an Airspace Co-ordination Notice (ACN) in this scenario. LJAO, ScATCC (Mil) and ScACC had all been denied forewarning of this trial in the UAS other than the BAC 1-11 pilot's RT brief en-route to the trials area. It was mentioned that in such a busy piece of Class B CAS agreement to a blocked level for the trial may have been problematic because the DCS SC had to achieve the standing agreement level of FL 290 for transfer to the next Sector. However, the lack of an ACN in this situation, where the trial straddled not only Sector but also ACC boundaries, was viewed as a possible contributory factor. Indeed as the trial profile had to be broken off when avoiding action was issued, this suggested that Non-Deviating Status might have been warranted for the flight and an ACN appropriate. However, it was unclear if the previous SC had refused a CFP owing to the standing agreement level or had never been asked by the previous LJAO LOW/PLN team for one in the first place. Refusal was thought unlikely as the previous SC had agreed to stop off earlier ac below the BAC 1-11, which had been very helpful - as would an ACN. Members agreed that the military controller was responsible in this situation and that LJAO NW (LOW) had not ensured that standard separation was effected between the BAC 1-11 and the A320 under the control of the DCS SC.

Some controller members questioned the apparent difficulty in communicating between the two controllers concerned. Subsequent information revealed that a Direct Access (DA) telephone line exists between the DCS SC and LJAO NW (LOW) control positions, but from DCS Support to the LJAO PLN a telephone extension number has to be dialled. These were the numbers that had been specified for use by the controllers concerned in this non-standard scenario, but adequate communication arrangements exist at the relevant control positions for normal operations.

Turning to risk, once the conflict was detected both controllers had issued avoiding action. The pilots – one more aggressively than the other - complied with this and members commended the BAC 1-11 pilot for his prompt action and very tight radius of turn, as evinced by the radar recording. Some pilot members familiar with the A320 observed that a 'level-off' for avoiding action - considered but then rejected by the DCS SC - would have taken effect more quickly. They confirmed that it takes but 1-200 ft to level the ac at a normal roc, which was a quicker solution than a turn in the horizontal plane. Other pilot members also noted the apparent preference by controllers to "avoid" in azimuth rather than in the vertical plane. By their nature avoiding action decisions are made by controllers on the spur of the moment and it was pointed out that the DCS SC's decisions were influenced by the presence of other traffic at the same level to the E. Although this situation had not apparently generated a TCAS RA, STCA had prompted the DCS SC and it was also triggered on LOW's display. Their joint actions prevented horizontal separation being eroded below 3 NM, albeit that the A320 had only climbed 100 ft above the BAC 1-11's level at the CPA. Although neither pilot had acquired the other's ac visually, appropriate 'safety nets' had worked, which led the Board to agree unanimously that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LJAO NW (LOW) Controller did not ensure standard separation between the subject ac.

Degree of Risk: C.

AIRPROX REPORT No 103/00

Date/Time: 14 Jul 0904

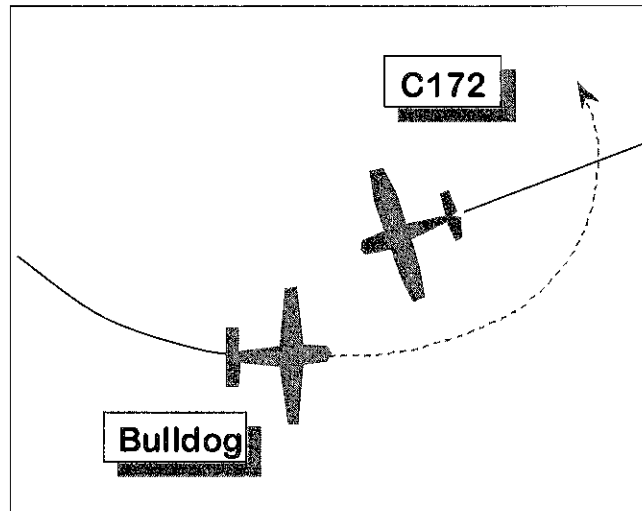
Position: 5133 N 0218 W (Badminton - elev 495 ft)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	Bulldog	C172
<u>Operator:</u>	HQ PTC	Civ Trg
<u>Alt/FL:</u>	2500 ft (RPS 1008 mb)	3000 ft (RPS 1007 mb)
<u>Weather</u>	VMC CLOC	VMC CLBC
<u>Visibility:</u>	CAVOK	50 km

Reporting Separation: 30 ft/200 m H, 200 ft V

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BULLDOG PILOT reports flying a dual instructional sortie with his student approaching 'high key' for a PFL at Badminton airstrip. While heading 340° at 75 kt in a descending L turn he saw a light civil ac on his left and 30 ft below which had just passed directly beneath. It was too late to take any avoiding action but he instinctively climbed up and away from it. The minimum separation was similar to close formation. He reported the incident to Colerne from whom he was receiving a FIS. (UKAB Note: LATCC radar recordings show that the Bulldog was tracking E as it passed the Cessna.)

THE C172 PILOT reports heading about 250° at 100 kt on a training sortie and was demonstrating the operation of the trimmer control when he saw the Bulldog passing port abeam almost on a reciprocal track. He therefore took no avoiding action. He assessed that the Bulldog passed 200 m away and 200 ft above with a medium risk of collision; he was at about 3000 ft at the time. He included 'head in cockpit' and 'high wing' as relevant factors. He also considered that because he saw the conflict too late to influence the outcome, the ac would have collided had they been on a collision course. His transponder did not include Mode C.

HQ MATO reports that the Bulldog pilot was receiving a FIS from Colerne Approach (APP), which is not radar equipped, on 277.275. When the Bulldog pilot reported an Airprox with what was thought was a Cessna, which had flown within 30 ft of the Bulldog, APP contacted Lyneham Zone who advised that they had just been called by a C172.

The C172 pilot had freecalled Lyneham Zone (Mentor & trainee) on 123.4 at 0903:16, requesting a FIS, advising that he was operating "...in the local area between 2000 to 4000 feet on 1006." After instructing the C172 pilot to squawk 4530 during the identification process, the controllers noticed that the C172 was to the W of Kemble, where there were a number of Colerne Bulldogs operating, and transmitted "...there's multiple Bulldogs operating in your vicinity at similar altitudes.." at 0903:55, which was acknowledged by the pilot. At 0906:37, having just received Colerne's telephone call, ZONE asked the C172 pilot if he had just had an Airprox with a Bulldog, to which the C172 pilot replied "I wouldn't describe it as an Airprox; he was fairly close (unintelligible words) good VMC."

UKAB Note: LATCC radar recordings show the C172 changing squawk to 4530 NMC 25 sec before passing the Bulldog which shows a gradual descent to 3000 ft Mode C as the ac pass at a distance too

small to measure from the recording. 3000 ft Mode C equates to 2800 ft on the 1006 QNH given on RT by the C172 pilot.

HQ PTC comments that neither military nor civilian pilot training can be provided with an insulated cocoon in which to conduct their airborne lessons, and the constraints of an ATC service at this ab initio stage could themselves be a complicating and potentially hazardous distraction. As a result, the instructional task can never be allowed to take priority over the need to see and avoid other traffic. We can but support most strongly the Station's exhortations for a continuous and comprehensive lookout (including an understanding of one's own ac's blind-spots) upon whose success the freedom of VFR flight rests.

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 was clear to members that the cause of the incident was that neither pilot saw the other ac in time to take avoiding action. This led members to discuss the problems of seeing round parts of the ac structure which impede vision and the necessity

to move the ac regularly to see past them. It was suggested that on teaching sorties, instructors should employ small but regular changes of flightpath to assist pilots' lookout and to 'break' collision courses and make conflicting ac, which might have been on a constant bearing, easier to see. The Board agreed that a discussion of these points with the CAA GAD to see how they might be furthered through dissemination to flying instructors, could be useful. The chairman agreed to take the matter up with GAD.

There was insufficient evidence about the C172 pilot's altitude at the time to resolve the differences in the 2 pilots' perceptions of the vertical miss distance. Members surmised this was probably somewhere between the estimates given. Debate continued at some length on whether there had been a risk of an actual collision heightened by the lack of timely sightings or whether the prevailing separation indicated a lesser degree of risk. Members' conclusions were not unanimous but a small majority considered that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Neither pilot saw the other ac in time to take avoiding action.

Degree of Risk: B

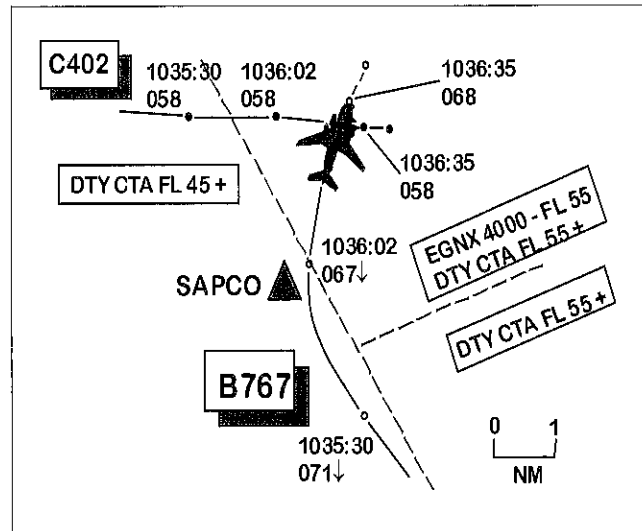
AIRPROX REPORT No 104/00

Date/Time: 18 Jul 1037

Position: 5234 N 0122 W (2 NM N SAPCO)

Airspace: CTA (Class: A)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	B76-2	C402B
<u>Operator:</u>	CAT	Civ Comm
<u>Alt/FL:</u>	FL 67 ↓	6000 ft (QNH 1021 mb)
<u>Weather</u>	VMC CLAC	VMC CLNC
<u>Visibility:</u>	40 km	20 km
<u>Reported Separation:</u>		1 NM 700 ft/800 ft V
<u>Recorded Separation:</u>		1 NM H/900 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports heading 330° at 250 kt descending through FL 75 to a cleared level of FL 60 shortly after ATC handover to East Midlands from Manchester. The visibility was 40 km, 700 ft above cloud in VMC. A crossing ac was seen first on TCAS at 20 NM distance and subsequently acquired visually. Shortly thereafter a TCAS TA annunciation was received as the traffic indicated at his cleared level. He selected ALT HOLD and levelled off at FL 67 at the same time as East Midlands instructed him to do so. The other ac, a twin-engined type, passed L to R 700 ft below approximately 1 NM ahead in level flight. He assessed the risk as high if he had not complied with TCAS.

THE C402B PILOT reports flying an aerial survey detail from Cranfield in the area to the N of Birmingham at 6000 ft QNH 1021 (FL 58). The visibility was 20 km with no cloud in VMC and he was receiving a RIS from Birmingham on 118.05. When approaching SAPCO on a steady easterly track he first sighted the B767 about 1 – 2 NM to his S and 800 – 1000 ft above; no avoiding action was necessary as the B767 appeared to be climbing to pass overhead. The B767 seemed closer than normal and as he was about to contact ATC they informed him about the ac. He assessed

the risk was medium to low because whilst he had good vision from the cockpit he was busy following his navigation display whilst 'on task'.

ATSI reports that all the MACC ATC equipment relevant to the task was serviceable. The East Midlands radar was reported as unserviceable, resulting in a lack of primary radar information available to that ATC unit and necessitating the use of the Claxby SSR only. This was not considered to be a contributory factor to the incident. The workload was described variously by the controllers concerned as light to moderate.

About thirty minutes prior to the Airprox, Birmingham informed East Midlands, MACC and LATCC, about the C402, a survey ac, operating at 6000 ft between the Birmingham Control Zone (CTR) and SAPCO. The call to MACC was answered by the STAFA Co-ordinator trainee, who held a Certificate of Competence for the STAFA Radar position. He wrote the details on a pink FPS and placed it in the display. Shortly afterwards, the trainee and his mentor were relieved from the position. Meanwhile the East Midlands APR, after receiving the telephone call from Birmingham, had converted the code/callsign of the C402 to read "MISS ME" on his radar display. This, he believed, would assist him in remembering its presence.

At 1026, the C402 requested, on the Birmingham Approach frequency, a clearance to route eastbound, from its present position, for 30 NM i.e. into the SAPCO area. The pilot was instructed to continue outbound, whilst the APR Controller co-ordinated with the relevant ATC units. The first call he made, on this occasion, was to the East Midlands APR Controller, who advised that he did not require to work the ac as he considered that it would not conflict with any of his traffic. The East Midlands APR Controller confirmed that a FPS, concerning the survey ac, was already in position in the active bay on his display. LATCC was then informed by Birmingham, followed by MACC.

Shortly after this telephone call was received at MACC, the Co-ordinator trainee, who had received the initial call, returned to the sector following his break. On this occasion he was to be monitored by a different mentor. At the time, this new mentor was still operating as a radar controller on another sector but owing to staffing considerations he was relieved from that position to take over the STAFA Co-ordinator task. He commented that, when he reached the sector, the handover had already been completed between the off-going controller and the trainee, so, as he arrived, the latter unplugged without making any further comment except that 'the trainee had the picture'. The on-coming mentor said that he accepted the position, reasoning that he would soon be able to brief himself on the traffic situation as the sector was not busy and there were not many FPS on the display board. The Manual of Air Traffic Services (MATS), Part 1, Page 8-2, states under the heading of "Handing over an operational position" that: "Only when they (controllers taking over) are completely satisfied that they have a total awareness of the situation, should they indicate to the controller handing-over that they are ready to accept responsibility for the operational position". Clearly, on this occasion, the controller taking over did not have total awareness of the traffic situation and was reliant, initially, on the trainee's understanding of the handover. The mentor explained that, having plugged in with his trainee, they received a telephone call concerning military crossing traffic. Because of his trainee's lack of experience with this type of co-ordination, it took some time to complete and, consequently, he did not have the opportunity to familiarise himself with the traffic situation on the sector, as he intended.

He, therefore, was not aware of the C402's details. The trainee, however, confirmed that he was aware of its presence following the handover he had received from the off-going Co-ordinator. He also recollected having written its FPS previously.

The B767 established communication with the STAFA Sector at 1032, on its descent to FL 100 in accordance with the Standing Agreement with the adjacent sector. The trainee Radar Controller, who was relatively inexperienced, having completed only about 50-60 hours training at Manchester, cleared the flight to descend to FL 60, routeing SAPCO - East Midlands NDB (EME). This instruction was made prior to a release level being obtained from East Midlands. However, the mentor agreed with the decision to issue the descent clearance as he considered that it could always be modified later if a higher release level was subsequently arranged. The Radar Controller mentor said that he was not aware of the C402 routeing to the SAPCO area at 6000 ft and could not recollect if it had been mentioned when he took over the sector. He added that, because of the presence of another mentor/trainee on the sector, he was monitoring his trainee from a position that meant that he did not have a full view of the FPS display. The trainee reported that he was aware of the C402's FPS on the board but believed that the flight was under the control of East Midlands ATC and, therefore, it would be separated from the B767 by that unit. Shortly after the B767 was cleared to FL 60, the East Midlands APR Controller informed the trainee Co-ordinator that FL 60, at the EME, was allocated for the flight. The APR Controller admitted that, at the time, he overlooked the presence of the C402 when allocating FL 60. He could not readily explain why this occurred, other than it was operating near the southern extremity of his area of responsibility and, consequently, he did not expect it to conflict with any of his traffic. The trainee Co-ordinator admitted that he, also, did not consider the presence of the C402 when accepting FL 60 for the B767 and passed the flight's release point as SAPCO. The Co-ordinator said that he was somewhat relieved when East Midlands allocated FL 60 at the EME for the B767, in view of the fact that he realised that it was already descending to that level. He was still unaware of the C402 at the time.

The mentor Radar Controller recollected that, when he was aware that the release level matched the B767's cleared level, he instructed his trainee to transfer the ac to East Midlands, still not realising the potential confliction with the C402. The B767 was transferred at 1034:34.

The B767 reported to East Midlands Approach that it was approaching FL 60 in a right turn at SAPCO to the EME. As this call was being made, the trainee Co-ordinator, realising the situation, telephoned East Midlands to warn him of the potential confliction. Because it was received in the middle of the ac's initial transmission to East Midlands, the controller did not realise, at first, the significance of the message from MACC. When he did, observing that the flight was just passing FL 70, he instructed the B767 to stop its descent.

Meanwhile, the STAFA Radar Controller noticed the 1736 squawk leaving the Birmingham CTR tracking towards SAPCO. He telephoned Birmingham immediately to query the ac's intentions. Birmingham pointed out that it was previously co-ordinated traffic. The Birmingham Controller said that he observed the B767 descend below FL 70 and passed traffic information to the pilot of the C402. The latter reported the other ac in sight.

It became apparent during the investigation that, for ergonomic reasons with two trainees on the sector, the Radar mentor was plugged in to the adjacent position, whilst monitoring his trainee, rather than the same one. Although he could hear all the RTF transmissions taking place on the sector, he was limited to monitoring the telephone calls which he selected. However, albeit it is recognised that it is not good ATC practice to operate in this manner, on this occasion, it was not considered to be a causal factor to the incident. However, the radar mentor's restricted view of the FPS display was undoubtedly a factor.

Since this incident, the following information, concerning training on area sectors, was published in a MACC Supplementary Instruction (552/00):

- a. Some incidents have shown that 'on-the-job-training' on operational sectors has the potential to affect safety. The ATC Watch Manager is responsible for managing training on his watch.

- b. The basic rule is that there must be only one trainee on a sector at a time. However, provided that 'mentor boxes' are available and in use, the ATC Watch Manager may approve two trainees per sector. In making this decision the ATC Watch Manager will take into account the experience level of each trainee."

UKAB Note: Replay of the Clee Hill radar at 10:35:31 shows the C402 tracking Eastbound 3 NM NW of SAPCO crossing 5-7 NM ahead of the B767 as it commences a R turn towards East Midlands. The closest point of approach is at time 10:36:18 when the C402 indicates FL 57 1 NM N of the B767 as it stops its descent at FL 66 and then passes O/H the C402, 10 seconds later, whilst in the climb back to FL 70.

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.

Initially, the Board wondered how each of the 6 ATCOs involved (5 at MACC and 1 at East Midlands) could have overlooked the presence of the C402 and why this ac was working Birmingham Approach. It was apparent that the modus operandi of the MACC STAFA sector was a significant factor in this incident. An ATSI adviser said that at 6000 ft the C402's survey detail would conflict mainly with traffic inbound to and outbound from Birmingham and this explained why it had been under the control of Birmingham Approach. Returning to events on the MACC STAFA sector, the Board noted that the oncoming Co-ordinator mentor had been relieved from an operational position so that he could monitor the trainee, and had taken the position over in a situation where the offgoing controller had given the trainee 'the picture' and then unplugged. The offgoing controller and/or the oncoming mentor may have thought this arrangement was satisfactory; the trainee Co-ordinator also held a Certificate of Competence for the STAFA Radar position, and so may have been assumed able to cope with the sector until the oncoming co-ordinator mentor could plug in. Whatever, the Board was critical of these

actions. The onus was on the two qualified Co-ordinators to carry out a handover to each other and to their own satisfaction. This was not done and formed a part cause of this Airprox.

The STAFA Radar trainee/mentor situation was discussed next. Concern was expressed about the limited monitoring ability by the Radar mentor but more crucially, the seating arrangements which did not allow him a full view of the active FPS display. This had contributed significantly to his lack of awareness of the C402. Consequently, despite earlier co-ordination from the Birmingham APR controller that had resulted in the generation of a pink 'blocker' strip to be displayed, both at MACC and East Midlands, the STAFA Radar mentor remained unaware of it when he allowed his trainee to descend the B767 to FL 60. Similarly, the STAFA Co-ordinator mentor remained unaware of the C402, because he was unbriefed, and had allowed his trainee to co-ordinate an acceptance level, FL 60, for the B767. Finally, despite having a FPS for the C402, the East Midlands APR controller appeared simply to have overlooked the presence of the C402 when negotiating an allocation of FL 60 with MACC for the B767. Drawing all these factors together led the Board to conclude that the cause of this incident could be broken down into 5 separate elements each of which held its own particular lesson.

As to the risk, the conflict was noticed, eventually. The MACC warning call to the East Midlands APR controller about the C402, the TCAS alert in the B767 and visual sightings by both pilots all combined successfully to remove any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

- a. An incomplete handover by the MACC TAFE Co-ordinator mentors.
- b. The MACC STAFA Radar mentor did not have an uninterrupted view of the FPS display and was unaware of the C402.
- c. The MACC STAFA Radar mentor did not take the C402 into account when he allowed his trainee to descend the B767 to FL 60.
- d. The MACC STAFA Co-ordinator mentor did not take the C402 into account when he allowed his trainee to co-ordinate the acceptance level for B767.
- e. The East Midlands APR controller did not take the C402 into account when he allocated FL 60 to the B767.

Degree of Risk: C

AIRPROX REPORT No 105/00

Date/Time: 19 Jul 1024

Position: 5054 N 0320 W (3 NM NNE of Cullompton VRP)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Gazelle Bulldog

Operator: JHC HQ PTC

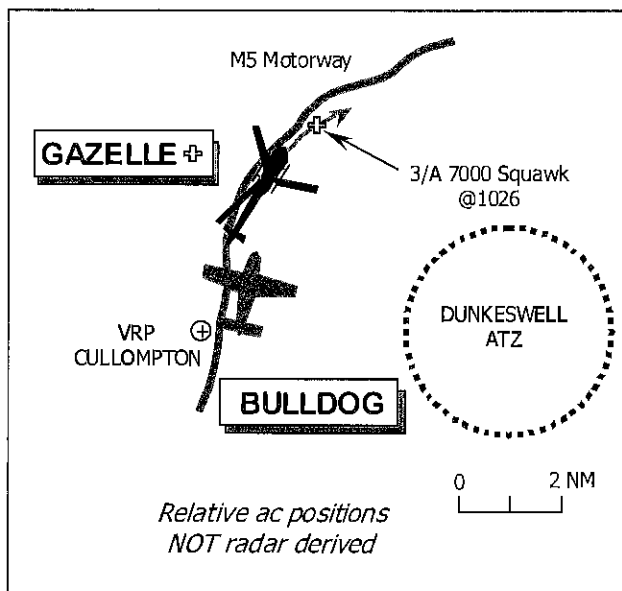
Alt/FL: ↑1000 ft 500 ft
(QNH 1022 mb) (agl)

Weather VMC CAVOK VMC

Visibility: >30 Km Not Reported

Reported Separation: 80-150 ft V, Nil H Unseen

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports he was returning to Yeovilton on completion of a low-level NAVEX and to avoid Dunkeswell ATZ he was following the M5 Motorway. The helicopter was camouflage grey/green but HISLs were on; 3/A 7000 was selected but Mode C was not fitted. He had just switched from Exeter APPROACH and was about to call Yeovilton APPROACH whilst climbing from 700 ft to 1000 ft Exeter QNH (1022 mb), heading 025° at 100 kt. At a position 3 NM NNE of CULLOMPTON VRP on the S side of the motorway, a Bulldog in a PTC colour scheme overflew his helicopter by about 80 – 150 ft on the same heading. He first spotted the Bulldog when it flew over the top, it came from directly astern and its pilot appeared to be complying also with the RHD traffic rule (ie following the M5 motorway); no avoiding action was taken. He added that the visibility was 30 km with no cloud, smoke or haze and the risk of a collision was very high if the Bulldog pilot had not seen his helicopter.

THE BULLDOG PILOT, a solo student, reports heading 009° 6 NM E of Dunkeswell at 500 ft agl whilst returning to Colerne at 120 kt. The helicopter was not seen.

HQ COMNA comments that the Gazelle pilot, a highly experienced aviator, was most concerned at the close proximity of the Bulldog as it overflew his helicopter. In an overtaking situation the Gazelle pilot had right of way and was unable to attempt any avoiding action. If the Bulldog pilot did sight the Gazelle he flew too close, although the situation was possibly exacerbated when the Gazelle climbed to 1000 ft, which may not have been apparent to the Bulldog pilot.

HQ JHC comments that this Airprox was the result of a breakdown of the 'see and avoid' principle. The Gazelle pilot was extremely unlikely to have seen the Bulldog as it approached from astern. The Bulldog pilot was in a better position to see the Gazelle, however, it may have been hidden by the Bulldog's nose.

This incident highlights the requirement to be constantly aware of the very real chance of not seeing another ac in close proximity until very late or even, as would appear in this case, not at all. It is possible that the Bulldog pilot did not see the Gazelle as their flight paths may have been constant; the Gazelle would therefore not have been moving in the Bulldog pilot's field of view. This reinforces the need for crews to ensure they follow correct

lookout procedures and constantly move their eyes and head as they look out of the ac. We believe there was a high risk of collision.

HQ PTC comments that although the Bulldog pilot did not see the Gazelle, there is little doubt that this was the ac involved in this incident. In mitigation, his lack of experience, and the fact that the Gazelle may have been obscured by the ac nose, may have contributed to his non-sighting. Nevertheless, both the 'see and avoid' principle and the rules of the air require that a pilot should see and avoid an ac he is about to overtake. Regrettably, in this case, that did not occur.

UKAB Note: A review of the Burrington radar recording, made before the primary radar service was withdrawn is inconclusive, as the Airprox is not shown. The Bulldog was identified from procedural tracing. The Gazelle pilot's initial telephone report gave a timing of 1024, rather than the 1034 subsequently reported. From 1025:21, about 4 NM NNE of CULLOMPTON VRP, an intermittent 3/A 7000 squawk, without Mode C, is shown NE bound following a track just S of and parallel to the M5 until 1026:28, whereupon it fades from coverage. This may, or may not, be the reporting pilot's helicopter.

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.

Despite the lack of confirmation from recorded radar, there was no reason to doubt the geometry of the encounter as reported by the Gazelle

helicopter pilot. Those members familiar with the type confirmed that he would have been unable to see anything approaching from astern, in the 4 – 8 o'clock arc and it was apparent to the Board that the Gazelle pilot had seen the Bulldog as early as he could.

In this overtaking situation the inexperienced Bulldog pilot was required to remain clear of the helicopter, but could only do so if he saw it and members deliberated why he had not. Notwithstanding the good weather conditions and the HISL, the Gazelle's small size and camouflage colour scheme was probably not conducive to visual conspicuity against the Devon landscape, especially tail-on and from above. Members agreed that at close quarters the Gazelle might have been masked from view under the Bulldog's nose. Moreover, the small speed differential of 20 kt was highlighted as producing little relative movement of the helicopter in the Bulldog pilot's field of view and certainly contributed to the non-sighting, which members agreed was the cause of the Airprox.

Turning to risk, a pilot member suggested that the helicopter might well have been easier to spot if both ac had been at the same altitude. In this instance the Gazelle pilot had levelled at 1000 ft just before the Bulldog overflew his helicopter, this was purely fortuitous. With both pilots unsighted on each other, only good luck it would appear forestalled a collision. The Board agreed, therefore, that an actual risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Bulldog pilot.

Degree of Risk: A.

AIRPROX REPORT No 106/00

Date/Time: 18 Jul 1416

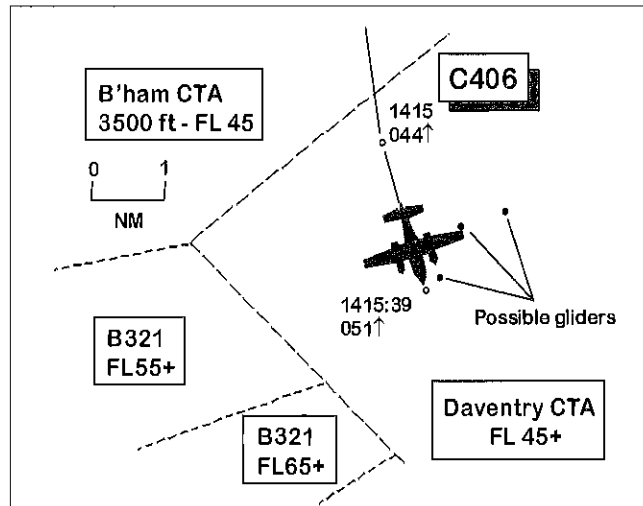
Position: 5210 N 0130 W (Gaydon)

Airspace: CTA (Class: A)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	C406	Discus Glider
<u>Operator:</u>	Civ Comm	Civ Pte
<u>Alt/FL:</u>	↑FL 60	FL 56 ↑
<u>Weather</u>	VMC CLAC	VMC CLAC
<u>Visibility:</u>	>10 km	5 km

Reported Separation: 100 ft V nil H / 50 ft V nil H

Recorded Separation: intermittent return



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C406 PILOT reports that he had departed from Coventry for Porto, in his white/green Cessna with navigation and strobe lights 'ON', under radar control from Birmingham APR on 118.05. He was squawking 0545 with Mode C. The visibility, 800 ft below cloud, was over 10 km in VMC.

About 40 NM N of the Compton VOR, heading 135° and climbing through FL 62 (he thought) at 160 kt IAS, he was in the process of being transferred to his next frequency when a glider appeared at his 1 o'clock position (at the limit of his overhead vision). It was about 100 m away in a 45° banked turn to the L. He began an immediate descent but had only gone about 50 ft when the glider passed 100 ft directly over him, taking no apparent avoiding action, and was last seen heading about 300°, still in the turn. He felt there had been a 'severe' risk of collision and immediately reported an Airprox to Birmingham ATC.

THE GLIDER PILOT reports that his ac is white with no external lighting. Owing to poor weather conditions to the S he had abandoned his plan to fly a cross-country to Dorchester and instead decided to head N, towards an area which would provide useful experience for his P2 who was flying the ac from the rear seat; he himself had chosen

to occupy the front seat. As this position did not have the benefit of GPS, he was using a 1:500 000 topographical chart as his primary means of navigation.

Their revised route took them over Didcot and Leicester and thence to Edgehill. Weather conditions on this latter leg looked the most favourable, albeit into sun, and they flew at about 2700 ft on 1013 mb to remain below the base of CAS (FL 45). At about 1410, they decided to climb in a good thermal because of deteriorating conditions. He was aware that the vertical limits of CAS varied considerably in this vicinity but he estimated they were W of a line between Gaydon and Banbury, which he could see through the hazy visibility. This was confirmed by the position of ammunition dumps and railway tracks which he could see to the N. He believed, therefore, this put them in the B321 section of CAS where the base of the airway was FL 65; as weather conditions were still not improving, they decided to climb as high as they legally could.

At about 1415, while in a climbing L turn through N at FL 56 and 50 kt, with visibility around 5 km, they both saw a green and white light twin ac some 3 – 5 sec before it passed 50 ft directly under them on a reciprocal track. He and the P2 simultaneously levelled the wings, while still climbing, to maximise vertical separation, and he thought there had been

a moderate risk of collision. The pilot comments that this type of glider has an unusually nose-high flying attitude and vision in a turn is further inhibited by the ac's wing configuration; in this instance the other ac had approached from their blind spot below the nose and he felt this contributed to their late sighting.

Subsequent analysis of the GPS trace revealed that they had infringed the DTY CTA where the base of CAS is FL 45, by some 1.5 to 2 NM. This incursion was unintentional and regrettable.

ATSI comments that the radar return believed to be the glider was in a position where the base of CAS is FL 45. Even if it was painting on Birmingham's radar, the controller could justifiably assume that it was below the base of CAS. There are therefore no perceived ATC implications in this incident.

UKAB Note: A recording of the Cleve Hill radar at 1415 shows the C406 tracking SSE and climbing through FL 44, having just entered the portion of CAS where the base of the DTY CTA is FL 45. At 1415:39 the ac is climbing through FL 51 and passing within a mile of 3 slow moving primary returns to his L, possibly gliders, the closest of which is about 400 m away. The close encounter described by both pilots is not seen on the recording.

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.

The glider member informed the Board that he had spoken to the glider pilot concerned who openly admitted that he had mistakenly identified his position on his map. Without the benefit of GPS corroboration in hazy conditions, he said he realised that he had inadvertently, and regretfully, entered CAS. The Board debated the pilot's decision to climb under a portion of airway (B321) that was only just over 1 NM in length, so close to the adjacent section to the N where the base was FL 55.

There seemed little doubt from the information presented that the incident was caused by the glider entering CAS without clearance. The C406 pilot, whilst flying IFR within CAS, was in VMC and had been fortunate enough to see the glider, albeit late, during the process of being handed over to LATCC. His immediate descent may have been just sufficient to allow the glider to pass overhead. Equally the glider's avoiding action of rolling wings level may have been enough in terms of flight path change to keep the ac apart. However, members were not persuaded fully and concluded that the lateness of the actions applied meant that there had been an actual risk of collision.

The Board was also aware that had the glider shown on radar, the controller would have assumed legitimately that it was operating below the base level of CAS (FL 45) and therefore clear of the C406.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Inadvertent penetration of the DTY CTA by the glider pilot.

Degree of Risk: A

AIRPROX REPORT No 107/00

Date/Time: 21 Jul 0930

Position: 5357 N 0122 W (7 NM SW of Linton on Ouse - elev 53 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tucano Slingsby T61F

Operator: HQ PTC Civ Club

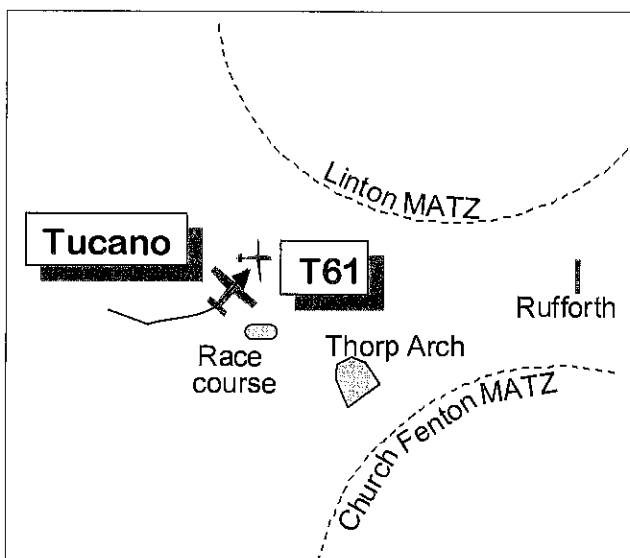
Alt/FL: 1800 ft 2000 ft
(QFE) (QFE)

Weather VMC HZNC VMC CLBC

Visibility: 7-10 km 4 NM +

Reported Separation: 2-300 ft V/NK

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT, a QFI in the rear seat, reports that while positioning for a radar approach at 1800 ft, ATC warned him of a possible unknown contact in the final approach area and advised him to keep a good lookout. A few minutes later, while he was awaiting glidepath intercept, configured for landing and heading 050° at 115 kt, Talkdown (TD) reported possible traffic in his 10 o'clock, height unknown, 1 NM away. Almost immediately he spotted a motor glider at that range and bearing at the same altitude. It was on a constant bearing and closing rapidly so he selected idle power and airbrake and started a bunt underneath it. He did not wish to turn (and lose sight of it) as his turning performance was limited by his configuration. The other ac, a motor glider with its engine running, maintained level flight and passed 2-300 ft directly overhead. He considered the risk of collision had been very high and appreciated the traffic call from TD.

THE SLINGSBY T61 PILOT reports flying at 55 kt while general handling in his local area W of Rufforth, out to the Wetherby racecourse and the Thorpe Arch trading estate at about 2000 ft QFE, about 300 ft below cloud; he was listening out on the Rufforth A/G frequency and had no transponder. He did not see the Tucano.

UKAB Note: LATCC radar recordings do not show the T61, but show the Tucano turning left onto finals steady at 1500 ft Mode C, and then descending sharply to 1200 ft before repositioning to the end of downwind. The position of the Tucano's descent is at 7 NM on the approach to Linton's RW 04. The radar shows the incident occurring at 0930:15; the RT transcript indicates that the Linton RT recorder clock was about 3 minutes adrift.

MIL ATC OPS reports that the Tucano pilot was conducting a series of PAR approaches to RW 04 at Linton-on-Ouse and was in receipt of a RIS from Linton Director (DIR) on 344.375. Primary radar was unserviceable, hence DIR was providing a service using SSR only and the pilot had been informed of this limitation during the first PAR circuit. At 0923:30, whilst the Tucano was heading downwind (left) for its second approach, the Talkdown controller (TD) observed a radar contact manoeuvring at 7 NM in the approach lane at about 2000 ft and 22 seconds later DIR transmitted "C/s there seems to be traffic operating at the seven mile point and around the glidepath area, not showing on Watchman radar, but showing on the talkdown tube." The Tucano pilot acknowledged the transmission, and appeared content to continue the approach. Shortly afterwards, the contact turned N and disappeared from the PAR screen. At 0925:50, as the Tucano was turned onto 080° to

close with the centreline, DIR advised the pilot "...the previously called traffic was last seen departing the talkdown tube to the north." At 0926:33, when 8.5 NM from touchdown and heading 050°, the Tucano was transferred to TD on 358.525. Almost immediately after the pilot checked in on frequency, a radar contact appeared about 1 NM ahead of the Tucano and, at 0926:50, TD transmitted "C/s, previously reported traffic left ten o'clock, left to right, 1 mile ahead, indicating similar height, are you visual?" to which the pilot replied "Affirm, C/S, and descending." Shortly afterwards, the Tucano pilot identified the other ac as a motorglider and passed its registration on the RT; he then repositioned downwind and advised that he would be filing an Airprox.

The 0850 weather observation at Linton-on-Ouse was reported as S/W Calm, Vis 10 km, nil weather, nil cloud, colour code BLUE.

Undoubtedly, DIR's task was made more difficult by the absence of primary radar; the DIR-TD team however, were well aware of this and provided the Tucano pilot with the best information that they had available.

HQ PTC comments that despite the lack of Primary Radar, Linton ATC provided the best possible traffic information on the T61, especially given the notorious difficulty of judging relative positions on an exponential (PAR) display. Considering this and the relatively good weather, this was an uncomfortably late sighting. We are surprised that such a near aviation neighbour should choose to operate, neither squawking nor talking, in such a position almost to guarantee such an encounter. The LoA between Linton ATC and the major operators at Rufforth does nothing to prevent such conflicts, focussing largely on Church Fenton's operations. It probably needs revisiting to emphasise the risk of lingering here, particularly when RW 04 is in use at Linton.

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 gave a round of applause for the teamwork displayed by the Linton ATC team who had managed to produce timely traffic information on the T61 despite their limited primary radar and the T61's lack of a transponder. The Tucano pilot was also appreciative, and ATC efforts had clearly helped him both spot the conflict and resolve it. In the Board's opinion, these actions removed any risk of the ac colliding.

Members discussed safety issues involved in the T61 pilot's choice of operating area. Pilots from Rufforth were hedged in by Linton and Church Fenton and had few ideal options for local flying, but the Board agreed that Linton's radar centreline, at that range and height, was not the safest place for general handling, especially without talking to Linton. RAF ATC members said they would welcome calls from pilots in such circumstances; their activity could then be co-ordinated safely with military traffic. The Board agreed that a revised LOA between the local operators would be helpful and members were advised that this action was currently being taken.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction of flightpaths resolved by the Tucano pilot assisted by Linton ATC.

Degree of Risk: C

AIRPROX REPORT No 108/00

Date/Time: 21 Jul 1427

Position: 5200 N 0017 W (9 NM NE LUTON)

Airspace: TMA (Class: A)

Reporter: LATCC TC

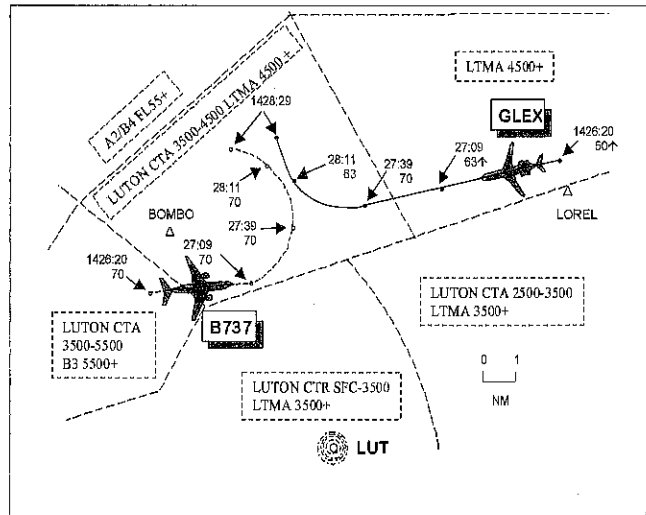
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	B733	Global Express
<u>Operator:</u>	CAT	Civ Exec
<u>Alt/FL:</u>	FL 70	↑ FL 70

Weather: VMC CAVOK VMC CLOC

Visibility: +10 km +10 km

Reported Separation: NK/1-1 5 NM H,NK V

Recorded Separation: 1 NM/700 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC TC NW RADAR CONTROLLER (TC NW SC) reports that the B737 was inbound to Luton through his busy sector from the N; the TC N Co-ordinator had released the B737 at WCO FL 70 descending to FL 60. He was considering splitting the sector but thought that it would not help the traffic situation as there was little traffic routing to BNN. However, the traffic level rapidly increased, both in volume and complexity, compounded by an ac infringing CAS at FL 80 working Essex Radar. He decided then to split the sector. Meanwhile he had been unable to achieve the release on the B737 so he instructed it to fly on an easterly heading towards LOREL and to reduce speed to 220 kt; his intention was to turn it back onto a westerly track, descend it to FL 60 and renegotiate the inbound release. By now the RT was saturated and he was unable to hear the TC N Co-ordinator clearly, who mentioned "...BOMBO" and he felt at that stage the sector had become overloaded. He was unable either to handover to the oncoming BNN controller or speak to the TC N Co-ordinator owing to RT congestion. The TC N Co-ordinator had alerted him to a CPT departure from Cambridge (the GLEX) on a westerly heading that he presumed was climbing to FL 70, but on which he had received no co-ordination. He gave the B737 a L turn onto W as the TC N Co-ordinator personally informed the

Essex Radar controller of the conflict, but the GLEX had already been transferred to his own TC NW position. The B737 did not appear to have commenced the L turn so he gave it an avoiding action L turn onto 360° (he thought) followed by an avoiding turn R to the GLEX when it came on frequency. This last turn was given to stop the B737 and GLEX from meeting head on. The GLEX reported a TCAS alert and visual sighting with the B737.

THE B737 PILOT reports inbound to Luton at 220 kt and FL 70. After extensive radar vectoring and an instruction to climb to FL 80, he was subsequently handed over to Luton APR for an uneventful approach and landing. The crew were unaware of an Airprox incident but thought the degree of vectoring and the climb to FL 80 as unusual - but no explanation had been forthcoming. The ac was not TCAS equipped and no other conflicting ac was observed.

THE GLOBAL EXPRESS (GLEX) PILOT reports climbing to FL 90 enroute from Cambridge to Farnborough at 250 kt in VMC. When 20 NM from Cambridge, he noticed an opposite direction ac 10 NM ahead on TCAS at his cleared level. The visibility was greater than 6 NM and he acquired the other traffic visually at range 5 NM as transfer of control was effected to TC NW. That controller issued an avoiding action R turn into the path of the opposite

direction ac who was turned L. He received a TCAS TA followed by an RA to climb, the B737 passing 1 – 1.5 NM clear on his left hand side.

UKAB Note: This report was submitted nearly 3½ months after the incident occurred even though the pilot was contacted at Farnborough immediately after the incident. During a subsequent telephone conversation after receiving his 1094, the pilot apologised for the delay and admitted he was unsure about his cleared FL within CAS and the TCAS warning to climb. However, he clearly remembered that the avoiding action turns given by the LATCC controller put both ac onto conflicting flight paths.

ATSI reports that a separate overload report had been filed and findings from it are referred to in this report. At the time of the Airprox both ac were in receipt of an area control service from the TC NW SC, the GLEX having just been transferred from Essex Radar. In the absence of vectoring instructions from ATC, the B737 would have followed the LOREL 2G STAR via CLIPY and BKY VOR for RW 08 at Luton. Cambridge departures, flight planned to enter the LTMA, route to the BKY VOR initially and, thereafter, follow the corresponding Stansted outbound route. TC NW, therefore, handle Cambridge departures, such as the GLEX, as if they were Stansted departures.

The recollections of the TC N Co-ordinator and the TC GSN, concerning the period preceding the Airprox, differed significantly from those of the TC NW SC. The TC N Co-ordinator assessed the workload as “moderate”, while the GSN thought that it had been an “ordinary” afternoon, with moderate traffic loading, which was starting to get busy at the time of the Airprox. The TC NW SC, however, considered that both the workload and traffic loading had been “over the top”. He had felt tired, having had busy duties on the four previous days and considered the working environment in the operations room to have been unreasonably noisy and distracting. This had been compounded by a “lot of fuss” caused by an ac which had infringed CAS at FL 80, approximately 5 minutes prior to the Airprox. In addition, the Farnborough Air Show had generated additional traffic; the GLEX was inbound to Farnborough to participate in the show. The TC NW SC was operating the Sector bandboxed,

fulfilling both the TC Bovingdon (BNN) and TC NW Deps roles. (The SC had considered splitting the sector earlier but had rejected the idea – see explanation later). The TC N Co-ordinator was covering the TC NW and NE Sectors.

The TC NW SC missed the initial call from the B737 but made contact at 1417. Flying at FL 150 at CLIPY, the crew were instructed to make their speed 250 kt. Amongst other tasks, the TC NW SC was involved in positioning two flights from the N, inbound to Luton ahead of the B737, for “straight-in” approaches to RW 08. Instead of following the standard routing to LOREL, this involved ac being positioned straight onto a L base leg and was common practice. Benefits were gained from a reduction in track miles flown and a lower overall workload on the TC NE ATC system (TC LOREL and/or Essex Radar did not become involved). However, as in this case, it could lead to a significant increase in the TC NW SC’s workload. Instead of permitting ac to follow the STAR on their own navigation and transferring them to TC LOREL at FL 130, the TC NW SC assumes added responsibility; he has to vector ac into position for transfer to Luton.

At 1419, the pilot of the B737 enquired whether he could expect a straight-in approach. The SC replied “... *no I don't think so*”. Meanwhile, however, the TC N Co-ordinator, on his own initiative (as is generally accepted to be permissible under the Co-ordinators’ MATS Pt.2 description of duties), had negotiated a full release with Luton Approach on the B737, to give that flight a straight-in approach. It is evident that, by that stage, owing to the workload, in part at least, there was little dialogue between the TC NW SC and the TC N Co-ordinator. Nevertheless, the TC NW SC assimilated that a full release had been co-ordinated for the B737; he could have declined this option, but he elected to attempt to implement it. The full release required the B737 to route to WCO descending to FL 60. Before the TC NW SC could take the B737 off the STAR and route it to WCO, it reached CLIPY and turned towards LOREL. At 1421, the Boeing was cleared to descend to FL 90. The TC NW SC still thought that he could avoid sending it all the way to LOREL.

By that time, the TC NW SC's workload was high and climbing. To compound the situation, the Luton inbound ahead of the B737, also routeing via WCO, was too high and had to be orbited and given a large number of radar vectors. Unable to keep his strip display up to date, the NW SC ceased referring to it and relied predominantly on his radar display for conflict detection and sector traffic. Evidence of this showed when he routed a Stansted flight, outbound for Knock, via UG1, rather than UB3 as flight planned. When interviewed, he said he thought he had asked the N Co-ordinator to summon another controller to split the sector but the N Co-ordinator did not have any recollection of this. The TC NW SC went on to explain that he had considered splitting the sector earlier but had not because he believed that nearly all of the traffic was through his sector anyway and opening TC BNN would have served little useful purpose. The GSN recognised that TC NW was becoming busy and complex and called for another controller to split off TC BNN on her own initiative. The new controller plugged into the TC BNN position several minutes before the Airprox. Unfortunately, because of his excessive workload, just as he was unable to communicate with the N Co-ordinator effectively, the TC NW SC was unable to conduct a handover to the new controller.

Eventually, the TC NW SC recognised that the best option might be to send the B737 to LOREL and he conveyed this to the N Co-ordinator. On the strength of this, the N Co-ordinator sought to co-ordinate a level at LOREL with Essex Radar. By that stage, the B737 was levelling at FL 90 but that level was occupied at LOREL so the N Co-ordinator said that the B737 would be held at BOMBO at FL 90, whose published holding pattern is specifically designed as a contingency hold for such eventualities. (The radar recording shows the B737 was tracking towards BOMBO at a range of approximately 9 NM at that stage, so it should have been possible for the flight to enter the hold without undue difficulty). The TC NW SC did not think that the B737 would be able to enter the BOMBO hold from its current position, so he reverted to his earlier plan; he thought that he could either turn the B737 onto a westerly heading, to position downwind for RW 08, or route it to the 'LUT' and transfer it to Luton Radar for onward sequencing. With this in mind, at 1424:10, he cleared the flight for further descent to FL 70 and assigned it radar heading 110°.

Meanwhile, the GLEX was airborne, having been cleared to join controlled airspace on track for 'BKY'. The Standing Agreement for the transfer of such traffic from Essex Radar to TC NW is that it should cross the eastern boundary of Airway B4 at the Minimum Stack Level (MSL) which, at the time, was FL 70. Accordingly, Essex Radar continued the GLEX's climb to FL 70 on a radar heading of 265° and, at 1425:40, instructed the pilot to report its heading on the TC NW SC frequency.

A short time earlier, at 1425:10, the NW SC had instructed the B737 to turn L 20° onto heading 090°. This had the effect of putting the subject ac almost directly head-on to each other, at a range of approximately 24 NM, one climbing and one descending to FL 70. At 1426:40, (at the same time that the GLEX was being instructed to change frequency) the TC NW SC started to instruct the B737 to turn R but then immediately corrected this, to an instruction to turn L onto heading 260°. At interview, the SC explained that this had been a 'routine' change of heading, designed to keep the B737 clear of a Heathrow departure, and nothing to do with the conflict with the GLEX. The TC NW SC and TC N Co-ordinator became aware of the developing conflict shortly before the GLEX reported on frequency; the N Co-ordinator had shouted a warning to the effect "*don't forget the Compton*" and had then run across to alert Essex Radar, only to be advised that the ac had already been transferred. At about the same time the Short Term Conflict Alert equipment activated, initially flashing white and then red.

The TC NW SC said that by then he had felt under great pressure, could not think clearly and most of his actions had been instinctive. His colleague, trying to take over the TC BNN position tried to assist by telling him to turn the B737 R. At 1427, the pilot of the GLEX came on frequency, reporting climbing through FL 63 for FL 70 on radar heading 265°, but the TC NW SC did not respond to this call. Instead, heeding his colleague's advice, he started to instruct the B737 to make an 'avoiding action' R turn but, remembering that he had already issued an instruction to turn L, he immediately corrected this to a L turn onto heading 360°. The pilot of the GLEX thought that this instruction was for him and acknowledged the turn instruction, advising "... we have the traffic visual ...". The NW SC corrected this to an 'avoiding action' R turn onto heading 360°

and then went on to instruct the B737 to continue its L turn onto heading 280°. At 1427:40, the pilot of the GLEX reported descending in compliance with a TCAS RA and repeated he was visual with the traffic. The NW SC instructed the GLEX to descend to FL 60 and the B737 to climb to FL 80. Thereafter, both flights continued without further incident and the TC NW SC was relieved from his position at 1431.

The radar recording shows that as the subject ac approached head-on, the GLEX was displaced slightly to the N so the best solution may have been to turn both ac R. However, if the B737 was already commencing a L turn, as the NW SC expected, his decision to turn it L is understandable. STCA activated when the ac were approximately 8.5 NM apart and this had closed to approximately 6.5 NM before the B737's L turn became evident. Thereafter, both lateral and vertical separation continued to reduce, with the B737 level at FL 70 and the GLEX continuing its climb to FL 70. The GLEX commenced its R turn, with both ac level at FL 70, when the B737 was in its 12 o'clock position, heading N, at a range of 2.1 NM. As the GLEX continued the R turn, the ac continued to converge but the latter carried out a rapid descent to FL 64, presumably in response to the TCAS RA.

UKAB Note: The Debden radar replay shows the closest point of approach at 1428:11 as 1 NM and 700 ft.

The TC NW SC was asked why he had descended the B737 to the MSL (FL 70) to the NE of Luton, an area and level which any Stansted departures following departure routes via BUZAD and COMPTON would utilise. The SC indicated that he had been aware of the possible implications of descending traffic to the MSL in that area and had checked the relevant CCTV to see whether any Stansted BUZAD or COMPTON departures were pending. None showed. Being a Cambridge departure, the GLEX was not required to be displayed on the CCTV. It is understood that it would not be unduly difficult to incorporate Cambridge TMA departures with the Stansted departures and this appears worthy of further consideration. That aside, however, the TC NW SC should have been aware that the GLEX was in the 'system' and would be entering the sector at, or climbing to, FL 70 because the TC MATS Pt 2 requires TC Stansted

FIN to advise the appropriate TC N Co-ordinator of any Cambridge departures via BUZAD and COMPTON. On this occasion, the TC N Co-ordinator recalled that he had been contacted by Stansted and was told that the GLEX was airborne. He had put out the relevant FPS under the HEMEL designator and written FL 70 on it. However, it is evident that the TC NW SC did not register this information, providing further evidence of the almost total lack of communication between him and the N Co-ordinator, plus the NW SC's discontinued use of the FPS display.

The TC MATS Pt 2 (Page NWE 5-3, para 2.1) requires the TC NW Co-ordinator to advise TC LOREL/ESSEX Radar of Luton inbound traffic which, rather than routing to LOREL, will be the subject of a full release. There is no evidence that this safeguard was carried out for the B737. This could have alerted the Essex Radar controller to the fact that the GLEX might conflict with the B737 on transfer to the TC NW Deps sector. This Airprox demonstrates why this additional safeguard was built into the procedures and why it is important that the procedure is followed.

The TC Traffic Manager's report shows that, prior to the Airprox, no flow regulation was in place for the TC NW or LOREL Sectors. He had not considered that the predicted traffic loading warranted the imposition of any restrictions. Indeed during the hour in which the Airprox and reported overload occurred (1400-1459), 42 ac entered the sector against a Target Sector Flow (TSF) of 40/60. However, there was a rapid build up of traffic after 1405 and by 1415 there were 13 ac on frequency of which 10 were inbound to LOREL. Between 1405 and 1429, the NW Sector handled 26 ac of which 11 were LOREL inbounds. While the hourly movement rate was within acceptable tolerance, a surge of traffic took the Sector by surprise. The controllers indicated that they had not been alerted to the impending surge by the sudden arrival of a large number of FPSs, as is often the case. Critically, a significant proportion of 'the surge' was inbound to LOREL. The arrival of this particular traffic combination on the NW SC's frequency, while he was already attempting to hand off a number of flights direct to their destination airfields, with its own additional workload, appears to have been what overwhelmed the TC NW SC.

This was the only reported overload of the TC NW Sector during 2000. During the previous year there were 2 reports, both of which occurred when the Sector was split and each was filed by the TC NW SC. Common to all 3 overloads were rapid increases in workload and the presence of 'bunching', or a relatively high proportion of the sector traffic being inbound to LOREL. This traffic adds significantly to the complexity of the Sector because it crosses the predominantly north/south flow of traffic entering and leaving the London TMA. The reporter of one overload had found it difficult to communicate with the TC BNN SC and the N Co-ordinator. In all 3 cases, the predicted traffic loading had not been deemed sufficient to necessitate the imposition of a flow regulation on the sector and, although the subsequent hourly traffic counts were never significantly above the relevant TSF, the workload on the NW Deps Sector was such that the SC felt the need to file an overload report.

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 highlighted the importance of teamwork during sector operations which was apparently below par during this incident. The onus was on the N Co-ordinator and NW SC team to recognise the increasing complexity of the traffic situation and rising traffic levels and manage the sector accordingly. Whether the Co-ordinator had sufficient time to carry out these tasks early enough may have been affected by his split duties between the NW and NE sectors. Both controllers were surprised by the LOREL surge which would normally have been preceded by a rush of fpss. However, even if the Co-ordinator had not appreciated that the NW SC was becoming busy on the RT, it was ultimately either his or the NW SC's decision to seek assistance by splitting the sector, stopping the traffic on full releases and reverting to LOREL STARS. As exposed in this incident, a decision to split had to be commenced early before events became overwhelming. In the event, the oncoming controller had plugged in for several minutes but was unable to communicate

with the N Co-ordinator or conduct the handover with the SC. In mitigation, it was felt that the Co-ordinator may have encouraged the NW SC into accepting one too many ac on a full release in a situation that was further complicated by a preceding ac that needed extensive vectoring to position it in traffic. An important point in all of this, easily missed under pressure, was that use of this procedure, to expedite the arrival of inbound ac, would only work effectively if pilots were made aware of it early enough to tailor their speed and eventually their level commensurate with their position relative to the release point. The use of the BOMBO contingency hold would have alleviated the situation confronting the NW SC but he rejected the option and reverted instead to issuing vector and descent instructions in an attempt to achieve a full release for the B737. However, in not assimilating the traffic situation with his fps display, any co-ordination carried out on his behalf and annotated accordingly would have been missed; members noted that the SC's workload, particularly with respect to RT loading, had by that juncture left him unable to hear any co-ordination that had been effected.

An ATCO, familiar with TC N operations, commented that pending fpss would be displayed at TC when clearance was requested from Cambridge and these would be activated on departure times given by the airfield. It was felt that the NW SC, whilst controlling solely with reference to radar, made a reactive judgement in descending the B737 to MSL (FL70) having checked the CCTV display for potential Stansted conflicts. This decision, without reference to his FPS display, did not take into account the impending GLEX Cambridge outbound. The Board understood why Cambridge 'outbounds' were treated operationally as if they were Stansted departures, but believed they should be included on the CCTV displaying Stansted traffic.

Discussion moved on to the 'traffic flash' that had occurred set against the Target Sector Flow for the banded sector. This situation had caused concern in a previous Airprox (148/00). The overall number of ac had slightly exceeded the TSF but it was the 'bunching' of traffic, particularly through LOREL, immediately prior to the Airprox that had caused the difficult situation. An Adviser briefed the members on the 'tools' available to the Traffic Manager to assist with traffic prediction. Routinely,

the sector levels were viewed in TMA quadrants; viewing individual sectors in 15 minute time frames was available but was generally considered impractical as it was far too time consuming. Also, a recently introduced program was on test aimed at showing a warning when traffic exceeded predictions. Members were grateful for the update but remained unhappy that the 'tools' available seemed to lack the sophistication required to extract traffic information from the system in a timely and 'user friendly' way. The Board also commented on the avoiding action L turn given to the B737 which was initially taken by the GLEX in error and was subsequently changed. It may have been the better option to let the 'error' go unchallenged to get both ac turning in opposite directions.

After much debate on all of these points, it was clear that the TC NW SC had ultimately descended the B737 into conflict with the GLEX and this had caused the Airprox. As to risk, the avoiding turn by the GLEX commenced as the B737 crossed L to R at just over 2 NM range but the pilot had noticed the

impending head-on situation on TCAS at 10 NM. Although he did not know the intentions of the B737 and had complied with the NW SC's avoiding action instructions, he had visually acquired the B737 (at range 5 NM) and had complied with the TCAS RA to descend to the extent that there was in the end no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LATCC TC NW controller descended the B737 into conflict with the GLEX.

Degree of Risk: C

Recommendation:

That NATS considers including Cambridge TMA departures on TMA N CDIS displays.

AIRPROX REPORT No 109/00

Date/Time: 12 Jul 1406

Position: 5148 N 0046 W (1.5 NM W of Halton Aerodrome - elev 370 ft)

Airspace: ATZ (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	Cessna 152	Robinson R44
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<u>Operator:</u>	Civ Trg	Civ Pte
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<u>Alt/FL:</u>	↑ 1000 ft (QFE)	1700 ft (QNH 1016 mb)
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<u>Weather</u>	VMC CLOC	VMC CLBC
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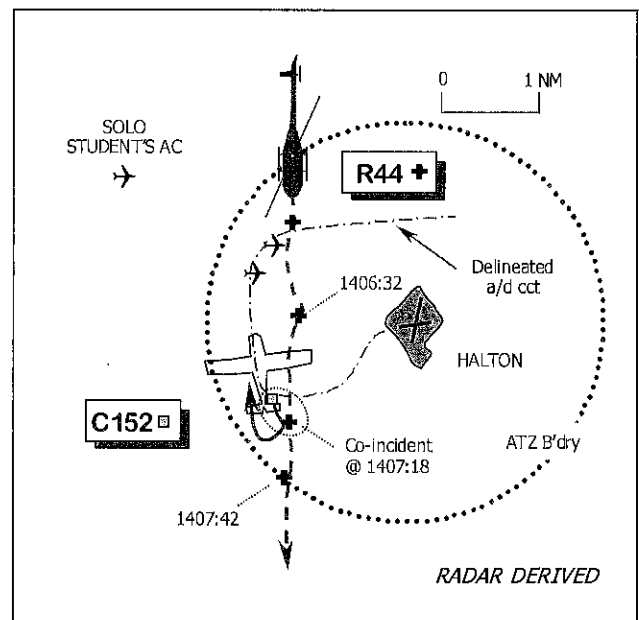
<u>Visibility:</u>	>10 km	8 Km
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Reported Separation: 2-300 m H, nil V
1000ft H, 300 ft V

Recorded Separation: Not Recorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports conducting a circuit training detail with a student who was the handling pilot and in communication with Halton



Radio A/G Station. The ac has a white and green colour scheme. Whilst heading 350° at 70 kt, cross-wind after take-off from RW 26 and just levelling at circuit height, 1000 ft Halton QFE, a green Robinson R44 helicopter was sighted at about 1 o'clock - 0.25 NM away, just clear of the starboard

side door pillar. He took control of the ac from the student, turned R to avoid the helicopter, which passed 2-300 m to port, he thought, with a high risk of collision. After he had passed astern of the helicopter he then reversed L and closed to about 500 m but could not identify it. He adds that his student was under a high workload and had not spotted the helicopter, which also passed just ahead of another ac (with a blue and white colour scheme) at circuit height just at the start of the downwind leg. This ac was piloted by another student conducting a 'solo' circuit detail. No calls had been heard on the A/G frequency from the helicopter pilot as it transited through the circuit area.

THE ROBINSON R44 HELICOPTER PILOT reports heading 180° at 100 kt in communication with Wycombe Air Park Tower on 126.55 MHz and level at 1700 ft QNH (1016 mb). His helicopter has a metallic green colour-scheme, HISLs were on and he was squawking 3/A 7000 with Mode C switched off. A high wing single engined light ac, with a white and green livery, was sighted about 5-6 km away. It was in a climbing attitude then levelled below his altitude and passed about 1000 ft down the starboard side, about 300 ft below his helicopter, he thought. No avoiding action was taken. Nonetheless, he had expected the pilot of the C152 to turn to pass down his LHS in accord with the 'rules of the air'. Consequently, he would not have elected to turn L if it had been necessary, which it was not. However, if it had been required he could have climbed or descended, but the situation appeared to him to be completely under control as the other ac levelled off and crossed from L to R ahead of and below his helicopter. He adds that though a "low hours" pilot, he believes he took the best course of action by maintaining his course and altitude.

UKAB Note (1): In a subsequent telephone conversation, the R44 pilot confirmed that he had seen the ac flown by the reporting pilot from the reported colour scheme and reaffirmed his view that the C152 passed down the starboard side. He did not see the other ac on the downwind leg flown by the solo student.

UKAB Note (2): The UK AIP at ENR 2-2-3-3, promulgates the Halton ATZ, active in Summer 06 - 1800, as a circle radius 2 NM centred on 51°47'34"N 000° 44' 16"W, from surface to 2000 ft above the aerodrome elevation of 370 ft.

UKAB Note (3): The UK AIP at ENR 5-5-1-1, promulgates Halton as a Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered to 2000 ft agl, during daylight hours.

UKAB Note (4): It is not possible to resolve the differing perceptions of the geometry of this encounter in the Halton ATZ because the Heathrow radar recording does not show this Airprox clearly. Only the R44 Helicopter is shown at the time of the encounter which probably occurred at about 1406:32, 1.5 NM W of Halton. The R44 is shown squawking 3/A 7000, without Mode C and entered the ATZ southbound at about 1405:30. The other ac flown by the solo student is evident turning downwind at 1405:41; the R44 crosses about 200 yd ahead of this ac at 1406:07. The subject C152 is not evident at all on radar until 1407:18, after the Airprox has occurred, when it is shown southbound closing in the 5 - 6 o'clock of the R44 before turning about northbound some 30 sec later. The R44 exited the ATZ, SW of Halton at 1407:42.

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.

Board members were concerned that the reportedly "low hours" R44 pilot had apparently made no attempt to communicate with HALTON RADIO, the Air/Ground Station, prior to penetrating the Halton ATZ. Whilst the level of ATS provided within ATZs across the UK does vary significantly, it seemed irresponsible to enter an ATZ without communicating with the appropriate facility. In this instance, where an aeronautical radio station was established, its purpose was to provide pilots with information about the aerodrome and any known traffic (as highlighted in AIC 136/1998). Based on the information obtained, pilots could then decide the most appropriate way to conduct the flight. Air/Ground Station operators are not permitted to pass "instructions or give advice", but in principle, the R44 pilot, before entering the Halton ATZ, was required to contact HALTON RADIO for traffic information so that he could then decide whether to enter the ATZ and how to transit with safety. An Air/Ground Station operator cannot refuse entry into the ATZ, but the prevailing view of members was that the R44 pilot did not have sufficient information

about the traffic operating within the ATZ to proceed with safety. It was noted that the R44 pilot had reported sighting the C152 some 5-6 km away, before he entered the ATZ, but he had not sighted the solo student ac at the start of the downwind leg at all. A call on the Halton frequency would have elicited information that there were 2 ac in the circuit.

Recognising the differing perceptions of this encounter in the Halton ATZ by the respective pilots, members wondered if the R44 pilot had indeed seen the solo student's ac and not the C152 flown by the reporting pilot. However the R44 pilot was adamant that he had sighted a white and green C152; the solo student's ac was white and blue. Although the possibility remained that the R44 pilot might have mistaken the colour of the C152, this seemed unlikely. In the end the Board concluded that this Airprox was caused by the R44 pilot, who flew through the Halton circuit against the traffic flow and into conflict with 2 ac in the pattern, one of which he did not see.

Turning to risk, the Board noted that the R44 pilot had spotted the C152 at 5-6 km away, had kept it in sight and so was in a position to avoid it. Nevertheless, it was fortuitous that the R44 pilot had not turned toward the solo student's ac. Although both the C152 and R44 pilots report differing vertical separation they were broadly in agreement about the horizontal distance between their ac and on balance the Board agreed that there had not been a risk of a collision in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R44 pilot flew through the Halton circuit against the traffic flow and into conflict with two ac in the pattern, one of which he did not see.

Degree of Risk: C.

AIRPROX REPORT No 110/00

Date/Time: 27 Jul 1259

Position: 5159 N 0013 W (Letchworth)

Airspace: LTMA (Class: A)

Reporter: Luton ATC

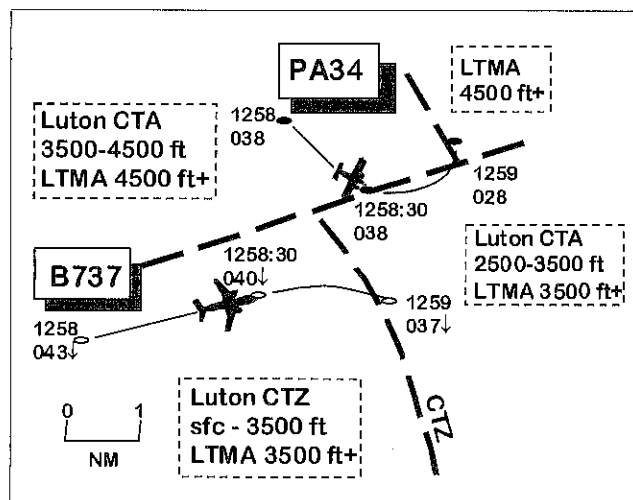
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	B737-300	PA34
<u>Operator:</u>	CAT	Civ Pte
<u>Alt/FL:</u>	3900 ft ↓ (QNH 1013 mb)	3500 ft (QNH 1013 mb)

Weather: IMC HAZE VMC

Visibility: 2 km 10 km

Reported Separation: not seen//not seen

Recorded Separation: 2NM / 200 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LUTON APR reports that the B737 was radar vectored N of Luton Airport downwind RH for RW 26. On passing N abeam, descent instructions

were given from 5000 ft to 3000 ft (QNH 1013). Earlier, the controller had observed a radar contact squawking 'C' with no Mode C, (see ATSI report) in the vicinity of Henlow, which was ignored as it was believed to be operating outside controlled airspace. As the B737 descended through 4000 ft, the

telephone rang from TCNE; the controller asked whether he had seen the "7000 at 3800" to the NE of the B737. The Luton controller was initially confused as there was not traffic in the position stated but then realised that the TCNE controller was referring to the 'C' squawk. The B737 was NE of Luton Airport inside the Control Zone whilst the unknown radar contact was outside the zone believed to be below the Control Area. The controller then selected "Filter override" which revealed the height readout of the unknown radar contact whilst simultaneously instructing the B737 to commence an avoiding R turn. The unknown contact then commenced a turn away from the B737 and indicated a discrete Essex Radar code. The Luton controller states that the combination of both turns took the B737 away from the conflicting ac onto a base-leg position from where a successful approach and landing were completed. The B737 reported that no other ac had been seen and that TCAS did not activate.

UKAB Note 1: The 1250 UTC Luton METAR gave surface wind 210/06 kt, visibility 8 km nil weather, scattered cloud 4000 ft, QNH 1013.

THE ESSEX RADAR CONTROLLER reports the PA34 called on frequency 120.62 however, due to the poor quality of the transmission, he misheard the callsign. He observed a 7000 squawk at 4000 ft to the NW of BKY in direct conflict with the B737 at 4000 ft downwind for Luton. He attempted to identify the PA34 by issuing a squawk of 0201 but used the wrong callsign. Eventually, the correct callsign was extracted from the PA34 pilot and after identification, an avoiding turn onto heading 050° was given with immediate descent and traffic information. The B737 was observed to pass behind and continue into Luton.

THE NW DEPARTURES RADAR CONTROLLER reports that after transferring the B737 to Luton radar descending to 5000 ft in a downwind RH position he was relieved by the afternoon watch. He immediately saw a 7000 squawk at 3900 Mode C in conflict with the B737 and telephoned the Luton radar controller from the TC coordinator N position. The position of the unknown ac was indicated with reference to B737 and during this conversation the STCA activated with white followed by red warnings.

THE B737 PILOT reports flying late downwind for RW 26 at 210 kt, descending through 3900 ft QNH 1013 in IMC; in flight visibility was reported as 2 km. Luton radar instructed him to turn R heading 170° and passed traffic information. The other ac was not sighted therefore he was unable to assess the risk or minimum separation; TCAS did not activate.

THE PA34 PILOT reports departing Leicester on a VFR flight to Stapleford cruising at FL 35 heading 150° at 140 kt. The visibility, 1000 ft below cloud, was greater than 10 km in VMC. He was squawking 7000 with Mode C maintaining a listening watch with Northampton AFIS0 on 122.7. At position LAM 330 R/36D (abeam Bedford), the pilot tried to establish RT contact with Essex Radar on frequency 120.62 but with no response. The frequency was busy with other traffic so he contacted Essex Radar again who responded initially with an incorrect callsign but finally at 32D, Essex Radar responded with instructions for an immediate L turn heading 015°, descent to 1800 ft and squawk code 0201. The pilot complied immediately with the instructions and on passing 2400 ft was told to resume own navigation. Advisory track and level information towards Ware was given and he subsequently landed safely at Stapleford. He was informed that he had been involved in a near miss but he had not seen any conflicting ac at the time of the incident.

ATSI reports that the PA34 was on a VFR flight from Leicester to Stapleford Tawney squawking 7000 and at 3900 ft. The B737 was working Luton Approach descending to 4000 ft to route downwind right hand for RW 26.

At 1255 the PA34 attempted to call Essex Radar but, because of radio problems and callsign confusion on the part of the controller, was not able to establish communications until 1257 hr. At this point the ac was in the vicinity of Henlow at 3900 ft which is well inside Controlled Airspace. At 1258 hr, having assigned a squawk of 0201 to the PA34, the Essex Radar controller gave an avoiding action turn onto 050° and passed traffic information on the B737.

At 1257 hr the Luton Approach controller was warned by the LATCC TC North East controller of the presence of an ac at 4000 ft which was conflicting with the B737. He replied that he had

not seen that it was a conflict but at 1258 hr the Luton Approach controller instructed the B737 to turn right onto a heading of 170° as avoiding action.

These instructions issued by both controllers resolved the conflict.

The Luton Approach controller had not identified the PA34 as a conflict because all relevant information on the ac was not displayed. The PA34 was squawking 7000 with altitude but the new radar display system in use at Luton converts the 7000 to a "C", meaning conspicuity, and suppresses the Mode C read out. Thus the controller assumed that the ac was below controlled airspace.

As a result of the incident, this anomaly has now been rectified at Luton so that all 7000 squawks are displayed as a "C" with altitude.

UKAB Note 2: A recording of the Heathrow radar at 1258 shows the B737 8 NM NE of Luton downwind RH for RW 26 descending through 4300 ft with a 7000 code in his 11 o'clock range 4 NM at 3800 ft. At 1258:15 the 7000 code is seen to change to code 0201 which commences a left turn at 1258:30 as the B737 passes 2 NM SW of him at 4000 ft. At 1258:45 the B737 commences a R turn descending through 3800 ft as the PA34 remains 2 NM NE of the B737 passing heading 070° and 3400 ft. The B737 and PA34 tracks diverge to be 2.25 NM and 900 ft apart 15 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 authorities. One civil ATC member, familiar with Luton operations, agreed that the radar display filter arrangements there had

recently changed. The aim was to ensure that 7000 codes were converted to show 'C' for conspicuity together with Mode C height readout for ac fitted with an encoding altimeter.

Members were puzzled why the PA34 pilot had routed towards the LTMA at a level that made him enter CAS (base level 3500 ft) 13 NM N of Luton. The pilot had reported tracking the 330 R to LAM VOR, (or so he thought) a route which would have passed 9 NM E of Luton where the base of CAS was 2500 ft, and that he had attempted to contact Essex Radar for a service. An inspection of 1:500 000 and 1: 250 000 topographical charts for the area revealed that the depiction of CAS, particularly with respect to base levels, lacked clarity. It was possible that the PA34 pilot had mis-read this information.

A GA member wondered whether the PA34 pilot had been in contact with the appropriate ATSU, since his planned track to the VOR passed through Luton airspace.

However, the Board was unable to resolve these points with any certainty and in the end concluded that the PA34 pilot had entered CAS without clearance and had flown into conflict with the B737.

Turning to the risk assessment, the actions of both controllers at Luton and TC, whilst not maintaining standard separation, were sufficient to keep the ac 2 NM apart and this led the Board to conclude that there had not been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Luton CTA by the PA34 pilot.

Degree of Risk: C

AIRPROX REPORT No 111/00

Date/Time: 28 Jul 0807

Position: 5446 N 0830 W (14 NM WNW of Donegal)

Airspace: UAR (Class: B)

Reporter: ScACC SW/Central SC

First Aircraft Second Aircraft

Type: B747-200 B767

Operator: CAT CAT

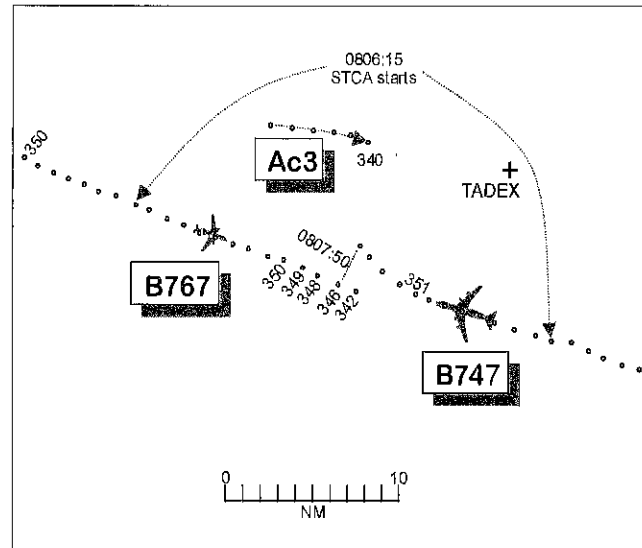
Alt/FL: FL 350 FL 350

Weather VMC CLNC VMC

Visibility: Unltd

Reported Separation: 2-3 NM

Recorded Separation: 2.5 NM/500 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC SW/CENTRAL SC reports that during hand-over of the banded SW/Central sectors to him it was pointed out that the westbound B747 required FL 340 but was at FL 350 because of opposing traffic at FL 340. This situation was highlighted on the FPS display. However, the eastbound B767 was also at FL 350, some 6 NM S of the traffic at FL 340. After resolving an unrelated problem near IOM, he noticed the B747 and B767 head-on (UKAB Note: STCA was flashing). He gave the B767 an immediate descent to FL 330 and a 40° R turn but the pilot did not reply. Next, he turned the B747 40° R and when its pilot acknowledged, he added that this was avoiding action. Reverting to the B767 he gave it avoiding action, R 40° and descend to FL 330 (it was clear of the other traffic at FL 340); this time the B767 pilot responded. The B747 pilot reported clear of the B767; the SC then gave further routing instructions to both ac. Just before the incident he had been distracted by the Watch Manager enquiring about some of his traffic, and his own request to split the sector owing to impending traffic.

THE B747 PILOT reports heading 290° at 490 kt when the ScACC controller told him to turn right to avoid traffic and a few seconds later TCAS sounded a TA followed immediately by a RA 'climb climb'.

He saw traffic at the same level about 10 NM ahead, also turning right. No further manoeuvres were required (he did not follow the RA) and the other traffic, a B767, passed 2-3 miles away at the same level. There would have been a high risk of collision if no avoiding action had been taken.

THE B767 PILOT reports heading SE at M 0.8. ATC gave him a descent and heading, so he knew there was traffic in his vicinity. Upon descending, the pilots were looking for conflicting traffic and saw the climbing ac on TCAS first, then visually; there was no TCAS TA or RA. He was given ample time by ATC to resolve the possible conflict, was in VMC and did not feel alarmed by this incident.

ATSI reports that the ScACC Southwest and Central Sectors were being operated banded with one controller fulfilling the 'T' and 'S' roles. A change of controller took place about 5 minutes before the Airprox occurred. The outgoing controller (Controller 'A') described the workload and traffic loading as "light to medium", the oncoming controller (Controller 'B') described it as "moderate". Both agreed that the traffic situation was "complicated and messy".

Controller B had recently obtained his initial Certificate of Competence. On returning to work after leave, this was the second of four duties with a new watch, covering for staff absent on training

courses. Controllers generally require a certain amount of time to get back "up to speed" after a period of absence and being on a different watch would certainly not have assisted this process. These human factors issues may have influenced his performance on the day.

In addition to the subject ac, a third ac (Ac 3) was germane to the Airprox; it was to exit oceanic airspace at 0800 at 55N 10W at FL 340 en route to Frankfurt, one minute behind the B767 at FL 350. Shanwick had cleared the westbound B747 to enter oceanic airspace, at FL 340, at 55N 10W, which it was estimating at 0816. In accordance with published procedures, the Shanwick controller had alerted the Southwest Sector to this potential conflict in their airspace. This did not present any immediate difficulty to the Southwest Sector because the B747 had been co-ordinated into the Sector at FL 350. The ScACC Controller 'A' marked the FPS on the B747 with Ac 3's callsign and an asterisk to serve as a reminder that the latter would have to be taken into account when descent was issued to the B747 to its oceanic entry level.

Although Ac 3 and the B747 would be vertically separated when they entered the Southwest Sector, the B767 and the B747 would both be entering at FL 350 on reciprocal tracks. Originally, the B747 had been planned to enter the Sector at FL 310 but, at 0731, shortly after taking over the position, Controller 'A' had agreed to accept it at FL 350 in a subsequent telephone co-ordination. Controller 'A' had not picked up the conflict initially and could not recall when she had, but on becoming aware, she had not considered it a difficult problem to deal with because the B767 would have to be descended in order to comply with a standing agreement for handling Manchester inbound; the agreement is that traffic inbound to Manchester should be level at FL 270, 30 NM DME before the 'IOM'.

The B747 established communication with Controller 'A', at 0748, and was cleared direct to 55N 10W at FL 350. Almost 10 minutes later, at 0757, the B767 established communication as it approached 55N 10W and was cleared direct to the 'IOM' at FL 350. Shortly after this, the handover to Controller 'B' took place, and B's first transmission, at 0801:50, was in response to Ac 3's first communication as it crossed 55N 10W at

FL 340. At 0802:40, the B747 pilot called to remind ATC that his oceanic clearance was at FL 340. Clearly well aware of the potential conflict with Ac 3, Controller 'B' replied: "...that's not available at this time but I'll call you back with descent shortly". However, the controller had not recognised the conflict developing between the B747 and the B767 as they converged head-on at FL 350.

Both controllers recalled that the handover had been "normal" and, in most respects, comprehensive. The problem involving Ac 3 and the B747 had been pointed out but information on the B747 and the B767 was dealt with individually. Controller B's attention was drawn to the B747 at FL 350 which would require descent to FL 340 (subject to Ac 3) and that the B767 at FL 350 would require descent for Manchester. Although, by implication, the B767 and the B747 would clearly be in conflict and the FPS should have confirmed this, the conflict was not specifically mentioned or highlighted during the handover.

Having taken over, Controller 'B' dealt with other sector traffic until, at about 0806:30 while routinely scanning the radar, he noticed the subject ac heading towards each other at FL 350; this was just before the STCA activated. He instructed the B767 to descend "now" to FL 330 but received no acknowledgement. He then instructed both flights to turn R 40° "now". These instructions were correctly acknowledged by both crews. The controller then repeated the instruction to the B767 to descend to FL 330, this time adding that this was for "avoiding action", and instructed the B747 to make the R turn an "avoiding action" turn of 50°. No traffic information was provided but, at 0807:50, the pilot of the B747 reported "...clear of traffic" indicating that he was aware of the situation. When questioned about why he did not employ the "avoiding action" phraseology in the first place, controller B said that he had thought initially that he could avoid a loss of separation by descending the B767. When it became clear that this assessment was incorrect, he employed the phraseology without hesitation. He accepted that, having issued his "avoiding action" instructions, it would have been appropriate to pass traffic information. Once the conflict had been resolved, the subject ac were cleared to resume their own navigation. Apart from

the controller who relieved Controller 'B' advising both crews that ATC would be filing a report on it, no further reference was made to the incident.

The radar recording shows the subject ac converging head-on to each other. The B747 remains with its Mode C indicating FL 351 throughout the encounter, with no evidence of a response to the reported TCAS "climb" RA. The STCA activated between 0806:20 and 0806:29, when the ac were about 25 NM apart. Controller 'B' commenced issuing instructions to resolve the conflict at 0806:30 but, a minute later, when the ac were only 6 NM apart, no deviation by either, in the vertical or horizontal planes, is evident. It is only after this point that the B747 can be seen turning right and the B767 leaves FL 350 and commences a gentle turn to the right. The minimum separation occurred at about 0807:50 when the ac passed port to port at a range of 2.4 NM with 4-500 ft vertical separation.

Clearly the handover between Controllers 'A' and 'B', taking place such a short time before the Airprox occurred, is central to it. According to MATS Pt 1 (Page 8-2, para 4), the controller handing over should provide the oncoming controller with *"the detailed traffic situation"*, nevertheless, it goes on to state:

"Controllers taking over should be alert to the possibility of errors and omissions in the information being provided and must verify the data transferred to them by a thorough check of the radar display, flight progress strips and any other relevant information. Only when they are completely satisfied that they have a total awareness of the situation, should they indicate to the controller handing-over that they are ready to accept responsibility for the operational position."

Thus, the onus was on Controller 'B' to ensure that he was fully au fait with the traffic situation. However, having been specifically alerted to a potential conflict (i.e. that Ac 3 was to be taken into account before descending the B747 to its cleared oceanic level) it was reasonable also to expect a specific alert to an existing conflict (i.e. the B747 and the B767 on frequency, head-on to each other at the same level). Both Controller 'B' and the Watch Manager stated that they would expect an existing

conflict of this nature to be highlighted during a handover. In addition, the ScACC MATS Pt 2 (Page SYS 3-50, para 1.3.15 entitled *"Conflicting Traffic"*) states:

"In order to more easily identify traffic that is in conflict, box D of the flight progress strip of each conflicting ac shall be annotated with an asterisk next to the callsign of the conflicting traffic."

In the case of the B747 and the B767, this procedure was not complied with and, indeed, in the case of the B747 and Ac 3, only the FPS on the B747 was annotated *"*(Ac 3 c/s)"*. Controller 'A' did not give any explanation for this other than to say that, because of the amount of information hand written in Box D of the FPS, it is often difficult to find room to annotate the callsign of conflicting traffic. Nevertheless, the FPS for the B747 shows that there was adequate space to annotate *"*Ac 3"* without undue difficulty.

With effect from 3 June 2000, ScACC had introduced the ScACC Single Strip (SSS) system. Under this system, a single 'live' FPS is provided for each flight, which is moved from bay to bay as the ac transits the sector. In the case of the Southwest Sector, there are designators for 55, 56 and 57N/10W on the left hand side of the strip board and TADEx to the right. The SSS strips are "directionally sensitive", with eastbounds reading left to right and westbounds reading right to left. The left hand box (Box A) displays the western sector entry/exit fix, in the case of the subject ac 55N 10W, together with the estimate, the right hand box (Box E), the eastern sector entry/exit fix, in the case of the subject ac REMSI and IOM, together with the estimate. In addition, Box D, contains a 'mid-point' (TADEx) estimate. Prior to the conflict, the FPS showed the B747 estimating TADEx at 0806 and the B767 estimating TADEx at 0807, with both flights at FL 350. Thus a conflict in the vicinity of TADEx should have been evident from the strip display, however, both Controllers 'A' and 'B' recalled that the relevant FPS had been under different designators around the time of the Airprox. ScACC Supplementary Instruction 13/00, *"Introduction of ScACC Single Strip"*, gives the following guidance on Strip Management for the Southwest Sector:

"Westbound Traffic"

The Strategic controller shall carry out initial conflict detection through the sector on receipt of a live strip and shall place the strip in time order under the TIRS/TADEX designator.

As the flight proceeds through the sector and is tactically clear of all conflicts at the mid-point the strip shall be moved under the appropriate 10W designator in time order.

Eastbound Traffic

The Strategic controller shall place the live strip under the relevant 10W designator. When conflict free the strip shall be moved under the TIRS/TADEX designator in time order using the strip mid-point time and conflict detection shall then be undertaken at the mid-point and the exit point."

If this procedure had been followed, it should have ensured that the conflict between the subject ac was picked up in a timely manner and the relevant FPSs should have remained under the TADEX designator until the conflict was resolved or until both strips had been annotated with the callsign of the conflicting traffic.

In his report, Controller 'B' states: "*Just prior to the incident I was distracted by the Watch Manager enquiring about a (XYX123) and the B767 and, due to pending traffic, I had requested that the sector be split*". Afterwards the Watch Manager explained that the SMF equipment had activated, indicating a loss of separation in the vicinity of 55N 10W between the B767, at FL 350, and an XYX123 at FL 340. In fact, the code converted callsign "XYX123" turned out to be Ac 3, which was using the SSR squawk assigned to XYX123. The Ac 3 crew should have changed squawk to 2000 on the ocean before being assigned a discrete code by ScACC. Because the real XYX123 was not RVSM equipped, 2000 ft vertical separation was required between it and the B767, leading to the activation of SMF, whereas 1000 ft was acceptable between Ac 3 and the B767, both being RVSM equipped. In hindsight, this was a distraction at an unfortunate time but it was the type of distraction which is likely to arise quite often and which should be allowed for when opting to operate in a bandboxed mode. On this occasion, the conflict itself should have been

identified and highlighted on the FPSs much earlier and a plan for resolving it already in place. The Watch Manager was not sure when the request to split the sector had come but Controller 'B' thought that it was at the end of the discussion about the SMF alert.

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 found the ATSI analysis left little else to discuss and concluded that the cause of the Airprox was that Controller B did not provide the appropriate separation between the B747 and the B767. It was suggested that one of the ac could have been left on route and the other vectored clear. However, this could only be done if Controller B had been aware of the confliction. While it was controller B's responsibility to ensure that he understood the traffic situation before accepting the position, members agreed that Controller A had contributed passively and actively to her successor's problem. First she had not pointed out the confliction, second, and more importantly, she had not annotated the FPSs as per the MATS Part 2 and third she had not ensured that the ScACC SI 13/00 was complied with.

While the Board agreed that the sightings by the pilots and their subsequent actions removed the risk of collision, disquiet was expressed about some aspects of their handling of the incident. Airline pilot members agreed unanimously that the B747 pilot should have followed his TCAS RA, and they were concerned about the slow reactions of the B767 pilot. The Board was advised that this had also been of concern during the investigation. It was often noted that eastbound crews were not particularly alert or responsive after an Atlantic crossing, but in addition it appeared that in N America the term 'avoiding action' did not have the same meaning as in the UK FIRs. Both the airline and the FAA advised that within the USA a controller would ask for an 'immediate' turn/climb/descent etc if he wanted a prompt avoidance out of a pilot, which complies with ICAO procedures. Consequently the

Board felt that there should be just one phrase used by ATC to alert pilots when prompt avoiding action was necessary and that this phrase should be recognised universally and made a recommendation to this effect.

UKAB Note: Enquiries after the meeting indicated that discussions are already taking place between ICAO, Eurocontrol and the UK on the standardisation of avoiding action instructions and responses. Depending on progress, the Board's recommendation is held in abeyance for the time being.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

Controller B did not provide the appropriate separation between the B747 and the B767, compounded by actions not carried out by Controller A.

Degree of Risk: C

AIRPROX REPORT No 112/00

Date/Time: 02 Aug 1521

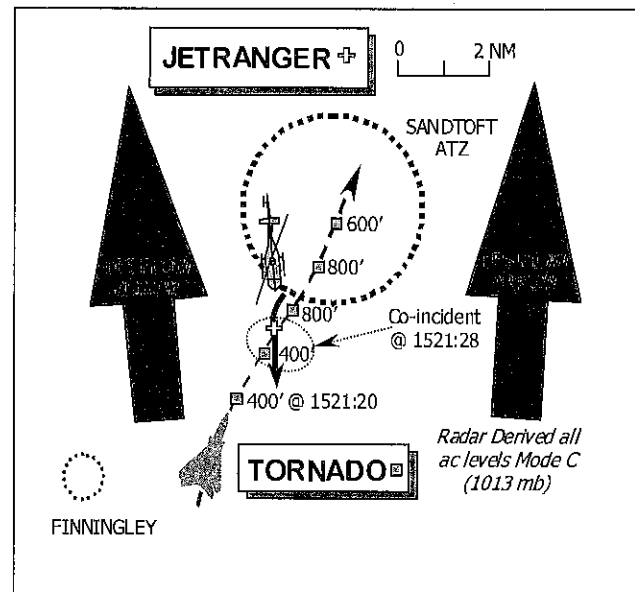
Position: 5331N 0054 W (3 NM SSW of Sandtoft – elev 11 ft)

Airspace: London FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	JetRanger	Tornado GR4
<u>Operator:</u>	Civ Comm	HQ STC
<u>Alt/FL:</u>	500 ft (RPS 1004 mb)	600 ft (Rad Alt)
<u>Weather</u>	VMC CLBC	VMC CAVOK
<u>Visibility:</u>	>20 NM	>10 Km

Reported Separation: 1-200 ft V & <100 M H
300ft V, Nil H

Recorded Separation: Contacts Merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETRANGER PILOT reports conducting a routine pipeline inspection flight at an altitude of 500 ft Barnsley RPS, (UKAB Note (1): reported incorrectly as 1006 mb but from the RT transcript 1004 mb) some 2000 ft below a scattered cloud layer at 2500 – 3000 ft with an in flight visibility in excess of 20 NM. The helicopter livery was red and white, HISLs and stabiliser strobes were on and a squawk of 0036 was selected with Mode C and he had just called Waddington to request a FIS. After passing Sandtoft heading 170° at 120 kt, his observer spotted a fast jet at 2 o'clock heading

straight toward his helicopter "on a collision course". Seconds later he saw the Tornado himself about 2-300 m away and immediately started an avoiding action descent, it was apparent that the fast jet crew had also spotted him and had also initiated an avoiding action climb. The Tornado passed about 1-200 ft above from 2-7 o'clock, certainly within 100 m of his helicopter. He believed that if both he and the Tornado pilot had not seen each other and taken avoiding action at the same time a collision would have resulted.

UKAB Note (2): It was ascertained during the course of the investigation of this Airprox that the JetRanger pilot's company, through an oversight,

had not notified the flight under the advisory Helicopter Pipeline and Powerline Inspection Procedures (PINS) as detailed in AIC 10/1998 (Yellow 284).

THE TORNADO GR4 PILOT reports his ac is camouflage grey, HISLs were on and he was squawking 3/A 7001 with Mode C on a low-level sortie. Whilst heading, he thought 340°, at 420 kt after an IP to target run flying straight and level at 300 ft Rad Alt, a red helicopter was sighted about 4-500 m away just R of the nose on a reciprocal heading. He pulled up to avoid the helicopter, which passed about 300 ft directly below them with no horizontal separation. The risk was not assessed but he comments that although it was late visual acquisition, there was sufficient time to take avoiding action. He added that there had been no area or individual notifications or NOTAMs about a pipeline inspection flight on the day.

UKAB Note (3): The UK Mil AIP Vol III Pt 1 - LFA11, specifies that the crews flying to the E of Sandtoft ATZ, in the Sandtoft/Scunthorpe gap and area E of Fittingley are to do so in a northerly direction. When flying to the W of Sandtoft ATZ, in the flowed gap between Doncaster and Sandtoft ATZ, they are to do so in a north northwesterly direction only.

Furthermore, Sandtoft aerodrome is to be avoided between 0815 & SS by 2 NM, when flying below 2000 ft msd. A warning is also specified for free-fall parachute drops at Sandtoft within the same timings, radius 1.5 NM, up to FL 150.

MIL ATC OPS reports that at about 1522:21, the JetRanger pilot freecalled Waddington ZONE, reported his position as 012° (M) GAMSTON 13 NM at 500 ft agl and requested a FIS. ZONE agreed the FIS and passed the Barnsley RPS (1004 mb); after reading back the RPS the pilot added, *"...we've also just had a near miss with a Tornado, could you log that please and I'll file an airmis when we get home."* ZONE asked the pilot whether he could see any distinguishable markings on the Tornado, to which the JetRanger pilot replied *"No, we were looking straight down his engine intakes...the position was north 53° 30' 86, west 0(00)° 53' 75 and the...time was 1621 local"*.

UKAB Note (4): It was noted that the RT recording timebase was up to 3 min behind UTC, the above has been corrected to UTC.

UKAB Note (5): A review of the Claxby radar recording reveals that this Airprox occurred broadly as described by both pilots just after 1521:28, 3 NM SSW of Sandtoft. The Tornado is shown tracking NNE, not 340° as reported, indicating 400 ft Mode C (1013 mb) as it approached the JetRanger. Although the JetRanger pilot reports Mode C was selected on, no Mode C indications are shown at all throughout the encounter, but an altitude of 500 ft RPS (1004 mb) would equate to about 670 ft (1013 mb). At 1521:28, the Tornado is shown at 1 o'clock to the JetRanger that had steadied on a track of 170°. The Tornado then passed through the helicopter's track and on the next sweep the Tornado pilot's avoiding action climb is evident as the Mode C indicates 800 ft.

FOI (H) comment that the company was requested to raise a Flight Safety Instruction to company personnel involved in this type of Low-level activity, reminding them of the notification requirements.

HQ STC comments that this was undoubtedly a very close call and it is fortunate that both crews, despite a closing speed of over 9nm/min, were maintaining a sharp look-out and that the pilots were able to take sufficient action to avoid a collision. It is possible, however, that had the helicopter's company elected to utilise the Pipeline Inspection Notification System, the incident may have been prevented.

The subsequent penetration of the Sandtoft ATZ is currently the subject of an HQ P&SS Low Flying Complaints investigation but an informal statement by the crew suggests that the divergence from their planned track occurred as a direct result of the alarming confliction with the helicopter and the avoiding action which ensued.

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 appropriate ATC and operating authorities.

The Board was briefed that during Pipeline Inspection flights the nature of the task can degrade crew lookout – the Helicopter pilot intent on the track

to be flown along the pipeline whilst the observer concentrates on ground observation and the task. Hence the importance of the PINS notification to users of the UKLFS. A pilot member suggested the company's task briefing should include a check-off sheet for the pilot, to go through before getting airborne which could possibly have highlighted the company's oversight. It was acknowledged that PINS is not a perfect system, as the notified area is quite large, but it does provide users of the LFS with some warning. Nevertheless, some pilot members whilst reaffirming the importance of PINS in general, believed that the lack of notification was not fundamental to the cause of this Airprox, which could have occurred virtually anywhere in the LFS. Slow moving helicopters are very difficult to spot, especially head on as in this case with little lateral movement to draw attention to it. Similar considerations would have applied to the helicopter crew's ability to spot the Tornado, which, with a closing speed of 540 kt would have been difficult to see head on. Nevertheless, both pilots had seen each other's ac in sufficient time to take avoiding action. This, the STC member explained, resulted in the Tornado crew inadvertently flying through the Sandtoft ATZ, whilst avoiding the helicopter at close quarters; otherwise the ac would have turned to comply with the westerly of the two LFS flow arrows around Sandtoft. The erroneous heading reported

by the Tornado pilot probably reflected the planned track from his chart. The Board agreed, therefore, that this Airprox resulted from a conflict in the Low Flying System, which was resolved by the action of both pilots.

Turning to risk, 'see and avoid' had worked but the HQ STC member thought it had been a close call. The Tornado pilot had thought it was a late spot at a range of 4-500 m, but nevertheless had time to fly above the helicopter and avoid it as he climbed robustly 400 ft. Similarly the helicopter pilot spotted the Tornado marginally later at 2-300 m and descended immediately to avoid the fast jet. Hence each had time to avoid each other but not by much – the lack of a Mode C indication from the helicopter prevented the vertical separation from being determined. However, it was probably somewhere between the 2-300 ft reported by both pilots, which members assessed to mean that the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the Low Flying System resolved by both pilots

Degree of Risk: B.

AIRPROX REPORT No 113/00

Date/Time: 3 Aug 1545

Position: 5400 N 0108 W (5 NM SW of Linton - elev 53 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Hawk Microlight
(Flexwing)

Operator: HQ STC Civ Pte

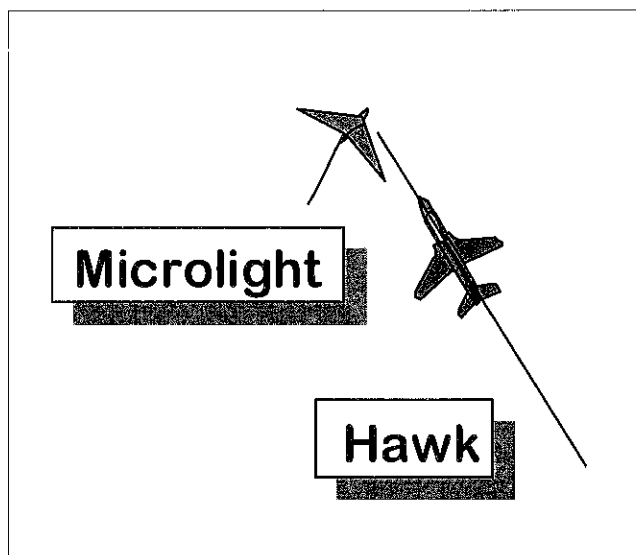
Alt/FL: FL 55 ↓ 5200 ft ↑
(QFE 1020 mb)

Weather VMC CLBC VMC CLBL

Visibility: Good 50 km

Reported Separation: 500 ft V/1 NM

Recorded Separation: < 0.25 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports heading 350° at 350 kt on a descent into Leeming from whom he was receiving a RIS. While descending through a gap in the cloud, passing 5500 ft, he saw a microlight apparently coming out of cloud from his 11 o'clock 500 ft below and 500 yd in front; it was tracking NE. He reckoned its pilot would not have seen him coming from aft of the beam and above. He pulled up and left to avoid it, reporting the incident to Leeming. The risk of collision would have been high if he had not seen it.

THE MICROLIGHT PILOT reports heading 360° at 60 kt on a Navex when a sudden squall developed and he climbed to 5200 ft between clouds to avoid it. He saw the Hawk pass 1 NM away and thought there was a minor risk of collision, although the Hawk had already passed when he saw it.

UKAB Note: LATCC radar recordings show the Hawk descending on a track of 329° while an intermittent primary-only return, assumed to be the microlight, is tracking about 030° above the gap between the Linton MATZ and York. The Hawk's return passes very close to the microlight (<0.25 NM) at FL 57 Mode C, increasing in the next 15 sec to FL 63 before resuming its descent.

MIL ATC OPS reports that the Hawk pilot was handed over to Leeming Approach (APP) from London Radar on recovery to Leeming. APP initially placed the Hawk under RAS at FL 110 for a radar to visual approach; however, the Hawk pilot requested a RIS and advised APP that he was descending inbound. APP transmitted "*Radar information, QFE 1010, descend 3500 ft*", which was acknowledged by the Hawk pilot. At 1542:38, the Hawk pilot asked "*Any signs of any promulgated gliders in the vicinity?*" to which APP replied "*I can see no gliders at all*". At 1543:46, the Hawk pilot transmitted "*C/S would like to report an Airprox with a microlight, in cloud*". At 1544:06, after APP acknowledged the call, the Hawk pilot stated "*C/S, estimate height of the glider 5000 ft, left on an easterly heading, at position 5400.31N 00107.84W*". The details were copied by APP and the Hawk was descended to 2000 ft.

APP was providing a RIS in accordance with the pilot's wishes and the controller reported that the conflicting traffic was not showing on radar at the time of the incident. APP's workload was low, the subject Hawk being his only radar traffic. Both the controller and the ATC Supervisor commented that faint returns similar to 'breakthrough' appeared in the vicinity some 40 seconds after the Airprox was reported; however, whilst the returns became momentarily stronger, they quickly faded without displaying the small lateral movement or modest velocity normally associated with a microlight. An intermittent contact appeared in the same area about 3-4 min later. Although the Watchman radar and displays in use at Leeming were serviceable, 'NR inhibit' had been selected to achieve a more workable picture for the radar controllers. Had APP advised the Hawk pilot the service was limited due to the radar's reduced performance this may have encouraged the pilot to adopt a more comprehensive lookout, or delay his descent until well clear of cloud. However, although inhibition of filters reduces detection performance it is most unlikely that the microlight, with its diminutive radar cross section, at 30 NM from the radar source, would have shown anyway. This has been confirmed by the military radar engineering authority, the Directorate of Engineering and Interoperability (DEI).

HQ STC comments that although the Hawk pilot had sufficient time to take avoiding action and hence remove any risk of collision, he was clearly surprised to see the microlight operating in a broken cloud layer at FL 55, albeit technically VMC, close to a busy military airfield.

There are clear indications that the intensity of traffic in the North Yorkshire airspace continues to increase. The many movements in and out of the 5 military airfields in the Vale of York each day encompass a wide variety of both fixed wing and rotary types. This HQ therefore fully endorses a commitment by RAF Leeming to hold an annual Flight Safety Awareness Day, to which local civilian operators and enthusiasts are invited. The process of mutual education must be continued if we are to nurture a safe and effective working relationship between military operators and their civilian counterparts.

vertical separation accurately, she thought that the safety of her ac had been compromised when the C130 passed very close, 500 ft below her ac.

She wondered if the C130 crew was in receipt of a RAS, whether they had been informed of the level of her ac and that she was para dropping? She added that when operating up to 7000 ft NW, W and SW of Langar her normal routine was to "listen out" with East Midlands Airport; when operating to the E of Langar she listened out with Cottesmore or Waddington. She queried whether she should "listen out" with LATCC when operating above FL 95, outside LARS cover.

UKAB Note (1): The UKAIP, at ENR 1-6-2-1, specifies that for parachute dropping unless a discrete code has been assigned, pilots should select Code 0033, together with Mode C, five minutes before the drop commences until the parachutists are estimated to be on the ground.

UKAB Note (2): The UK AIP at ENR 5-5-4-3, promulgates Langar free-fall drop zone as a circle of 1.5 NM radius centred on 52°53'38"N 000°54'16"W up to FL 150, active normally during daylight hours. Activity is notified to Cottesmore on the day or LATCC when outside their hours of operation.

UKAB Note (3): The UK AIP, at ENR 5-2-2, and CAA VFR aeronautical charts, promulgates the lateral co-ordinates of the Lincolnshire AIAA and from 2500 ft ALT to FL 180, wherein this Airprox took place. Pilots transiting the area are advised to maintain constant vigilance and that a LARS is available from Waddington ATC (H24). Peak activity is noted as taking place between 07-1600 Monday – Friday.

THE C130 PILOT reports that the ac colour scheme was camouflage grey/green; navigation lights, anticollision beacons and HISLs were on and he was squawking 3/A 6151 with Mode C whilst in receipt of a RIS from London (Mil) inbound to Teesside at 290 kt. Heading 355° out of sun, while approaching a position about 5 NM SSE of Waddington at FL 100, London MIL passed traffic information on a contact at FL 90 to the R of the nose. This contact was detected on the ac radar at about 6 NM, low, 15° R of the nose tracking from R – L. A high wing ac similar to an Islander was

acquired visually at 5 NM range and retained in view throughout the encounter. The other ac appeared to be heading 260° and climbing, which was confirmed by London MIL as passing FL 98. At a range of about 1 NM a 25° aob L turn was made onto 300° to increase horizontal separation against the other ac which passed 300 ft above them and 0.5 NM away down the starboard side. There was no indication that the other ac had seen them.

MIL ATC OPS reports that the C130 was tracking N at FL 100 under a RIS from London RADAR Console 15 (CON15). At 1356, the controller advised the C130 crew "*..there is para dropping at Langar and the two ac showing there at the moment believed to be operating at Flight Level one five zero, keep you advised if you come close.*" Further traffic information was passed on the C208 at 1358, "*para dropping ac in your 12 o'clock - 10 miles, crossing L - R at the moment, indicating FL 85 in a slow climb*", which was acknowledged by the C130 crew. Over the next 2 min, CON15 made a further two transmissions regarding the same ac "*..the previous called traffic, still in your 12 o'clock at range 8 miles crossing L - R indicating FL 90*" and "*...para dropping aircraft now slightly right of 12 o'clock, range three miles, passing FL 98 in the climb.*" In response to the second at 1400, the C130 pilot reported "*..visual thanks*", whereupon CON15 advised that the other ac, the C208, had commenced a L turn. The remainder of the C130's transit was uneventful, but about 40 min later, a controller at Waddington telephoned to say that the pilot of the C208 had freecalled Waddington ZONE and enquired about a C130 "*...travelling northwards at about ten and a half thousand feet*" after the event. The C208 pilot later telephoned Waddington ATC to file an Airprox.

The RT transcript and radar recordings indicate that CON15 provided a complete and accurate picture of the situation, which enabled the C130 crew to acquire the C208 visually at a range of over 3 NM. However, the C208 then turned W, back towards the C130, and overflew it with 400ft separation Mode C.

HQ STC comments the handling pilot in the C130 at the time of the Airprox was converting to type and was therefore flying in the LH seat under the supervision of a training captain. A qualified co-

pilot occupied the RH seat. It is therefore possible that the handling pilot, and the rest of the flight deck crew for that matter, did not fully assimilate the traffic information passed by London Radar which was otherwise quite sufficient to enable them to avoid the C208 by some considerable margin. That aside, it is not clear from the Cessna pilot's report exactly what steps she was taking to supplement her lookout and a radar service may well have served to improve her situational awareness from traffic information on the approaching C130.

Although it is probable that the handling pilot's assessment of the geometry of the encounter was further complicated by the manoeuvring Cessna, an early and positive avoidance turn would no doubt have minimised any risk. It is surprising that after acquiring the C208 visually at 5 NM, the C130 pilot remained on his pre-planned track, electing not only to maintain a converging heading but also to underfly an ac which had been identified to him previously as a parachute dropper.

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 appropriate ATC and operating authorities.

The Board agreed that CON15 had conscientiously passed comprehensive traffic information about the parachute dropping ac under the RIS and painted a good picture of the traffic scenario for the C130 crew, which enabled them to acquire the C208 visually at a range of about 5 NM. Thereafter it was up to the crew to maintain appropriate separation on the observed C208. The HQSTC member reaffirmed his view that the C130 crew had not sensibly evaluated the traffic information provided. After being told that para dropping was in progress at Langar and sighting the subject ac heading SSE and climbing, the C130 crew should have at least considered the possibility that it would turn about and head back toward Langar to drop the parachutists. Conversely, some members suggested that the C208 pilot had turned into conflict with the C130 unaware it was there, but this view did not engender wide support. It was pointed out that underflying an ac known to be

involved in parachute dropping was not good airmanship, (albeit that the parachutists would probably not have been dispatched in this vicinity). Furthermore, most thought that the L turn at 1 NM was too late. A majority view prevailed that as soon as the C130 crew detected that the C208 was turning L, they should have turned R and given it a wide berth.

From the C208 pilot's perspective, she was unaware of the C130 until it was pointed out by an alert parachutist – this demonstrated commendable and sound 'crew co-operation'. Nonetheless, some members were mildly surprised that it had not been seen earlier by the pilot in the prevailing CAVOK conditions. Wondering why the C208 was so far away from Langar, it was explained that the normal profile was to climb to the required height some distance from the drop zone before turning inbound for a steady 'run-in' prior to the drop. Accepting this, members thought the C208 pilot could have done more to minimise the chances of other ac approaching unseen. The C130 pilot had sensibly obtained a RIS to warn him of other traffic unlike the C208 pilot who, quite legitimately, was content to operate without the benefit of a radar service. Merely 'listening-out' on an ATSU's frequency, rather than establishing contact and obtaining an ATS was a poor safety option. Although usually busy at weekends a radar service could have been available from Waddington (or other radar equipped ATSU's) to supplement lookout and members recommended that a RIS or RAS offered the best operating method. Notwithstanding the potentially high RT workload during a day's parachuting activity, the benefits gained from a RIS or a RAS would greatly reduce the potential for this type of occurrence. As an alternative, the C208 pilot could have asked for a service from London RADAR, but their VHF capacity is finite and a LARS service is a low priority compared with traffic transiting the UAS or crossing CAS, for which they are specifically established. Immediately prior to 'the drop' the ac would be above the lower airspace (above FL95) but the parachutists would quickly enter into it and members believed it was far more appropriate to obtain a service from a LARS unit which would be aware of more relevant traffic in that airspace rather than LATCC (Mil).

Taking all these factors into consideration, it was concluded that the Airprox resulted because the C130 pilot flew close enough to cause concern to the C208 pilot for the safety of her ac. However, as the C130 crew had spotted the C208 at range, in a climbing attitude, with no further avoiding action necessary according to its pilot, members agreed that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C130 pilot flew close enough to cause concern to the C208 pilot for the safety of her ac.

Degree of Risk: C

AIRPROX REPORT No 115/00

Date/Time: 9 Aug 1735

Position: 5118 N 0118 W (11 NM SSW CPT VOR)

Airspace: Airway (Class: A)

Reporter: Southampton APR

<u>First Aircraft</u>	<u>Second Aircraft</u>
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<u>Type:</u> Jetstream 41	Cessna 208
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<u>Operator:</u> CAT	Civ Club
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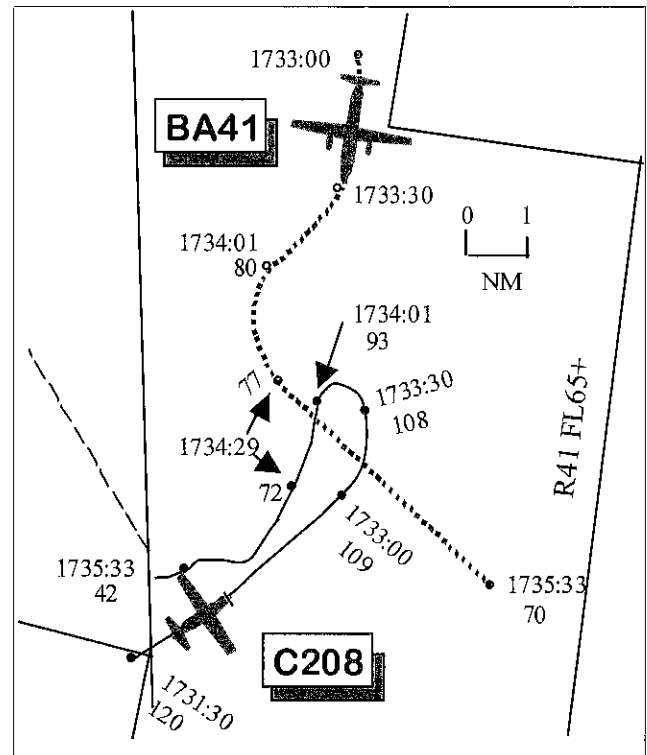
<u>Alt/FL:</u> FL 80 ↓	NK
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<u>Weather</u> VMC CLOC	VMC CLOC
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<u>Visibility:</u> 10+ km	NK
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<u>Reported Separation:</u>	2 NM/NK
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<u>Recorded Separation:</u>	1.72 NM, 500 ft
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PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SOUTHAMPTON APR reports that the Jetstream 41 was transferred from LATCC on a silent handover descending to FL 80. As the Jetstream reached FL 80, the controller deselected his radar display height filter (set at FL 102) to look for another inbound ac and observed an unknown ac tracking NE at FL 105. An avoiding action R turn onto heading 240° was given to the Jetstream but the unknown ac turned W so the avoiding turn was changed to L 140°; traffic information was given to the Jetstream pilot with the unknown ac seen to be descending. The Jetstream had been cleared for descent to FL 70 and its pilot observed the unknown ac as being white in colour with a dark/black tail in

a steep dive through his level at a distance of 2 NM; radar indicated the unknown ac to the SW of the Jetstream.

THE JETSTREAM 41 PILOT reports flying at FL 80 at 240 kt inbound to Southampton when Solent Radar informed them of traffic at FL 95 squawking 7000 and infringing CAS. An avoiding action R turn onto a heading of 240° was flown and the conflicting traffic was seen turning to cross their track and commencing a steep descent; ATC then gave a new heading of 110° to stay clear. The pilot reported the traffic visual, passing approximately 2 NM away at the closest point, at the same level. He said the ac was coloured white with dark markings on the tail, but was unable to identify the type.

THE CESSNA 208 PILOT reports flying on a training exercise from Netheravon in VMC squawking 7000 with Mode C receiving a listening watch on Netheravon frequency 128.3. His ac is white with red/blue stripes; the navigation and strobe lights were 'ON'. He was unaware that he had been involved in an incident.

ATSI reports the Jetstream 41 was inbound to Southampton from the N at FL 80. It was the subject of a silent handover from TC Ockham and at 1732:10 hr was about 10 NM N of Compton. At this point the intruding 7000 squawk was 10 NM S of Compton, inside Class A airspace at FL 119. Nearly 2 minutes later the Southampton controller instructed the Jetstream to turn R heading 240° followed by traffic information on the intruder. Immediately after this the controller had to give further avoiding action instructions, this time to the L as the intruder ac manoeuvred. By this stage the Jetstream pilot had acquired the intruder visually and identified it as possibly a C550 type with a white fuselage and a black tail. The intruder then continued to descend and clear controlled airspace and was tracked until it was seen descending in the vicinity of Netheravon from which it first appeared. Meanwhile the Jetstream went on to complete a successful approach into Southampton.

It is noted that the Southampton radar display was height filtered at FL 102 and the TC radar display was filtered to remove all 7000 squawks. Both these settings are considered normal.

There is no known ATC implication in this Airprox.

UKAB Note 1: Following discussion with the Jetstream 41 pilot, he initially thought the unknown ac was a high wing Cessna type but stated that as it diverged and disappeared from view it may have been a small business jet.

UKAB Note 2: A recording of Heathrow and Pease Pottage radars at 1731:30 show a 7000 squawk, believed to be the C208, at FL 120 tracking NE entering CAS 4 NM SW of the incident's plotted position. The ac then commences a slow descent until 1733:00 when it commences a L turn onto N passing FL 109; the Jetstream is seen 7.3 NM N of the C208 tracking S. At 1733:30, the C208 turns L onto a SSW track passing FL 108 while the Jetstream turns R onto 240°. At 1734:01 the C208

is steady tracking 200° passing FL 93 as the Jetstream commences a L turn onto 100° and descends. At 1734:29 the Jetstream is seen steady on track 140° passing FL 77 as the C208 is 1.72 NM S of his position at FL 72 and diverging (rate of descent calculated as 4400 ft/min from radar data). The minimum separation is calculated:-

1734:21 200 ft 2.1 NM
1734.29 500 ft 1.72 NM

The Jetstream 41 continues to track SE passing behind the C208, which dives out of CAS (base level FL 65) at 1734:37.

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 ATSI advisor informed the Board that the action of the Southampton radar controller had been purely fortuitous in deselecting the radar display height filter to show the conflicting ac in CAS on a 7000 code. Setting FL 102 was common practice at Southampton, while the removal of 7000 squawks by code filtering was the normal routine at LATCC.

The Board were in no doubt that the incident had been caused by the unauthorised entry of CAS by the C208 pilot, but members wondered why it had occurred. The C208 pilot had been busy on a type conversion training sortie which included a practice emergency descent but he could only surmise that he had drifted further E than intended owing to strong upper winds from the W (Met archive data show medium level wind FL 120 270/30 kt). The Board noted the very high rate of descent of the C208 as it passed through the Jetstream 41's level and on down below CAS. However, the airliner's avoiding action turn R 240° and subsequent turn L 140°, in addition to the visual sighting by the Jetstream crew, led the Board to conclude that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of R41 by the C208

Degree of Risk: C

AIRPROX REPORT No 117/00

Date/Time: 7 Aug 1637

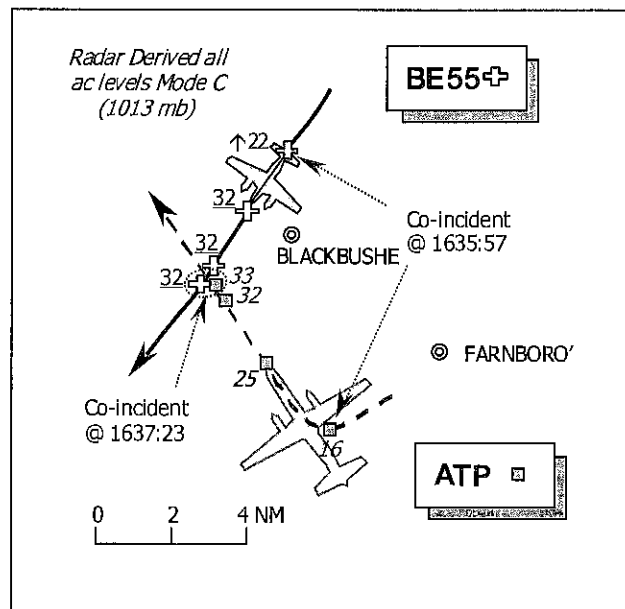
Position: 5118N N 0054 W (6 NM NW of Farnborough elev – 237 ft)

Airspace: London FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	ATP	Beech 55
<u>Operator:</u>	Civ Exec	Private
<u>Alt/FL:</u>	↑3500 ft (QNH 1022 mb)	3400 ft (QNH 1022 mb)
<u>Weather</u>	VMC CLOC	VMC
<u>Visibility:</u>	10 km	NR

Reported Separation: 500 m H, 200 ft V 1 NM H

Recorded Separation: 0.5 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATP PILOT reports his ac has a white livery and anti-collision beacons, HISLs and landing lights were all on as they departed Farnborough RW 25 for Warton under IFR, but in very good VMC, climbing initially to 3400 ft London QNH (1022 mb). Following the noise abatement requirements they turned R onto a heading of 310°(M), direct Compton VOR at 160 kt and shortly after the turn they were re-cleared to 6000 ft ALT by London Control. Almost immediately thereafter, TCAS enunciated a TA "traffic - traffic". Both he and the First Officer looked out and saw a light twin piston-engined ac crossing from R – L, he thought in a continuous climbing L turn. TCAS then enunciated an RA - "climb - climb" and the VSI demanded a higher rate of climb which was complied with. The Twin, a Beech Baron, crossed "very close" 500 m ahead of and 200 ft

below his ac. London CONTROL was informed of the TCAS occurrence and replied it was unknown pop-up traffic.

He reports that a very good lookout is always maintained when flying in that area of the 'Open FIR' between Farnborough and COMPTON. He opined that the other ac approached us from "very much a blindside", and he was unsure if they would have spotted it to take visual avoiding action. The TA provided by TCAS was useful and provided the cue to look for the other ac. He subsequently filed an Airprox with the UKAB.

THE BE55 BEECH BARON PILOT filed his Airprox report 1 month after the incident, stating his memory of the event was thus "far from perfect". Whilst heading 221°(M), routing direct from the Burnham NDB (BUR) to the Southampton VOR he thought at 3000 ft London QNH, under a RIS from Farnborough LARS, he was advised that an ATP

from Farnborough would be climbing through his altitude. He identified the ATP in the climb and watched it, as it was quite close, whilst informing LARS that he had visual contact.

He did not consider there had been any "danger" as he was good VMC and had seen the ATP following the traffic information from LARS.

ATSI reports that the Airprox occurred about 6 NM NW of Farnborough Airport, close to where the base of the LTMA is 3500 ft ALT. The Farnborough Approach Radar Controller's (APR) workload was assessed as low, while that of the LARS mentor, supervising a trainee, was reported as light to medium.

At 1628 the Farnborough Aerodrome Controller (ADC) telephoned the Farnborough APR to advise him that the ATP, was taxiing for a RW25 departure. The ATP crew had flight planned to Compton (CPT) VOR below the LTMA, in Class G airspace, to await a CAS joining clearance from LATCC TC. The APR in turn telephoned the LATCC TC Ockham Sector (TC OCK) who accepted the flight remaining clear of CAS initially, and issued an SSR code and contact frequency. Following a readback, the APR advised TC OCK of an 'expected airborne time' of 1633.

The LARS position in the Approach Control Room (ACR) at Farnborough is immediately adjacent to the APR position, with the Odiham Radar suite beyond. At 1631, the LARS trainee received a telephone call from Thames Radar who advised that the BE55 was VFR, just N of the BUR NDB and its track would pass about 6 NM to the NW of Farnborough. The trainee agreed to provide the flight with an ATS and issued a Farnborough squawk -A0432. The audio recording of the APR's position reveals that APR had monitored part of this telephone conversation between Thames RADAR and LARS. However, the APR could not be certain how much of the BE55's flight details he had absorbed but believed that once he had heard the ac type was a BE55, and not a jet, he had not considered it further.

At 1632, the APR issued departure instructions for the ATP to the ADC, including the assigned TC SSR code, approval for the flight to climb to 3400 ft London QNH and, after the completion of noise

abatement, a routing towards CPT. Additionally, the relevant TC OCK frequency was notified, which indicated to the ADC that the flight could be transferred direct to the OCK SC after departure; APR gave final approval for the ATP's departure about 1 min later. The APR said later that before allowing the ADC to retain the ATP, he would first have scanned the radar to determine the presence of any potentially conflicting traffic. None was apparent to him, consequently he elected not to provide the flight with a radar service. The radar recording at this point shows the BE55 about 10 NM N of Farnborough, squawking A7000 but with no Mode C. It is not known why the flight was not squawking the assigned code issued to Thames RADAR earlier, but had it been doing so, it may have prompted the APR ask LARS about it.

The LARS mentor said she would have expected the APR to have notified her about a Farnborough departure. But no such co-ordination took place and consequently neither she nor her trainee was aware that the ATP's departure was imminent. In contrast, the APR had a different expectation; he confirmed that he did not tell LARS about the ATP's departure, but added that he had probably informed the Odiham radar controller (situated in the Farnborough ACR). He had assumed that LARS would have picked up this information either from a scan of the APR FPS display or from the Odiham controller. The latter, however, was under no obligation to undertake such co-ordination. Both the APR and the LARS controller had held unfulfilled expectations of the other that resulted in neither being aware of each other's traffic. The Farnborough MATS Part 2 does not lay down, specifically, the co-ordination process in such circumstances, though since the incident, the unit have undertaken a review to determine if guidance is required. The MATS Part 2 (4-6) does, however, require Farnborough APPROACH to ensure that "*ac will be transferred to TC clean of known conflicts...*". On the basis of this requirement it was incumbent upon the APR to establish that such a condition existed. While a cursory scan of the radar was useful, it was no substitute for positive interrogation of LARS to establish the presence of traffic likely to affect the departure. Relying upon the LARS controller voluntarily to acquire the information, or by chance obtain it from the Odiham controller, was neither reliable nor practical as an option.

The BE55 pilot made the first call to Farnborough LARS at 1635. The pilot reported 4 NM N of Blackbushe at 2300 ft (1022 mb) requested a RIS and a climb to FL 40, whereupon LARS reaffirmed the assigned squawk A0432 and confirmed the Farnborough QNH as 1022 mb. Following identification, the LARS trainee placed the flight under a RIS and approved a climb to 3400 ft QNH (clear below the LTMA).

Meanwhile the ATP was airborne and climbing straight ahead in accordance with the noise abatement procedure. This requires ac to have passed 1800 ft (or DME 2.5 NM) before commencing a turn. The Farnborough ADC retained the flight on his frequency until it had passed 1800 ft and commenced a R turn. The radar recording, at 1635:57, shows the ATP in a R turn passing 1600 ft Mode C (1013 mb), with the BE55 about 7 NM to the N, tracking SW and indicating 2200 ft (1013 mb). The ADC had not been notified of any traffic to affect the ATP and none was apparent to him on the Aerodrome Traffic Monitor. Consequently, at 1636:23, he transferred the ATP to the notified TC OCK Sector frequency.

The ATP was now established on a converging track, with the BE55, and climbing to the same assigned altitude. The developing situation was detected by the LARS trainee controller who, unaware of the ATP's intentions, immediately issued traffic information to the BE55 pilot in accordance with the RIS at 1636:30, "...traffic out of Farnborough 3 miles south of you is an ATP tracking to the north west in the climb through altitude two thousand eight hundred feet". The pilot acknowledged the call and reported looking out for the traffic. At the same time, the LARS mentor asked the APR, directly, for information on the ATP and was told that the flight had already been transferred to TC. The LARS controller immediately telephoned the TC OCK Sector to notify them about the confliction. During the call, which was answered by a TC OCK Sector Co-ordinator (OCK CO-ORD), the BE55 pilot reported to LARS he was visual with the other traffic, this was passed onto OCK CO-ORD, but there was little that the TC OCK SC could have done by this stage. The radar recording shows that the CPA occurred moments later at 1637:23, after the BE55 had crossed from R - L through the ATP's 12 o'clock at about 0.5 NM;

the BE55 indicated 3200 ft Mode C (1013 mb), while the ATP was climbing through 3300 ft (1013 mb). At this point the BE55 was in class G airspace and the ATP was just entering the Class A LTMA.

In parallel with these events, the ATP crew had made their first call to the TC OCK SC, reporting passing 2800 ft, climbing to 3400 ft ALT, own navigation to CPT. Responding, the TC OCK SC instructed the flight to '*squawk ident*' and issued a clearance to climb to 6000 ft ALT. TC does not provide either a RAS or a RIS to traffic outside CAS below FL 70 (LATCC MATS Part 2 and UKAIP ENR 1.6 refer). Consequently, while below the LTMA base of 3500 ft ALT, the ATP crew was receiving a FIS. The pilot should have been aware of this, but a reminder from the TC SC during this intervening period would have been appropriate. Although the TC OCK SC could expect the ATP to be transferred to him '*clean of known conflictions*', he is, nevertheless, expected under a FIS and subject to workload, to provide collision hazard information where it is self evident. It is understandable on this occasion that the presence of conflicting traffic was not apparent to the OCK SC, because the BE55's SSR label was partly obscured by the label of higher level traffic.

An STCA warning, of 8 seconds duration, was produced on the TC radar display, but this did not commence until after the ATP was about 0.5 NM astern of, and 500 ft above, the BE55. Moments later the ATP pilot reported "...just had a TCAS alert", adding that the traffic had crossed from R - L at the same level.

NATS have since examined the STCA performance and concluded that it did not trigger earlier because at that stage neither ac had entered the predefined STCA alerting area.

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 noted that both Farnborough LARS and APR had required the BE55 and ATP pilots respectively to fly at 3400 ft London QNH initially and it was apparent that between the two controllers no co-ordination had taken place before the ATP's departure. Controller members were also concerned that the APR had not taken sufficient care to scan the area around the ATP's departure track for possible conflicts. Once again the importance of selecting Mode C with A7000 was demonstrated in this incident. The BE55's squawk of A7000 (albeit without Mode C at that stage) should have been evident to the APR and drawn his attention to it, but it seemed that he had not noticed it. Hence his decision to permit the ATP crew to call TC OCK direct. This was thought by some civilian ATCO members to be an unsatisfactory method of operation. Under IFR the ATP crew could reasonably have been expected to ask for and receive an ATS from APR whilst departing from the aerodrome, but APR's decisions effectively obviated the option. This caused great concern to several controller members familiar with operations in the confined Class G airspace below the LTMA. It was explained that this form of entry into the airways structure – routing initially to CPT at 3400 ft ALT to await entry clearance from TC OCK – very often meant that IFR traffic had to hold in the FIR at CPT before joining CAS. Members thought the APR should have allowed for this situation by giving the ATP pilot the opportunity to ask for a RIS or a RAS. Either service would have ensured traffic information was given on possible conflicts. None of this happened and the ATP had instead been transferred direct to TC OCK who provided a FIS but whom were also unaware of the approaching BE55. This Airprox had been entirely avoidable in the Board's view since all of the information relating to the two ac had been available to controllers sitting in close proximity. Moreover, the APR had been unrealistic in assuming that the LARS controller would have obtained details of the ATP's departure without a proactive injection of traffic information. Had the APR done so, it might have prompted the co-ordination that was called for. In the end, the developing conflict was recognised by the LARS controller who issued traffic information to the BE55 pilot, in accordance with the RIS and elicited a visual report from the pilot. Although LARS then alerted TC to the proximity of the BE55, there was, unfortunately,

insufficient time to warn the ATP pilot before the two ac had passed the CPA and were starting to diverge.

Turning to the ATP pilot's comments on lookout in this area of the Open FIR, and the BE55's approach from the "blind-side", pilots on the Board were surprised by this and considered that the crew's lookout might reasonably have detected the BE55 earlier. Some suggested that the late sighting by the ATP pilot had caused the Airprox but others thought that TCAS had alerted him in time to act accordingly. Whereas controller members strongly believed that the APR probably took insufficient steps to establish the presence of the BE55 and denied the ATP pilot a radar service, with no contiguous CAS between the aerodrome and the airways structure, it was recognised that pilots must exercise due regard for other traffic. Pilot members were in no doubt that while flying in the FIR, whether VFR or IFR, the onus had remained equally and ultimately with both the ATP and the BE55 pilots to avoid each other. This view prevailed and consequently, the Board concluded that in the circumstances that pertained this Airprox was the result of a conflict in the FIR.

With regard to risk several safety nets had come into play to forestall a more serious incident. The BE55 pilot had seen the ATP following the traffic information from LARS and was watching it closely. Hence he was forewarned and would have been able to take avoiding action if it had been necessary, which evidently it was not. Warned by TCAS, the ATP pilot had seen the BE55 and complied with the RA whilst climbing into the LTMA. The timely clearance to join CAS had been fortuitous, nonetheless, TCAS again proved its worth and it was agreed that no collision risk had existed.

After the meeting it was ascertained that Farnborough ATC had completed their review of the co-ordination procedures and requirements for use within the unit. Appropriate action had been taken and the topic would be covered within the Local Competency Examination scheme.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR.

Degree of Risk: C.

AIRPROX REPORT No 118/00

Date/Time: 7 Aug 1220

Position: 5200 N 0035 E (3.5 NM NE of
Wethersfield - elev 321 ft)

Airspace: TMA/FIR (Class: A/G)

Reporting Aircraft Reported Aircraft

Type: A321 Viking glider

Operator: CAT HQ PTC

Alt/FL: 4000 ft ↑ 3500 ft
(QNH) (QNH)

Weather VMC CLAC VMC CLOC

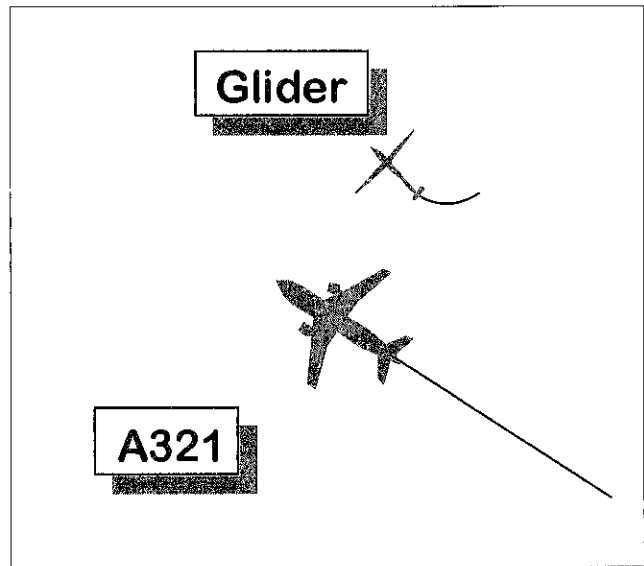
Visibility: 10 km+

Reported Separation: 150-200 ft/1000 ft

Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports heading 290° at 220 kt, levelling at 4000 ft on a wide left base to RW 23 at Stansted. The weather was good, clear with shallow scattered Cu below. His F/O shouted a warning and he saw a glider in a climbing steep right turn at the same level and very close (150-200 ft) on the right. He reported an Airprox to Essex radar on 120.62. He thought the risk of collision was high. His F/O confirmed that he had seen the glider in his 2 o'clock for a few seconds as it flashed past; it was in a climbing right turn and level with or just above a good horizon. There was a scattering of shallow Cu cloud below but none within half a mile on his right. He pointed out (to the suggestion that the glider may have been below their level) that his Captain would not have seen it had this been so. In a later telephone conversation the captain explained that he was wings-level and from the left hand seat had seen the glider at the same level, pulling up to, if anything, above his level, and flashed past to his right about as far away as an ac parked on an adjacent stand. It was a particularly frightening experience which affected both pilots and which was still distracting them as they flew their next sector. At the time of the incident they were in clear air somewhat above the tops of the



shallow clouds. He confirmed that the glider was not a powered glider; it was grey with orange bands on the wings and fuselage.

THE VIKING GLIDER PILOT (an instructor) reports taking off at about 1206 and thermalling to the NE of Wethersfield; passing 2000 ft he called Essex Radar who cleared him up to 3500 ft; he was given a QNH which he set on his altimeter and continued to thermal. The lift weakened as he approached 3500 ft and he heard an RT call from another ac asking Essex if they were aware of gliding activity, as he had passed a glider. Continuing his turn, he saw an airliner passing E to W between himself and Wethersfield and at his estimation at least 1000 ft above. He heard Essex acknowledge that he had been cleared up to 3500 ft, although by then he was descending. Approaching 2000 ft he returned to Wethersfield radio frequency and landed at about 1320.

UKAB Note: The discrepancy in the pilots' reports suggested the possibility that the Viking's altimeter might be faulty, but its pilot had suggested the airliner he saw had passed about 1000 ft above, or that another glider was involved. A replay of the Stansted 10 cm radar recording shows 2 primary-only returns manoeuvring around Wethersfield which are joined by a third at 1208. The latter then

manoeuvres generally in a NE direction to the Airprox position where it is passed to its SW with minimal separation in plan by the Airbus which had been level for some 5 seconds at 4000 ft (QNH 1024). The primary return then manoeuvres to the NW and W of Wethersfield from where it returns to the proximity of the airfield. Its identity is lost amongst other returns at 1235. There are no other returns in the Airprox area or entering or leaving it, apart from those described, in the 30 min either side of the Airprox; i.e. no other airliner which could have been 1000 ft above the glider.

ATSI reports that the Viking had been cleared to 3500 ft by the Stansted Intermediate Controller at 1206. This level is the base of Class A controlled airspace in this vicinity. The A321 was being vectored on base leg for RW 23 at Stansted and at 1220 was instructed to turn onto a heading of 270°. It is seen maintaining 4000 ft and heading for a slow moving, circling, primary return in a position between Wethersfield and Ridgewell.

After acknowledging the heading change the A321 reported that it had passed a glider at the same level and on the starboard side. The A321 was entitled to expect standard separation in this class of airspace and this was not provided and neither was traffic information passed as the controller thought that he had only cleared the glider to 3400 ft.

HQ PTC comments that even by taking into account the possibility of an under-assessment of the miss distance by the A321 crew, it is difficult to reconcile the marked discrepancies between their account and that of the Viking pilot. The Viking's altimeter has been checked and found serviceable. On the other hand, there is no evidence to indicate the involvement of a third party. Well-established procedures and limitations exist to prevent any such incursion into controlled airspace by Wethersfield-based ac; we can but ensure that these are reviewed, publicised and scrupulously implemented at all times.

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 discussed whether or not the Airbus pilots could have been mistaken about the relative altitude of the glider and was shown photographs taken across the flight deck from the LHS of an A321. It was clear that if seen 150 ft away, from the LHS, the glider must have been at a similar level. Members were advised that the surface temperature and dew point indicated that thermal activity could have taken place at least to the altitude of the A321. It seemed apparent that the Viking pilot was well aware, as shown by his call to Stansted, of the local airspace constraints; he had obtained an appropriate QNH and it was difficult to perceive how he could have come anywhere near the Airbus' level, unless he had perhaps forgotten to set this QNH and had found himself in a surprisingly good thermal. However, he reported that he had set the supplied QNH. It was suggested that another, perhaps wooden, glider, which may not have shown on radar had been involved. This could not be ruled out, but the glider pilot had been asked if he had seen any other gliders above - he had not; the description of the glider and its markings given by the Airbus pilots matched the Viking exactly and there was absolutely no trace of any other glider on the radar. In the time period studied it was most unlikely that even a wooden glider, above the stated level of the Viking, would have given no returns at all on the Stansted radar.

All this led members to agree that the conflicting information available neither lent itself to a conclusion that the glider pilot had penetrated the LTMA nor that the Airbus pilots had been mistaken in what they saw. The Board noted that the Stansted Intermediate Controller should not have cleared the glider to 3500 ft because, technically, he was thereby not providing the prescribed separation. However, a glider could legally fly to 3499 ft in that area without talking to anyone and members believed that this lapse was not part of the cause.

After a lengthy discussion, the Board accepted that a glider had penetrated Class A airspace and had come into conflict with the A321. The only residual difficulty was in determining whether the reported Viking was that glider. Members considered after much further debate that the bulk of the available information indicated that it probably was. In any case, members agreed that because

of the apparent lack of timely sightings and opportunities for avoiding action, this was a dangerous Airprox with a real risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class A airspace by the glider pilot.

Degree of Risk: A

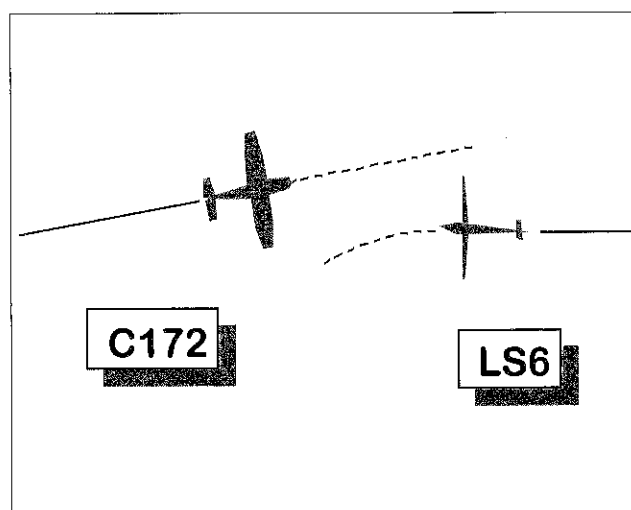
AIRPROX REPORT No 119/00

Date/Time: 11 Aug 1315

Position: 5059 N 0041 W (2 NM E of Midhurst)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	LS6 glider	Cessna 172
<u>Operator:</u>	Civ Pte	Civ Club
<u>Alt/FL:</u>	2500 ft (QNH)	24-2500 ft (QNH 1016 mb)
<u>Weather</u>	VMC CLBC	VMC HZBC
<u>Visibility:</u>	12 NM	10 km+
<u>Reported Separation:</u>	30 m/NK	
<u>Recorded Separation:</u>	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS6 GLIDER PILOT reports heading 270° at 70 kt in his white (with blue and red markings) glider in somewhat hazy conditions when he saw a Cessna approaching at his level from 200 yd ahead, more or less head-on, tracking to a point just off his starboard wing. He altered course to the left and kept a watch on the Cessna which passed 30 m away without any recognition of his presence. He considered the risk of collision would have been high if he had not seen it when he did. He noted the registration of the Cessna which, while he saw it only briefly, left him with a clear impression.

UKAB Note: Although well within the coverage of the Pease ATC radar, there is no evidence of the encounter on the radar recording which was examined for over 2 hours centred around the

reported time. The only ac to come anywhere near the position was a TB20 (identified from its squawk) which tracked 145° from the MID (6 NM NE of Midhurst) and thence some 5 NM E of the Airprox position.

THE PILOT OF THE CESSNA 172, whose registration was noted by the glider pilot, reports heading 100° at 95 kt in his predominantly white ac while on a Sandown to Shoreham flight at 2400-2500 ft QNH. He had passed the area of Midhurst, as he was on an easterly heading from near Petersfield, but he did not see the glider. His transponder was not switched on. He was receiving a FIS from Goodwood and commented that it would be helpful if glider pilots would let people know when they were in the area as gliders are so hard to see.

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.

It was not clear why the ac had not shown on the Pease Radar recording but experience within the Board suggested that there was a 'hole' in that area where the primary coverage was not good. In this context members asked, if the C172 had a transponder, why was it not switched on? Moreover, what was the purpose of having a transponder if it was not going to be used? While it would only have assisted in tracing action in this incident, a conspicuity squawk, ideally with Mode C was of great use to controllers and other ac which may be receiving an ATS.

Members agreed that the only means of collision avoidance in this incident was for the pilots to see and avoid each other; they agreed that the cause of the Airprox was that the Cessna pilot did not see the glider, and the glider pilot saw the Cessna very late. In this case neither was helped by the 'white on white' effect; white ac against a hazy background. The conspicuity of gliders was discussed. While glider pilots in the group averred

that they found other gliders easy to spot, other members pointed out that they were flying at similar speeds and had more time to look for them, and had an absolutely ideal fenestration for lookout. Pilots of powered ac found white gliders particularly difficult to see and almost invisible from head on. A higher approach speed would also reduce the time available to search for and find them. The Board agreed that while powered ac were supposed to give way to gliders, this could and would only happen if they were seen. It was therefore up to glider pilots to expect that they would not be seen and to look out accordingly. It was apparent that this glider pilot was doing so sufficiently to spot the Cessna just in time to reduce the danger; he assessed that he saw the Cessna at 200 yd which was only about 2 seconds away at the closing speed involved and the Board therefore assessed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Cessna pilot did not see the glider, and the glider pilot saw the Cessna very late.

Degree of Risk: B

AIRPROX REPORT No 120/00

Date/Time: 16 Aug 1601

Position: 5348 N 0056 W (0.25 NM W of Brighton Aerodrome - elev 20 ft)

Airspace: FIR/LFS (Class: G)

Reporting Aircraft Reported Aircraft

Type: Chipmunk Tornado GR

Operator: Civ Pte HQ STC

Alt/FL: 300 ft ↑ 300 ft
(QFE 1010 mb) RadAlt

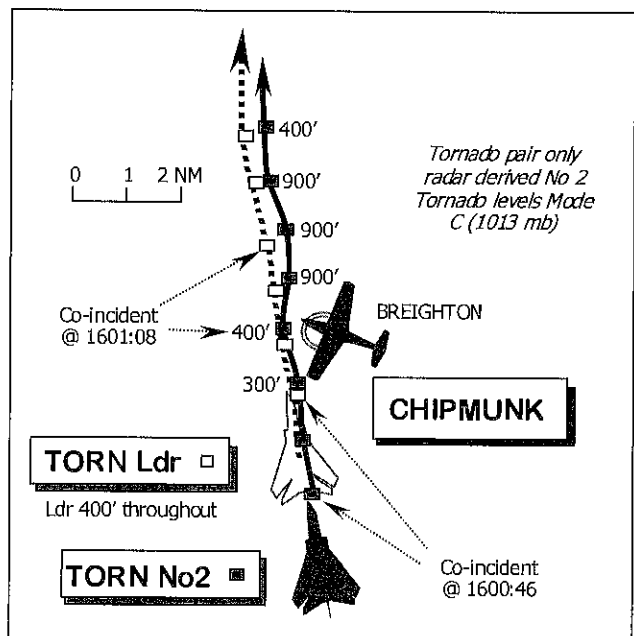
Weather VMC CLOC VMC CLOC

Visibility: >20 km >10 km

Reported Separation: 200 ft V, nil H

100 ft V, 100 ft H

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHIPMUNK PILOT reports that his ac has a silver colour scheme with red upper decking; neither HISLs nor SSR is fitted. After take-off from RW29 at Brighton aerodrome, heading 290° (M) climbing through 300 ft QFE (1010 mb) at 70 kt, wings level, he was scanning the circuit area to the L and suddenly spotted in his 11 o'clock a Tornado approaching at high speed at the same height, heading N. The jet passed from L - R not more than 3 – 400 ft ahead of his Chipmunk as he pushed the nose down and turned L with full aileron. As he rolled to the L a second Tornado was seen at 9 o'clock pulling up directly above, about 200 ft over the top of his ac as its pilot waggled the wings. He adds that he had to take violent avoiding action at full throttle to avoid the two jets; he did not assess the risk.

UKAB Note (1): Brighton aerodrome is promulgated within the UK Military AIP at Vol. III pt 1-2-11-7, as a Light Aircraft Landing Site (LA24). It is a warning only and no mandatory avoidance criteria are specified. However, the entry is annotated 'A' notifying that there are "...high levels of activity..." at the site. Brighton aerodrome does not have an ATZ.

THE TORNADO GR 4 PILOT reports that he was the No 2 of a pair conducting a low-level sortie, squawking 3/A 7001 with Mode C; the ac were camouflage grey and HISLs were on. Whilst heading 351° at 420 kt, flying at 300 ft Rad Alt, he spotted a red & white Chipmunk at R 1:30 – less than 500 ft away at the same height. A 4g pull-up was initiated to avoid the Chipmunk and the ac climbed from 300 ft to 1000 ft Rad Alt, whilst passing 100 ft above and 100 ft ahead of the light ac. He adds that if no avoiding action had been taken he would have passed less than 50 ft ahead of the Chipmunk at the same height.

UKAB Note (2): Further enquiries revealed the Tornado Leader did not see the Chipmunk.

HQ STC comments that Brighton is marked as a minor aerodrome on the UK LFC (S) (6+ movements per day) and it should therefore have been no great surprise for the Tornado formation when they encountered light ac in the immediate

vicinity. The see and avoid principle worked and positive avoiding action by the Tornado pilot resolved the confliction but the margin for error was reduced to an extremely uncomfortable degree.

UKAB Note (3): A review of the Claxby radar is inconclusive; only the Tornado pair are shown clearly throughout as they pass west abeam Brighton aerodrome northbound. The Chipmunk is not evident at all. The Tornado Leader is shown indicating a steady 400 ft Mode C (1013 mb) throughout. The No 2 is shown at 300 ft Mode C until 1601:08, when a climb to 400 ft Mode C is indicated 1 NM W of the aerodrome datum, followed on the next sweep by a further climb to 900 ft Mode C, presumably as it climbed above the Chipmunk.

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 authority.

This was undoubtedly a close call and the STC member advised that the Tornado crew had been shaken by it. Whilst the Board recognised that the Tornado crews were certainly entitled to fly the track that they had planned, and that there was no mandatory avoidance criteria specified for military aircrews engaged in low-flying to avoid the landing site at Brighton, some members questioned the wisdom of passing quite so close to it; they had circuit traffic in mind in raising this point. Although the forecast weather along the planned track would have been covered in their briefing, it was recognised that the likely landing/take-off direction at Brighton may not have been readily apparent to the Tornado Ldr and probably did not feature in his planning. The STC member added that RAF crews were trying to give Church Fenton a wide berth and the flow-restrictions further to the N may also have influenced the Tornados' planned track. Although peak activity at such a landing site would normally occur during week-ends, the GA member added that flying could occur at any time and could easily catch-out the unwary or those unfamiliar with the area. However, in choosing to fly so close it was incumbent on the Tornado crews to maintain a sharp lookout for landing-site traffic, a point which

military pilot members believed would have been covered within the squadron, by the authoriser of the flight.

The Chipmunk would not have been readily apparent until after it was airborne. Similarly, it would have been equally difficult for the Chipmunk pilot to spot the low-level pair at any range prior to take-off. Without the protection of an ATZ, one ex-Chipmunk pilot advocated levelling at a safe height below 250 ft and taking a long hard look before climbing above this height into the airspace where military ac could be encountered. Most believed the Chipmunk pilot had spotted the Tornado Ldr as soon he reasonably could and his robust avoiding action L turn kept the Chipmunk clear of the first jet whose pilot did not see anything. Meanwhile, it was fortunate that the No 2 Tornado pilot had spotted the Chipmunk and had in turn taken positive avoiding action immediately, again probably as early as he could. Members believed this was probably moments before the Chipmunk pilot had turned and spotted the No2 himself. Therefore, there was full agreement that this Airprox resulted from a conflict,

close to a light ac landing site, resolved by the actions of the Chipmunk pilot and the No 2 Tornado pilot.

Although the robust 4g avoiding action climb took the Tornado up to 1000 ft, crossing clearance above the light ac, (he thought 100 ft while the Chipmunk pilot thought about 200 ft) had been marginal. Unfortunately the lack of Mode C in the light ac prevented accurate assessment of the vertical separation achieved. However, the No2 Tornado pilot's sharp pull-up was evident in a sudden 500 ft Mode C increase, which reinforced the urgency of the action. After considering all these factors, members agreed that while an actual risk of collision had been averted the safety of both ac had been compromised nonetheless.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict close to a light ac landing site resolved by the actions of the Chipmunk pilot and the No 2 Tornado pilot.

Degree of Risk: B.

AIRPROX REPORT No 121/00

Date/Time: 13 Aug 1625 (Sunday)

Position: 5157 N 0056 W (5.5 NM NNE WCO NDB)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	C152	PA28
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<u>Operator:</u>	Civ Trg	Civ Club
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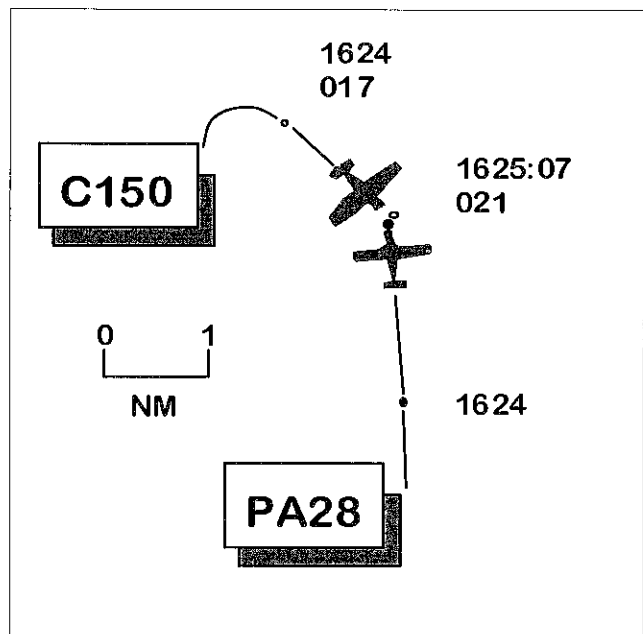
<u>Alt/FL:</u>	↑ 2500 ft (QNH 1016 mb)	about 2300 ft (RPS)
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<u>Weather</u>	VMC CLBC	VMC CLBC
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<u>Visibility:</u>	>10 km	10 km
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Reported Separation: 60 ft V 25m H / not seen

Recorded Separation: <100 m H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports that he was flying an instructional sortie from Wycombe Air Park teaching climbing and descending. The visibility, 1500 ft below cloud, was 10 – 15 km in VMC. He was receiving a FIS from Wycombe Tower on 126.55 and squawking 7000 with Mode C. His ac is light blue/white with red lines; the anti-collision beacon was on.

The student was instructed to descend to 2000 ft (QNH 1016) but reached 1800 ft having been slow to level off. When about 2 NM NW of Little Horwood, a turn to the R was made onto heading 150° and the student was instructed to climb the ac to 2500 ft at 65 kt. Prior to the climb, he had emphasised the importance of maintaining a good look out, especially from above; however, neither crew saw any other ac. During the climb, the instructor asked his student to correct the climbing airspeed from 75 kt to 65 kt by adjusting the ac into a more nose-high attitude. The instructor again carried out a lookout scan and saw another ac, possibly a PA28, in his one o'clock 60 – 70 m away. He instinctively pitched the ac forward and the other ac passed about 20-30 m above and to his R in a 30° banked turn to the L, which he believed was a late evasive manoeuvre; it was coloured white with possibly red and green trim.

The pilot stated that had the student adopted the correct climbing attitude earlier or if he had not pitched the ac nose down, he would have passed within 5 m of the conflicting ac, or possibly even collided with it. He also thought that his high wing configuration whilst climbing towards a low wing type contributed to the incident.

THE PA28 PILOT reports that at the time and date of the reported incident he was on a dual training flight from Denham in the vicinity of Little Horwood heading 300° at approximately 2300 ft. The PA28 is white with blue stripes; the anti-collision beacon and white strobe lights were 'ON'. He was unaware that he had been involved in an incident.

UKAB Note: A replay of LATCC radar at 1624 shows a return squawking 7000, believed to be the C152, having completed a R turn onto a track of 150° and

commencing a climb from 1700 Mode C. At the same time, a primary return, believed to be the PA28, can be seen squawking 7000, no Mode C, heading North 3 NM SE of the C152. At 1625:07 the returns merge, with the C152 indicating 2100 Mode C (equivalent to 2181 ft QNH1016). No course change is apparent from either ac.

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 GA member expressed concern at the current practice of teaching climbing and descending on steady headings. A much better technique was to weave the ac's nose gently whilst climbing and descending, particularly in a C152 with its marked high nose attitude in the climb. This produced more effective lookout by unblinking 'blind spots'. The Board discussed the present instructor examination process and requirements to comply with JAR regulations. Some wondered if these might result in a lowering of overall standards in training techniques, especially if basic flying training methods of the past were being omitted. These concerns were generalisations, however, and the Chairman agreed to discuss the wider issues with the Head of GAD to gain an update.

The Board were unanimous that this conflict in the FIR was caused by a combination of a very late and non sighting by respective pilots in conditions where both pilots should have seen each other's ac much sooner. The C152 instructor had pitched forward instinctively while the PA28 pilot had been completely unaware of the other ac. Good fortune played a large part in keeping both airframes apart and because of this it was assessed that a risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sighting by C152 and non sighting by PA28.

Degree of Risk: A

AIRPROX REPORT No 122/00

Date/Time: 22 Aug 0934

Position: 5857 N 0248 W (3.2 NM E of Kirkwall
- elev 50 ft)

Airspace: ATZ/LFS (Class: G)

Reporting Aircraft Reported Aircraft

Type: SAAB 340 F15 x 2

Operator: CAT Foreign Mil

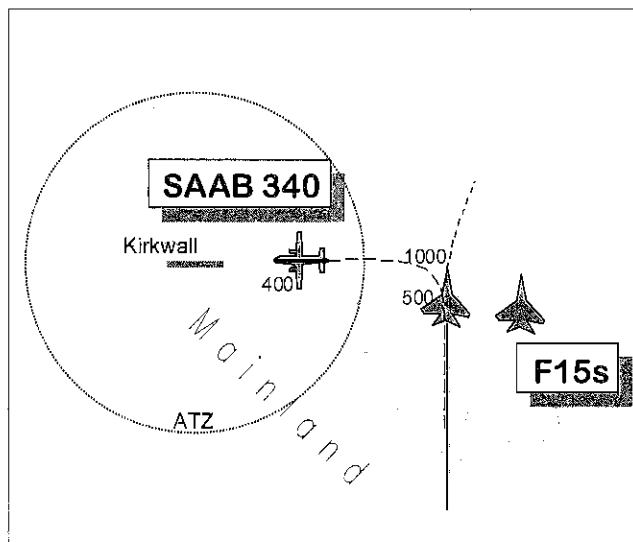
Alt/FL: 400 ft ↓ 1000 ft
(QNH 1022 mb) (amsl)

Weather VMC CLOC VMC NK

Visibility: 10 km NK

Reported Separation: Not seen/Adequate

Recorded Separation: 1.8 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT reports heading 270° at 140 kt and passing 400 ft on finals to RW 27 at Kirkwall when he was warned about fighters crossing, one above and one below him. TCAS confirmed that they were within 6 NM with one 100 ft above and the other 100 ft below. He could not see them but considered the risk of collision was high.

THE F15 PILOT reports heading 035° at 400 kt, leading a pair on a low flying exercise at 1000 ft with his wing man on his right. He was squawking 7001 with Mode C. They acquired the SAAB 340 on radar at >10 NM when it was tail on to them, but much slower. They saw it at 3-5 NM and turned 30° R to ensure adequate separation, seeing it turn left away from them towards Kirkwall. Their mission recording showed they were over the sea throughout and they estimated that they had remained at least 5 NM from Kirkwall and 3-5 NM from the SAAB 340.

KIRKWALL ATC reports, with RT transcript, that the controller saw a pair of northbound F15s to the S of the extended centreline approaching the SAAB 340 which had been cleared to land. He transmitted "C/s fast jet just crossing your nose above you now it looks to be turning away". When the pilot acknowledged, he continued "another one just

passing under you now". The pilot replied that he had "got him on TCAS but er we don't have him visual", and added that he would "have an airmiss for that".

UKAB Note: ScACC radar recordings show the SAAB 340 approaching Kirkwall on a left base for RW 27 as one of the F15s approaches from astern (only one is squawking and no primary returns are seen from the other). The SAAB turns left onto final and when it is descending through 400 ft, the F15 is showing 500 ft Mode C (corrected to QNH). It climbs to 1000 ft as it crosses the RW 27 centreline and turns slightly to the right to pass just over 3 NM from Kirkwall and 2 NM astern of the SAAB.

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 diagram included in the Kirkwall ATC report clearly showed the controller's perception that one F15 had flown in front of and above the SAAB 340, and other behind and below it. With this perception, he was obliged to pass traffic information and tell

the SAAB pilot what he saw. Members were not surprised that the pilot would consequently have been concerned, seeing a different picture on his TCAS. However, with the full incident geometry before them, the Board concluded that the Airprox report was the result of the pilot's understandably mistaken impression of the separation between the ac, and that there had been no risk of them colliding.

It was suggested that the large size of the F15 (for a fighter) may have made it look closer to the controller that it was; this was a common factor in many Airprox reports involving F15s. Members accepted the radar information that both F15s were some way to the E of Kirkwall and clear of the ATZ, although, it was noted, not as far as their Wing HQ

had stated. In this respect it was regrettable that the Wing had not permitted an independent assessment of the mission recording. It was suggested that all of this could have been avoided if the F15s had given Kirkwall a call as they approached, but their representative advised that the F15 is not VHF equipped.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Mistaken impression of separation by the SAAB 340 pilot.

Degree of Risk: C

AIRPROX REPORT No 123/00

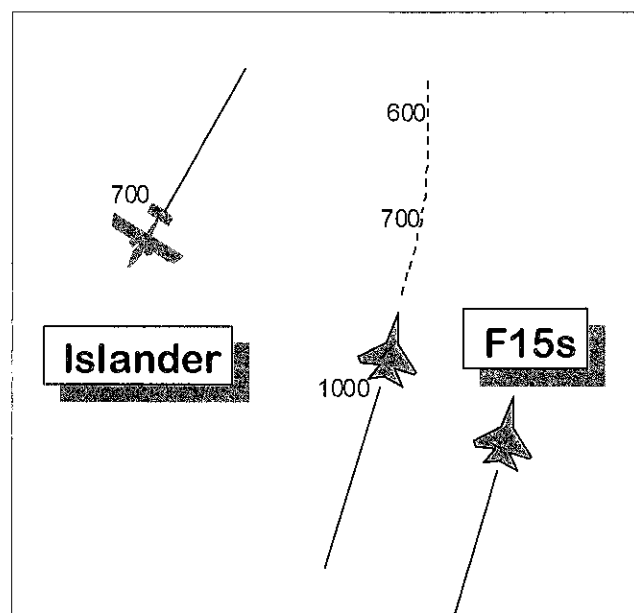
Date/Time: 22 Aug 0935

Position: 5903 N 0245 W (6.7 NM NE of Kirkwall - elev 50 ft)

Airspace: FIR/LFS (Class: G)

Reporter: Kirkwall ATC

	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	Islander	F15 x 2
<u>Operator:</u>	CAT	Foreign Mil
<u>Alt/FL:</u>	1000 ft (QNH 1022 mb)	1200 ft (RPS)
<u>Weather</u>	VMC CLBC	VMC NK
<u>Visibility:</u>	10 km+	NK
<u>Reported Separation:</u>	2-3 NM/Adequate	
<u>Recorded Separation:</u>	1.7 NM	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

KIRKWALL ATC reports, with RT transcript, that the F15s were seen to pass close to a SAAB 340 that was on finals for RW 27 and then continue to the N towards the approaching Islander. The controller advised the Islander pilot "C/s traffic information pair of fast jets just passed through the 27 extended centreline to the east of the field heading northbound", adding "give or take 500 ft" in response to the pilot's query about their level. It

appeared to the controller that one F15 passed in front of the islander and the other behind it; the islander pilot reported having one of them in sight.

THE ISLANDER PILOT reports heading south at 135 kt, inbound to Kirkwall from N Ronaldsay at 1000 ft. Kirkwall ATC advised him about a possible conflict with 2 F15s and he saw one 3 NM ahead where it turned to pass 2-3 NM to his left, but did not see the other. He thought the risk of collision was moderate.

THE F15 PILOT reports leading a pair of F15s on a low level exercise heading 020° at 450 kt with his No 2 to his right. They saw the Islander on radar and acquired it visually, turning 15° R to provide adequate separation.

UKAB Note: ScACC radar recordings show the Islander tracking 210° at 700 ft as a return from the F15s turns right onto 020° from abeam Kirkwall at 1000 ft, with an intermittent primary-only contact to its right. At a position 040°/ 6 2/3 NM from Kirkwall, the ac pass port-to-port by 1 2/3 NM at which point the F15 descends to 600 ft and resumes a northerly track.

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 diagram included in the Kirkwall ATC report clearly showed the controller's perception that the F15s had bracketed the Islander. With this perception, he was obliged to pass traffic information and tell the pilot what he saw. However, with all of the radar information before them, members accepted that both F15s passed to the E of the Islander. The Board concluded, therefore, that the Airprox report was the result of the controller's mistaken impression of the separation between the ac, and that there had been no risk of the ac colliding.

It was pointed out that it was nearly impossible accurately to judge the separation between 2 ac, or their relative positions, unless the observer was in one of them.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction

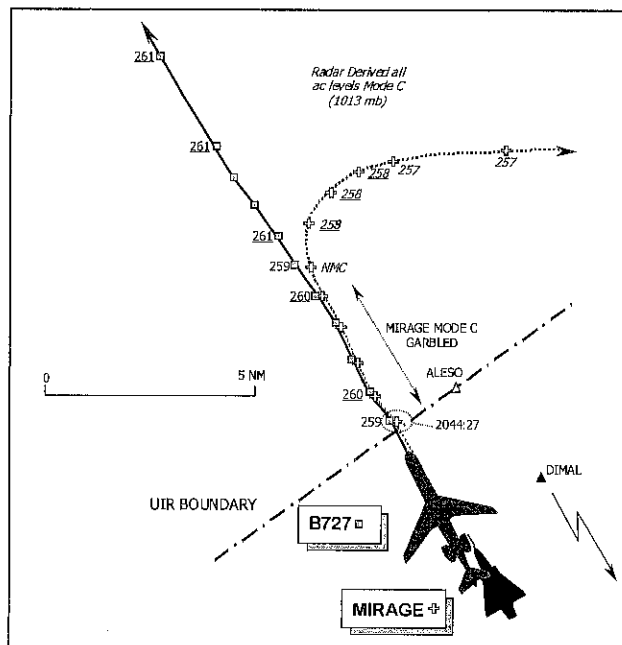
Degree of Risk: C

AIRPROX REPORT No 124/00

Date/Time: 16 Aug 2044 NIGHT
Position: 5033 N 0110 E (UIR Boundary 2 NM SW of ALESO)

Airspace: UAR (Class: B)
Reporting Aircraft Reported Aircraft
Type: B727 Mirage 2000
Operator: CAT Foreign Mil
Alt/FL: FL 260 NR
Weather VMC CLOC VMC
Visibility: 40 km NR

Reported Separation:
 100 ft V, 1000 m H, 1000 ft V
Recorded Separation: Contacts merged, 100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B727 PILOT reports he was inbound to London Heathrow from Tripoli at 300 kt and under a RCS from London Control on 134.9 MHz, at FL

240. Whilst heading 320° for the BIG VOR at 48 DME, he thought, ATC reported unknown traffic 100 ft below his ac. He was instructed to climb to FL 250 and then turn L onto 270° to avoid the other ac. Subsequently, he was given a climb to FL 260 and turned R onto 330°. He believed that there could

have been a collision if he had not climbed and turned as recommended by ATC immediately. He did not sight the other ac and the risk was not assessed.

THE LATCC WATCH SUPERVISOR reports that the B727 was transferred to the LYDD SC from PARIS ACC at FL 240. Shortly after the B727 passed DIMAL, the SC observed a 7400 squawk with the Mode C indicating FL 230 and climbing beneath the B727. Traffic information, avoiding action turns and a clearance to climb to FL 260 were given to the B727 crew. However, the ac squawking 7400 matched the lateral and vertical manoeuvres of the B727. Enquiries of Paris ACC and Mazout Radar revealed that the 7400 squawk was a French military ac carrying out a routine surveillance flight of the B727, but neither unit had advised LATCC of this. It would appear that a Flight Plan was subsequently filed when the B727 was airborne. He reports the separation was minimal - 0.08 NM, nil vertical.

UKAB Note (1): During the investigation of this Airprox the French Air Force (FAF) was requested to provide a report through DAP; radar video stills of the Debden radar recording were provided to assist the FAF with their report.

A report was not received from the Mirage pilot but a letter from the Attaché de l'Air revealed that the other ac was an escort and identification flight, without the B727 pilot's knowledge. It would appear that although no flight plan had been submitted and no diplomatic clearance granted for its flight over France, the B727 was authorised to do so by their Ministry of Foreign Affairs. Moreover, the Ministry of Foreign Affairs had asked the FAF to identify and escort the ac during its flight over their country. One Mirage 2000 had escorted the B727 over Southern France handing over to a second Mirage to cover flight over Northern France. Both escorts were flown *"in good visual contact, at a minimum distance of 1000 m and with a minimum altitude separation of 1000 ft, squawking 7400, as directed by [the] regulations of escort measures"*. According to the instructions issued by the French Ministry, *"the escort flight ended at the limit of the French UIR. At that point the Mirage turned R and afterwards began to climb"*.

The Attaché added that a study of all the different reports shows that there was no risk of a collision. The Mirage pilot always kept the B727 in good visual contact, especially during the 'separation manoeuvre', during which he initiated his climb only after turning R. Furthermore, it was a pity that, when the B727 was transferred to LATCC the French Controller did not inform his English counterpart of the presence of the French Fighter, which would have avoided any element of surprise caused by the 'separation manoeuvre'.

UKAB Note (2): A review of the LATCC LYDD sector RT transcript substantiates the report from the LATCC Watch Supervisor. The B727 pilot checked in with the LYDD SC at 2037:20, at 110 NM DME BIG, climbing to FL 240. Before issuing avoiding action instructions the LYDD SC ascertained that the B727 was not fitted with TCAS. At various times between 2041 & 2044:20, the LYDD SC reported to the B727 pilot the vertical separation between the B727 and the Mirage Mode C indications to be between 1 - 300 ft. The video of the LATCC Debden radar recording does not show this clearly as the SSR indications are garbled, but this may be the result of the poor definition of a VHS recording/TV screen compared to a high resolution radar display. Indeed it is extremely difficult to determine that there is another contact proximate to the B727, until after the ac passed W abeam DIMAL approaching the UIR boundary. At that stage the Mirage appears to open to about 400 yd 'in line astern' and then moves back and to the R into an echelon starboard position as both ac cross the UIR Boundary. The SC advised the B727 pilot that the Mirage was turning away to the E at 2045:20. The Mirage Mode C is not clearly evident until the 'break-away', thereafter indicating FL 258, 1-300 ft below the B727 as it moves away in a wide R turn, crossing the UIR boundary steady E and level at FL 256 (perhaps intentionally at an intermediate level) at 2046:23. No other GAT is evident on the radar recording in the immediate vicinity at any level.

ATSI reports that the B727 though in French airspace, had been transferred to the LYDD SC in accordance with normal practice. The SC observed an ac in close proximity wearing a squawk, which the LATCC HOST Computer System associated with a Chiltern Police Helicopter.

Eventually, the other ac peeled away having penetrated UK airspace by 5 NM. There are no ATC implications in this incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilot of the B727 and the French Attaché de l'Air, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the ACC Watch Supervisor involved and a report from the UK ATC authority.

The catalyst to this sequence of events happened outside UK airspace, but has been assessed for two reasons. First, initial reports filed direct to the UKAB by the B727 pilot placed the Airprox well within UK airspace thereby triggering UKAB involvement. Second, LATCC had provided an ATC service to the B727 crew involved, under delegated arrangements by France. Unfortunately the controlling authority of the Mirage, despite requests, had provided no report.

Hence this was an unusual Airprox report as the majority of this occurrence took place SE of the UIR/FIR boundary in airspace within which the B727's route lay and where functional ATC is delegated to LATCC. Moreover, it was evident to the Board that the B727 pilot was unaware of the presence of the Mirage until warned by the LYDD SC and avoiding action issued. It seemed inconceivable to most members that no prior notification took place between PARIS ACC and LATCC before the B727 was transferred to the LYDD Sector, informing them of the presence of the Mirage and the reasons why it penetrated within accepted standard ATC separation minima. A civilian ATCO member familiar with the LATCC operation endorsed this view and believed that PARIS ACC should have effected co-ordination if they had known about the Mirage shadowing the B727. Clearly they were aware of it from the enquires made after the event reported by the LATCC Watch Supervisor. A civilian member opined that although PARIS ACC might have been aware of the nature of the Mirage pilot's mission

they might not have seen it on their radar equipment, as some believed (but were unable to confirm) that DAT/OAT is filtered out from the display. This suggestion caused considerable concern amongst members. If co-ordination had been effected before transfer of control/communication to the LYDD SC this would have prevented fruitless avoiding action, which was extremely unlikely to 'shake-off' the Mirage pilot who was evidently shadowing the B727 very closely. The Board commended the SC for his awareness, prompt reaction and perseverance when he was clearly placed in a difficult situation. It was noted that the radar recording revealed the Mirage pilot had encroached within the "...*minimum distance of 1000 m and ... minimum altitude separation of 1000 ft... directed by regulations of escort measures*" as reported by the Attaché de l'Air. Moreover, the Board recognised that although it was dark the Mirage pilot would have held the B727 in clear view throughout, whereas the B727 pilot would have been unable to see the Mirage astern at all. In the absence of any further information members concluded that this Airprox resulted from an unauthorised penetration of UK controlled airspace by the Mirage pilot.

Turning to the risk aspects of the encounter, while the Mirage pulled away from the B727 and turned about in UK airspace, the radar recording also revealed that no other ac in the vicinity had been compromised. As the Mirage pilot was intent on escorting the B727 out of French airspace it was probable that he would have been concentrating on his station keeping carefully. Therefore, as the Mirage pilot was able to turn away or increase the range at will, from the B727 unbeknown to either its pilot or the LYDD SC, the conclusion was that no risk of a collision had existed in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of UK CAS by the FAF Mirage 2000.

Degree of Risk: C.

AIRPROX REPORT No 125/00

Date/Time: 23 Aug 0940

Position: 5705 N 0252 W (1 NM NW Aboyne aerodrome - elev 460 ft)

Airspace: Scottish FIR (Class: G)

Reporting Aircraft Reported

Aircraft

Type: PA25 Tug/Glider F15E

Operator: Civ Club Foreign Mil

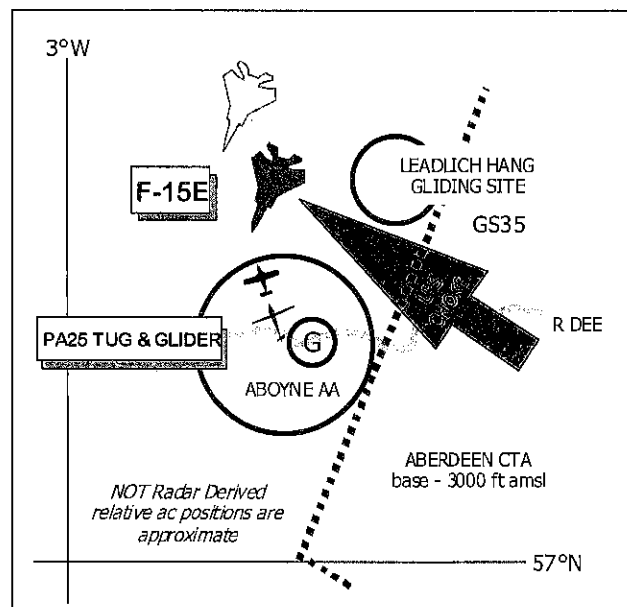
Alt/FL: 900 ft ↑ ↑3000 ft
(QNH 1013 mb) (RPS mb)

Weather VMC CLBC VMC

Visibility: >10 Km NR

Reported Separation: 400 m H, nil V/NR

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA25 PAWNEE TUG PILOT reports he was climbing out from Aboyne Glider site with a glider under tow at 80 kt, about 2000 ft below cloud. The ac had a red/white livery and the anti collision beacon was on; SSR is not fitted.

Passing 900 ft QNH (1013 mb) about 1 NM NW of the site, heading 340°, an F15E Strike Eagle was spotted at 2 o'clock, some 500 m away, which then crossed 400 m ahead of the combination from R – L at about the same altitude. It was in a steep R bank and he thought there was a high risk of a collision at the time. Later, it was realised there were 2 F15s; the glider pilot on the tow did not spot the first one until after it had passed about 2 NM to the W at a height of about 900 ft. No avoiding action was taken as the jets were flying very fast.

THE F15E PILOT reports he was leading a flight of 2 F15Es on climb-out from the LFS at the end of a low-level sortie; his wingman was 1.5 miles off to the R in a 45° trail. Both ac were climbing out heading 200° at 450 kt returning to base. No conflicting traffic was observed below 3000 ft RPS, but cockpit workload was high with frequency and squawk changes during a formation rejoin.

UKAB Note (1): This Airprox was not shown on recorded radar.

UKAB Note (2): The UK AIP at ENR 5-5-1-1, promulgates Aboyne Glider Launching Site for aerotow launches, active during daylight hours.

UKAB Note (3): The UK MIL Aeronautical Planning Document, at Vol. 3 Part 1 - LFA 14, promulgates a mandatory 2 NM avoidance for Aboyne (GS02), the origin of which is offset 0.75 NM to the W. Furthermore, a warning of intensive gliding activity above 1000 ft agl within 5 NM of the site datum is given.

A flow restriction is also imposed in the vicinity for ac transiting the Aboyne/Leadlich Gap Choke Point, which is to be flown in a northwesterly direction. The F15s may have been outside the lateral limits of the choke point.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

As only one of the pilots involved actually saw the encounter, the Board was only able to assess this Airprox on the information available from the PA25

Tug pilot. Unfortunately, the mission tapes from the F15Es had already been recycled before the identity of the ac involved had been determined. The Tug/Glider combination had been 1 NM NW of the Aboyne Glider Launching Site when the Tug pilot first sighted the F15s, which then allegedly crossed about 400 m ahead of the combination. However, there was no information available to confirm that the jets had actually penetrated the Aboyne Avoidance Area (AA), when the offset co-ordinates were taken into account, although the Tug pilot thought they had done so. Regrettably, this Airprox was not shown on recorded radar either, so the Board was denied any corroborative information as to the relative geometry of the encounter. Moreover, the F15 pilot thought they were climbing out from the LFS when they passed abeam Aboyne. Taking all these limited pieces of information into account there was little option left for the Board other than

to conclude that this incident stemmed from a conflict near the boundary of the Aboyne AA, as members were unable to determine with any assurance whether this was 'inside' or 'outside' the AA. With regard to the risk, the PA25 pilot reported the minimum horizontal separation had been 400m; although the F15 pilots had apparently not spotted the Tug/Glider combination, the ac in question had been reported turning R, away from the Tug, and from this it was judged that there had not been a risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction near the boundary of the Aboyne Avoidance Area.

Degree of Risk: C.

AIRPROX REPORT No 126/00

Date/Time: 25 Aug 1411

Position: 5149 N 0041 W (12 NM WSW Luton)

Airspace: CTATMA (Class: D/A)

Reporting Aircraft Reported

Aircraft

Type: B73-3 Learjet 35A

Operator: CAT Civ Exec

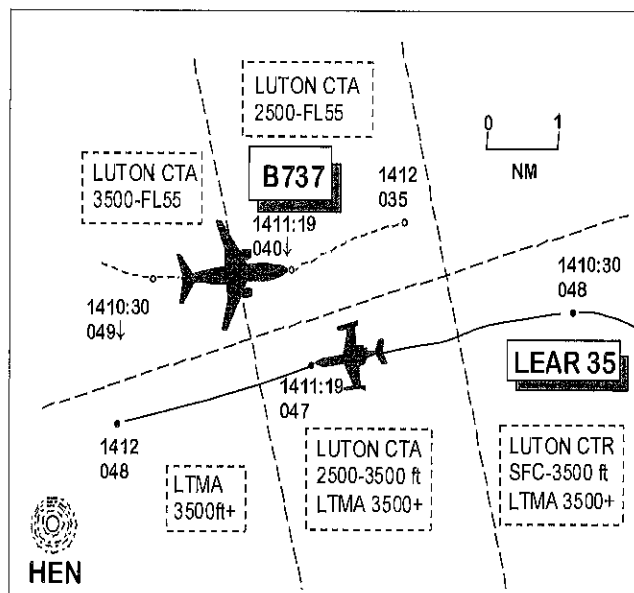
Alt/FL: 3800 ft ↓ 5000 ft
QNH 1019 mb QNH 1019 mb

Weather VMC CAVOK VMC CAVOK

Visibility: 10 km >10 km

Reported Separation: 200 ft V /2 NM H, 1000 ft V

Recorded Separation: 1.1 NM/700 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was heading 110° at 170 kt in a descent having been cleared by Luton APC on 129.55 for an ILS approach to RW 08 at Luton. The weather was CAVOK. When passing through about 3800 ft (QNH 1019) a TCAS RA

demanding 'descend'; vertical separation indicated traffic 200 ft above. The FO, who was flying the ac, disconnected the autopilot and complied immediately; the descent was arrested at 3500 ft. Luton ATC was advised of the TCAS RA compliance. The other ac was not seen but he felt there had been a high risk of collision.

THE LEARJET PILOT reports that he was tracking W at 250 kt and maintaining 5000 ft in CAVOK following departure from Luton. He was receiving a radar control service from LATCC and squawking with Mode C. Another ac, a low wing twin engined type, was seen at his 2 o'clock position about 2 NM away; it subsequently passed about 2 NM to his starboard side and about 1000 ft below. No avoiding action was necessary and he thought there was little risk of collision.

ATSI reports that the incident took place at 1411 in Controlled Airspace about 8 NM W of Luton Airport. The LJ35 had recently departed from RW 08 at Luton and was in receipt of an Area Control service from the LATCC TC NW SC whilst the B737 was on final approach to RW 08 at Luton receiving an Approach Radar Control service from Luton.

The TC NW SC was operating the sector in 'boxed' mode and described both the traffic loading and the workload level at the time as moderate and within capacity. She had been at the position for about 40 minutes and there were no equipment unserviceabilities and no undue distractions reported.

At 1400:30, LATCC TC gave Luton Tower approval for the LJ35's departure. The flight had been issued with a CPT (Compton) 4C SID which after departure from RW 08 required a R turn onto a reciprocal track to HENTON NDB (260 QDM). This track is parallel to, and a little under 3 NM to the S of, the Luton RW extended centreline.

At 1402:30, the TC N Co-ordinator passed inbound release details on the B737 to the Luton APR. As the Luton RW was 08, the B737 was offered to Luton on a 'full release', rather than via the standard routeing via LOREL, to expedite its arrival. This was not unusual when RW 08 was in use. The B737 was to the SE of Heathrow, tracking NW and would be positioned towards a right-hand base leg for RW 08. The release agreed was via WCO (Westcott) descending to FL 60. Recognising that the B737 and the LJ35 would at some stage conflict, the TC N Co-ordinator also notified Luton that they, implying the NW SC, would take responsibility for the separation of these two flights. Although there was nothing to prevent the TC controllers adopting this course of action on a tactical basis, it is contrary to the procedures published in the LATCC MATS

Part 2 (Page NWE 5-5, para 3.4 "Co-ordination - Inbound and Outbound Traffic") which states: "The separation of Luton outbound airways traffic released for departure by TC, and inbound traffic which may be following the LOREL procedure or complying with the terms of a Full Release, is the responsibility of Luton APC". Nevertheless, the NW SC acknowledged the requirement placed upon her and agreed to it. The LJR35's departure was delayed slightly, until 1405 and for reasons unconnected with this incident, LATCC placed a departure restriction of not above 4000 ft on it.

In the meantime, the B737 had already established communications with the NW SC and had been descended to FL 90 and placed on a radar heading of 325°. To act as a reminder that the ac was on an unusual route, the controller elected to 'hook' the flight, i.e. electronically place a box around the flight's SSR label on the radar. At 1406, the LJ35 made its first call and was instructed by the NW SC to squawk 'ident' and advised that there was no ATC speed restriction. Other flights were then attended to before finally the B737 was cleared to FL 60 and, at 1407, was transferred to Luton Approach still on the radar heading of 325°. The controller stated that she could not be certain if she had retained the B737's fps on her display as a reminder, but thought that she had probably done so. Thirty seconds later, the NW SC instructed the LJ35 to continue its climb to 5000 ft. The radar recording for this time shows the LJ35 at 4000 ft turning R, but with a radius of turn that had caused it to pass through and to the S of the SID track to HENTON; this was not noted by the NW SC. Notwithstanding the pilot's responsibility to adhere to the SID track, it would have been prudent on this occasion for the NW SC not to have removed the ATC speed restriction, in view of the high performance capability of this ac type. The B737, meanwhile, is seen about to cross through the CPT SID track, still on a NW heading and passing FL 63. The two ac were about 23 NM apart at this point and were apparently not in potential conflict with each other.

By this point, the B737 had established communications with the Luton APR and was turned R from radar heading 325° on to 110° and was instructed to establish, from the N, onto the ILS localiser for RW 08. The flight was then cleared to descend to 4000 ft. The LJ35, meanwhile, had

completed its R turn and was now tracking NW to intercept the 260 QDM for HENTON, from the S. On this track, the LJ35 was heading directly towards the B737, now established on the heading of 110°. Noting that the LJ35 appeared to be 'wandering off track', the NW SC instructed it, at 1410:05, to turn L on to a radar heading of 255°. The controller said that she had not recognised the developing conflict with the B737, despite the latter's SSR label remaining 'hooked', and had issued the heading instruction to the LJ35 with the primary intention of returning the ac broadly onto its SID track and 'away from the Luton area'. The radar recording for this time (1410:05) shows the two ac head on about 10 NM apart, with the B737's mode C indicating 5400 ft altitude in the descent, while the LJ35 is indicating level at 4900 ft altitude.

At 1410:25, the B737 reported established on the ILS localiser at 13.5 NM from touchdown and was instructed by the Luton APR to descend on the ILS. The APR then observed the LJ35 converging with the B737 at the same level and immediately telephoned the TC N Co-ordinator to ensure TC were aware of the situation. By the time she spoke to the Co-ordinator, the LJ35's turn to the L was just becoming apparent, on radar, which she conveyed to the Co-ordinator adding that the B737 was now descending. This was acknowledged by the N Co-ordinator who then alerted the NW SC to the proximity of the two ac. Meanwhile, at 1411:08, the pilot of the B737 reported to the Luton APR that he was descending in response to a TCAS RA. The radar recording shows the B737 at 4400 ft with the LJ35 in its 2 o'clock position at a little over 2 NM, indicating 4900 ft altitude. Nine seconds later, the point of minimum separation occurred as the two ac passed abeam, on opposite direction parallel tracks, just over 1 NM apart, with the B737 at 4100 ft altitude and the LJ35 700 ft above. (Note: While not intended at the time specifically to increase the lateral separation from the B737, it is clear from the subsequent track of the LJ35 that the heading of 255°, combined with the southerly wind on that day, was inadequate in achieving quickly even its original aim). The NW SC said that she had been aware of the wind effect during her duty but did not know why a greater allowance had not been made for it on this occasion. Had it been, it is possible that the 5 NM lateral separation required may have been achieved.

The geometry of this encounter was such that the STCA did not activate and the NW SC said, by the time her attention had been drawn to the situation, the two ac had reached their closest point and she assessed that no further action was warranted. Reflecting on the handling of the LJ35, the controller stated that she would normally have placed such a departure on to a radar heading as soon as she had been able to. (Note: ac on CPT SIDs have to be at or above 4000 ft before a deviation from the SID route is permitted). Normally, a climb clearance to the minimum stack level would follow, which on this occasion would have been FL 70 and available to her. She concluded that employing this combination of actions, at the correct time, would have ensured the required separation was achieved. She could not explain why she had not taken a similar course of action on this occasion but could only assume that she must have been concentrating on other events within the sector at the critical time.

UKAB Note: Analysis of the Debden radar shows the point of closest approach at 1411:19 with the LJ35 passing 1.1 NM S of the B737 and 700 ft above.

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 initially were surprised that the LATCC TC NW SC had accepted responsibility for separation between the subject ac, contrary to published procedures and had apparently then not appreciated the need to monitor closely the ac tracks which were always going to conflict. An ATCO member, familiar with the procedures, advised that separating outbound and inbound traffic on these tracks during RW 08 operations was routine. Luton could effect this separation although it was often preferable to transfer ac on departure to LATCC TC, who were in a better position to carry out this task. He also advised that the inbound routing of the B737 from the S for RW 08 would be subject to a late release into Luton owing to

controlled airspace (CAS) base level constraints; this normally involved late descent and subsequent vectoring through the ILS to keep the ac within CAS. Pilot members felt that inaccurate flying of the outbound SID by the LJ35 pilot may have been a contributory factor, not helped by removal of ATC speed control on the high performance LJ35. It was noted, however, that the SID was separated by only 3 NM from the RW 08 final approach track (FAT). Therefore, any departing ac on this routeing would require a vector to route S of the SID track and/or be given early climb to remain clear of inbound traffic.

Turning to the TCAS alert, members believed this had been caused by the geometry of the incident; the B737 was on a closing heading from the L onto the ILS against the LJ35 tracking WNW in an

attempt to regain the CPT SID track to HEN from the S. It seemed clear that the LATCC TC NW SC, having accepted responsibility, did not ensure subsequently that standard separation was accomplished between the B737 and LJ35 and this was the cause of the incident. As to risk, taking into account the B737's TCAS RA alert and descent had been coupled with its L turn onto the ILS away from the LJ35's track, the Board concluded there had been no risk of collision.

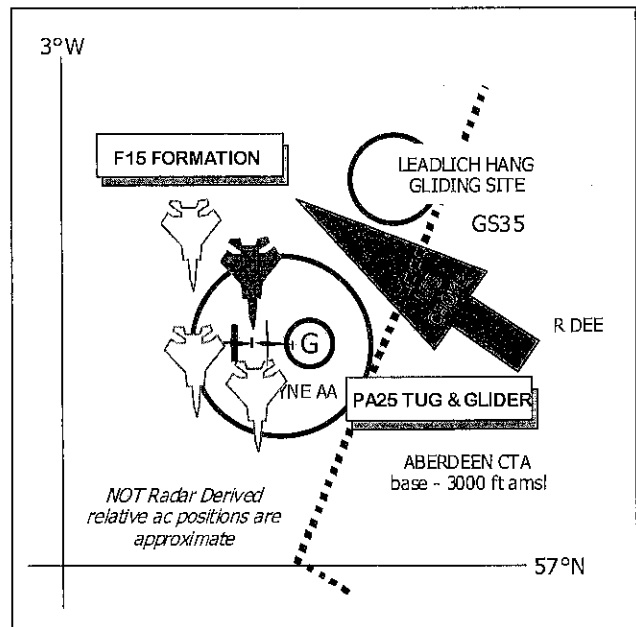
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LATCC TC NW SC did not ensure standard separation between the B737 and LJ35.

Degree of Risk: C

AIRPROX REPORT No 127/00

Date/Time: 29 Aug 1515
Position: 5704 N 0252 W (1 NM W of Aboyne Glider Site - elev 460 ft)
Airspace: Scottish FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: PA25 TUG/GLIDER F15C
Operator: Civ Club Foreign Mil
Alt/FL: 1000 ft 500 ft
(QNH 1022 mb) (RPS 1016 mb)
Weather VMC CLBC VMC
Visibility: >10 Km NR
Reported Separation: 300 ft V 4-5000 ft H
Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA25 PAWNEE TUG PILOT reports he was climbing out from Aboyne Glider site with a glider under tow, about 2000 ft below cloud. The ac had a red/white livery and the anti collision beacon was on; SSR is not fitted.

About 1 NM W of the site, heading 270° at 80 kt, passing 1000 ft QNH (1022 mb) in the climb, a formation of F15 fighter ac was spotted 600 m away to starboard. One F15 crossed ahead from R – L about 400 m away, other elements of the formation flew about 300 ft above and below his Tug/Glider combination and one flew astern (the glider pilot mentioned it flew right above his glider), which he

assessed presented a high risk of a collision. No avoiding action was taken as the jets were flying very fast, he thought about 400 kt straight and level heading about 180°, so he had little room to manoeuvre his tug/glider combination. He adds that this was the second time within a week that he had filed an Airprox with F15 ac.

THE F15C PILOT reports he was No 3 in a formation of 4 F15C ac, conducting low-level "fluid formation" flying in LFA 14 at about 500 ft ORKNEY RPS, VMC. After about 20 minutes of "fluid" manoeuvring at low-level, he observed a tug/glider combination just less than 1 mile off the leader's port side. The tug/glider combination was slightly lower than the formation's height of 500 ft agl. Whilst scanning he picked up another glider at L 10 o'clock about a mile away, whereupon he directed the whole formation to climb to 3000 ft until clear of all other traffic, before descending back down to 500 ft agl. The minimum horizontal separation with any other ac was 4-5000 ft.

UKAB Note (1): This Airprox was not shown on recorded radar.

UKAB Note (2): The UK AIP at ENR 5-5-1-1, and CAA VFR aeronautical charts, promulgates Aboyne Glider Launching Site for aerotow launches, active during daylight hours.

UKAB Note (3): The UK MIL Aeronautical Planning Document, at Vol. 3 Part 1 - LFA 14, promulgates a mandatory 2 NM *avoidance* for Aboyne (GS02), the origin of which is offset 0.75 NM to the W and shown on the UK LFS Charts. Furthermore, a *warning* of intensive gliding activity above 1000 ft agl within 5 NM of the site datum is given.

A flow restriction is also imposed in the vicinity for ac transiting the Aboyne/Leadlich Choke point, which is to be flown in a northwesterly direction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

As had occurred with Airprox 125/00, reported some 6 days earlier, neither the mission tapes from the F15C, nor a radar recording were available to

assist the Board in determining the exact position and relative geometry of this encounter. In this instance, however, the F15 pilot had seen the Tug/Glider combination and was able to provide a better account of the incident from his perspective, but it did not resolve the differing perceptions of the horizontal separation reported. Unlike the 2 seat F15E's involved in Airprox 125/00 the jets involved in this incident were F15C ac, single seaters, these are markedly different ac which fulfil significantly different rôles. Nevertheless, they are large ac with a wingspan of 13 m, which can give a misleading impression of their relative proximity when spotted suddenly at close quarters - a point that had been raised within the Board's discussions on several occasions. Within this Airprox, however, there seemed to be little doubt that the F15 formation had penetrated the Aboyne Avoidance Area (AA); the No 3 F15 pilot reported he sighted the Tug/Glider combination 'just less than 1 mile off the leader's port side' and the Tug pilot stated he was 1 NM W of the Aboyne Glider Launching Site, when the F15 formation was sighted heading S. Taking the offset co-ordinates of the AA into account these reports fixed the Airprox position inside the AA boundary. The importance of strict compliance with promulgated avoidance criteria was emphasised by the military pilot members of the Board, to prevent just such an occurrence as this during the critical stages of climb-out when a tug towing a glider is very vulnerable. Members considered the possible reasons why the leader had flown into the area and concluded that he would not have done so intentionally. The Board was briefed that the squadron in question flew low-level sorties about twice a week, hence all of its pilots should be as familiar with the UKLFS as RAF pilots on average. UK issued low-flying charts were used, plus the addition of a basic moving map display; some military pilot members thought there was often room for error if too much reliance was placed on the moving map display. Another possibility was that the F15 leader might have been concentrating on avoiding the Aberdeen CTA and had unconsciously edged too close to the Aboyne AA. However, this was purely speculation. The HQ3AF advisor emphasised that the F15 leader had not seen the Tug/Glider combination at all, but the No 3 had, and probably just before the Tug pilot spotted the formation. After a wide-ranging discussion, the members judged that the cause of this Airprox was

a non-sighting by the lead F15C pilot and a late sighting by the No 3 F15C pilot, during an inadvertent penetration of the Aboyne Avoidance Area. Turning to risk, members could not resolve the anomaly of the reported separation with the limited information available. However, it was clear that the Tug pilot found his un-maneuvrable Tug/Glider combination in a vulnerable situation, unexpectedly, when encountered by the F15 formation only 1 NM from the glider launching site. The No3's late sighting and avoiding action instruction mitigated the F15 leader's non-sighting and eventually led to the formation climbing out of the AA, but it had been an anxious few moments for the Tug pilot who found himself with no room to manoeuvre when virtually enveloped by the fast moving formation. Consequently, members agreed that while an actual risk of collision had been averted the safety of both ac had been compromised.

A glider member of the Board added that the Gliding Club had extended an invitation to USAF crews to visit the club, with the object of achieving a better understanding of each other's methods of operation. The Board wholeheartedly endorsed this constructive initiative, as greater understanding could only engender improved flight safety and the HQ 3AF advisor agreed to look into this aspect further.

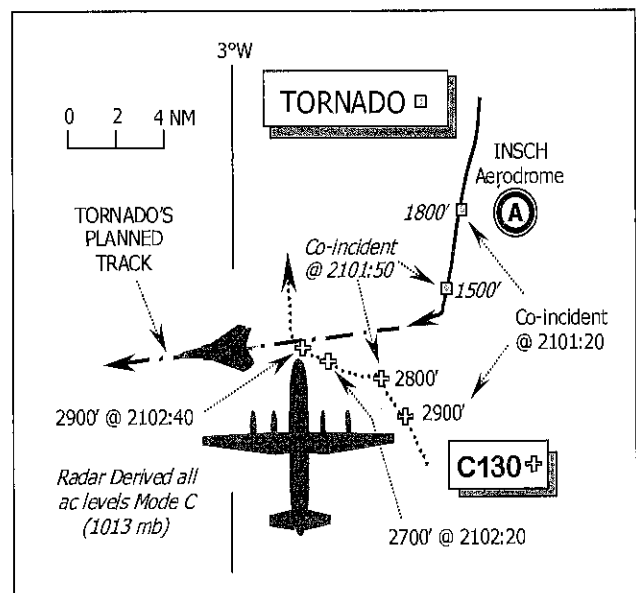
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Lead F15C pilot and a late sighting by the No 3 F15C pilot, during an inadvertent penetration of the Aboyne Avoidance Area.

Degree of Risk: B.

AIRPROX REPORT No 128/00

Date/Time: 16 Aug 2103 NIGHT
Position: 5714 N 0255 W (10 NM WSW of Insch aerodrome)
Airspace: Night LFS (Class: G)
Reporting Aircraft **Reported Aircraft**
Type: Tornado GR1 C130
Operator: HQ STC Foreign Mil
Alt/FL: 560 ft 2000 ft
 (Rad Alt) (Rad Alt)
Weather VMC CAVOK VMC CAVOK
Visibility: >10 Km Not reported
Reported Separation:
 5-800 m H 500-1000 ft V Not reported
Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR1 PILOT reports he was conducting a low-level Terrain Following Radar (TFR) sortie at night in the Night LFS Area 1, without Night Vision Goggles. HISLs were on and the area

was booked from 2100 to 2200 for 15 min TFR, followed by a 20 min range detail at Tain AWR. On track at their booked entry time of 2100, they descended into the LFS to 500 ft Rad Alt. At a position 3 NM SW of Insch aerodrome whilst turning R onto a new track of 264° at 420 kt, another ac was spotted at 11 o'clock slightly high but the range

could not be determined. Retaining visual contact throughout the R turn it became apparent as they rolled out and steadied on track that the other ac would pass about 500 - 1000 ft above and behind his ac from L to R on a northerly heading. Four engines were clearly seen and they identified the other ac as a C130 when it passed about 5 – 800 m astern. He climbed to 1000 ft agl and reported the occurrence to Lossiemouth ATC, who later confirmed the identity of the C130. There was no risk of a collision, but he thought that the C130 should not have been in the LFS at this point.

THE C130 PILOT reports that HISLs were on as they flew straight and level at 2000 ft Rad Alt, heading 002° at 220 kt. A strobe light was spotted about 20-30 sec before they were under flown by the other ac, which appeared to be about 1000 ft below them. No avoiding action was taken - none was necessary - since there was no real danger of the two ac being too close. He adds that they had just climbed up out of the UK LFS a few minutes before and were not surprised to see low flying traffic which did not seem to be passing close at all, he considered there was "no danger".

HQ STC comments that the Tornado crew complied with all the rules and operating procedures and were understandably concerned to find another ac operating in the UKNLFS, seemingly without clearance. There may well be some doubt as to the accuracy of the estimated miss distance and although neither pilot believed an actual risk of collision existed, the Tornado crew clearly felt that the safety of their ac had been compromised. The C-130 captain reports flying at 2000 ft Rad Alt – agl - when the incident occurred, at that height he was still within the NLFS.

UKAB Note (1): From Meteorological Office archive data the ORKNEY RPS for the period was 1000 mb.

UKAB Note (2): A review of the Aberdeen radar recording is inconclusive as only the C130 is shown at the time of the Airprox, which probably occurred just after 2102:40.

The Tornado is shown southbound, descending into the LFS and passed about 2 NM W abeam Inch aerodrome at 2101:20 indicating 1800 ft Mode C

(1013mb); at this point the C130 is crossing ahead from L – R on a northwesterly track at 12 o'clock – 8 NM indicating 2900 ft Mode C. Radar contact is lost on the Tornado 30 sec later, just before the ac turned R to intercept the planned westerly track. It is not possible to ascertain from the radar recording whether the Tornado followed the planned track of 264° exactly, but when the Tornado's radar contact is lost at 2101:50, the C130 is shown 4 NM to the SW, 1300 ft above it. The C130 then turned L westerly, maintaining 2900 ft, before it descended 200 ft. At 2102:20, it commenced a R turn indicating 2700 ft, a sudden climb of 200 ft to 2900 ft is evident at 2102:40. The C130 is shown northbound crossing the Tornado's planned track at 2103, in the vicinity of the 1000 ft contour and thereafter maintains this track at 2900 ft.

At 2900 ft (1013mb), which equates to about 2510 ft amsl ORKNEY RPS (1000mb), the C130 would have been at a height of about 1510 ft agl when crossing the 1000 ft contour.

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 members recognised that a comparison of the radar recording with the topographical LFC had revealed that the C130 crew had indeed been within the confines of the night LFS outside the period of their previously booked activity when flying below 2000 ft agl – as suspected by the Tornado pilot. However, they expressed the view that this had been an inadvertent mistake rather than any procedural error, which both the STC member and HQ3AF advisor accepted. In the light of the facts revealed by the investigative process there was common agreement amongst the members that this encounter was not an Airprox. This was not a criticism. The reporting pilot had quite understandably, reported his justifiable cause for concern because the C130 should not have been within the LFS. Nevertheless, it was apparent that the C130 crew had spotted the Tornado (about 3-4 NM away) some 20-30 secs before the jet underflew them – which was about the same time as the

Tornado crew reported sighting the C130 when they turned on track towards it. This, coupled with the vertical separation reported, led the members to agree unanimously that this was a sighting report. The members also agreed entirely with the Tornado pilot who had reported that there was no risk of a collision

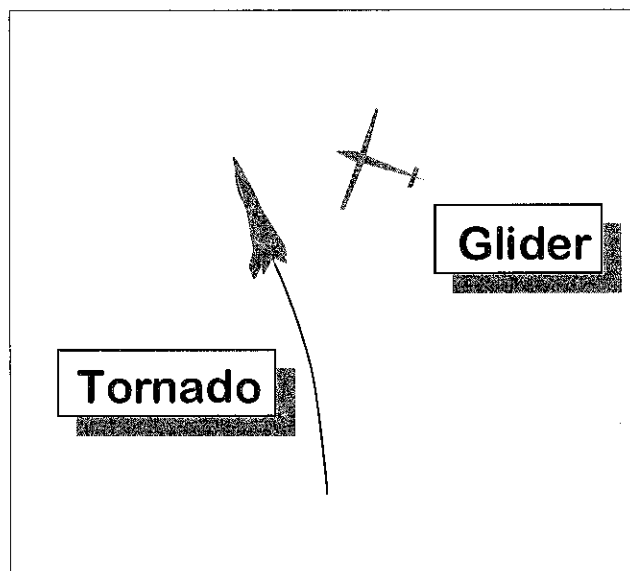
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 129/00

Date/Time: 30 Aug 1302
Position: 5152 N 0138 W (4 NM N of Burford)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: DG202 glider Tornado GR
Operator: Civ Pte HQ STC
Alt/FL: 3300 ft ↓250 ft
(QNH) (Rad Alt)
Weather VMC CLBC VMC CLBC
Visibility: 35 km NK
Reported Separation: 100 ft H/NK
Recorded Separation: Too small to measure



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DG202 GLIDER PILOT reports heading 300° at 70 kt, cruising below broken cloud when he heard jet noise; the belly of a vertically banked military jet then passed about 100 ft across his nose from his 8 o'clock to his 2 o'clock, at the same level, leaving him to cope with its jet efflux and severe buffeting from its wake. He therefore had no time for avoiding action and no time to identify it. It had a flat bottomed fuselage and passed so close, filling his canopy, that he could not see its wingtips, nose and tail at the same time. From the time he first heard it to the time of its disappearance in the distance took about 2 seconds, and the risk of collision had been very high.

THE TORNADO GR PILOT reports heading 350° at 400 kt, manoeuvring to avoid broken cloud in a descent to low level. He was receiving a radar service from Brize Norton but did not see the glider.

MIL ATC OPS reports that RAF Brize Norton's involvement in the incident was only revealed on 27 Sep, almost one month later, hence there is no specific recollection of the flight by ATC. Following a radar handover from Boscombe Down, the Tornado established communications with the Brize Norton LARS 2 controller (LARS) at 1258:58. At this point, the ac was S of Brize Norton, tracking N at FL 50 with the stated intention of descending to low level at Moreton in the Marsh. LARS placed the ac under RIS, but limited the service from all around due to the high density of traffic and passed traffic information (TI) regarding two slow moving contacts ahead of the ac. At 1300:38, the service was further limited "...for the next ten miles..." as the Tornado tracked through the Brize radar overhead. At 1302:17, the Tornado crew advised that they were "...happy to go en route" to which LARS responded (at 1302:20) "C/S roger, squawk 7000, continue en route, multiple . . traffic erm twelve o'clock two miles, right to left slow no height and left ten o'clock, two miles northbound, slow, no height" and very shortly

afterwards, "C/S, just to be advised, there are a lot of gliders to the north and north east of you, range about seven miles, all north west bound, slow, no height." The crew acknowledged both transmissions and left the frequency at 1302:48.

The LATCC radar recording shows the Tornado, squawking 3725, tracking N with a groundspeed of about 480 kt and passing 0.5 NM W of Brize Norton in a descent. At 1302:07, whilst passing an indicated 3400 ft Mode C (3560 ft QNH), the Tornado's radar contact merges with a slow moving primary radar contact tracking 295°. At 1302:20, about 10 sec after the Airprox, the disposition of radar contacts, in relation to the Tornado, bears no resemblance to LARS' TI call, recorded at the same time. At 1301:50 however, radar shows the Tornado tracking about 355°, with a contact 20° L, range 2 NM tracking NNE and a second contact (the reporting glider) 10° R, range 2 NM tracking W. Given the fact that on a 40 NM radar scale, with only 2 NM separation between contacts, bearing estimation cannot be totally accurate, this disposition is very close to that passed in the TI and would thus indicate that the events recorded in the Brize Norton RT transcript are 30 sec ahead of events as seen on radar. This being the case, it would appear that the TI passed by LARS was reasonably accurate and that the Tornado crew was in the process of leaving the frequency when the Airprox occurred.

MOD DPA comments that from the description of the reporting pilot this appears to have been a very close call indeed. Clearly the geometrical orientation at the CPA meant that at that point, it would have been impossible for the Tornado crew to see the glider. The crew of the Tornado were flying under VFR and were, sensibly, obtaining a radar service from Brize Radar. However, gliders do not always show on ATC radar systems. From the information in the pilots' reports there would appear to be some debate about the position and amount of cloud in the vicinity of the reported Airprox position. The reporting pilot stating it was at 1400 ft below, when flying at 3300 ft, and the reported pilot stating that there was a broken cloud base at 3-4000 ft. This discrepancy may well be significant in that the glider could well have been obscured by the broken cloud until the aircraft were quite close. Turning to avoid cloud and going "belly-up" would

then have completely reduced any chance of the Tornado crew seeing the glider. That said, both aircraft were operating in the open FIR, under VFR and with both commanders responsible for avoiding aerial collisions. The message about continued and effective look-out is an vitally important one; it must be stressed and stressed again within all flying organisations as much as humanly possible.

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 agreed that the cause of the Airprox, which contained an obviously very high risk of collision, was a non-sighting of the glider by the Tornado pilot, and a very late sighting by the glider pilot, too late for him to do anything about it. Members had pointed out in connection with another Airprox that although 'steam gives way to sail' this can only happen if the glider is seen. A white glider against a cloudscape is nearly invisible, especially from a fast jet cockpit, and it was necessary for glider pilots to be aware of this and to look out accordingly.

The question was raised about the warning passed to the Tornado pilot of gliders ahead, "*no height*" and whether or not a reply of "*keep talking*" would have been more appropriate than changing radio frequency while descending through the levels likely to be occupied by gliders. Members guessed that the Tornado pilot was thinking ahead to the next part of his sortie and wished to get the frequency change out of the way. While reaching no conclusion on this matter, members suggested it could be a wise point of hindsight for pilots to bear in mind for the future.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting of the glider by the Tornado pilot, and a very late sighting by the glider pilot.

Degree of Risk: A

AIRPROX REPORT No 130/00

Date/Time: 30 Aug 1020

Position: 5303N 0051W (2.75 NM NE of Syerston Aerodrome - elev 224ft)

Airspace: LFS – LFA11 (Class: G)

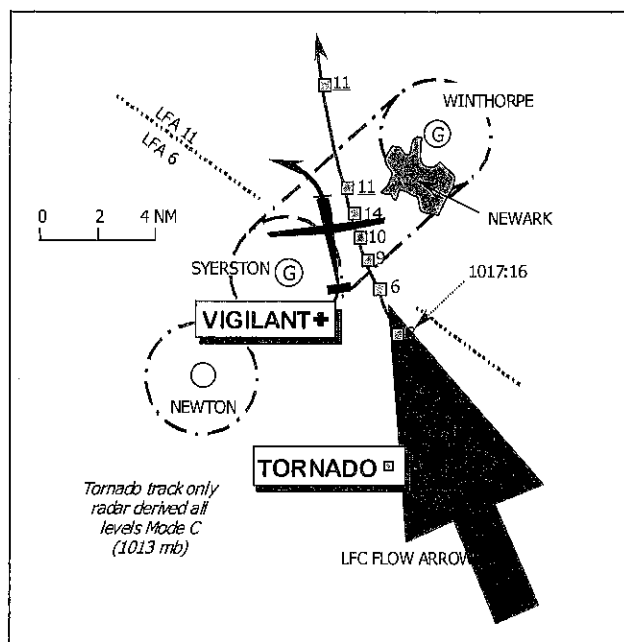
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	Vigilant Glider	Tornado GR
<u>Operator:</u>	HQ PTC	HQ STC
<u>Alt/FL:</u>	800 ft (QFE 1010 mb)	1000 ft Rad Alt
<u>Weather</u>	VMC CLBC	VMC CLBC
<u>Visibility:</u>	>20 km	25 km

Reported Separation: 1-200 m H 'slightly below'
3-400 yd H & 2-300 ft V

Recorded Separation: Not recorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT MOTOR GLIDER PILOT reports he was instructing a student in the circuit at Syerston and in communication with Syerston Radio on 125.425MHz. The ac colour scheme is red/white and HISLs were on. After take-off from RW07, he levelled at 800 ft QFE (1010 mb) and carried out a standard lookout search to the R before commencing a 15° banked L turn onto the downwind leg. In the turn at 60 kt, passing 350° a Tornado was spotted as it appeared from "under the raised right wing". The jet passed about 1-200 m away to the R and slightly below their height. No avoiding action was taken as he was already turning away from it. He thought that the Tornado had penetrated the circuit pattern to RW07 as it crossed the climb-out at approximately 90°, heading N; it was almost certainly on the southern edge of LFA 6, which is adjacent to the Syerston ATZ. Light winds had extended his climb-out to circuit height, taking his ac closer to the eastern edge of the ATZ. He added that the Vigilant crews had been informed of low level flying activity at the morning brief, but the Vigilant is very difficult to spot from some aspects and may not have been seen by the Tornado crew.



THE TORNADO GR1 PILOT reports cruising at 1000 ft Rad Alt on a low-level sortie through the Newark/Syerston gap heading 330° at 420 kt. HISLs were on and a squawk of 3/A 7001 was selected with Mode C. He first spotted the Vigilant Motor Glider at the 1130 position, slightly L of the nose about 1 NM away as they closed on it from astern. The Vigilant was flying straight and level, he thought, so to give it a wider berth he manoeuvred his ac to pass "several hundred yd to the R" of the motor glider and climbed 2-300 ft to avoid it, thereby increasing horizontal and vertical separation. He waggled the wings for several sec as they overtook the Vigilant, but saw no form of acknowledgement. It was very difficult to see the motor glider as they approached from almost directly astern and he added that it took a few sec to realise that it was in fact another ac and that they were overtaking it. The motor glider pilot did not appear to manoeuvre as they flew past, but he considered there was no risk of a collision because both he and his navigator believed that they had seen it in time to take appropriate avoiding action.

UKAB Note (1) The UK MILAIP at Vol III 1-2-6-5 – LFA6 stipulates that military aircrews are to avoid Syerston Glider Site by a 2 NM radius. Syerston is situated just inside LFA 6, S of the LFA 6/11 boundary.

UKAB Note (2): A review of the Clee Hill radar recording is inconclusive as only the Tornado is shown, neither is the Vigilant evident on the Debden or Claxby radar recordings. Moreover, it is difficult to resolve the differing perceptions of each pilot – the reporting Vigilant pilot stating the Tornado passed slightly below - the Tornado pilot stating he climbed 2-300 ft to fly above its height. The Tornado is shown flying in compliance with the specified 'flow' and approaching the Winthorpe - Syerston corridor at 300 ft Mode C (1013 mb). A climb is evident to 1000 ft Mode C, and thereafter a further momentary climb to 1400 ft at 1017:54, before the jet descended to 1100 ft abeam Newark, which was maintained until well N of the corridor.

HQ PTC comments that with the light easterly wind conditions prevailing, the Vigilant would have approached closer to the eastern edge of the ATZ than is normal during his climb to circuit height, and hence into closer proximity with any transit traffic on the western side of the low level flow. While both ac were entitled to be where they were, it may be prudent for pilots to be aware of the effect of light wind conditions on the circuit patterns of light ac and gliders when planning their avoidance of known and active sites. It is unfortunate that the Tornado crew's 'waggle' was not seen by the Vigilant pilot. However, a more obvious avoidance manoeuvre could have allayed his concerns just as effectively.

HQ STC comments that the Tornado crew had correctly climbed to 1000 ft agl to pass through the Winthorpe/Syerston weather corridor, avoiding the Syerston ATZ, and indeed circuit, by a significant margin, when they saw the Vigilant about 1 NM in front of them. Given the tail-on aspect of the encounter, this was a relatively early visual acquisition. However, with a closing speed of around 6 NM/min, this allowed only secs to react and effect a change in flightpath. On balance, the Tornado crew made all reasonable efforts to minimise the risk of collision and indicate to the glider pilot that they had seen him.

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 STC member reaffirmed that the actions of the Tornado pilot were entirely in accord with the stated requirements for safe passage through the Winthorpe/Syerston gap. The Tornado pilot spotted the Vigilant motor glider, which by the reporting pilot's own comments is a difficult ac to detect visually - a point with which members well understood. The resultant avoiding action by the jet was all that could reasonably have been expected from its pilot, given the constraints of the Syerston and Winthorpe Avoidance Areas and the town of Newark; he had successfully avoided, all of them as evinced by the radar recording. This recording also showed that the Tornado's track passed about 0.75 NM clear of the Syerston ATZ/Avoidance Area boundary, which reinforced the Board's view that this had been an unintentional excursion outside the ATZ by the Vigilant pilot, rather than an inadvertent incursion just inside it by the Tornado pilot. Members believed that the further than normal distance made good by the Vigilant after take off in the light headwind conditions was an important point, which should be borne in mind by all pilots when flying in close proximity to ATZ/Avoidance Area boundaries. In these weather conditions, ac, like motor gliders, were likely to fly perhaps just outside their 'protected airspace', a situation that fast jet pilots need to be aware of. However, the Tornado pilot had seen the Vigilant 1 NM away – a good sighting - and effected avoiding action to increase separation, whereas the Vigilant pilot did not see the fast jet until it appeared under his R wing. It would have been very difficult indeed to have seen the Tornado any earlier, however, as it closed from the starboard quarter at an overtaking speed 7 times faster than the motor glider. Therefore, the

members agreed that the cause of this Airprox was a conflict in the Newark/Syerston gap resolved by the Tornado pilot.

The Vigilant motor glider did not show on the radar recording, therefore, the actual separation could not be determined. However, the members believed that the Tornado pilot's prompt actions had removed any risk of a collision. A discussion on the relative merits of LFS flow arrows then ensued and fuelled

further interest in the outcome of a review into this subject being undertaken jointly by the Director of the Air Staff and the Inspector of Flight Safety (RAF).

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the Newark/Syerston gap resolved by the Tornado pilot.

Degree of Risk: C.

AIRPROX REPORT No 131/00

Date/Time: 30 Aug 1415

Position: 5213 N 0224 W (7 NM NW Great Malvern)

Airspace: FIR (Class: G)

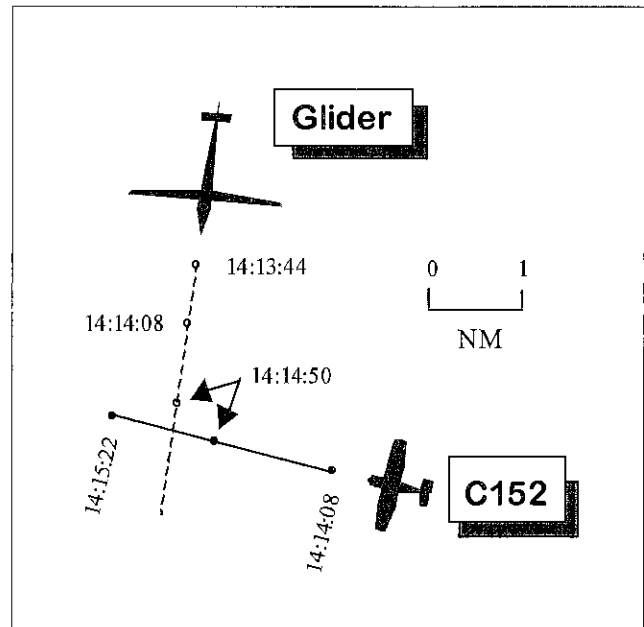
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	Glider K6CR	C152
<u>Operator:</u>	Civ Club	Civ Club
<u>Alt/FL:</u>	3000-4500 (QNH 1020 mb)	2000 (QNH)
<u>Weather</u>	VMC CLBC	VMC CLBC
<u>Visibility:</u>	20 KM	NK

Reported Separation: 100 ftV 0 ft H/NK

Recorded Separation: Unrecorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER K6CR PILOT reports flying solo near Great Malvern heading between 180° and 220°, at about 60 kt between 3000 and 4500 ft. The visibility was greater than 20 km, 1500 - 2000 ft below cloud, in VMC. The glider was white with red wing tips and lower fuselage and was not fitted with a radio or external lighting. Whilst in the cruise and scanning to the right, he glimpsed a movement to his L and saw a white Cessna with red and blue on its nose approaching in level flight just 100 – 200 m away. He pushed forward and passed about 100 ft vertically below the other ac which continued without taking any avoiding action. He assessed the risk of collision as very high.



THE C152 PILOT reports flying solo on a local cross country from Shobdon at 2000 ft at 90 kt receiving a listening watch with Shobdon Radio on 123.5. The ac is white with blue and red markings and the anti collision light was 'on'. He was routing from Worcester to Shobdon heading 275° at the time of the incident but did not recall seeing any conflicting glider. The visibility was good, 1000 ft below cloud, in VMC.

UKAB Note: Replay of the Cleve Hill Radar at 14.12:44 shows an intermittent primary return, believed to be the glider, tracking 190° about 9 NM NW of Great Malvern. Shortly after, a primary return appears 2.2 NM SE of the glider, believed to be the

C152, tracking 285° on a crossing track L to R. At 1414:50, the two ac are still on a constant relative bearing 0.62 NM apart. Both ac then fade from radar with one intermittent contact seen 40 sec later steady on a track 285°, about 0.6 NM to the W of the estimated point of closest approach.

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 initially queried the height discrepancy from the pilots' reports. The C152 pilot had submitted his 1094 form approx. 7 weeks after the incident following tracing action and later advised that he was unsure about his operating level at the time. He normally operated on this local type of sortie at about 2000 ft and usually had no reason to fly any higher but he could not be sure. The glider pilot had subsequently advised that his GPS data log for this flight had confirmed his 1094 report; this showed him at just over 3000 ft at the incident time. On this information members decided that the glider pilot's reported height was the most accurate one.

Members agreed that this incident highlighted the difficulty of seeing other ac flying VFR when both ac are on steady tracks and on a line of constant relative bearing; the conflicting ac would show as a non moving object on the canopy. The need to maintain continually a good look-out scan, both ac being predominantly white and, in the C152's case, the added cross cockpit blind spot problems were raised as factors that contributed towards the cause. The Board were unanimous in concluding that the cause of the incident was the non sighting by the Cessna pilot and a late sighting by the glider pilot. Turning to risk, the avoiding action taken by the glider, albeit late, had been sufficient to avoid any collision by descending to pass below. This led the Board to conclude that the safety of the ac had been compromised.

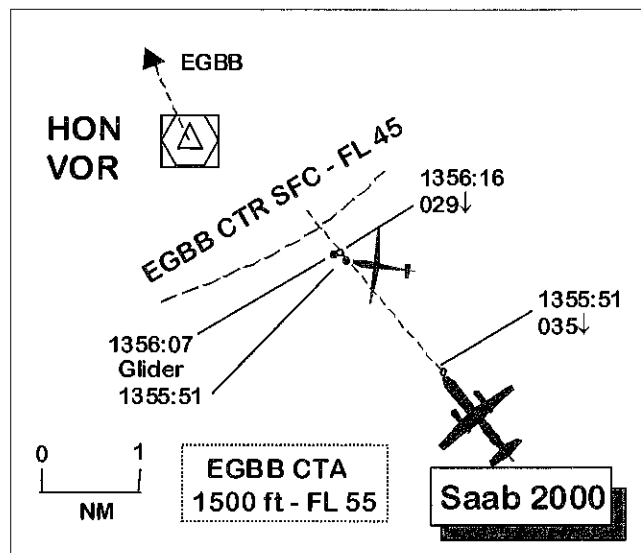
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the glider pilot and a non sighting by the Cessna pilot.

Degree of Risk: B

AIRPROX REPORT No 132/00

Date/Time: 29 Aug 1356
Position: 5220N 0138W (2 NM SE HON VOR)
Airspace: CTA (Class: D)
Reporting Aircraft Reported Aircraft
Type: Saab 2000 Glider
Operator: CAT NK
Alt/FL: 3400 ft ↓ NK
 (QNH 1020 mb)
Weather VMC CLBC NK
Visibility: 20 km NK
Reported Separation: 0 ft V / 0.5-1 NM
Recorded Separation: unrecorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SB20 PILOT reports established on the ILS RW 33 at Birmingham at about 10 NM from touchdown. The visibility was 20 km, 500 ft below cloud in VMC. Whilst descending through 3400 ft QNH 1020 at 190 kt, he saw a glider, coloured white, in his 12 o'clock range 2 NM in level flight crossing R to L. He maintained visual contact whilst continuing the approach; the glider passed 0.5-1 NM on his port side on a steady track 260° at the same level, 3000 ft QNH. He informed Birmingham APR who reported seeing a small primary return but the pilot did not see any target on TCAS. He assessed the risk of collision as high.

AIS MILITARY reports that after enquiries the identity of the reported glider remains unknown. Tracing action was hampered owing to the intermittent radar contact and subsequent total fading post encounter. Procedural tracing through glider site movement logs and the BGA Airspace Committee were unsuccessful.

ATSI comments that a primary radar return appears briefly 1.5-2 NM ahead of the SB20 when it establishes on the ILS at 10 NM. In this position, the base of the Birmingham CTA is 1500 ft where traffic would be deemed to be operating outside CAS.

UKAB Note: Analysis of the Cleve Hill radar at 1355:51 shows the SB20 established on the RW 33 ILS for Birmingham descending through 3500 ft as a pop up primary contact, believed to be the reported glider, appears 1.4 NM ahead of the SB20 in his 12 o'clock. The glider radar return shows

once more, 16 seconds later, just to the W of the SB20 which passes abeam the glider at 2900 ft shortly thereafter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included the report from the filing pilot, the results of the tracing action, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controller involved and reports from the appropriate ATC authorities.

The Board were in no doubt that the cause of the incident was the unauthorised penetration of the Birmingham CTA by the untraced glider. A member involved with the subsequent procedural tracing action questioned the identification of the conflicting 'low wing' glider by the reporting pilot as this ac configuration would infer a motor glider type. However, the SB20 pilot had reported the ac type as a glider without engines and this anomaly was unresolved. The reporting pilot also said that he had sighted the glider in good time at 2 NM range, and maintained visual contact with it as it crossed ahead of his track eventually passing 0.5-1 NM clear on his left hand side. From this information, the Board concluded that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of the Birmingham CTA by an untraced glider/ motorglider.

Degree of Risk: C

AIRPROX REPORT No 133/00

Date/Time: 2 Sep 1223 (Saturday)

Position: 5147 N 0042 W (1 NM SE Halton -
elev. 370 ft)

Airspace: ATZ/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: LS6C Glider PA28R

Operator: Civ Club Civ Pte

Alt/FL: 1700 ft ↑

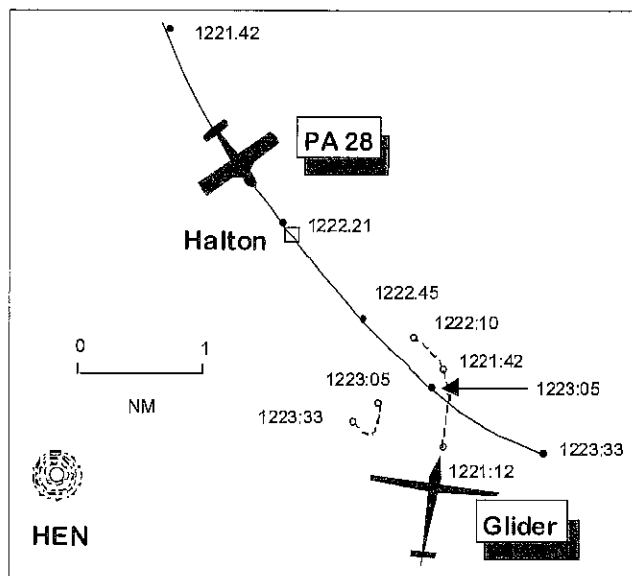
2700 ft
(QFE 996 mb) (QNH)

Weather VMC CBLC VMC CBLC

Visibility: 10 km 10 km

Reported Separation: 100 ft V 0 H/ 500 ft

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS6C GLIDER PILOT reports circling in a slight climb 1 NM SE of Halton airfield at 1700 ft QFE 996, (2070 ft QNH) at 47 kt. The visibility, 1200 ft below cloud was >10 km in VMC. The glider was white with blue marks and was receiving a listening watch with Halton Radio on 130.42. On passing through heading 040° (he thought) turning L, he looked over his L shoulder into the turn direction and saw a powered ac with retractable u/c 70 m away flying straight and level which passed directly over him by <100 ft heading SE. He had insufficient time to take any avoiding action, except momentarily levelling off. He had not heard any transmissions from the ac as it flew through the Halton ATZ.

THE PA28R PILOT reports flying from Coventry to Stapleford via DTY, Halton and BNN at 125 kt squawking 7000 with no Mode C fitted. The weather was VMC with visibility >10 km and the cloud base was >500 ft above him. The ac, which had a retractable u/c, was painted white with blue/black stripes and the anti collision lights were on. He was informed of gliding activity by Halton Radio on 130.42 and was told not to transit the Halton ATZ below 2500 ft. He climbed to 2700 ft QNH and contacted Luton for a RIS on 129.55. He was

passed traffic information by the radar controller which he saw as a PA28 which passed below as it descended to land at Halton. He also saw gliders in the Halton area which passed 500 ft and 1000 ft below.

UKAB Note (1): Replay of the Heathrow Radar at 1221.44 shows a 7000 squawk 1.5 NM NNW of Halton change to 4662 with no Mode C. It tracks 150° and passes O/H Halton. This was traced to the PA28 which was receiving a service from Luton. At 1221:12 a primary return is seen 2 NM SE of Halton tracking N, believed to be the LS6C glider, which commenced a L turn and faded from radar at 1222:10. The PA28 continues on a SE track as the glider reappears on radar just to the SW of the PA28 at 1223:05. The close encounter as described by the glider pilot is not observed on radar.

UKAB Note (2): At 1222, a 7000 code is seen crossing 1 NM ahead of the PA28 R to L heading E and fades from primary radar O/H Halton. This is believed to be the ac observed by the subject PA28 descending to land at Halton.

UKAB Note (3): The UK AIP at ENR 2-2-3-3, promulgates the Halton ATZ, active in Summer 06 - 1800, as a circle radius 2 NM centred on 51°47'34"N 000° 44' 16"W, from surface to 2000 ft above the aerodrome elevation of 370 ft.

UKAB Note (4): The UK AIP at ENR 5-5-1-1, promulgates Halton as a Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered up to 2000 ft agl, during daylight hours.

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 were initially concerned, owing to the discrepancies in the subject ac reported levels, whether the reported PA28 was the subject ac. However, the subject PA28 was confirmed as an Arrow (PA28R) with retractable u/c which would eliminate the other fixed gear PA28 that was seen descending to land at Halton. The PA28R was traced through his squawk change with Luton at the time reported by the glider pilot and its pilot had contacted Halton Radio for information on gliding activity within the ATZ with which he complied subsequently. This call was apparently not heard by the reporting pilot on the same frequency. The Board then wondered whether the reported height discrepancy may have been attributable to different pressure settings. An ATCO member said that the PA28R would have been using the Luton QNH as he had contacted them for a service. Another member questioned the wisdom of planning a flight using a promulgated active gliding site as a turning point. Although his plan was questionable in airmanship terms, the pilot had flight planned thoroughly enough to contact the A/G station for information prior to flying over the Halton ATZ at 2700 ft QNH and subsequently contacting Luton for a radar service. What the planning overlooked was that gliders may be operating outside the confines of the ATZ, particularly above the A/D up to the cloudbase or base of CAS. Members noted that the PA28R pilot had seen two gliders whilst adjacent to Halton which he believed passed 500 and 1000 ft below.

Discussion then moved on to the look out aspect of the incident. Board members were well aware of the difficulty that glider pilots and powered ac pilots had in seeing each others' ac. Glider pilot members agreed that perhaps owing to their slow speeds whilst manoeuvring and the need for maintaining a constant lookout for other gliders whilst soaring, they could readily see one another. However, seeing powered ac closing at higher speeds was a different matter. From the 'powered ac' perspective, pilots agreed that they always found gliders, particularly when coloured white, difficult to see even in good conditions. When they were presented head-on or tail-on, they were practically invisible until at close range.

After much discussion, in the end the Board was unable to resolve the discrepancies in reported heights. The glider at 1700 ft QFE (approx. 2100 ft QNH) would have been within the ATZ whilst the PA28R was reported at 2700 ft QNH, 300 ft above it. Without any other corroborating information, the only thing members could conclude with any degree of certainty was that a confliction had occurred near the vertical limit of the Halton ATZ. The PA28R pilot had seen two gliders within the ATZ but 500 ft or more below him. The glider pilot had seen the PA28R late as it passed overhead. It may have been that the glider pilot perceived the distance as being a closer than it was owing to the late sighting which was not uncommon in such circumstances. With this in mind members were persuaded that no risk of actual collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction near the vertical limit of the Halton ATZ.

Degree of Risk: C

AIRPROX REPORT No 134/00

Date/Time: 1 Sep 1433

Position: 5049 N 0141 W (6 NM ENE of Bournemouth - elev 36 ft)

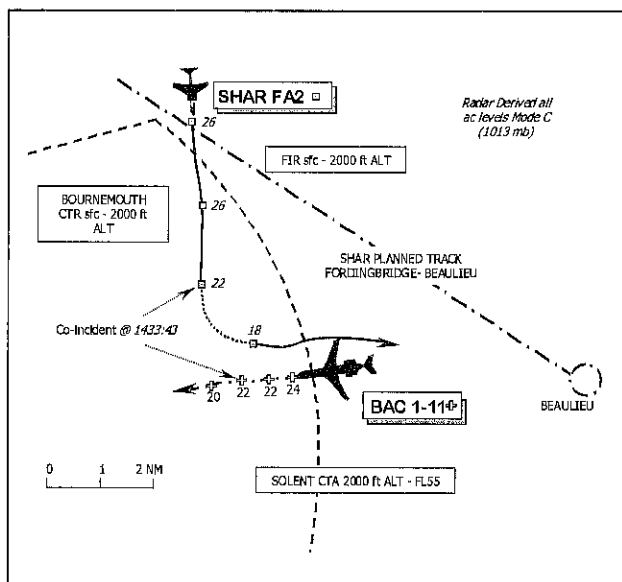
Airspace: Bournemouth CTR (Class: D)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	BAC 1-11	Sea Harrier FA2
<u>Operator:</u>	Civ Comm	COMNA
<u>Alt/FL:</u>	1700 ft ↓ QNH 1001 mb	1500 ft QNH 1001mb
<u>Weather</u>	VMC CLBC	VMC CLBC
<u>Visibility:</u>	>10 km	¼ NM in RASH >10 km o/s SH

Reported Separation:

3-500 m H & nil V 2000 m H

Recorded Separation: CPA not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAC1-11 PILOT reports that he was returning to Bournemouth Airport on completion of a maintenance airstest. The ac has a red/white livery and full landing lights were on during the ILS approach to RW26, whilst in communication with Bournemouth TOWER, squawking A7721 with Mode C.

At 6 NM finals, whilst heading 260(M)° and passing 1700 ft Bournemouth QNH (1001 mb) in descent at 160 kt, TOWER warned him about a high-speed ac on their RHS. Whereupon a Harrier was spotted on the starboard beam about 500 m away in a 'tight' L turn at the same altitude. TOWER advised that the Harrier was not under their control. He believed that if the Harrier pilot had not turned away a collision would have occurred.

THE SEA HARRIER PILOT reports he had planned to transit the Bournemouth/Southampton Gap at an altitude of 2000 ft from Fordingbridge to Beaulieu and Calshot at 420 kt, under an ATS from Southampton ATC whilst inbound to Shoreham. He turned onto the heading for Beaulieu but then had to turn R and descend to 1500 ft to avoid a heavy

rain shower wherein the visibility was 0.25 NM. Before he could regain his planned track and climb back to his planned transit altitude, he spotted the BAC1-11 approaching Bournemouth at about 12 o'clock - 1.5 NM. He immediately turned L to avoid it and informed Southampton ATC, but did not consider that he came closer than 2000 m to the BAC1-11, which was at about 5 NM finals to Bournemouth. After landing at Shoreham he spoke to both the BAC1-11 Captain and Bournemouth ATC. Although he had entered CAS without a clearance in order to avoid weather and remain VMC, there was no collision risk.

THE BOURNEMOUTH APPROACH RADAR CONTROLLER (APR) reports that he had just transferred the BAC1-11 to TOWER. Whereupon a fast moving primary target with associated unverified Mode C indicating 2500 ft ALT was observed heading S, entering the Bournemouth CTR and heading directly towards the BAC1-11 at about 6 NM finals. He immediately informed the ADC via the intercom who passed traffic information to the BAC1-11 pilot. At the same time the primary contact was seen to turn away to the E, the unverified Mode C indicating 2000 ft ALT. Immediately thereafter, Solent RADAR called and advised that the ac involved was a Sea Harrier.

THE BOURNEMOUTH AERODROME CONTROLLER (ADC) reports that after the APR advised him of the fast moving traffic he passed traffic information "...on your right-hand side moving south bound...unknown to Bournemouth". The crew acknowledged "...looking for traffic..", as he looked at the Airport Traffic Monitor (ATM). After repeating which side the traffic was, at the crews request, they reported it in sight "...a Harrier...at 1700 ft roughly". The contact observed on the ATM then appeared to turn L and go down the side of the BAC1-11, which was then cleared to land.

THE SOLENT RADAR CONTROLLER (SAM) reports that the Sea Harrier pilot had called at 2000 ft RPS requesting a FIS en-route to Shoreham, was advised to remain outside CAS, provided with a FIS and given the Southampton QNH (1001mb). During a period sequencing a busy arrivals/departures traffic scenario to both Bournemouth and Southampton, a fast moving southbound SSR contact was observed at Stoney Cross, about 7 NM NE of Bournemouth. Whereupon the Sea Harrier pilot reported "...just left Stoney Cross... just about to arrive at Beaulieu and then down to Spithead". This contact, which he believed was the Sea Harrier, entered the Bournemouth CTR, so he issued traffic information "...you're not positively identified but I believe you are about to take out traffic that's on a Bournemouth Approach at 6 miles suggest you route SE immediately...". The pilot acknowledged and added "...got...an ac at 2000...I'm in a L turn".

THE SHAR PILOT'S UNIT comments that although avoiding weather, the Sea Harrier pilot should have obtained positive clearance to enter CAS. Whilst the separation achieved was probably sufficient for VFR operations, the BAC1-11 operating under IFR would not have expected other ac to be that close without co-ordination.

COMNA comments that the Airprox stemmed from the Sea Harrier pilot entering class D airspace without clearance. The pilot had been conducting a VFR transit from Yeovilton to an area over the Solent where he had planned to rendezvous with another ac before proceeding to an air display. As he approached Fordingbridge he unexpectedly encountered a heavy rain shower which obscured his intended track. Due to his altitude and relatively high speed, and thus high workload, he had to make

a rapid decision, either enter IMC and attempt to upgrade to a radar service from Solent RADAR, or maintain VMC by deviating from his planned track and possibly infringe CAS. The pilot opted for the latter, which he considered the safest. Although we would not condone penetration of CAS without clearance, in this case it did appear to be the safest course of action under the prevailing circumstances. However, it is recognised that the pilot's route planning was flawed on two counts; firstly to plan to fly at 2000 ft RPS technically placed him in CAS (base level Solent CTA 2000 ft ALT in this area) and secondly, at 2000 ft ALT he would also technically be low flying, neither of which he had considered. The station has taken appropriate flight safety action to highlight the lessons learnt from this Airprox, in particular the need to plan carefully when intending to fly close to the extremities of CAS or the UKLFS.

UKAB Note (1): A review of the Pease Pottage radar reveals this Airprox occurred shortly after 1433:43, broadly as described by both pilots. At 1433:19, the BAC 1-11 is shown squawking the assigned code inbound to Bournemouth descending through 2400 ft Mode C (1013mb), about 2040 ft Bournemouth QNH (1001mb). Whereas the SHAR, squawking 7000, is shown tracking southbound, indicating 2600 ft Mode C (1013mb), about 2240 ft QNH, crossing the Solent CTA boundary 6 sec later. The SHAR maintains a steady course and speed descending to 2200 ft Mode C until radar contact is lost momentarily for two sweeps at 1433:43, when the BAC 1-11 is shown at the same level – 2200 ft Mode C [about 1880 ft Bournemouth QNH], 1.9 NM SSE of the SHAR. In the intervening period before radar is regained on the SHAR at 1434:02, it turned L, which is when the CPA occurred. Although the CPA cannot be accurately ascertained, it was probably <1 NM. Thereafter, it is shown eastbound at 1800 ft Mode C, about 1440 ft Bournemouth QNH, on a reciprocal course to the BAC1-11 which is descending through 2000 ft Mode C, about 1640 ft Bournemouth QNH, 1.1 NM to the SW. The SHAR exited the contiguous Solent CTA/Bournemouth CTR at 1434:15.

UKAB Note (2): The Class G airspace beneath the Solent CTA between the Bournemouth/Southampton CTRs below 2000 ft msd, is encompassed within the Bournemouth/

Southampton/Isle of Wight Avoidance Area. Within this airspace low-flying by military ac is not permitted.

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 agreed with the COMNA perspective that this Airprox had stemmed from flawed pre-flight planning. The Board noted from the SHAR pilot's commendably honest and frank report that he had planned to fly through this area at an altitude of 2000 ft – the promulgated base of the Class D Solent CTA. Members thought this plan was unwise. Moreover, the chosen altitude also penetrated the UKLFS overland, and it was surprising to military pilot members that the SHAR pilot had not realised that his flight would penetrate the avoidance area underlying the CTA. The Board welcomed the measures taken at station level to highlight these lessons to aircrew and commended them to all military pilots.

Turning to actions in flight, the Board did not agree with COMNA's view that penetrating CAS to maintain VMC was the SHAR pilot's safest option. There were better alternatives. The SOLENT RADAR controller had earlier advised the pilot to remain clear of CAS, but faced with poor weather ahead, the SHAR pilot could have asked SOLENT RADAR for clearance and assistance through the SOLENT CTA. Another solution would have been simply to turn back along his track (to maintain VMC) whilst asking for routeing assistance.

Another lesson to be highlighted in this Airprox is the use of the emergency squawk - 3/A 7700. This should be selected as quickly as practicable when

pilots are confronted with an unpremeditated penetration of CAS. Fortunately the alert Bournemouth APR had spotted the SHAR as it entered CAS, warned the ADC who in turn alerted the BAC 1-11 pilot. Similarly the SOLENT RADAR controller had quickly assimilated what was happening and warned the SHAR pilot about the BAC 1-11, albeit that he had apparently already seen it. Nonetheless, it was disappointing that 3/A 7700 had not been selected which is designed to attract a radar controller's attention very quickly, should rapid decisive action be warranted.

Although military ac are not constrained by the 250 kt speed limit when operating below FL 100, some controller members wondered if the SHAR's speed of 420 kt was too high, when manoeuvring in such constricted airspace. Fast jet members reassured the Board that such a speed was perfectly acceptable in these circumstances, provided decisions on weather avoidance were taken early. If not, reducing speed made sense.

Taking all these factors into account the members agreed that this Airprox resulted when the SHAR penetrated Class D CAS without a clearance and flew into conflict with the BAC 1-11. Turning to risk, it was apparent that the BAC 1-11 pilot had been alerted to the presence of the Harrier and had spotted it as it was turning away. Similarly the SHAR pilot had seen the BAC 1-11 at a range of 1.5 NM and promptly turned away, coupled with a warning from the SOLENT RADAR controller as he did so. This led the members to conclude that 'see and avoid' had worked and no risk of a collision had existed in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SHAR pilot penetrated Class D CAS without a clearance and flew into conflict with the BAC 1-11.

Degree of Risk: C

AIRPROX REPORT No 135/00

Date/Time: 29 Aug 0843

Position: 5337 N 0130 E (20 NM NW of DOGGA)

Airspace: UAR UL602 (Class: B)

Reporter: LATCC NS West SC

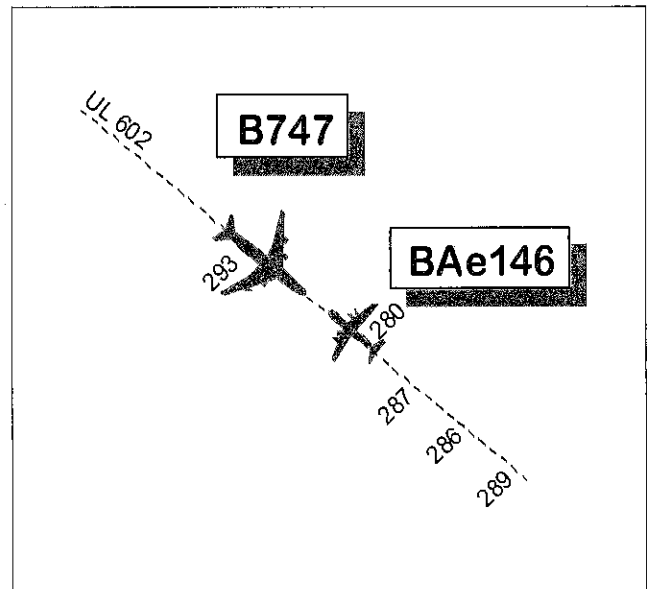
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	B747	BAe 146
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	↓FL 290	FL 280

Weather VMC VMC

Visibility:

Reported Separation: 900 ft

Recorded Separation: 600 ft V, 3-8 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC NS WEST SC reports that the controller involved was mentor to a trainee sector controller on Sector 10. Traffic loading was described as heavy. The B747 was inbound to Amsterdam from N America while the BAe 146 was inbound to Newcastle.

The B747 entered the sector cruising at FL 390 and had been cleared via DOGGA and BLUFA and cleared down in stages to FL 330. At 0838 the ac was instructed to continue its descent to FL 290 to be level 20 miles before KIPPA, against the opposite direction BAe 146 which was cruising at FL 280 and had just established contact with the sector. The B747 acknowledged this instruction, advising that it was routing towards DOGGA and sought confirmation that it should be level 30 NM before DOGGA. The SC instructed the ac to be level 20 NM before DOGGA. At 0840, and in response to the presence of a military ac tracking northbound at FL 290, the B747 was instructed to stop its descent at FL 310. The military ac was under the control of London Military radar who were taking responsibility for the separation of their ac against civil traffic as it crossed UL602. This is standard operating procedure. However, the SC observed the oblique angle at which the military ac was

approaching UL602 and therefore the longer the B747 would be in potential conflict with it, and he felt it prudent to stop the descent of the B747 at FL 310.

At 0841:42, observing that the B747 would pass safely behind the conflicting military ac, the SC cleared it down to FL 290. The instruction to be level 20 miles before DOGGA was not repeated and the ac accurately acknowledged the descent clearance. At this point, the B747 had the opposite direction BAe 146 in its 12 o'clock at a range of 18.6 miles and was passing FL 320 in descent, thus the ac was not required to level at FL 310. Forty four seconds later, at 0842:26 the B747 was instructed to turn left on to a radar heading of 125°, and to report that heading to the next London frequency. The reply from the B747 was slightly garbled, commencing with "125 er we have a", but then changed in mid sentence: "say again the frequency". The controller repeated the frequency, together with a reminder that the ac should maintain FL 290 on reaching. The pilot replied "OK c/s".

The ac passed each other at 0842:54. BAe 146 reported a TCAS alert at 0843:15, stating that "a seven four seven above us was descending, passing just above us at nine hundred feet". The pilot reported that he had not received a Resolution Advisory and the SC observed the continued

descent of the B747, reaching FL 286 before it climbed back to FL 290. The BAe 146 took no evasive action in response to the TCAS alert as the two ac passed with 900 ft vertical separation.

The point of minimum separation occurred at 0843:10 after the ac had passed, when the B747 had the BAe 146 in its 6 o'clock at a range of 3.8 NM and 600 ft below. Standard lateral separation was restored within 10 seconds.

THE B747 PILOT'S COMPANY reports that the pilot was not informed of the level bust by ATC and when called to provide an ASR, replied that he had no recollection of the incident. When instructed to provide an ASR he wrote "400 ft altitude deviation – I don't remember anything about it". It appears from his remark on RT coupled with the TCAS alert in the BAe 146 that the B747 pilot probably received a TCAS alert and should therefore have submitted an ASR to the company.

THE BAe 146 PILOT involved was not identified by his airline and submitted no report to the company or UKAB on the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the B747 pilot's company, 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 assessed that because standard separation was only marginally breached before the ac passed, there was no risk of collision in the incident. However, while the cause of the Airprox was clearly the descent of the B747 below its cleared level, the pilot had not provided any information as to why, which could have been useful in the campaign to reduce the incidence of such occurrences; this seemed to the Board to be a disappointing response to a Flight Safety investigation. Pilot members of the Board observed that the incident occurred late in a long sortie and that the B747 pilot working the RT appeared to be showing signs of fatigue. Members asked what model of B747 was involved (the Company had been asked for the information but had not provided it.) It was observed that the autopilot height capture on older models was less reliable than on the – 400, but at the same time members commented that the crews of such ac should be prepared for this eventuality and be ready to react before an assigned level was passed. In the absence of any helpful input from the B747 crew, the Board was unable to assess the reason for the 'height bust'.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B747 pilots descended below their cleared level.

Degree of Risk: C

AIRPROX REPORT No 136/00

Date/Time: 31 Aug 1221

Position: 5346N 0302 W (Blackpool airport
- elev. 34 ft)

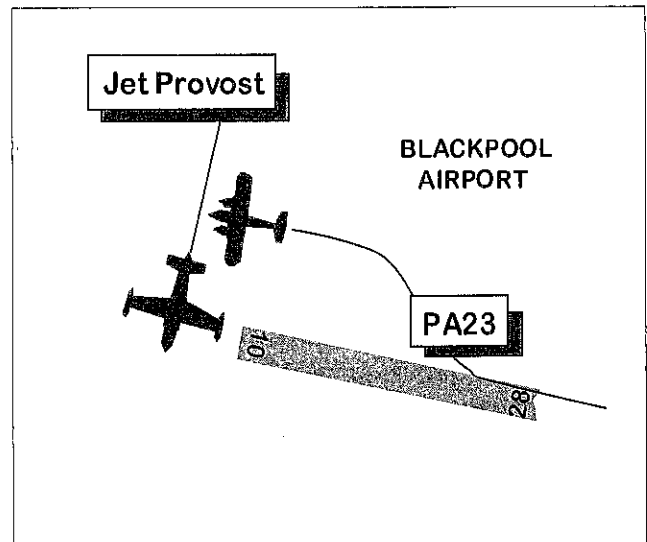
Airspace: ATZ (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	PA23 Aztec	Jet Provost
<u>Operator:</u>	Civ Trg	Civ Trg
<u>Alt/FL:</u>	1000 ft (QFE 1004 mb)	500 ft ↑2000 ft (QFE 1004 mb)

<u>Weather</u>	VMC	VMC
<u>Visibility:</u>	8 NM	10 km

Reported Separation: 300 m, 300 ft/ not seen

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AZTEC PILOT reports that he was on a dual training sortie with his student flying a simulated asymmetric ILS approach and go around to RW 28 at Blackpool. The duty RW was 10 LH and the visibility was 8 NM in VMC. He was receiving an ADC service from Blackpool Tower on 118.4. Following the go around at 250 ft QFE (1004) he turned R and climbed to 1000 ft to position at the end of the downwind leg for RW 10 LH. At 500 ft he took control and returned both engines to normal power for landing, which enabled the ac to reach 1000 ft QFE by late downwind. When about 0.75 NM abeam the RW 10 threshold, heading 280° at 150 kt, a Jet Provost (JP) was seen 300 m to his L and 300 ft below on a southerly heading. Its speed was estimated at 250 – 300 kt. He felt there had been a high risk of collision because had he not powered up the dead engine when he did, or done so later, his ac might have been at a similar height to the JP. He informed ATC of the presence of the JP and heard its pilot announce that he was "joining in the overhead at 2000 ft".

THE JET PROVOST PILOT reports that he was returning to Blackpool having cancelled a student training sortie because of deteriorating visibility in the training area. Generally the visibility was around 10 km in VMC. Owing to congestion on the RT and

cockpit workload, he was unable to transmit a call abeam the Blackpool Tower (ATZ boundary). He flew towards the airfield at 500 ft agl (the pilot does not report his heading or speed) and when on base leg advised Blackpool ADC that he was going into the overhead at 2000 ft to join the circuit. Apart from a helicopter no other ac was seen.

BLACKPOOL ADC reports that the Aztec was flying an ILS approach to RW 28 after which the pilot advised that he intended to carry out a go around and 'teardrop' to position onto RW 10 for landing. The ac was No. 1 to land. The JP was joining the airfield from the N and was instructed to report passing abeam the Blackpool Tower, to expect a L base join for RW 10. The pilot did not report as instructed and appeared on L base, apologising for not being able to call. There were no other ac on the frequency at the time. The Aztec pilot reported seeing the JP pass below him. The controller could not say how close the ac came to one another.

UKAB Note (1): RT Transcript indicates 2 other ac on frequency during the incident.

ATSI reports that on first examination this Airprox did not appear to have ATC implications, consequently ATSI did not arrange a Field Investigation. In addition, the ATCO's 1261 was submitted late and to the incorrect addressee.

Nevertheless a desk investigation was carried out and this indicated that there are significant ATC implications.

The Aztec was carrying out instrument training at Blackpool and at 1217:30 the pilot reported on the Tower frequency at 5.8 DME on the ILS for RW 28. He was instructed to continue approach as No 2 to traffic on RW 10, which was the duty RW, and to report his intentions. There was a strong southerly wind. The pilot responded that he wished to make an approach and go-around followed by a visual circuit for RW 10. This was acknowledged and he was instructed to continue approach.

The Tower controller next enquired of the Aztec pilot whether he was tracking off to the N to join downwind LH (for RW 10) to which the pilot responded that they were continuing with the ILS for a low go-around into the visual circuit with a break either way to suit the traffic situation. ATC issued no instructions.

The Jet Provost called the Tower at 1219:10, having been cleared to Fleetwood (VRP 9 NM N of the aerodrome on the coast) by APC for a join, and requested a go-around at 500 ft followed by a standard circuit to land. This was acknowledged with a request to report E then corrected to W of the Tall (Blackpool) tower for RW 10 with a LH circuit. The Tower Controller then requested the present position of the ac which was reported as W abeam Cleveleys. This position report was used to pass traffic information on an R44 and the Jet Provost to each other. (Cleveleys is on the coast 7 NM N of the aerodrome.)

By 1221, the Aztec having evidently elected to make a left hand circuit, the Tower controller asked the pilot whether he could make a L turn back onto final, with which he concurred, and was then cleared to final No 1 for RW 10 with traffic information passed on a joining helicopter. At 1221:30 the Aztec pilot reported the JP passing beneath him, to which the latter's pilot replied that he was unable to get his call in and that they were "reporting into the overhead at 2000 ft". The RT recording does not indicate the frequency to be particularly busy.

UKAB Note (2): RT Transcript and subsequent playback of the Blackpool ADC frequency shows the Jet Provost pilots' transmission on left base for RW 10, after passing below the Aztec, followed 10 seconds later by him reporting level at 2000 ft.

UKAB Note (3): The incident is not observed on recorded radar.

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.

The Blackpool RT tapes had been listened to for the period bracketing the incident which revealed that throughout there had been a lack of positive instructions given by the Blackpool ADC controller and overall poor control of ac. During the incident itself, no RT instructions were given to the PA23 for the low approach and go around and no call was given by the pilot as he executed the missed approach. Consequently, the Jet Provost (JP) joining from the North would not have heard the PA23 going around on RW 28 and he was not given traffic information.

A pilot member enquired if the JP pilot was locally based who would have been familiar with the Blackpool procedures; this was the case and his stated intention of joining at 500 ft on his initial RT call was noted. However, no clearance to join the circuit was given by ATC, rather the JP pilot had been asked to report abeam the tall (and famous) Blackpool Tower. An ATCO member reiterated the need for the ADC controller to issue positive instructions to all traffic, particularly the PA23, joining from a missed approach against the pattern for RW 10. A direction of turn on the go around as well as the position of circuit traffic should have been given as a minimum.

Members wondered about the chain of events that could have created this situation. From the RT transcript, ATC had requested the JP's position (7

NM N) in order to pass traffic information on a helicopter which had recently departed the circuit in the opposite direction. After the traffic information had been received, the JP pilot reported "W abeam the coast"; this position did not correlate to any VRP or requested reporting point and pilots thought it was an unhelpful thing to say. Therefore the Board could only surmise that this ambiguous transmission, which did not fulfil the 'Tall Tower' reporting requirement, may have been intended to do so. By the time the PA23 reached downwind for RW10, the elapsed time since the JP's last transmission "W abeam ..." should have caused the ADC controller concern as to its whereabouts. It was clear to the Board that when the PA23 pilot reported a JP passing underneath him and that the JP had omitted to make his 'Tower' call at the ATZ Boundary, the JP pilot had entered the ATZ at 500 ft without clearance and had put himself into conflict with the PA23 which was at that stage late downwind.

Members also wondered about the JP's height during the joining procedure. It was noted from the RT timings that the elapsed time between the pilot

announcing that he had been unable to get his call in on frequency, after passing underneath the PA23 which he did not see, and being level in the overhead at 2000 ft was only 10 seconds. This led the Board to believe that the JP had climbed very steeply after passing the PA23 in the base leg area to position overhead.

As to the risk, members agreed that although the JP did not see the PA23 on the downwind leg, the geometry and heights involved were such that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The JP entered the ATZ without clearance and failed to integrate safely into the circuit pattern.

Degree of Risk: C

AIRPROX REPORT No 137/00

Date/Time: 8 Sep 1250

Position: 5313 N 0011 W (3 NM W of Horncastle)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	Jetstream	Tutor
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<u>Operator:</u>	HQ PTC	HQ PTC
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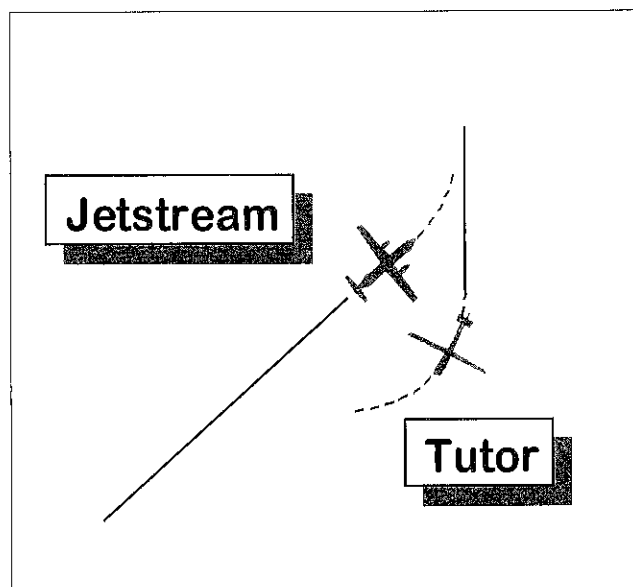
<u>Alt/FL:</u>	FL 70	NK ↑(RPS)
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<u>Weather</u>	VMC CLBL	VMC CLBC
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<u>Visibility:</u>	10 km+	10 km+
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Reported Separation: 400 ft, 200 m
300 ft, 1.5 NM

Recorded Separation: 400 ft, 0.5 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 020° at 190 kt having levelled off at FL 70 with cloud 4000 ft above and 500 ft below. He was receiving a RIS from Cranwell on 250·05 and was advised of traffic in his 1 o'clock 5 NM at 6500 ft. He and his student searched for it without success and ATC gave an update: 1 o'clock 3 NM, 6500 ft manoeuvring. It was still not visible and when ATC advised that it was at 1 NM he broke left and saw the ac, a Grob Tutor, during the manoeuvre. It was white and very hard to see against the white/grey background despite a careful search in the right area.

THE TUTOR PILOT reports heading 270° at 90 kt (radar recordings show the ac was tracking 180°). He was in a straight climb on a dual GH sortie and saw the Jetstream approaching from about 1·5 NM away and slightly above in his 1 o'clock. It passed about 300 ft above and 0·5 NM away as he turned gently away from it. There was no risk of collision. He had been listening out on 249·875, a quiet frequency.

MILATC OPS reports that the Jetstream crew was receiving a RIS from Cranwell Departures (DEPS) on 250·05 having just departed from Cranwell for a general handling sortie. The crew had been released on their own navigation, tracking NE, and climbing. The DEPS control position was handed to a new controller at 1247:25. At 1249:18, DEPS transmitted "(Jetstream c/s), traffic north east, six miles southbound, indicating Flight level six zero." This call related to a radar contact (the Tutor) squawking 2642 (Lincs AIAA conspicuity). One min later, at 1250:11, DEPS updated the traffic information (TI) "C/s previously reported traffic, north east, two miles indicating six five climbing." The crew acknowledged both TI calls individually, with "C/S looking" and, at 1250:21 reported "C/S level seven zero." DEPS however, felt that the situation required a further update and at 1250:26, transmitted "...traffic now right one o'clock, one mile, crossing, correction, now manoeuvring, indicating Flight Level six five climbing." Ten sec later, the Jetstream crew responded "...visual with that thank you" adding about 25 sec later, "And eh, c/s, we will call that an Airprox, that was a very good steer from you, we only got (visual) within half a mile."

The LATCC radar recording shows the Jetstream, squawking 2610, tracking about 050° in a slow climb. At 1249:15, the Tutor is 045°/6 NM from the Jetstream tracking S and at 1250:10, it is 053°/3 NM, both positions corresponding with the TI provided to the Jetstream crew at about the same times. At 1250:56, the time of the third TI call, the Tutor is 065°/1·5 NM, about 25° R of the Jetstream's projected track, although the latter appears to have just commenced a slight turn to the R. The Tutor also appears to turn R, towards the Jetstream. The CPA occurs just after the cross, at 1250:49, with the Tutor 400 ft Mode C beneath the Jetstream and 0·5 NM in its 3 o'clock; the ac then turn onto their reported headings.

Having already provided TI about the Tutor on two occasions, DEPS had already more than fulfilled his remit for the provision of RIS. The third TI call however, proved to be highly significant in enabling the Jetstream crew to acquire the Tutor visually, and it is to the controller's credit that he elected to pass this update. In light of the concerns surrounding the conspicuity of the Tutor ac, highlighted by this incident, Cranwell ATC initiated an SSR trial, using a dedicated SSR code to draw attention to this specific type of ac whilst manoeuvring within the Lincolnshire Agreed Airspace (which is heavily used by training ac). The aim of the trial was to enable ATSU's to identify, and thus inform aircrew under their control about conflicting ac known to be difficult to see. The trial has proved most successful, and permanent ratification of the procedure is anticipated at the next meeting of the LAUG on 8 Nov 00.

HQ PTC comments that the conspicuity of GRP gliders (and now their powered cousins) against cloud has been a matter of general concern for some time. Now that they fly with other training ac of disparate performance in tight airspace it has become more acute. HQ EFT have studied the problem and their findings will be presented verbally to the Board. The Cranwell palliatives may have some effect locally but other crews may have to adapt to accepting/taking RIS-based avoiding action rather earlier in future. HQ EFT note that the Grob crew did not see the (rather more visible) Jetstream until a similar range.

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 were briefed on the HQ EFT findings from their study, which concluded that the problem of the Tutor's lack of conspicuity in certain conditions appeared to be insurmountable. The SSR trial, however, had been successful and the procedure implemented whereby the ac type could now be passed in traffic information so that other pilots could be warned of the presence of an ac they might not be able to see easily. In this Airprox, while members understood that the Jetstream pilot filed the Airprox to draw attention to the Tutor's lack of conspicuity, they concluded that it had occurred

because he had continued on course despite not being able to see the conflicting traffic that he was being warned about. The Board considered that he would have been more prudent to have said, for example, "Not seen, request avoiding action" and that this might usefully become a more prevalent response to the above mentioned procedure. At the same time members agreed that there was no risk of the ac actually colliding; there was vertical separation and the Tutor pilot, and indeed the Jetstream pilot, saw the other ac in time to remove any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jetstream pilot flew into conflict with traffic of which he had been warned.

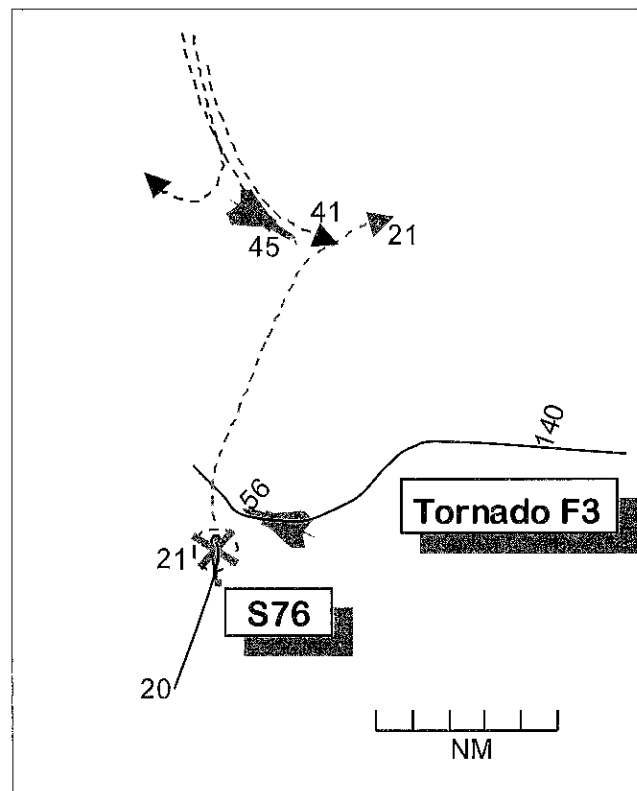
Degree of Risk: C

AIRPROX REPORT No 138/00

Date/Time: 8 Sep 0926-30
Position: 5308 N 0126 E (14 NM NNE of Cromer)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: S76 Tornado F3
Operator: CAT HQ STC
Alt/FL: 2000 ft 4500 ft â (RPS) (RPS)
Weather VMC CLBC VMC CLBC
Visibility: 8 NM 20 km
Reported Separation: NK/NK
Recorded Separation: 1 NM, 3500 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S76 PILOT reports heading 010° at 145 kt en route to an offshore platform at 2000 ft RPS and receiving a RAS from Anglia Radar on 125-275. He followed various avoiding action turns given with a sense of urgency by the controller to avoid several military ac in the area, despite which no ac was



seen. Traffic had been reported 11 NM away at FL 85 descending and then less than 500 ft above and 1 NM away; he considered the risk of collision was high.

THE TORNADO F3 PILOT reports heading 275° at 14000 ft, 350 kt, and about to attack his Nos 2 and 3 who were W of him, tracking 080° at low level. He turned L onto 240° and descended; during the descent Neatishead warned him of a stranger at 250° 6 NM heading N at 2000 ft. Ten seconds later this was updated to 3 NM, on the nose 2000 ft, while the F3 was turning right onto 300° in a gentle descent passing 6400 ft. He assessed the traffic was no longer a factor; well below the nose it would not be visible and would also not be a factor at the intercept, distance to target (by now tracking NE) then being some 18 NM. Shortly afterwards he turned right onto 340° and continued the gentle descent to 2000 ft. He did not believe there had been a risk of collision or that vertical separation was less than 3780 ft when passing the helicopter's position.

ANGLIA RADAR reports, with RT transcript, that the controller saw a Neatishead squawk turn towards the S76, under a modified RAS, and descend from FL 85. He attempted co-ordination with Neatishead but this was refused. He gave avoiding action to the S76 *"C/s avoiding action left onto 350, military traffic was in your right one o'clock range 4 miles turning towards, FL 85 rapid descent"*. The pilot acknowledged and the controller updated him *"That traffic in your 2 o'clock range 2 miles going behind"*. The traffic then turned right in front of the S76 and further avoiding action was given *"And c/s avoiding action left 310 he's turned right hard right just coming in front of you now indicating one thousand five hundred above"*. The pilot complied. The S76 then proceeded en route only to come into conflict again with the 2421 squawk which turned back towards him at 0930:10. The controller again passed traffic information *"... eleven o'clock range six miles in a right hand turn indicating 2000 – not sighted turn right 070"*. The pilot complied. The controller was busy during the next 2 minutes providing near continuous traffic information and avoiding action on the F3 and its 2 target ac, achieving a minimum separation of 2 NM and 3000 ft, although the intercept appeared to take place at about 2000 ft. The pilot advised he would consider after landing whether or not to file an Airprox.

UKAB Note (1): The Cromer radar recording shows the F3 tracking W at FL 140 some 11 NM in the S76's 2:30; the latter is steady at 2000 ft Mode C.

The Tornado begins a descent at 0925:05 and when the separation is about 8 NM, turns towards the S76. When about 4 NM apart the Tornado, still descending, turns right to cross above and ahead of the S76 at 0926:29; separation at that point is 1 NM and 3500 ft Mode C. The Tornado's average RoD up to that point was 5900 ft/min. The Tornado then engages the 2 targets and the group manoeuvres back to the S, then SE towards the S76, and then splits. The Tornado and one other ac pass some 2 NM astern of the S76 which shows 2100 ft Mode C as the fighters pass; the latter show 4100 and 4500 ft.

HQ 2 GP reports that the RT recording equipment at Neatishead was unserviceable at the time of the incident. The weapons controller (WC) was in training and being supervised by a very experienced School of Fighter Control Phase 2 instructor. The F3s were being provided with an Air Defence Information Service (ADIS) 3000 the provisions of which means that the F3s were receiving a FIS below 3000', a limited RIS between 3000' and 5000' and a RIS above 5000 ft. During the latter stages of the sortie the ac were split east/west either side of HMR 3 with the Nos 2 and 3 to the west. The sortie profile was for a low-level identification of the targets by the fighter, No 1. At this stage No 1 was above 8500 ft inbound, with the targets descending to 250 ft. The WC had detected the S76 to the W of HMR 3 by about 5 NM, heading N at 2000 ft. At this stage Anglia Radar called to co-ordinate the S76, under a modified RAS, against the F3s. Anglia wanted coordination to restrict the F3s to operate above 3000 ft.

The WC realized that the tactical situation was such that the No 1, the fighter, would require to descend to 250 ft to identify the targets and would not achieve the mission if the co-ordination was imposed. The WC did not convey this to the Anglia controller, instead he replied he would ask the ac. However, the supervising instructor indicated that as the targets were already at 250 ft the WC should not ask the ac and should refuse the co-ordination. The WC believed that he had told the Anglia controller that his ac were under a RIS and a FIS below 3000 ft and that he would therefore call the S76 in to the F3s (but see UKAB Note (2)). The supervising instructor then spoke to the Anglia controller to explain why the co-ordination had been refused and believed he was happy with the situation.

The WC called the S76 in to the F3s 3 times (according to the F3's mission recording) and it is clear from the F3 pilot's report that he was fully aware of where the S76 was in relation to himself, although not actually visual with the helicopter. The No 1's recording shows that the F3 was more than 3500 ft above the S76 as it passed overhead in a gentle descent.

On completion of the intercept, the F3s were turned starboard away from the Waveney HPZ and the WC again called in the S76 to the SE of the No 3. No 3 indicated that he was climbing through 4000 ft and that all were aware of the helicopter traffic. The WC was well aware of the location of the HMR from his console display and given the radar service and mission requirements took all reasonable steps to ensure separation from the S76, which appeared to be some distance from the HMR. The achieved separation exceeded 2000 ft on both occasions of the encounter.

From the HQ 2 Gp perspective the ASACS controller fulfilled his obligations under the radar service and ensured that his ac was kept informed of the position of the S76. Both ac were flying in VMC conditions in open FIR, class G airspace. The F3 pilot received accurate and adequate stranger warnings and took his own perceived separation from the S76. Co-ordination in these circumstances was deemed unsuitable because of the nature of the exercise and the in-flight conditions. Moreover, the reasons for not co-ordinating were explained to the Anglia controller. The fact that neither ac saw each other may be an indication that the actions taken by ASACS controller and F3 pilot were sufficient to maintain safe separation from the S76.

UKAB Note (2): A recording of the Anglia Radar landline shows that the Neatishead controller advised that the target ac were already at 250 ft and co-ordination would not be possible; the Anglia controller accepted this but was not told the F3s had been given traffic information on the S76, rather, he was given the impression that the Neatishead controller could not talk to them.

ATSI comments that there are no apparent civil ATC implications in this incident. The Anglia controller appears to have done all that could have been

expected of him in difficult circumstances where the flight profiles of the military ac could not have been anticipated. Rather than *refusing* to co-ordinate, as the Anglia controller reports, it would appear from the deskside recording that the Neatishead controller was *unable* to do so as the military ac were undertaking a low level run at the time.

The S76 was en-route at 2000 ft, under a Modified RAS and experienced two separate encounters. In the first which involved only one target closing from the right and descending, avoiding action instructions were issued, twice, together with comprehensive traffic information. Although the controller reported that the other ac had descended to within 1500 ft of the S76, it would appear from the radar recording that the minimum vertical separation was probably nearer 4000 ft when lateral separation was just less than one mile. The second encounter involved 3 targets wearing sequential SSR codes, including the one involved in the earlier encounter. The radar recording shows them, in trail, at high speed converging with the S76, the first two in the climb from low level. One closes to a little under 6 NM as it climbs through 2600 ft. Once again the Anglia controller issued avoiding action instructions and gave traffic information to the S76, but the pilot reported unable to acquire the traffic visually. Ultimately this traffic passed astern of the S76 and above while the others presented no risk.

HQ STC comments that the Tornado F3 crew made a considered and correct judgement that there was no risk of collision with the stranger, based on VMC being maintained and good traffic information from Neatishead. Had the Anglia controller been informed that the Tornado crews had been given such information, both he and the S76 pilot may have felt considerably more comfortable with the situation.

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 suggested that in view of the separation that actually pertained, which was plenty in Class G airspace, this was not really an Airprox. This was hindsight; while the investigation showed that the fighter pilots were well aware of the S76, had given it a wide berth and there had been no risk of collision, this would not have been apparent to the Anglia Radar controller (and consequently the S76 pilot) at the time. The Board agreed that, left with an impression that the Neatishead WC could not talk to the fighters, the Anglia controller may well have thought he was the only line of defence for the S76: having seen the Tornado descend rapidly towards the helicopter it was hardly surprising that both he and then the S76 pilot became agitated by the situation. If the WC had (as he thought he had) told Anglia that he would inform his formation about the S76, this would probably have reduced the Anglia controller's sense of helplessness somewhat and members agreed that the incomplete information from the WC was part of the cause of the report being filed.

However, it was pointed out that even armed with that information, the Anglia Radar controller was still obliged under a RAS to try to maintain 5 NM and 5000 ft from the unco-ordinated fighters. Their subsequent flightpaths, especially the Tornado's turn and rapid descent towards the S76, meant that achieving this separation would have been virtually impossible. Members therefore concluded that the flightpath flown by the Tornado was also part of the cause of the Airprox. This turned the discussion towards the differing ATS and the separation requirements of, on the one hand a RAS, and on the other a RIS/FIS and visual separation, and the interaction that these differences allowed. Members suggested that the requirements were incompatible in that the Anglia controller was required to strive for 5 NM/5000 ft separation and

all that the fighters required was traffic information and to maintain safe separation. The Board concluded that the differences between these services in the same airspace was also a causal factor in the Airprox.

Other factors were also discussed. Was the Anglia radar controller late in requesting co-ordination? When he did so it was effectively too late, but the Tornado had originally been proceeding westwards at FL 140 and only became a factor once it had started to descend, leaving too little time for co-ordination. It was suggested, however, that by the fighters' disposition, the WC should have known what they were about to do, could have announced the helicopter's presence earlier and arranged a descent for the Tornado which would not have caused unnecessary distress to the Anglia Radar controller. It was noted that Airprox of this nature used to be much more frequent, giving the impression that procedures had evolved to reduce their frequency. Even so, with the huge disparity in performance between fighters and helicopters in this shared airspace, it would always be up to the military side to take the initiative in resolving such conflicts and thereby sustaining the existing good working relations so necessary for flight safety.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado's flightpath caused concern to the Anglia Radar controller and to the S76 pilot, compounded by incomplete information from the Neatishead WC to the Anglia Radar controller, each of whom was providing a different radar service.

Degree of Risk: C

AIRPROX REPORT No 139/00

Date/Time: 4 Sep 1431

Position: 5123 N 0123 W (4 NM W of Greenham Common)

Airspace: London FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	C152	PIPER PA28 R
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<u>Operator:</u>	Civ Trg	Civ Pte
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<u>Alt/FL:</u>	2500 ft QNH 1024 mb	2000 ft RPS 1020 mb
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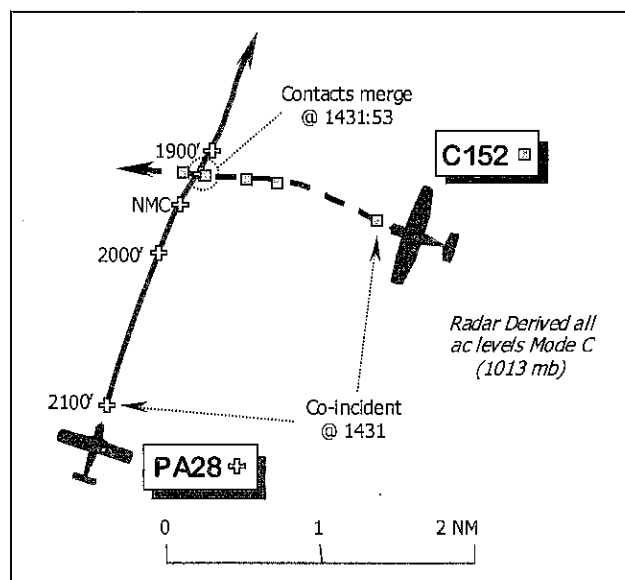
<u>Weather</u>	VMC CAVOK	VMC CLOC
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<u>Visibility:</u>	>10 km	>20 km
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Reported Separation:

3-500 ft V, nil H 50 ft V & 500 m H

Recorded Separation: Contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports conducting the navigation section of a PPL skills test, flying from Blackbushe to Chippenham, at 2500 ft QNH (1024mb). The candidate was flying the ac from the LHD seat. They were receiving a FIS from Farnborough LARS and squawking A 0441, but Mode C is not fitted.

Approaching Hungerford (Berkshire), heading 273°(M) at 93 kt, a single engined low-wing monoplane (possibly a PA28 R) was suddenly seen at 4 o'clock, clearing away to starboard in what appeared to be a "steepish" descending L turn after it had flown under his ac. The candidate had not spotted it either as he was making a flight log entry at the time. He estimated that it had passed 3-500 ft beneath his ac with a "high" risk of collision and added that it was too close for comfort, he suggested that the other pilot could not have seen his ac until almost too late.

THE PIPER PA28 R ARROW PILOT reports heading 360° (M) abeam Hungerford at 120 kt, flying at 2000 ft QNH (1021 mb), he thought, whilst changing frequency from Boscombe Down ZONE (who had provided a FIS) to Benson ZONE. He

was about to change heading when he spotted a high wing single engined ac, which he thought was a C172, at 2 o'clock through his RHD window 500 m away and slightly above his altitude. He checked the area to his L and below before making a descending L turn to avoid the other ac. He was able to maintain visual contact through about two thirds of his turn, but it was lost as the other ac overflew about 50 - 100 ft above him. He regained sight of the C152 again through the LHD rear cockpit window above him maintaining a steady course. He considered that there had been a medium risk of a collision.

UKAB Note (1): The PA 28 pilot reported to Boscombe ZONE on RT that he was maintaining 2000 ft Cotswold RPS (1020 mb) in transit.

THE FARNBOROUGH LARS CONTROLLER reports that the C152 departed Blackbushe at 1419, on a cross-country via Chippenham. He believed he warned the pilot of extensive traffic on his route and subsequently passed several proximity hazard warnings. At 1436, during a period when he was busy with other traffic, the C152 pilot reported that an Airprox had occurred with a Cherokee Arrow which passed 2-300 ft below his ac and whose registration was reported.

UKAB Note (2): The registration reported by the C152 pilot was incorrect, the identity of the reported ac was subsequently established after tracing action by AIS (Mil).

MIL ATC OPS report that the PA28 was in receipt of a FIS from Boscombe ZONE on 126.7 MHz, whilst in transit from Southampton to Stapleford, at 2000 ft Cotswold RPS (1020 mb). The flight was not identified on radar, nor assigned a discrete SSR code. Due to the volume of traffic in the area, Boscombe Down controllers do not routinely identify flights under a FIS unless the reported track of an ac takes it through the CMATZ, or close to the approach/climbout lanes. The pilot reported abeam Hungerford, whereupon ZONE advised the pilot to freecall Brize Norton. The pilot responded that he would probably change to High Wycombe in preference to Brize, and left the frequency without further comment. The ZONE controller first became aware of the Airprox three weeks after the event and had no further recollections of what appeared to be an unremarkable LARS transit.

ATSI report that there were no ATC implications in this incident and confirmed the essential detail provided by the C152 pilot.

UKAB Note (3): The C152 is shown on the Heathrow radar recording westbound squawking the assigned squawk. The PA28 is shown northbound indicating 2100 ft Mode C (1013mb). The ac converge with little fluctuation in their respective tracks; the PA28 indicates 2000 ft at 1431:26, the Mode C is then lost immediately before the contacts merge. The PA28's Mode C level of 2000 ft (1013mb) would equate to an altitude of about 2330 ft QNH (1024 mb), beneath the C152 pilot's reported altitude at 2500 ft QNH. The minimum horizontal separation is not measurable, but certainly less than 200 m. The next Mode C return from the PA28 indicates 1900 ft, in line with the avoiding action descent executed by the PA28 pilot; the avoiding action L turn is not apparent.

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 authorities.

It was apparent that both pilots were operating under VFR in good weather conditions and the relative geometry of their respective courses should have enabled each to sight the other's ac. Under the 'Rules of the Air' the PA28 pilot was required to give way in this situation. However, that presupposed he had seen the Cessna early enough to do so, which he had not. Instead he had closed to a range of 500 m, quite close, before spotting the C152. This left sufficient time to look to Port, clear his L turn and look down, before he committed himself to this avoiding action. This late sighting members concluded was part of the cause. Though the instructor in the RHD seat of the C152 would have had to look cross-cockpit to see the PA28, it should have been visible to him as they converged, but it was not spotted until after it had passed below. This made it effectively a non-sighting and was agreed by the Board to be the second part of the cause. A further point on 'right of way' was not to assume anything. Pilots must be alert to other ac and be prepared to take action to avoid a collision if the other pilot does not appear to be 'giving way' as might be required by the geometry of the situation. A GA pilot member was concerned at the division of lookout within the C152. Here was a salutary lesson - although the student in the LHS should have had a good searching look around for other traffic before going 'heads-in' to update the flight log, whilst the student was doing this, the onus on 'searching' passed to the instructor.

Turning to risk, although the PA28 was 'up sun', it should not have presented a problem to the high wing monoplane pilots looking down on other ac. The PA28 should have been visible, but it was not seen until after the event. Whereas the PA28 pilot reported the C152 overflew by about 50-100 ft, the C152 pilot reported 3-500 ft, (after the PA28 had dived below his ac). The radar recording suggested that the PA28 passed about 170 ft below the C152 pilot's reported altitude and contacts had merged leading the Board to conclude that this had been a close encounter. Taking all the factors into consideration, members agreed that the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the PA28 pilot and a non-sighting by the C152 pilot.

Degree of Risk: B

AIRPROX REPORT No 140/00

Date/Time: 10 Sep 1710 (Sunday)

Position: 5143 N 0218 W (1 NM NW
Nympsfield - elev. 700 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported

Aircraft

Type: DG 505 Glider Helicopter

Operator: Civ Club NK

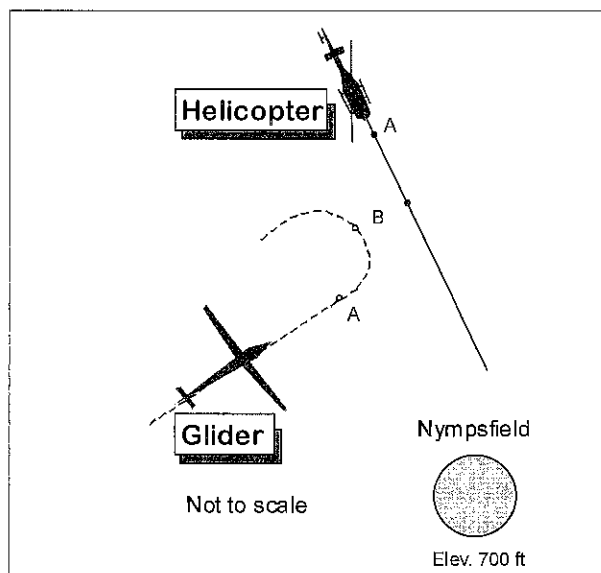
Alt/FL: 1000 ft ↓ 1700 ft
(QFE) (QNH)

Weather VMC CLBC VMC CLBC

Visibility: 18 km

Reported Separation: 0 ft V/ 150 m H

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DG 505 GLIDER PILOT reports joining the Nympsfield circuit on a dual local training flight in a slow descent passing 1000 ft QFE (1700 QNH) at 50-60 kt. The visibility was 18 km, 2000 ft below cloud, in VMC. His glider was white and he was listening out on frequency 129.9. When 1 NM NW of the gliding site on a NE heading, with his student flying the ac, he saw a helicopter, possibly a Jet Ranger, 'gaudy' in colour, 250 m ahead (see diag. point A). He took control and turned L as rapidly as possible; the helicopter did not alter course and passed 150 m away on a steady SSE track at the same level (diag. point B). As the student pilot had not seen the conflicting ac the instructor thought that they would probably have collided if he had not taken control. He also stated that the conflicting helicopter had been seen flying through the area

on many occasions prior to this incident apparently ignoring the 'intense gliding' warning shown on the topographical charts.

AIS MILITARY reports that despite exhaustive enquiries the identity of the reported helicopter remains unknown. Replays of the Clee Hill, Burrington and Heathrow radars do not show either the glider or helicopter. A radar data analysis and comprehensive procedural trace including ATS units, airfield and airstrip operators as well as 16 helicopter operating/leasing companies failed to identify the reported ac. Exceptionally, therefore, the helicopter remains untraced.

UKAB Note (1): The UK AIP at ENR 5-5-1-4, promulgates Nympsfield as a Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered up to 3000 ft agl, during daylight hours.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B777-200 PILOT reports he was cruising on UR37 at 450 kt inbound to Gatwick and under an Air Traffic Control Service from London Control; HISLs were on. About 40 NM W of EXMOR, level at FL 250, he received a TCAS "RA Alert" demanding a climb at 1500 – 2000 ft/min, which was complied with. They achieved FL 262, he thought, before advising ATC that they were descending back to their assigned level. Two fighters were spotted at 11-1130 crossing R – L on a NNW heading, he thought that the minimum horizontal separation was about 5 - 6 NM at the same level. About 4 minutes later he received another TCAS RA against traffic at 7-8 o'clock, demanding another climb, which was complied with. He perceived the risk to be "high".

THE SHAR FA2 No 2 PILOT reports he was a student, flying as the No 2 of a pair of single-seat FA2s conducting his first 2v1 instructional intercept sortie against a two-seat Harrier T8 target ac, whilst operating between FL 50 and FL 300. The formation was receiving a RIS below FL 245 - with a RCS FL 245 and above - from the RN School of Fighter Control (RNSFC) at Yeovilton and a squawk of 3/A 1705 with Mode C selected. The ac is camouflage Grey and HISLs are not fitted.

During the second practice intercept (PI) about 35 NM SW of Swansea heading 040° at 340 kt under a RIS, their upper level was capped at FL 240 by the fighter controller (FC) against civilian traffic. He descended to FL 235 with an AI radar contact 68° L of the nose – 10 NM. Whilst concentrating on his radar picture and forming visually on his leader (there was no discernible horizon beyond his leader) he unintentionally commenced a 1° nose-up climb. The FC alerted him when he had climbed to about FL 245 and above his assigned upper limit. His Leader instructed him to descend immediately but he reached FL 248 before he was able to initiate the descent. He added that the target ac appeared on his AI radar later than expected resulting in a high cockpit workload. He did not sight the B777 visually and did not assess the risk.

THE LATCC BERRY HEAD SECTOR CONTROLLER reports that traffic was light – moderate and the B777 was on the centre line of

UR37 about 10 NM E of MERLY at FL 250. He became aware of 2 contacts about 10 NM SE of the B777 heading NE on a converging track at FL 230, one of which was squawking A1705. At a range of about 5-7 NM the A1705 Mode C indicated it had climbed to FL 240 so traffic information was issued. As the range closed still further - about 3 - 5 NM - the A1705 had climbed to FL 242 so he continued giving traffic information until it had attained FL 248 about 1 NM away from the B777, whose crew reported climbing as a result of TCAS to FL 256. The two contacts continued to the N and he continued to pass traffic information. The B777 crew then descended back to their assigned level, whereupon the 2 contacts turned SE, back toward the B777. The crew of the airliner then reported they were climbing again to avoid these jets, they were somewhat agitated about who they were and what they were doing. The 2 contacts then turned W and flew away from B777.

THE LATCC BERRY HEAD CHIEF SECTOR CONTROLLER (CSC) reports that the SC pointed out a pair of unknown ac in the proximity of the B777. He asked London RADAR if they were aware of the identity of the 2 contacts, who informed him that the ac were working the 'D School' (RNSFC) at Yeovilton. The ac were on a closing track with the B777 and after calling the RNSFC via the Yeovilton direct line, was informed these ac were supposed to be at FL 240.

ATSI comments that the provision of traffic information by the BERRY HEAD SC was timely, comprehensive and in accordance with the action required in MATS Part 1, 1-51, para 14, which describes the action to be taken by controllers in respect of 'Unknown' traffic in Class B airspace. This states that "Whenever practicable pass traffic information" and "give avoiding action if considered necessary or requested by the pilot". Avoiding action was not requested by the B777 pilot and was clearly not a practical option for the controller at the time when considering the fast and unpredictable nature of the military conflicting traffic.

THE UNIT FIGHTER CONTROLLER operating from the RNSFC reports with RT transcript that the sortie was operating in the block FL 50 to FL 300, and the agreed radar service was a RIS, with a RCS FL 245 and above. Having split for their second intercept over the Bristol Channel (leader

& No 2 as a pair, with the Harrier T8 target in the NE), the pair were committed to the singleton and turned starboard N about, to begin their intercept. The target ac was given traffic information on the B777 and as the pair turned, he 'capped' them "...not above FL240 have Commair....12 miles, tracks east 250", which the leader acknowledged "copy". This ac was squawking A6207 and subsequently identified as the B777. The pair completed their turn heading about 040°, at which point he noticed their Mode C had begun to rise slowly. He warned them again of the conflicting B777 "...stranger North West 3 miles FL 250", at which point the leader called "visual", and stated that "...1 & 2 not above 245". The leader then called for the No 2 to descend, which they both appeared to do. The highest Mode C he observed was FL 246 from the No 2, and this was after he had reiterated the potential conflict to the pilot. At the closest point all three ac were within 3 NM of each other.

THE SHAR FA2 PILOT'S STATION comments that the formation had been split for the second 2 v 1 intercept of a radar training sortie, the leader and No 2 to the W as a pair (in battle formation with 1.5 NM lateral displacement) and the Harrier T8 target in the E. Traffic information had been passed at about 30 NM regarding a civilian ac, the B777, transiting the area W - E at FL 250 which was likely to be at the predicted point of interception. As the pair and target were committed towards each other the FC once again passed traffic information on the civil ac, now at a range of 12 NM from the pair. The formation leader acknowledged this call. As the range decreased the FC noticed an increase in the fighter's altitude and transmitted further information at 3 NM to which the leader replied visual followed by "1 and 2 not above 245". This was subsequently followed by an instruction from the leader to "descend a bit gently".

The No 2 was a student pilot conducting his first 2 v 1 air combat sortie. Cockpit workload was high as he tried to gain radar acquisition on the target ac some 30 NM away whilst simultaneously forming on his leader who was slightly ahead and 1.5 NM to starboard apparently at the same level (visual horizon was poor). The student pilot recalled the first two traffic information calls, but not the call at 3 NM. He obtained radar contact on the civil track at 12 NM, assessed he would pass safely ahead

and returned his attention back to the target ac. It would appear that from this position he commenced a 1° nose up climb, of which he was unaware; this resulted in the inadvertent climb above FL 240, and subsequently, into Class B airspace. It would appear that the leader also climbed above FL 240 to FL 245 whilst similarly attempting to gain radar acquisition on the target ac; realising the situation with the B777 he reported not above FL 245 and instructed No 2 to commence descent. The leader assessed that there was no risk of collision as he gained visual contact with the civil ac at 3 NM. The pair was observed to pass about 1 NM ahead and below the B777. Subsequently, the FC was contacted by the LATCC Berry Head CSC who notified him that his ac had been forced to climb and suggested that follow up action may be required. This information was not passed on immediately to the pilots who on clearing to the N of the B777, turned SW towards the target T8 to complete the intercept. This involved the No 2 descending to FL 150 then climbing rapidly beneath the target ac. Although the No 2 did not fly above FL 220 during this climb it is assessed that his ROC was such that the civil ac's TCAS would have reacted, thus inducing the second RA. The Berry Head CSC called again stating that the B777 had been forced to climb again to avoid the same military ac and the pilot would be filing reports.

COMNA COMMENTS that this Airprox was the result of a student pilot, who's cockpit workload was high, and his instructor inadvertently climbing above their assigned level into Class B airspace. It is considered that the risk of collision was low as the student pilot had gained AI radar contact on the B777 and assessed he would pass ahead, which he did by over 1 NM. Additionally, the formation leader was visual with the civil ac at a range of 3 miles, whereupon he had instructed the student to commence descent. Notwithstanding that both ac climbed above their capped level, there are several other lessons to be learnt from this Airprox and appropriate action has been taken by the Station to reduce the potential for a recurrence.

It should be noted that similar sorties are frequently conducted in this area west of A25, where the ac operate autonomously below FL 240 without the assistance of ground control radar. It is feasible

that such sorties involving fast rates of climb could induce a TCAS alert and possible RA for ac flying close to the base of Class B airspace.

We do not consider that the second event, reported 4 minutes later, was an AIRPROX as all formation ac were at or below FL 230. The TCAS RA was most likely the result of one of the SHARs conducting a rapid climb from about FL 150 to FL 220 as he completed his practice intercept on the target ac, which was maintaining FL 230.

UKAB Note: This Airprox is shown on the LATCC recording broadly as described by both pilots. However, the Mode C of the subject ac is not shown continually and at other times is obscured by SSR label overlap, especially during the second TCAS occurrence.

The SHAR pair are shown tracking NE and closing on the B777; the No 2 SHAR is shown climbing through FL 242 Mode C in company with the SHAR leader. Both SHARs continue to climb steadily, the No 2 ascends to FL 248 Mode C at 0846:12, 400 ft below the B777, cruising eastbound on UR37, which is shown climbing above its assigned level at the same time, indicating FL 252 Mode C. This is the same level achieved by the SHAR leader, in the previous radar return, before both SHAR commence a descent and cross ahead of the B777 from R – L. The minimum horizontal separation between the B777 and No 2 is about 1.4 NM and with the leader about 2.8 NM at 0846:29.

The second occurrence reported by the B777 pilot is also shown, but about 2 min after the first - not 4 min as reported by the B777 pilot. When the B777 is shown indicating FL 253 and above its assigned level, the closest of the two SHAR ac is at 9 o'clock descending through FL 213, about 4000 ft below the airliner. At the same time the Mode C of the No 2 SHAR indicates FL 205 apparently in a climb and turning R, through S onto W, in the airliner's 7 o'clock. Successive Mode C returns from the No 2 SHAR at 0848:25, cannot be determined through the SSR label overlap. The B777 ascends to a maximum of FL 258 at the next Mode C indication, before commencing a descent back to its assigned level as the No 2 SHAR climbs to FL 220 heading W away from the B777. It is difficult to reconcile

the second TCAS RA with the actions of the SHAR pair, but was probably generated as a result of the No 2's climb before it turned away to the W.

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

In considering the first encounter, it was readily apparent to the Board that this Airprox had stemmed from the No2 SHAR pilot's inadvertent climb above his assigned level. Nonetheless, it was also apparent to members that his leader had also climbed above their capped level of FL 240. It was explained that the SHAR leader's maximum level during the encounter was clearly shown on the radar recording as FL 252 Mode C (1013 mb). However, there were reservations about the veracity of this single response at this level, that may have been the result of anomalous garbling with the B777 Mode C, which also showed FL 252 on the next return. If so the leader had not climbed as high as indicated (and hence above his No2). The COMNA member affirmed that the leader did not recall going above his No 2 from the Head-Up Display (HUD), but fast jet members were quick to point out that HUDs are not as accurate as the Mode C and can 'lag' significantly. Notwithstanding this point, the radar recording clearly showed both SHAR FA2s had climbed above their capped level of FL 240. This 'level bust' should also have been evident to the FC, and the COMNA member reaffirmed that the FC thought that he had done all that was required to prevent a close quarters encounter – three transmissions of traffic information and an upper level limited to FL 240 - until he saw the fighter's Mode C start to rise slowly above this. When the leader responded "1 and 2 not above 245" to the 3rd traffic information transmission about the B777, members wondered if the FC should have been more positive and issued a descent instruction. Theoretically under the 'contract' between FC and pilot a RCS applied and the FC would have been entirely justified in ordering a descent that might well have forestalled the TCAS RA in the B777. Members strongly endorsed this

line as it could have prevented the Airprox. The COMNA member agreed, but explained that the leader's response had reassured the FC, but unfortunately the No2 had not heard the final caution and ascended to FL 248 before complying with his leader's "*descend a bit gently*" instruction. Some members thought this instruction a little odd but it was explained that, from his perspective, the leader thought the separation was satisfactory and he did not want the No2 to descend too rapidly in case he lost visual contact with his own ac or the whole tactical picture. Fast jet members understood the point being made, knowing the SHAR pilots would have been 'heads – down' for much of the time looking at their AI radars to set up the practice intercept (PI) in which they were engaged. Adding to the workload was the need to maintain formation visually. This probably formed the underlying reason for the inadvertent shallow climb induced apparently by both pilots. Some military controller members also questioned the wisdom of the FC setting up the PI with the point of intercept close to GAT cruising only just above the fighters' level, which heightened the potential for a problem. There was a lesson here for fighter controllers; as one member put it "*when ac are operating close to the base of Class B airspace with GAT cruising at FL 250, it is far better to take positive and effective action and alter the set-up early as it could save a lot of grief later!*" Some members also thought that it would have been wiser if the FC had effected co-ordination with the LATCC BHD CSC, though this was not strictly obligatory under a RIS below FL 245.

From the B777 pilot's perspective, he had little alternative but comply with the TCAS RA, which unbeknown to the SHAR leader was about to cause the vertical separation to increase. It was fortunate there was no other traffic above the B777, but the deviation above the assigned level - 700 ft - was in accord with the normal TCAS parameters. The Board noted that the second encounter whilst generating another RA was probably the result of a sudden climb by the formation which was well below the B777 at the time. The radar recording did not reveal separation of less than 3000 ft when the No 2 ascended to FL 220. Moreover, it was behind the B777 and heading in the opposite direction. Another useful point emerged here. Military ac could operate (legitimately) in class G airspace close to the base of Class B airspace with

GAT cruising just above them at FL 250, the lowest available cruising level available on the UAR. These situations could result in less than 1000 ft vertical separation unverified Mode C and TCAS RAs being generated against military ac conducting high energy manoeuvres, near to, but not penetrating Class B airspace. Members understood the dearth of cruising levels for GAT in the UAS and a corresponding desire by the military to make the best use of available Class G airspace but felt that pilots had to be aware of the possible resulting consequences. Civilian ATCO members suggested that military operations in Class G airspace should therefore be capped further below FL 245. Other members countered by suggesting the lowest useable cruising level on such UARs should be raised. A further suggestion was that an MTA might be warranted, but it was recognised that such fundamental differences were well beyond UKAB's remit to resolve. On another tack, a civilian ATCO member did not agree with the ATSI comment that "avoiding action was... clearly not a practical option for the [BHD Sector] controller at the time" and opined that avoiding action was feasible in the vertical plane. This would have replicated what TCAS subsequently achieved. In finalising the assessment of the cause of this Airprox, members concluded that it resulted when the SHAR FA2 formation climbed above their capped level into Class B airspace and flew into conflict with the B777. With regard to assessment of the risk, members considered the first encounter, wherein TCAS again proved its worth. Having been forewarned by the FC, the No 2 still closed unsighted to 1.4 NM but 400 ft below the B777, which had just started to climb in response to the RA. However, the leader had spotted the B777 before crossing 2.8 NM ahead of and 2900 ft below it whilst ensuring that the No 2 had descended. This led members to the unanimous conclusion that no risk of a collision had existed in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SHAR FA2 formation climbed above their capped level into Class B airspace and flew into conflict with the B777.

Degree of Risk: C.

AIRPROX REPORT No 142/00

Date/Time: 13 Sep 1513

Position: 5226 N 0017 W (2 NM SW of Conington - elev 26 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: Cessna 152 Grob Tutor

Operator: Civ Trg HQ PTC

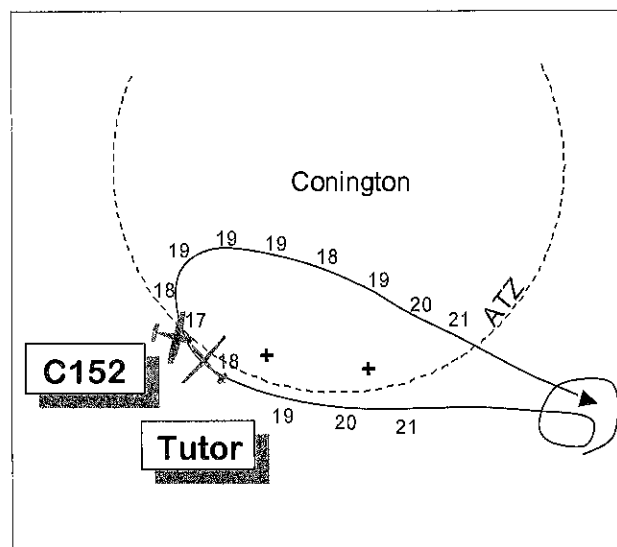
Alt/FL: 1000 ft 1000 ft ↑
(QFE 1012 mb) (RPS)

Weather VMC CLBC VMC CLBC

Visibility: 10 km+ 10 km+

Reported Separation: 200 ft, 100 m/1000 ft

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 152 PILOT reports heading 100° at 90 kt having just rolled out downwind for RW 28 LH at Peterborough (Conington), at 1000 ft QFE. His ac was white with a blue stripe. He saw a G115 in RAF colours 200 m in his 1 o'clock crossing right to left ahead; he took control from his student, descended and turned right 20-30° to avoid it. It passed 200 ft above and 100 m away in a right turn which took it back across his track and out of the ATZ again. He considered the risk of collision was medium; the ac was light coloured against a light background and gave poor contrast and he was closely monitoring his student on his final dual before first solo. He added that over the last 5 months Wyton-based G115s have frequently infringed the Conington ATZ despite numerous conversations with them; this was the closest he had been to an incident in 20 years of flying. He was in communication with Conington Radio and his transponder was at standby.

THE GROB TUTOR PILOT, a solo student, reports heading 270° at 80 kt, climbing away after a PFL into a field near the S edge of Conington ATZ, when he saw a Cessna closing from his 11 o'clock low. He made a climbing right turn to avoid it. He

estimated it was 100 ft below and 1000 ft away when he saw it; it came no closer than 300 m to him; he did not assess the risk of collision.

UKAB Note: LATCC radar recordings show a 7000 return following the path described by the Grob pilot at the time of the incident. It climbs in a LH orbit over a location 2.7 NM SE of Conington and then rolls out on a westerly track to follow the S boundary of the Conington ATZ as shown in the diagram, at the Mode C heights shown (QFE was 1012 mb). It then flies a right turn onto ESE through the ATZ. There are 2 primary-only returns (+) which might be the Cessna tracking downwind within the ATZ after the Airprox.

HQ PTC comments that there will be times when ab-initio pilots unwittingly place themselves in areas where the more experienced would steer clear; this would appear to be one of those occasions. Although the Tutor pilot believed himself to be in free airspace, the radar evidence indicates that he possibly inadvertently infringed the Conington ATZ. However, since Conington circuit traffic is routinely observed flying downwind legs outside the Conington ATZ this is by no means a foregone conclusion. In either case, however, the Tutor pilot did see and avoid the Cessna as he climbed away from his PFL. Nevertheless, to minimise the risk

of further similar encounters, the unit concerned has taken steps to ensure that their pilots avoid Conington by a greater margin in future.

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 were advised that the student pilot of the Tutor had been debriefed about avoiding the Conington ATZ and agreed that while his choice of field for a PFL was clear of the ATZ, it did not allow for his apparent disorientation when climbing away and his subsequent proximity to the ATZ. The Board was also advised that the training unit had taken on board the need to avoid Conington and hopefully these 2 aviation neighbours would be able to co-exist safely in future. As to the incident itself the Board considered that the ATZ infringement was not the cause of the Airprox but more the result of it in that the Tutor only actually entered the ATZ during his avoiding action. Members considered that the primary cause was late sightings of the other ac by both pilots. At the same time it was not surprising that the Cessna pilot had not seen the Tutor earlier as its lack of conspicuity had already become a matter of concern to the RAF.

Many Airprox occur on or near the boundaries of airspace and GA members of the Board commented that if one was lucky enough to have an ATZ then it made sense to fly one's circuits well within it to gain the appropriate protection from passing traffic. It appeared that the Cessna's turn onto downwind was just outside the ATZ and the Airprox occurred just as the ac was re-entering the zone. Jet pilots had no difficulty flying a visual circuit well within an ATZ and GA members commented that at some airfields, circuits had become far too large.

As to the risk level, the matter was somewhat complicated by the Mode C readings from the Tutor which seemed at variance with both pilots' estimates of the vertical separation, which were not far apart. The Board agreed that if both pilots thought the separation was in the order of 1-200 ft (rather than the 700 suggested by the Mode C) then it was probable that they were right. In any case it was considered that the pilots, though surprised by each other's presence, had seen each other in time to remove the risk of a collision.

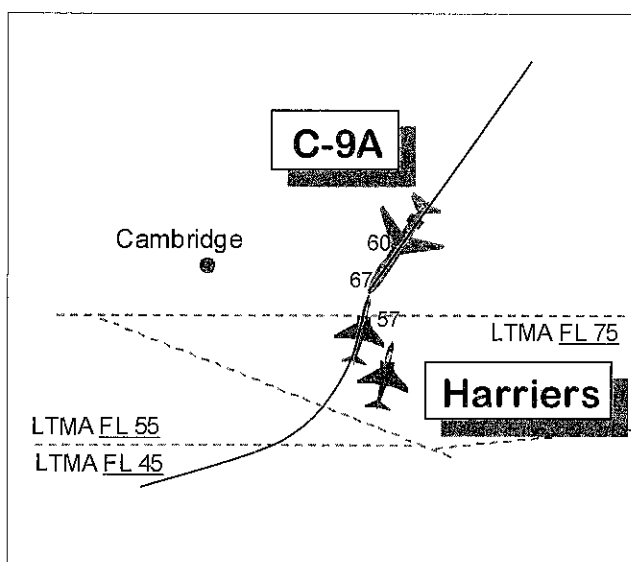
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by both pilots on the boundary of the Conington ATZ.

Degree of Risk: C

AIRPROX REPORT No 143/00

Date/Time: 11 Sep 0744
Position: 5212 N 0017 E (4 NM ESE of Cambridge)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: C-9A Sea Harrier x 2
Operator: Foreign Mil COMNA
Alt/FL: ↑ 3500 ft FL 70 ↑
 (QNH)
Weather VMC CLAC VMC CLAC
Visibility: Good Good
Reported Separation: 1000 ft V/1000 ft
Recorded Separation: 1000 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C-9A PILOT reports heading SW between MLD and BKY, cleared by London Radar to descend to 3500 ft and fly at 310 kt, destination Northolt. Although receiving a RAS he was not warned of traffic which closed from ahead in a climb, triggering a TCAS 'Climb' RA. He saw the other ac, a pair of Harriers, pass about 1000 ft below after he had pulled up.

THE HARRIER PILOT reports heading 040° at 400 kt in a climb, leading a pair out of Duxford. He called London Radar, as pre-arranged, but before a service was established he saw the C-9 closing from 3 NM ahead. He levelled the formation to pass about 1000 ft almost directly beneath the C-9 with no risk of collision. He had been too busy with checks, establishing comms and leading the formation to use his radar before the incident and consequently had maintained a good lookout.

MIL ATC OPS reports that the crew of the C9 ac were receiving a RAS from London Radar (LRAD) Console 15 (CON 15) on 135.27 and descending to FL 50. Having been given descent to FL 50, the pilot requested to remain at FL 100 to "stay high speed for a while". The controller (who had just taken over) advised the pilot that he would have to be level at 2400 ft before entering CAS. The pilot requested to remain high speed below FL 100 and this was approved by the controller. Acting as both controller and Allocator at the time, CON 15 had 2 other ac under service, one of which was an airliner inbound to Norwich from the W. The C9 had been prenoted to Essex Radar (ESSEX), for a handover in the vicinity of Cambridge and the C9's descent had been co-ordinated with Cambridge Radar, the agreement being that the C9 would not be below 3500 ft on the Cambridge QNH (1017 mb), whilst Cambridge operated traffic up to 2000 ft. At just before 0743, CON 15 provided avoiding action to keep the ac inbound to Norwich clear of Holbeach Range, which had just become active. Shortly afterwards, the controller instructed the C9 pilot to descend to 3500 ft (30.01 in) and, commenced the radar handover to ESSEX; at this point the C9 was about 8 NM NE of Cambridge. The handover proceeded normally, including a statement that the ac was under RAS and the 'passing on' of the co-ordination with Cambridge. With the handover

complete at about 0743:30, CON 15 instructed the C9 pilot to squawk 0201, as directed by ESSEX, before offering a second avoiding action turn to the ac inbound to Norwich, in order to remain clear of Holbeach Range. Once this had been acknowledged, she instructed the C9 pilot to contact ESSEX on frequency 120.62; in response however, the C9 crew transmitted "*Ma'am, we got a TCAS – we're turning, we have to climb right now to avoid traffic*". At 0744:00, CON 15 transmitted, "*C/S roger, traffic south 2 NM heading north indicating FL 50*". ESSEX, who were still on the landline, confirmed that they were not working the conflicting traffic, but were happy for the C9 to continue on their frequency as planned.

Before the instruction for the C9 crew to change frequency could be repeated, the Harrier pilots checked in on the ICF, which was cross-coupled to 135.27, just as the Allocator position was being 'opened'. CON 15 replied "*Station calling London Mil, standby*" and then advised the Norwich traffic "*....now clear of the range, own navigation direct Norwich.*" The C9 crew then transmitted, "*we can take a descent...2 fighters just passed...right underneath us*" to which CON 15 replied "*Roger, did you get the type?*". One of the Harrier pilots transmitted "*C/S, we're good visual with them*"; however, the call was not acknowledged and the C9 pilot replied "*Negative ma'am...but we did get a TCAS Traffic Avoidance*". The C9 was then transferred to ESSEX, whilst the new Allocator took control of the Harriers; 3 days later, LRAD were informed that an Airprox had been filed by the C9 crew.

The recording of the Debden Radar, the same radar that CON15 was using, shows the C9 squawking 6151 and tracking 220° towards Cambridge, in a steady descent. At 0742:43, about 1:30 min before the Airprox, the Harriers appear in a position 190°/6 NM from Cambridge, tracking 045° and squawking 7000 at an indicated 100 ft Mode C when the C9 is 10 NM NE Cambridge, passing FL 72 Mode C. At 0743:34, about the time that the radar handover to ESSEX was completed, the C9 is passing FL 64, whilst the Harriers are about 5° L of its track, range 7.5 NM, still tracking 045° as they climb through FL 24. At 0743:52, about the time of the C9's TCAS RA, the Harriers start a gentle L turn whilst passing FL 46, and track directly towards the C9 (now descending through FL 61), placing them in its 12

o'clock, range 4 NM. On reaching FL 60, eight seconds later at 0744:00, the C9 commences a climb at a rate of 300 ft per radar sweep, in response to the TCAS RA; over the same period, the Harriers' rate of climb reduces by 100 ft every radar sweep (from 500 ft/sweep to 300 ft/sweep) as the contacts merge. The closest point of approach seen on radar occurs at 0744:11, with the Harriers about 0.25 NM in the C9's 11 o'clock, now on a more northerly track, and indicating 900 ft below (Harriers FL 57, C9 FL 66). In the following frame, the Harriers emerge from the C9's 5 o'clock indicating FL 60, with the C9 having just levelled at FL 67; the Harriers therefore, appear to have passed almost directly beneath the C9. (UKAB Note: The C-9A's groundspeed between Mildenhall and abeam Cambridge is 343 kt.)

The first indication of the Harriers would not have been a major cause for alarm; CON 15 was, no doubt, more concerned with the Norwich a/c's track towards a Danger Area that had just become active at the time. By the time the handover to ESSEX had commenced however, the '7000' was effectively in the C9's 12 o'clock, range 10 NM, indicating 1200 ft (Mode C) and on a reciprocal track; given that the C9 was under RAS and had been cleared to 3500 ft, a confliction ought to have been evident. By the time the handover had been completed, separation had reduced to about 7 NM, whilst the '7000' had climbed to an indicated 2400 ft (at this point the C9 was still indicating FL 64). The ESSEX controller had accepted the handover without comment on the confliction and thus, appeared willing to take control of the C9; this may have lulled CON 15, concerned with the a/c tracking towards Holbeach Range, into a false sense of security and might explain why the area around the C9 was probably not scanned adequately. It is also possible that, as a boundary line of Controlled Airspace lies immediately S of Cambridge (although the '7000' was below CAS), the controller, who would be more used to controlling in the Middle and Upper Air, did not think of looking 'beyond' this line.

JSP318A 1301 states that *"The releasing controller resolves any traffic conflictions before completing the handover"* and in this case, it is clear that the C9 was handed over in confliction. Whilst it may have been difficult to have achieved 5 NM horizontal separation, given the speed and track of the Harriers, the controller would have been expected

to have tried to achieve some form of separation, but none was attempted. Bearing this in mind, it is most likely therefore that CON15 either did not notice, or did not perceive there to be a confliction between the C9 and the Harriers.

COMNA comments that the Airprox occurred within Class G airspace where two Sea Harriers operating under VFR were in the process of obtaining communications with LATCC Mil for a radar service and subsequent permission to climb into CAS. Despite the Harrier crew's relatively high workload, adequate lookout was maintained and visual contact on the conflicting C-9A was obtained at 3 miles. The Harrier formation leader reduced the rate of climb with a view to levelling off and passing well beneath the C-9A. This course of action appeared to work effectively providing approximately 1000 ft vertical separation. The plan to stop climb and level off, as opposed to turning the formation for avoiding action, was the safest option as the pilot was aware of the proximity of CAS to the south (base level 4500 ft) and Cambridge aerodrome to the north-west. Additionally the radius of turn for a formation, (particularly to the right when in echelon starboard) is far greater than that for a singleton and in this case a turn may not have achieved as much separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Controller members of the Board considered the high speed of the C9 to have been irrelevant; dealing with fast jets on a daily basis was part of their normal operations. However, if the C9 had had time to spare and had flown at more normal speeds below FL 100, there would have been more time for the controller to have noticed the Harriers pop up and to issue avoiding action instructions. The Board concluded that ideally CON15 should have noticed the confliction developing and given avoiding action but members considered that, in the time available, this would have made little difference to the outcome. The incident occurred in Class G airspace where the primary means of collision avoidance is 'see and avoid' whether under a radar service or not and, with the aid of TCAS, the C9 pilots had seen and avoided the Sea Harriers. Their leader, in turn, had seen the C9 and passed, members agreed, a more than satisfactory distance beneath it, both pilots' actions having

removed any risk of the ac colliding. The Board concluded that the cause of the incident was a conflict of flightpaths in Class G airspace which had been resolved by both parties.

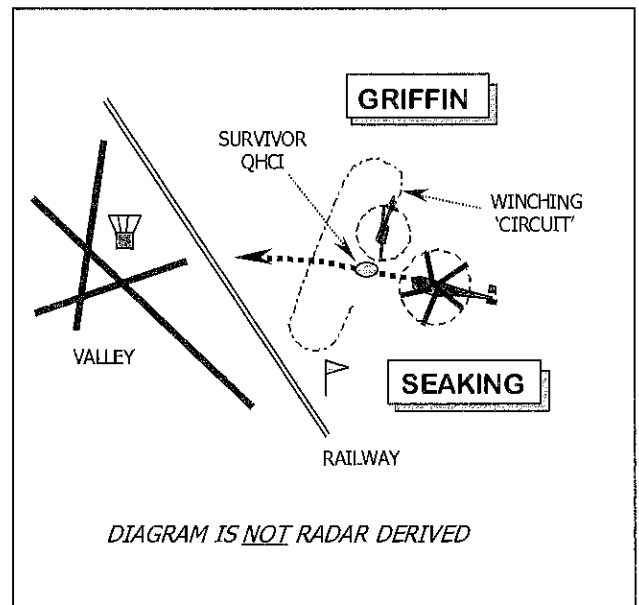
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict of flightpaths in Class G airspace resolved by both parties.

Degree of Risk: C

AIRPROX REPORT No 144/00

Date/Time: 14 Sep 1528
Position: 5315 N 0431 W (1 NM E of Valley - elev 37 ft)
Airspace: MATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Griffin HT1 Sea King HAR 3
Operator: HQ PTC HQ STC
Alt/FL: 75 ft (agl) 130 ft (1010 mb) (Rad Alt)
Weather VMC CAVOK VMC
Visibility: 45 km >10 km
Reported Separation: 20 ft V & 70 ft H
 50 ft V & 120 ft H
Recorded Separation: Not Recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GRIFFIN HT1 HELICOPTER PILOT, a QHI, provided a comprehensive report stating that he was conducting a pilot winching training sortie in an area of scrub land on the golf course just to the E of Valley aerodrome. He was occupying the LHS with the student 'handling' pilot in the RHS. The helicopter has a black & yellow colour scheme, position lights, upper red anti-collision beacon and HISLs were all on, and he was squawking 3/A 3764 with Mode C, whilst in receipt of a "listening watch" from Valley TOWER on a 'quiet' frequency for the instructional sortie.

They were 'running in' at 5 kt heading 205°(T) with the winch cable deployed and the winchman about 10 ft off the ground, with 30 m to run to the QHCI 'survivor' on the ground. At a height of 75 ft agl, a

Sea King was suddenly spotted crossing fast from L – R about one Sea King rotor span (70 ft) directly in front of, and about 20 ft above his helicopter heading 300° (M); the other ac was flying toward the Valley RW26 threshold. No avoiding action was feasible as there was no time to react to the sighting as the Sea King passed in front of them.

He added that with the winchman around 60 ft below his helicopter on the winch cable, manoeuvrability was very limited and he assessed there was an extremely high risk of collision. The crew was concentrating on the winching exercise and he had been paying particular attention to monitoring the student on his R. The winching sortie was then terminated and the helicopter recovered back to dispersal, whereupon the 'survivor' stated that the Sea King had flown directly above him. It would appear that the Sea King had been operating on a different frequency whilst 're-joining'. The upper red

anti-collision beacon was confirmed to be on during the sortie and a satisfactory functional check of the HISLs was conducted post flight by the ground crew.

THE SEA KING HAR 3 HELICOPTER PILOT a QHI and the PF from the LHS, reports he was on recovery to Valley following the standard routing from the RLG at Mona, on completion of an annual standards check and in communication with Valley TOWER. No emergencies were being practised during the visual approach to the threshold RW26. The helicopter is bright yellow with a high visibility rotor-blade, HISLs were on but the SSR was selected off.

They passed 1 NM E of E Gate and remained at or below the standard transit height of 250 ft Valley QFE (1010 mb) and whilst approaching the golf course adjacent to the eastern perimeter of the aerodrome at 100 kt, both pilots were aware of three Hawks on the break to land. Heading 300°(T), at 130 ft Rad Alt, (they were required to cross the railway line between the aerodrome boundary and the golf course above 100 ft), the RHS PNF observed a black and yellow Griffin helicopter at the 1-30 position; it was spotted late and was apparently in a hover over the golf course. He made a gentle L turn to avoid the Griffin, which passed 50 ft below and about 2 rotor spans (120 ft) down the starboard side of his Sea King with a "slight" risk of a collision.

During the recovery, TOWER did not pass any traffic information about the Griffin on the golf course at all, although ATC had previously done so on identical sorties. He believed that when the Griffin landed shortly after his ac, the upper red anti-collision beacon was not operating.

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

MIL ATC OPS reports that the Valley 1450 weather was 45 km visibility, nil weather and no significant cloud below 9000 ft. The Griffin had taken off from its dispersal at 1456, however, the visual circuit to RW14 was extremely busy at the time, including 3 'first solo' Hawk pilots, and it was almost 7 min before the Aerodrome Controller (ADC) was able to clear the helicopter to cross the runway. The Griffin subsequently departed for an area of scrubland on the Golf Course about 1 NM E of the

Valley Control Tower and, at 1503:23, its pilot changed to a quiet frequency; although monitored by an ATC assistant within the VCR, this frequency provided no controlling function. The TOWER frequency remained busy and the ADC's attention was concentrated on the activities of the student pilots within the circuit. At 1526:21, shortly after a formation of 3 Hawks had joined the visual circuit, the Sea King pilot called TOWER requesting a "...visual rejoin from Mona via the Golf Course for the two six threshold". TOWER responded, "...roger report finals for the two six threshold, surface wind 230 - 10 knots, using runway 14 L, QFE 1010". The lead Hawk 'rolled' at 1529:37 and once airborne, its pilot requested a low-level circuit, which was approved. ADC saw the Sea King behind him, making an approach to the RW26 threshold and at 1530:21, cleared the pilot to cross the active runway for the SAR dispersal after the other 2 Hawks had landed. At 1534:13, the Griffin pilot transmitted on the TOWER frequency "...discontinuing the sortie, complete now at the golf course for rejoin to cross". As the circuit was now clear the ADC cleared him accordingly. There was no mention of an incident on the frequency by the crew of either helicopter. The ATC watch Supervisor was subsequently informed of the Airprox.

The ADC's workload during the period had been high, whilst concentrating on a busy fixed wing circuit and in contrast, the Griffin's sortie was taking place 'behind' him at a low height. Here, helicopters are often difficult to see from the Control Tower, against the vegetation, or because of obstructions.

ATC Local Orders did not specifically require controllers to inform helicopters arriving from, or departing to, the E about helicopters on the Golf Course, although it was customary to do so. There was a specific requirement for the ADC to advise fixed wing ac conducting low level circuits to RW14 about rotary wing traffic operating at the Golf Course. However, the ADC did not advise the lead Hawk pilot about the Griffin. Hence, it is quite likely that the controller had forgotten about the helicopter.

RAF VALLEY provided a very frank and comprehensive analysis, reporting that the Griffin was operating on the Golf Course, an area of rough ground used by the Unit for winching training; the Sea King was conducting an East Gate visual

recovery to Valley from Mona. This procedure, promulgated in the Flying Order Book (FOB), requires ac to route over the Golf Course to the RW26 threshold and contains a warning to pilots to be aware of helicopter activity on the Golf Course.

Although ADCs may warn helicopter pilots departing or arriving via East Gate of rotary traffic on the Golf Course, this has not previously been stipulated in the ATC Order Book. On this occasion, the ADC passed no warning about the Griffin to the Sea King crew. Whilst there is a slot on the ADC pinboard to remind controllers of the presence of rotary traffic on the Golf Course, for much of their operations helicopters are obscured from the Controller's view by buildings and can also be difficult to see against the predominantly gorse vegetation. Ac operating on the Golf Course listen-out on a frequency monitored by an ATC assistant. Again, there was no instruction that required ATC to inform pilots of East Gate arrivals or departures.

Following this Airprox, a critical review of helicopter VFR arrival and departure procedures was conducted. It was determined that any changes to the extant routes would lead to greater, or additional, deconfliction problems between rotary and fixed wing ac at other points on or around the aerodrome and its approaches. However, to prevent a recurrence, the ATC Order Book now requires the ADC to advise all helicopter flights to and from 'East Gate' of any activity on the Golf Course. To remind the ADC of the presence of ac on the Golf Course the ADC pinboard has also been amended, to make the 'Golf Course Slot' more distinct. Additionally, SARTU pilots are to select their upper strobe to white when hovering/wincing on the Golf Course to improve conspicuity. Though these measures apply to Valley based ac a wider review of procedures for visiting helicopter traffic to ensure that their crews are also made aware of the 'Golf Course' area and the potential dangers, has been initiated.

Although this Airprox was a serious incident it was a 'one-off', as one ac was being flown by a visiting standards unit pilot who was not perhaps as familiar as all other pilots on this unit with the procedures and associated hazards. Moreover, it is a strongly held view on each Unit involved that the colour

scheme of the Griffin, which operates predominantly below the visual horizon, was a major contributory factor to this Airprox.

HQ PTC comments that this incident shows how even procedures which have stood the test of a great deal of time can be rendered inadequate with only a little neglect of common sense. Whilst aircrew might dislike being reminded of something which to them is generally plainly self-evident, when that reminder does not come you may be assured that their attention is temporarily elsewhere. We are satisfied that the Station have made a thorough review of the procedures concerning the golf course and plugged the remaining gap. However, we would like to see the use of black in the DHFS paint scheme revisited: against the normal helicopter background of vegetation it is not as effective as the violent dayglow colours.

HQ STC comments that the attention of the Sea King crew was focused primarily on the 3 recovering Hawk ac and, in the absence of traffic information on the Griffin, both pilots were much less likely to be searching for an ac hovering over the golf course. Aggravated by the relatively low conspicuity of the Griffin, given the ambient light conditions and the background terrain, there is little more that the Sea King crew could reasonably have been expected to do to prevent this incident. It is therefore encouraging that the station involved has conducted a thorough investigation into the circumstances and, by reviewing local ATC and SARTU procedures, has taken a number of steps to prevent a recurrence.

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 appropriate ATC and operating authorities.

Members were encouraged that the station had conducted a thorough examination of local procedures, subsequent to this Airprox, a useful periodical exercise, which had revealed several areas worthy of revision. Notwithstanding the absence of any instruction to the ADC in the ATC Order Book, controller members thought it

incumbent on the ADC anyway, to warn pilots on recovery of ac in the circuit they might overfly. The Mil ATC Ops adviser explained that the ADC had simply just forgotten about the Griffin conducting his winching exercise on the golf course, whilst absorbed with the recovery of the three Hawks which had just broken into the circuit. Faced with a high workload, these student pilots were the focus of his attention to the detriment of the Sea King pilot, who joined direct for the RW26 threshold oblivious to the Griffin's presence. Members believed that the Sea King pilot should have been provided with traffic information on the Griffin and if he had then this Airprox would probably not have resulted. Although the Griffin was operating at a location effectively behind the ADC's natural viewpoint, it was still underneath the downwind leg for RW14, well within the circuit area and thus within his domain. A military controller member thought this Airprox also identified the ADC's poor use of the pinboard, which is designed as a memory aide to help keep track of circuit traffic. A slot existed for the 'Golf Course' but apparently it had failed to act as a reminder about the Griffin. The Board noted that improvements had been made to this basic tool and thought that the Hawks had been more of a distraction than the ADC had realised. Some military controller members also suggested that if the circuit was busy enough to distract the ADC when the Hawks broke, then it might have been appropriate for the ATC Supervisor (of which there was no mention) to have been in the VCR.

The principle of ac operating on 'quiet' frequencies other than TOWER when within the circuit area of military aerodromes was a long-established one and Valley is certainly not the only aerodrome to allow such operations. However, this can generate significant problems and requires a careful watch by ATC over those pilots who are not able to hear to what is being said by pilots joining the circuit area on TOWER RT. In this instance the Board recognised that the 'patter' intensive winching exercise necessitated a quiet RT frequency, but this in turn denied the Griffin pilot information on the Sea King joining for RW26. Without information from ATC the onus was placed on the Sea King crew transiting this area to keep a watchful eye for 'winching' traffic, as required by the Valley FOB. Several members believed that the Griffin would not have been that easy to spot for the Sea King

pilot and the Board endorsed the concerns expressed by PTC regarding the Griffin's colour scheme. The low speed and height of the Griffin, with little relative movement to the Sea King, would have all impeded visual acquisition without the 'heads up' that traffic information should have provided. Moreover, controller members noted the apparent absence of any circuit information to the Sea King pilot from the ADC. From the Griffin pilot's perspective there was little he could have done to preclude this close encounter. Denied the benefit of an RT 'cue' on the quiet frequency and concentrating on the winching in progress he was placed in a difficult position with little room to manoeuvre when the Sea King was first spotted as it unexpectedly flew past. Thus the Sea King PF was probably the only one who could effect the outcome, when he eventually saw the Griffin and effected an avoiding action "*gentle*" L turn. With all this in mind members agreed that this Airprox was caused by a late sighting by the Sea King pilot of the inconspicuous Griffin, resulting from a lack of traffic information from the ADC.

Turning to risk, both pilots held different opinions over the horizontal separation that pertained, the Sea King pilot reporting double that of the Griffin pilot; their assessment of the risk also varied. Regardless of 1 or 2 rotor spans, it was a relatively close call, especially as the QHCI had reported being overflowed by the Sea King. The Griffin pilot reported that no avoiding action was feasible and members recognised how severely restricted he was, in his ability to manoeuvre, by the winchman on the cable. In the other cockpit, the Sea King pilot only spotted the conflict when his attention was drawn to it by the PNF. However, he then had time to make a gentle L turn to avoid the Griffin. Having considered all of these factors members concluded that though no actual risk of a collision had existed, the safety of the ac had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the Sea King pilot of the inconspicuous Griffin, resulting from a lack of traffic information from the ADC

Degree of Risk: B

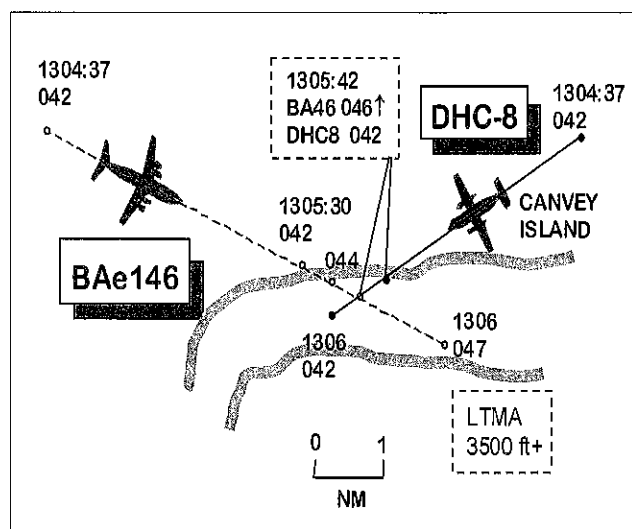
AIRPROX REPORT No 145/00

Date/Time: 15 Sep 1306

Position: 5130 N 0031 E (8 NM WSW Southend airport)

Airspace: LTMA (Class: A)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	BAe146	DHC 8
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	4000 ft (QNH 1005 mb)	4000 ft (QNH 1005 mb)
<u>Weather</u>	IMC INT CLOUD	IMC INT CLOUD
<u>Visibility:</u>	good	
<u>Reported Separation:</u>	200-300 ft V	
	400 ft V/ 5NM H	
<u>Recorded Separation:</u>	45 NM/400 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe146 PILOT reports flying en route to Zurich to the NE of London City level at 4000 ft heading 070° in IMC; TCAS indicated traffic at 11 o'clock coming towards his ac, range 12 NM at the same level. As this traffic closed to 6 NM, he attempted to contact ATC but was unable due to RT congestion. Shortly thereafter a TCAS TA then an RA climb was received; the weather was broken cloud and the traffic could be seen on his left handside and slightly below. A climb was commenced immediately and after passing the other ac by about 200 - 300 ft vertically he informed Thames Radar of his TCAS action and descended back down to 4000 ft.

THE DHC-8 PILOT reports inbound to London City from Brussels heading 230° at 180 kt level at 4000 ft QNH 1005. When passing SW of SPEAR in IMC, he heard an RT call '(callsign) TCAS climb avoiding action'. Although flying in and out of clouds and rain, he saw the conflicting BAe146 about 0.8 NM away; crossing R to L, passing 0.5 NM ahead and 300 - 500 ft above. No avoiding action was taken but he considered the risk of collision as serious.

ATSI reports that in order fully to understand the circumstances surrounding the Airprox, it was necessary to start the analysis some time before the actual incident as events which happened then had a significant bearing on the way in which the controller concerned was operating when the Airprox occurred. Thames Radar, who provide Approach Radar Control Services for Biggin Hill as well as London City airport, held pending departure Flight Progress Strips (FPS) for 3 foreign military Jaguar ac from Biggin Hill to Leuchars via the Airways system. They were to depart as a pair and a singleton with the intention of joining up when airborne. At 1240 hr, Thames Radar was informed by Terminal Control (TC) that they would be unable to accept the foreign military flights departing in formation, as there was severe weather in the area in the form of thunderstorms and they did not wish to risk the extra workload involved should the Jaguars lose visual contact with each other. The Special VFR (SVFR) controller, co-located with Thames Radar, spent in the region of 10 minutes, on behalf of the Thames Radar controller, making alternative arrangements for the Jaguars to be transferred from Thames Radar to Essex Radar and thence to military radar for a transit via the East Coast. At 1250 hr TC was informed of the new arrangements for the Jaguars.

At 1247 hr London City informed Thames Radar that the airport was closed due to flooding of the runway following a thunderstorm. This resulted in Thames Radar making arrangements with TC Southeast for 3 inbound ac to be held at ALKIN and SPEAR. At 1249 hr, Thames Radar released the first pair of Jaguars from Biggin Hill with the instruction to turn right after departure from RW 21 onto a radar heading of 050° and climb to an altitude of 2400 ft. At 1252 hr the Thames and SVFR controllers both noticed the Jaguars airborne and ascending through their cleared altitude. They continued their climb past 5000 ft into TC airspace and on contact with Thames radar they were instructed to descend immediately to 3000 ft. Appropriate co-ordination was carried out with TC.

At 1254 hr, London City informed Thames radar that the airport was open again and, a minute later, a departure release for the BAe146 was agreed. At 1256 hr, the pair of Jaguars was transferred to Essex radar following appropriate co-ordination by the SVFR controller acting as Thames Radar Co-ordinator.

At 1258 hr, a F50 inbound to LCY from Antwerp, called Thames Radar at the same time as a C340 from Geneva to Biggin Hill. As he was expecting the third Jaguar to be airborne soon, the Thames Radar controller stated that the Biggin Hill inbound caused him some concern after the experience with the first pair of Jaguars. Also at this time a departure clearance for the BAe146 with initial heading and level instructions was agreed by SVFR, acting as Thames Co-ordinator, with London City. The SVFR controller passed Biggin Hill a departure release for the singleton Jaguar at 1259. It was cleared to make a right turn after take off onto a heading of 090°, climbing to 2000 ft. The Thames Radar controller, at interview, said that this clearance was chosen as being simpler than the previous one and provided separation against the C340.

The BAe146 called Thames Radar at 1300.30 hr and reported passing 1600 ft climbing. The Thames Radar controller instructed the BAe146 to maintain 3000 ft and turn right onto a heading of 075°. At this stage another inbound was establishing on the ILS for London City and it was necessary for the Thames Radar controller to vector the following F50

through the centreline to provide the required 10 NM spacing. The controller stated at interview that it was difficult to provide 10 NM spacing between inbounds, allowing for departures, as this very soon uses up the available vectoring area. This difficulty was compounded because all ac arriving or departing via SPEAR and Detling join and leave Thames Radar airspace at 4000 ft. Leaving ac at 3000 ft is not a practical option because the area of CAS at that level is considerably smaller.

At 1302hr, the BAe146 was instructed to climb to 4000 ft and turn right onto a heading of 125°. This was to get the flight on track towards Detling and to achieve a cross with the ac inbound from SPEAR to ALKIN. This was a fundamental and routine part of the Thames Radar task. At interview, with hindsight, the controller admitted that the heading of 125° was probably insufficient to provide a "positive" cross in the prevailing strong southerly winds.

Throughout the period of analysis both the Thames Radar and the SVFR controllers dealt with other traffic, including helicopters, but the majority of their joint effort was directed at London City traffic and the Jaguars from Biggin Hill.

The DHC8 reported on Thames Radar frequency at 1303 hr and was instructed to take up a radar heading of 230°, maintain 4000 ft and a speed of 180 kt. At 1303:30 hr the single Jaguar called and the controller became preoccupied with providing separation between it and the traffic inbound to Biggin Hill.

Meanwhile the subject ac were converging and at 1305:50 the BAe146 reported the TCAS event and responded to the TCAS alert by climbing. The DHC8 crew reported visual contact with the BAe146. The Thames Radar controller admitted that his attention had been drawn to the Biggin Hill area of his display and that he had not noticed that the two ac involved were likely to come into close proximity. He added that because all ac arrived and departed at the same level, concentration on all areas of the radar display was required. The radar system at Heathrow Tower is not equipped with Short Term Conflict Alert (STCA).

The STCA at LATCC activated at 1304:40, one minute before the BAe146 reported the TCAS alert, and so enquiries were made through LATCC ATC Investigations as to why the TC controllers did not warn the Thames Radar controller of the confliction. The response was that the TC controller felt the Thames controller would probably be too busy and a telephone call might be a distraction. He had also been under the impression that Thames Radar was equipped with STCA.

Minimum separation was assessed as 0.44 NM horizontally and 400 ft vertically.

UKAB Note: Replay of the Heathrow radar recording corroborates the SMF minimum separation as accurate.

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.

An ATSI adviser to the Board said that the Southern ATC Inspectorate had commented on the manning levels within the Thames Radar/Heathrow SVFR control room. This matter is being addressed separately by ATSSD. What was relevant was that the Thames Radar controller was busy and the SVFR controller was acting as his co-ordinator. A more important point was that procedures for London City/Biggin Hill had been in use for several years and were designed when lower performance ac such as DHC-8 were the norm and traffic levels for both airports, but in particular London City, were considerably lower. Things had moved on and operations now involved higher performance ac, such as SAAB 2000, plus increased traffic levels. Moreover current procedures routed airway traffic, inbound and outbound, to airfields served by Thames Radar at the same level. As a result of these differences and increasing congestion ATSI had recommended that the ATC procedures were reviewed to provide procedural separation for IFR airways traffic and this was endorsed by the Board.

An ATCO Member agreed that the procedures were complicated by traffic departing on Gatwick SIDs climbing to 5000 ft and Heathrow SIDs to 6000 ft while City/Biggin Hill traffic climbed to 4000 ft. Members wondered why the TC controllers had not contacted the Thames Radar controller when the STCA activated at LATCC and why the TC controller thought that STCA was installed at Thames Radar. The Board were informed that TC controllers were used to observing STCA alerts from Thames traffic owing to the complexity of current procedures compounded by alerts caused by VFR traffic squawking 7000 in that area. Further advice was given that NATS was investigating the installation of STCA into Approach units but some software incompatibility problems existed with radar display systems. Additionally, long term plans for Thames Radar may include integration into LATCC, which would render STCA installation at Thames Radar's present location unlikely.

The Board also wondered why the separation achieved between the 2 ac was only 400 ft after the pilot had received a TCAS TA followed by RA. Subsequent advice explained that in following TCAS indications to achieve 'a solution' to an 'RA', pilots could expect to experience safe vertical separation distances of between 200 to 500 ft. In this instance, the 400 ft achieved was therefore fairly typical. Once the TCAS 'solution' had been achieved, pilots should then recover to their assigned level/altitude. Additionally, ATC should be informed about the deviation as soon as pilots were able to do so. Members went on to discuss recommended techniques with TCAS. Attempts to acquire traffic visually instead of reacting to an RA could significantly degrade separation criteria. It could also lead pilots to seeing traffic that was not the subject of the TCAS warning.

The Board agreed that the Thames Radar controller had been preoccupied with the first pair and then the single Jaguar departing from Biggin Hill which distracted him from his London City tasks. It was acknowledged that the holding patterns for London City and Biggin Hill at ALKIN and SPEAR were less than ideal because usage by Thames Radar required co-ordination, sooner rather than later, with LATCC TC. This reinforced the point raised by the ATSI Recommendation.

The Board were clear that the cause of this incident was that the Thames Radar controller did not separate the DHC8 and BA46. As to the risk, the Board concluded that TCAS had alerted the BA46 pilot and the 400 ft separation achieved, which was within the design parameters of TCAS, had removed the risk of collision. The pilot's inability to advise Thames by RT of the TCAS alert was noted but this did not affect the outcome.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Thames Radar controller did not maintain standard separation between the BA46 and DHC8.

Degree of Risk: C

AIRPROX REPORT No 146/00

Date/Time: 16 Sep 1144 (Saturday)

Position: 5146N 0043 W (1 NM SSE Halton - elev 370 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: LS 6C glider PA28

Operator: Civ Club Civ Club

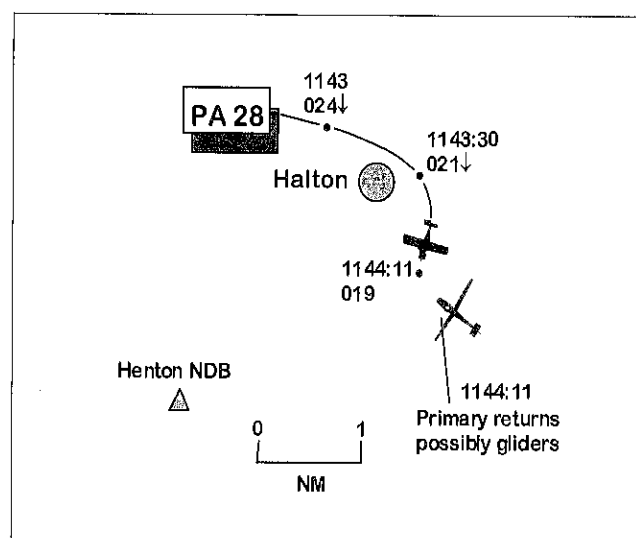
Alt/FL: 1500 ft NK
(QFE 997)

Weather: VMC CLBC VMC

Visibility: >10 km 7 - 10 km

Reported Separation: 100 m H / 0 ft V // 500ftV

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS6C GLIDER PILOT reports operating in the Halton Aerodrome ATZ at 45 kt, 1500 ft QFE 997 (QNH 1011) on a solo flight. He was receiving a listening watch from Halton Radio on 130.42. The visibility was >10 km, 700 ft below cloud in VMC. The glider was white with blue marks. Whilst ridge soaring just SE of the aerodrome, he commenced a lookout scan over and behind his left wing for any traffic owing to an anticipated L turn away from the ridge towards the airfield. Nearing completion of the scan L to R, another pilot reported an ac in conflict which he saw 200 m away heading straight towards him at the same level. The ac appeared to commence a L turn so the glider pilot turned L and commenced a dive, passing 100 m clear horizontally at the same level. The other ac was a low wing single engine type with fixed uc

mainly white in colour with red cheat lines. He assessed the risk of collision as high. No RT calls were heard from the conflicting ac as it flew through the ATZ.

THE PA28 PILOT reports flying on a dual instrument sortie in the Aylesbury area using I/F screens. He was receiving a FIS from Oxford APP on 125.32 squawking 7000 with Mode C. The visibility was 7-10 km in VMC and his ac was white with blue and orange marks - wing tip strobe and anti collision lights were on. The student had just completed a descending turn onto a westerly heading with some degree of difficulty and the instructor allowed his attention to focus in the cockpit to the detriment of maintaining a good lookout. He also unintentionally allowed the ac to drift into the Halton ATZ. He saw a glider ahead and below by 500 ft and initiated a climbing L turn to the S and considered that there had been no risk

of collision when sighting the glider, albeit late, but he states that the glider may have already taken avoiding action.

UKAB Note (1): Replay of the Heathrow radar at 1143 shows a 7000 squawk, believed to be the PA28, turning onto a SW track in the Halton ATZ and descending from 2400 ft to 1900 ft Mode C (1900 ft Mode C equates to 1468 ft QFE). At 1144.11 the ac passes close to 2 intermittent contacts within the SE 'corner' of the ATZ on a steady track. The encounter as described in both pilots' reports was not observed on the radar recording.

UKAB Note (2): The UK AIP at ENR 2-2-3-3, promulgates the Halton ATZ, active in Summer 06 - 1800, as a circle radius 2 NM centred on 51°47'34"N 000° 44' 16"W, from surface to 2000 ft above the aerodrome elevation of 370 ft.

UKAB Note (3): The UK AIP at ENR 5-5-1-1, promulgates Halton as a Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered to 2000 ft agl, during daylight hours.

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.

A pilot member drew attention to the PA28 instructor who had inadvertently allowed his ac to penetrate the Halton ATZ while his student was flying under simulated IFR using I/F screens. The instructor had admitted to 'drifting into the ATZ', which was active with glider flying, because he let his attention focus inside the cockpit, to the detriment of maintaining a good lookout. This was a salient learning point and members applauded the instructor's honesty. Moving on, members tried to understand the discrepancy in relation to each of the pilot's reported sightings. The PA28 instructor

had seen a glider ahead and 500 ft below, albeit late, as he initiated an avoiding L turn. However, the glider pilot flying at 1500 ft QFE had reported the PA28 at the same level. The radar replay shows the PA28 at 1900 ft (1013 mb) which would equate to approx. 1470 ft QFE and this led the Board to wonder if the PA28 pilot had seen the reporting glider, or another one that was in the area, or had misjudged the sighting distance. In the absence of any other information this anomaly remained unresolved. Members were aware of the instructor workloads in carrying out training sorties but thought that sorties of this nature, particularly when flown at a weekend, should be planned and executed well clear of active gliding sites. Taking the facts and the reported sighting anomalies into account, the Board came to the following conclusion: on the balance of probability, the PA28 pilot had flown into conflict with a glider, perhaps the subject ac, during an inadvertent penetration of the Halton ATZ.

As to risk, the glider pilot reported a late sighting of the PA28 at his level following an RT warning from a fellow glider pilot. After turning L and commencing a dive, the best practical evasive manoeuvre option open to him at the time, he said he passed 100 m clear of the PA28 at the same level. With this in mind and with no assurance that the PA28 instructor had seen the subject glider, but perhaps another one, a view formed that the glider pilot had done enough to avert any risk of collision, but in doing so the safety of his ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following inadvertent penetration of the Halton ATZ, the PA28 pilot flew into conflict with a glider.

Degree of Risk: B

AIRPROX REPORT No 147/00

Date/Time: 17 Sep 1304 (Sunday)

Position: 5148 N 0044 W (Halton Aerodrome
- elev 370 ft)

Airspace: ATZ (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	Ka13 Glider	C172
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<u>Operator:</u>	Civ Club	Civ Pte
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<u>Alt/FL:</u>	700 ft ↑ (QFE 998 mb)	1400 ft (RPS 1006
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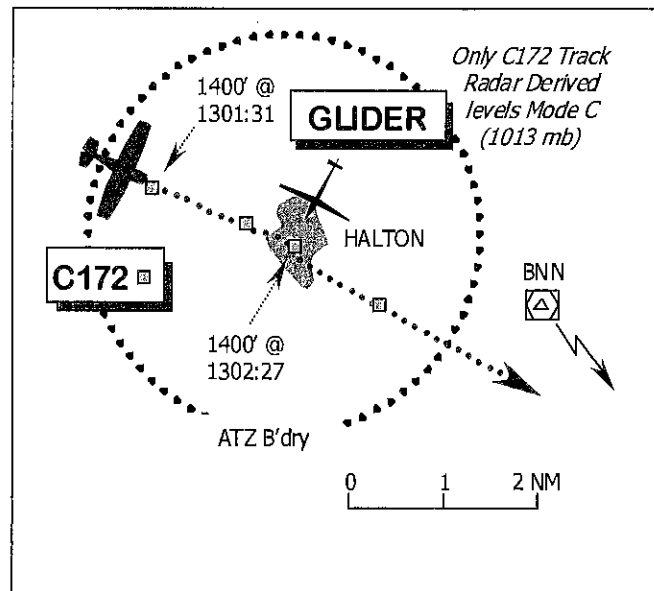
mb)

<u>Weather:</u>	VMC CLBC	VMC CLBC
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<u>Visibility:</u>	10 km	6-8 km
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Reported Separation: 300 ft V, 200 m H
Not Seen

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KA13 GLIDER PILOT reports that he was being winch launched at Halton Aerodrome heading 200 (M)° at 60 kt for an instructional sortie with a student. He climbed to 700 ft Halton QFE (998 mb) on the winch, about 800 ft below cloud, when the winch driver spotted a single engine high wing light ac overflying the launch area heading about 125° (T) and aborted the launch. He saw the other ac at about the same time as the winch operator. The light ac passed about 200 m astern and about 300 ft above his glider at the closest point with a high risk of a collision. His workload was high after the launch was aborted, but the student was not aware of the other ac at all.

The Air Cadets Duty Officer reported the Airprox to Luton ATC who tracked the ac to Denham Aerodrome where it was identified on landing.

THE C172 PILOT reports that he departed Oxford aerodrome intending to route via the Westcott (WCO) and Chiltern (CHT) NDBs, and thence to Denham at 1400 ft RPS. At WCO he tried to tune in the CHT but without success. Therefore, he decided to route via the Bovingdon (BNN) VOR heading 120°(M) at 90 kt, whilst under a "FIS" from Denham Information, squawking 3/A 7000 with Mode C. Another pilot was doing the map reading and

did not mention that this revised route would take them past Halton, but when he saw the aerodrome it was too late to turn back. He reports that the clouds were low, causing him to fly at an "altitude lower than usual", with a visibility of 6-8 km, but "the distance below cloud varied". He kept looking out but did not see any conflicting traffic at all. He thought that there would have been no gliding activity because of the weather.

UKAB Note (1): From Meteorological Office archive data the Cotswold and Chatham RPS for the period was 1006 mb (the dividing boundary runs overhead Halton)

UKAB Note (2): The UK AIP at ENR 2-2-3-3, promulgates the Halton ATZ, active in Summer 06 - 1800, as a circle radius 2 NM centred on 51°47'34"N 000° 44' 16"W, from surface to 2000 ft above the aerodrome elevation of 370 ft. Halton Radio, the A/G Station, is available on 130.425MHz.

UKAB Note (3): The UK AIP at ENR 5-5-1-1, promulgates Halton as a Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered to 2000 ft agl, during daylight hours.

UKAB Note (4): A review of the Heathrow radar reveals only the track of the C172, the Glider is not shown at all. The C172 is shown tracking

diametrically through the Halton ATZ, directly toward Bovington (BNN), maintaining 1400 ft Mode C (1013 mb). The C172's indicated level equates to 950 ft Halton QFE (998 mb), suggesting the vertical separation was in the order of 200 ft and generally in accord with that reported by the glider pilot.

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.

A BGA member explained that the glider would have been difficult for the C172 pilot to spot as it rose very steeply during launch. Moreover, the high nose attitude makes lookout difficult for the glider pilot who had done well to spot the other ac himself. Members were advised that usually someone on 'wingtip' lookout performed a visual search all round before the launch, confirmed all was clear, before signalling the winchman to execute the launch. In this instance the wingtip man apparently did not spot the C172, but it might have been obscured from the launch position, appearing low on the horizon at about 950 ft aal. Furthermore, as it was heading directly toward the aerodrome there would have been little lateral movement to draw attention to it and, being up-wind, its engine noise may have been muted. Clearly the winchman did well to spot the C172 in this situation and abort the launch; the Board commended his alertness and prompt reaction. Considering that the winch wire probably posed an even greater threat to the C172 than the glider, his actions undoubtedly forestalled a more difficult situation.

The C172 pilot's belief that there would be no gliding at Halton because of the weather revealed a dangerous assumption, which was wrong - assumptions in aviation can quickly lead to incidents such as this. Here was another occurrence that caused GA pilot members concern; the pre-flight planning conducted by the C172 pilot revealed some significant shortcomings. His original planned track from the WCO to the CHT NDBs would have passed through the SW quadrant of the Halton ATZ. His revised track from WCO to BNN took him even closer to Halton and the radar recording revealed that he passed diametrically through the ATZ and directly over the aerodrome at a height of about 950 ft aal. This poor appreciation of the airspace along his route was unimpressive. Whilst clearly the ATZ

boundary is not a 'brickwall' to transiting ac, pilots must comply with the appropriate procedures to ensure safe entry. In this instance the C172 pilot had apparently made no effort to contact Halton RADIO, and if he had done so he would have learned that gliding was in progress. Although another pilot was doing the map reading, he was the 'Captain' and remained responsible for the safe navigation of the ac. Some members believed he was placing too much reliance on 'Beacon to Beacon' navigation whilst flying in conformity with the VFR and not enough attention to the map and the airspace he was flying through. Halton, with its associated ATZ, is clearly marked on both 1:500,000 & 1:250,000 CAA VFR charts, with the additional warning of "*Intense Gliding*" activity, and this should have been readily apparent to the C172 pilot with even a cursory glance at the chart. Having entered the ATZ he recognised that he was approaching Halton, apparently too late to turn back and then flew directly over the launch area into conflict with the glider which he was unaware of. Weighing all these factors, the Board agreed unanimously that this Airprox was caused by the C172 pilot who entered the Halton ATZ and flew into conflict with the launching glider, which he did not see.

Turning to risk, the radar did not detect the glider, therefore, the minimum horizontal separation could not be measured, but it was evidently a close encounter. The glider pilot reported the maximum height he attained was 700 ft QFE about 250 ft below the C172's equivalent Mode C height. Fortunately the alert winchman had aborted the launch at the same time as the glider pilot spotted the Cessna. However the C172 pilot was unable to effect the outcome, and it was fortunate that he passed astern of the glider and not between it and the winch. Hence, the members concluded that the safety of the subject ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C172 pilot entered the Halton ATZ and flew into conflict with the launching glider, which he did not see.

Degree of Risk: B

AIRPROX REPORT No 148/00

Date/Time: 15 Sep 1440

Position: 5113 N 0038 W (8 NM SW OCK)

Airspace: LTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: B737 G4

Operator: CAT Cív Exec

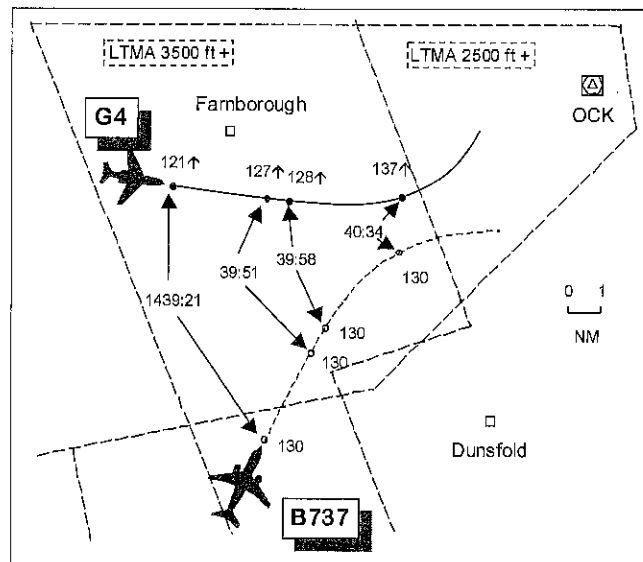
Alt/FL: FL 130 áFL 130

Weather: VMC VMC

Visibility: 50 km >10 km

Reported Separation: NK/500 ft V,2-3 NM H

Recorded Separation: 1.85 NM/700 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying inbound to Luton from Barcelona heading 035° level at FL 130 at 280 kt. The visibility was 50 km in VMC. The LATCC TC controller issued an avoiding action R turn onto heading 090° with the conflicting ac reporting a TCAS RA; the other ac was not seen.

THE G4 PILOT reports en route from Farnborough to Rotterdam climbing to FL 130 heading 110° at 300 kt. The LATCC controller was heard to issue an avoiding action R turn to another ac on frequency. The G4 pilot was then given an avoiding action L turn onto heading 360° which was followed shortly by a TCAS RA alert to climb with which he complied. The other ac passed 2-3 NM clear to the SE and 500 ft below.

ATSI reports that the TC Ockham Sector Controller (TC OCK SC) stated that he had felt overloaded at the time of the Airprox and a consequent interim overload report by ATC Investigations (ATCI) at LATCC was referred to as part of this analysis. At interview the TC OCK SC said that it had been his fifth day of a work cycle and, although he felt adequately rested prior to the duty, there was always a reservoir of fatigue at that stage of a work cycle. At the time of the Airprox, he had been in position for 70 minutes which he felt was longer than he would have expected but as he was with another watch he had made no issue of it. The Group Supervisor stated, at interview, that 90

minutes on a position was normal at that time of day, on that watch, in order to allow for those applicable to perform extraneous ATC duties.

UKAB Note (1): The TC OCK position was banded with SW Departures.

At 1433, the sector was quiet and operating normally. In the 9 minute period between 1434 and 1442 a total of 16 ac entered the sector. At interview, the TC OCK SC stated that his preferred method of operation was to arrange his Flight Progress Strips (FPS) in such a way as to provide him with a representation of how he would expect to see the traffic. When new strips arrived, he would assess the implication of that ac in terms of the traffic situation and would place it in the relevant place on the display board. However, on this occasion, the FPSs arrived with such speed that, with the ac calling as well, he did not have time fully to assimilate the relevance of new strips and was forced to control by reaction and with reference primarily to the radar. This, he stated, was a modus operandi which was alien to him.

The B737, en route from Barcelona to Luton, called the Ockham sector at 1435.10. The pilot reported descending to FL 130 to be level abeam HAZEL and on a radar heading of 035°. The position of the ac was to the E of the track that would normally be expected for a Luton inbound and the heading would route it over Heathrow instead of to the W, via Woodley. The TC OCK SC considered this situation and decided to keep the B737 on its radar heading

to allow a more expeditious descent against 4 other ac which were due to enter the W of the sector heading S. He also noted that it would provide an earlier track crossing with a Heathrow departure on a Southampton SID.

The G4, en route from Farnborough to Rotterdam, established communication with the TC OCK SC at 1435.20. The flight was climbing to 4400 ft towards Compton in accordance with the joining instructions issued by TC. The TC OCK SC stated, at interview, that he applied the same logic to this ac as with the B737, namely that it would be more expeditious to climb initially to the E as there were several conflicting ac southbound on the W side of the sector. Thus he instructed the G4 to turn L, the long way round, onto a heading of 105° and to climb to FL 100. It was shortly after this that the TC OCK SC recalled that FPSs started arriving in a "deluge". At an approximate time of 1435, the TC OCK SC requested the TC South Co-ordinator to relieve some pressure which was done by slowing down, and eventually stopping, LTMA and Solent CTA outbounds and, at 1437, assistance was requested.

UKAB Note (2): The TC South Co-ordinator informed the Group Supervisor South that the TC OCK sector needed to be split.

At 1436:20, the TC OCK SC instructed the Heathrow departure on a Southampton SID to climb to FL 150 and transferred the ac to another sector in accordance with his plan. At 1437:30 he instructed the G4 to climb to FL 130, aiming to achieve the co-ordination agreed with the London Middle Sector, to climb to FL 170 on track to Bovington. In the next 2 minutes, 6 further ac called the sector and it was during an exchange between the TC OCK SC and another Heathrow outbound routeing W, about weather avoidance, that he noticed the confliction between the G4 and the B737. At 1439:50, the TC OCK SC issued avoiding action instructions to the B737 to turn right immediately heading 090° followed, at 1440:10 with avoiding action to the G4 to turn L heading N. The G4 reported "having the traffic" and the TC OCK SC responded with climb instructions to FL 170. On transfer to the next sector, the pilot of the G4 reported that they had responded to a "TCAS climb". As the TC OCK SC was issuing avoiding action instructions to the 2 ac the Group Supervisor plugged into the position to assist the controller in

the "Man and Boy" mode as it was considered too complicated to split the sector and achieve any short term benefit. This was continued until 1449, when the controller was relieved by which time the sector had returned to normal.

One of the operational responsibilities of the TC Traffic Manager (TM) is to monitor traffic flows in the TC area of operations and to respond with appropriate strategic action to ensure that TC sectors do not become overloaded. To this end, and to provide traceable evidence of action taken, there is also a requirement to keep a comprehensive log of all flow actions and a supporting rationale.

A copy of the TM Log for the afternoon shift was produced by the Traffic Manager. In it was a thunderstorm warning until 1700, later extended to 2100. An aftercast obtained from the Meteorological Office showed a front lying from Worthing to Cromer with another, much smaller, on an axis from The Wash to Southampton. A TM log entry, at 1440 showed that Gatwick Southampton and Heathrow Kennet departures, plus Heathrow Southampton departures, had been stopped for 15 minutes owing to weather and traffic complexity. This coincided with the Airprox.

Meanwhile at 1203, an entry in the AC Flow Manager's log recorded a rate of 38 ac per hour for the AC Hurn sector valid until 1830 hr. This sector abuts TC Ockham to the SW and, in general, handles traffic inbound to and outbound from the LTMA and Solent area. At 1347, just under an hour before the Airprox, the rate for AC Hurn was increased to 48 ac per hour.

A reconstruction of the Traffic Load Prediction Device (TLPD) data showed that, at 1359, there had been a large "spike" of demand, with the 22 ac on the TC Ockham sector for the period 1430 to 1445. This was 10 ac (83.3%) more than the 12 which would normally be expected in a fifteen minute period and the 'peak' moved towards the active time gradually, changing bias from forecast to actual. The TC Traffic Manager was questioned about this "spike" and responded that it would not have been displayed on his machine as there was insufficient time to view individual sectors in TC. He added that the tendency was to check TMA

sectors in quadrants, i.e. SW, NW etc., so that although there was a significant over delivery on TC Ockham, when this figure was combined with TC SW Departures and TC Willow, the figures averaged out and thus no problem was evident.

When asked about the TLPD display and whether there was any warning available of excess of traffic (e.g. by forcing this through onto the display), the Traffic Manager said that he was aware of the existence of such a program, but as he had not had any formal training in operating the equipment, he felt unsure about it and had left it inoperative. Furthermore, he believed that it was set with too low a threshold and thus would give too many spurious warnings. He also stated that because of his other operational and managerial duties, he only performed about 3 duties per month on the Traffic Manager position; this allowed little time to familiarise himself with the operation of the various pieces of equipment.

The Traffic Manager went on to say that unlike Area Control, there was no requirement in TC to reduce the flow of traffic when there were thunderstorm warnings in force.

The Group Supervisor was asked whether there was any other way in which the overloaded controller could have been assisted. He replied that he had been unaware of a problem until he heard the avoiding action instructions. At that stage he had immediately paged the spare controller and then plugged in to operate TC Ockham "Man and Boy". When asked whether any traffic could have been off-loaded to the WILLO controller, who was reported to be lightly loaded, the Group Supervisor explained that the controller in that position had only recently qualified and was relatively inexperienced.

As a consequence of this incident, ATSI made a Recommendation.

UKAB Note (3): Replay of the LATCC radar shows at 1439:21 the G4 2.7 NM SW of Farnborough tracking 100° climbing through FL 121 with the B737 9 NM SSE of the G4 tracking 030° maintaining FL 130. At 1440:14 the B737 is seen to commence a R turn whilst the G4 passes 3 NM to the N at the same level. The G4 is then seen to commence a L turn and continue the climb, the point of closest

approach occurring at 1440:34 when the ac are on parallel tracks 1.85 NM apart with the G4 700 ft above the B737.

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.

An ATC advisor explained that the program mentioned on the TLPD (to show a warning on the display) was a recently introduced function by the FMU that was on evaluation and as such, no formal training would have been given. The TC TM's method of viewing sector traffic levels in quadrants was commonly adopted; although viewing individual sectors in TC, in 15 minute time frames, was available, this was not very practical because it was far too time consuming. However, if individual sectors had been looked at, this would probably have revealed the 'spike' on the OCK sector to the TM. That said, it was unclear if any one action i.e. splitting the sector or off-loading traffic to adjacent sectors would have helped during the period of high traffic intensity. The GS would have had the option to slow outbound traffic flow levels by imposing Minimum Departure Intervals (MDIs) at Heathrow and Gatwick to balance inbound traffic levels. However, the flow rates for AC sectors, which abut TC sectors, were set by the AC Flow Manager; what had happened in this incident was that a large proportion of the flow rated traffic appeared within a 15 minute period on the SW TC sectors. The Board noted that, on the date of the incident, there had been no requirement to impose flow restrictions in TC whenever a thunderstorm warning was in force. This requirement had since been changed to align with AC procedures. An ATC member commented on the track given to the G4 outbound from Farnborough which would normally have been routed to the W and N of London via CPT-BPK through the N sectors of TC. By vectoring the ac back to the E, the controller had probably created more work for himself than was necessary in trying to achieve previous co-ordination that had been agreed with the London Middle Sector. In the end, for whatever reason, traffic levels were higher than

expected and it was during this period that the TC OCK SC unwittingly climbed the G4 into conflict with the B737.

The ATSI advisor informed members that after their investigation, ATSI had recommended that a more formalised training programme for Traffic Managers should be introduced with a view to achieving an improved, uniform standard of competence; this was endorsed by the Board.

Some members were also concerned that the Human Factors element of fatigue might have contributed in some way to this incident. The controller concerned had worked the sector for 70 minutes since his last break, longer than he expected, although it was accepted that SRATCOH limits at TC of 90 minutes had not been exceeded. It was also noted that the controller was on his 5th day of his 6 day cycle and was working on a different Watch. Nevertheless, members agreed the onus was on the controller concerned to assess whether

he was fit for duty before commencing the shift. One member wondered if this arrangement produced the best answer.

Finally, with regard to risk, the Board concluded that despite the confliction, the timely avoiding action instructions given by the TC OCK controller and the TCAS RA executed by the G4 had combined to remove any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: During a period of intense traffic activity, the TC OCK SC climbed the G4 into conflict with the B737.

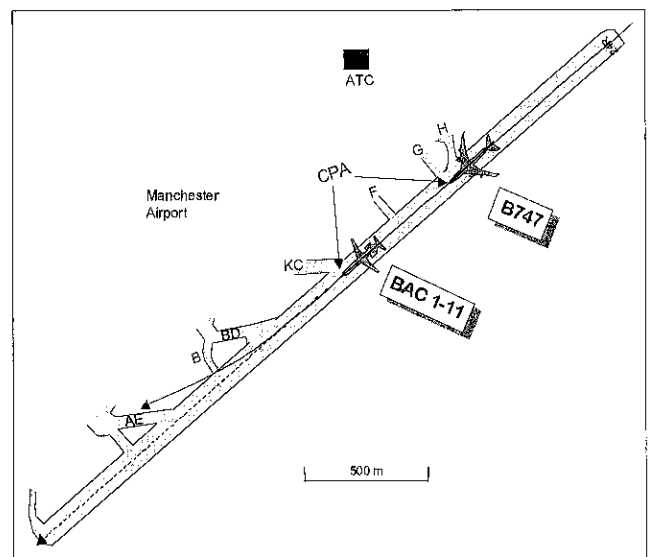
Degree of Risk: C

Recommendation: The UKAB invites the CAA to consider conducting a review of the formal training programme for LATCC Traffic Managers.

AIRPROX REPORT No 149/00

Date/Time: 16 Sep 0716 (Saturday)
Position: 5321 N 0216 W (Manchester Airport)
Airspace: CTZ (Class: D)
Reporter: Manchester ATC

	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	BAC 1-11	B747-41
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	Take-off	Go around
<u>Weather:</u>	VMC CLBC	VMC CLBC
<u>Visibility:</u>	22 km	NK
<u>Reported Separation:</u>		NK
<u>Recorded Separation:</u>		480 m



PART A: SUMMARY OF AAIB AND ATSI REPORTS

UKAB Note: The incident took place before Manchester's second runway (24L) was in use.

THE AIRPROX. At 0711 the BAC 1-11 was cleared by the Manchester tower controller to taxi to the holding point for RW 24R. At 0713 the controller cleared the pilot to line up after a landing A320. Following this ac on the ILS approach to RW 24R was the B747, inbound from Amsterdam. After

checking in on the tower frequency the B747 crew had informed the tower controller that *"we're heavy and we'll be using the whole runway"*.

After landing the A320 was slow to vacate the runway and so the controller instructed the crew to *"expedite to the right and contact ground 121.85"*. He also transmitted to the BAC 1-11 to be *"ready when cleared"*. The crew of the A320 did not clear the runway in the time expected by the controller so, although he had instructed the crew to change to the ground frequency he transmitted *"... could you expedite the rapid exit"*. The A320 crew, who were fortunately still on the tower frequency, were able to confirm that they would.

As the A320 vacated the runway at AE, the second rapid exit turnoff (RET), the controller cleared the BAC 1-11, which by now was lined up, for take off. Its pilot was aware of the heavy B747 on finals and commenced his take off roll immediately. At this time the inbound B747 was at approximately 1 mile from touchdown and the controller asked the B747 commander if he could see the 'rolling' One Eleven. The B747 commander advised that he could. The controller reported that 'the One Eleven's acceleration appeared to him to be very slow whilst the approaching B747 appeared to be surprisingly fast so much so that it would reach the start of the runway whilst the One Eleven was only some way along it'. At this point the controller issued a 'cleared to land after the departing' clearance to the B747 as, in his opinion, it seemed marginally safer than to instruct an ac to 'go-around' with another ac departing at the same time.

As the B747 reached the runway threshold markings the commander initiated a go-around from approximately 50 feet agl transmitting *"On a go-around (C/S) and we'll start a right turn to miss the traffic"*. At this point the BAC 1-11 was some 400 m ahead of the B747 and had not yet reached rotate speed when this call was made. The controller replied *"roger that's a right turn"*. As the B747 began to climb and diverge slightly from the departing BAC 1-11, which by now was airborne and climbing slowly, the commander of the B747 transmitted *"tell us what you advise, we cannot see that traffic"*. The controller replied that the traffic was clear to the left. The commander of the B747 then remarked *"Ok what do you want now?"* The controller responded by clearing the B747 onto a

heading of 330° climbing to 3,500 feet and coordinated that with approach control. The B747 continued under approach control and was radar vectored for a further ILS approach, landing without further incident at 0728.

The BAC 1-11 pilot was aware of the B747 overhead and continued to climb after hearing its pilot being told to turn right. He turned left at 2 DME in accordance with the SID and changed frequency. It was not until their return to Manchester that the crew of the BAC 1-11 were told by ATC that the B747 had come exceptionally close to their aircraft during take off. His ac was not equipped with TCAS.

Surface movement radar information, recorded at Manchester, showed that the B747 was 1.5 NM from the threshold as the A320 vacated the runway. As the BAC 1-11 commenced its take off roll the B747 was at 0.5 NM from the runway threshold. The B747 crossed the threshold as the BAC 1-11 passed link 'H' (a separation distance of 850 metres). As the B747 crossed the touchdown zone the BAC 1-11 was half way between link 'G' and link 'F' giving an approximate separation distance of 860 metres. As the B747 passed abeam link G the BAC 1-11 was abeam link 'KC' (approximate separation distance 480 metres). Then as the B747 passed abeam KC the BAC 1-11 was approaching link B (approximate separation distance of 700 metres). Finally the SMR showed that the B747 turned away to the right as it passed abeam link 'B'.

ATSI reports that the Air Controller described his workload as light to moderate at the time of the Airprox. The movement rate for the period 0645 to 0745 was confirmed as 42 flights per hour. (The contracted rate between NATS and the Airport Operator is 46 movements per hour, although, depending on various factors, a rate of 50 per hour is not uncommon.)

The Manual of Air Traffic Services (MATS) Part I, Page 2.9, states that: "Unless specific procedures have been approved by the Authority, a landing aircraft shall not be permitted to cross the beginning of the runway on its final approach until a preceding aircraft, departing from the same runway, is airborne". Manchester has been approved, by the Authority, subject to certain conditions, to use a "Land After Departure" procedure. The Manchester Aerodrome MATS Part 2, Page ADC 2.7, stated

(now p 2.10) that: "When the runway is temporarily occupied by departing traffic, landing clearance may be issued to an arriving aircraft provided that, at the time the landing aircraft crosses the landing threshold of the runway-in-use, the following minimum separation distances will exist : Either a) The departing aircraft will be airborne and at least 2000 metres from the landing threshold or b) The departing aircraft will not be airborne but will be at least 2400 metres from the landing threshold. The Air Controller is responsible for assessing that the specified separation minima will be achieved. The final responsibility to accept the landing clearance remains with the pilot". Under the conditions for the use of the procedure the MATS Part 2 goes on to state that : "These procedures shall only be used when ALL the following apply:

- a) By DAY
- b) When the reported meteorological conditions are equal to or better than a visibility of 6 km and a cloud ceiling of 1000 ft and the Air Controller is satisfied that the pilot of the landing aircraft will be able to observe continuously the departing aircraft.
- c) When both aircraft are being operated normally (e.g. at normal approach speeds, no emergency etc). The pilots are responsible for notifying ATC if they are operating their aircraft other than normally, e.g. final approach speed greater than 160 kt.
- d) When the runway is dry and free of all precipitants such that there is no evidence that the braking action may be adversely affected.
- e) When the Air Controller is able to assess the separation visually".

The BAC 1-11 was departing 24R on a Conga 1R SID (climb straight ahead to the MCT, DME 2 miles, to turn left onto a track of 163°M, climbing to 5000 feet). At 0713, the flight received an instruction to line up and wait after the next landing aircraft, an A320. When the B747 pilot, on final, was passed the surface wind (320°/9 kt) and replied "..... we're very heavy and we'll be using the whole runway", the Air Controller explained that he did not appreciate, at the time, the significance of this statement, relative to its effect on the aircraft's approach speed i.e. higher than normal. He considered the fact that it would be using the whole runway would be more likely to affect the traffic

situation between the next arriving and departing aircraft, rather than that between the subject aircraft. He said that, after the A320 landed, although it slowed down to take the Rapid Exit Taxiway (RET) at Bravo Delta, it missed the turning. He instructed the aircraft to expedite to the right and to contact Ground Control. The pilot read back the instruction but did not mention the need to expedite. By this stage, the Air Controller realised that the situation was tight and advised the BAC 1-11 to "be ready when cleared". The A320 was again instructed to expedite clearing the runway, this time on the RET.

As soon as the A320 vacated the runway at AE, the BAC 1-11 was cleared for take-off at (0715:32) when the B747 was 1.5 NM from touchdown. The Air Controller said that he did not use the term "immediate take-off" because, as far as he was concerned, he had already primed the pilot to make an expeditious departure. The controller realised that the situation would be very tight but was reassured when, after he had informed the pilot of the B747 about the departing aircraft, the latter had replied that he had "the rolling aircraft in sight". The B747 was then cleared to land after the departure. The Air Controller admitted that, when he issued the 'Land After' clearance, he had realised that the laid down criteria, as quoted above, would not be met. However, he had believed that the B747 would have sufficient space to land and, consequently, it would be the better option as, not only would it save a heavy aircraft from having to carry out a go-around at the last moment but also it would prevent the subject aircraft both being airborne, in the vicinity of the runway, at the same time. Nevertheless, the pilot of the B747 reported that he was going around and was starting a right turn to miss the traffic. Coincidentally this turn took the aircraft away from the SID routing of the departing aircraft. (The standard missed approach procedure is to climb straight ahead to 3500 feet, then as directed by ATC.) The controller replied : "Roger that's a right turn". He explained that he did not pass any instructions to the pilot because he reasoned that the crew would be preoccupied, at least initially, with the go-around. When the pilot of the B747 reported that he had lost sight of the traffic, the controller informed him that it was clear to the left but he still did not pass any heading or altitude instructions to the flight. Consequently, the B747's pilot asked what the controller wanted him to do next. The controller replied by instructing the flight to take up a heading

of 330°, climbing to 3500 feet. This clearance was co-ordinated with Approach Control and the aircraft was transferred to the Director's frequency, albeit at the second attempt, as the pilot did not act on the first transmission. No calls were made to or from the pilot of the BAC 1-11 from the time it was cleared for take-off, until it was transferred to the STAFA Sector frequency at 0717.

In accordance with normal operating procedures at Manchester to facilitate the integration of arriving/ departing aircraft, the Air Controller was entitled to expect that the Approach Radar Controller would position the B747 6 NM behind the A320, rather than the 5 NM that was achieved. However, although not an ideal gap in the circumstances, it was still incumbent on the Air Controller to determine whether the spacing provided could be utilised for a departing aircraft.

Following a previous incident involving the Land After Departure procedure at Manchester, the local NATS ATC Operations Section issued a Supplementary Instruction (S/I) on 21 June 2000, entitled "Best Practice". It reiterated the fact that the controller has the responsibility for assessing that the required distance between a landing aircraft and the previous departure exists and provided some information on aircraft speeds in the last 2-3 miles of the approach. Additionally, the following guidance was included: "When a 'Land after Departure' clearance is being considered, a decision must be made that the required separation will be achieved. If it will not be achieved, then missed approach instructions must be issued and consideration given to stopping the departing aircraft. The point at which this decision should be finalised is around 2 NM from touchdown, after taking into account all the relevant factors. A missed approach from this range, with an aircraft just commencing its departure roll, is much easier to resolve at this stage than later on short finals". Since this incident, a notice was issued on 27 September 2000 by the Manager Safety/Quality, reminding controllers of their responsibilities with reference to the Land After procedure and emphasising that it "must not be used to place the responsibility on the pilot when the required separation cannot possibly exist".

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted of the AAIB and ATSI reports.

Members agreed that the Air Controller had been caught out by a combination of factors including the initial 5 NM spacing on finals, the high speed of the heavy B747, the absence of headwind and the A320 being slower than expected to clear. It was also observed that the Air Controller had told the A320 pilot to expedite his runway clearance and to go to ground frequency in the same transmission; controller members agreed that the expedite instruction required an acknowledgement and, if necessary, repetition, and that the frequency change was probably added as a matter of habit. This was a point with wider ramifications and the Board made a recommendation that the practice should be reviewed. Members were advised of pressures on the controller which would have led him to try to maximise runway usage and agreed he had used the Land After procedure in a situation which by then required a go around instruction to the B747. The Board concluded that the cause of the Airprox was the Air Controller's lack of positive action at that point. Although in the event the B747 never actually caught up with the departing BAC1-11 this was not as a result of deliberate action by anyone, and in view of the fact that the BAC1-11 pilot could not see the B747 at all after he had lined up, and the B747 pilot did not have the BAC1-11 in sight continuously, the Board agreed that the safety of the ac had not been assured.

Members criticised the 'Land After' procedure which required the judgement of distances (prior to making a decision) which could not be measured until the effect of that decision was seen. This led to a wider discussion on the pressures applied by airport managements and airlines to maximise runway utilisation rates during peak times, rather than spread out traffic into less busy periods. These pressures were communicated to pilots and controllers in the form of target runway occupancy times. Consequently pilots were frequently left with

clearances to land which pilot members agreed were often so late as to erode safety margins especially if it resulted, as in this case, in the pilot-going-around losing sight of the other traffic, a hazard of which the Air Controller was aware. Some members suggested that part of the cause of the Airprox was the B747 pilot going around as late as he did, but the Board agreed in the end that an earlier go-around with a 'climb straight ahead' MAP would not have made much difference to the hazard level unless the BAC1-11's take-off had also been delayed. Pilot members pointed out that the runway utilisation pressures were communicated to them because if they felt unable to accept late landing clearances they would be forced into many more go-arounds. They went on to explain that a go-around caused disproportionate disruption not only to the flow of traffic as the ac going around had to be fitted back into the traffic flow but also to airport stand occupancy plans, passenger connections and airline passenger handling. The pressures on aircrews to avoid them continued to mount and the Board concluded that several recent late go-around incidents indicated that these pressures needed to be looked at in the round to ensure that the balance of safety had not been moved too far off centre. Members were advised that a point had now been reached at Gatwick, Heathrow and at Manchester when one runway was in use, where pilots felt there was a clear conflict between flight safety and commercial pressures to reduce runway occupancy times.

Members agreed that the Manchester SI of 21 Jun 00, in suggesting that an ATC land/go around decision should be made at about 2 NM from touchdown was a move in the right direction. Therefore the Board made a recommendation that took this point further; at Manchester and other busy airports ATC should always issue a landing clearance or a go-around instruction by 2 NM finals. It was also pointed out that aircrew orders stipulated

a go around if an approach was not stabilised by a greater distance than this and it was illogical routinely to delay an ATC decision until a point where a go-around could cause greater problems, both for pilots and the management of traffic flow.

Pilot members also queried why the Land After decision factors (Manchester MATS Part 2 p ADC 2.10) were not in Jeppesen /Aerad approach plates, as they were for Gatwick and Heathrow. The UK AIP contains the information for all the major UK airports at GEN 3-3-5 (Types of Service) section 6.3 but not in the AD sections for each airport. Since there are differences for each airport, members considered it would be more appropriate to have the information in the AD sections. Similarly, the requirement to notify ATC if operating other than normally (ie IAS > 160 kt) is included in GEN 3-3-6 but not in the AD (Manchester) pages. The Chairman agreed to follow up these anomalies with the appropriate authorities.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Manchester Air Controller did not take positive action to prevent the ac flying into close proximity.

Degree of Risk: B

Recommendation:

- (1) That the CAA reviews the way ATC instructions are given in sequence to aircraft so that a change of frequency is not given in the same transmission as an instruction requiring an acknowledgement.
- (2) That the CAA considers adopting as policy that controllers should issue either a landing clearance or a go around instruction by 2 NM finals at Manchester and other busy airports.

AIRPROX REPORT No 150/00

Date/Time: 20 Sep 1336

Position: 5206 N 0123W (Shotteswell near Banbury – elev 525 ft)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Denney Kitfox Tornado GR

Operator: Civ Pte HQ STC

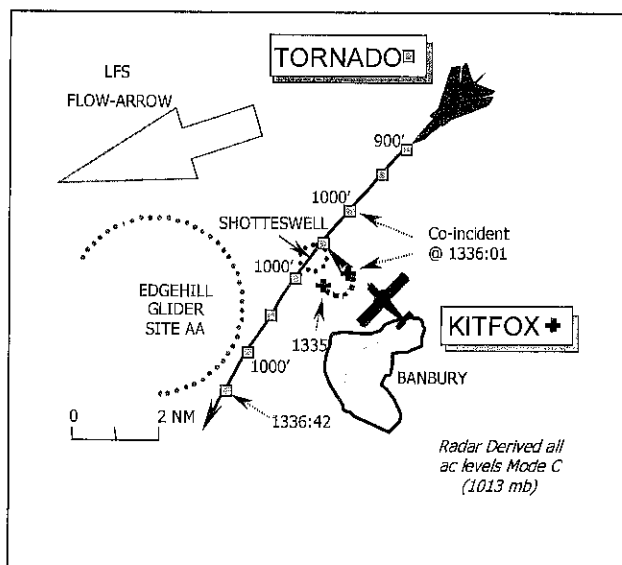
Alt/FL: 600 ft 300 ft
(QFE 982 mb) (Rad Alt)

Weather: VMC CLBC VMC

Visibility: >10 Km Not reported

Reported Separation:
minimal H & 300 ft V 500 m H

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DENNEY KITFOX Mk II PILOT reports that his ac colour scheme is black with a yellow sunburst on the upper mainplane and the HISL was on. He was flying downwind in the circuit for RW15 at Shotteswell aerodrome, N of Banbury. Whilst heading 330° (M) at 60 kt, level at 600 ft QFE (982 mb), he was looking at the RW threshold and planning the turn onto base leg, when he first spotted the camouflaged fast jet. It emerged from under his port side having flown 300 ft below his ac with minimal horizontal separation and with a "fairly high" risk of collision. He adds that no avoiding action was taken as the jet was already clearing to the SW when first seen.

THE TORNADO GR1 PILOT reports that his ac was standard camouflage grey/green; HISLs were on and he was squawking 3/A 7001 with Mode C, whilst in transit to Sennybridge Danger Area for a reconnaissance task at 300 ft Rad Alt. When abeam Banbury aerodrome, heading 225° at 420 kt, a light coloured single engined ac was seen at about 10 o'clock heading from L – R, but it seemed to him that no avoiding action was necessary as it passed, in excess of 500 m, to port.

HQ STC comments that this was a late acquisition by the Tornado pilot and, although he assessed that avoiding action was unnecessary, he might have been better advised to undertake a positive manoeuvre to increase the separation and reassure the Kitfox pilot that he had been seen.

UKAB Note (1): The UK MIL Aeronautical Planning Document at Vol. 3 Part 1 Pg. 1-2-4-4 (LFA 4) promulgates a warning only of the Light Aircraft Site at Banbury (Shotteswell) - LA11. No Mandatory avoidance criteria are specified for this location.

UKAB Note (2): A review of the Clee Hill radar is inconclusive, as the Airprox is not shown clearly. A primary contact, which is probably the Denney Kitfox is shown at 1335:04, departing from Shotteswell and turning L downwind. The contact fades from radar at 1336:01, when the Tornado is shown clearly at R 2 o'clock - 1.5 NM to the Kitfox, southwest bound indicating 1000 ft Mode C (1013 mb). The Tornado maintains a steady course through Shotteswell at the same indicated level.

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 to some members that the Tornado pilot's chosen route through the narrow gap between the town of Banbury and the Edgehill glider site AA, had unnecessarily boxed him in, thereby causing him to fly unavoidably close to Shotteswell. It might have been better to follow the flow arrow just to the N, to get round the glider site. Nevertheless, members recognised that this was purely a matter of choice. Having decided to fly past Shotteswell, which is marked on the LFC, this did not alter the crew's responsibility for looking out for other traffic and avoiding it, which they did. Although the Tornado pilot had not specified the range at which he had spotted the Kitfox, it seemed to have been quite close, as reinforced by the Command. He had been abeam the aerodrome,

but even so he considered that no avoiding action had been necessary. Conversely, the Kitfox pilot who was flying in the circuit at Shotteswell, had not spotted the Tornado until it had already flown past – effectively making it a non-sighting. Shotteswell aerodrome does not have an ATZ or any other avoidance criteria placed upon it for avoidance by low-level military ac. The Tornado pilot was, therefore, legitimately flying along his chosen route and members concluded that the Airprox was the result of a late sighting by the Tornado pilot and a non-sighting by the Kitfox pilot. As the Tornado pilot was always in a position to turn away to starboard if necessary and avoid the Kitfox by a greater margin, the Board agreed, therefore, that no risk of a collision had existed.

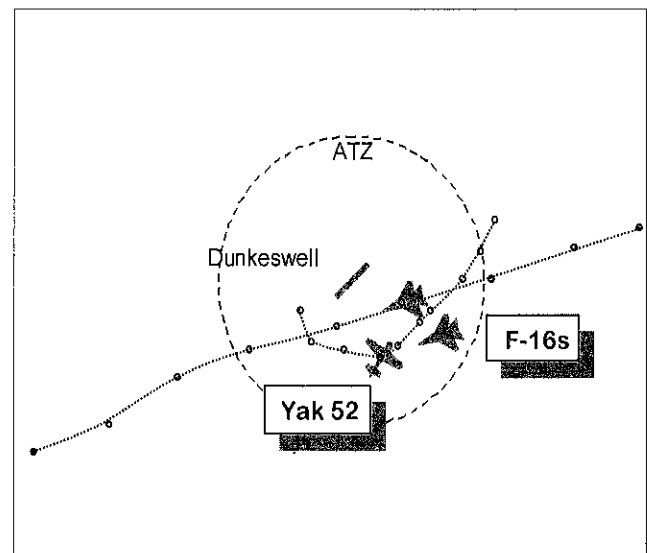
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Tornado pilot and a non-sighting by the Denney Kitfox pilot.

Degree of Risk: C.

AIRPROX REPORT No 151/00

Date/Time: 17 Sep 1226 (Sunday)
Position: 5051 N 0312 W (1 NM SE of Dunkeswell - elev 850 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Yak 52 F16 x 2
Operator: Civ Pte Foreign Mil
Alt/FL: 1000 ft 1000 ft
(QFE 984 mb) (RPS)
Weather VMC CLBC VMC CAVK
Visibility: 10 km+ 10 km+
Reported Separation: 200 ft V/NK
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE YAK 52 PILOT reports heading 050° at 110 kt downwind LH for RW 23 at Dunkeswell when he saw a grey F16 pass along the runway at about 1000-1200 ft agl. Almost immediately a second F16 passed directly above him by about 200 ft, on a

reciprocal track. Its colour had blended with the 2000 ft cloud base. The ATZ was active with light ac, microlights and parachuting and there was no radio call from the F16s. He thought the collision risk had been medium to high.

THE F16 PILOTS report flying a local sortie at 420 kt from Yeovilton at 2000 ft RPS in good VMC, and neither pilot saw the Yak 52.

UKAB Note: LATCC radar recordings show one F16, identified from Yeovilton and Exeter squawks tracking 250° through the Dunkeswell ATZ as indicated in the diagram. A primary only return is intermittently shown about 0.5 NM to its port. The returns pass that of the Yak 52 as described by its pilot, with the northerly one showing Mode C 2000-2100 ft as the ac pass. Taking the pressure (1011 mb QNH) and airfield elevation into account, this equates to 1100-1200 ft agl. The incident is under investigation by HQ P&SS for unauthorised low flying below 2000 ft agl.

MIL ATC OPS reports that the F16s had departed Yeovilton en route for a flypast at Plymouth. Their prenoted departure details were VFR to the SW at 2000 ft and these details were passed by the Approach controller (APP) to Exeter (the next ATC agency along their projected track); APP advised Exeter that the ac would be freecalled to them. On departure, the F16s were provided with the RPS and FIS. When about 15 NM W of Yeovilton, APP instructed the pilots to change squawk and freecall Exeter on 128.15.

About 1 hour later, Exeter ATC called on the landline to enquire if APP had been providing a radar service to the F16s before they were released, as Exeter had received a complaint from an ac at Dunkeswell.

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 ATC authorities.

It appeared that the F16 pilots had not understood that the LFS was not available on a Sunday and that its upper limit was 2000 ft agl, not amsl. These aspects were the subject of a separate investigation. However, the Board was concerned about the infringement of the Dunkeswell ATZ. Dunkeswell has a very busy environment, especially at week-ends, with a variety of co-ordinated aerial activities, into which the insertion of un-announced fast jets could have been disastrous and should have been avoided whatever the F16 pilots' understanding was of the status of the LFS. Members concluded that this unauthorised penetration of the ATZ was part of the cause of the Airprox, as was the non sighting of the Yak 52 by the F16 pilots. They had flown close to the Yak (as confirmed by the radar recording) without seeing it and the Board assessed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of the Dunkeswell ATZ by the F16 pilots who did not see the Yak 52.

Degree of Risk: B

AIRPROX REPORT No 152/00

Date/Time: 18 Sep 1334

Position: 5507 N 0210 W (9 NM N of Hexham)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: DHC-8 Tornado F3

Operator: CAT HQ STC

Alt/FL: FL 95 ↓
↓
(RPS)

Weather VMC NK VMC NK

Visibility: 10 km nk

Reported Separation: 600 ft V/NK

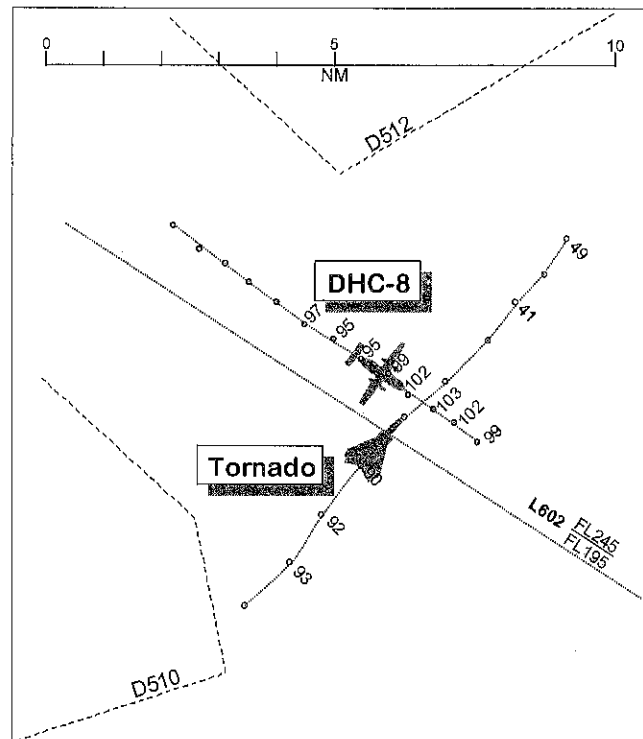
Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT reports heading 135° at 230 kt in descent for Newcastle and receiving a RIS on 124.5 from ScACC. His TCAS showed traffic closing from the right followed by a TCAS Climb RA; he disengaged the autopilot and followed the RA at 1500 ft/min to FL 105. A fast jet was briefly seen (1-2 sec) through the right window crossing right to left below (by 600 ft on TCAS). It was not seen for long enough to determine if it was climbing or descending, but it was banking in a turn.

THE TORNADO F3 PILOT reports heading 045° at 400 kt as No 2 of a pair carrying out an exercise in Spadeadam range, operating VFR in Class G airspace. Despite keeping a good lookout he did not see the DHC-8 and was unaware of the Airprox.

MIL ATC OPS reports that the Tornado F3 was the No 2 of a pair of F3s operating in and above D510 whose crews were in receipt of a FIS from Spadeadam (SPADE) on frequency 340.3. A second pair of F3s, operating in conjunction with the first pair, were also receiving a FIS from the same controller, but on a different frequency; this frequency was bandboxed but not cross-coupled. Both formations were carrying out EW training, under VFR, between medium and low level. The exercise had involved a reasonably heavy use of



intra-formation RT with SPADE stepping in, when requested, to provide positional information on the other pair. The controller was also aware of the 'heads-in' nature of the training being conducted and thus closely monitored the tracks of all 4 ac. At 1331:24, while they were southbound, SPADE had advised the No 2 pilot and his leader of traffic (the DHC8) which had been tracking SE and indicating FL 123; the F3 pilot had reported visual contact with this ac and shortly afterwards advised his lead that it was a civilian ac, but it would pass behind. 1½ min later, at 1134:06, as the pair tracked back to the NE, SPADE transmitted "C/S 1, the previously mentioned traffic is due north of you, four miles, tracking south east, descending slowly, passing nine five." The lead crew acknowledged "...copied, eyes out, we're both now at low-level, running zero seven zero." SPADE responded "...roger, I have an indication of Flight Level nine zero on one aircraft" to which a crewmember of the No 2 F3 replied "That's C/S 2 descending." Shortly afterwards, the lead crew reported that their exercise was complete and, after requesting an update of the stranger's position (which was by now well behind them) climbed to FL 100 and left the frequency. Spadeadam ATC received their first notification of an Airprox about 2 weeks later, following tracing action by AIS (Mil).

The LATCC radar recording shows the DHC-8, squawking 6246, tracking SE, about 4 NM S of the centreline of AWY L602 (Base varies between FL 155 and FL 195) whilst in a gentle descent. The F3s are seen operating as a pair and squawking 2613 (Ldr) and 2614 (No 2) at varying levels. At 1334:01, about the time of SPADE's traffic update, the lead F3 is tracking 070° at an indicated FL 36, with his No Two 2 NM W and above, tracking about 045° at an indicated FL 93 with a groundspeed about twice that of the DHC-8. The DHC-8 is 345°/4.5 NM from the lead F3 and 010°/4 NM from the No 2, and indicating FL 95; this is the DHC-8's lowest level during the encounter, which is held for 1 radar sweep, before it indicates a climb to FL 99 at 1334:18, with the No 2 F3 now 2 NM to the S. The closest point of approach observed on radar occurs at 1334:25, when the No 2 F3 is seen in the DHC-8's 2:30, at a range of about 0.25 NM; the F3's Mode C is not seen during this frame (it indicated FL 91 in the previous sweep) while the DHC-8 indicated FL 102. In the following frame (1334:33), the F3 emerges from the DHC-8's 8:30 position, the DHC8 indicating FL 103. The next Mode C indication from the F3 occurs at 1334:49, at FL 41, a loss of 5000 ft in 30 sec. A direct interpolation would place the F3 at about FL 65 as it passed directly beneath the DHC-8; this may account for the reason that the F3's pilot did not see the DHC-8 during the encounter.

Because of the two week delay in notification, the controller concerned could not recall the incident and thus, could add nothing to the investigation. From the recorded information however, it would appear that SPADE acted appropriately by informing the formation of the DHC8's presence and in particular, highlighting the fact that one of the F3's still appeared to be at a conflicting level.

ATSI reports that the incident took place in class G airspace, beneath Airway L602, to the north-west of Newcastle airport. The DHC-8 was en-route from Aberdeen to Newcastle on an IFR flight plan. The civil ATC aspects relate to the service being provided to this flight by the ScACC TAY Sector Tactical (T) Controller (accompanied by a Strategic controller). The TAY Sector area of responsibility is geographically very large including, to the west, Controlled and Advisory airspace while the remainder, and the greater part, consists of class G airspace where a RIS or FIS is provided. To meet

the varying needs of traffic in such a large Sector, the SC will, from time to time, need to change radar sources and adjust the viewing range of the radar display. The traffic loading at the time of the incident was considered medium but the workload high.

In its first call to the TAY Sector, the DHC-8 reported at FL 140 en-route to HAVEN, a reporting point at the boundary between the Scottish TMA, class D Controlled Airspace, and Airway L602. The controller placed the flight on a radar heading to position it clear of Danger Area D512 and the flight remained on a radar heading until transferred to Newcastle. The base of Airway L602 from HAVEN is FL 155, therefore, the ac would leave Controlled Airspace at the Scottish TMA boundary. However, when it reached HAVEN, the TAY SC neither informed the flight that it was leaving Controlled Airspace nor, in the absence of a request from the pilot, did he establish what service it required, in accordance with MATS Part 1, 1-39,40. This states *"Outside controlled airspace it is the responsibility of the pilot to request the radar service he requires. However, if the pilot fails to specify the type of service the controller must ask the pilot which radar service he requires."* It also states that *"Pilots must be advised if a radar service commences, terminates or changes when: ...they cross the boundary of controlled airspace."* The TAY SC has acknowledged that he did not adhere to the MATS Part 1 requirement but has confirmed that, as is usual with flights on this route, he was providing a Radar Information Service (RIS). Although the pilot had not discussed a service, it is apparent from his written report that he believed he was in receipt of a RIS.

Newcastle had agreed to accept the DHC-8 at FL 90 and the flight commenced a descent to that level, having been advised there was no traffic to affect its descent. Although he had observed unknown military traffic in the area, the TAY SC reports that none had been considered a specific threat to the DHC-8 at the time. However, following a telephone conversation with the Newcastle APR who pointed out traffic ahead of the DHC-8, the TAY SC issued traffic information to the flight. He advised that multiple military targets had crossed from right to left and were now in its 1130 position, with unverified Mode C indications of FL 140 and FL 145. The radar recording confirms this information and shows two targets wearing

sequential SSR codes at a range of about 18 NM, tracking north. While still indicating similar levels they then turned left to cross once more ahead of the DHC-8, this time tracking south at a range of about 5 NM; the DHC-8, meanwhile was passing FL 120 in the descent. Again the TAY SC passed traffic information and the pilot reported visual. The traffic then continued south, clear of the DHC-8's track.

By issuing traffic information to the DHC-8, the TAY SC had fulfilled his basic responsibilities for the provision of a RIS as described in MATS Part 1, 1-41. This also states that *"The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information"*. In addition: *"The controller shall only update details of conflicting traffic, after the initial warning, at the pilot's request or if the controller considers that the conflicting traffic continues to constitute a definite hazard."*

About two minutes later, the unknown traffic turned north again towards the DHC-8 but this manoeuvre was not observed by the TAY SC who was now attending to traffic in another part of the Sector. It was not until he attempted to transfer the DHC-8 to Newcastle that he was alerted to a conflict when the pilot reported he was climbing in response to a TCAS RA. The controller did not reply, reporting later that his priority at the time was to re-adjust his radar display to permit a detailed assessment of the situation. While this was taking place, the pilot of the DHC-8 reported *"approaching FL 100 in a TCAS climb"*. The controller acknowledged the report and then advised that although military traffic was observed in the area, none was indicating above 2000 ft Mode C. The radar recording confirms that this was the case at the time, however, it also shows that moments earlier one of the unknown ac had established on a conflicting track with that of the DHC-8 and, at a range of 2 NM was descending through FL 91, while the DHC-8 was indicating FL 99 in a climb. Thereafter there is no Mode A or C indication from the unknown traffic as it continues to close with the DHC-8; the radar returns eventually merging. This encounter was not observed by the controller and the Mode C of the unknown traffic does not appear again until about 25 seconds later when the aircraft is to the north of the DHC-8 and indicating FL 41.

HQ STC comments that there was clearly a potential for collision and it is disappointing that the Tornado crew neither saw nor gained radar contact on the Dash 8 throughout the incident. It is fortunate that TCAS resolved the confliction and that a safe outcome resulted.

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 noted that while the Tay SC had informed the DHC-8 pilot about the Tornados on an earlier encounter, he had not (while attending to matters elsewhere in his sector) noticed the encounter that became the Airprox, or informed the DHC-8 pilot about the Tornados' approach. It seemed to some members therefore that the Tay Sector was too large to be manned by one radar controller if he had prior responsibilities to ac in CAS to the N as well as RIS traffic a long way to the S. He also appeared to have been too busy to complete the handover to Newcastle, only 17 NM from the Airprox position. Members accepted that, while a lack of pertinent traffic information from the Tay SC to the DHC-8 pilot was a feature of the Airprox, the terms of a RIS did not absolve pilots from their ultimate responsibility to see and avoid other traffic. In the DHC-8 this function was hugely aided by TCAS which primarily enabled the DHC-8 pilot to avoid the Tornado. Unlike their DHC-8 counterparts, the Tornado crew had no other 'safety system' to augment their lookout but members were disappointed nonetheless that the crew did not see the DHC-8; they considered that this was the cause of the Airprox. It appeared that the No 2 Tornado crew either did not hear or did not assimilate the first traffic information passed by SPADE and only reacted to a specific call to them just before it was too late.

Members discussed the part played by TCAS at some length. There had been another very similar Airprox in Mar 00 (39/00) involving a non-TCAS SD3-60 on a similar track into Newcastle and another Tornado; neither crew saw the other ac until too late and a very close (A Risk) Airprox resulted. The significant difference in Airprox 152/00 was that

the airliner was equipped with TCAS. Members assessed that, as a result of the DHC-8 pilot following the TCAS RA, over 1000 ft of vertical separation was achieved before the ac crossed, which had removed any risk of the ac colliding. It was suggested that this lesson should be conveyed to the MOD regarding the much delayed introduction of a military CWS.

The Board was advised that as a result of Airprox in the area Tornado F3 pilots would be required to contact Newcastle more frequently than before for traffic information.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado pilot did not see the DHC-8 in a confliction resolved by TCAS.

Degree of Risk: C

AIRPROX REPORT No 153/00

Date/Time: 13 Sep 0817

Position: 5217 N 0134 W (5.5 NM SE HON VOR)

Airspace: CTA (Class: D)
Reporting Aircraft Reported Aircraft

Type: A319 PA38

Operator: CAT Civ Pte

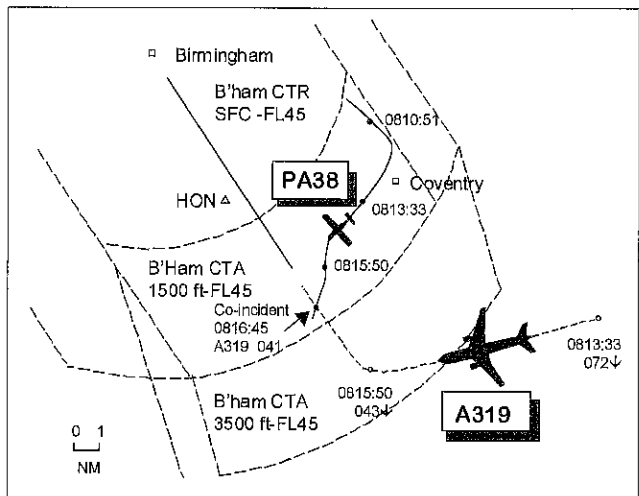
Alt/FL: 4000 ft ↓ FL 35
 (QNH 1013 mb)

Weather VMC CAVOK VMC CLBL

Visibility: 10 km 10 km

Reported Separation: 0 H 600 ft V/NK

Recorded Separation: 0 H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports heading 330° at 180 kt established on the ILS RW33 at Birmingham. He was receiving an APR service from Birmingham ATC on 118.05 MHz; the weather was CAVOK. On commencing descent on the glidepath, he received a TCAS TA, "traffic", on crossing traffic which was squawking but with no Mode C. The ac was seen to be a PA38, which passed directly underneath by 600-700 ft. He took no avoiding action but assessed the risk of collision as medium as he was commencing descent on the ILS.

THE PA38 PILOT reports departing Birmingham en route to Biggin Hill with one passenger. The ac was red & white, with strobe & anti collision lights both on and he was receiving a FIS from Coventry Approach on 119.25 MHz. The visibility was 10 km in VMC and although his ac had a transponder, Mode C was not fitted. After departure from RW 33 he had been cleared for a R turn onto an easterly heading not above 1500 ft QNH. 5 minutes later he was given step climb clearance to not above altitude 3000 ft QNH. He routed towards Coventry Aerodrome and was transferred to Coventry Approach who issued a squawk. He requested a R turn direct CPT and climb to FL 35 which were approved. Shortly thereafter, when level at FL 35

between layers, he observed a crossing CRJ or EB145 in his 11-12 o'clock in a R turn which he reported to Coventry ATC. It was well above his level and this ac was subsequently found out not to be the reporting ac, but preceding landing traffic. Coventry replied "Birmingham don't want to give you a service". He next contacted Coventry as he left their service area and transferred to Brize Norton. He did not see the subject ac and was informed of the incident after landing at his destination.

ATSI reports that the incident took place at 0816 in Class D airspace approximately 12 NM SE of Birmingham Airport. The Birmingham Radar 1 Controller (APR) reported that in the period leading up to the incident, both the traffic loading and the workload level were light. All ATC equipment required was serviceable and no factors had been identified likely to have adversely affected the controller's performance at the time.

The PA38 departed Birmingham at 0803 for a VFR flight to Biggin Hill and the Birmingham APR told its pilot to turn R on to a heading of 090° and not to fly above 1500 ft altitude. The Birmingham MATS Part 2, 3-8, 2.4, states "*Prior to issuing departure clearance to VFR traffic, the Air controller shall request from the pilot the intended track after departure*". There is no indication from the RTF recording that the pilot of the PA38 had been asked for his intended track or routeing either before or after departure. (Note: Such an omission was identified as a causal factor in a previous Airprox involving Birmingham ATS [see 32/99] in which a departing flight unexpectedly changed its route and came into conflict with traffic established on final approach). No flight plan had been filed; the pilot had elected to 'book-out' and the relevant FPSs did not indicate a routeing.

After departure the PA38 was squawking the allocated SSR code without Mode C. The Birmingham APR then amended its altitude restriction to not above 2500 ft altitude and the pilot was instructed to continue on the assigned heading and to say if he was unable to maintain VMC. Two minutes later, at 0806, the pilot asked for FL 35, which was not approved but instead the APR permitted the flight to continue not above 3000 ft. The PA38 was then instructed to turn R on to 130°

with the intention, the controller explained later, of ensuring the ac remained clear of the RW 33 final approach.

At 0809, the Birmingham APR requested the flight's "*passing level now?*". The RTF transcript indicates that the pilot replied "level 3000 ft 1013", however, the APR mistook this for "2000 ft" and consequently asked "*.....are you climbing to 3000 feet?*". The pilot replied "*negative we're level now sir*". At that point the PA38 was in fact level at 3000 ft (1013) but the APR determined from the final reply that it was at 2000 ft. At 2000 ft, the ac's track would pass close to Coventry Airport's delegated airspace within the Birmingham CTA (broadly 2 NM radius up to 2000 ft); the Birmingham APR therefore telephoned Coventry ATC to provide them with the details of the PA38. If the Birmingham APR had established that the PA38 was at 3000 ft it would have remained on the Birmingham frequency and the incident would probably have been avoided.

At Coventry, a combined ADC/APC service was being provided by a trainee controller, supervised by a mentor, operating from the VCR. There was no radar service available at the time. The Birmingham APR provided the Coventry trainee with the PA38's flight details including its position (4 NM to the N of Coventry Airport) adding it was currently at 2000 ft but had requested FL 35. Agreement was reached that the flight would be transferred to Coventry.

At 0810:40, the APR told the PA38 pilot to "*.....resume own navigation squawk 7000 Coventry would like to speak to you (frequency)*". The pilot acknowledged making no further comment. At no time had the Birmingham APR established the PA38 pilot's intended route yet the ac was released on its own navigation within controlled airspace. At interview, the APR said he assumed the ac would more or less continue on its current track, eventually to clear Birmingham's airspace to the SE. During a later conversation with Coventry, after the incident, he repeated "*I assumed he was going out towards Daventry*".

When the PA38 called Coventry, the pilot reported level at 3000 ft on a heading of 130°. The altitude was queried by the Coventry trainee and 3000 ft was confirmed by the pilot who then requested to route VFR to CPT VOR. Having had no restriction

or condition placed upon the flight by Birmingham, the trainee controller simply acknowledged the request adding that there was no known traffic to affect the flight at that height. The PA38 reported turning towards CPT and was later instructed to select the conspicuity SSR code 4650 used by Coventry for VFR transiting flights. In their subsequent written reports, both Coventry controllers expressed surprise, and in the trainee's case concern, that the PA38 had reported unexpectedly at 3000 ft. However, it was not until about 2 minutes later, at 0813:30, when the pilot requested climb to FL 35, that co-ordination with Birmingham was prompted. The trainee reported that the PA38 was observed close to Coventry Airport's overhead before turning towards the SW. The radar recording at 0813:30 shows the PA38 about 2 NM SW of Coventry, squawking 4650 with no Mode C, on a SW track towards the final approach centreline to RW 33 at Birmingham. The ac had probably adopted this track to intercept a radial from the HON VOR en-route to CPT.

The Coventry trainee telephoned Birmingham Approach and spoke to the Birmingham Approach Assistant. The trainee explained that the PA38 had just been handed over to her and that *".....he's climbed to 3000 ft in that period er come over to me at 3000 ft wants now.. to climb to FL 35; do you want him back?"* The Assistant said *"standby"* but during the pause that followed while he was waiting to refer the request to the Birmingham APR seated nearby, the Coventry trainee added *"he's (the PA38) in my overhead at the moment possibly 2 miles W"*. However, this information seemed to escape the Assistant, who neither acknowledged nor passed it on to the APR. Consequently the Assistant completed his discussions with the APR, without the benefit of this additional information, and eventually responded to the Coventry trainee with *"No he's out outside controlled airspace he er we don't wish to speak to him at the moment"*. It transpired that the APR did not mean to convey the impression that the PA38 was now outside CAS, as the Assistant's message implied, but rather, if the ac was to leave controlled airspace on the route he had assumed it was taking, he had no further need to speak to it. Unfortunately, the APR did not make this latter aspect clear enough to the Assistant. This demonstrates that great care has to be exercised when co-ordination is undertaken

through an intermediary, especially when that third party may not be aware of all the implications. Birmingham's response was interpreted the same way by both trainee and mentor at Coventry - the PA38 could be retained on their frequency and there was no traffic to affect its climb to FL 35. The flight was then advised accordingly. Neither controller at Coventry thought to question their Birmingham colleague about the reference to 'outside controlled airspace', assuming perhaps that Birmingham knew of the PA38's intended route and current position and level (Coventry were not aware that the flight had no Mode C). However, the Birmingham APR had not monitored the flight's progress and was unaware of its current position.

In the meantime, the A319 was inbound to Birmingham from Paris under IFR and had established communications with the Birmingham APR. The flight was placed on a radar heading to position it towards a RH base leg for an ILS approach to RW 33 at Birmingham. It was cleared, in stages, to altitude 4000 ft and finally reported established on the ILS localiser at a range of about 15 NM from touchdown. The Birmingham APR then cleared it for further descent on the ILS. The radar recording for this time shows the A319 on the final approach centreline indicating FL 43 Mode C (equivalent to altitude 4300 ft). Meanwhile, the PA38 wearing SSR code 4650, no Mode C, is in the A319's 1 o'clock position at a range of about 4 NM, tracking SW and on a converging track. The PA38 continues on the same track and about 1 minute later the SSR targets of the two ac are coincident, the Mode C of the A319 indicating FL 41, the level from which the ac would normally commence its descent on the ILS glidepath. Moments later in his first call to Birmingham TWR, following transfer by the APR, the pilot reported *"....just fully established on the ILS eleven and a half (miles) we've just passed over a Tomahawk er it looked er fairly close beneath us"*. (Later he estimated vertical separation was 600 ft). The pilot of the PA38 did not report sighting the A319. The Birmingham ADC, not aware of any traffic, acknowledged the report and stated he would make enquiries. The A319's approach and landing was completed without further incident although later the pilot expressed concern about the proximity of the other ac, especially as there had been no indication of height on his TCAS equipment.

Failure to establish an outbound's route was identified as a causal factor in a previous Airprox involving Birmingham ATS (Airprox 32/99). In view of this precedent it is therefore considered that the Management at that Unit should satisfy themselves that the MATS Part 2 procedures adequately cover the subject and that the mechanisms for ensuring controller compliance are effective.

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 ATSI adviser confirmed that measures had been taken, through the Inspectorate, to ensure that the content of Birmingham MATS Part 2 procedures on this subject were adequate and their effective compliance by controllers had been addressed.

The Board initially visited the ATC aspects of the incident. Members were clear that the Birmingham ATC team had not established the PA38's desired routeing to Biggin Hill and this started a chain of events that led to the Airprox. The ADC controller, contrary to MATS Part 2, had not established the pilot's intended track prior to departure and this omission was followed by the APR "controlling" the PA38 by means of headings and level restrictions on a routeing that was assumed rather than known. Routeing the PA38 E of the RW 33 final approach centreline towards the DTY area on a direct track may have seemed expeditious, but unfortunately this led to the PA38 flying close to the A319 at a later stage of the flight. Members discussed the progress of the PA38 on its flight and initially wondered why the Coventry mentor and trainee, after receiving a handover on the PA38 at 2000 ft then did not contact Birmingham ATC straight away when the pilot reported on their frequency at 3000 ft within the Birmingham CTA. This altitude discrepancy stemmed from a misheard level report to Birmingham but did not alter the fact that the APR controller had cleared the PA38 pilot "not above 3000 ft" before releasing it to Coventry even though the controller passed its level as 2000 ft but requesting FL 35. The request by the pilot to climb to FL 35 had eventually triggered co-ordination

between the ATSUs but, like the Coventry ATCOs, members felt that as no restriction had been applied to the flight during the initial handover, the PA38's flight path was deemed acceptable to Birmingham. It was noted as a side issue that the co-ordination had been conducted through an ATC assistant and that pertinent positional information had been missed. Some ATC members were concerned that the Birmingham APR controller had not retained the PA38's radar identity after it had been released to Coventry while still within the CTA. If the APR had kept up his air picture then the pilot's request for climb to FL 35 would probably have brought his attention to the developing confliction and the offer from Coventry to Birmingham of working the traffic would have been accepted. Another factor was the PA38's lack of any Mode C reading which could also have alerted the APR to recheck the ac's level. As it was, he had assumed the PA38 was leaving CAS on a SE track and a climb to FL 35 would keep it clear of inbound traffic. In assuming this and then declining to provide the PA38 pilot with a service, these combined to form a second cause in the incident.

Turning to the piloting aspects, the Board were surprised that the PA38 pilot, flying VFR, had not seen the A319 passing about 600 ft above, when earlier he had observed the preceding Birmingham inbound which had crossed ahead and above. In the A319's cockpit, a TCAS TA warning had alerted both pilots to the crossing PA38 but no traffic information was received from the Birmingham APR; members reasoned the latter had assumed that the Coventry squawk 4650 (the PA38) was operating outside the CTA in the area below 1500 ft as the controller had not retained the PA38's radar identity post transfer.

As to the risk, the TCAS TA had warned the A319 crew who then visually acquired the PA38 crossing R to L and 600 ft below. Members appreciated this sighting must have surprised the crew somewhat but took note of the geometry and the captain's decision to continue with his descent on the ILS. This led the Board to conclude from the relative flight paths flown that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: a. Birmingham ATC did not establish the PA38 pilot's intended routeing.

b. The Birmingham APR mistakenly assumed the PA38 would leave CAS to the SE when he declined to provide it with a service.

Degree of Risk: C

AIRPROX REPORT No 154/00

Date/Time: 22 Sep 0651

Position: 5332 N 0240 W (1.5 NM E MIRSI)

Airspace: MTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: ATP BAe146

Operator: CAT CAT

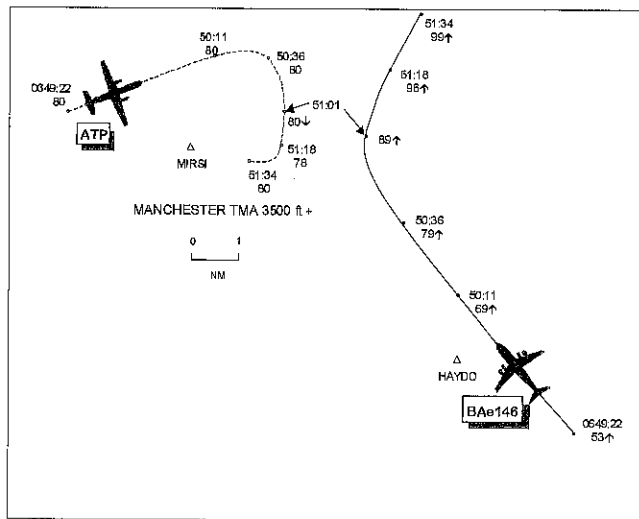
Alt/FL: FL 80 ↑FL 110

Weather VMC VMC

Visibility: >10 km >10 km

Reporting Separation: 0 ft V/ 1.5 H// 1-2 NM

Recorded Separation: 0 ft V/ 1.9 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATP PILOT reports flying in the MIRSI hold at 160 kt level at FL 80 in VMC. Whilst turning outbound at MIRSI he received a TCAS RA, "monitor vertical speed", which was followed by an ATC avoiding action R turn onto heading 270°. The other ac was seen on TCAS to pass 1.5 NM away at the same level and he assessed the risk of collision as medium.

THE BAe146 PILOT reports climbing en route to Munich from Manchester at 220 kt. After departure from RW24 at 3 NM DME, he made a R turn onto track and climbed as instructed by MACC. He observed several ac ahead on TCAS and was unable to contact ATC owing to frequency congestion when he saw that a conflict was occurring; he then received TCAS TA. Simultaneously ATC issued an avoiding action R turn onto heading 090° with traffic information on

the other ac which was also turning R. The TCAS TA lasted for approx. 5 seconds as he saw the other traffic pass to his left and below whilst turning.

UKAB Note: The BAe146 pilot's report was submitted nearly 10 weeks after the incident. His recollection of the incident was rather vague but he thought that the ATP passed 1-2 NM clear horizontally; he was unable to assess the vertical separation.

ATSI reports that the Airprox occurred at MIRSI whilst the BAe146 was being provided with a Radar Control Service by the MACC TMA NE Radar Controller. The ATP, holding at MIRSI, was under the control of the Manchester Approach North Radar Controller at the time. The TMA Controller was operating the Ribble/Bolin Sectors combined and described his workload level as moderate. An extra controller was available to split the sectors if it had been considered necessary.

The BAe146 was cleared, initially, on a STOCK IR SID for its flight to Munich. However, in accordance with local procedures to expedite departures, as stated in the MACC MATS Part 2, the Aerodrome Controller exercised his option of issuing the ac with a specific early turn after departure i.e.: “after passing 500 ft agl, turn right heading 320° climb to 5000 ft QNH”. This clearance does not have to be co-ordinated with the relevant MACC Area Sector. The MACC MATS Part 2 also states that: “Aircraft are to be instructed to report their heading on initial contact with the relevant sector”. Accordingly, when the BAe146 established communication with the MACC TMA NE Radar Controller, at 0646, it reported a radar heading of 320°, climbing to 5000 ft. Shortly afterwards, he cleared the BAe146 to climb to FL 110. This, the interviewee explained, was an arbitrary level not chosen because of the presence of any other traffic. He said that he issued the climb clearance because he observed that there was no downwind traffic to the north of Manchester Airport to affect the flight. He added that, ideally, he would have given the ac a right turn straight away but because Approach Control’s area of responsibility reached to 4000 ft, he had to wait until the BAe146 passed that altitude. He then turned his attention to the traffic situation elsewhere in the sector. His intention was to instruct the BAe146 to make a right turn towards STOCK, as soon as it was in the airspace under his responsibility. However, he was distracted by other traffic tasks and overlooked the fact that the BAe146 was still continuing on a radar heading of 320°, towards the MIRSI hold and, consequently, towards the ATP. He thought that using the combined Claxby/Great Dunfell radar display, with the Manchester Watchman on an adjacent display, may have contributed towards this oversight. He explained that ac departing from Manchester do not show on the Claxby radar until they are passing about 3500 ft. Consequently, the Manchester Watchman is used, as on this occasion, to identify the outbound ac and to verify and validate their transponder codes. The fact that the BAe146 was not showing on his primary display, at the time he cleared it to climb to FL 110, may have contributed to him forgetting to instruct it to turn.

The TMA Controller said that he only became aware of the confliction, between the subject ac, when the STCA activated. He immediately instructed the BAe146 to expedite its climb through FL 90 and to turn right for avoiding action heading 030°. The pilot

reported sighting the traffic and climbing to FL 190, with a right turn heading 030°. The controller did not notice the incorrect readback of the cleared level but in any case, before it reached its correct cleared level of FL 110, it had been recleared to FL 190. Meanwhile, as soon as the Manchester Approach Radar Controller became aware of the situation, he passed an avoiding action turn to the ATP, which was established in the MIRSI hold.

UKAB Note: Replay of the Clee Hill radar at 0650:11 shows the ATP 1 NM N of MIRSI at FL 80 commencing a R turn in the hold as the BAe146 is 6.5 NM SE of MIRSI tracking NW and passing FL 69 in the climb. At 0650:36 the BAe146 is head on to the turning ATP, 4.7 NM apart, and 100 ft below; the separation reduces to 2.5 NM whilst the BAe146 passes FL 86 17 seconds later. The closest point of approach occurs at 0651:01 with the BAe146 carrying out the avoiding R turn passing 1.9 NM E of the ATP at FL 89.

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.

A member wondered whether the operation of the MACC TMA NE sector, using the Claxby/Great Dun Fell radars on one display and the Manchester Watchman on an adjacent display, could have contributed towards this incident. It was explained that this type of operation was typical at many ATSU’s but the limitations of each radar would need to be fully understood and the controllers’ techniques adjusted accordingly. Members were in no doubt that the TMA NE controller had intended to monitor the departing BA46 but had been distracted. This was another example of a well known ‘trap’. The Board concluded that the MACC TMA NE controller inadvertently climbed the BA46 into confliction with the ATP.

As to risk, the TMA NE controller had become aware of the confliction after activation of the STCA. He then issued avoiding action instructions to the BA46 whose pilot had been aware of the confliction on TCAS and had received a 5 second TCAS TA as

he complied with ATC's avoiding action. The Manchester Approach N Radar controller had also seen the conflict and had issued an avoiding action R turn to the ATP in the MIRS hold. Additionally, the pilot had received and complied with a TCAS RA. All of these actions combined led the Board to conclude that any risk of collision had been removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MACC TMA NE controller climbed the BA46 into conflict with the ATP.

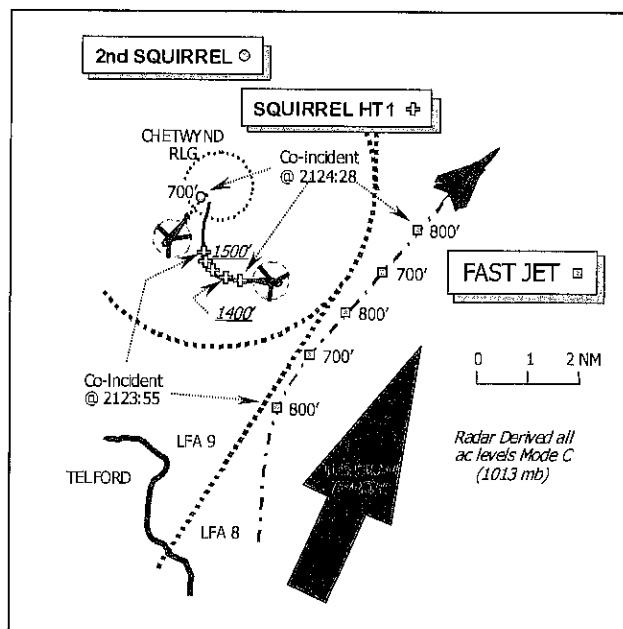
Degree of Risk: C

AIRPROX REPORT No 155/00

Date/Time: 26 Sep 2124 NIGHT
Position: 5227 N 0223 W (2 NM SSE of Chetwynd RLG elev 275 ft)
Airspace: London FIR (Class: G)
Reporting Aircraft: Squirrel HT1
Reported Aircraft: Untraced
Type: Squirrel HT1
Operator: HQ PTC
Alt/FL: 1000 ft (QFE 999 mb)
Weather: VMC CLOC
Visibility: 20 km
Reported Separation: 50 m H, nil V
Recorded Separation: Not recorded

ART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SQUIRREL HT1 PILOT, a QHI, reports he was conducting a dual night sortie in the Chetwynd RLG circuit. The visibility was excellent, navigation and upper red anti-collision lights were on and he had just extinguished the two landing lamps after turning crosswind onto 090° at 90 kt. Flying straight and level at 1000 ft Chetwynd QFE (999 mb), a light was suddenly spotted about 50 m ahead of the helicopter at the same height. He immediately turned L to avoid it, but he could not determine the type of the other ac, as only the white tail light was displayed which blended into the background of streetlights at Telford. Neither Port navigation light, anti-collision beacons nor HISL were evident on the other ac. The risk of a collision was very high and he reported the Airprox to Chetwynd Tower. After his RT report he was unable to re-acquire the other



ac visually. He added that the other pilot must have seen his lighted ac but continued to fly within 50 m of his helicopter.

UKAB Note (1): With the exception of a second Squirrel departing the Chetwynd circuit returning to Shawbury and a low-level fast jet, extensive analysis of the radar recording has not revealed another ac contact in the immediate vicinity of the Chetwynd circuit. Cleve Hill radar coverage in the area is good. The reporting pilot is adamant that the lights of the other ac he spotted was not the fast jet shown in the diagram, though the geometry bears a striking similarity to the diagram he provided. Hence the other ac remains untraced.

MIL ATC OPS reports that the pilot of the Squirrel was flying night circuits at the RLG at Chetwynd and in communication with Chetwynd Tower. The LHD circuit was flown at 1000 ft QFE (999 mb) for

visual approaches to 2 illuminated night "T"s set up on a heading of 180°. While turning onto the downwind leg the pilot enquired "*...how many in the circuit at the moment?*", to which the Aerodrome Controller (ADC) replied "*I believe you're the only one left... (another C/S) just taken a R turn out to depart [for] Shawbury*". The Squirrel pilot responded "*...I've just had a very very close call with an aircraft that doesn't have a strobe, just passing Newport about [900-1000] feet and like I said no strobe, we were very very close*". The pilot went on to confirm that he was filing an Airprox and he was at 1000 ft, VMC while the other ac "*...wasn't showing any strobes*". The ADC then added "*...have you got an estimate on his heading? We can have a look on the Shawbury radar*" to which the pilot reported it was "*...approximately zero three zero*." The ADC also asked whether he thought that the other ac may have been a fast jet, but the pilot replied "*...negative. No he was very slow, a helicopter or a light aircraft, I mean we estimate he was perhaps no more than 50 metres away.*"

Night flying operations at Shawbury are primarily VFR, however the Shawbury Approach Control Room is manned 'on request' for radar recoveries. The radar had been manned at about 2115 but because the primary radar was unserviceable, only the SSR was available. Whilst setting up the equipment, the controller (RAD) noticed a 3/A 7001 squawk to the SE of Shawbury indicating below 1000 ft Mode C and rapidly tracking N. RAD continued to track the ac, which turned NE onto a track of about 035° was parallel to, but outside the boundary of LFA9 (the Shawbury Dedicated User Area within which Chetwynd lies). As the 7001 squawk approached Newport, RAD observed a Shawbury helicopter squawking 0221 [the subject Squirrel] in the Chetwynd circuit climbing out. The 7001 squawk was crossing the helicopter's track from R to L at the time at an indicated 800 ft Mode C, he thought about 4 NM away. About 1 min later, RAD received a landline call from the ADC, asking if anything had been seen on radar, as a Chetwynd helicopter had reported an Airprox; the 7001 squawk was the only SSR contact that had been seen. ADC relayed the information about the fast jet to the Squirrel pilot, who replied "*...no this was a light aircraft. You could see the tail lights and the nav lights and everything but no strobe, he just appeared out of nowhere.*"

UKAB Note (2): The statement on RT by the reporting pilot to Tower about the exact lighting visible on the other ac, appears to be slightly at variance with his report.

The LATCC Clee Hill radar recording shows the subject Squirrel tracking S and climbing to an indicated 1400 ft Mode C (1013 mb), about 1000 ft QFE (999 mb), during the climb-out at Chetwynd. A 7001 squawk is shown tracking N at 800 ft Mode C, about 400 ft QFE, which turned NE at 2123:55, 3 NM SSE of the Squirrel. The CPA between the two ac occurs in the next radar sweep, at 2124:03, as the 7001 squawk (with corresponding primary radar return), indicated 700 ft Mode C and passed just over 2.5 NM SE of the Squirrel, which had commenced a L turn onto the crosswind heading indicating 1500 ft Mode C. The 7001 squawk continues to track NE at an indicated 7-800 ft, whilst the Squirrel tracks E at an indicated 1400 ft. No other primary or secondary radar returns are seen in the vicinity of the Squirrel.

It has not been possible to correlate the Squirrel pilot's account of the Airprox, which describes an extremely close encounter with a partially illuminated slow moving ac at about 1000 ft, with the radar recording. The primary radar return associated with the 7001 squawk is seen for the majority of the time during the encounter and fits with the reported time of the Airprox, but its unverified Mode C indicates that it is about 700 ft below the Squirrel. Therefore, unless this ac's Mode C was incorrect, this would suggest that the primary radar cover in the area was sufficient to have detected another ac in the area. At 2124:28, the second Squirrel's primary radar contact appears as it indicates 700 ft [whilst departing the circuit], which would seem to verify the quality of radar coverage in the area. As part of their night flying preparations, RAF Shawbury ATC personnel check the night flying activities at the local airfields of Sleaf, Welshpool, Wolverhampton and RAF Cosford. With the exception of possible Police helicopter movements from Wolverhampton, there were no planned movements at any of these airfields and there were no calls on the Shawbury LARS frequency (120.775 MHz) which had been monitored during the night flying period. Therefore, it is

possible that, owing to an optical illusion, it was the fast jet squawking 7001 which was seen by the Squirrel pilot rather than a light ac.

UKAB Note (3): There was a significant discrepancy between timings on the ATC RT transcript and the corresponding event being seen on the radar recording. Whilst there is no positive radar 'event' to correspond to the RT, Mil ATC Ops has estimated that the RT transcript timings are approximately 2:15 min behind the timings of the radar recording (which is known to be derived from a reliable source). Hence, RT timings in the Mil ATC Ops report have been corrected to UTC by adding 2:15 min.

HQ PTC comments that this Airprox is clearly irresolvable beyond doubt. Mil ATC Ops have offered a plausible explanation both for the time discrepancy and the identity of the unknown ac – a Tornado at a greater range than perceived – although in this case one would have expected strobes to have been visible. On the other hand, this was a very experienced helicopter pilot, used to operating at night and, without the evidence of a local primary radar to prove that there was no such conflicting traffic, it is impossible to discount a mute and stealthy intruder. However, in light of the corroborative evidence derived from the 2 radar sources which were available, we are persuaded that the STC ATC analysis is the more probable and to add this experience to the lore of nocturnal airborne illusions.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the Squirrel pilot, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the appropriate ATC and operating authorities.

The PTC member reaffirmed the reporting pilot was absolutely adamant that he had seen an ac at close range and, from his perspective, it was not the fast jet alluded to previously. The Board was briefed that because of this strong conviction, the fast jet - a low-level Tornado - had been discounted from earlier enquiries, which had instead centred on whether it was the 2nd Squirrel helicopter that the

reporting pilot had spotted. This line of approach had been encouraged by what later turned out to be an inaccurate timebase in the Shawbury ATC RT recording equipment; this promoted a misleading impression that the Airprox might have occurred nearer to Chetwynd and 3 min earlier, hence the focused attention on the 2nd helicopter. However, an exhaustive review of the plot extracted radar data showed that this helicopter was outbound from Chetwynd returning to Shawbury and well astern of the reporting pilot's helicopter when the Airprox occurred. Radar data did not reveal any other contact in the vicinity of the Griffin at all throughout the period either side of the actual Airprox timing with the exception of the fast jet upon which attention then re-focused. Members thought that it was entirely understandable and feasible that the Squirrel pilot might have mistaken the fast jet in the distance for a closer slower moving ac, as the human brain could 'fill-in' missing information, especially at night to produce a 'convincing' recollection of events. Indeed, the Squirrel pilot had just extinguished the landing lamps after turning crosswind, which could have altered his night vision without him realising the effect. Moreover, inconsistencies were noted in the Squirrel pilot's report about the lights he actually saw. Initially he reported on RT that he "... could see the tail lights and the nav lights and everything but no strobe" of the other ac, whereas his Airprox report only mentioned sighting tail lights. Members reasoned that if he had seen the fast jet, the port navigation light would only have been visible from dead ahead to 20° abaft the jet's port beam as it passed. Relative to the helicopter pilot in his L turn this would appear as a slow moving red port navigation light with little crossing motion which would disappear as the jet drew ahead, to be replaced by a steady white tail light as it came into view at the same relative angle. In essence the helicopter pilot would only have been able to see one light from the jet at a time. However, it was pointed out that this theory did not explain the reported absence of any red strobe such as the type fitted on Tornados. What it did suggest, however, was a possible explanation on the range of the sighting; the relative height of the fast jet which was about 7-800ft below the Squirrel, at a range of 2.5 NM, could make it seem to be at a similar height to the reporting pilot. With no real depth of field information between the 2 ac, because of the dark, it was not difficult to see how an impression of closeness might be arrived at.

Given the absence of another ac on the radar recording members tried to think of reasons for another ac operating at night without full lighting. No approvals had been issued by HQ STC Ops LF for military ac to operate in LFA 8/9 without lights, which might occur for crews flying on night vision goggles. Some members pondered the possibility of illegal nocturnal aerial activity, such as drug running or smuggling; there had been rumours alleging such activities in the area. Certainly that could not be discounted entirely, but it was thought that such flights would hardly be flown with some lights on - all would probably be extinguished. Turning to radar detection aspects, it was explained that the Clee Hill radar was ideally situated to detect another ac in close proximity to the Squirrel. Indeed it had shown both helicopters' primary contacts very soon after take-off from Chetwynd and these could be clearly followed around the circuit with considerable accuracy. Similarly the fast jet was painting clearly on the recording in primary radar coverage 7-800 ft below the Squirrel. It seemed inconceivable to the controller members of the Board who used the Clee Hill Radar operationally, that it would not have detected another ac close to the Squirrel.

Military fast jet members thought it strange that the helicopter pilot had not made out the silhouette of the reported ac at 50 m ahead. Whilst members realised that visual perception at night can be affected by many factors, against a background of

street/town lights at that close range they thought another ac would have been 'silhouetted' sufficiently to reveal some shape. Another point noted was that the reporting pilot's geometry of the encounter was virtually identical to the fast jet's angular movement displayed on the radar, lending compelling evidence that he could easily have misjudged the distance, for entirely understandable reasons. There was no doubt about the reporting pilot's earnest conviction in filing this incident. He was utterly convinced from the visual cues presented quickly before his eyes at the time that another ac had come close to his helicopter. Board members, on the other hand, had the advantage of fuller information gathered and analysed slowly. There was nothing to show that another ac had come close to the Squirrel, but much to explain how the lights that were seen were those of the fast jet. Therefore, with the information available to the Board, in their opinion and on the balance of probability, the members agreed that the cause of this Airprox report was an apparent mistaken impression of separation at night and concluded that no risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Apparent mistaken impression of separation at night.

Degree of Risk: C.

AIRPROX REPORT No 156/00

Date/Time: 28 Sep 1152

Position: 5552 N 0425 W (1 NM NE
Glasgow Airport - elev. 26 ft)

Airspace: ATZ (Class: D)

Reporter: Glasgow ADC

	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	B733	C172

<u>Operator:</u>	CAT	Civ Club
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<u>Alt/FL:</u>	↑6000 ft (QNH 992 mb)	↑2000 ft (QNH 992 mb)
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<u>Weather</u>	VMC CLBC	VMC CLBC
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<u>Visibility:</u>	> 10 km	> 10 km
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Reported Separation: 100 ft V/-5 NM H// NK

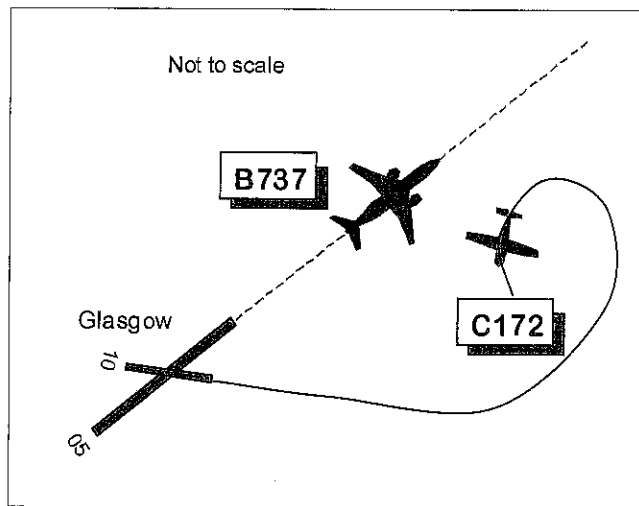
Recorded Separation: -45 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLASGOW ADC CONTROLLER reports at 1150 hr issuing take-off clearance to the C172 departing RW 10 on a VFR local flight to the W; this necessitates a routeing through the climb out area of the duty RW 05. He initially instructed the C172 to climb straight ahead to allow for departing traffic, the B737, from RW 05. After the C172 had reached 2 NM he instructed the pilot to turn L and report clear of the climbout. He then issued take off clearance to the B737 from RW 05 and instructed the C172 to orbit in its present position; it was seen to commence its orbit as the B737 departed. When the B737 pilot subsequently reported that the C172 had passed close to him on the climb out he was informed that the Aerodrome Controller could see both ac and they were well separated. The B737 pilot replied that "he would take his word for it".

UKAB Note: The Glasgow 1150 METAR shows 12008 9999 SCT020 SCT026 13/09 Q0992.

THE B737 PILOT reports heading 053° at 160 kt on initial climb out from RW 05 at Glasgow to altitude 6000 ft en route for Luton. The visibility was >10 km in VMC. He saw a high wing Cessna circling to his R in a LH orbit which appeared to be taking evasive action. There had been no warnings given by ATC and he felt that the C172 was not following ATC instructions. He queried this with Glasgow



ATC who replied "OK, I had you both in sight". He considered that the C172 had passed closer than normal and had not been expected. He assessed the risk of collision as medium and estimated the C172 passed .5 NM to his R and 100 ft above. He also thought that ATC should have informed him of traffic in close proximity particularly with the B737's high initial pitch attitude.

THE C172 PILOT reports departing RW 10 at Glasgow on a local VFR flight to the W having received clearance for a L turn out on track. On passing 500 ft, he was instructed to continue climbing straight ahead. At 1200 ft, he was then instructed to orbit in his present position and then proceed along the south bank of the Clyde. He did not see the subject B737 during his departure.

ATSI reports that the controller involved in this incident was on only his second full duty since achieving his first Certificate of Competence. He described his workload as light at the time of the occurrence. Approximately 10-15 minutes prior to the incident, the runway in use was changed from RW 23 to 05, because an ac landing on RW 23 had reported a tailwind on final approach.

The MATS Part 1, Page 2-1, states, under the title "Responsibilities" 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:

- a) aircraft flying in, and in the vicinity of, the aerodrome traffic zone,
- b) aircraft taking off and landing”.

The C172 established communication with Glasgow Tower at 1147, reporting at holding point 'Whiskey 1', ready for departure. The ac was intending to route on a local VFR flight to the west, via Greenock. The pilot was cleared to holding point 'Yankee 1', in preparation for an expected departure on RW 05. Shortly afterwards, the pilot requested a departure from RW 10. This request was approved and the C172 was cleared to line up and wait RW 10. The pilot was informed about landing and departing traffic on RW 05 ahead of his departure and was given permission to backtrack RW 10. At 1148, the B737 called on the frequency whilst taxiing to holding point 'Golf 1', for a departure on a New Galloway 1J SID from RW 05. This SID routing is to climb straight ahead to the Glasgow (GLG) NDB before turning left onto the Perth (PTH) VOR 240° radial. Ac are expected to cross the GLG NDB above 2000 ft, climbing to 6000 ft. The B737 was instructed to hold at 'Golf 1'.

The C172 was cleared for take-off at 1149 and was passed the surface wind of 150°/10 kt, together with an instruction to make a left turn after departure; the pilot reported rolling. The interviewee explained that, initially, because of arriving ac on RW 05, he assessed that the C172 would clear RW 05/23 to the west, before he would have the opportunity of clearing the B737 for take-off. However, subsequently, when reassessing the situation, he decided that he would be able to expedite the B737's departure by clearing it to depart ahead of the ac on final approach, rather than behind it as he planned originally. Accordingly, to accommodate this plan, he instructed the C172 to continue straight ahead. After receiving an acknowledgement of this instruction, he cleared the B737 for an immediate take-off. Shortly afterwards, the controller authorised the C172 to make a left turn and to report clear of the main runway to the west. He then asked the pilot his altitude which was reported as 1000 ft. The interviewee commented that, when he made the transmission allowing the C172 to make a left

turn, he believed from the noise of the ac's engines, that the B737 was airborne and, consequently, adequate spacing would exist for the C172 to turn on track. He did consider whether he would give the pilot of the latter an instruction to make a right turn to route overhead the airport before setting course to the west and this was the reason for asking the pilot his altitude. In the event he did not think that this would be necessary. However, with hindsight, he realised that the B737 had not been airborne at the time and, consequently, his actions had resulted in the subject ac being on conflicting tracks. He, therefore, instructed the C172 to carry out an orbit in its present position, although he did not stipulate its direction of turn. The controller believed, from observing both ac visually, that the situation had been resolved, especially as the C172 commenced an orbit straight away. Consequently, he considered that he did not need to pass traffic information to either flight. Once the B737 was airborne, the pilot commented about the close proximity of the light ac. The controller replied that he had both ac in sight and estimated that they were "well clear" of each other. Subsequently, the B737 was transferred to Scottish Control and the pilot reported, on that frequency, his intention of filing an Airprox.

The controller reported that he could not remember whether he had ever experienced, during his training, the combination of using RW 10 for a departure whilst the promulgated runway was 05. It is understood that, because the prevailing surface wind is generally south south west to west and RW 10 is comparatively inaccessible to departing traffic, is not used very often for departures. The controller agreed that he had made an error of judgement in allowing the C172 to turn cross-wind when he did. He attributed part of the cause as a misjudgement of the increasing effect that the relatively strong south easterly wind had on the light ac's ground speed as it turned westwards. The Approach Radar Controller, who was in position at the time of the incident, commented that although he could not recollect the exact figures, the wind was significantly stronger at 1000-3000 ft, than it was on the surface.

Following the investigation, the Training and Operations Manager agreed that, prior to the issue of a Certificate of Competence, it would be prudent to ensure that a trainee should either have

experienced the various combinations of mixed runway operations or at least have discussed their relative interactions with an OJTI.

UKAB Note: Radar recording shows the subject ac pass approx. 0.45 NM apart, horizontally, whilst the B737 was passing 1100 ft (QNH).

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 controller involved and reports from the appropriate ATC authorities.

The ATSI adviser confirmed that the incident had occurred on what was only the second full duty since the controller had achieved an initial Certificate of Competence and that he had not experienced the mixed RW operations that were in use on the day of the incident. The use of RW 10 for departure was acknowledged to be a rare occurrence owing to accessibility problems and the controller's relative lack of experience may have contributed to the incident. The discussion started between members as to merits of turning L or R after departure from RW 10; debate took into account the traffic situation, local procedures for VFR departure routings via the Clyde and geographical restrictions with respect to built-up areas adjacent to the airport boundary to the SE and E. An ATCO member explained the Glasgow airport layout; the location of the ATC VCR was just S of the RW intersection where the controller had to maintain a good lookout during dual RW operations. It appeared that the controller had assumed, from the noise of its engines, that the B737 was airborne from RW 05, without visually confirming so, when he instructed the C172 pilot to turn W onto track. Subsequently, the instruction given to the Cessna pilot to orbit, in order to maintain separation, did not

specify a turn direction but it was seen to enter an immediate L turn. This, he felt, negated the need to pass traffic information. Perhaps through inexperience, the controller appeared not to have taken into account the effects of the strong south-easterly surface wind which would have caused the C172 to drift during its orbit towards the RW 05 climb out. Also, the increase in ground speed as it turned downwind would have exacerbated the situation. However, the controller should have passed traffic information to both pilots even though he had both ac in sight and felt that they were 'well clear' of each other, and this omission was part of the cause behind this incident. He should also have given a more appropriate instruction to the C172 pilot to ensure a safe and orderly passage to clear the ATZ against departing IFR traffic. This had also contributed to the cause. Members also noted that both ac were on the TWR frequency during this incident and felt that perhaps the pilots in both ac could and should have been more aware of each others' intentions from the RT transmissions.

Finally, in assessing the risk, the Board were aware that when the B737 became airborne and reported the close encounter, the C172 was at that stage turning away from it following the orbit instruction from the TWR controller. Therefore, the combination of the B737 pilot's sighting of the C172 and the TWR controller's orbit instruction and his action of keeping both ac in sight, led the Board to conclude that any risk of collision had been removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Glasgow ADC did not pass traffic information and issued an inappropriate instruction to the C172 pilot which resulted in the confliction.

Degree of Risk: C

AIRPROX REPORT No 157/00

Date/Time: 28 Sep 1144

Position: 5729 N 0420 W (3 NM W of Inverness)

Airspace: LFS/FIR (Class: G)
Reporting Aircraft Reported Aircraft

Type: Tornado GR Cessna 152

Operator: HQ STC Civ Pte

Alt/FL: 500 ft 600 ft
(RadAlt) (QNH 985 mb)

Weather VMC CLOC VMC CLBC

Visibility: 30 km Unltd

Reported Separation: 200 m H/2-300 m

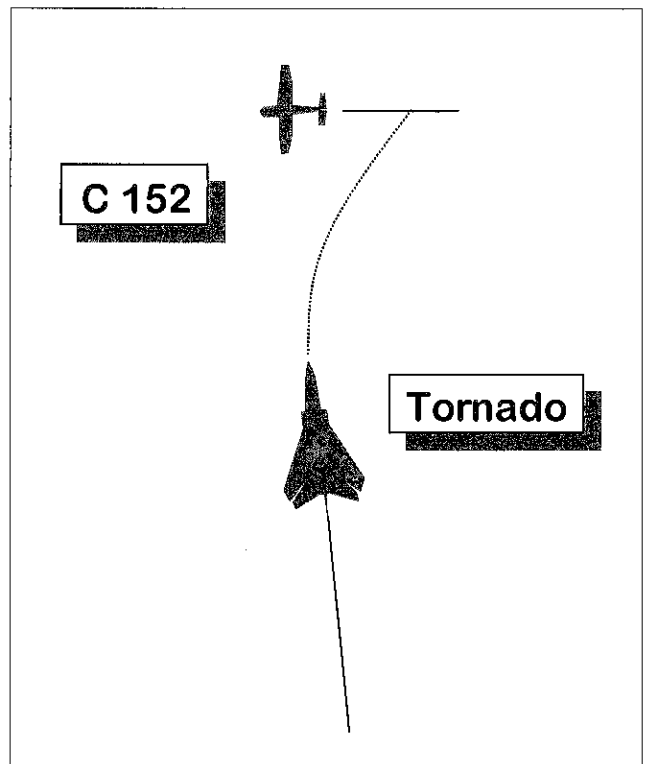
Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 350° at 469 kt; his workload was high as he approached Tain Range with whom he was in contact on 337-6. He saw a C152 in his 12:30 1 km away tracking SW at the same level and broke right to pass 200 m astern of it. There had been a possible risk of collision.

THE CESSNA 152 PILOT reports heading 270° at 90 kt during a photographic sortie with a photographer on board. He was receiving a FIS from Inverness on 122-6. While heading W by Beaully Firth at 600 ft he saw 2 Tornados cross L to R ahead of him by 400 m. Minutes later he could see one in the distance and then the other one came over a ridge towards him. He commented that he was in no position to get out of its way and it passed some 2-300 m astern of him. There was no time for avoiding action and the risk of collision was high.

He had tried to use the CANP for photographic sorties before; apart from being on the phone for 15 minutes, they could not handle the information given as the area concerned was too large. He added that such sorties can last 6-5 hours and he cannot be time and location specific because where he goes depends on the conditions found once airborne. He wondered why military ac do not have



a collision avoidance system, why the Tornados could not use the restricted airspace 20 NM to the N, and why Lossiemouth had not picked him up on radar and warned the Tornados.

HQ STC comments that although the Tornado crew had complied with the local requirement for all Lossiemouth-based ac to be in radio contact with Lossiemouth Departures or VHF Approach when operating in the vicinity of Inverness, the Cessna had not requested a service from the unit and, more importantly, was not visible on radar. The Cessna, therefore, was not called to the Tornado crew. Consequently, the onus was on both crews to see and avoid. The increased cockpit workload on approaching Tain Range may go some way to explain the late sighting by the Tornado crew; nevertheless, there was still sufficient time for them to take avoiding action.

Those civilian operators who wish to know more about military low flying operations, and the value of CANPs, may wish to obtain a copy of CAA General Aviation Safety Sense Leaflet 18A – 'Military Low Flying.'

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.

GA members of the Board were slightly concerned about what might be conveyed by the tone of the military comment in Part A, in that it seemed to be suggesting that the Cessna pilot should not have been where he was at low level without having filed under the CANP. While members supported the point that if the Cessna was in transit between 'targets' he would have been safer at a higher level, they agreed that the CANP was incompatible with a task which was unpredictable as to time and location. Members noted that the pilot was complying with advice issued after the last fast jet collision with a photographic ac, to carry a photographer; this had clearly freed him to look out and he had spotted the Tornados in good time. Members did not agree that he 'was in no position to get out of their way'; had the Tornado pilot not seen the Cessna its pilot would clearly have been able at least to dive or climb sharply to avoid a collision. However, the Tornado pilot had seen the Cessna and resolved the conflict of flightpaths, which the Board concluded was the cause of the

Airprox. The Board assessed that both pilots, certainly the Tornado pilot, had seen the other ac in time to ensure that they did not actually collide.

The Board also discussed the communications aspects. Had the Cessna pilot told Lossiemouth what he was doing, this information could have been passed to fast jet pilots known to have been in the area. This would not necessarily have included the Tornados who were, correctly, talking to Tain Range on UHF. In answer to the Cessna pilot's queries; the RAF had been developing a CWS for years but funds kept being diverted to more pressing operational needs; the Tornados were en route to a specific target at Tain which required an approach from the S (and the HRA was not active at that time of day), and both the Cessna and the Tornado would have been well below the coverage of Lossiemouth radar at the Airprox position.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict of flightpaths resolved by the Tornado pilot.

Degree of Risk: C

AIRPROX REPORT No 158/00

Date/Time: 29 Sep 1214

Position: 5432N 0156 W (2 W of TILNI)

Airspace: NORCA (Class: G)

Reporter: Newcastle APR

First Aircraft Second Aircraft

Type: B737-400 Harrierx2

Operator: CAT HQ STC

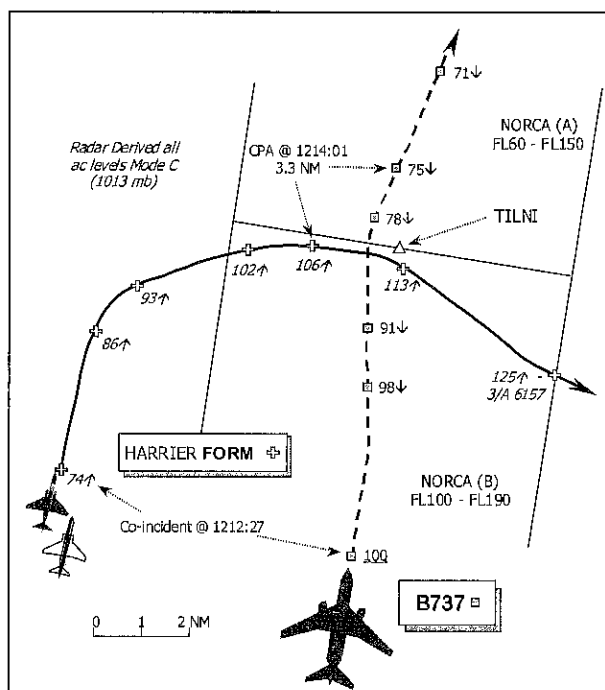
Alt/FL: FL 90 ↓ 11000 ft RPS ↑
(RPS 993 mb)

Weather: VMC VMC CAVOK

Visibility: NR >10 km

Reported Separation: 1.5 NM & 1000 ft

Recorded Separation: 3.3 NM H & 3100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE NEWCASTLE APPROACH RADAR CONTROLLER (APR) reports that the B737 had recently been identified 32 NM S of Newcastle, descending to FL 100 within the Northern Off-route Co-ordination Area (NORCA), inbound to Newcastle and placed under a RAS. The B737 was tracking along the NORCA centreline approaching TILNI and the crew had been instructed to descend to FL 60 on a heading of 005° to remain within the NORCA. An ac squawking A7001 was observed about 8 NM to the W of the B737 on a parallel track climbing through FL 88; the B737 crew was advised, but shortly afterwards the unknown ac turned towards the B737. An avoiding action R turn to head 040° was given to try to maintain separation, but the A7001, climbing through FL 109, then crossed about 1.5 NM, he thought, behind the B737, before crossing overhead TILNI, climbing through FL 116. The squawk then changed to A6157, a London Radar code, who was contacted by landline to obtain the details of the other ac. LATCC (Mil) and the B737 crew were advised an Airprox would be filed.

THE B737-400 PILOT'S company declined to provide a comprehensive report, though the pilot was informed of the Airprox report by the APR at the time of the occurrence. Allegedly, the pilots commented that as far as they were concerned it was a non-event; they thought the minimum separation was 6 NM and it was shown on TCAS.

THE HARRIER T10 PILOT reports that he was flying an instructional sortie from the rear seat as part of a formation of two Harriers; he was the ac Captain. Approaching the southern edge of NORCA (A) passing 8500 ft RPS (993 mb) in a shallow climb they were endeavouring to find a suitable break in the cloud to re-enter the LFS, hence the squawk of 3/A 7001 was selected with Mode C; HISLs were on. Aware of the proximity of the NORCA he informed his student that 'for exercise' a simulated bird strike had just occurred. During the subsequent airframe inspection an 'actual' large dent in the starboard wing leading edge was detected. For the following 30 sec while they discussed the various options, the ac remained in a gentle climb until they levelled out at 11000 ft RPS – about FL 104. A free-

call was initiated to LATCC (Mil) and a radar service requested for an immediate return to base. The B737 was not sighted at all and he believed their flight path remained clear throughout. He adds that it was not immediately apparent that they were in close proximity to the southern part of the NORCA – NORCA (B), because it is not shown on the Low Flying Chart (LFC) or on the cockpit moving map display. He perceived any risk to be "extremely low".

UKAB Note (1): The specific and unique procedures to be followed by the crews of military ac which require access through the NORCA are promulgated within the Mil AIP at Vol I ENR-5-2-6 3.9, the salient features of which are included here.

The NORCA is established within, and remains, Class G airspace. Crews of military ac operating near the NORCA are to obtain a radar service from specified ATSUs. The radar service is to be requested in sufficient time to allow standard separation to be achieved against GAT in the NORCA. If a military ac is determined by the controller to be in conflict with *participating* GAT [only CAT inbound/outbound from Newcastle/Teesside] a RAS is mandatory and crews must comply with compulsory ATC instructions to achieve standard separation. Against other traffic the normal rules of a RAS will apply and any avoiding action instructions are advisory in nature.

Civil procedures are specified within the UKAIP at ENR 1-6-6-1.

UKAB Note (2): The LFC contains a warning that : "*Airspace with a base level above 10,000 ft is not depicted on this chart*". Discussions between HQ STC SO2 Ops LF and MOD concluded that the LFC was already too cluttered and inclusion of the NORCA (B) was not warranted.

ATSI reports that the B737 was inbound to Newcastle from London Heathrow. The ac had been identified and was descending to FL 100 on the centreline of the NORCA in receipt of a RAS from the Newcastle APR. The controller observed other traffic 8 miles W of the B737 on a parallel track, squawking 7001 climbing through FL 88 Mode C. Further descent was given to the B737 and shortly afterwards the 7001 traffic turned towards the B737. Avoiding action was passed and the 7001

squawk passed astern of the B737 passing FL 109. This traffic subsequently climbed to FL 116 and crossed overhead TILNI.

THE HARRIER PILOT'S UNIT comments that NORCA B is not marked on the LFC. It is interesting to note that as the LFC is supposed to depict airspace information up to an altitude of 10,000 ft; it should show CAS with a base of FL 100, since whenever sea level pressure is less than 1013 mb, FL 100 will be below an altitude of 10,000 ft.

HQ STC comments that the Harrier T10 crew were dealing with an in-flight emergency and the ac was inadvertently allowed to climb into NORCA B. Due to bad weather on the intended route, the crew were flying VFR above cloud, but below the NORCA, intending to descend to low level, when as a result of inspecting the airframe following a simulated birdstrike they noticed a large dent in the leading edge of the starboard wing. The Video Map Generator in the cockpit was displaying the Low Flying Chart on which NORCA (B) is not depicted (presumably because its base is FL 100), which is why the crew did not consider the implications of initiating a slight climb when they were faced with dealing with a real birdstrike.

Notwithstanding the factors that led to the inadvertent penetration of the NORCA and the subsequent Airprox, this incident serves as a reminder to all crews to consider the 'what ifs' during the planning phase paying particular attention to regulated airspace. Sqn pilots have been re-briefed on the importance of adhering to SOPs when operating near or in the NORCA.

UKAB Note (3): A review of the Great Dun Fell radar recording at 1212:27, shows the Harriers squawking 7001 northbound in a slow climb on a parallel track 9 NM W of the B737, which is on the centreline of NORCA (B) and flying at its base level of FL 100. The B737 is shown descending below the base as it passes FL 98 31 sec later, which is when the Harriers are shown turning R passing FL 86 Mode C. At 1213:45 the Harriers are shown climbing through FL 102 entering NORCA (B), meanwhile, the B737 has just crossed through their 12 o'clock at 3.7 NM and entered NORCA (A) descending through FL 78, where the airliner appears to have turned R in response to the avoiding action turn reported by the APR. The CPA

is shown two sweeps later at 1214:01, the Harriers are shown passing 3.3 NM astern at FL 106 Mode C, 7 o'clock to the B737 and 3100 ft above its indicated passing level of FL 75. The Harriers exit the eastern boundary of NORCA (B) at 1215:12 at FL 125, where the London Radar squawk of 6157 is first evident, subsequent to the pilot's request for an immediate return to base (RTB) following the bird strike.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the Harrier pilot, radar video recordings, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

A military pilot member of the Board observed that the Harrier pilots were flying above the transition altitude on the RPS, anticipating a return to low-level but this did not occur. Once the dent in the wing had been discovered, resetting the altimeter to 1013 mb, the SAS, might have helped to forestall what transpired. It would certainly have been one less thing to think about when the crew was confronted with a sudden development. The STC member understood this perspective but noted the irony where a simulated emergency had turned into the real thing. The crew of this single engine ac would have been concentrating on more immediate actions, such as checking flying controls, ac systems and considering the nearest suitable airfield to divert to. A civil controller commented that had the Harrier pilot selected 3/A 7700 - the emergency code - this would have alerted the Newcastle APR to their predicament instantly. Other Controller members concurred and emphasised the importance of its prompt selection as an aid to the crew; alerting radar controllers - including Distress & Diversion cell at LATCC (Mil) - this way enables them promptly to identify emergency traffic and warn other aircrews in the vicinity. This was an important lesson worth noting. All things being equal, once an emergency situation in the air has been assessed by the crew, selecting the emergency squawk should come next.

Turning to the NORCA, specifically NORCA (B), it was evident that like the LFC the Harrier's 'electronic' map also did not depict this area of airspace. Some

members thought that if it had been shown on the LFC this Airprox could have been avoided. They thought the omission was surprising in view of the effort that had been expended in negotiation, creation and promulgation of the NORCA as a whole. The members understood that in the unexpected situation the Harrier crew found themselves it was all too easy to overlook switching charts.

It was clear from the APR's report and the radar recording that the B737 was initially level at FL 100 - the base level of NORCA (B). Controller members did not think this was sound practice as requiring GAT to fly at the base level appeared to provide no benefit against any unknown traffic operating near to the base of NORCA (B). Moreover, members noted the APR's intention of descending the B737 to FL 60 to keep it within the 'NORCA', but the radar recording revealed that it had been descended out of NORCA (B) before the Harrier started to turn towards the airliner. If the descent was for avoiding

action at that stage the radar recording showed the Harrier climbing through FL 86 still on a parallel course. To some members an 'avoiding action descent' did not appear logical with the geometry of this situation, also the avoiding action R turn issued to the B737 crew appeared to have little effect until after the Harrier had turned to pass astern of the B737 and had climbed above it. With this in mind the Members agreed unanimously that this was a controller perceived confliction. Horizontal separation of 3.3 NM was evident as the Harrier passed astern of the B737 and 3000 ft above it and this led members to conclude that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C

AIRPROX REPORT No 159/00

Date/Time: 2 Oct 1422

Position: 5828 N 1646 W (330 NM W of Stornoway)

Airspace: SOCA (Class: A)

Reporting Aircraft Reported Aircraft

Type: A330 A340

Operator: CAT CAT

Alt/FL: FL 370 FL 360

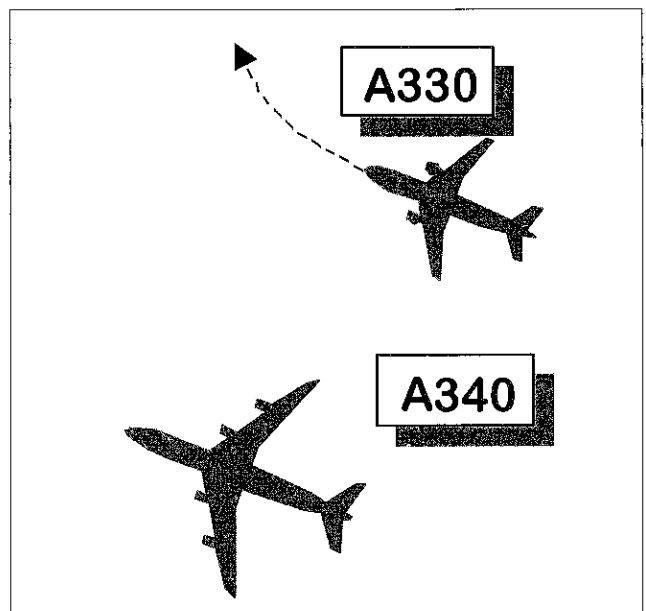
Weather: VMC CLOC VMC

Visibility: 10 km+

Reported 200 m

Separation: 1 NM

Recorded Separation: NK



PART A: SUMMARY OF AAIB INVESTIGATION

THE A330 PILOT reports heading 290° at M 0.82 and level at FL 370 in clear air. He was aware of the A340 1000 ft below and slightly left which he was slowly overhauling on the same track. He was

almost abeam it when he saw the A340's wings start to flex. At about that time he felt a bump which he described as similar to entering a mountain wave; 5 - 10 seconds later there was another bump during which the A330's altimeter reading decreased by 200 ft. Immediately thereafter he

heard a TCAS “climb climb” warning and noted that the A340 TCAS symbol had changed colour to red on his navigation display. He looked out and down at the A340 which was some 200 to 300 ft to his left in a nose-up attitude and climbing steeply. The A340 passed through his level before he had time to react to the TCAS warning and the TCAS was still issuing a climb instruction for a short while after the A340 had climbed above him. He continued to monitor the A340 visually and on TCAS. It appeared to reach an apogee above FL 380 although by this time it had fallen behind the A330. Nevertheless, it was still laterally quite close to his track so he altered course to the right to make space for it to descend back to FL 360. After a short discussion with the A340 crew on VHF radio, he broadcast a warning of severe turbulence on the common VHF frequency and then reported both the turbulence and the Airprox to Shanwick on HF Radio. There were no injuries on board the A330 although there were spillages in the cabin.

THE A340 PILOT reports that at FL 360 he was 1000 ft below the maximum cruising level displayed on the Flight Management and Guidance System (FMGS). He was expecting turbulence around 59° N 20° W and when the ac first entered light turbulence he made a cabin announcement and switched on the seat belt signs. Shortly before the Airprox he experienced moderate turbulence and noticed outside air temperature changes. Suddenly the ac began to climb, the Master Warning sounded and the autopilot self-disengaged as the ac exceeded the speed limit of 0.86 Mach. The indicated airspeed dropped below V_{LS} (the lowest selectable) as the ac climbed, and he took manual control of the ac because neither autopilot would engage. The crew subsequently reported the incident to Shanwick on HF radio and using their TCAS, they descended back to FL 360 in a safe area. At the time of the Airprox he estimated the ac were one mile apart laterally. After landing he had the ac inspected by technical staff but no defects were found. There were no injuries on board the ac. He could not remember the sequence of warnings but he did recall being unable to re-engage either autopilot which prompted him to make manual control inputs. He also remembered seeing an ‘Alpha Lock’ warning displayed on his Primary Flying Display (PFD).

Route and Weather. Both ac were westbound on North Atlantic (NAT) Track E entering Oceanic Airspace at 58° N 10° W with a next reporting point of 59° N 20° W; both ac were cruising at Mach 0.82, separated vertically by 1000 ft in accordance with RVSM (Reduced Vertical Separation Minima) used by approved ac within NAT MNPS (Minimum Navigation Performance Specification) Airspace. Each ac was using SELCAL but on different HF frequencies. They were beyond radar coverage but both crews were monitoring the common VHF air to air frequency. Both ac had a limiting speed at their respective flight levels of 0.86 Mach. A meteorological aftercast shows that at the incident location, NAT track E lay within an area marked as likely to contain clear air turbulence between FL 200 and FL 400, associated with the westerly jetstream 240/170 at FL 310 whose core was 150 NM to the S of track E.

TCAS. For a climb/descend RA, the word “Climb” or “Descend” is broadcast three times on the flight deck loudspeakers. At the same time, in Airbus fly-by-wire ac, traffic is indicated by a red square on the pilots’ navigation displays and the required rate of climb/descent is indicated by a green band within the vertical speed scale of the pilots’ PFDs. Both ac were equipped with TCAS version 6.04 which was not optimised for RVSM and this software can produce nuisance warnings. Software version 7.0, which is compatible with RVSM operations, is being deployed.

Flight Data Recordings The CVRs in both ac had over-run the event before landing but digital flight data readouts were obtained. However, since the ac clocks were not synchronised, there was no method of determining a coherent sequence of events for both ac on one timescale.

A330 Data The ac first received a TCAS TA at 1410:08 (ac clock time) which remained active for 12 minutes until the TCAS issued a climb RA at 1422:07. The RA persisted for about 19 seconds and the issue of an audio “Climb” command was recorded but the ac remained under autopilot control and within 150 ft pressure altitude of FL 370 throughout the event. Its Mach No, AoA and OAT fluctuated as to be expected in jetstream turbulence and the wind speed fluctuated by 30 kt.

A340 Data The A340 crew received a TCAS TA at 1409 (ac clock time) alerting them to the proximity of the A330. From 1420:40 the ac suffered increasing variation in windspeed (41 kt) and air temperature (10° C) which in turn caused fluctuations in pitch angle, normal g, altitude, calibrated airspeed, engine RPM and Mach No. One minute later in a particularly vigorous fluctuation, the ac's Mach No briefly increased to 0.87 and within 2 seconds fluctuated between 0.855 and 0.882. This excursion above the Mach 0.86 limit triggered a Master Warning at 1421:40 and automatically disengaged the autopilot. One second later the TCAS issued an RA with a "Descend" audio warning.

Five seconds after the autopilot disengaged, the thrust levers were closed and then autothrust was disconnected, probably by the handling pilot in an effort to prevent another overspeed condition. Ten seconds after the autopilot disengaged (at 1421:50) the AoA reached a value which caused a change in the pitch flight control law to AoA protection law which seeks to hold the angle of attack constant at a *prot* until a sidestick pitch command is made. The first recorded sidestick input was made at 1422:08, some 28 seconds after the commencement of the Master Warning.

For 18 seconds after the autopilot disengaged the ac remained within 200 ft of FL 360 but once AoA law was invoked the ac began to pitch nose-up. The pitch-up continued for 17 seconds reaching a peak of 15° nose-up shortly before the first nose-down sidestick command was applied. Throughout this phase the ac climbed rapidly (reaching a peak rate of about 6,000 ft/min) due to the increase in lift created by the flight control system's capture of a *prot*. (The ac passed FL 370 about 10 seconds after starting its climb.) The ac reached its apogee at FL 384 at 1422:28 where the airspeed had decayed to 205 KIAS and 0.67 Mach even though full thrust had been applied. Throughout the turbulence encounter, the normal g fluctuations were between 0.5g and 1.5g. There were 7 cycles of temperature change, the second cycle being the most severe. The crew subsequently descended back to FL 360 and successfully re-engaged the autopilot and autothrust systems.

The descend RA persisted in the ac logic for 27 seconds by which time the ac was climbing rapidly through FL 372. The alert then changed to a TA which persisted for 8 seconds, ceasing as the ac climbed through FL 378.

Analysis – General The incident began when both ac deviated from their assigned flight levels whilst the lateral separation between them was less than 2 NM, triggering TCAS RA warnings in both ac. Initially the risk was minimal because when TCAS RAs were issued, the ac were about 800 ft vertically separated with transient variations in vertical speed due to the turbulence; at that stage the A340 had not begun its 'zoom climb'. The incident became serious about 10 seconds later when the A340's flight control system captured a *prot* and commenced a vigorous climb which resulted in the A340 climbing through the A330's assigned flight level whilst both ac were laterally separated by a few hundred ft.

A340 crew awareness The TCAS voice message "Descend Descend Descend" may not have been noticed by the A340 crew because of other concurrent warnings. The A340 Fault Warning Computer (FWC) prioritises warnings and requires 1 second between successive warnings. The sequence of aural warnings commenced with a CRC (a Continuous Repetitive Chime that also illuminated the MASTER WARNING light) which was active for 2 seconds, then deactivated for 1 second, and was then active for a further 2 seconds. The TCAS RA aural warning should have started at about the same time as the CRC and would have been active during the 5 second period of near continuous repetitive chime but it probably ceased before the chime stopped. Both warnings are delivered through the cockpit loudspeakers and although the respective systems can generate only one aural warning and one synthetic voice message at any moment, the loudspeakers can generate simultaneously one synthetic voice and one aural tone warning. Consequently, the crew should have heard both warnings but they may not have assimilated both. Moreover, another warning, the 'Cavalry Charge' alert for autopilot disconnect, was suppressed for about 6 seconds by the FWC logic and this warning would have followed the CRC and

remained active until it was cancelled by one of the pilots after a further 5 seconds. Therefore, the succession of aural warnings could have affected the crew's ability to assimilate a concurrent synthetic voice warning.

Even though the A340 crew may not have registered the TCAS synthetic voice message, they would have had visual indications of the TCAS generated instruction not to climb. However, they were experiencing what they described as severe turbulence which may have made reading the displays very difficult. Also, it would have been natural for their attention to have been captured by the Master Warning triggered by the overspeed condition which took priority over the autopilot disconnect warning. That they reacted to the overspeed warning is indicated by closure of the thrust levers five seconds after the onset of the CRC.

AoA Protection Law Once AoA law is active, rearward movement of the sidestick controls angle of attack between α_{prot} (neutral sidestick) and α_{max} (full aft sidestick). Forward movement of the sidestick disengages AoA protection law and the system reverts to normal pitch law. However, there is no aural or text message which informs a crew that AoA protection law has been invoked. If the sidestick is not moved from its neutral position, the pitch flight control system is programmed to capture α_{prot} and not the airspeed that corresponds to α_{prot} in 1 g flight. Consequently, in turbulence the speed scale will probably be oscillating, the ac pitch angle could also be oscillating, and the change from normal pitch law to AoA protection law could be difficult to detect.

The commander's reported sighting of an 'Alpha Lock' message was probably an **alpha floor** warning on the flight mode annunciator portion of the PFDs. Alpha floor is an autothrottle function which applies full thrust, irrespective of the position of the thrust levers, if the airspeed is likely to reduce to a value approaching **alpha max**. In this incident, the A340's calibrated airspeed decreased from around 270 kt before the turbulence encounter to 205 kt at the apogee of the climb.

Ac Response to Turbulence Changes to the A340's flightpath caused by the ac's response to the overspeed warning and autopilot disconnect

were negligible until AoA law was triggered. The fact that this law was not triggered until 10 seconds after the autopilot disconnected was a random event driven by the severity of the turbulence. Had the turbulence been more severe at the first encounter and coincident with the overspeed warning, reversion to AoA law could have been triggered as soon as the overspeed condition disconnected the autopilot. However, had the autopilot remained engaged, the AoA law would not have been invoked because it only applies in manual control.

Such was the vigour of the A340's climb in AoA law, the ac could well have climbed through FL 363 (thus provoking a TCAS RA with revised software version 7.0) in a very short time, even if the crew had applied nose-down sidestick as soon as they heard the (delayed) autopilot disconnect warning. The climb to FL 363 would have been sufficient to generate a TCAS RA in any adjacent ac at FL 370, but, if the intruder ac continues its climb, there can be no guarantee that an ac directly above it could respond in sufficient time to avoid a collision. Therefore, the RVSM safety case should not be driven by any assumption that a different crew might have contained the situation by making an earlier nose-down sidestick command than the A340 crew involved in this incident.

Navigation Accuracy The safety case for RVSM is partially dependent on accurate plan position navigation. The accuracy of modern navigation systems is such that contemporary ac types assigned to the same airway or NAT Track will tend to be very close to each other laterally; GPS will probably increase this tendency. Therefore, although ac on adjacent NAT tracks will be 60 NM apart, ac on the same NAT track may be vertically aligned and 1,000 ft apart. Consequently, improvements in navigation technology progressively reduce random lateral scatter between ac on the same track. This reduction in natural scatter increases the hazard if ac adopt unexpected or uncommanded pitch manoeuvres.

NAT Track Tactical Separation Procedures The need for tactical procedures to increase lateral separation between ac at different FLs on the same NAT track is recognised in Edition 8 of the Operations Manual for flights within the North Atlantic MNPS Airspace. Special Procedures in

Chapter 12 take account of the possibility of encountering wake turbulence, when commanders are permitted to offset their track by not more than 2 NM upwind of the designated track. However, there is no mention in the Special Procedures section of contingency measures which might augment safe separation when one ac overtakes another on the same track when their vertical separation is 1,000 ft.

Overtaking Procedures This incident arose (and was reported) because one ac was overtaking another whilst they were following the same track and vertically separated by 1,000 ft. There was no risk of a wake turbulence encounter because the leading ac was below the overtaking ac. However, there was a serious loss of separation when both ac entered clear air turbulence which caused the A330 to experience height perturbations and brought about a significant undemanded pitch-up manoeuvre in the A340. Moreover, although the TCAS systems in both ac detected the loss of separation and immediately issued appropriate warnings to the two crews, the A340 crew may not have heard the warning and the A330 crew did not have the time or ac performance reasonably required to take successful avoiding action. In essence, although the TCAS computers issued appropriate instructions in both ac, the combination of TCAS equipment, crew reactions time and ac performance was not capable of resolving and preventing a serious collision hazard provoked by clear air turbulence.

Risk reduction Measures This collision risk could have been reduced if the commander of the overtaking ac had been permitted (and expected) to increase the lateral separation between the two ac before they reached the line abreast position. A simulation conducted at the request of Airbus Industrie indicated that for one ac slowly overtaking another at high altitude, a lateral separation of 1.5 NM would be sufficient to preclude a TCAS RA if the vertical separation of two ac on parallel tracks was compromised. The ability to offset by up to 2 NM for wake turbulence reasons is already an approved contingency procedure and there would appear to be a safety case for extending this contingency procedure to overtaking, particularly in regions where turbulence of any kind is evident or forecast. Therefore AAIB made Recommendation 2000-67.

ATC Reporting Whether or not ac are within land-based radar coverage, Oceanic ATC will not issue a clearance for a contingency lateral offset manoeuvre. However, commanders are still required to inform ATC if they take such action. Without radar coverage and with the in-built time delay through messages being received by HF radio in one place and relayed to controllers in another place (ie Ballygireen/Prestwick) it is difficult to see what practical use ATC can make of such messages. Certainly pilots are not usually able to assimilate the information because they will be maintaining an HF radio SELCAL watch. Moreover, the requirement to seek clearance from ATC may inhibit pilots from taking timely action to offset from a preceding ac's track. Consequently, since all ac in Oceanic RVSM airspace must have TCAS equipment, any safety benefit acquired through notifying ATC would appear to be of inferior use to TCAS derived information. Because the presence of any ac which is a proximity threat to another ac will already be known to both crews via their TCAS equipment, the need to inform ATC of a lateral offset of not more than 2 NM seems superfluous when adjacent tracks are 60 NM apart. Therefore AAIB made Recommendation 2000-68.

European RVSM airspace RVSM procedures are due to be implemented in European airspace in January 2002 between FLs 290 and 410 inclusive. To meet this target date ac required full technical approval by 31 March 2001. It is not clear whether the European (or Oceanic) safety case studies and models have taken account of the risks of clear air turbulence coupled to the response of sophisticated flight control systems such as those fitted to the Airbus fly-by-wire ac series. Moreover, the European RVSM safety case will be different to the NAT safety case because there is far more traffic flying opposing tracks or crossing the tracks of other ac. Consequently, AAIB made Recommendation 2000-69.

Offset Direction The approved contingency measure to alleviate wake turbulence on NAT Tracks (to offset by up to 2 NM upwind of the ac ahead) is sound for ac flying predominantly in the same direction but will be less sound for ac flying on opposing tracks in European RVSM airspace. In this region, ac offsetting upwind by 2 NM from the ac ahead will tend to place themselves in a head-on position relative to another ac performing

a similar manoeuvre but flying in the opposite direction. Whilst the European area procedures will be different because of the extensive radar control, and clearance from ATC will be required to offset track, there may be a safety benefit in adopting a standard procedure for offsetting to the right. Such a procedure would be in accordance the Rules of the Air and if action is taken early, wake turbulence could be avoided irrespective of the wind direction. In this way ac adopting a lateral offset to overtake or for wake turbulence would be well separated from all traffic travelling in the opposite direction on the same datum track or airway. Therefore AAIB made Recommendation 2000-70.

Summary of Safety Recommendations On 29 November 2000 AAIB recommended that:

- 2000-67** The CAA forward a recommendation to the appropriate international bodies to review overtaking procedures in RVSM airspace.
- 2000-68** The CAA forward a recommendation to the appropriate international bodies that they reconsider the need for commanders to inform ATC of all lateral offset manoeuvres of less than 2 NM in Oceanic airspace, irrespective of the reason for the manoeuvre
- 2000-69** The CAA bring this incident to the attention of the Eurocontrol RVSM Safety Assurance Section as soon as practicable so that its impact on the safety case may be properly considered.
- 2000-70** The CAA forward a recommendation to the appropriate international bodies to consider standardising lateral track offset procedures which are independent of wind direction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted of a report from the filing pilot and the AAIB investigation report.

Members commended the AAIB on their lucid and detailed report which made it clear to the Board that the cause of the Airprox was that the A340's climb, generated by the capture of 'a prot', was not contained by the crew in time to prevent the ac climbing through the level occupied by the A330. Board members who fly Airbus ac believed that there must have been a breakdown in the clear allocation of responsibilities on the flight deck. In Airbus ac it is essential that only one pilot flies the ac while the other deals with associated duties, and that both pilots fully understand who is handling the ac. There appeared to be an over-riding desire in the A340 flight deck to get the autopilot to re-engage instead of flying the ac. In a conventionally controlled ac, the ac may not be exactly in trim when the autopilot trips out and the natural tendency on autopilot disconnect will be to take hold of the flying controls. However, in a fly-by-wire ac, an autopilot disconnect will leave the ac in trim and it will maintain the last selected attitude so the normal natural tendency of a pilot to reach for the controls in the event of a disconnect may be abated. With the handling pilot's hand on the sidestick, an unwanted climb could have been stopped straight away, cancelling a prot law at the same time. It appeared that for many seconds after the autopilot disconnect, no-one was flying the A340.

While the pilot members believed that they would have been able, without difficulty, to prevent the ac climbing through 2300 ft in these circumstances, it was considered that the surprise factor could well cause a significant departure from an assigned level especially if α prot was captured as soon as the autopilot disconnected in turbulence. The Board therefore fully supported the AAIB recommendations to improve flight safety in the event of such departures, with the following exception. ATC members agreed that an automatic 2 NM offset for overtaking ac was unexceptionable in a non-radar environment such as the NAT System, but would be unworkable in a radar environment where controllers might already be using a 5 NM radar separation. An offset in these circumstances would have to be at a controller's discretion. Nevertheless recommendation 2000-67 was supported provided that the recommended

review differentiated between the overland, radar RVSM environment, and the Oceanic, non-radar environment.

In addition, the Board made a recommendation of its own; that the 'turbulence induced' capture of α prot law (in circumstances such as those encountered in this Airprox) should be introduced in Airbus flight simulator training, firstly to establish some sort of norm for the size of level deviations across the Airbus pilot population, and secondly to train pilots to cope promptly with the situation.

Because the A340 climbed so close past the A330, before the latter's pilot had time to react to the TCAS RA or to move his ac out of the way, the Board assessed that there had been a risk of collision in the incident. This was the first incident in the UK FIRs in which TCAS RAs had been generated and the risk of collision had not thereby been removed, but it was pointed out that the circumstances were outside the design parameters of TCAS and neither pilot had followed his RA.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A340's climb, generated by the capture of ' α prot', was not contained by the crew in time to prevent the ac climbing through the level occupied by the A330.

Degree of Risk: A

Recommendations: (1) The Board strongly supported AAIB recommendations 2000-67 to 70 provided that account was taken with 2000-67 of the different lateral separations used in the radar and non-radar ATC environments.

2) That the 'turbulence induced' capture of α prot law (in circumstances such as those encountered in this Airprox) should be introduced in Airbus flight simulator training, firstly to establish a norm for the size of level deviations across the Airbus pilot population, and secondly to train pilots to cope promptly with the situation.

AIRPROX REPORT No 160/00

Date/Time: 4 Oct 1227

Position: 5142 N 0207 W (1.25 NM SSE Aston Down - elev. 600 ft)

Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	Cirrus Glider	Hunter
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<u>Operator:</u>	Civ Club	Civ Pte
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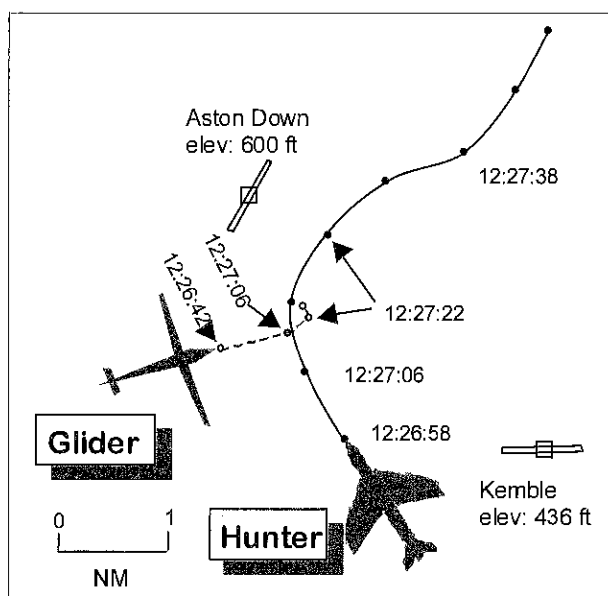
<u>Alt/FL:</u>	900 ft (QFE 1000 mb)	800 ft á (QFE 1004 mb)
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<u>Weather</u>	VMC CBLC	VMC CLOC
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<u>Visibility:</u>	50 km	10 km
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<u>Reported Separation:</u>	400 V/0 H//300 V/ 0H
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<u>Recorded Separation:</u>	not recorded
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PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CIRRUS 703 GLIDER PILOT reports flying solo downwind LH for runway 21 at Aston Down heading 360° at 55 kt and level at 900 ft QFE 1000

mb. The visibility was 50 km, 2000 ft below cloud in VMC. He heard the sound of a jet ac and saw a camouflaged 2 seat Hunter pass 400 ft directly beneath him heading towards the glider launch point. The Hunter was then seen to commence a tight R turn followed by a climb, passing through

the glider's level and clearing the area to the E. The pilot assessed the risk of collision as moderate to high.

THE HUNTER PILOT reports flying a dual training sortie from Kemble routing to Brize Norton for a circuit detail. He was receiving an A/G service from Kemble Radio on 118.9 squawking 7000 with Mode C. The visibility was >10 km with no cloud in VMC. Immediately after departure, he told the student to commence a R turn to avoid Aston Down. During the R turn, approximately 2 NM NW of Kemble at 220-230 kt passing 800 ft QFE 1004, and heading 330° he saw a glider in level flight and told the student "ac at 11 o'clock, high". As the student did not reply, he reiterated "it's a glider – 11 o'clock, stay low". Due to the lack of acknowledgement from the trainee, who was on his second Hunter sortie, he took control and whilst maintaining visual contact with the glider, which passed 300-400 ft above, continued the turn onto heading 030° and contacted Brize Norton. He reports an initial sighting distance of the glider as 1-2 NM and did not believe that this incident was an Airprox.

UKAB Note (1): The Clee Hill Radar replay at 1226.42 shows an intermittent primary response, believed to be the glider, 1 NM S of Aston Down tracking ENE. At 1226.58, another primary response appears 1.5 NM W of Kemble in a R turn, believed to be the Hunter, with no squawk. Eight seconds later, the glider crosses 0.5 NM ahead the Hunter's track in a L turn onto a Northerly heading. The tracks converge very shortly afterwards, 1 NM SSE of Aston Down, with the Hunter turning R onto a NE track as the glider turns L onto the downwind leg.

UKAB Note (2): Radar data indicates the Hunter accelerating in the R turn with a speed calculated as >300 kt as the returns merge.

UKAB Note (3) The UK AIP at ENR 5-5-1-1, promulgates Aston Down as a Glider Launching Site centred 514228N 020750W for winch and aerotow launches where cables and tug ac may be encountered to 3000 ft agl, during daylight hours.

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.

Members initially discussed the geography of the incident location, in particular the proximity of Kemble and Aston Down airfields. The distance was measured as just under 4 miles and the incident was believed to have occurred as the Hunter left the Kemble ATZ in a R turn towards Brize Norton. One member wondered whether a L turn on departure would have been more prudent to take the Hunter away from the glider site but it was apparent from the maps that Kemble also had 2 more neighbouring airfields within 4 miles to the S and another gliding site 5 miles to the E. With all this in mind, the Hunter's planned departure track and direction was perfectly reasonable, but it had to be flown 'tightly'.

It was clear from both pilots' reports that the Hunter had passed underneath the glider by about 400 ft and there was concern that the jet pilot had not given the Aston Down circuit a wider berth. Members then discussed the possible reasons why this should have happened. The Hunter student had commenced a R turn immediately after departure from Kemble but had not reacted to 2 warnings from his instructor of the glider ahead of him. It was easy to criticise the QFI's delay in taking control but those familiar with fast jet flying and teaching, sympathised to a degree. They went on to point out that the Hunter had flown at a speed which would have increased its radius of turn and this had exacerbated the situation. A slower speed (below 250 kt) and a tighter R turn after departure would have kept the Hunter clear of the busy gliding site as it transited to Brize Norton.

Members concluded that the Hunter had flown close enough to give the glider pilot concern for the safety of his ac. However, whilst passing within 400 ft of each other, the Hunter captain had remained in visual contact with the glider throughout and was always in a position to remove any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hunter flew close enough to cause the glider pilot concern for the safety of his ac.

Degree of Risk: C

AIRPROX REPORT No 161/00

Date/Time: 5 Oct 1420

Position: 5055 N 0136 W (258° SAM 10 NM)

Airspace: CTA (Class: D)

Reporting Aircraft Reported Aircraft

Type: Gulfstream GA7 PA28

Operator: Civ Trg CivTrg

Alt/FL: FL 50 5000 ft
(RPS 1013 mb)

Weather VMC CLOC IMC IICL

Visibility: 20 km 10 km

Reported Separation:

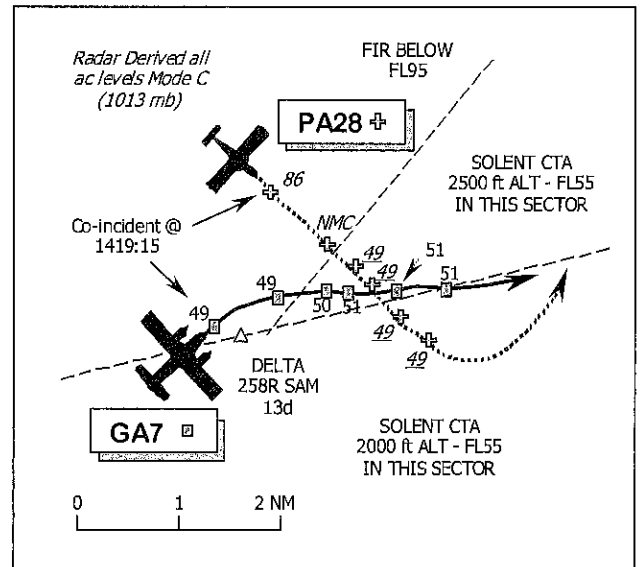
100 ft V, 200 ft H NR

Recorded Separation: 100 ft V, 0.2 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GULFSTREAM GA7 PILOT reports he was instructing an IFR training flight under simulated IF with a student; IF screens were in place for the LHS. They were flying in VMC – 5 NM clear of cloud horizontally with an in-flight visibility of 20 km and out of the sun. The ac has a blue/white livery, anti-collision beacon and HISLs were on. They were in receipt of a RCS, from SOLENT RADAR and squawking A1740 with Mode C.

While cruising at 135 kt, level at FL 50, about 258° SAM 9 NM heading 075°(M), a blue and white low wing single engine light ac – possibly a Cherokee type - was spotted at the 10-30 position, about 250 yd away crossing ahead from L – R. A slight pull-up was made to avoid the other ac, but the late sighting prevented earlier action; he banked L then R as the other ac passed about 100 ft below and 200 ft ahead with a “high” risk of a collision. The ac disappeared from view into the blind spot under the nose with no apparent change of level or track. It reappeared at the 3-30 position, still about 100 ft below his ac, before turning L and flying back toward him. SOLENT kept him informed and there was no further danger. He added that the IF training screen fitted on the LHS adversely affected vision from the cockpit and contributed to the late spot. He reported the Airprox to SOLENT RADAR on RT.



THE PA28 PILOT submitted his report over 3 months after the event stating he was conducting an IMC training sortie with a student. The ac has a blue and white livery, HISLs were on and a squawk of A7000 was selected with Mode C on, whilst listening out on the BOURNEMOUTH APPROACH frequency of 119.62 MHz.

He was flying in and out of cloud, between layers at 5000 ft, Portland RPS (1013 mb), with an in-flight visibility of 10 km. Toward the end of the flight, about 11 NM W of SAM, in the vicinity of the Stoney Cross VRP they were turning through 090°, he thought, to intercept the 270°R at 95 kt, when APPROACH broadcast a request to an ac N of the Bournemouth CTR to identify itself. He responded and was subsequently asked to switch off Mode C, as it was apparently mis-reading. (UKAB Note (1): Such a transmission is not evident within the RT transcript before 1434). Upon landing he telephoned Bournemouth ATC and was advised of the Airprox report. Neither he, nor his student, saw any other ac at the time of the Airprox.

He added in a subsequent telephone conversation that 2 Garmin 430 GPS units were in use by him at the time, whilst the student flew to the VOR; he thought that the navigational equipment was operating satisfactorily and could not account for

his inadvertent entry into Class D airspace. The Mode C was subsequently placed u/s and has only recently been returned to service.

UKAB Note (2): Meteorological Office archive data confirmed the Portland RPS for the period was 1013 mb.

THE SOLENT RADAR CONTROLLER reports with RT transcript, that the GA7 was level at FL 50 on an IFR training flight routeing DELTA – SAM VOR – Bournemouth Airport. Just before 1420:30, and just after the GA7 passed DELTA (258° SAM 13 NM), the pilot reported “...just had an ac a Cherokee..in fact a blue and white one has crossed our path about a hundred foot below us”. He responded “...it's not working me...I believe he may have just been turning back towards you at the moment, presently tracking eastbound...not showing any Mode Charlie at the moment”. A 7000 squawk was observed garbling with that of the GA7, but when the two separated the Mode C of the other ac intermittently indicated FL 47, but was observed to be fluctuating between FL 44 and FL 84. The GA7 pilot then reported that “...looks like he's climbed to our level now”.

BOURNEMOUTH and BOSCOMBE RADAR were requested to track the ac squawking A7000. The Bournemouth APR subsequently called to advise the traffic was on their frequency under a FIS. When asked, the GA7 pilot reported he was filing an Airprox.

THE BOURNEMOUTH APPROACH RADAR CONTROLLER (APR) reports with RT transcript, that the PA28 departed Bournemouth Airport on a local flight and once outside CAS was placed under a FIS and the Portland RPS issued.

The GA7 departed Bournemouth Airport at 14.13, on a local IFR training route. The crew was cleared to route under their own navigation to 'DELTA' (a local IFR training route fix - 045° Bournemouth Airport 9 NM). The ac was transferred to SOLENT RADAR at 1416, climbing to FL 50 routeing Bournemouth Airport – DELTA - SAM, and estimating SAM at 1421. SOLENT RADAR called at 1421, and informed her of an Airprox, which occurred at about 14:20. SOLENT asked if she was aware of the identity of the other ac squawking A7000, as it had entered Class D CAS without a

clearance. Being unaware of the ac's identity she agreed to attempt a positive identification on it for SOLENT.

An ac tracking westbound was observed squawking A7000, but the Mode C was erratic indicating FL 48 and then it changed to a much higher level. When the contact was N abeam Bournemouth Airport she made a 'blind' transmission at 1432:30 – “Station operating N of Bournemouth range of 8 miles due N of Bournemouth indicating FL 85 unverified say your callsign”. The subject PA28 pilot immediately responded giving a much lower level “...heading westbound...5000 ft on 1013 tracking the 270 for the Sierra Alpha Mike squawking 7000”. For identification a squawk of 1730 was assigned, whereupon the ac involved in the incident was positively “...identified position 9 miles N of Bournemouth”. The pilot was then instructed to squawk 7000 again at 1433:30, and to contact ATC on landing by telephone, which he subsequently did.

ATSI reports that the Solent RADAR controller did not notice the 7000 squawk prior to the Airprox and when he was made aware of the incident by the pilot of the GA7, the respective SSR labels were overlapping. The local IFR training route via 'DELTA', results in aircraft routeing very close to the boundary of CAS, as on this occasion. Apparently it is used just for IRT traffic by design to avoid Southampton Airport traffic.

UKAB Note (3): The LATCC Pease Pottage radar recording illustrates this Airprox clearly which occurred very close to the Boundary of Class D/G airspace. The GA7 identified by its A1740 squawk is shown climbing to FL 50 and exits the Solent CTA via DELTA, into Class G airspace at 1419:15, before turning R to track toward the SAM VOR indicating level at FL 49 and re-entering the Class D CTA at 1419:40. Meanwhile, the PA28 - subsequently identified on the recording when the Bournemouth APR assigned a squawk of A1730 - is shown tracking SE and closing on the GA7. The PA28 indicates FL 86 unverified Mode C at 1419:15; subsequently no Mode C (NMC) is evident until 1419:46, when it indicates FL 49, apparently 100 ft below the GA7 shown at FL 50. It is probably just after this point that the GA7 pilot spotted the PA28. The CPA occurs at 1419:59, as the PA28 crosses about 0.2 NM ahead of the GA7, which climbs 100

ft to FL 51 following the “slight pull-up” reported; the PA28 indicates FL 49 unverified Mode C throughout, and subsequently turns back toward the GA7.

The PA28 Mode C indication is slightly erratic about 45 sec before the Airprox. However, the vertical separation reported by the GA7 pilot is exactly in accord with the indicated Mode C separation observed at the time of 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, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

GA instructor pilot members were concerned that the IF screens fitted in the GA7 might have adversely affected the instructor pilot's vision from the cockpit more than normal. Although not a frequent occurrence, impaired 'lookout' caused by IF screens has been a recurrent theme in several Airprox involving IF training flights. This Airprox took place on the boundary of the SOLENT CTA and clearly illustrates the need for a careful lookout when operating close to or crossing the boundary of CAS. IF screens are used to simulate IF conditions and preclude the use of external references by the PF. However, CAP 682 (Part 5) Appendix 5 - *Requirements for ac used on IR modular courses of flying training* stipulates that IF screens must “*be angled to ensure minimum interference to the all-round lookout from the normal seating position of the instructor*”. The presence of IF screens does not absolve the instructor from his requirement to lookout whilst acting as the 'safety pilot'. Members were in no doubt that there was a lesson here for all instructors.

Fortunately, the GA7 pilot had spotted the PA28 at a range of 250 yd and managed to pull up to avoid it, albeit without any warning or avoiding action from SOLENT RADAR, a point which prompted discussion on the provision of a RCS at the boundary of Class D. Although somewhat academic, the controller had not apparently revised the ATS as the ac exited and then re-entered Class D airspace whilst the GA7 student attempted to fly

via DELTA to SAM. This routeing seemed to be used regularly for local IFR training and presumably had been agreed with ATC to minimise interaction between training flights and commercial traffic, but IFR flights routeing via this point were then vulnerable to traffic operating in the FIR close to the CTA boundary. Some members thought this procedure leaned more towards convenience than safety. The Board recognised that the SSR label overlap, coupled with the reported erratic Mode C indications probably obscured the conflict from the SOLENT RADAR controller. Certainly, the PA28's Mode C had indicated FL 86 at 1419:15, on the radar recording. This would have indicated to the controller, erroneously, that the ac was well above the CTA at the time. Unless the controller had monitored the unknown 7000 squawk (the PA28) closely, and he had no reason to do so, he would have been unaware that it was at virtually the same level as the GA7 and on a conflicting course. Because the PA28 did not indicate FL 49 Mode C until 13 sec before the CPA, there was little opportunity for the controller to take positive action before the close encounter.

Notwithstanding the foregoing, it was abundantly clear to members that the PA28 pilot had entered Class D airspace without a clearance. The pilot could not account for this as all navigation aids - specifically the VOR - were serviceable and the much vaunted accuracy of GPS had not helped here at all. Though the Airprox could have occurred with the PA28 outside the CAS boundary, neither the pilot nor his student saw the other ac at all on either occasion they flew close to the GA7. As the PA28 pilot was very familiar with the local area this surprised some pilot members who thought that operating so close to the CTA without a radar service was unwise. Regardless of the instructor's teaching task, his prime responsibility was to ensure that his ac was operated safely, clear of CAS and other ac. Consequently, members concluded that this Airprox was caused by the PA28 pilot who entered CAS without a clearance and flew into conflict with the GA7, which he did not see.

Turning to the risk inherent in this encounter members considered the GA7 pilot's late sighting, the PA28 pilot's complete lack of awareness of the other ac and the absence of any warning or avoiding action from ATC all of which raised considerable concern. However, it was fortunate that the GA7

pilot spotted the PA28 when he did, which enabled him to climb 100 ft above the PA28 as it crossed from L – R, about 0.2 NM ahead of his ac. As the GA7 pilot had time to take avoiding action, albeit only a slight pull up, this deflected some members away from the view that an actual risk of collision had existed. Others were less convinced, but in the end a majority concluded that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot entered CAS without a clearance and flew into conflict with the GA7, which he did not see.

Degree of Risk: B.

AIRPROX REPORT No 162/00

Date/Time: 29 Sep 0744

Position: 5138 N 0006 E (2 NM W LAM)

Airspace: LTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: MD90 B737-300

Operator: CAT CAT

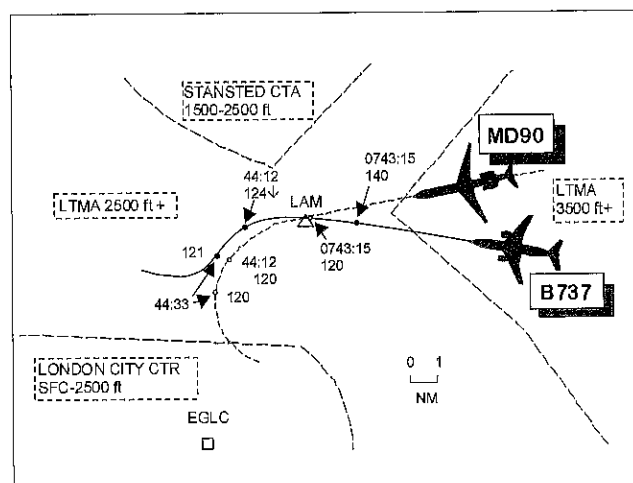
Alt/FL: FL 120 ↓ FL 120

Weather VMC CLAC VMC CLAC

Visibility: "unlimited" >10 km

Reported Separation: 100 ft, 2 NM/
0 ft, 1.3 NM

Recorded Separation: 100 ft V 1.3 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD90 PILOT reports entering the LAM hold at FL 120 at 220 kt inbound to Heathrow. The visibility was unlimited in VMC. He was given avoiding action by ATC owing to another ac descending in the hold to FL 120. The ac was not sighted visually but was tracked on TCAS; no TCAS alert was received. The reported traffic passed 2 NM horizontally and 100 ft vertically clear.

THE B737 PILOT reports descending to FL 120 at 210 kt in a L turn as he also entered the LAM hold. The weather was VMC above cloud with >10 km visibility. As he was approaching FL 120 he saw a

MD90, which he had heard on frequency previously, about 2 NM ahead and 100 ft below. He queried his R turn onto an easterly heading. The pilot commented that he had expedited his descent through FL 130 as he had 2 months previously been given an avoiding action turn in the LAM hold at FL 130 against conflicting traffic at the same level which passed 3 NM clear. He had not received a TCAS TA or RA. He surmised that as both ac were travelling in line astern and not closing, the risk of collision once both ac were at the same level was not considered a possibility.

ATSI reports that the incident took place at 0744, 3 minutes after a change of controller had been made on the LATCC TC NE Sector and involved both the

outgoing and the incoming Sector Controllers (SC). The workload and traffic loading were assessed as light to medium and the Sector was bandboxed.

Both ac were inbound to Heathrow via a LAM 3A STAR and estimating LAM VOR, the clearance limit, within a minute of each other. Approaching LAM from the E, both ac had been placed on parallel radar headings to facilitate simultaneous descents. The outgoing SC issued descent clearances to each flight, the MD90 to FL 120 and the B737 to FL 140. Once the MD90 had vacated FL 140 and the required vertical separation had been established, lateral separation could be dispensed with and each flight was instructed to resume its own navigation direct to LAM, to enter the holding pattern. Thereafter, the NE SC was responsible for ensuring that the minimum 1000 ft vertical separation was maintained between the two ac as they were stepped down to their respective release levels: FL 110 for the MD90 and FL 120 for the B737, prior to transfer to TC Heathrow Approach.

At about this time, the incoming SC was preparing to take over the bandboxed Sector from his predecessor. He reported that the handover was conducted over several minutes and was confident that he had obtained an accurate picture of the traffic situation, including the subject flights. The MD90 reached FL 120 and, at 0740:05, the outgoing SC instructed this flight to descend to FL 110, its release level, and marked the FPS accordingly. Controllers are required to ensure that they obtain a satisfactory readback to level instructions (MATS Part 1, page E-7/8 & SI 8/99). On this occasion, the outgoing controller believed she had received a readback from the MD90, however, the RT recording reveals that the contents of the transmission immediately following the descent instruction consisted of *"descending flight level one seven zero inbound Lambourne"* and was not identifiable as a response from the MD90 pilots. This transmission has since been attributed to the partly blocked first call on the frequency by another flight, which made its call uninterrupted seconds later. The outgoing SC cannot explain why she had not detected the absence of a satisfactory readback. It therefore, can only be speculated that maybe her concentration had slipped momentarily during the handover or that possibly her successor had inadvertently caused her distraction by talking at the critical moment, as he later suggested. The

incoming SC recalls the MD90 being issued with the descent clearance by the outgoing controller but is not sure if he heard the response as it was possible he did not have his headset on at the time. He nevertheless had no reason to believe that his colleague had not obtained a satisfactory readback from this flight. The radar recording shows, however, that the MD90 did not subsequently leave FL 120.

A short while later, at 0741, the incoming SC took over the sector. He did not notice that the MD90 was still maintaining FL 120 and during the course of the next two minutes attended mainly to outbound traffic in other parts of the sector. The radar recording shows that in the meantime the MD90, still at FL 120, and the B737, at FL 140, had continued on slowly converging tracks towards the LAM VOR, with the MD90 about 2 NM ahead of the B737. Returning his attention to the LAM hold and confident that the MD90 had been descended to FL 110, its release level, the NE SC instructed the flight, at 0743:05, to contact Heathrow Approach. The issue of the MD90's descent clearance to FL 110 is recorded on the relevant FPS, however, FL 120 is not marked as having been vacated. The controller stated that it was normally part of his routine, especially during holding situations, to ensure level vacating reports are secured before reassigning the levels. He acknowledged that on this occasion he should have sought confirmation by either checking with the pilot of the MD90 or observing the flight's SSR Mode C height readout on the radar. By that stage, however, there was limited opportunity for the latter option because the radar recording indicates the subject ac's SSR labels were partly obscured by other labels in the vicinity of the LAM VOR. The alternative would have been the selection of the 'stack windows' facility on the radar display, which provides an expanded view of individual holding patterns. Useful though this facility can be in reducing the incidence of label overlap, controllers have found that during bandboxed operation there is insufficient space on the radar display to include the 'window' without obscuring important parts of the sector. Hence, it was not being employed on this occasion. The incoming NE SC believes that during those first few minutes of the duty, he had underestimated how out of practice he had become and consequently his performance had been less disciplined and thorough than otherwise would have been the case.

This had been his first duty for about 30 days, following a period of leave and an absence due to sickness. In view of this lack of ATC currency, he felt on reflection that it would have been prudent to have 'split' the Sector prior to him taking over. Operating initially just one element of the Sector would have allowed him time to get back 'up to speed' while exposed to a lower workload.

At 0743:15, immediately after the MD90 crew had read back their transfer instructions to Heathrow Approach, the SC issued the B737 with a descent instruction to FL 120, with a request to report leaving FL 140. The radar recording shows that over the next 35 seconds the MD90, still at FL 120, arrived overhead the LAM VOR and commenced a left turn outbound in the holding pattern, while the B737 followed in trail at a steady 1.3 NM and started its descent from FL 140. At 0743:50, the MD90 made its first call to Heathrow Approach, reporting entering the hold at FL 120. Expecting the flight to be at or descending to its release level, the Heathrow North Support controller, sharing the same frequency as the Intermediate Director North, instructed the MD90 to continue in the hold and to confirm its cleared level. The pilot replied FL 120. Meanwhile, the B737 crew had sought confirmation of their cleared level from the NE SC. At the same time, the STCA triggered a low severity alert and, now recognising the proximity of the MD90, the controller responded to the B737 by instructing the pilot to turn right onto a heading of 090° but did not stop the flight's descent. The controller employed avoiding action phraseology but did not issue traffic information; the pilot replied "*in sight*" and read back the radar heading. At this stage, the radar recording shows that the MD90 was in the B737's 11 o'clock position at a range of 1.3 NM and 400 ft below. The Heathrow North Support controller was alerted as the STCA equipment activated again, this time at high severity and he immediately instructed the MD90 crew to "*...descend now FL 110 avoiding action descend FL 110*"; there was no reply. The Heathrow Intermediate Director North then established communication with the flight and instructed it to "*...descend immediately to level 110 avoiding action and turn left heading 100 (degrees)*". These combined efforts did not prevent separation reducing further, reaching a minimum, at 0744:33, when the B737 had reached FL 121 with the MD90, still at FL 120, in its 10 o'clock position, at a range of 1.3 NM. Thereafter the ac tracks started to

diverge and vertical separation began to increase, with the required minimum separation being established 30 seconds 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 authorities.

The ATSI advisor reminded members of the need by ATC to obtain a satisfactory read-back of executive instructions; the outgoing SC did not receive a positive acknowledgement to the descent clearance to FL 110 from the MD90 pilot. Although this occurred during the handover and was missed by the oncoming SC, ATCO members were clear that this should not have affected the outcome. The oncoming ATCO had other 'tools' and information available to him, in the 2-3 minutes after he had taken over the sector, before he issued the descent clearance to the B737 crew which brought it into conflict with the MD90. It may have been that the SC was 'getting up to speed' when he assumed the MD90 had descended to FL 110 and had not referred to the radar, fpps or checked with the MD90 pilot for confirmation. Avoiding action instructions were issued by the Heathrow and the TC NE SCs but separation continued to decrease for another 15 seconds; this may have been because these instructions were issued too late or more likely that both crews were monitoring the situation visually and on TCAS.

The Board commended the NE SC for his honesty in reporting, with hindsight, how he had underestimated his currency on the sector following a period of leave and sickness. Members were aware of the ATCO 90 day validation limit but wondered whether currency limits were prescriptive. At LATCC, after 30 days, Watch Management assess the individual ATCO's circumstances up to an overall 45 day limit after which a dual session with an Local Competency Examiner (LCE) would be required. Elsewhere, either Local Management set currency limits or, ultimately, the individual is responsible for carrying out a self assessment prior to returning to duty. It

appeared that controllers may hold validations for several positions and although he/she may not work on a particular sector for some time they can be considered fully operational by carrying out controlling duties on other sectors.

Pilot members commented on the lack of a TCAS alert when the subject ac were flying adjacent in the hold. However, it was apparent that the ac were effectively line astern with no closure rate which would put them outside the TCAS alert parameters. The Board also noted that the MD90 crew missed the descent instruction RT call, possibly owing to a simultaneous transmission, but also the avoiding action call shortly after transferring to the Heathrow frequency. Concern was also expressed over the B737's crew using a high rate of descent (ROD). Although it was acknowledged that there was a need to use a minimum ROD of 500 ft/minute, the use of high RODs could lead to the generation of TCAS alerts within busy airspace and particularly within holding patterns.

Turning to the risk element, it was noted that both crews were aware of the situation from the TCAS indications and the B737 crew had seen the MD90 ahead and was in a position to maintain separation. Additionally, both controllers had been alerted by STCA and had passed avoiding action instructions, which split the ac laterally and vertically. These 'fail safe' points led the Board to conclude that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TMA NE SC descended the B737 to a level occupied by the MD90.

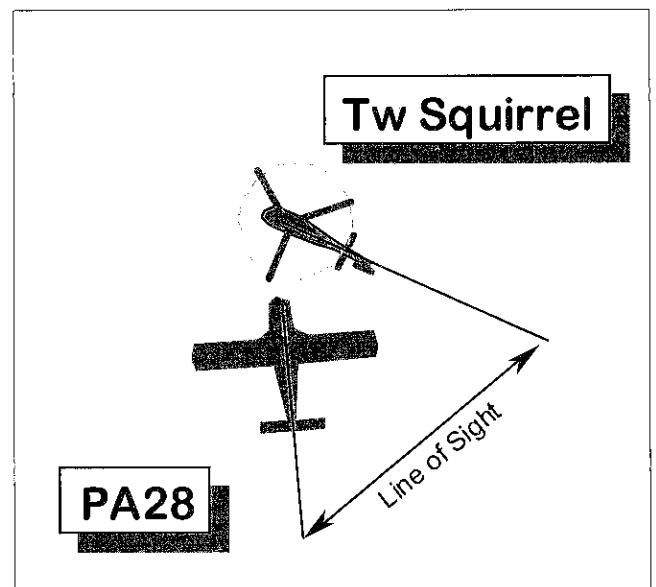
Degree of Risk: C

AIRPROX REPORT No 163/00

Date/Time: 10 Oct 1417

Position: 5119 N 0042 E (1 NM S of Sittingbourne)

<u>Airspace:</u>	FIR	(Class: G)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	Twin Squirrel	PA28
<u>Operator:</u>	Civ Comm	Civ Pte
<u>Alt/FL:</u>	1500 ft (QNH 987 mb)	1800 ft (QNH)
<u>Weather</u>	VMC CLNC	VMC CLNC
<u>Visibility:</u>	10 km+	
<u>Reported Separation:</u>	100 ft/NK	
<u>Recorded Separation:</u>	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TWIN SQUIRREL PILOT reports heading 338° at 120 kt cruising at 1500 ft with autopilot engaged and returning to base having completed a

power line inspection. He saw a low wing single engined ac when it was 100 ft away closing from his 7:30; he pulled hard on the stick to initiate a rapid climb and had no idea at what height he passed over the fixed wing ac which proceeded in

the direction of Southend. It was white with blue markings and he presumed the other pilot saw him but considered the risk of collision was very high.

THE PA28 PILOT reports flying from Headcorn to Stapleford at 1800 ft QNH at 110 kt. His ac was white and blue and his transponder and Mode C were switched off. He did not see the helicopter and could remember few details when he was traced some 2 weeks after the flight in question.

UKAB Note: The incident is shown on LATCC radar recordings as described by the helicopter pilot. The Twin Squirrel is squawking 0036 without Mode C and tracking 294°, and the PA28, primary-only, closes on it on a track of 356°. The ac close in each other's 2 o'clock /10 o'clock and the horizontal miss distance is too small to measure on radar. The PA 28 can be tracked to Stapleford and was identified from its route and landing time.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Members were surprised that the helicopter crew had not seen the PA28 which had been closing in their 10 o'clock for several minutes; their slightly

superior speed had put the PA28 aft of their beam in the final seconds before passing. It was surmised that the lack of relative angular motion until that point would have been a factor requiring active lookout to overcome, and that the crew may have tended to relax on their transit home. The same of course applied to the PA28 pilot and members were even more surprised that its pilot had not even seen or heard the Twin Squirrel as it passed close above. Members hoped that both crews would learn something useful about lookout from this very close Airprox which, the Board concluded, occurred because the PA28 pilot did not see the Twin Squirrel and the helicopter crew saw the PA28 very late. The Board concluded that the lack of timely sightings and the closeness of the Airprox meant that there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot did not see the Twin Squirrel and the helicopter crew saw the PA28 very late.

Degree of Risk: A

AIRPROX REPORT No 164/00

Date/Time: 11 Oct 1428

Position: 5306 N 0054 W (4.5 NM N of Syerston)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Bo105 Harrier T10

Operator: Civ Comm HQ STC

Alt/FL: 500 ft 300 ft
(RPS 963 mb) (Rad Alt)

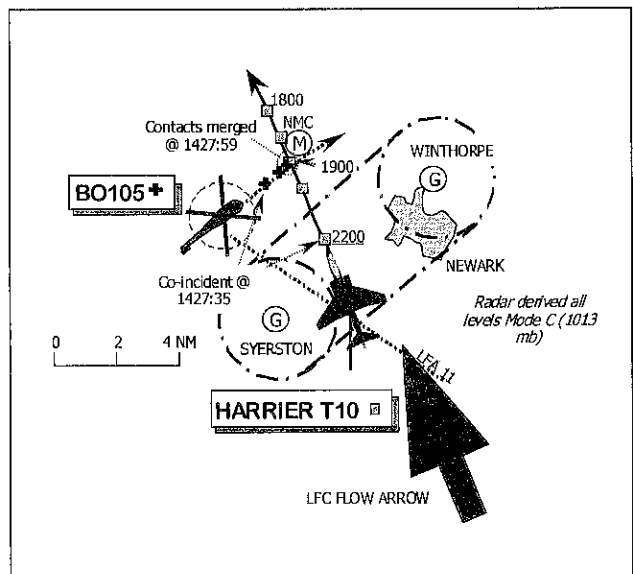
Weather VMC CLBC VMC

Visibility: >10 km NR

Reported Separation:

Nil V, 150 m H Not seen

Recorded Separation: Contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo105 HELICOPTER PILOT reports that he was returning from Nottingham Tollerton to Waddington, VMC at 110 kt, 150 ft below cloud; visibility to E/N/S was good. The helicopter colour scheme is blue and white, HISLs, navigation lights and the landing lamp were all on and he was squawking A0020, but neither Mode C nor TCAS was fitted; he was receiving a FIS from Waddington ZONE.

Whilst heading 060° about 3 NM NW of Newark, at 500 ft Barnsley RPS (963 mb) just as the ac was clearing low cloud (about 3 min after the ac had emerged from the edge of a moderate rain shower), another ac was spotted by the starboard rear seat crew member. He saw the Harrier, which he believed was a twin-seater, at a range of about 900 m which then crossed ahead from R to L. A sharp descending RHD turn was made to avoid the jet, which passed about 150 m ahead at the same altitude with a high risk of collision.

UKAB Note (1): In a subsequent telephone conversation with UKAB staff the Bo105 pilot added that he was familiar with the UKLFS.

camouflage grey, but HISLs were on and he was squawking 3/A 7001 with Mode C and under a FIS from Cranwell. At the reported Airprox position they were VMC, heading 333° at 420 kt, just clearing the Newark/Syerston gap at 1000 ft Rad Alt descending back to low-level. The Bo105 helicopter was not seen at all by either crewmember.

UKAB Note (2): The LATCC Claxby Radar recording illustrates this Airprox, which occurred at 1427:59. The Harrier T10, squawking 3/A 7001 with Mode C, is shown departing Cottesmore at about 1423 and tracked directly to E abeam Syerston at about 1427:16. The Bo105 Helicopter identified from its 0020 squawk is shown tracking NE toward Waddington (Mode C not fitted). The Harrier tracked clear of the Syerston Aerodrome Avoidance Area and Newark town and turned NNW; it indicated 2200 ft Mode C, (1013 mb), which equated to about 700 ft RPS (963 mb) on the radar return

immediately before the contacts merged with little discernible horizontal separation. The avoiding action R turn reported by the Bo105 pilot is not discernible on the radar recording. Thereafter, on clearing N of the Winthorpe/Syerston Weather Corridor the Harrier T10 commenced a slow descent and continued on track clear to the W of Caunton microlight site.

UKAB Note (3): The UK MILAIP at Vol III 1-2-6-5 – LFA6 stipulates that military aircrews are to avoid Syerston Glider Site by a 2 NM radius. Syerston is situated just inside LFA 6, S of the LFA 6/11 boundary.

UKAB Note (4): - **Board meeting only** - The UK MIL AIP at Vol III 1-2-11-2 – LFA11 defines the dimensions of the Winthorpe/Syerston Weather Corridor. It is established to minimise disturbance to the public in the flowed gap between Winthorpe and Syerston glider sites and requires crews to take particular care not to overfly the town of Newark. The following regulations are to be adhered too by aircrew transiting the corridor:

(a) The corridor is to be flown in a northwesterly direction only.

(b) Aircrew are to transit above 1000 ft MSD unless the cloudbase precludes VFR ops. If this is the case the corridor is to be flown as high as possible commensurate with VFR.

(c) In exiting the corridor aircrew should pay particular attention to Caunton Microlight Site (circuit height 800 ft agl). [This constitutes a warning. No mandatory avoidance of the Microlight site is specified].

MIL ATC OPS reports that at 1427:41, the pilot of the Bo105, which is based at Waddington, freecalled Waddington ZONE on 127.35MHz. ZONE was manned by a trainee and mentor. The Bo105 pilot advised that he was “...just approaching north of Newark, 500 feet 963. We’re out of Nottingham Tollerton inbound to Waddington”. At 1427:53, ZONE responded “...roger, Flight Information, Barnsley 963, request POB and do you require fuel?” It was 16 sec before the Bo105 pilot made

his next transmission, "...Waddington, C/S." ZONE repeated the previous transmission after which, at 1428:23, the pilot reported, "...three POB...no fuel...I'd just like to report an Airmiss with a Harrier." The pilot then went on to report that he had been flying at 500 ft due to weather and that the Harrier had passed an estimated 150 m away, from S to N at the same height.

THE HARRIER T10 PILOT reports the ac is Waddington ZONE was unable to identify the helicopter immediately on radar when the pilot freecalled; the helicopter's squawk was not seen and D/F was unserviceable. In addition, the reported ac was only observed on radar after the incident. Unfortunately therefore, there was nothing that the controllers could have done in the short time available, to warn the Bo105 pilot of the approaching ac.

The Harrier T10 pilot freecalled Cranwell ZONE at about 1426:39, saying that he was "...low level passing Newark gap at 1000 ft" and requested a FIS. The ZONE controller, who was also acting as the Cranwell and Barkston Heath DEPARTURES controller, asked the pilot to squawk 'ident' at about 1427:18, and placed the Harrier pilot under a FIS at 1427:32. The crew reported changing frequency at about 1428:59. The request to squawk ident was purely an effort by the controller to make a positive check, for tracking purposes, that the 7001 squawk he could see in the area was actually the ac that was calling.

UKAB Note (5): The Waddington RT transcript timings were found to be about 1:45 min behind UTC; the Cranwell RT transcript timings were found to be about 0:30 sec behind UTC. Consequently all timings in this report have been corrected as near as possible to UTC.

HQ STC comments that the Harrier crew had satisfied all criteria for operating safely in the Winthorpe/Syerston area. However, experienced and alert as they were, they did not see the conflicting helicopter and the recorded separation suggests an extremely close encounter reinforcing, yet again, the very real need for a technology-based collision warning system.

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 appropriate ATC and operating authorities.

From the information presented, it was apparent to the Board that the Harrier T10 crew had conformed with promulgated procedures for military ac in the LFS in transit through the Winthorpe/Syerston Weather Corridor. Specifically, they followed with the flow direction through the corridor, which only military ac had to comply with – civilian ac may be encountered heading in any direction, a point that must always be remembered by military crews. Navigating the corridor required care so as to remain clear of the various avoidance areas and other locations, which had to be taken into account in this fairly confined airspace. This may in part be why the Harrier T10 crew did not see the Bo105 helicopter at all. Some members thought that the partially blue helicopter may have been difficult to spot against the background of dark cloud after it emerged from the rain shower. That said, it had been on the Harrier's port beam with a crossing movement and all its lights had been on, which should have been visible to the Harrier crew. Others thought that they might have been concentrating their lookout in the direction of Caunton Microlight Site, looking for circuit traffic, a hazard that they would have been forewarned about and highlighted by the entry in the UK MIL AIP and the LFC.

Nevertheless, although the Harrier pilot had cleared his flight path ahead, he for whatever reason was oblivious of the presence of the helicopter just off to his left. Consequently, the members strongly endorsed the comments by HQ STC regarding the need for another form of collision warning.

However, 'see and avoid' had worked from one cockpit, thanks to the alert helicopter crewmember, who spotted the Harrier and alerted his pilot. This demonstrated good crew co-operation and deserved praise. Since the helicopter pilot was familiar with the LFS, members wondered if he had biased his crew's lookout to the R for fast jet traffic

following the 'flow'. If there was going to be a conflict with a military ac below 2000 ft agl between Tollerton and Waddington it was probably going to be just where it had happened; military crews had to abide by the applicable regulations, on direction of flight, which the radar recording clearly showed had been the case here. Undoubtedly, the Bo105 pilot was constrained by the weather - which may be why he chose to fly at an altitude of 500 ft well inside the LFS. A military helicopter aircrew member opined that he would fly if possible below 250 ft msd to avoid fast jet traffic, but this was not an option open to the Bo105 pilot who was generally constrained to operate at 500 ft agl or above during a transit back to base. Some members thought this raised the risk of a conflict especially in that location, just to the N of the weather corridor. It might have been preferable to climb above 2000 ft agl and obtain a radar service from Waddington, but this would have meant going IMC and the pilot would not have known what the cloud tops were to judge whether this was practical as an option so close to base. In any case, a helicopter pilot member pointed out that the Bo105 was perfectly entitled to fly at this altitude in this situation, which the Board accepted.

Members noted that the Bo105 pilot was in RT contact with Waddington and the Harrier with Cranwell. Some wondered if it would be preferable to make one ATSU the point of contact for transit through the Winthorpe/Syerston Weather Corridor. A single ATSU is sometimes specified in the UK MIL AIP, but not in this case. Waddington seemed a sensible choice as they were the promulgated LARS unit and all things being equal would be the ATC unit called mostly by GA pilots. However, this

was purely a matter of choice by the pilots concerned; in this incident, considering that each was only in receipt of a FIS there was no guarantee that traffic information would have been issued. Moreover, while the Bo105 operated on VHF the Harrier usually used UHF, so RT transmissions alone would not necessarily have alerted the pilots to the presence of each other. These points led members to agree this aspect was not intrinsic to the cause of this Airprox. After weighing up all the relevant factors, the Board agreed this Airprox resulted from a conflict in the FIR/LFS resolved by the Bo105 pilot.

Turning to risk, the Harrier pilot saw nothing. Conversely, the Board appreciated that in the weather conditions reported, the helicopter crewman had probably spotted the Harrier as soon as he could. Seconds more elapsed before the helicopter pilot acquired the crossing jet and in the end, although close, the Bo105 pilot just had time to take prompt avoiding action as the jet passed close ahead. The helicopter pilot believed this was about 150 m, which was borne out by the radar recording as the contacts merged - it was certainly a close call. This led the members to agree that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR/LFS resolved by the Bo105 pilot.

Degree of Risk: B.

AIRPROX REPORT No 165/00

Date/Time: 11 Oct 1229

Position: 5144 N 0040 W (5 NM W of BNN)

Airspace: LTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: A319 B767

Operator: CAT CAT

Alt/FL: ↓FL 100 ↑FL 90

Weather VMC IICL VMC IICL

Visibility: NK NK

Reported Separation: NK/NK

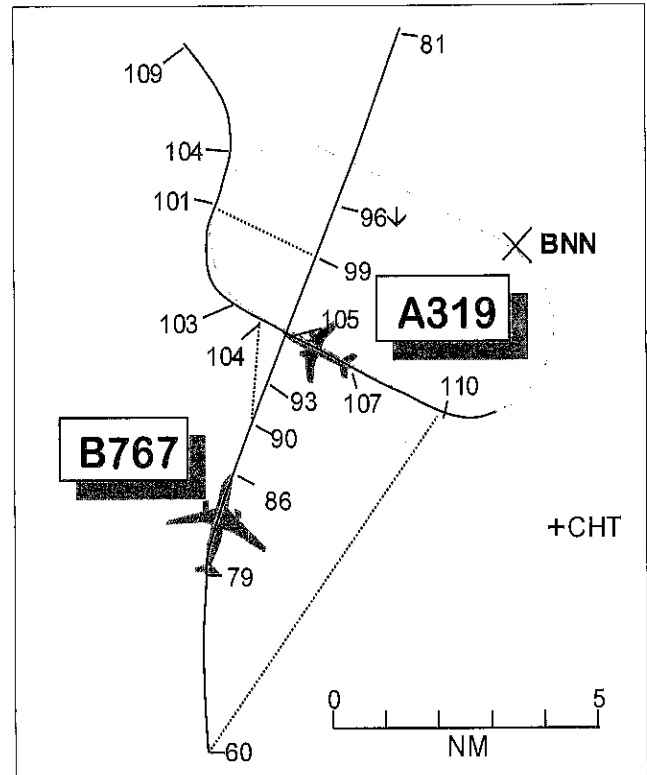
Recorded Separation: 1.9 NM

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports turning right at 205 kt in the BNN hold at FL 100 when he received a TCAS TA on an ac 900 ft below and climbing; it was showing 2.5 NM range and climbing to 400 ft below and astern of him as he passed a northerly heading. He could not see it and informed the LATCC TC controller who issued avoiding action instructions to turn left onto 270° and climb to FL 110. He disconnected the autopilot and followed ATC instructions while the TCAS target remained close eventually disappearing in his 4 o'clock. He reported an Airprox to the controller but did not assess the collision risk.

THE B767 PILOT reports heading N at 250 kt; he had been cleared to climb to 6000 ft (QNH 974 mb, 28.76 in) and then to FL 90. The crew intended to set their altimeter to 29.92 in when above the TA; however, they mistakenly set it to 28.92. They did not see the A319 and could not remember any TCAS indications when asked afterwards but they were following avoiding action instructions in that period.

Their fleet manager advised that setting 28.92 in would cause the altimeter to under-read by nearly 1000 ft and a climb to an indicated FL 90 would result in the ac being close to FL 100. All company



ac have altimeters with 2 subscale windows; one for each unit of pressure. Company policy, in areas that use mb (Hpa) pressure settings, is to set 1013.2 mb above the TA; the pilots involved are thoroughly familiar with this policy but somehow reverted back to inches as they transitioned to QNE. Cross checking of altimeter settings between the pilots is mandated in company SOPs.

The crew's recollection that there were no TCAS indications in the B767, despite the TA in the A319, was puzzling. The fleet manager confirmed that the ac had TCAS ver 6.4A and there was no reason why there should have been no TCAS indications to the crew; TCAS alerts are not recorded on the FDR. He has thoroughly debriefed the crew concerned and issued a bulletin to all pilots reminding them of the lessons learned.

LATCC reports, with RT transcripts and radar recordings, that the B767 departed Heathrow RW 27R on a WOBUN SID climbing to 6000 ft. The departure QNH was 974 mb (28.76 in). The pilot was instructed by the TC NW SC (trainee) to leave BUR on a heading of 360° and climb to FL 90; the heading was then amended to 025°. The A319

was inbound to Heathrow and in communication with the INT DIR (N), was holding at BNN and had been cleared to descend to FL 100.

At 1228:34 the B767 climbed through FL 90. The A319 was 1.6 NM to port and going away as it transited the outbound leg of the holding pattern. At 1228:49 the A319 pilot reported "C/s we've got TCAS traffic, within 2½ miles 400 below". This was the point of minimum separation, 1.9 NM and 400 ft. The Heathrow Director saw the STCA flashing white and instructed the A319 to turn left heading 290° and climb to FL 110, adding the phrase "Avoiding action".

The trainee TC NW controller saw the STCA trigger and instructed the B767 "C/s you're meant to be er descend immediately FL 90, that's avoiding action". The pilot acknowledged with his callsign only so the trainee repeated the instruction, to which the pilot replied "On the way nine zero". (The controller then instructed the pilot to descend to FL 80 which was acknowledged correctly.) The B767 reached FL 99 before commencing a descent; by this time the A319 was 2.1 NM away at FL 101. The TC NW OJTI asked the B767 pilot to confirm that when he was cleared to FL 90 he had 1013 mb set; he replied "Affirm we were cleared to nine, er Flight Level nine zero". The controller confirmed this. The B767 continued its descent to FL 81; at this point it was cleared to FL 140. The descent was stopped and the ac then began to climb.

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.

The Board was advised that both pilots had made the same error in setting their altimeters, which meant that cross checking between them would

not have disclosed the error. Airline members wondered if the ac was being flown manually or on autopilot; the former left pilots with less capacity for cross checking/monitoring and put a greater load on the PNF; the ac had been on autopilot. It was observed that when using inches Hg altimeter settings, the inherent warning of low atmospheric pressure indicated by a 3 figure mb setting would be absent. While moving the subscale from 28.76 which, without consciously thinking about it, might not be attention-gettingly low, the pilots had apparently concentrated on the '92' part of the figure without realising that a lot more winding was required to reach the correct figure of 29.92. Members accepted that by not using the mb setting the pilots would have been more vulnerable to this error. Although in UK airspace this was contrary to their SOP, they were from an environment where they regularly used inches Hg and should have been especially alert to the potential problem posed by low atmospheric pressure.

Members also commented on the B767 crew's poor RT discipline and lack of proper acknowledgement which caused the controller to have to repeat the messages. A further point was that the crew may have been distracted while realising, were reacting to, and were resolving their error, in which they were probably aided by the controller's suggestion of an altimeter setting error.

As to the risk level, members noted the early alert provided by TCAS and the prompt reactions of both controllers to re-establish separation and agreed that these factors had removed any risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B767 pilots mis-set their altimeters and climbed above their cleared level.

Degree of Risk: C

AIRPROX REPORT No 166/00

Date/Time: 12 Oct 1233

Position: 5536N 0205W (0.5 NM NNW
of Milfield aerodrome - elev 150 ft)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA25 Tucano

Operator: Civ Pte HQ PTC

Alt/FL: 300 ft \uparrow 350 ft
(agl) (RPS 983 mb)

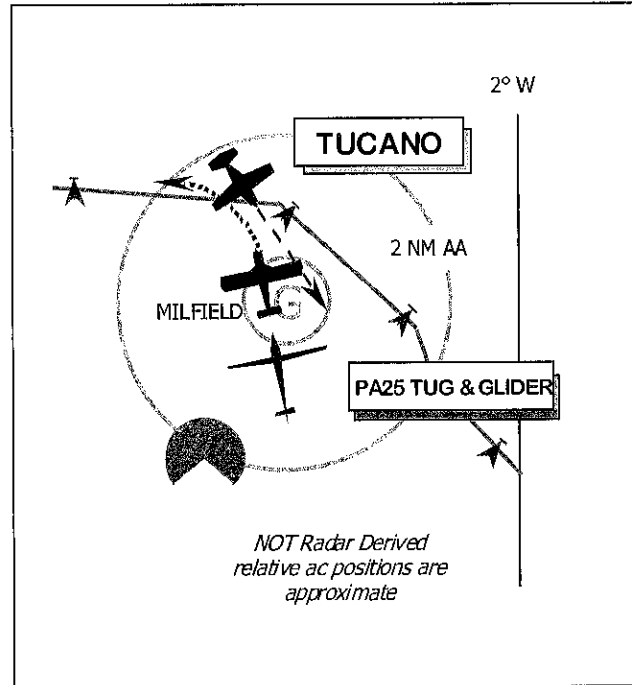
Weather VMC NR VMC CLOC

Visibility: >10 km >10 km

Reported Separation:

nil V 200 yd H 1-200 ft V 50 m H

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA25 PAWNEE PILOT reports that he was executing an aerotow glider launch from Milfield aerodrome and in contact with Milfield RADIO on 130.1 MHz. The ac livery is yellow, but no lights were displayed. Just after take-off about 0.5 NM NNW of the site, passing 300 ft agl in the climb, heading 340° at 70 kt, a black Tucano with wing lights 'on' was spotted "head-on", about 0.5 – 0.75 NM away descending towards him. He turned hard L with 40° of bank, to avoid the Tucano, which also turned L and passed down the starboard side at the same height about 200 yd away with a "High" risk of a collision.

He added that it was only about 2-3 sec from initial sighting to deciding to turn L in avoidance, the minimal delay occasioned because he wanted to ensure that the Tucano was actually going to pass to starboard, so that he did not turn into it. The L turn gave him more chance of avoiding the Tucano although it took the Tug/glider combination nearer to the village of Milfield. 'Casting off' the glider was not an option - although the glider pilot had seen the Tucano, he thought it would have put further pressure on all three pilots to take the appropriate action in a very short time considering the normal separation rules between tug and glider

(the aerotow rope was at least 180 ft long). Furthermore, at heights of less than 500 ft agl, high bank angles are inadvisable owing to the constraints of manoeuvrability and the experience level of the towed glider's pilot.

UKAB Note (1): Accompanying his report, the PA25 pilot provided extensive detail of arrangements which had been established with the then HQ MATO Ops Low Flying Office for notifying activity at Milfield Glider site to military flying units. He added that the club has rigorously applied these arrangements. This Airprox was one of three occurrences involving military ac during that week and is also the subject of an investigation by HQ P & SS.

THE TUCANO PILOT, a QFI, reports that the ac colour scheme is high conspicuity black; HISLs were on and 3/A 7001 with Mode C was selected, during a low-level instructional NAVEX in good 'BLUE' weather conditions. Whilst supervising a period of off-track navigation, heading 150° at 240 kt, the intended route of his student pilot passed close to Milfield Gliding Site. He believed the site to be inactive, as he had not seen any NOTAMs to the contrary prior to the flight, therefore, he allowed

the student pilot to fly along his chosen route. As they approached Milfield they spotted the Tug/glider combination about 0.5 NM away on a reciprocal course, so he climbed to about 800 ft ALT above the site, which appeared active, whilst maintaining his track. He descended again when clear of the site. The Tug/glider combination, which appeared to be getting airborne, passed 1 - 200 ft below and 50 m to starboard on a reciprocal track, with a "Low" risk of collision. After landing it became apparent to him that a NOTAM had been issued to activate Millfield Gliding Site, but that the information had not been displayed on the NOTAM board from which he had outbriefed.

UKAB Note (2): For military aircrews, the UK Military Aeronautical Planning Document at Vol. 3 Part 1 Pg. 1-2-12-4 (LFA 12) promulgates a mandatory 2 NM radius avoidance for GS04 the Glider launch site at Milfield when active, centred on 55°35'23" N 002° 05'08" W, from the surface to 2000 ft aal. This site is notified active at weekends and other times by NOTAM, which for activities on Thursday 12 Oct, had been issued on 25 Sep.

UKAB Note (3): The civil UK AIP at ENR 5-5-1-1, promulgates Milfield Glider Launching Site for aerotow launches where Tug ac may be encountered to 2000 ft agl, during daylight hours, Sat, Sun, Public Holidays and as notified by NOTAM.

UKAB Note (4): This Airprox is not shown on recorded radar.

HQ PTC comments that through a breakdown in procedures, a NOTAM was not plotted on the briefing maps in the Tucano unit's flight planning facility. As a result, the Tucano crew remained unaware of its existence when planning their sortie, and consequently infringed the gliding site to which it referred. The unit has taken positive action to ensure that such an error cannot be repeated. In mitigation, the Tucano crew's lookout did enable them to see and avoid the conflicting traffic in sufficient time to eliminate any risk of collision.

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 authority.

The PTC member explained that the Tucano instructor had intentionally diverted off the student's planned route as an exercise in map reading without any plotted course to follow; this was termed 'off-track navigation'. This was a common exercise that had been initiated by the QFI in the belief that Milfield Gliding site was not active. The Tucano instructor pilot had checked the NOTAM board within the Unit on several occasions prior to the flight. Moreover a final check was made just before walking out to the aeroplane. None of these checks revealed the activation of the Milfield Avoidance Area nor would they because of the clerical error. The Unit had taken prompt action to rectify this and had devised a system of double checks on NOTAM distribution and plotting to forestall any such repetition of this simple human error, which had such a significant impact. Whilst members appreciated that the Tucano QFI was heading toward what he thought was an inactive gliding site, military pilot members thought it was best to steer clear of such locations at all times, to prevent just such an incident as happened. The lesson is don't overfly glider sites without good reason. That said, members were mindful that airspace at low-level is at a premium. There was also a wider lesson for all airspace users here - to check that aeronautical information distribution systems within flight planning sections and flying units are robust enough to prevent such a basic error.

Turning to the encounter itself one pilot member thought that the relative courses and speeds of the ac involved suggested that the Tucano crew had about 10 sec to effect avoidance once the Tug/Glider combination was spotted as it got airborne. For this reason the combination probably could not have been spotted earlier. Some members thought that a more positive turn by the Tucano pilot away from the Tug/Glider combination was warranted, but the PTC member pointed out that he had taken positive action with a sharp pull-up as soon as it was seen. The Board agreed that the Tug pilot was placed in a difficult position so soon after departure. The L turn was one of the few options open to him and it was probably wise not to have cast-off the inexperienced glider pilot in this situation, but a difficult judgement to make nonetheless.

Although the Tucano pilot had chosen his route intentionally knowing it would be adjacent to the gliding site, the infringement was not a premeditated decision. Consequently, the members agreed that this Airprox resulted from an infringement of the Milfield Gliding Site Avoidance Area by the Tucano crew, following a breakdown in the NOTAM distribution system at the Tucano pilot's unit. However, it was a good spot by the Tug pilot and fortunate that he had seen the Tucano's lights which proved their worth in this situation and had allowed him time to turn. Similarly the Tucano pilot had time to pull-up. Nevertheless, given the geometry of the situation and the

vulnerability of the glider on the towline in close proximity to the ground the members agreed that the safety of the ac involved had been compromised.

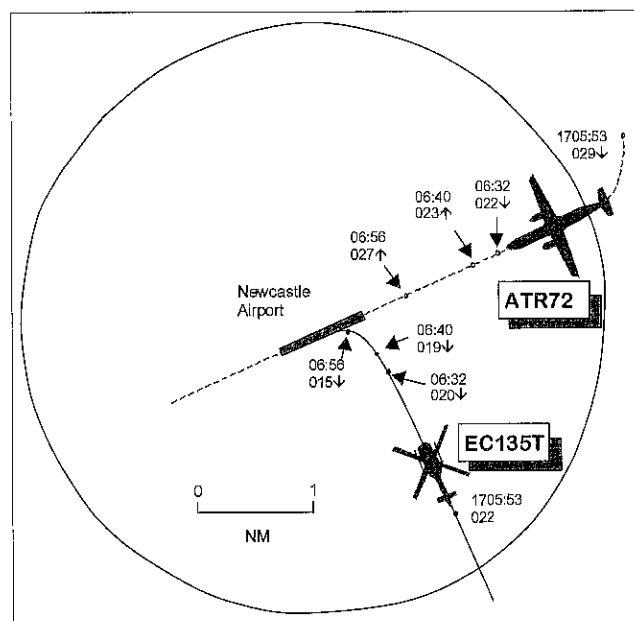
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An infringement of the Milfield Gliding Site Avoidance Area by the Tucano crew, following a breakdown in the NOTAM distribution system at the Tucano pilot's unit.

Degree of Risk: B.

AIRPROX REPORT No 168/00

Date/Time: 11 Oct 1706
Position: 5502 N 0140 W (1 NM ENE Newcastle Airport-elev. 266 ft)
Airspace: ATZ (Class: D)
Reporter: Newcastle ADC
First Aircraft Second Aircraft
Type: ATR 72 EC135T
Operator: CAT Civ Comm
Alt/FL: 1200 ft↓ 500 ft↓
(QNH 969 mb) (QFE 961 mb)
Weather VMC CLBC VMC CLBC
Visibility: 15 km 8 km
Reported Separation: NK/200 ftV,1000 mH
Recorded Separation: 200 ft V 1.36NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE NEWCASTLE ADC reports that the EC135T was operating to the S of Newcastle and called on frequency for a rejoin; the pilot was instructed to report at the mid point of RW 25. When the helicopter was approx. 4 NM S of the aerodrome, he instructed the pilot to orbit R owing to an inbound ATR72 at 4 NM final on a visual approach for RW25. No response to this was received so he

repeated the instruction to the EC135T to orbit and passed traffic info. Still no response was received or to a further 4 radio calls.

The ATR72 had by now reached 2 NM final whilst the EC135T was observed routeing from the midpoint to land. Consequently he instructed the ATR72 to go around and passed traffic information while watching the helicopter on final approach ahead of and 250 ft below the ATR as the latter commenced its missed approach. He then

received an acknowledgement from a further RT call to the helicopter pilot who was informed about the attempts to establish RT contact with him. Finally, traffic information on the ATR72 and landing clearance was passed to the helicopter pilot who apologised for not paying attention.

UKAB Note (1): The Newcastle 1650 METAR shows- CALM 15KM SCT015 SCT030 10/09 QNH 969.

THE ATR 72 PILOT reports heading 250° at 140 kt on final approach for RW 25 at Newcastle. The visibility was 15 km, 1000 ft below cloud, in twilight VMC. He heard ATC instruct a helicopter to hold S of the aerodrome followed by several further unsuccessful attempts on RT to extract a reply from its pilot. ATC then instructed him to go around, as he passed 1200 ft QNH which he did; followed by a visual circuit to land. He stated that despite maintaining a good lookout, both he and his co-pilot were unable to see the conflicting helicopter.

THE EC135T PILOT reports heading 340° at 90 kt returning to Newcastle from a local sortie with 3 POB. The visibility was 8 km, 200 ft below and 1000 m horizontally from cloud, in VMC and the helicopter white strobe lights were on. On initial contact with ATC at range 5 NM, he was given clearance to route towards the circuit from the S via the mid point of RW 25; he saw the ATR72 at this stage. However, he had set a low radio volume setting on the TWR frequency and that, combined with noise levels on other radio frequencies and the intercom meant that he missed subsequent RT calls from ATC. On passing 500 ft QFE at the aerodrome boundary with the ATR72 still in sight in his 2 o'clock, he contacted ATC who told him of their attempts to contact him. He was given landing clearance as the ATR72 went round. He estimated that the ATR72 passed 1000 m on his starboard side and 200-300 ft above on the missed approach. During all of this, in his opinion, the risk of collision was low to nil as he had always had the other ac in sight and was always prepared to land short of the RW on the grass.

Additionally, he reported that the cockpit workload can be quite high while approaching to land and has recommended that pilots should monitor only the ATC frequency during the critical stages of flight and that intercom calls should be kept to a minimum.

NEWCASTLE MANAGER ATC reports that the Controller concerned at interview agreed that he should have passed traffic information to the ATR and should not have cleared the EC135T to fly directly to the mid-point without including a clearance limit plus and an instruction to report. The incident was discussed at a subsequent Local Competency Examiners meeting and the following guidelines were issued:-

- a) Traffic information must be passed at all times to aircraft established on an instrument approach when aircraft are making visual joins on base leg.
- b) Helicopters must not be cleared direct to the runway mid-point without an instruction to report on base leg.
- c) Clearance limits must be used at all times, particularly when protecting the circuit.

ATSI endorsed the Newcastle report and had no further comments regarding the ATC aspects of this incident.

UKAB Note (2): Replay of the Great Dun Fell radar at 1705:53 shows the ATR72 3 NM NE of Newcastle in a R turn onto final approach RW 25 passing 2900 ft (1712 ft QNH) whilst the EC135T is seen tracking 330° 2 NM SE of Newcastle in a slow descent passing 2200 ft (1012 ft QNH). At 06:32, the ATR is established on final approach passing 2200 ft (1012 ft QNH) with the EC135T in his 11 o'clock, 1.36 NM, passing 2000 ft (812 ft QNH). 8 seconds later, the ATR is seen climbing through 2300 ft (1122 ft QNH) with the EC135T commencing a L turn passing 400 ft below. At 06:56 the EC135T is descending through 1500 ft (312 ft QNH) and turning in front of the ATR as it passes 1200 ft above.

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 controller involved and reports from the appropriate ATC authorities.

Discussion opened on the wisdom of the ADC controller 'giving away' the RW at such an early stage even if the clearance was to 'route to the

mid-point' with anticipated landing clearance to follow. Members agreed with the Newcastle Manager ATC that the instruction should have contained a clearance limit and an instruction to report. As events unfolded, the controller was subsequently unable to change the traffic sequence to make the ATR No 1 as it positioned towards RW 25 final approach. Because the helicopter could not be contacted to ensure he positioned No 2, the ADC had no option but send the ATR around. Helicopter operations at civil aerodromes vary according to local procedures but usually involve an approach to the RW with landing clearance and then a taxi or hover-taxi using taxiways to dedicated parking areas. This allows a degree of standardisation in aerodrome approach and integration into traffic patterns. Members were agreed that this incident had been a circuit traffic integration problem caused by the helicopter pilot not listening out and solved safely by the ADC's instruction to the ATR. Members understood the awkward situation that the ADC had been in, but noted that he had negated the potential for a confliction very effectively.

The helicopter pilot had advised that procedure changes had been implemented following this incident to ensure that only the ATC frequency is monitored by the pilot during critical stages of flight.

In discussing the risk, it was noted that the ATR crew had not seen the helicopter but they had complied promptly with the controller's instructions to execute a missed approach. Conversely, the helicopter pilot had seen the ATR at range 5 NM whilst routing towards the aerodrome and had maintained visual contact with it throughout. This led the Board to conclude that there had been no risk of collision.

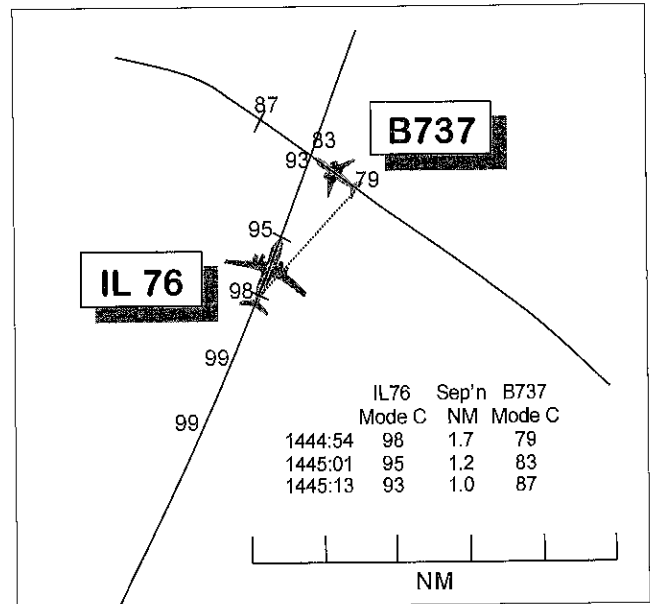
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A controller perceived confliction.

Degree of Risk: C

AIRPROX REPORT No 169/00

Date/Time: 11 Oct 1445
Position: 5154 N 0002 W (10 NM W of Stansted)
Airspace: LTMA (Class: A)
Reporting Aircraft Reported Aircraft
Type: B737-300 IL 76
Operator: CAT CAT
Alt/FL: FL 90 4000 ft
 ↑ (QNH 974 mb)
Weather VMC VMC
Visibility: 10 km+
Reported Separation: <1 NM, 300 ft
Recorded Separation: 0.9 NM, 700 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-300 PILOT reports heading 330° at 290 kt, passing FL 85 for FL 90 on departure from Stansted RW 23 on a BUZAD 6R SID when he

saw visually and on TCAS (TA) a conflicting ac at 9 o'clock descending. He told his F/O to reduce the RoC and Stansted told him on 126-95 to stop climbing and to turn L onto 270°. He told the controller that he was by then no longer in a conflicting situation as he had passed 1 NM ahead

of the other ac which was 300 ft above him. ATC insisted on the avoiding action; he turned and levelled at FL 87 and was told the other ac had descended below its cleared level.

THE IL 76 PILOT reports heading 050° at 180 kt flying a LOREL 1C STAR to Stansted. He was cleared by LATCC to descend to FL 100 and was then transferred to TC Essex Radar on 120.62. The TC controller told him to descend to 4000 ft on QNH 974 mb and this was confirmed by his radio operator. 15-20 seconds later having reduced speed and carried out pre-descent checks he started a descent. After descending about 200 ft the controller confirmed that he was descending and told him to maintain FL 100, heading 050°. 2-3 minutes later he was told to descend again to 4000 ft. All crew members clearly heard their c/s in the instruction to descend – the crew carries out a triple check when translating instructions into their own language, and did not carry out instructions intended for another ac. TCAS was not fitted due to unavailability of equipment.

ATSI reports that after departure the B737 pilot established communication with the Stansted Final Director (FIN DIR), who instructed the flight to 'squawk ident' and climb to altitude 5000 ft. The IL76, meanwhile, was to the SW of Stansted approaching the BPK VOR, from which it would follow the 027° radial to BKY VOR in accordance with the LOREL 1C STAR for Stansted. The ac was maintaining FL 100.

Co-ordination was agreed between the INT DIR, shortly to take control of the IL76, and the FIN DIR that the latter could climb the B737 to FL 90, beneath the IL76 at FL 100. To facilitate the cross with the IL76's projected track, the FIN DIR, at 1443:22, took the B737 off the SID routeing. He instructed it to stop the R turn on a radar heading of 310° and at the same time removed the ATC speed restriction. After this was read back, the flight was cleared to climb to FL 90. At this time the ac were about 8 NM apart, with the B737 in a right turn at 5000 ft, while the IL76 at FL 100 had just passed BPK, tracking NE towards BKY.

In addition to the IL76, an F28 inbound to Stansted had been released and was also due to make its initial call on the INT DIR's frequency. The F28 was approaching the ABBOT holding pattern from

the E at FL 100 on an ABBOT 1D STAR, however, the INT DIR had co-ordinated an early descent with the relevant TC sector in order to expedite the flight's approach. Once on his frequency the controller would issue descent and vectoring instructions for a 'straight-in' ILS approach to RW 23. The success of the plan relied upon communication being established with the flight before it entered the hold.

At 1444:10, the IL76 made its first call on the INT DIR's frequency. The RT transcript shows that the pilot said "*Radar (IL76 c/s) good afternoon er maintaining one zero zero information Echo*". Although a distinct foreign accent is present the content of the message is readable, in particular the numerals in the callsign. However, in the erroneous belief that this call had originated from the F28, the controller responded with "*(F28 c/s) Essex good afternoon to you twenty miles to touchdown descend to altitude four thousand feet the Stansted QNH 974 millibars is that sufficient for er height loss*". Although the instruction was not addressed to his flight, the pilot of the IL76 nevertheless read back the instruction with "*..(unintelligible word)..Ilyushin Seventy Six descending to four thousand feet on QNH 974 (IL76 c/s)*". Despite the contents of this readback, the controller once more did not detect the inappropriate originator and responded as though he was communicating with the F28 by saying "*Thank you er (F28 c/s)*". At interview the INT DIR could not readily account for his error but it would appear his need to establish early communication with the F28 had influenced his performance to the extent that he had heard what he was expecting or wanted to hear (this matter is discussed in more detail in a Human Factors Assessment).

Less than 5 seconds after the IL76 had read back the descent clearance, the F28 made its first call on the frequency, reporting "*....descending eight thousand towards ABBOT*". Suspecting now that he may have made an error and descended the 'wrong' flight, the INT DIR, at 1444:45, instructed the F28 to stand-by and then requested the IL76, which was indicating FL 99 on Mode C, to confirm that it was maintaining FL 100. There was no reply and he asked again, this time eliciting the reply "*....(IL76 c/s) affirmative maintaining*". Confident that any error on his part had now been rectified and the flight would maintain FL 100, the controller returned his attention to the F28. (With the benefit

of hindsight, it would probably have been preferable to have issued a straightforward instruction to maintain FL 100, rather than just seek a confirmation where an element of ambiguity could exist, especially with a foreign operator). The radar recording shows that in the 14 seconds that had elapsed since the controller first sought confirmation that the flight was maintaining FL 100, the IL76 had commenced a descent and at 1444:59 was passing FL 96 with the B737 in its 1 o'clock position crossing R to L at a range of 1.5 NM, passing FL 81 climbing. By now, STCA had activated with a low-severity warning. The IL76 continued to descend, passing FL 95 as the B737 crossed through its 12 o'clock position, at a range of just over 1 NM climbing through FL 83. Minimum separation occurred a few seconds later at 1445:09 when the IL76 was at FL 93 and the B737, climbing through FL 86, was in its 10 o'clock position at a range of just under 1 NM. At the same time STCA equipment had triggered a high-severity warning.

Meanwhile, the FIN DIR had recognised the situation and had transmitted to the B737 *"...traffic off your left just descended through his cleared level or avoiding action turn left heading 270"*. The pilot reported visual with the other ac and asked if a turn should still be made. The FIN DIR replied *"Yes stop your climb stop your climb"*, and this was read back correctly.

Thereafter the tracks of the two ac continued to diverge, with the IL76 eventually climbing back to FL 100 from FL 93, the lowest level it achieved. The B737, meanwhile, had reached FL 88 before descending briefly to FL 86 and then commencing a climb once more after being instructed to do so by the FIN DIR. Standard separation was restored about 20 seconds after the point of minimum separation. No mention was made on the RT by the crews of either flight that they had experienced a TCAS event.

The INT DIR reported that he did recall noting the IL76 at FL 96 on Mode C but he did not take any action. He had, however, considered the issue of an avoiding action turn but ultimately elected not to as he believed he might worsen the situation by confusing the foreign crew and, anyhow, he could see that the IL76 was to pass safely astern of the B737 and there was no risk of collision. In hindsight, however, he felt that it would have been appropriate to have taken some action and

acknowledges that avoiding action in the vertical plane would have been prudent, together with traffic information.

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.

It appeared that the initial cause of the Airprox was that the INT DIR gave an instruction to the F28 in direct response to the IL76's initial call. Members understood how this had happened – expectations played a large part in human behaviour in all walks of life. In this case the controller's expectations were partly reinforced by the accent in the voice of the IL76 radio operator; the only way to overcome such expectations is to be aware that everyone is subject to their effects and to listen consciously to a callsign rather than assume a message is from an expected source.

The Board agreed that the second part of the cause was a similar error on the IL76 flight deck where having made a transmission, and expecting descent clearance, the crew assumed that the controller's immediate response to their transmission was indeed for them. In this instance, having made the assumption that the descent clearance had been for them, it formed part of their firmly held belief (another human behavioural trait) that they had not made a mistake. This was shown in their report in which they were adamant that they had not taken another ac's instruction. However the RT recording showed clearly that this was the case.

Members agreed that the final part of the cause was that the INT DIR did not hearken to the IL76 crew's acknowledgement of the descent clearance which happened to contain both the ac type and the IL76 c/s. He thereby missed the final chance of preventing the incident.

Fortunately the flightpaths of the 2 ac were not precisely coincident and the B737's TCAS had allowed its crew to see and avoid the IL76 in good time. The Board concluded from this that there

had not been a risk of the ac actually colliding, but commented that the avoiding action issued by FIN DIR appeared illogical, especially his insistence upon it. However, information was not available as to what lay ahead of the B737 and the controller may have required it further to the W for reasons unconnected with the Airprox.

(b) The IL 76 crew did not detect that the descent instruction was not addressed to them.

(c) INT DIR did not detect the IL 76 ac type and callsign in the acknowledgement.

Degree of Risk: C

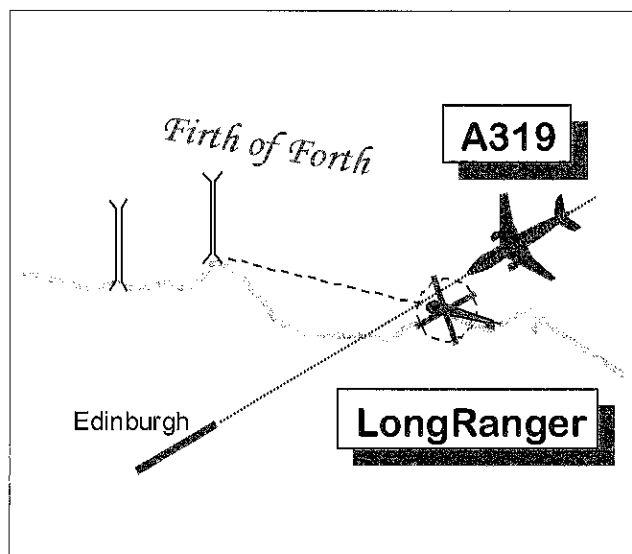
PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

(a) INT DIR gave an instruction to the F28 in direct response to the IL 76 crew's initial call.

AIRPROX REPORT No 170/00

Date/Time: 14 Oct 1406 (Saturday)
Position: 5558 N 0316 W (3 NM ENE of Edinburgh - elev 135 ft)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: A319 LongRanger
Operator: CAT Civ Comm
Alt/FL: 1300 ft 1000 ft
(QNH) (QNH)
Weather VMC CLOC VMC CLBC
Visibility: 10 km 10 km+
Reported Separation: 300 ft
0.5 NM, 400 ft V
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports flying at 130 kt on a visual approach to RW 24 at Edinburgh. ATC informed him that a helicopter was lifting from Granton for 'the bridges' and he received a TCAS TA when passing 1300 ft on final. He saw the helicopter about 500 m away at 11 o'clock and below; ATC stated it was at 1000 ft. The risk of collision was low but he was flying the approach one dot high on the ILS; had he been on the glidepath it would have been exceedingly close.

THE LONGRANGER PILOT reports heading 280° at 90 kt having been cleared by Edinburgh ATC from the Granton docks to the Forth bridges, not above 2000 ft; he was at 1000 ft QNH. He saw the A319 approaching from 0.5 NM away in his 5 o'clock and it passed much closer than he would have wished, about 400 ft above. Its speed and direction of approach meant he could not have seen it earlier, and he had not been warned of it by ATC who were usually very good at keeping him informed of traffic. If he had seen it he would not have flown that close to it and commented that he was surprised that he had been cleared to depart

in view of its position when he called. If he had been told where it was in his take-off clearance he would not have lifted. He was squawking Mode A but Mode C is not fitted to this ac.

EDINBURGH ATC reports, with RT transcript, that the Edinburgh Tower position was manned by a controller and trainee. At 1404 the helicopter pilot requested to fly from Granton to the Forth Bridge and the trainee cleared him VFR within the CTZ not above 2000 ft. Shortly afterwards he was given the QNH and was cleared to "cross the 24 climb-out" (UKAB Note: Presumably meaning the 24 approach.). A few seconds later the A319 pilot called on left base for RW 24 and was asked to report final, being advised "*Traffic you may see ahead is a JetRanger helicopter lifting out of Granton for the bridges*". The pilot acknowledged. A minute later, once it had passed the helicopter, the controller cleared the A319 to land, passing the wind as 240/11; in his acknowledgement the pilot asked what the helicopter's altitude was. The controller ascertained this (1000 ft) from the latter's pilot and passed it to the A319 pilot who replied "*We passed him by 300 ft then*" and, after landing, said he would be filing an Airprox. The controllers had had both ac continuously in sight and were both under the impression that the trainee had passed traffic information to both ac on each other. However, the transcript shows that the LongRanger pilot was given no information on the A319, apart from what he could have gleaned by listening to the frequency.

ATSI comments that MATS Part 1, Page 1-3, applies i.e. "pass traffic information to IFR flights on VFR flights and give traffic avoidance advice if requested and pass traffic information to VFR flights on IFR flights and other VFR flights".

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.

Traffic information was the key factor in this Airprox. While the controllers were clearly familiar with Granton, it is not a VRP; the A319 pilot thought it was 'Grantown' and may have had no idea where it was, so there was no guarantee that that part of the controller's task had been successful. It was pointed out that positions relative to the airfield should be used in such circumstances. However, the A319 pilot would have known that the VFR helicopter would have a responsibility to avoid him and it was a crucial part of the control team's job to pass relevant information to the helicopter pilot to enable him to do that. That the mentor did not ensure this was done was held by the Board to be the cause of the Airprox. As the helicopter pilot had said, if he had known where the A319 was he would have stayed on the ground until it had passed; members wondered if the controller should have kept it there anyway as part of their duty to ensure the safe and orderly conduct of flight in the CTZ, believing that it was not good practice to allow ac to operate close to an active approach path. However other members considered that this could have been achieved by delegation to the helicopter pilot; " with the A319 on finals in sight, you are clear . ." etc.

As to the risk level, some members considered that the safety of the ac had been compromised but a majority thought that the actual tracks and flightpaths were not directly in conflict. There had been 3-400 ft of vertical separation and the Board concluded that there had not been a risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ADC mentor did not ensure that adequate traffic information was passed to both ac.

Degree of Risk: C

AIRPROX REPORT No 171/00

Date/Time: 13 Oct 1545

Position: 5108 N 0134 W (Middle Wallop - elev 297 ft)

Airspace: MATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: Gazelle APACHE AH1

Operator: HQ DAAvn Civ Comm

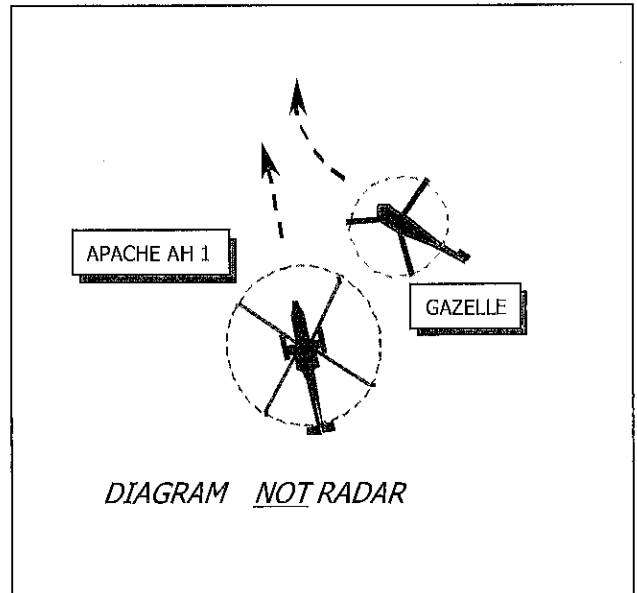
Alt/FL: 500 ft ↓ 75 ft
(QFE 1000 mb) (QFE 1000 mb)

Weather: VMC CLOC VMC CLBC

Visibility: 15 km >10 km

Reported Separation: 150 ft V/150 m H, 250 ft V

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT, a QHI and the PF, in a very full and frank account reports he was flying a 'Competence to Instruct' (C to I) sortie for a QHI student, and completing of a series of Engine Off Landing (EOL) exercises of different profiles in the Engine-Off Practice Area (EoPA) circuit at Middle Wallop. After flying 4 EOLs, as the PF, he was demonstrating a maximum range EOL. Clearance was obtained from ATC to climb to 2000' QFE (1000 mb) for this exercise. A 'finals' RT call was made just prior to entering autorotation and at a height of 1500 ft the throttle was retarded. He reduced the rotor speed (NR) down to 330 RPM to demonstrate the maximum range configuration and at 500 ft QFE, heading 310° with the throttle fully retarded he converted to a 60 kt autorotation for the EOL. An Apache helicopter was suddenly spotted by the student QHI through the port side cockpit bubble, hover taxiing in the same direction as the Gazelle's heading, directly underneath and moving into his committed landing area, for which they were short finals. Assessing the risk of collision as very high, he initiated a turn to the R as the student PNF advanced the throttle fully. By 150 ft AGL, with the throttle fully forward to the gate, an overshoot was successfully initiated into powered flight. The vertical separation was assessed as about 150 ft directly below his helicopter.

He added that opening the throttle contravened the appropriate handling guidance in the relevant AP, but there was no other way to avoid a collision. He commended the QHI student for his awareness and prompt reaction.

THE APACHE AH1 HELICOPTER PILOT provided a comprehensive report stating that the navigation lights and HISLs were all on whilst conducting a rotor track and balance test flight following replacement of one of the main rotor blades. He was in communication with Middle Wallop TOWER on 372.625 and 118.275 MHz.

For each of the data run flights he had been cleared to depart to the E from the Apache dispersal area with a turn out to the S. During the first run outbound ATC asked if he would be changing frequencies or remaining with TOWER, so he informed ATC that he would be remaining on the TOWER frequency for the duration of the short tracking flights. Whilst returning from the fourth such flight, he called TOWER about 4 NM S of the airfield for rejoin for the Apache dispersal and was subsequently cleared direct to the Apache dispersal. No other ac was observed in the circuit, nor had he heard any communication between ATC and any other ac in the area. Whilst flying across the airfield boundary heading 350° towards the Apache dispersal at 30 kt, in vicinity of the compass

base, they were asked by TOWER if they could turn to avoid an ac on approach to the EoPA. This was the first notification he had of any other ac within the circuit. As the crew of two scanned for the position of the other ac they observed another helicopter 225 m away above and to their R in an avoiding action climbing R turn. No avoiding action was taken as the other helicopter crew had already taken effective action to avert, what he assessed was a high risk of collision. The Gazelle passed about 150 m away and about 250 ft above his helicopter. He then continued to the dispersal and shut down.

He added that the Apache is fitted with a single VHF and single UHF radio, both of which were tuned to the normal published Middle Wallop TOWER frequencies, and which he was monitoring. He reiterated that at no time before being asked by ATC if they could turn to avoid another ac, was he aware of another ac in the circuit, no ac was seen, nor was there any communication heard between ATC and another ac other than his Apache.

THE MIDDLE WALLOP TOWER/APPROACH

CONTROLLER (ADC) reports the Gazelle was carrying out an extended range engine-off approach from 2000 ft aal to an area adjacent to the Apache dispersal heading 310°. The Apache was rejoining from due S (tracking about 360°) and routeing direct to the Apache dispersal.

When he first regained sight of the Gazelle from its earlier climb-out - it had been overhead the Visual Control Room - the helicopter was passing about 900 ft in a steep descent, which surprised him as he had not heard a "finals" call from the pilot when he commenced the procedure. The Apache was visible about 1 NM to the S and passing about 300 ft in a shallow descent with fast forward speed. He assessed that both ac were potentially in conflict if the Gazelle had selected the same aiming point used during the previous approaches. Therefore, he called the Gazelle pilot and offered to break off the Apache's approach. Receiving no immediate response, he instructed the Apache pilot to break L to avoid the Gazelle in the Engine-off Practice Area. The pilot of the Apache acknowledged the call promptly, but before he could make a turn

the Gazelle was observed to be climbing and turning R from approximately 150 ft, so the deviation became unnecessary.

Neither pilot advised ATC that he would be filing an Airprox report on the day in question.

ATSI reports that ATC at Middle Wallop, a 'Government Aerodrome' is provided by licensed civil ATCOs but operating in accordance with the provisions of JSP 318A (Military Air Traffic Services).

The controller concerned described his workload level and traffic loading as light at the time of the Airprox. He commented that, due to the anticipated low traffic loading, he was controlling/monitoring 3 frequencies - APPROACH, TOWER and 'LOCAL AREA TRAINING' - a quiet frequency, used for circuit work; usually an ATC Assistant monitors this frequency and pilots make appropriate circuit calls but do not expect an acknowledgement from ATC. The TOWER frequency is used for taxi clearance, rejoining instructions, and notifying sortie completion. It is not used for circuit work, unless "Full RT" procedures are in force.

The Apache helicopter had been carrying out a number of short air tests, routeing to the S of Middle Wallop, remaining on the TOWER frequency. Because of the light traffic situation, the helicopter had been operating direct from its dispersal, situated just to the N of the Engine Off Practice Area (EoPA) being used by the Gazelle helicopter flown by the reporting pilot, rather than positioning to and from the Rotary Wing Area, as normal. The controller said that, on the outbound leg of the flight, before the Airprox took place, the Apache pilot had been made fully aware of the Gazelle operating in the EoPA.

The Gazelle had been operating in the EoPA at low level using a final approach track of 310°, for about 30 min before requesting, at 1544, clearance to climb to 2000 ft for an "extended range engine off". This request was approved by the controller, who confirmed that, whilst at low level, the helicopter was operating in accordance with the procedures relating to use of the 'LOCAL AREA TRAINING' quiet frequency i.e. making appropriate broadcast calls of its position in the circuit. The controller said that he would have expected the

pilot to make the call, requesting a climb above the circuit height to 2000 ft, on the TOWER frequency i.e. to an ATCO position. However, unknown to the controller, the pilot remained on the training frequency. The controller explained that, when an ac transmits, a bulb illuminates on the communications panel on the VCR desk indicating which frequency is being used. However, because he was concentrating his attention out of the window, he did not notice the indication illuminate. As he believed, erroneously, that the Gazelle pilot had made his climb request on the TOWER frequency, the controller said that he assumed the Apache pilot which was operating on TOWER himself, would have heard the transmission and would, therefore, be aware of the Gazelle's continued presence in the EoPA.

The Apache pilot called for rejoin at 1545, requesting a routeing to the Apache dispersal from a position 5 NM S of the airfield. Because the only traffic operating on the airfield was the Gazelle, the controller approved the direct routeing and passed traffic information on a Sea King helicopter, which had reported, on the APPROACH frequency, flying westbound to pass 3 NM S of the airfield. The Sea King crew was informed about the Apache joining from the S and was asked its present position. As the pilot did not respond immediately, the question was repeated. Whilst the Sea King pilot's reply was being received on the APPROACH frequency, the Gazelle pilot reported finals on the 'LOCAL AREA TRAINING' frequency. As a result of these part simultaneous transmissions, the controller did not hear the finals call made by the Gazelle pilot. He assumed, erroneously, that the Gazelle pilot was holding at 2000 ft to wait for the Apache to clear to its dispersal. Consequently, believing that both helicopter pilots were aware of each other's ac and the Gazelle pilot was taking action to control the situation, he did not pass traffic information to either pilot. Had he realised that the Gazelle had commenced its descent, he would not have agreed to a direct routeing for the Apache, as an approach to the Rotary Wing Area, would have kept it clear of the Gazelle.

The controller first became aware of the confliction between the two helicopters when he noticed that the Gazelle was descending and passing about 1000 ft. At this point he saw the Apache about 0.5 NM 8-9 o'clock to the Gazelle. He surmised that he had not seen the Apache previously as it was

flying at a relatively low level. When he saw the Apache it was about 300 ft in a shallow descent. His first reaction was to pass traffic information to the Gazelle pilot on the Apache passing to port, incorrectly stating its position as Danebury Hill, which is situated 1.1 NM SE of the airfield. In fact it was slightly further away at Chattis Hill but the controller said he had a mental block at the time and could not recall that location's name. The Gazelle pilot was asked if he wanted the Apache to be broken off to the L or if he was happy with the situation. The Gazelle pilot replied: "*we're finals engine off*". The controller then instructed the Apache pilot to make a left turn to avoid the 'engine-off' Gazelle on its RHS. By this time the controller was aware that the Gazelle was climbing from about 150 ft and turning away to the R and that avoiding action was no longer necessary. He commented that the Apache did not alter its heading as a result of the confliction. In the controller's opinion, the horizontal CPA between the two helicopters was not less than 500 m. The Gazelle pilot assessed that the Apache passed 150 ft directly below his helicopter. The Apache pilot estimated the minimum horizontal separation as 150 m and vertical as about 250 ft.

JSP 318A, Page 22-1, states that: "Aerodrome Control is established to deal with VFR traffic flying in the circuit and all movements on the manoeuvring area. Information and instructions will be given to pilots by the aerodrome controller to achieve a safe, orderly and expeditious flow of traffic and to assist pilots in preventing collisions between:

Ac, and ac and obstructions on the manoeuvring area
Ac landing and taking off
Ac flying within the circuit area".

In the event the Middle Wallop ADC had not passed appropriate information or instructions to either of the pilots under his control. Both helicopters were permitted to carry out manoeuvres that had the potential for placing them on conflicting tracks.

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

THE SCHOOL OF ARMY AVIATION (SAAvn) comments that the incident arose for a number of reasons. Firstly, the approval by ATC of a non-standard approach by the Apache, which secondly,

was allowed to be on the TOWER frequency rather than the correct quiet frequency, in accordance with the SAAvn Flying Order Book (FOB) procedures. The ADC may have been distracted by the Sea King traffic passing S of the airfield and, as a result, missed the vital call from the Gazelle saying that it was on finals for an engine-off landing. The fact that the Apache had completed the same routine several times previously may have also lulled him into a false sense of security. Thirdly ATC did not ensure that information pertaining to the activities of the Gazelle was given to the Apache pilot, prior to joining. Although an experienced test pilot, he was not fully familiar with the Middle Wallop procedures, particularly the use of the EoPA. Lastly, the Gazelle crew was warned of the Apache joining the circuit, but not told that it was doing a non-standard approach in the proximity of the EoPA; they did not, therefore, try to locate it during their pre-descent checks.

Middle Wallop airfield procedures are currently undergoing review with a view to the integration of Apache AH1 training and Army Flying Grading (Firefly). However, with the limited flying being undertaken by the Apache fleet (4 ac) no changes to the SAAvn FOB have as yet been required or introduced. The application of current procedures and the passage of the correct level of information to pilots could have avoided this incident. New procedures are to be designed specifically to avoid any ambiguity and to ensure that, unless under positive control, ac in the same airspace are on the same frequency. Visiting pilots, or those not fully familiar with the local procedures, are to be under positive control by ATC at all times within the circuit.

The interpretation of the ATCO on duty at the time, of the flight profile or performance of the Gazelle once committed to the EOL may, have compounded the error. Once the throttle has been retarded it is committed to an 'engine-off' landing, only in exceptional circumstances such as these could the throttle be re-advanced, but with a potentially damaging effect to the transmission and engine. As a result of this incident all ATCOs will fly a variety of EOL profiles to ensure that they have an understanding of the limited manoeuvrability of the ac, rates of descent, descent angles and restricted lookout available to the crew.

HQ DAAvn endorsed the SAAvn comments adding that the Apache pilot was employed by the civil contractor and was accompanied by a flight test engineer. They are content that appropriate action has been taken to minimise the potential for a recurrence.

MOD DPA comment that once again the risk of not adhering to standard procedures resulted in a serious incident, which could easily have resulted in the loss of aircrew and valuable ac. Whilst a 'quiet' frequency is considered desirable for some 'high-risk' exercises, procedures must ensure other ac operating in the area are de-conflicted procedurally. Clearly, this Airprox has lessons for us all and in high-density traffic areas it is vital that ac are on the same frequency during similar 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 controller involved and reports from the appropriate ATC and operating authorities.

It was apparent to the members that this avoidable Airprox stemmed from a lack of positive 'control' by the ADC of the two ac, which placed the Gazelle pilot in a difficult predicament. Local procedures at Middle Wallop, which are geared to training, had led to the use of several frequencies for ac operating in the immediate aerodrome circuit area where broadcast calls on 'quiet' frequencies are accepted practice and are incorporated within the FOB procedures. The army member explained that this works well as long as these procedures are adhered to; quiet frequencies are essential in a teaching environment, but this serious incident illustrates what can go wrong when standard procedures are not followed in apparently low-intensity traffic scenarios. He endorsed the SAAvn and ATSI reports; reiterating that the Apache pilot should have been routed via the 'Rotary Wing Area' clear of the Gazelle in the EoPA and if both ac had been on the same frequency both pilots would have been alerted to the presence of each other's ac.

From the Gazelle pilot's perspective he had conducted the EOL in accordance with the established procedure on the 'quiet' frequency, had transmitted a finals call and was committed to the EOL, whilst unbeknown to him the Apache was closing from the S. On the other hand, the Apache pilot was routing back to the Apache dispersal through the EoPA as approved by the ADC. The Board recognised that three frequencies in use by one controller was not an ideal situation and it was unfortunate that the Sea King crew's transmission masked the Gazelle pilot's finals call. Nevertheless, the ADC should not have assumed that each pilot was aware of the other ac and the members agreed with the comments by ATSI that traffic information should have been given. Furthermore, it was apparent to controller members that existing procedures to de-conflict the two helicopters were not followed, whereby the ADC allowed the Apache to recover through the active EoPA, direct to the Apache dispersal but in conflict with the 'committed' Gazelle. Members agreed that positive action should have been taken at an earlier stage and the ADC should have detected the conflict earlier. Indeed, interrogating the Gazelle pilot as to his preferred solution may have only delayed resolution of this conflict. Members agreed, therefore, that this Airprox resulted because the ADC cleared the Apache to fly through the EoPA without providing traffic information or appropriate instructions to either pilot, which could have prevented the conflict.

The Board endorsed the Gazelle pilot's comments about the awareness and prompt reaction of his student QHI whom, members agreed, did well to spot the Apache in this very difficult situation and who probably could not have detected it any earlier than he did. Conversely, the Apache pilot did not see the Gazelle until his attention was drawn to it by the ADC, after its pilot had succeeded in establishing powered flight and was effecting his avoiding action climbing R turn. This may explain why the Apache pilot's estimate of the minimum vertical separation – about 250 ft - was larger than that of the Gazelle pilot's - 150 ft. The Board noted the Gazelle student's engine handling and while commending the crew's reactions recognised the risk that had been taken of damage to the engine and transmission. This decision had been the 'lesser of two evils' – possible damage to the engine against probable collision with the Apache – but with no assurance that either outcome would prevail. With this in mind members agreed that an actual risk of a collision had existed.

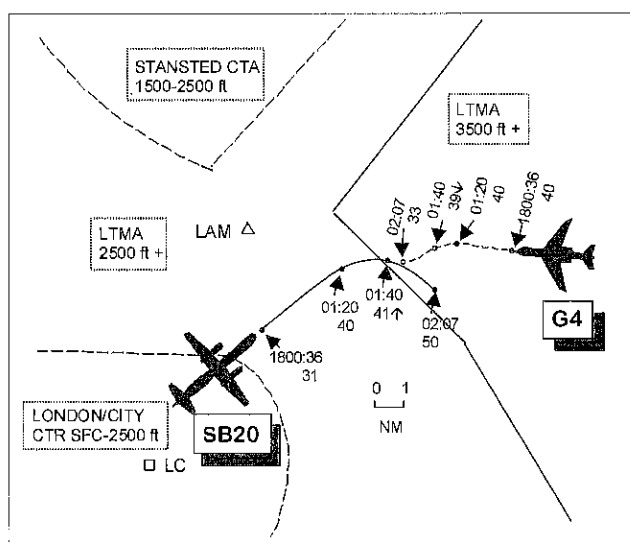
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ADC cleared the Apache to fly through the EoPA without providing traffic information or instructions to either pilot.

Degree of Risk: A.

AIRPROX REPORT No 172/00

Date/Time: 11 Oct 1802 NIGHT
Position: 5137 N 0019 E (6 NM E LAM VOR)
Airspace: LTMA (Class: A)
Reporting Aircraft Reported Aircraft
Type: G4 SB20
Operator: Civ Exec Civ Comm
Alt/FL: 4000 ft ↑ 4000 ft
(QNH 976 mb) (QNH 976 mb)
Weather IMC KLWD IMC KLWD
Visibility:
Reported Separation: 2.5NM 200 ft/ NK
Recorded Separation: 1.3NM 600 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE G4 PILOT reports flying inbound to Northolt heading 260° at 250 kt maintaining 4000 ft QNH 976 mb. He was in IMC, in cloud, at night, with anti collision and strobe lights on whilst receiving a radar control service from Heathrow Director. Avoiding action instructions were given to turn L heading 180° and to descend to 3500 ft with which he complied. Immediately thereafter, a TCAS TA then RA "climb" was received whilst following ATC instructions and the conflicting ac was seen as he descended out of cloud at 3500 ft in his 2 o'clock whilst still in the turn. It passed 2.5 NM clear and 200 ft above and he assessed the risk of collision as medium.

THE SB20 PILOT reports climbing to 4000 ft outbound from London City heading 060° at 240 kt. He was in IMC in cloud and receiving a radar control service from Thames Radar. His navigation, landing and strobe lights were on. Whilst on a vector to avoid a CB, he was asked if he could accept a R turn due to conflicting traffic to which he replied that he could take any R turn. He was then cleared to route direct to DET and to expedite a climb to 5000 ft. Whilst carrying out this manoeuvre, he was asked if he could see traffic at 4000 ft but he was unable to owing to IMC. ATC then informed him that the other traffic had passed clear of him underneath. He was unaware of any problem or risk except for the request to turn quickly and climb from the controller.

ATSI reports a meteorological aftercast was obtained for the relevant period as there were elements of weather avoidance by one ac and the possibility of upper wind effects which were factors for consideration.

The G4 was inbound to Northolt via Lambourne and, at 1800 hr, the pilot called the Heathrow Intermediate Director, reporting at 4000 ft. The Director responded with instructions to leave Lambourne heading 265° to establish on the ILS for RW 25 at Northolt.

Some 2 minutes earlier at 1758 hr, the SB20 got airborne from London City airport RW 28. The Heathrow SVFR controller rang TC asking for a climb co-ordination to 5000 ft should it be needed

but the request was refused because of the G4 descending to 4000 ft inbound to Lambourne. At interview, the Thames Radar controller remembered that he needed to co-ordinate 5000 ft for the SB20 but could not remember specifically asking the SVFR controller to carry out that task on his behalf. The SVFR controller had told the Thames Radar controller that 5000 ft was unavailable, however, as the Thames Radar controller was so busy, he was not sure if the latter had absorbed this information. At the time both the RTF and telephones were in almost continuous use, with the SVFR controller acting as co-ordinator for the Thames Radar controller

At 1759:40 hr, the SB20 called the Thames Radar controller reporting on a LYD3T SID, level at 3000 ft and requesting a heading of 060° for weather avoidance. The SVFR controller passed this information on to the TC North Co-ordinator shortly afterwards. The LYD3T SID requires an intercept of the LON R083 and to maintain 3000 ft to D27 and then climb to maintain 4000 ft by D31 followed by a R turn onto the DET R336. The LON R083 provides 5 NM separation from Lambourne VOR, so any track to the N of the radial will bring ac into conflict with those tracking through the VOR overhead at similar level. At 1800.13 hr the Thames Radar controller instructed the SB20 to climb to 4000 ft. He stated that he did this because he was concerned that the ac was running out of Controlled Airspace. He was also concerned at the high groundspeed of the ac, measured later at 300 kt, and believed that it was due to a strong tailwind. (Note: The ac had been flying at normal departure speed with a 35 kt tailwind). The Thames Radar controller was questioned about radar identification of ac after take-off and the speed control of departures. He stated that he did not use speed control for outbound ac and normally applied the Secondary Radar method of identifying ac after take-off but in this case he had not as he was too busy.

The Thames Radar controller first saw the conflicting G4 at 1800:50 hr, by which stage it was level at 4000 ft and the SB20 was passing 3400 ft in the climb. He asked the pilot of the SB20 when he would be able to make a R turn as it was needed for avoiding action. At 1801.10 hr, having been advised by the pilot that a R turn was acceptable, he instructed the SB20 to turn R heading 140°.

(The instruction did not contain the words "Avoiding Action" but this was implied from the previous request). Traffic information on the conflict was then given as "3.5 NM to the ENE of you at 4000 ft". He was convinced that the turn would maintain the prescribed separation. However, as the turn took effect, it became apparent that lateral separation would not be maintained, not only due to SB20's high speed but also because the TC Heathrow Intermediate Director had turned the G4 L to avoid passing ahead of the SB20. In response to this fluid situation the Thames Radar Controller instructed the SB20 to climb to 5000 ft, at 1801:20 hr. He stated that he had been unaware of the presence of the G4 until he saw the conflict on the radar. He had also been unaware of exchanges between the Heathrow SVFR controller and TC so, although he was acting without co-ordination, he believed that it was reasonable to anticipate the availability of that level. He said that it was his philosophy to try and climb outbound ac as soon as possible and get them over to TC and out of the way so as to enhance tactical freedom. This demonstrated the dilemma facing Thames Radar controllers dealing with high performance ac travelling at 300 kt in this area. Controlled Airspace is limited geographically, the outbound SID level is 4000 ft which is the same as the inbound level and unless further climb is made available, leaving Controlled Airspace becomes inevitable.

The Heathrow Intermediate Director was first alerted to the conflict when the Short Term Conflict Alert (STCA) activated as the ac closed to about 6 NM apart. The SB20 had not been visible before that owing to traffic in the Lambourne hold. He had seen this climbing ac in the G4's 10 o'clock position and, rather than turn R in front of it, at 1801:20 hr he issued an avoiding action turn L onto 180° followed by descent to 3500 ft. When the conflict was resolved he instructed the G4 to resume heading and level towards Lambourne.

The TC North Co-ordinator had handled all the exchanges with the Heathrow SVFR controller and was sure that the Thames Radar and Heathrow SVFR controllers were aware of the presence of the G4. When asked whether there were any occasions when traffic in this area would be given a clearance to climb he said that, when traffic conditions permit, it was quite normal that co-

ordination would be agreed with TC Northeast for Thames Radar to climb such an ac. He added that any such climb also had to be agreed with TC South.

The question of workload was raised with the Thames and SVFR radar controllers as the RTF load on the Thames Radar controller's frequency was such that he did not appear to have time to perform his own co-ordinations. It was stated that the manning in the radar room was not ideal; there should be a dedicated Thames Radar Co-ordinator since it was not always possible to guarantee that the SVFR controller was qualified on Thames radar and/or had the spare capacity to assist.

UKAB Note: Replay of the Heathrow radar at 1800:36 shows the SB20 3.7 NM S of LAM tracking 050° commencing the climb from 3000 ft as the G4 is seen 9.6 NM E of LAM steady on a track of 280° level at 4000 ft. At 1801:20, the SB20 levels at 4000 ft and commences a R turn as the G4 closes to 4.2 NM to the E. 20 seconds later, the SB20 is seen passing 4100 ft in the climb as the G4 passes 3900 ft descending in a L turn 1.8 NM apart. CPA occurs 4 seconds later at 1801:44 with the SB20 climbing through 4300 ft and passing 1.3 NM ahead of G4 descending through 3700 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 authorities.

The board noted that the SB20, on leaving the LYD3T SID onto a more northeasterly track for weather avoidance, flew from Thames/TMA S airspace into that of TMA N and was correctly co-ordinated by the SVFR controller at 3000 ft. However, the Thames Radar controller did not subsequently co-ordinate with TMA N before climbing the SB20 to 4000 ft which brought the SB20 and G4 into conflict. Members also noted that ac on a LYD3T SID, (which follows the LON R083 further S), climb to 4000 ft before routing

towards the DET VOR, but on this occasion the controller believed that the SB20 would have left CAS at 3000 ft had he not given climb clearance.

Discussion then focused on the airways joining/leaving procedures and the manning levels within the Thames Radar/Heathrow SVFR Control room. As highlighted in a recent Airprox (145/00), the Board had endorsed the ATSI recommendation that ATC procedures should be reviewed to provide procedural separation for IFR airways traffic. Two things had prompted this; first was the complexity of the Thames radar task dealing with higher performance ac within confined airspace boundaries and second was increased traffic levels. Members were concerned that the SVFR controller, as well as doing his own job, had carried out co-ordination on behalf of the Thames controller who appeared to be too busy to effect his own or absorb the information subsequently. This was at a time when London City could expect to be busy and members agreed that a dedicated Thames Radar Co-ordinator was needed for this situation. Consequently, they recommended that a review of established posts within Thames Radar to meet their task be carried out.

Moving on to the avoiding action, a controller believed that this incident highlighted the benefits of STCA. The SB20 had been obscured by other traffic on the TC display and, unlike the Heathrow Intermediate Director, who was alerted by the STCA, Thames Radar/Heathrow SVFR controllers were disadvantaged in not having this equipment available to warn them of the developing conflict. Provided there were no technical reasons to prevent it, members felt that fitting STCA into the Heathrow Approach room would improve safety and the matter should be reviewed.

As to the risk, members initially were concerned that the G4 pilot had ignored the TCAS RA to climb but he had stated that this alert occurred only after receiving and starting to comply with the TC Heathrow Intermediate Director's avoiding action to turn L and descend. The timing of the TCAS alert was possibly when both ac were level at 4000 ft but the expeditious climb by the SB20 to 5000 ft as well as the G4's turn and descent to 3500 ft ensured the subject ac passed clear of each other. The TC controller's L turn was also felt to compound the incident but it had been a fast moving situation. His decision to turn the G4 L was probably made before the SB20's R turn had become apparent; just before levelling out the G4 had become visual with the SB20. However, members agreed that the ac had got sufficiently close during the encounter in IMC, owing to the late avoiding action on the SB20's part, to such an extent that safety had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Thames Radar controller climbed the SB20 to 4000 ft without co-ordination.

Degree of Risk: B

Recommendation: That NATS considers the following for Thames Radar:

- a. Fitting STCA equipment.
- b. A review of the established posts.

AIRPROX REPORT No 173/00

Date/Time: 19 Oct 0920

Position: 5309 N 0019 E (8 NM ESE of Waddington)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Jetstream Mirage

Operator: HQ PTC Foreign Mil

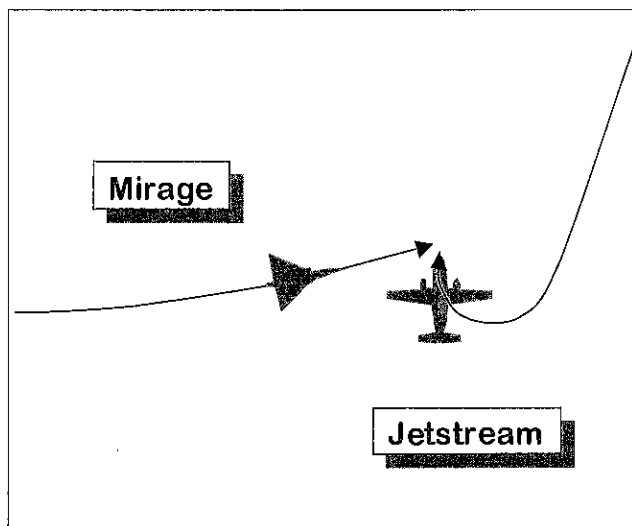
Alt/FL: FL 55 FL 50 ↑

Weather VMC CLNC VMC CLNC

Visibility: Unltd

Reported Separation: 200 yd/500 ft, 1500 m

Recorded Separation: 200 yd



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading N at 160 kt having seen 2 Mirages pass on an easterly heading, 0.5 NM away and 500 ft above. A few seconds later a 3rd ac passed across his nose at the same level about 200 yd ahead. It was too late to take avoiding action and the risk of collision was high. A call to Waddington confirmed that 4 Mirages had just departed; he did not see the 4th at all. He was not receiving an ATS at the time of the incident.

THE MIRAGE PILOT reports departing from Waddington under a RAS, heading 060° at 400 kt as the second pair of a 4 ac formation. During the join up, No 4 saw the Jetstream at 0.5 NM and the No 3 just afterwards. He took strong avoiding action without which there would have been a high risk of collision; he estimated passing 1500 m from the Jetstream.

MIL ATC OPS reports that the formation of 4 Mirages was under a RIS from RAF Waddington ZONE (ZONE) after departing RW 21 as 2 pairs in 2.5 NM trail en-route to the Air Combat Manoeuvring Installation (ACMI) in the North Sea. Waddington Approach (APP) would normally have controlled all airfield departures; however, APP was pre-occupied with an emergency after take-off and so the task was delegated to ZONE, who was

suitably qualified and was not working any LARS traffic. The formation was instructed to climb to FL 150, which was acknowledged. The Mirages started a left turn onto 060° climbing to FL 150 iaw the SID 1 profile whilst still operating as 2 pairs in 2-3 NM trail. At 0919:39 ZONE transmitted "C/S, traffic left half past eleven, five miles crossing left-right, indicating flight level five zero", which was acknowledged whilst both elements of the formation continued in a climbing left turn. At 0920:23, ZONE updated the traffic information (TI) to the trailing pair in the formation by transmitting "C/S 3 & 4, previously called traffic is now your right half past twelve, one and a half miles crossing right to left at flight level five zero", the call was not acknowledged. At 0920:51, following a request from ZONE, the crew of the trailing pair confirmed that they were visual with the lead pair.

At 0922:22 the Jetstream crew freecalled APP to enquire "...what ac type have just left you please? I wish to file an airmis". After APP had confirmed that the ac were Mirages, the Jetstream crew replied "...I would like to file an airmis on a Mirage, er, about 2 minutes ago, he was eastbound at level five zero" adding a few seconds later "C/S, I will do it on the ground – call you back". At 0923:04, APP transmitted to the Jetstream crew to squawk ident, which was acknowledged. At 0923:24, APP enquired if the Jetstream crew were squawking Mode 3A 4264 with ident, but the call was

unanswered; a similar enquiry about 30 seconds later also went unanswered. Waddington ATC contacted Humberside to find out details of their 4624 squawk, but were told that the Jetstream had been receiving a service and had gone en-route without changing the squawk.

After landing, the Mirage leader spoke to ATC and confirmed that he had seen the Jetstream in good time and been able to pass well above. The leader had then relayed the position of the Jetstream to the trailing pair using a discrete frequency; unfortunately, this call had caused some confusion within the formation and resulted in a late sighting of the Jetstream by the trailing pair. Whilst the formation leader did not confirm whether the second TI had been heard by the second pair, it was possible that internal formation dialogue had blocked out the ZONE's update.

The Claxby radar recording radar shows the lead pair of Mirages departing from RW 21 at Waddington at 0918:38 squawking Mode 3A 6073. At the same time, the Jetstream is 075° from Waddington at 9 NM tracking 200°, squawking 4264 (a Humberside discrete code) and indicating FL 50. The second pair departs Waddington at 0919:03 (also squawking 6073) about 2 NM in trail to the lead pair, who are beginning a climbing left turn passing 1500 ft. At 0919:39, the time of ZONE's first TI, the lead pair of the formation are about 5 NM south-east of Waddington continuing a left turn, passing through east, climbing through FL 39; the second pair are 2.5 NM in trail in a climbing left turn passing 1500 ft. The Jetstream is in the lead pair's 11 o'clock at 6 NM maintaining a track of 200° and indicating FL 50. The lead pair continues a left turn to about 060° on a track that will pass to the west and then astern of the Jetstream. At 0920:07, the first pair tracks 1.5 NM west of the Jetstream on a reciprocal track passing FL 55, with the second pair 2 NM in trail passing 2500 ft. As the first pair passes, the Jetstream begins a right turn towards the projected track of the trailing pair. At 0920:23, the time of ZONE's second TI, the Jetstream is slightly right of the trailing pair's 12 o'clock at 1.5 NM in a right turn passing through 300° and still indicating FL 50; the trailing pair are tracking 060° climbing through FL 38. When the No 3 and the Jetstream are about 0.5 NM apart the Jetstream shows FL 50 and the trailing pair FL 46. At 0920:34, the radar returns

are 200 yd apart, one showing FL 50 and the other FL 49. As the radar returns diverge, the Jetstream is still in a right turn passing 345° indicating FL 50, whilst the trailing pair are about 1 NM to the east, maintaining track and climbing through FL 55. The Jetstream continues its turn to virtually complete an orbit as the Mirages maintain their north-easterly track towards the ACMI.

The routeing and handling of the Mirage formation applied by ZONE were both standard and in accordance with Local ATC Orders. ZONE's application of RIS was commensurate with current regulations and TI was accurate throughout; moreover, when it became apparent that the trailing pair would pass in close proximity to the Jetstream, ZONE sensibly updated TI specifically to the second element of the formation.

The formation leader became visual with the Jetstream following ZONE's first TI and was able to pass one mile to the west and above the conflicting traffic. As the second pair was trailing 2 NM on a similar track, they too should have passed to the west of the Jetstream. However, the radar recording shows that the Jetstream began a right-hand orbit immediately after the first pair passed down their starboard side, which intercepted the projected track of the trailing pair bringing all 3 ac into close proximity. Had the Jetstream maintained its original track of 200°, it is estimated that the trailing pair would have passed between 1.5-2 NM west of it. The incident may have been further complicated by an internal call from the formation leader which may have blocked ZONE's second TI, delaying the second pair's visual acquisition of the Jetstream. Whilst they were perfectly entitled to be flying in the vicinity, the Jetstream crew's decision to transit VFR through an area regularly used by fast jets departing from Waddington and Coningsby may not have been best practice without talking to Waddington. (Waddington had promulgated details of 2 major international deployments operating from their airfield that week.)

HQ PTC comments that we must assume that the Jetstream pilot was aware of the position of the Waddington SID and the fact that their nearest neighbour was hosting ACMI FJ. Therefore, notwithstanding both the gin-clear weather and his necessary preoccupation with flying instruction, it

might have been prudent for him either to have positioned himself elsewhere, or to have been in contact with Waddington ATC during this part of his IRT sortie.

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 came to no conclusions regarding the Jetstream pilot's lack of ATS. Members were aware of the difficulty of conducting an IRT, or instructing, while receiving an ATS, and the pilot was constrained to the area E of Waddington by the locations of his PD and his base. However, the incident clearly illustrated the risks inherent in what

the Jetstream pilot was doing. Members considered it possible that not all the Mirage pilots understood English well enough to assimilate their RIS, hence the internal conversation on separate radios, and this may have delayed the Mirage pilot's acquisition of the Jetstream. The Board agreed that the cause of the Airprox was the late sighting by both the Mirage and Jetstream pilots, and that while the last minute and vigorous avoiding action by the Mirage pilot had removed the risk of an actual collision, the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by both pilots.

Degree of Risk: B

AIRPROX REPORT No 174/00

Date/Time: 19 Oct 0945

Position: 5724 N 0401 W (8 NM SSE of Inverness - elev 31 ft)

Airspace: LFS (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR1 Bell 206L

Operator: HQ STC Civ Pte

Alt/FL: 570 ft 1500 ft
(Rad Alt) (QNH 1006 mb)

Weather: VMC VMC CLBC

Visibility: Not reported 10 km

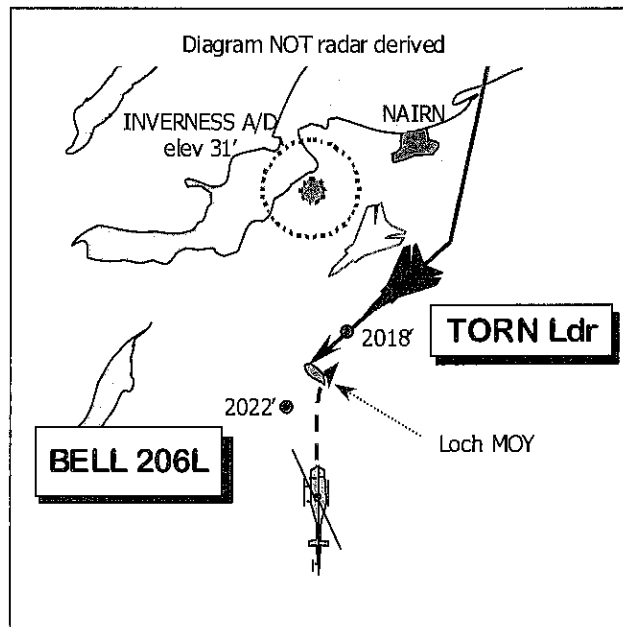
Reported Separation:

100 ft V 50 ft V, 2-300 m H

Recorded Separation: Not recorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR1 PILOT reports leading a pair on a low-level cross-country sortie in loose battle formation at 430 kt; the No 2 was positioned 4 km to starboard. Both ac were camouflage grey but



HISLs were on and 3/A 7001 selected with Mode C, whilst under a FIS from Lossiemouth; workload at the time was relatively low.

They coasted in E of Nairn heading 230° at 1000 ft then descended to 3 – 400 ft msd, which was maintained as the terrain rose ahead. After cresting

high ground at 2018 ft amsl about 8 NM SSE of Inverness, he initiated a 2° dive to regain their transit msd. About 4 sec later whilst passing 570 ft agl he spotted helicopter blades to the L and below, with a slight L - R relative motion (10°) and on an apparent collision course. The ac was pulled up into a climb to increase separation with the helicopter, which 2 sec later, under flew the Tornado. He estimated that the helicopter, which he identified as a JetRanger, was at about 300 ft agl and passed 100 ft below the Tornado with a high risk of a collision.

He added that visual acquisition was hindered by, what he thought, was a dark blue colour scheme against a dark background in low contrast light conditions.

THE BELL 206 LONGRANGER HELICOPTER PILOT reports flying VFR at 95 kt inbound to a private landing site. His helicopter has a blue/silver livery, HISLs were on, but SSR was switched off whilst under a FIS from Inverness Approach. The weather was clear and bright and he was cruising at 1500 ft QNH about 1-2000 ft below cloud with an in flight visibility of >10 km.

Whilst approaching Loch Moy heading N, he spotted some military jets, he thought 3, about 1 NM ahead and to the R at a similar height. One of them was lagging behind the others and was on a collision course, he hoped its pilot had seen his helicopter, but if he had continued on track they would have hit. To avoid the jet he turned R and descended as the other ac passed 2-300 m down the port side about 50 ft above his helicopter. Although he reported there had been a high risk of a collision, he felt he had plenty of time to alter course as he had seen the jet for a 'relatively' long period of time.

UKAB Note (1): Inverness Airport ATC is not radar equipped.

UKAB Note (2): From Meteorological Office archive data the Inverness QNH was 1006 mb.

UKAB Note (3): In a subsequent telephone conversation the B206 pilot said that there may only have been two jets.

HQ STC comments that in order to afford large passenger ac extra protection, there is an RAF Lossiemouth local order which requires their ac to be in radio contact with Lossiemouth Departures when operating in the vicinity of Inverness. This arrangement, however, does not provide crews of military ac with information on all traffic in the Inverness area unless those pilots have requested a FIS or RIS with Lossiemouth ATC. In this Airprox, the helicopter pilot had neither requested an ATS from, nor was seen on radar by, Lossiemouth ATC, therefore, it was not reported to the Tornado crew. The helicopter pilot's decision to operate VFR in the UKLFS at a height of around 300 ft agl may not necessarily constitute sound risk management. In the event, the Tornado crew did well to spot it against the terrain, and under the nose of their ac, as they bunted over the high ground.

In an effort to make local civilian operators more aware of the heights at which the RAF operates within the UKLFS, aircrew and operations staff from RAF Lossiemouth attended a 'ShAirspace' symposium at Aberdeen during November 2000. It is hoped that similar interest can be engendered at Inverness but in the interim, the Station Flight Safety Officer will be contacting all known users of the local airspace to publicise the routes and profiles flown by military ac in the Inverness area.

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

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A civilian helicopter pilot member drew attention to the HQ STC comments regarding sound risk management and the Bell 206 pilot's decision to operate within the UK LFS at a height of around 300 ft agl. He emphasised that below 2000 ft agl, Class G airspace was not the exclusive preserve of military ac. From the civil perspective, he thought the HQ STC comments were unhelpful to the extent that they did little to engender a positive approach

to flight safety. The Bell 206 pilot had been perfectly entitled to fly at that height, as long as it complied with the *Low Flying* rules as he legitimately carried out his task of checking out various sites along his route. Members understood both viewpoints. Though the jet was probably skylined as it crested the high ground and may have drawn the helicopter pilot's attention initially, the Bell 206 pilot did well to spot the Tornado as early as he did and make his R turn to avoid, what was apparently, the leader's ac. This timely action may have forestalled a much more serious incident. Similarly the Tornado leader had spotted the helicopter and had climbed to avoid it – but not by much. This led the members to conclude that this Airprox was the result of a conflict in the LFS/FIR, which had been resolved by the avoiding action of both pilots.

Both ac had been operating with different ATSUs in the same area albeit only under a FIS. This was a matter of choice for the helicopter pilot, perhaps not so for the Tornado pilot, but some members wondered if Inverness ATC would pass details to Lossiemouth ATC about their traffic and vice versa. Such exchanges might hold true for ac routeing between the two aerodromes and switching frequencies between ATSUs, but in this instance co-ordination was unlikely; there was little that Inverness could pass on to Lossiemouth other than a general warning of the presence of the transiting VFR helicopter, which was more than 25 NM from Lossiemouth. It was explained that Tornados from Lossiemouth generally flew in this vicinity under a FIS with their parent ATSU, to enable them to receive information about large CAT ac operating into Inverness. Lossiemouth ATC provides an arrival and departure service for Inverness as the latter is not equipped with radar. However, it was

most unlikely that the Lossiemouth SRE would have detected the helicopter at a height of 300 ft because of shielding by high ground between them. Even if the Bell had been squawking A7000, which it was not, the Kinloss SSR head used by Lossiemouth, would probably not have detected it either at this height.

Turning to risk, in the absence of a radar recording it was not possible to quantify exactly the minimum separation at the CPA. However, both pilots had estimated similar vertical separation distances; the helicopter pilot thought 50 ft after he had descended and the Tornado pilot thought 100 ft, the latter as he climbed above the helicopter and somewhere between the two was probably close to the mark. Some members assessed the combined actions of both pilots had removed any risk of a collision. Although the helicopter pilot reported he had plenty of time to alter course and had seen the jet for some time, others considered that the Tornado pilot had only just seen the helicopter in time to avoid it – he had overflowed it just 2 secs after pulling up. Having considering all these points, in the end the latter view prevailed by a very narrow majority and it was concluded that the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the LFS/FIR resolved by both pilots.

Degree of Risk: B.

AIRPROX REPORT No 175/00

Date/Time: 13 Oct 1451

Position: 5411 N 0229 W (10 NM S of Sedburgh)

Airspace: LFS/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Jaguar Paraglider

Operator: HQ STC Civ Pte

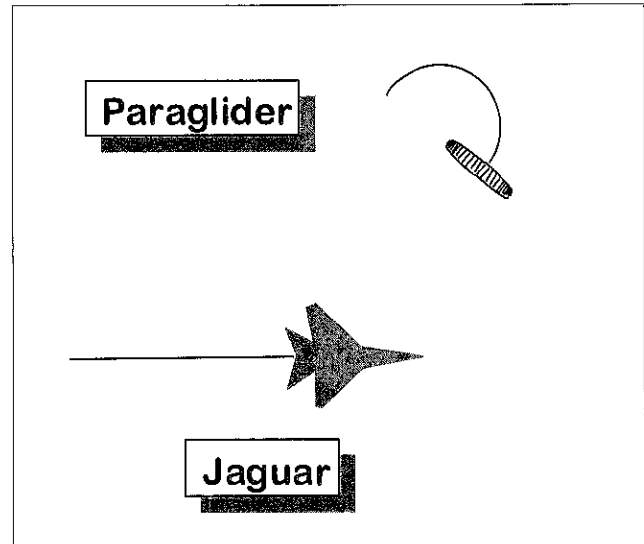
Alt/FL: 4-500 ft↑ 1000 ft
(Rad Alt) (QNH)

Weather VMC CLBC VMC CLBC

Visibility: Unltd 20 km+

Reported Separation: 100 ft V 100 ft H/
30 m V 500 m H

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JAGUAR PILOT reports flying at 450 kt as No 3 of a 4-ac formation at low level. The No 2 spotted and called a paraglider as a threat to his (No 3's) track. He delayed his turn at a waypoint to avoid the reported traffic's position (at that stage he could not see it) but pulled up to 4-500 ft Rad Alt to cross a slight ridge and continued to look out for it. He spotted it as he rolled out of the turn; it was 200 m ahead and 100 ft below, too close for avoiding action, and it passed 100 ft to his left and 100 ft below. Had he not climbed, the risk would have been far greater.

THE PARAGLIDER PILOT reports soaring at 15 kt from Tow Scar which is much in use all week since its relatively low level means it is less windy than higher sites. He saw the Jaguar approaching from 5 NM away and flew hard turns to make his canopy more visible. He saw the Jaguar jink slightly, taking this to mean he had been seen, and the Jaguar passed 500 m away and 30 m above. He thought the risk of collision was low although he had some worry about the Jaguar's vortices. However, the jet passed downwind of him and he was not troubled. He did not consider the incident was threatening so he did not take particular note of it but commented that when jets approach from

the Kingdale (NNE) or Twisleton (NE) directions they can only be seen at the last moment. He was operating on his own so had not informed ALFENS Ops; he commented that often paraglider pilots will scout about for a site where conditions are suitable and launch when they find one; this leaves insufficient time for any meaningful warning to be given to ALFENS Ops.

UKAB Note: The incident took place below the coverage of recorded radar, and Tow Scar is not notified on the LFC as a paraglider site.

THE BHPA comments that this incident highlights the problem of late sightings that can result from any low flying aircraft approaching from behind an active ridge. In this case there was no effective method for the paraglider pilot to notify the Jaguar formation that the site was active. The introduction of a military Collision Warning System coupled with a sensible SSR usage policy (e.g. being able to site a transponder on top of an active site) could be a major improvement in mutual flight safety.

The criterion for selecting which sites are listed on the LFC is usage figures periodically provided by the clubs. It would appear that this site is mostly used for low level initial training, i.e. where the aircraft will not exceed 150ft agl; usage not deemed to warrant listing in the LFHB.

HQ STC comments that there is some considerable difference in the separation distances reported by the respective pilots but it would seem reasonable to conclude that these are the 2 ac involved and that at least one of the pilots has misjudged the separation to some degree. Nevertheless, this was a close call and had the Jaguar passed upwind of the paraglider, the latter's pilot may have suddenly found his flight significantly more challenging.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

It was not clear if the Jaguar pilot's actions on hearing No 2's warning, though sensible, had made matters better or worse. He delayed his turn and came into conflict, implying that if he had turned on time he may have missed the Airprox. The traffic call may not have been that accurate; judging where a paraglider is relative to another member of a low level battle formation is not easy. Nevertheless it was a good spot by the No 2, doing

what members of a battle formation are supposed to do for each other. Moreover, the Jaguar pilot's slight climb into airspace ahead of him that he could see was clear, also helped. In the end, members agreed that timely sightings of paragliders, especially against terrain, cannot be guaranteed and that the encounter was a conflict of flightpaths. The risk level depended on the miss distance which was somewhat in dispute; the Board concluded that it was probably somewhere between the 2 pilots' estimates and that, combined with neither pilots' ability to influence events, led members to assess that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict of flightpaths.

Degree of Risk: B

AIRPROX REPORT No 176/00

Date/Time: 23 Oct 0801

Position: 5055N 0018E (TIMBA Hold)

Airspace: London TMA (Class: A)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	B737-400	B767

<u>Operator:</u>	CAT	CAT
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<u>Alt/FL:</u>	FL 100	FL 100
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<u>Weather</u>	IMC CLAC	VMC CLAC
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<u>Visibility:</u>	NR	NR
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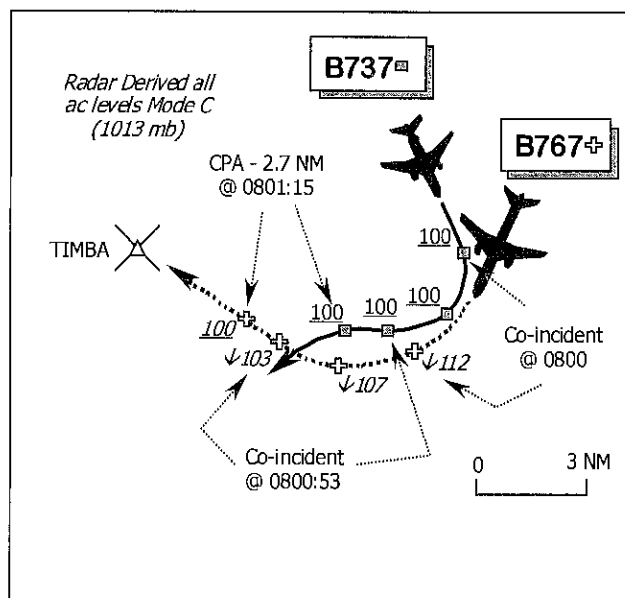
Reported Separation:

2-3 NM H, Nil V	NR
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Recorded Separation: 2.7 NM H, Nil V

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-400 PILOT reports that he was flying the TIMBA hold at 220 kt, level at FL 100 prior to landing at Gatwick. He was technically IMC as the cloud tops were about 200 ft below him, but good VMC above, when the B767 was observed visually



and on TCAS as it descended down toward his level. The B767 turned into the hold at the same level – FL 100, levelling about 2-3 NM ahead of his ac. He reported this apparent erosion of separation to ATC who passed avoiding action and he turned in 'heading select' onto 210° to avoid the B767. Afterwards he turned back toward TIMBA,

whereupon ATC issued descent to FL 90 and apologised, confirming that they had been at the correct level.

When queried later, the B737 pilot added that TCAS only enunciated a TA – no RA was received. He believed this might be due to the low ROD of the B767 when it entered the hold and whose pilot did not appear to realise that separation was being eroded at the time.

THE B767 PILOT reports heading inbound to Gatwick for a TIMBA arrival and that the controller was very busy when they were first transferred to LATCC. They were instructed to hold at BEXHILL initially at FL180 and given an Expected Approach Time (EAT), before radar vectors into the TIMBA hold descending to FL 120 and being transferred to Gatwick DIRECTOR. As they entered the TIMBA hold another ac [the B737] was showing on TCAS just ahead, 1000 ft below his ac. Further clearances to descend were then received. During the descent in the hold they heard a conversation between ATC and the B737 crew that his B767 was descending to the other crew's level in the hold. The controller confirmed that the B737 was at the correct level and he thought the controller gave the crew a radar heading.

He added later that the B737 was also spotted visually 1 NM ahead when they originally entered the hold; it was subsequently overtaken in the holding pattern below them and was probably astern of them at the time of the Airprox. He was unable to ascertain the minimum separation, as they were unaware of the occurrence at the time. The risk was assessed as "slight" and he believed it was more an erosion of separation than a "real risk of a collision".

UKAB Note (1): After the Airprox, which occurred at 0801:20 as the B767 levelled at FL 100, the B767 pilot reports that they were on a radar vector of 250° and cleared to descend from FL 80 to FL 70. As he was reading back this clearance, TCAS enunciated a "CLIMB" RA; the F/O (the PF) complied immediately and he interrupted his readback at 0810:00 to advise the controller of the TCAS climb. The F/O believed that the traffic showed on TCAS 200 ft below their ac, crossing. After the RA they resumed the descent, having

ascended to FL 83, he thought, following the RA. Gatwick DIRECTOR advised the B767 pilot that there was "...*nothing below you at FL 70*", but there was traffic heading into TIMBA at FL 90. The LATCC radar recording at 0810:04 shows the B737 12 o'clock - 7.2 NM crossing from L – R, at FL 69 Mode C (1013 mb) and on a radar vector of 285° well ahead of the B767. The reported TCAS climb of the B767 to FL 83 is not evident, but a momentary climb of 100 ft to FL 81 is shown as the ac steadies on 250°. The B767 pilot reports on RT that they had "*lost*" the RA and were descending at 0810:10, which is evident from the Mode C 10 sec after the INT DIR reaffirmed the instruction to descend to FL 70 at 0810:20.

ATSI reports with RT transcript, that the LATCC, TC, MATS Part 2, [pg. GAT 1-2], describes the relationship between the two LATCC TC controller positions of INTERMEDIATE DIRECTOR (INT DIR) and SUPPORT (SPT) as 'Executive and Support' controllers sharing a common Gatwick DIRECTOR RT frequency. It also states that: "*Whenever the SPT position is manned, the responsibilities of the SPT controller, using the radar display include - The issuing of descent instructions to holding ac as the lower stack levels become vacant, down to the lowest level available to TC Inbound. The Minimum Stack Level is to be left available for INT DIR use*". The SPT controller described her workload level and traffic loading as high, both at the time of the Airprox, and in the 25 min period she had been in position prior to the occurrence. Because the holding time at the two Gatwick stacks was in excess of 20 min, EATs were being issued.

The B737 crew established communication with Gatwick DIRECTOR at 0752, and reported descending to FL 110 inbound for the TIMBA hold. The ac was instructed to route via LARCK to TIMBA, to take up the hold and passed an EAT of 0816. Shortly afterwards, the SPT controller cleared the B737 to descend to FL 100.

At 0757, the B767 crew made their initial call on the frequency, which was blocked by another transmission so the pilot transmitted again and reported reaching FL 120 in the hold at TIMBA. The crew was instructed to maintain FL 120 and to expect a 20 min delay.

Both the B737 and the B767 were now established in the hold at TIMBA, at FL 100 and FL 120 respectively under an Approach Control service. Between these two flights was another airliner, which was maintaining FL 110 in the TIMBA hold. Because this airliner had been held earlier 'en-route', its sequence number, issued to prevent ac 'losing their place in the queue', was in advance of other ac holding below it. Consequently, the INT DIR decided to vector this airliner away from the holding area until it could be given descent clearance to FL 70 and sequenced into the correct order for landing. The SPT controller reported that she was aware of the INT DIR's intentions with respect to this airliner and watched it vacate FL 110 on the radar display. As this level in the TIMBA hold was now vacant, just after 0758:30 she instructed the B767 to descend from FL 120 down to FL 110. She continued to monitor the other airliner's descent profile and when it had passed FL 100, she cleared the B767 to descend to that level just after 0759:00, which was immediately acknowledged by the crew. In issuing this descent instruction to FL 100, however, she overlooked the presence of the B737, which was still maintaining FL 100 in the hold. Consequently, SPT was unaware of the potential conflict she had now created. SPT reported that she had relied on information provided by the radar display, rather than scanning her FPS display to check the levels vacant in the stack before clearing the B767 to descend to the level occupied by the B737. She could not recollect the positioning of the other airliner's FPS after it had commenced its descent from FL 110 out of the hold down to FL 70, specifically, when it was removed from the FPS display. The significance, according to MATS Part 2, of removing a FPS from the display, is that it indicates that the ac can be disregarded in respect of level allocation at that holding facility. It is possible that the positioning of the other airliner's FPS could have been a factor in the incident. If it had remained in position after the airliner descended through FL 100, it could have given a false indication that the level was vacant for the next ac displayed above it - the B767 - to descend into.

Neither SPT, nor the INT DIR, were aware of the situation until the pilot of the B737 transmitted, at 0800:50, "[Callsign] in the TIMBA hold we've got an aircraft that seems to be descending into our

level in the hold". The radar recording at 0800:53, shows the B737 at FL 100 with the B767 passing through its 12 o'clock - 3.0 NM in a R turn at FL 103. The INT DIR immediately issued avoiding action to the B737 crew "...thanks for that left now please avoiding action turn left heading 210", which was acknowledged. Just after 0801:20, the B767 crew reported reaching FL 100. By this time the CPA 2.7 NM had been reached with both ac at the same level. Traffic information was not passed to either flight. The INT DIR reasoned that, because the B737 crew had the conflicting ac on TCAS, its pilot would have been aware of its position and, consequently, there was no risk of collision.

This incident reinforces the importance of controllers utilising the FPS display correctly rather than over-reliance on radar derived information.

UKAB Note (2) The LATCC radar recording reveals that the STCA activated at 0801:20, when standard horizontal separation had been eroded and some 20 sec after the INT DIR issued the avoiding action L turn to the B737 crew. The alert persisted low severity 'white' for about 20 sec until separation increased to 3.5 NM at about 0801:40.

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 a report from the appropriate ATC authority.

It was apparent to members that this Airprox occurred during a busy period for the controllers concerned, indeed the Board was advised that the SPT position is only manned during periods of high traffic loading. However, some military pilot members queried why the ac could not depart the stack to land in their stack order. Controller members explained that in busy periods ac may have to be held at an intermediate 'en-route' hold and furthermore, traffic can enter the final stack from several different directions, some having held 'en-route' while others have not. Controllers therefore take the total holding time into account and generally follow the allocated EAT, which allows pilots to plan ahead for possible diversions.

This incident illustrated the point; the airliner between the B737 and the B767 in the stack was taken out of the hold for landing in the correct order ahead of the B737. The controller members noted that SPT had used the radar display to monitor this airliner's descent away from the stack and consequently issued the instruction for the B767 to descend to FL 100 with reference to radar information only. The Board agreed that if the FPS display had been scanned by SPT it should have revealed the presence of the B737. There was a fine balance to be struck here in the use of both radar and FPS display, but some members believed that SPT probably saw the airliner clear FL 100 in descent from the radar display and then allowed the B767 to follow it down, overlooking the B737. Indeed controller members explained that SPT can reallocate a level as soon as a pilot had reported leaving that stack level. This led the members to agree unanimously that the Airprox occurred because SPT descended the B767 to FL 100, the level occupied by the B737.

Turning to risk, the Board thought that the B737 pilot showed good situational awareness in spotting the B767 on TCAS and fortunately the weather also allowed him to acquire it visually as it turned in ahead of his ac. Hence, the B737 pilot was in a position to take action earlier if it had been warranted. Although separation was eroded, the INT DIR issued avoiding action to ensure it was restored promptly, once his attention had been drawn to the situation by the B737 pilot and before the STCA was triggered. Therefore, members agreed that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LATCC TC Gatwick SPT controller descended the B767 to a level occupied by the B737.

Degree of Risk: C.

AIRPROX REPORT No 177/00

Date/Time: 24 Oct 0835

Position: 5221 N 0136 W (2 NM E HON VOR)

Airspace: CTA (Class: A)
Reporting Aircraft Reported Aircraft

Type: B757-200 A319

Operator: CAT CAT

Alt/FL: ↑ FL 160 FL 80

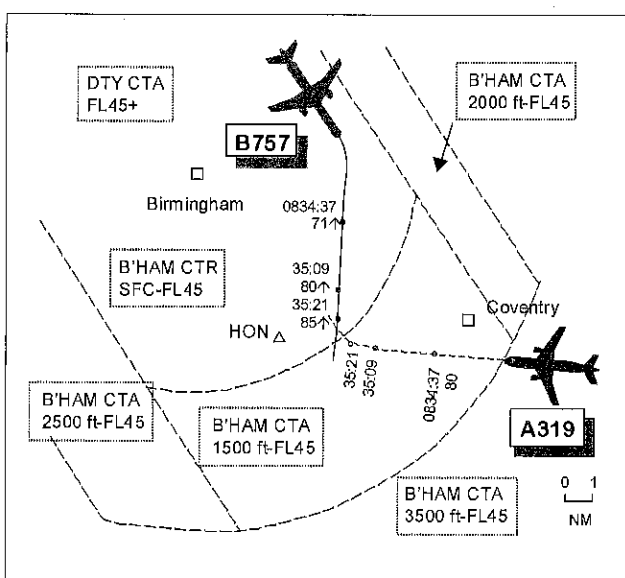
Weather: VMC CLBL VMC CLBL

Visibility: 20 km >10 km

Reporting Separation:

700 ft V 0 H 500 ft V 1.5 NM H

Recorded Separation: 800 ft V 0.5 NM H



PART A: SUMMARY OF INFORMATION
REPORTED TO UKAB

THE B757 PILOT reports flying outbound from Birmingham climbing to FL 160 heading 140° at 250 kt. The visibility was >20 km, 3000 ft above cloud and between layers in VMC, and he was receiving a Radar Control service from LATCC. On receiving an initial TCAS TA alert, the conflicting ac was at first hidden by the windshield pillar (between Capt's No 1 & DV windows). The F/O, PF, heard the TCAS RA "*climb*" and partially heard ATC issue "Emergency turn heading 190°, stop climb FL 90"; he complied with both simultaneously. The Capt, PNF, concentrated on the ATC avoiding action instructions and missed hearing the TCAS RA but saw it on his HSI. The subject ac, first acquired visually by the F/O, passed 700 ft below and he assessed the risk of collision as high. A TCAS 'monitor vertical speed' was received passing FL 91, and the maximum level attained was FL 94 before returning to FL 90. He believed TCAS "saved the day" as the ATC emergency turn may have been issued too late.

THE A319 PILOT reports flying inbound to Birmingham towards HON VOR level at FL 80 heading 290° at 250 kt. The visibility was >10 km above cloud in VMC. He received an avoiding action R turn onto heading 030° and traffic information from Birmingham Director on a B757 ac passing FL 80 in his 2 o'clock position heading towards him. He received a TCAS TA then RA "*do not climb*", and saw the subject ac pass R to L 1.5 NM ahead and 500 ft above. He assessed the risk of collision as medium.

ATSI reports that owing to organisational difficulties, it was not possible to arrange a field investigation into this Airprox within the pre-determined timescale. Nevertheless, the following report has been compiled following reference to ATC reports, pilot reports, radar and RT recordings.

At the time of the Airprox, the workload and traffic loading on the TC COWLY Sector were reportedly moderate. No equipment unserviceabilities or factors, likely to have adversely affected the performance of the controllers involved, were reported.

The B757 departed from Birmingham on a Compton 3D SID. In accordance with standard procedures, the flight was climbed to FL 60 and, at 0833:00, transferred to the TC COWLY SC. Meanwhile, the A319, inbound to Birmingham, had been transferred from TC WELIN to Birmingham Approach. The Radar 1 controller passed the airfield information to the flight and, at 0833:20, transferred it to the Birmingham Director (Radar 2). The A319 was maintaining FL 80 on a westerly track towards HON.

When the B757 first established communication with the COWLY SC, it was on a southeasterly track towards DTY. The SC lifted the speed restriction and instructed the flight to turn R, initially on to heading 180° and, a few seconds later, on to 195°. This heading change was designed to provide lateral separation from an East Midlands outbound (EM O/B) climbing to FL 140.

UKAB Note (1): The EM O/B was an ac from the same company as the B757 with the same suffix to the c/s but with different numerals (e.g. XYZ123C & XYZ158C).

On its original heading, the B757 would almost certainly have passed behind the A319 but the heading change placed the flights on converging tracks. Once satisfied that the B757 had taken the turn and that the flight would be separated from the EM O/B, the SC cleared it to FL 110. By his own admission, however, this climb did not take account of the A319. The TC MATS Pt 2 (page MID 3-14, para. 4.5.1) states:

"TC Midlands (this comprises the COWLY and WELIN Sectors) will ensure separation between Birmingham or Coventry departures climbed above FL 60 or deviated from the SID or Standard Departure Route track, and known Birmingham and Coventry inbounds under the control of Birmingham APC."

Thus, since the A319 was known traffic to the sector (FPS on Birmingham inbounds are displayed in front of the COWLY SC), responsibility for ensuring that separation was preserved between the subject ac rested with the COWLY SC.

The Birmingham Director observed the B757 climbing above FL 60 and turning towards the A319. At 0834:50, he issued an avoiding action instruction to turn R, to the A319 pilot, onto heading 030° and passed traffic information. The A319 pilot reported the other ac in sight and assessed that it appeared to be climbing above him. No reference was made to TCAS but, in the subsequent written report, it was stated that the flight received a TCAS RA "Do not climb".

Meanwhile, at 0834:30, the COWLY SC had cleared the EM O/B to climb to FL 160. However, although it subsequently proved to have no bearing on the Airprox itself, the clearance was read back by the pilot of the B757. Neither the SC, nor the crew of EM O/B picked up this error. A few seconds later, the pilot of the latter reported level at FL 140. As he did so, virtually coincident with the activation of the STCA, the SC noticed the developing conflict and instructed the B757 to turn R heading 270° for 'avoiding action' and to "...climb flight level nine zero expedite". From the SC's report it is evident that he meant to instruct the B757 to expedite through FL 90 but the pilot took it as an instruction to level at FL 90 and acknowledged accordingly. Again, this inappropriate readback was not picked up.

The radar recording shows that when the Birmingham Director issued the 'avoiding action' instruction to the A319, the B757 was in its 2 o'clock position at a range of 4.4 NM, climbing through FL 75. With the benefit of hindsight, a L turn may have been a better option because the R turn increased the rate of convergence and the radar returns from the two ac eventually merged. Nevertheless, the Birmingham controller had no reason to expect such a conflict to arise and did well to notice it. The intentions of the controller in communication with the B757 would not have been immediately apparent to him. His prompt action ensured that the crew of the A319 were aware of the situation and the controller quickly gained the assurance that they were visual with the conflicting traffic. The ac were approx. 3 NM apart as the B757 climbed through FL 80. Thereafter, lateral separation continued to reduce but the vertical separation increased as it did so. The A319 remained at FL 80 throughout the encounter and, as the B757 passed FL 85, lateral separation was 0.9 NM and as it reached FL 90, 0.3 NM. The B757 actually reached FL 95, having responded to

a TCAS RA. After the tracks of the ac had crossed, the pilot reported returning to FL 90 but was instructed to continue the climb to FL 140. Although the A319 commenced its R turn as instructed, there is no evidence of the B757 commencing a turn prior to the CPA. Once standard separation had been restored, both flights continued uneventfully.

UKAB Note (2): Replay of the Heathrow Radar shows the CPA occurring at 0835:25 as the B757 crosses through the A319's 12 o'clock range 0.5 NM 800 ft above.

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 ATSI adviser confirmed that the COWLY SC in his report had admitted not taking the A319 into account when he issued the climb clearance to the B757 which led to the Airprox; the SC was responsible for ensuring separation between the subject ac in accordance with the TC MATS Pt 2. The A319 was known traffic to him, even though the ac had been released to Birmingham APR, with a fps on the A319 acting as an 'aide memoir' on his data display. In resolving a conflict between the B757 and an ac departing East Midlands, the SC had issued radar headings which ultimately put the subject ac onto conflicting tracks. His subsequent instruction to the B757 to climb through the A319's level, in the belief that he had sorted out the traffic, then put both ac on conflicting flight paths. Members moved on to discuss the phraseology that had been used during the incident, as there appeared to be some confusion as to what actions would have been expected from the B757 crew. Notwithstanding the initial climb clearance given by the SC to FL 110, the SC's instruction to "climb flight level nine zero expedite" during the avoiding action period was interpreted by members, in exactly the same way as the crew i.e. 'expedite your climb but stop at FL 90'. However, the SC thought he had instructed the B757 crew to 'expedite through FL 90' but this had not been corroborated by the RT transcript.

The Birmingham Director, in giving avoiding action instructions and TI to the A319, had alerted its crew early enough visually to acquire the conflicting B757. As a further safety point, pilot members also thought that early removal of the ATC speed restriction on the B757 may have adversely exacerbated the geometry of the situation.

Turning to the risk, members noted that the B757 pilots had received a TCAS TA then an RA "climb" in addition to ATC avoiding action instructions, which were followed. The A319 pilots also received ATC avoiding action instructions and TI which

enabled the crew to see the B757 followed by a TCAS TA and then RA alert "do not climb". All of these actions combined led the Board to conclude that any risk of collision had been removed.

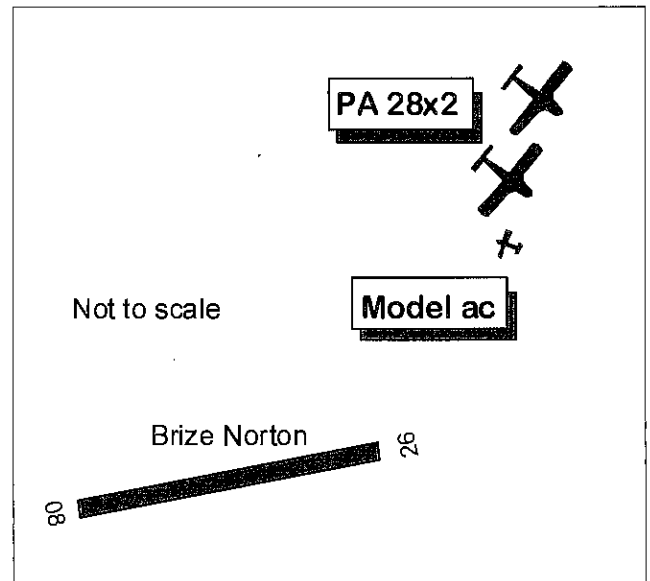
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The COWLY SC did not take the A319 into account when he issued instructions to the B757 pilots to climb through the A319's level.

Degree of Risk: C

AIRPROX REPORT No 179/00

Date/Time: 4 Nov 1636 (Saturday) Twilight
Position: 5147 N 0132 W (2.5 NM NE Brize Norton)
Airspace: ATZ/CTR (Class: D)
Reporting Aircraft Reported Aircraft
Type: PA28 x2 Model ac
Operator: Civ Club untraced
Alt/FL: 1000 ft NK
 (QFE 998 mb)
Weather VMC CAVOK NK
Visibility: 50 km NK
Reported Separation: 0 V 50 ft H/NK
Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports leading a two ac formation in echelon port from Burford VRP returning to Brize Norton to intercept the RW 26 centreline, range 1 NM, at 1000 ft QFE. The weather was CAVOK with visibility 50 km and he was receiving an aerodrome control service from Brize Norton Tower on 123.72. His intention was to break R at 1000 ft overhead the RW 26 threshold, at 3 second intervals for a RH circuit stream landing. He had just completed his landing checks and whilst maintaining a lookout his passenger (non-pilot) pointed to a conflicting ac, that turned out to

be a model, which he then saw in his 1 o'clock moving L to R approximately 50 ft away. No avoiding action was taken as he had seen the model ac too late to do anything about it as it passed close by. He informed ATC immediately of the incident and assessed the risk of collision as high. His passenger commented that when he had first seen the conflicting ac he thought it was a long way off because of its apparent relative size. It was only after it had crossed the PA28's nose that he realised it was a model ac - and very close.

UKAB Note (1): The PA28 pilot flying N° 2 in formation commented that he saw the model ac cross ahead of the leading PA28 at the same level.

UKAB Note (2): The passenger in the lead PA28 was using a video camera and captured a 3 sec video clip of an object, possibly a model ac, passing adjacent to the PA28 as described by the pilot, shortly before both ac turned onto final approach RW 26 at Brize Norton.

AIS MIL reports that extensive tracing action took place but they were unable to identify the conflicting model ac and operator. Enquiries included contacting local model ac flying clubs, the British Model Flying Association and the local police for knowledge of non-affiliated model ac owners in the area and reports of lost model ac.

UKAB Note (3): Replay of the Clee Hill radar at 1634 shows the PA 28 formation 3 NM NNW of Brize tracking 110° at 1400 ft (1000 ft QFE) for 2 minutes prior to turning, approx. 3 NM NE of Brize, on to final approach. The radar does not show the incident but correlation of radar and RT timings with the passenger video and 1:50,000 OS Maps show the incident as occurring just SW of Minster Lovell on the ATZ boundary.

MIL ATC OPS reports the pilots of the PA28 formation, were carrying out a visual join from the N for a run and break to RW 26 RH at Brize Norton and in communication with Brize Tower (TWR) on 123.72 MHz. At 1636:10, the lead pilot transmitted "*...I've just gone past a model ac at er 1000 ft QNH QFE*" adding shortly afterwards, *...a model ac just gone past yes, er in this position now.*" When asked, the pilot confirmed the position of the incident was at the end of the downwind leg of RW 26 RH. The ac then broke into the circuit and landed in turn. It was dusk at the time and with the light starting to fail, there were no further sightings of the model ac, which was never sighted by TWR. Previously that afternoon, the Brize Norton Model Aircraft Club had been operating model ac to the S of the airfield, but flying had been completed

sometime earlier and TWR had been informed of this in accordance with the local procedures. There was no notification of any other model flying.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the PA28 pilots, transcripts of the relevant RT frequencies and reports from the appropriate operating authorities.

Members were swift to conclude that this was a conflict near the edge of the Brize Norton ATZ, within the Brize Zone, with an untraced model ac. Even if the model had become 'uncontrolled' during flying, there was concern that someone had flown a model ac adjacent to an active aerodrome so as to compromise flight safety. A GA pilot confirmed that the BMFA were committed to flight safety through their organisation and operations with affiliated clubs and their members. The No 2 PA28 pilot had seen the model first as it crossed the lead ac's nose at their level. It was then seen by the leader's front seat cameraman who had brought it to the pilot's attention. All this was too late to do anything about it, however, and it had been purely fortuitous that the model passed clear of the leader's flight path without collision, on his R. The Board concluded that, in the absence of other 'safety nets' which may have assisted in seeing the conflicting ac in time to change flight paths, there had been a definite risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict near the edge of the Brize Norton ATZ, within the Control Zone, with an untraced model ac.

Degree of Risk: A

AIRPROX REPORT No 180/00

Date/Time: 7 Nov 1127

Position: 5301 N 0041 W (6.5 NM WSW of Cranwell - elev 218 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Jetstream Mirage

Operator: HQ PTC Foreign Mil

Alt/FL: 1500 ft 2000 ft
(QFE 971 mb) (QFE)

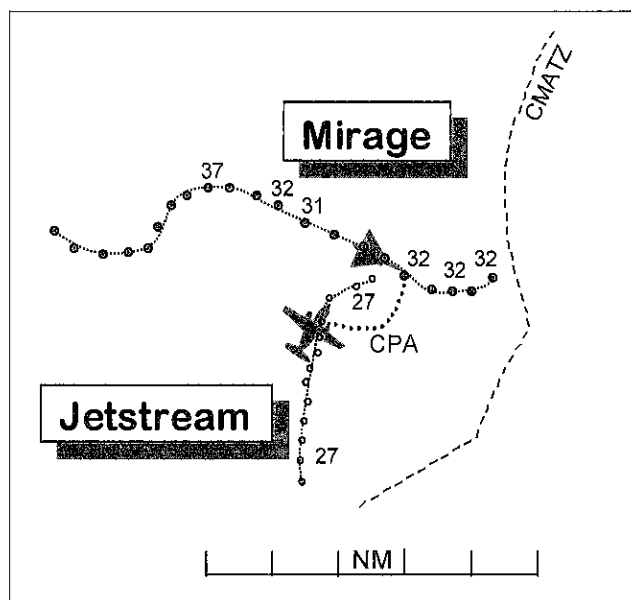
Weather IMC CLBL VMC CLOC

Visibility: 10 km

Reported

Separation: 0.5 NM NK

Recorded Separation: 1.3 NM 500 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 060° at 130 kt on a closing heading for a PAR to RW 09 at Cranwell, at 1500 ft, IMC in and out of Cu clouds. Director informed him of Waddington traffic, 2 ac, 500 ft above. On handover to talkdown he exited cloud and saw a Mirage, gear down, slightly above and 0.5 NM away heading about 130°. It was turning left away from him and descending to his level, apparently to avoid cloud, and then climbed. He did not see the second of the 2 contacts called.

THE MIRAGE PILOTS did not recall anything resembling an Airprox during their recovery to Waddington and provided no report.

MIL ATC OPS reports that the Jetstream pilot was recovering to Cranwell at 2500 ft QFE (971 mb) under a RIS for a PAR to RW 09. Whilst DIR had only one other ac in the radar pattern, adjacent units were also in the process of conducting IFR recoveries and so the Supervisor (CWL SUP) was effecting co-ordination on behalf of his controlling team. At 1123:42 DIR descended the Jetstream to 1500 ft QFE whilst the ac maintained its westerly track 5 NM SW of Barkston Heath. At 1124:29, DIR turned the Jetstream right onto a base leg of N and after it had rolled out, revised the base leg

heading to 010°, which was acknowledged. At 1125:40, DIR transmitted "C/s, traffic 12 o'clock 4 miles crossing left-right, four hundred feet above in the Waddington radar pattern" closely followed by "C/S, traffic left 10 o'clock crossing left-right also in the Waddington radar pattern, five hundred feet above"; the second call referred to the subject Mirage. Both calls were acknowledged.

Whilst DIR was passing the TI, the Waddington Supervisor (WAD SUP) called CWL SUP requesting co-ordination between the Jetstream and the 2 ac that DIR was passing TI on: "WAD SUP, request co-ordination your traffic west of Barkston six miles northbound 360, correction (squawking) 2605". CWL SUP replied "2605 is not above 1500 ft, Cranwell QFE 971". WAD SUP continued "Co-ordination, my traffic north-west of him, er, north-east of him by 3 and 4 miles respectively turning onto easterly headings (squawking) 3620 and 23". After CWL SUP indicated that he could see both of the Waddington tracks, WAD SUP continued "Not below two thousand feet Waddington QFE" at 1125:55. Once co-ordination had been effected, DIR continued to pass instructions to both ac under his control, turning the Jetstream right onto 050° then 070° to converge with the extended centreline. At 1127:53, with the ac 7 NM W of Cranwell, the Jetstream

pilot was instructed to contact Talkdown; the pilot left DIR's frequency a few seconds later and filed an Airprox report after landing.

The Mirage was the lead ac in a pair recovering to Waddington from the NW under a RAS from Waddington Approach (APP), acting as an overload controller for the Director on 312.5. The workload at Waddington ATC had been high and was made more challenging because the radar pattern for RW 03 at Waddington overlaps Cranwell's RW 09 pattern; consequently, WAD SUP was required to undertake a large amount of tactical co-ordination by proxy to assist the controllers on watch. When some 20 NM NW of Waddington, the Mirage pilots split for individual PARs with the second Mirage recovering first. At 1121:48 with the split complete, the subject Mirage was descended to 2500 ft QFE (971 mb) whilst maintaining a south-easterly track. At 1125:26 with the Mirage pilot having completed cockpit checks, APP transmitted "C/S, avoiding action turn left heading 020°, traffic was south, three miles, manoeuvring indicating 500 ft below (not the Jetstream) -what are your flight conditions? "; the Mirage pilot replied "VMC, turning left". After confirming the reply, APP transmitted "C/S, can you accept a RIS and I'll feed you in from there ?", to which the Mirage pilot replied that he could. APP confirmed the change of service, turned the Mirage back onto a south-easterly heading and descended the ac to 2000 ft QFE; shortly afterwards the Mirage pilot transmitted "...good contact with the ships ahead". APP acknowledged the transmission adding "...further traffic south three miles, northerly heading indicating five hundred feet below"; the Mirage pilot replied "Visual with the traffic " at 1126:58. Shortly afterwards, APP turned the Mirage left onto a north-easterly heading to converge with the Waddington extended centreline and instructed the Mirage pilot to contact Talkdown at 9 NM from touchdown. The Mirage pilot left the frequency at 1128:36.

Both ATSU's were using a QFE of 971 mb, therefore the Mode C levels noted below are 1200 ft higher than the heights in the RT transcript. The Claxby Radar recording shows all the ac identified by their squawks. At 1125:40, the time of DIR's TI, the first Mirage is in the Jetstream's 12 o'clock 4 NM crossing left to right indicating 3200 ft, whilst the subject Mirage is in the Jetstream's 10 o'clock 5.5 NM in a left turn passing E indicating 3700 ft. The

Mirage maintains its track and height until 1126:07, when the pilot begins a descending right turn to track SE after accepting a RIS, although by now the ac are co-ordinated to remain vertically separated.

At 1126:52, the time of APP's updated TI, the Mirage steadies on a track of 120° with the Jetstream in its 2:30 position at 2 NM 500 ft below; 6 seconds later the Mirage pilot calls visual with the Jetstream. Both ac maintain headings and remain vertically separated by 5-600 ft over the next 30 seconds. At 1127:23, the Jetstream begins its inbound turn whilst the Mirage is 1.6 NM due E, 500 ft above and maintaining track. At 1127:40, the Mirage begins a left turn inbound. Both ac maintain their levels and diverging headings until the Jetstream begins to descend at 1128:52; the Mirage begins to descend at 1129:11, when 2.5 NM N of the Jetstream. Both ac remain vertically separated by at least 500 ft throughout. (UKAB Note: The Mirage shows 3100 ft for one return after levelling at 2000 ft QFE as it passed initially through the Jetstream's 12 o'clock while the latter was heading 360°; this was before the Jetstream turned onto its closing heading and came out of cloud. The Mirage appeared on the radar recording to be perfectly level before and throughout its left turn onto the Waddington centreline.)

The pilots of both ac were recovering under RIS and so the controllers were required to pass TI regarding the details of conflicting traffic. The TI in both cases appears to have been reasonably accurate, with APP's TI helping the Mirage pilot to become visual with the Jetstream from a distance of 3 NM. The co-ordination that was effected between the WAD and CWL SUPs regarding the subject ac appears to have been safe, effective and commensurate with current regulations. JSP 318A 1512.3 permits military Terminal controllers to apply Reduced Vertical Separation of 500 ft between military ac provided that:

- a. Both ac are within 40 NM of the radar head.
- b. Both ac are in receipt of a service from the same controller or the subject of military to military co-ordination.
- c. Both ac are below FL 100 outside CAS other than Class D.

Although WAD SUP did not verbally confirm the Waddington QFE during the agreement, both SUPs had instigated co-ordination throughout the morning, had a sound understanding of the local air picture and were well aware that the QFE at both airfields was the same.

HQ PTC comments that the Jetstream pilot's concern at leaving cloud to find himself apparently surrounded by Mirages at a vulnerable stage of his approach is understandable. However, notwithstanding the crew's perception of a loss of vertical separation, the ATC investigation and the recorded radar evidence indicates that proper separation and co-ordination was in fact maintained.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

No departure from the Mirage's assigned height was apparent on the Claxby Radar recording and the Board was advised that the flightpaths of both

ac had looked normal on the PARs. Members agreed that within the tolerance of SSR accuracy and an 8 sec interval between radar sweeps there was a possibility of a small, short deviation by the Mirage but nothing that would constitute a significant departure from its assigned height. It was suggested that the cloud structure may have disguised the Jetstream pilot's horizon, leaving him with the impression that vertical separation was inadequate, and the Board agreed that this was probably the cause of the Airprox report. The Jetstream pilot may also have been concerned that he could not see the 'second' ac he had been warned about. In fact the one he saw was the second; the first being well ahead down the Waddington PAR glidepath at the time of the sighting. The Board agreed that there had been no risk of collision in the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Degree of Risk: The Jetstream pilot perceived that vertical separation was inadequate.

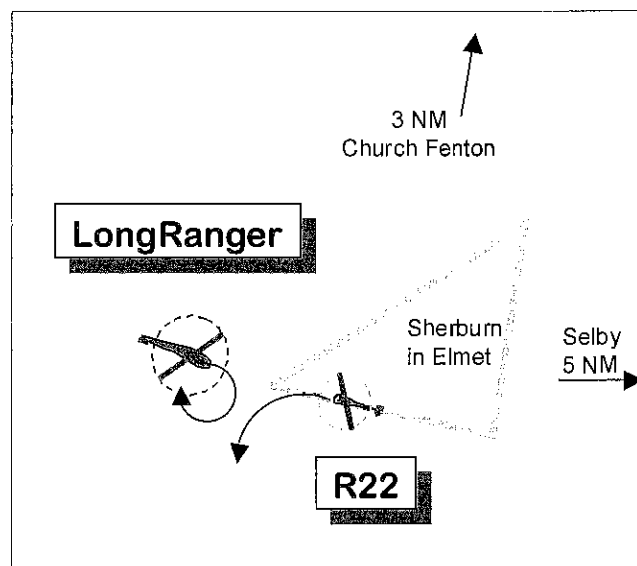
Cause: C

AIRPROX REPORT No 181/00

Date/Time: 4 Nov 1538 (Saturday)

Position: 5347 N 0114 W (Sherburn in Elmet - elev 26 ft)

<u>Airspace:</u>	ATZ	(<u>Class:</u> G)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	R22	LongRanger
<u>Operator:</u>	Civ Trg	Civ Comm
<u>Alt/FL:</u>	50 ft ↑ (agl)	50-100 ft (QNH)
<u>Weather</u>	VMC CLOC	VMC CLNC
<u>Visibility:</u>	7 km	10 km
<u>Reported Separation:</u>	0.25 NM/500 ft	
<u>Recorded Separation:</u>	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE R22 PILOT reports conducting a PPL (H) licence test and had returned to Sherburn, making his initial call to Sherburn Radio on 122.6. There were no ac in the circuit so he set up for an autorotation to the into-wind runway, RW 29. He heard the LongRanger pilot call to say he was on a powerline patrol 3 NM S of Church Fenton and was routeing to Selby at low level. Sherburn Radio replied that there was little activity and that fixed wing ac were using RW 01/19, which was the only useable runway due to floodwater. The position given by the LongRanger pilot indicated that he was inside the ATZ (he had not heard the pilot ask for or receive permission to enter the ATZ) but meant that the LongRanger was 1 NM E of him and going away. He called his intentions for the PFL and aimed half way down the runway. On completion he called lifting for a 29 LH circuit and as he transitioned, heading 290° at 60 kt, he saw the LongRanger in his take-off path about 0.25 NM ahead. It was following the powerlines that run close to the RW 06 and 11 thresholds and was at about 75 ft, twice the height of the powerline poles. He turned hard left, calling visual with it, and put his landing light on. Turning right and stopping were not options. The LongRanger performed a tight right orbit, returning to the hover facing the airfield. He considered there had been a moderate risk of collision.

THE LONGRANGER PILOT reports following 33000 V powerlines which were shorting to floodwater in places. He had explained to Church Fenton that these were not marked on maps and so he was unable to say in advance where he would be going and the floodwater hindered map reading. Church Fenton gave him a squawk and monitored his progress on radar advising as he approached Sherburn. He called Sherburn on his other radio, explaining the nature of his work. Some time later, while concentrating on the powerlines which went in various directions, he suddenly came within a couple of hundred yards of the W end of Sherburn's runway. He immediately took up an orbit to the N at 45 kt, noticing an R22 high to the W of the runway, and called Sherburn stating his position and requested to cross the extended centreline. He was advised to proceed at his discretion and no traffic information was passed. In his opinion

there was no risk of collision at all. The R22 was not particularly close and on hearing the broadcast of the nature of his work should have been on the lookout for him.

He added that he had been on a 1 hour response to a call out because 17500 homes were without power. The engineer accompanying him was not the regular one for that area and had been unable to find plans for the network. The only way to find the faults was to follow each line from the substation in the flooded area.

MIL ATC OPS reports that the LongRanger pilot had freecalled Church Fenton Approach (APP) (located at RAF Linton-on-Ouse) for a FIS on frequency 126.5 having departed from a private landing site in the vicinity of Tadcaster. The LongRanger pilot informed APP that he was conducting a powerline patrol towards Selby and would be initially climbing to 1300 ft, although the majority of the sortie was likely to take place below 500 ft. When APP asked the LongRanger pilot to confirm his routeing in relation to Church Fenton, the pilot replied that he would need to enter the MATZ, but "*We're just not too sure where this line actually goes - it's not actually shown on the map either*".

At 1530:19, APP prenoted Church Fenton Ground with the LongRanger's details so its transit could be co-ordinated with traffic in the visual circuit; however, after passing transit details, APP noticed that the LongRanger's track would be in close proximity to Sherburn-in-Elmet Aerodrome. At 1532:43, APP suggested that the LongRanger pilot call Sherburn on 122.6 to pass details of his routeing and then "*Call back up this frequency*", which was acknowledged. At 1534:21, the LongRanger pilot again called APP on 126.5 after speaking with airfield information at Sherburn aerodrome; however, due to an unserviceability at Church Fenton, his transmissions were not received by APP, as the receiver coverage of the stand-by radios (sited at Linton-on-Ouse) was insufficient to pick up transmissions from the LongRanger, which was operating below 500 ft in the Sherburn area. At 1540, the reported time of the incident, 2-way communications between the LongRanger pilot and APP had still not been re-

established and the pilot was not in receipt of an ATS from APP, although brief details of his transit were known.

UKAB Note: A return with the LongRanger's assigned squawk can be seen on LATCC radar recordings manoeuvring to the SW of Church Fenton and progressing slowly towards Sherburn. It manoeuvres for some minutes in the area and then progresses back to the NW. There is no sign of the R22 whose transponder was reported to be at 'standby'.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered that, in the circumstances of the emergencies associated with the flooding, the filing of an Airprox by the R22 pilot showed a lack of understanding, but he may not have been fully aware of the difficult conditions the LongRanger pilot was operating under. At the same time it appeared that the LongRanger pilot was not where he thought he was; if the R22 pilot's recollection of the LongRanger's position report to

Sherburn was correct, it was reasonable for him (the R22 pilot) to have assumed the other ac was to his NE, and going away to the E, and was therefore not a factor.

GA members considered that, despite the flooding, the LongRanger pilot should have been able to recognise earlier (from hangars, etc) that he was coming upon the airfield at Sherburn and wondered if he had become somewhat over task-oriented, or was perhaps relying too much on Church Fenton to advise him of his location. While sympathising with the LongRanger pilot's predicament, the Board concluded that his unfortunately inaccurate position report followed by his effectively unannounced entry into the Sherburn ATZ were the causes of the conflict with the R22.

The pilots' descriptions led members to conclude that the R22 pilot had seen the LongRanger in plenty of time to remove any risk of a collision.

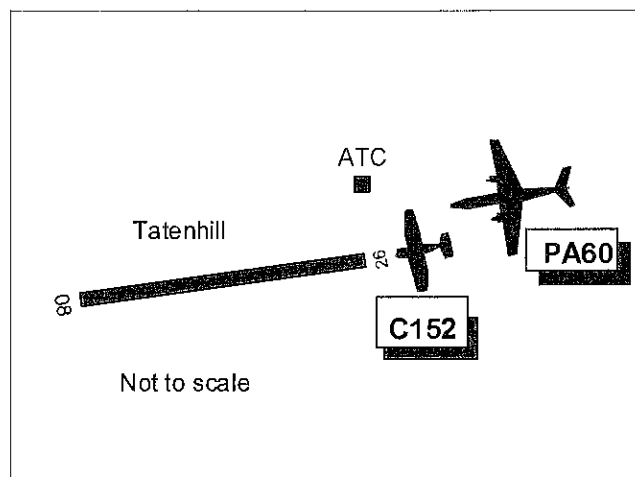
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an inaccurate position report, the LongRanger entered the Sherburn ATZ unannounced.

Degree of Risk: C

AIRPROX REPORT No 182/00

Date/Time: 4 Nov 1120 (Saturday)
Position: 5249 N 0145 W (RW26 threshold Tatenhill A/D - elev. 450 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: C152 PA60
Operator: Civ Trg Civ Pte
Alt/FL: 100 ft ↓ 500 ft ↓
(QFE) (QFE)
Weather VMC CLBC VMC CLBC
Visibility: 20 km >10 km
Reported Separation: 50 ft H&V/ 500 m H
Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying a local dual training circuit detail with his student at Tatenhill LH RW 26. The visibility was 20 km with no significant cloud and he was receiving an A/G service from Tatenhill radio on 124.07. The ac was white and green with a red anti-collision beacon switched on and was squawking 7000 with Mode C. Whilst downwind, he heard a pilot call (later found to be the PA60 pilot), reporting he was joining the circuit on a L base position. He was unable to see the joining ac so he positioned onto L base then onto final approach at 1.5 miles. The student reported "final to roll" which was acknowledged by the A/G operator. He did not remember hearing the PA60 report L base but heard him reporting on final approach. He looked out the rear window but was unable to see the PA60 whilst continuing approach. As he crossed the RW 26 threshold numbers at 100 ft, the PA60 overtook him on his RH side, just below the R wing, whilst carrying out a go around; the other ac was close enough to hear its engines as he passed. No avoiding action was taken and he continued talking the student through the landing procedure as he was just about to roundout. He estimated a separation distance of 50 ft both horizontally and vertically and believed the safety of his ac had been compromised.

THE PA60 PILOT reports flying inbound to Tatenhill for avionics maintenance and was familiar with the Tatenhill procedures. The visibility was >10 km, 1400 ft below cloud in VMC. The ac was coloured moonstone with red lines and was squawking 7000 with Mode C. He contacted Tatenhill radio on 124.07 at range 9 NM and announced his intentions of joining wide L base RW 26; he believed he was informed of one other ac in the circuit. He reported his position when established on L base and he was asked to report on final. He commenced descent from 1000 ft to 800 ft and turned on the RW centreline whilst making the "final" RT call. At about 0.5 to 0.75 mile from the threshold, he saw the C152 ahead but much higher and wondered what the ac's intentions were; it seemed too high and close to the RW to effect a landing. Owing to this uncertainty as to the Cessna's intentions, he commenced a go around with an RT call "going around". He manoeuvred onto the dead side with uc down and 20° flap set, and overtook the C152 whilst climbing to circuit height to reposition for

another visual circuit from which an uneventful landing was accomplished. He did not consider there to have been any risk of collision as he had maintained visual contact with the other ac at all times during the final approach and go around.

UKAB Note (1): The PA60 pilot, during a subsequent telephone conversation nearly 3 months after the incident, believed he passed 500 m to the N of the C152 on the go around which he commenced at 500 ft QFE, but certainly flew past the Cessna with the ATC TWR on his LHS.

UKAB Note (2): The ATC TWR is situated approximately 100 m N of the RW 26 threshold.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Discussion commenced on the procedures that should be followed by pilots when entering an ATZ for the purposes of landing without ATC; A/G communications were in use. The ANO Rule 17 (5 & 6) applies under 'Rules for avoiding aerial collisions – (5) flight in the vicinity of an aerodrome, (6) order of landing'.

The PA60 pilot had a responsibility to conform to the "pattern of traffic" formed by the C152 intending to land. Members agreed that the former, in positioning his ac onto L base then final approach without having seen or establishing the position of the C152, had not integrated safely into the circuit pattern. There seemed to be no good reason for this, given the reported weather conditions and the availability of the A/G radio facility. When the C152 was eventually seen, about half a mile ahead and above, it was too late to do anything other than commence a go-around. This should have involved the application of power and a simultaneous pitch change to a nose-up climbing attitude, followed by a climbing turn onto the dead-side whilst maintaining visual contact with the other ac throughout.

A pilot member updated the Board with a report from the A/G operator at Tatenhill. The ATC TWR is situated 80 m N of the RW 26 threshold with an elevated VCR. The operator at the time of the

incident remembered the situation and recalled that the PA60 had been observed to pass between the Cessna and the ATC building when carrying out the go-around. Moreover, the go-around had not followed the normal profile expected. Taking this into account together with the C152 pilot's report, the Board concluded that the PA60 pilot had flown close enough to cause the C152 pilot concern.

As to risk, members considered the geometry carefully. In the situation faced by the PA60 pilot, with a late visual acquisition of the C152 on short finals ahead and above him, he needed to make an early 'go-around' decision followed by a positive execution of the manoeuvre. This would have enabled him to keep his ac well clear of the C152 on final approach. However, the Board assessed

that, on this occasion, the PA60 pilot had flown sufficiently close to the C152, whilst executing the 'go-around', to compromise the safety of both ac.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

- a. The PA60 did not integrate safely into the circuit pattern.
- b. Late sighting by the PA60 pilot.
- c. On the go-around, the PA60 flew close enough to cause the C152 pilot concern.

Degree of Risk: B

AIRPROX REPORT No 183/00

Date/Time: 9 Nov 1138

Position: 5417N 0314W (10 NM N of Barrow-in-Furness)

Airspace: LFS (Class: G)
Reporting Aircraft Reported Aircraft

Type: Tornado GR1 Tornado GR1

Operator: HQ STC HQ STC

Alt/FL: 680 ft ↓ 250 ft
(Rad Alt) (msd)

Weather: VMC VMC

Visibility: 20 km >10 km

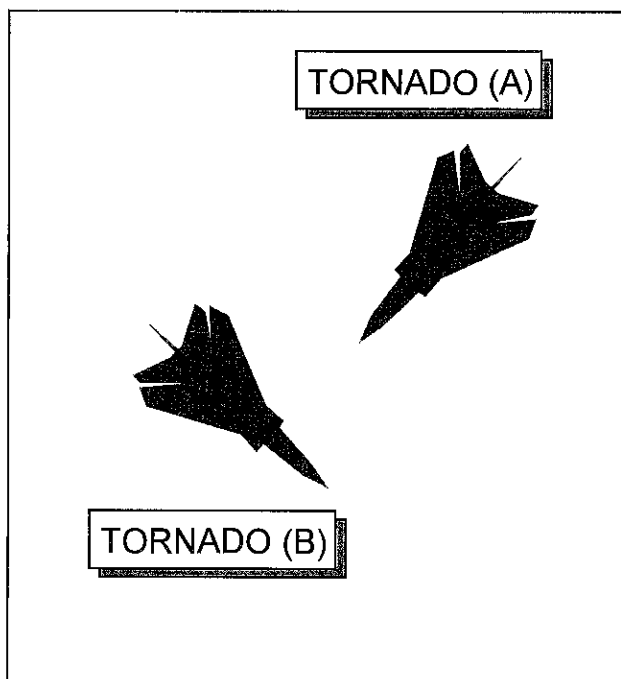
Reported Separation:

About 100 m H, nil V Unseen

Recorded Separation: Not recorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE REPORTING TORNADO GR 1 PILOT (A) reports that he was leading a pair of Tornados on a bounced low-level evasion sortie at 444 kt. The ac was camouflage grey/green, HISLs were on and



3/A 7001 was selected with Mode C. Whilst heading 221° about 10 NM N of Barrow-in-Furness descending through 680 ft Rad Alt, another unknown Tornado GR1 was suddenly spotted at R 2 o'clock, at a range of 350 ft, very close. The other Tornado passed directly in front of his ac from R – L at the same height, whereupon he flew

through the other ac's slipstream. It was seen too late to take avoiding action, but he added that their formation lookout was "very high" during a low workload phase of the flight. He assessed the risk of a collision to be "very high".

THE REPORTED TORNADO GR 1 PILOT (B) reports leading a formation of 3 ac at 250 ft msd. The ac was camouflage grey/green, HISLs were on and 3/A 7001 was selected with Mode C. The other Tornado was not seen by any of the crews of his formation.

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

HQ STC comments that this Airprox occurred at low level, by day and in VMC and it is therefore of considerable concern that not one of the crew members saw the confliction in sufficient time to take avoiding action. The lack of relative movement, ac conspicuity and cockpit/canopy obstructions were probably all factors and, in the absence of any effective collision warning system, such an incident remains an operating hazard.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, three frames from the reporting pilot's Head-Up Display (HUD) video and a report from the appropriate operating authority.

As both formations were legitimately proceeding about their respective sorties in the LFS, wherein the LFA was operating at well below its maximum capacity, great concern was expressed that no crew member from either formation saw anything in time to give warning. The HUD video pictures shown to the Board provided graphic evidence of this close

encounter, rarely seen by members. This showed the reported ac, Tornado B, passing from R - L in the order of 100 m ahead of the reporting pilot's Tornado, Tornado A, at about the same height and in accord with his report. Such distances at these speeds were in the order of 1 sec to the crossing point and not nearly enough time to see, react and avoid another ac. For this reason the board agreed unanimously that the reporting pilot whilst apparently the only pilot involved to see the other ac, was not in a position to effect any change in the geometry or the outcome of this encounter. The Tornado's cockpit arch and airframe are known to be detrimental to lookout by pilot and navigator respectively and the mountainous terrain was another factor that would have impeded detection of the camouflaged ac. Consequently, members were in accord that this Airprox resulted from effectively, a non-sighting by both formations.

The Board endorsed HQ STC's desire for an effective collision warning system which could give a prompt alert in circumstances such as these, but members also wondered how TCAS would cope with such an encounter between multiple ac formations. Turning to risk, that this was not a mid-air collision was purely fortuitous. The Board agreed entirely with the only pilot that saw the encounter, that he would have been unable to effect any avoidance manoeuvre in the time between detection and point of confliction. On this basis the members agreed unanimously with the pilot of Tornado A, that an actual risk of a collision had existed in the circumstances that pertained.

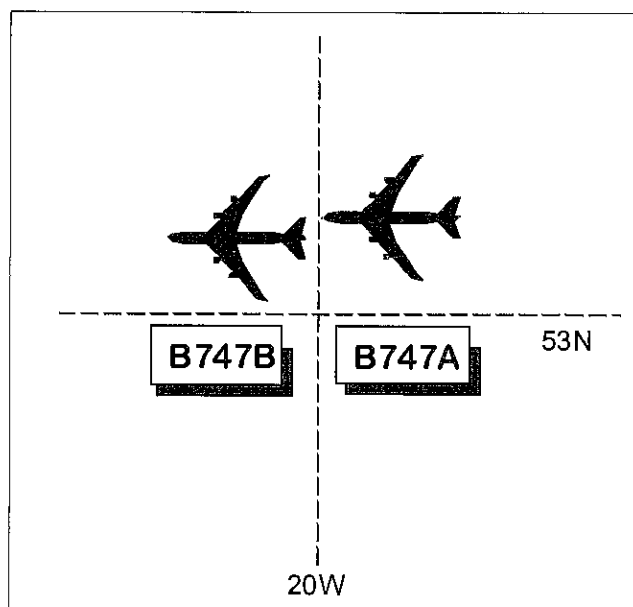
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by both formations.

Degree of Risk: A.

AIRPROX REPORT No 184/00

Date/Time: 07 Nov 1516
Position: 5300 N 2000 W
Airspace: CTA (Class: A)
Reporter: SOACC
First Aircraft Second Aircraft
Type: B747 (A) B747 (B)
Operator: CAT CAT
Alt/FL: ↑ FL 360 FL 360
Weather VMC CAVOK VMC CLOC
Visibility: 50 km >10 km
Reported NK 800 ft V
Separation:
Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHANWICK OACC EN ROUTE controller reports receiving a pilot's report, relayed from Ballygirreen, that B747 (A) was leaving FL 350 for FL 360; B747 (A) was displayed in the Flight Data Processing System (FDPS) as cleared at FL 350 showing no climb profile. However, the ATC/ line showed ATC/LLVLP 350 53N 20W BLVLP 360 52N 30W from the copy plan (ATC/LEAVE LEVEL 350 AT 53N 20W BE LEVEL AT 360 AT 52N 30W); the climb profile predicted that B747 (A) would be 3 minutes behind B747 (B) at FL 360. He telephoned Ballygirreen to relay to B747 (A) pilot to stop his climb; co-incidentally, Ballygirreen were about to phone him as they had no details of the B747 (A)'s automatic climb. He then sent a message to B747 (B) to climb to FL 370 as B747 (A) had reported at FL 352. B747 (A) then reported at FL 350 so he cancelled the climb clearance to B747 (B) and sent confirmation to the B747 (A) pilot to maintain FL 350.

THE SHANWICK OACC PLANNER reports receiving an oceanic clearance request from B747 (A) pilot, via datalink, for entry at FL 350 but specifying "able FL 360 at 20° W"; he provisionally cleared the ac, in FDPS, at FL 350 using the 'prime plan'. A 'copy plan' was made and the climb request

to FL 360 at 20° W was reflected on it and also provisionally cleared. He then decided not to issue the climb so he "ACCCL'd" (accepted) the prime plan but later discovered that the ATC/ climb clearance suffixed to the copy plan had attached itself to the prime plan during the ACCCL key stroke. The en route controller subsequently received a report from B747 (A) pilot climbing from FL 350 to FL 360.

THE B747 (A) PILOT reports in receipt of an Oceanic clearance via datalink which contained a climb clearance from 20° W, up 1000 ft, to be level at 30° W. After informing Shanwick that he had commenced climb from FL 350, he received instructions, 2 minutes later, to descend back to FL 350 to maintain; the maximum level achieved was FL 353. No TCAS alert was received and the other ac was not seen although the weather was CAVOK.

THE B747 (B) PILOT reports flying in the cruise at FL 360 passing 53°N 20°W. He received a momentary TCAS TA, which immediately disappeared, and he believed the other ac was B747 (A) which had climbed to FL 352 before descending back to FL 350 to maintain. The

weather was VMC and he saw the other B747 (A) approx. 800-1000 ft below; no avoiding action was taken.

UKAB Note (1): The Capt of B747 (B) during a subsequent telephone conversation was adamant that he had seen B747 (A) just below him on his RHS as it had been the TCAS TA which had alerted him to its relative position.

ATSI reports that all ATC equipment relative to the task was serviceable. The Oceanic Planner described his workload level and traffic loading as light at the time of the incident.

The ORCA datalink system was introduced in 1996. Initially, it was used by only one airline but has subsequently expanded its operation and is now used by about 40% of westbound Oceanic traffic. The ORCA concept was designed to mirror the Flight Data Processing System (FDPS) voice system, whereby the pilot requests a clearance, which is issued by the Oceanic Planner and acknowledged by the pilot - all messages using the datalink system. When ORCA is not used, messages are received and sent by a Clearance Delivery Officer (CDO) using the voice system.

A request for an Oceanic clearance at FL 350 was received from B747 (A) by the Oceanic Planner at 1346. It was sent via ORCA and, additionally, the pilot requested a climb to FL 360 at 020W. The interviewee stated that it was unusual for pilots to request a level change enroute as normally they would just state whether they could accept a higher level. The Planner said that using the prime plan, i.e. the original plan, he provisionally cleared B747 (A) at FL 350 with a Request Level Change Enroute (RLCE) to FL 360. This would then place the responsibility on the Oceanic En-route (ER) Controller to decide whether to clear the ac to climb within Oceanic Airspace.

Subsequently, the Planner decided to probe for conflicts, in accordance with the pilot's request. He, therefore, made a copy plan. This copy, referred to as a copy* plan, is a duplicate of the prime plan and allows changes to be made without altering the original. Using the copy* plan, the Oceanic Planner reflected the pilot's request to climb to FL 360 at 020W and provisionally cleared the ac on this plan. The Planner worked on the controllers' update device with the system (IUD),

which can best be described as a "scribble line". An ATC/line on the IUD is used to input extra information to the clearance. On this occasion, the Planner input the message: "ATC/LLVLP 350 53N _ 20W BLVLP 360 52N _ 30W". This message would be translated into plain language when received by an ac i.e. "ATC/LEAVE LEVEL 350 AT 53N _ 20W BE LEVEL AT 360 AT 52N _ 30W". This type of clearance, whereby an ac is recleared to climb to another level at a specific point, is referred to as issuing an "automatic climb". Although no conflicts were apparent, the Planner decided against using this clearance. He thought that his decision to return to the original clearance was that, if an automatic climb is issued then, an instruction has to be passed to the ac to revert to the voice system. Additionally, when Planning Controllers issue ac with an automatic climb/descent in the Oceanic Clearance, Ballygirreen should be advised in order to avoid doubt or confusion when the traffic reports leaving the initial cleared level.

Having decided not to use the copy* plan, the Planner returned to the prime plan. He checked for conflicts and once again provisionally cleared the flight at FL 350. He accepted the plan using the Acceptance (ACCCL) button, believing that the clearance passed to the ac was at FL 350. The interviewee explained he had not appreciated that the ATC/line instruction on the IUD attaches itself to any plan that is accepted using the ACCCL button. Consequently, on this occasion, the automatic climb clearance was communicated to B747 (A) to leave FL 350 at 020W, to be level at FL 360 by 030W.

Once the plan had been accepted, it would have been noticeable, on the Planner's display, that the clearance level shown on the main part of the text did not match that displayed on the ATC/line. Basically, the upper part of the screen shows the various latitudes/longitudes associated with the ac's routing, together with its cleared level at these positions i.e. its flight profile. The ATC/line is displayed below this information. On this occasion, the Planner agreed that he should have realised the discrepancy between the two pieces of information. He added that, if there are a significant number of lines displayed in the flight profile at the top of the screen, it is necessary to scroll down the page to reveal the ATC/line. When this occurs an asterisk is marked either side of the last displayed

line of the profile. The Planner could not remember whether it had been necessary to scroll down to see the ATC/line in this instance.

The ER Oceanic Controller was also presented with the same message as on the Planner's display and acknowledged its receipt. The Oceanic Manual of Air Traffic Service, Part 2, Page DUT 3-2, states that the ER Controller must check any ATC/line remarks, or lack of them, on receipt of a new flight statement. Although, it has not been possible to determine the identity of the ER Controller concerned, it was apparent that the correlation of the flight profile with the ATC/line did not take place as required, otherwise it should have been brought to the Planner's attention.

There is no computer related process which automatically checks whether the ATC/line input is compatible with the ac's flight profile. As can be seen from the preceding two paragraphs, the system is totally reliant on human safeguards.

It was not evident that a potential conflict existed, between the subject ac, until B747 (A) reported passing 020W and leaving FL 350 for FL 360. On prediction by the ER Controller, (not the one in position when B747 (A)'s new flight statement was received), it was noted that a conflict existed with B747 (B) which was maintaining FL 360, three minutes ahead. The ER Controller acted swiftly and ensured that a message was sent, via Ballygirreen, to stop the climb of B747 (A). Additionally, a message was prepared to instruct B747 (B) to climb to FL 370. As reports were received that B747 (A) had levelled at FL 350, the instruction to B747 (B) was not transmitted. The minimum separation was estimated as three minutes and 700 ft, whereas the requirement was either ten minutes or 1000 ft.

Since the ATSI interview with the Planner concerned, the Manager ATC (Oceanic) has decided to withdraw, temporarily, the issuance of "step climbs" using ORCA. A number of options, including a possible change to the computer software, will be investigated to mitigate the risks involved with this type of clearance. In addition, Oceanic Controllers have been given the following reminders:-

a) Of the importance of checking the content of profiles and ATC/lines at the time of ACCCL.

b) Of the importance of ER Controllers performing diligent checks of new flight statements.

c) That the ATC/line is composed on the IUD scribble line and is appended to whatever version of the plan that is being cleared. There is only one ATC/line and it will be added to whatever version is used. The applicability of any ATC/line should be checked against the version used.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI adviser appraised members that the ORCA system, as used in the ScOACC, had worked as intended during this incident and that it had been the PLANNER controller's lack of awareness on part of the ORCA system that led to the Airprox; the controller had not realised that the ATC/ remarks added onto the IUD scribble line would attach itself to the prime plan when he used the ACCCL button. The generation of copy plans for conflict probing mirrored the FDPS system but the 'automatic climb' facility was not used very often. Members noted that the software did not automatically check data inputs or generate a positive acceptance challenge (ie do you wish to accept YES/NO) to the operator before accepting and transmitting the data. However, the PLANNER should have been aware of this error after his ACCCL action from the difference in the clearance levels on his display between the main text and the ATC/ line text. Also, the ScOACC MATS Pt 2 required the EN ROUTE controller, who was on duty at the time when the new flight statement was generated, to have correlated the ATC/ line to the flight profile; this second check should have highlighted the unwanted instruction to climb and have been brought to the PLANNER's attention for correction. Members were clear that this omission by the EN ROUTE controller had contributed to the Airprox. As a side issue, members could not understand why the person involved remained a mystery and were critical. An ATCO member commented that in using the ORCA system, there did not appear to be any sort of read-

back and subsequent agreed contract between parties that occurred during normal ATC/pilot exchanges using RT but understood that the system worked well and had been a major improvement to Oceanic operations.

Looking at the risk element, members noted that the B747A crew had received and complied with the ORCA 'automatic climb' clearance. It had been the pilot's report (PIREP) at 20W that had alerted the EN ROUTE controller and the Ballygirreen HF operator to the situation which, fortunately, was resolved expeditiously and safely. The B747B crew had received a TCAS TA which alerted them to B747A's presence which they acquired visually below them. This visual sighting surprised the Board, since the PIREPs at 20W indicated the subject ac were 3 minutes apart with B747A flying behind B747B. However, the B747B crew were sure they had seen a B747 which was the subject

ac; this anomaly remained unresolved. Taking these elements into account the Board concluded that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

- a. The ScOACC PLANNER did not appreciate that the ATC instruction on the IUD scribble line had attached to the prime plan and transmitted a clearance to B747A which allowed both ac to fly into confliction.
- b. The unidentified EN ROUTE controller, on duty when the PLANNER sent the climb clearance, did not detect the error.

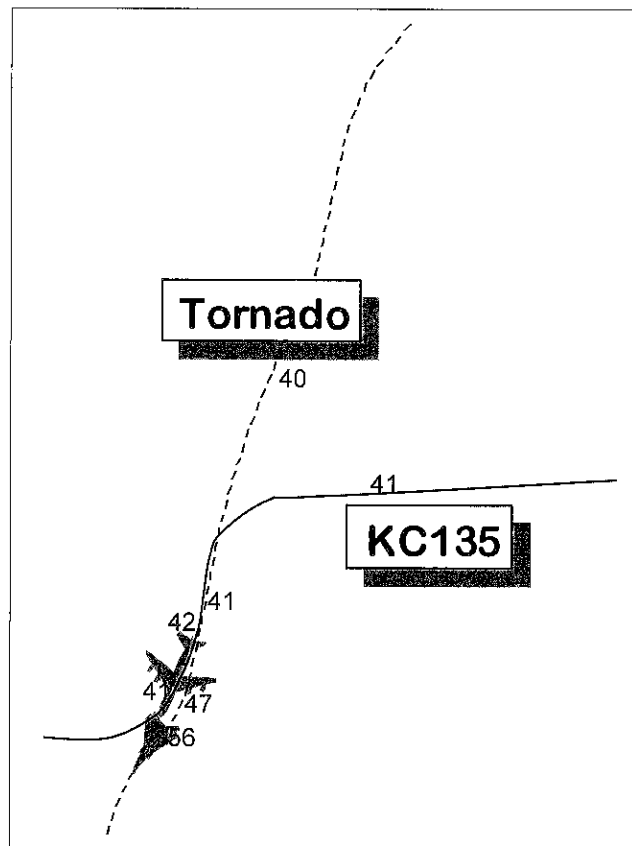
Degree of Risk: C

AIRPROX REPORT No 185/00

Date/Time: 6 Nov 1920 NIGHT
Position: 5228 N 0011 E (13 NM NW of Mildenhall - elev 33 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: KC-135 Tornado GR
Operator: Foreign Mil HQ STC
Alt/FL: 3000 ft 2500 ft
 (QNH 972 mb) (RPS)
Weather IMC INCL VMC CLBC
Visibility: 0.5 NM 15 km
Reported Separation: 600 ft V 1000 ft V
Recorded Separation: 600 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KC-135 PILOT reports heading 270° at 210 kt downwind in the radar pattern for RW 11 at Mildenhall, at 3000 ft QNH in cloud and receiving a RAS from Lakenheath Approach. ATC called pop-up traffic 8 NM N of him, fast moving; if not in



sight to turn left onto 170°. He informed ATC he was IMC and started to turn. ATC advised that the traffic continued to close and passed several avoidance vectors with the other ac still closing in his 6 o'clock. When it was less than 1 NM, ATC issued a traffic alert. At this point he initiated a descent to 2000 ft and saw the other ac diverging from overhead into his 10 o'clock. ATC advised it was 600 ft above and appeared to be manoeuvring to follow him. The other ac was not in contact with ATC and he considered the risk of collision was high.

THE TORNADO PILOT reports transiting at 2500 ft agl, VMC below cloud and on NVG, as a singleton, his leader having RTB u/s. He was not receiving an ATS. While on a southerly heading at 420 kt he saw on NVG the lights of another ac in his 12 o'clock. His radar showed it was 3 NM ahead and it appeared to be about at his level but he was unable to determine its direction of travel. He climbed, maintaining VMC to pass directly over the other ac, he estimated by 1000 ft. He thought the risk of collision was low.

MIL ATC OPS reports that the KC135 crew were under a RAS with Lakenheath APP (APP) at 3000 ft (28.71 ins, 972 mb) in the radar pattern to make an approach to Mildenhall. At 1918:21, as the KC135 manoeuvred downwind to RW 11 on a heading of 260°, APP transmitted "*C/S, pop up traffic 5 o'clock and 8 miles southbound, fast moving indicating 3000 – if not in sight, turn left, left turn heading 170°*". The KC135 crew acknowledged the transmission and the ac began to turn onto the advisory heading; however, shortly afterwards, APP advised the KC135 crew that the conflicting traffic was now in their 6 o'clock, 3 NM at 3000 ft. At 1919:12, APP advised the KC135 crew that the conflicting traffic appeared to be turning to the east of them and provided an advisory turn onto 230°, which was acknowledged. At 1919:29, APP transmitted "*C/S, that traffic is now 6 o'clock and less than a mile – traffic alert, if not in sight turn right heading 270°*"; the KC135 crew acknowledged the call and indicated that they were IMC. A few seconds later, APP replied "*...he's right over the top of you now, 600 ft above you*". At 1919:50, the KC135 crew requested a descent to 2000 ft and asked APP to confirm whether the conflicting traffic could be a spurious radar return; APP advised the KC135 crew that the conflictor

was an autonomous, fast moving military ac. At 1920:08, the crew of the KC135 became visual with the Tornado diverging on their port side. The KC135 crew indicated that they were happy to accept vectors and continue their approach, and confirmed that they would be filing a report after landing.

Under the circumstances, APP provided timely and accurate traffic information and avoiding action turns against fast-moving and unpredictable conflicting traffic.

UKAB Note: LATCC radar recordings show the KC135 at 4000-4100 ft Mode C as it begins to turn away from the Tornado which is closing from the N within 100 ft below it. When less than 1 NM astern, as the KC135 begins to turn right, the Tornado climbs sharply showing 4700 ft when close abeam the KC 135 and 5600 ft on the next return.

HQ STC comments that the Tornado crew, operating quite legitimately on NVGs whilst VFR in Class G airspace, acquired the KC135, both visually and on radar, in good time. However, although the crew initiated avoiding action, they did not create sufficient separation to reassure the KC135 crew.

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 believed that the lack of depth perception in NVGs played a part in this Airprox, along with the Tornado pilot's not allowing sufficiently for this problem. On the other hand he said he had seen the KC135 on radar at 3 NM. While members accepted that he might have been unable to assess the KC135's direction of travel, the Board agreed that he should have climbed much earlier than the apparent last minute sharp climb that was indicated on the radar recording. The incident perfectly illustrated the justifiable concern that late avoiding action can give to controllers, and to pilots under air traffic service, and the need for pilots to consider the problems they can unwittingly cause. The

Board concluded that the cause of the Airprox was the Tornado pilot flying close enough to the KC135 to cause its pilot concern for the safety of his ac, but that his action removed any risk of the ac actually colliding.

Cause: The Tornado pilot flew close enough to the KC135 to cause its pilot concern for the safety of his ac.

Degree of Risk: C

PART C: ASSESSMENT OF CAUSE AND RISK

AIRPROX REPORT No 186/00

Date/Time: 2 Nov 1041

Position: 5739N 0416 W (CROMARTY FIRTH)

Airspace: LFS/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR 1 AS350 Squirrel

Operator: HQ STC Civ Comm

Alt/FL: 625 ft ↓ 500 ft
(Rad Alt) (QNH 987 mb)

Weather VMC VMC CAVOK

Visibility: >30 km >10 km

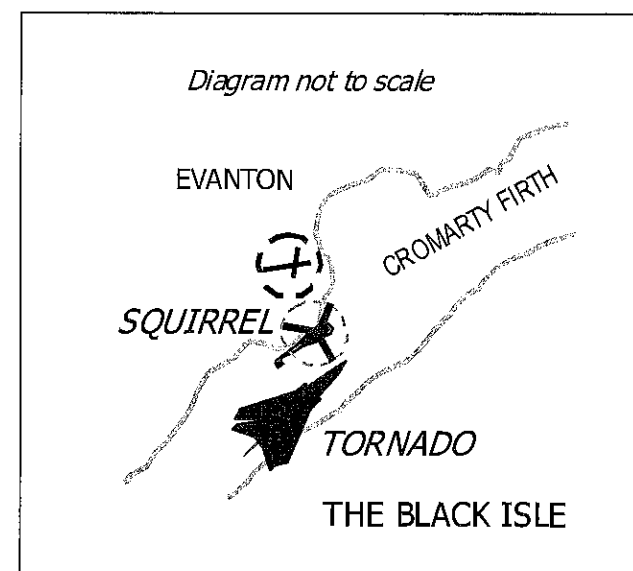
Reported Separation:

20 ft V, 1-200 ft H 50-100 ft V, nil H

Recorded Separation: Not recorded

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR 1 PILOT reports his ac was standard camouflage grey/green and HISLs were on whilst inbound to Tain Air Weapons Range at 500 kt, under a FIS from Tain RANGE. The Black Isle was overflown at 7-800 ft agl and he descended into the Cromarty Firth in a 1° descent through 625 ft Rad Alt. Tracking 040° at 500 kt, he became aware of a Squirrel helicopter at 11 o'clock - slightly high - about 1000 m away, heading he thought, about 120° and at an altitude of about 650 ft. Estimating that the helicopter was maintaining a constant relative bearing, he broke R and pulled up above and away to avoid it by about 20 ft vertically and 1-200 ft horizontally, but by the time this had been accomplished he had flown past it.



He added that the helicopter was in front of gently rising ground and from his perspective in the Tornado cockpit, its dark colour scheme made it very difficult to spot against the wooded background; no lights were seen. He assessed the risk of a collision as medium to high.

THE AS350 SQUIRREL HELICOPTER PILOT reports his helicopter has a Burgundy livery; navigation lights anti collision beacons and HISLs were on whilst flying a 30 min scenic flight with two passengers in CAVOK conditions.

After departing Inverness Airport he flew a route Drumnadrochit – Beauty - Dingwall to Cromarty, returning to land at Inverness, whilst under a "listening watch" from Inverness ATC. About 1 NM S of Evanton disused aerodrome at 110 kt, heading

050°, he thought at 500 ft QNH, the Tornado was first seen when it passed directly overhead his helicopter from astern. No avoiding action was taken - this was the first he was aware of the jet, which overflew about 50-100 ft above his helicopter with a high risk of a collision.

UKAB Note (1): From Meteorological Office archive data the Inverness QNH was 987mb; and the PORTREE RPS for the period was 982 mb.

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

MIL ATC OPS reports that the Tornado crew, freecalled Tain RANGE at 1038:35, on 337.6MHz and advised that the ac was inbound for a first run attack on the range (EGD703) from the SW. The Range Controller (RCO) passed weather information to the Tornado crew and advised them that there was a Bo105, not the subject helicopter, in transit from Brora to Dornoch Bridge at 2000ft RANGE QFE (987 mb). At 1039:51, the RCO advised the Bo105 pilot of the Tornado's presence, to which the Bo105 pilot advised that he was at Golspie, which is to the N of the D703 boundary. At 1041:22, the Tornado crew transmitted "...we've just had an airmiss with a, er, helicopter on the run in to Invergordon, are you in contact with him? Is that the one you were referring to was it?" The RCO replied that it was not the Bo105 and the sortie continued without further comment. Tain RANGE is not radar equipped and the existence of the Squirrel was unknown to the RCO.

HQ STC comments that this was a very close Airprox indeed, with a very real risk of collision. In spite of the high cockpit workload as the crew of the Tornado prepared for their attack at Tain AWR, 'they did well to see the helicopter at a range of 1000 m given the geometry of the encounter and the helicopter's conspicuity relative to the background terrain. However, had the crew called Inverness ATC, it is possible that they might have been warned of the civilian traffic but, again, cockpit workload may have precluded this call.

RAF Lossiemouth are taking considerable steps to brief all local airspace users on the nature of fast-jet operations in the area, but those civilian operators who wish to know more about military

low flying operations in general may wish to obtain a copy of CAA General Aviation Safety Sense Leaflet 18A – Military Low Flying.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The STC member explained to the Board that the Tornado crew would have been working hard approaching Tain Range with about 2 minutes to run before weapon release on the AWR. The dark colour of the slow moving helicopter, with little relative crossing motion to draw attention to it all conspired to defeat early visual acquisition by the Tornado crew. Some members thought that the descent of the Tornado below the level of the helicopter may have helped the Tornado pilot to spot it, but for whatever reason it was not sighted until 1000 m away, which at 500 kt was covered in under 4 sec. It is a generally held view that it takes about 2 sec for a pilot to react to a sighting with a flying control input, which will start changing the ac's attitude and flight path. Hence, the Tornado pilot was probably unable to avoid the helicopter by a greater margin - he reported 20 ft whereas the helicopter pilot reported 50-100 ft. Conceivably the latter might have been a more accurate assessment as the helicopter may have been masked from view as the Tornado pilot broke R to avoid it.

It was readily apparent to the board that the Helicopter pilot would have been unable to see the fast jet approaching from astern and would have been powerless to effect the outcome of this encounter. A wide-ranging discussion ensued over the merits of calling Tain Range for a FIS, as had another helicopter pilot at the time. Indeed, a Danger Area Activity Information Service (DAAIS) is available from Tain during promulgated periods, which would, potentially, enable pilots flying in the vicinity to obtain information on ac joining and leaving the range. Members asked if there were standard joining directions which the Board was advised there are; these 'run-ins' allowed preparation for attack profiles to be set up outside the danger area boundary. Some controller

members thought Tornado crews might more appropriately call Inverness ATC and advise of their transit. This minority view, was also expressed forcibly by a BHAB member (whilst unable to attend the meeting he had provided comment through the Chairman on his views of the encounter). He questioned whether the Tornado crew were doing all they could as they 'ran-in' to maintain a sharp look-out and be aware of other likely and legitimate users of the airspace surrounding Tain Range. HQSTC's reference to the Tornado crew's high workload suggested that they were not paying full attention to the priority tasks of look-out and safe navigation in the 'Open FIR' before entering the range. In his opinion the distraction of pre-attack procedures by the crew as they approached the 'safe haven' of Tain Range may have been a factor in this apparently late sighting. He thought if the AWR was too small to encompass sufficient airspace as the crew switched from peaceful transit to attack 'mode', then application should be made to enlarge the Danger Area to ensure that other airspace users are not put at risk. The helicopter pilot would have been unable to see the Tornado approaching 390 kt faster from astern and the fast-jet pilot's choice of evasive action, while to some inappropriate, had the desired effect and averted a collision – but not by much. Taking all these factors into account, the Board agreed that this Airprox resulted from a late sighting by the Tornado crew.

Turning to risk, it was apparent to members that the fast-jet crew had an implicit responsibility under VFR to spot slower more vulnerable ac in time to avoid them safely. However, because of the late sighting, the Tornado pilot's avoiding action was

more of a snap reaction than anything else. This coupled with the helicopter pilot's effective non-sighting - he had been unaware of the presence of the Tornado before it flew past - led the Board to conclude that an actual risk of a collision had existed.

During the discussion mention was made of the constructive work done by RAF Lossiemouth to brief local airspace users about fast-jet operations. The BHAB member alleged that the RAF still regarded the airspace between 250 - 2000 ft msd as fast-jet territory, wherein other users should expect to be 'bounced' by fast-jets. He represented the BHAB view that Lossiemouth should make more effort to educate fast-jet crews on the activities of other local civilian operators, specifically the tasks and routes flown by Inverness based helicopters. The IFS adviser objected strongly to the unhelpful tone of these statements and the STC member countered that recent 'Shairspace' forums – a joint venture by GA, Military and Commercial pilots and controllers to explain each other's flying activities – has proved of great benefit. The Board strongly endorsed the efforts made recently in this respect, which has engendered a very positive and constructive attitude to flight safety by all concerned.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Tornado crew.

Degree of Risk: A.

AIRPROX REPORT No 187/00

Date/Time: 15 Nov 1512

Position: 5714 N 0213 W (2 NM NNW
Aberdeen Airport - elev. 215 ft)

Airspace: ATZ (Class: D)
Reporting Aircraft Reported Aircraft

Type: ATR42 AS332

Operator: CAT Civ Comm

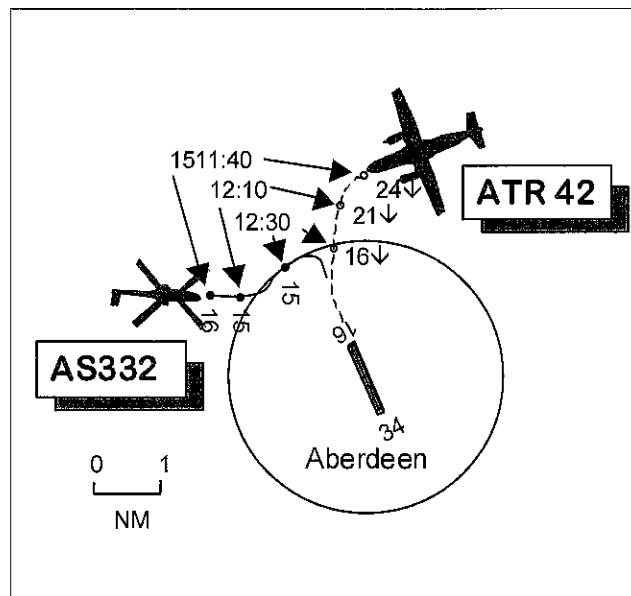
Alt/FL: 1200 ft ↓ 800 ft ↓
(QNH 998 mb) (QFE 990 mb)

Weather VMC CLBC VMC CLBC

Visibility: 30 km NK

Reported Separation: 50 ft V 250 m H/
0 ft V 0.5 NM H

Recorded Separation: 0 ft V 0.5 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR42 PILOT reports inbound to Aberdeen joining on a L base for RW16 passing 1200 ft QNH 998 mb whilst receiving an ADC service from Aberdeen Tower on 118.1 MHz. The visibility was 30 km in VMC and the ac was displaying an anti collision beacon and white strobe lights. After reporting on L base, he heard another pilot announce "ATR visual, will slot in behind". Both he and his co-pilot were unaware of the other ac's position until they saw it, albeit late, a helicopter in his 1.30 position range 300 m, maintaining a constant heading and closing. He made an RT call to warn the other pilot of his proximity whilst the First Officer, pilot flying, turned further L to avoid. He assessed the risk of collision as high with the other ac passing 250 m horizontally and 50 ft vertically clear on his R hand side. His cockpit workload was high whilst positioning visually and carrying out final landing checks.

THE AS332 PILOT reports flying inbound to Aberdeen with clearance to join R base RW 16 from Aberdeen Tower on 118.1 MHz. ATC then asked him to report when visual with an ATR42 joining L base RW16 which he saw joining from the NE at 45° to the RW centreline. He was asked to position No 2 to the ATR, which he did, by slowing

to 70 kt and "slotting in behind". He at no time felt that he positioned too close to the other ac and was somewhat surprised when the ATR pilot made a comment on the RT about his proximity. He believed that had the ATR pilot been listening to the RT, he would have known where his helicopter was and what his intentions were.

UKAB Note (1): - RT transcript shows the AS332 on the TWR frequency for 8 minutes prior to the incident. His clearance to join, at 1510, was made 30 seconds before the ATR reported on frequency on L base. At 1511, the AS332 was asked to position No2 to the ATR on L base, with position information of "4 NM NE of the field" and to report the traffic in sight. At 1512, the ATR was cleared to land and the AS332 pilot reported visual with the ATR and "slotting in" No 2 behind him. A further 30 seconds later, the ATR pilot transmitted "that helicopter please keep further away from us". This was then followed by "c/s, helicopter er came very close on our R hand side". ATC replied "understood, he had you in sight and is positioning behind you".

ATSI comments that the MATS Part 1 requires that, in Class D airspace traffic information is passed to IFR flights on VFR flights and to VFR flights on IFR flights. However, Page 2-9 states that "Clearance to enter a circuit is issued when an

aircraft is still some distance from the airfield to enable the pilot to conform with the traffic circuit, pending clearance to land. Information concerning landing direction or runway in use and any other necessary instructions are given at the same time so that the pilot may intelligently position himself in the traffic pattern". The ADC informed the AS332 of his number in traffic and the position of the ATR42 and expected the helicopter to position safely behind it. Arguably, had the ATR42 pilot been given traffic information about the AS332's intentions he might not have been so concerned about its close proximity.

UKAB Note (2): Radar pictures at 1511:40 show the AS332 2.6 NM WNW of Aberdeen at 1600 ft (1195 ft QNH) tracking 090° with the ATR just over 3 NM N of the airport turning L towards final approach RW 16 descending through 2400 ft (1995 ft QNH). 20 seconds later the AS332 is seen to turn L on to a NE track on R base maintaining 1500 ft (1095 ft QNH) heading towards the ATR tracking SSW at 2100 ft (1695 ft QNH). Shortly thereafter, at 1512:30, as the ATR descends through 1600 ft (1195 ft QNH) it is seen to turn further L on to a S track to pass ahead of the AS332 which also turns further R on to an E track. The point of closest approach occurs shortly afterwards; the ATR passes 0.5 NM ahead and 100 ft below.

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 reports from the appropriate ATC authorities.

The initial discussion between members focused on the geometry of this incident. The AS332 had been positioning on to a tight R base to the RW and was then told to position No 2 to the ATR approaching on the opposite base leg position. He visually acquired the ATR 1 minute later, which was on an oblique 45° closing approach, and by then

turning L onto a NE track he positioned himself effectively head-on to the airliner. To provide more spacing for 'slotting in' but still to keep the traffic pattern tight, the AS332 pilot reduced his airspeed to 70 kt. The ATR pilot had heard the RT call that another ac had him in sight and was positioning behind, but he was taken by surprise to see a helicopter approaching to the R of his nose and closer than he would have expected. By seeing the helicopter late, it would have been difficult for the ATR pilot quickly to receive any visual clues that the AS332 was slowing down (for spacing to position No 2) whilst appearing to be aiming directly towards him on a constant bearing. Members were aware that at busy airports, this situation occurred regularly; the option to orbit for spacing would have been available but this could lead to problems integrating slower traffic whilst maintaining an expeditious flow. It was clear to members that two out of the three parties involved were aware of the situation; the AS332 pilot and ATC were both 'in the picture' but the ATR pilot was not. However, it was felt that had the ATR pilot been given traffic information (TI) on the AS332 it might have alleviated the former's concerns. ATC members felt that this was sometimes unnecessary at busy airports and that passing TI to one pilot whilst the ADC controller had both in sight was adequate. Nevertheless, the Board concluded that the late sighting of the AS332 by the ATR crew and its perceived proximity gave them cause for concern.

As to the risk, the AS332 pilot saw the ATR in good time and maintained visual contact throughout his manoeuvring whilst trying to keep the circuit tight behind the ATR which was crossing L to R and descending through his level. This led members to agree that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Perceived proximity of the AS332 caused concern to the ATR42 crew.

Degree of Risk: C

AIRPROX REPORT No 188/00

Date/Time: 16 Nov 1627

Position: 5246 N 0119 E (2 NM NW of Coltishall)

Airspace: MATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: S76 ATR42

Operator: CAT CAT

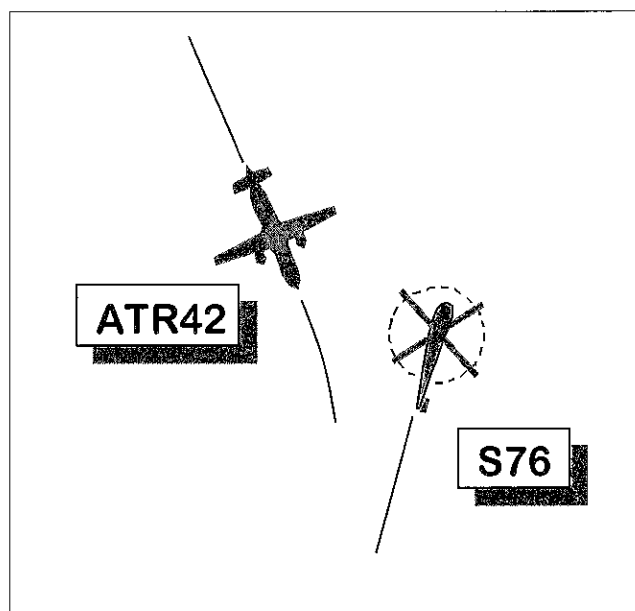
Alt/FL: 1800 ft ↑ 3000 ft
(RPS 994 mb) (QNH 1001 mb)

Weather VMC CLBC VMC CLOC

Visibility: 10 NM+ 30 km

Reported Separation: 800 ft V, 1.5 NM H/ 1000 ft

Recorded Separation: 6-700 ft V, 0.25 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S76 PILOT reports heading 017° at 142 kt and climbing out of Norwich VFR while receiving a RIS from Coltishall on 125.9. He saw the ATR42 closing in his 10:30 from 5 NM away and reduced his rate of climb to pass about 800 ft beneath it as it appeared to turn away to pass to his left. He considered the situation potentially dangerous because he was flying on the Yarmouth RPS (994 mb) and the ATR, working Norwich Approach (119.35), was on the Norwich QNH (1001 mb). Coltishall had advised him of the ATR which was asking for a descent 'against him' as he was visual. He refused this request as he could not hear the ATR pilot's intentions and it seemed too close to him for a descent through his level. When the ATR passed him he queried the vertical separation, which was given as 800 ft. He considered that all ac should be on the same pressure setting when in the same airspace even if working different frequencies.

THE ATR42 PILOT reports heading 160° at 210 kt receiving an Approach Control service from Norwich. He saw the helicopter 10 NM away and was held by the controller at 3000 ft (QNH) until he had passed it. In his opinion there was no Airprox.

MIL ATC OPS reports that the timing facility on the Coltishall recording equipment was found to be 54 sec fast; timings in this report have been adjusted

accordingly. Messages between the Coltishall Zone (ZONE) and Norwich Approach controllers, who sit next each other at RAF Coltishall, were conducted 'face to face' and are therefore not recorded.

The S76 pilot established communications with ZONE at 1625:22, and requested a RIS. ZONE identified the helicopter, provided a RIS and advised the pilot to "...report level at two thousand, Yarmouth nine nine four." At 1626:57, ZONE transmitted "(S76 C/S), ...traffic left, ten o'clock, six miles, Norwich inbound, descending for their two-two, not below three thousand feet." This traffic information (TI) referred to the ATR42, following which the S76 pilot advised that he was levelling at 2000 ft. At 1627:29, following a prompt from the Norwich controller (APP) seated next to him, ZONE transmitted "(S76 C/S), the Norwich inbound have (has?) you in sight, are you happy for him to descend to your level?" The S76 pilot replied "Eh, negative, we got two contacts and one very close to us" to which ZONE replied "Affirm, that's the one I've just told you about, now in your ten o'clock at two miles, currently at three thousand, wishing to descend with you in sight" and the S76 pilot replied "Eh, negative, wait 'till he's past us." At 1627:48, the S76 pilot requested "Confirm he's at three thousand feet please?" and ZONE replied "Affirm, he's passing to your eight o'clock to go behind." About 30 sec later, the S76 pilot transmitted "...just confirm whether the inbound was on the Norwich, eh, pressure setting or the Yarmouth?" ZONE advised the pilot that he would check with APP and,

at 1630:11, advised the S76 pilot *"The Norwich inbound was on the Norwich QNH which meant you have eight hundred feet separated."* Five minutes later, at 1635:11, the S76 pilot transmitted *"Just confirm the other aircraft was working, eh, Norwich approach?"* ZONE confirmed this, following which the S76 pilot transmitted *"Roger, for your information I'll be filing an Airprox on that incident."*

LATCC radar recordings shows the S76, squawking 0221, tracking about 030° after departing from Norwich in a slow climb. The ATR42, squawking 3702, is to the N of the helicopter, tracking about 170° and level at an indicated 3300 ft Mode C. At 1627:30, about the time that ZONE informed the S76 pilot that the ATR42 was visual and wished to descend, the S76 has just reached an indicated 2600 ft Mode C (it indicated the same level in the previous radar sweep) and has the ATR42 in its 10:30 position, range 2 NM, indicating 3300 ft (ie 700 ft above). Subsequently, the S76 indicates 2500 ft until after the ac pass. The closest point of approach (CPA) occurs at 1627:55 (25 sec later) with the ATR42 in the S76's 8 o'clock, at a little under 0.25 NM and passing behind; the Mode C responses are overlapped, although that of the S76 can still be identified as 2500 ft. The Mode C of the ATR42 indicates 3200 ft immediately prior to the CPA, and 3100 ft immediately afterwards, thus the recorded vertical separation was in the order of 600-700 ft.

The S76 pilot specifically requested, and was provided with, a RIS, during which he was provided with TI, which referred to the ATR42, at a range of 6 NM. There is however, no requirement within the conditions of RIS to separate ac, as separation advice can only be expected when in receipt of a RAS. The ATR42 pilot, who was in receipt of a RAS, had become visual with the S76 by the time the ac had closed to 5 NM horizontal separation (the pilot reports being visual at 10 NM, APP reported that he was "visual from 5 NM away") and shortly afterwards, requested a descent. Once visual however, the controller's responsibilities for providing separation advice to resolve that particular confliction had, in effect, been achieved and the ATR42 pilot was free to descend of his own volition. The APP and ZONE controllers did not have to request the S76 pilot's approval prior to releasing the ATR42 for further descent.

The S76 pilot stated that he wished to highlight his opinion that ac flying within the same airspace should be on the same pressure setting. However, the controllers concerned were sitting next to each other, not at different aerodromes, and hence were able to communicate freely with each other. Although his point regarding the mixed use of pressure settings is valid, the filing of an Airprox is considered an inappropriate method of voicing his concerns. The S76 pilot was told that the ATR42 was visual with his ac. In a different situation (eg had the S76 pilot requested a RAS), the appropriate service and separation advice would have been applied. Coltishall ATC has remarked that helicopters on N Sea support tasks rarely, if ever, request RAS while passing through their area.

ATSI reports that it appears that the Norwich APR Controller did not carry out full co-ordination with the military controller, in that he did not confirm which pressure setting the S76 was using. He said that it was not apparent from his radar display Mode C that the regional setting was selected by the S76, whilst it was in the climb. Fortuitously, the minimum vertical separation was 6-700 ft, with both ac visual. Use of different pressure settings between the two units is a common occurrence with Norwich Approach using the Norwich QNH. The Norwich MATS Part 2 has been amended to remind civil controllers of the need to ensure that the pressure settings of relevant ac are known and to plan 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 authorities.

Members agreed that under the prevailing ATSS, the S76 pilot's permission did not need to be sought for the ATR42's descent. Indeed, neither did the ATR42 pilot need permission to descend; having accepted that he could see the helicopter he was at liberty to descend at his own volition, taking his own separation. The Board considered that this was not an Airprox and the helicopter pilot's concern about pressure settings would have been more appropriately dealt with in an incident report (MOR).

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report

Degree of Risk: C

AIRPROX REPORT No 189/00

Date/Time: 13 Nov 1424

Position: 5257 N 0106 W (2.25 NM NW NOTTINGHAM A/D)

Airspace: ATZ/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: AS355 MD600N

Operator: Civ Comm Civ Pte

Alt/FL: 1200 ft 1700 ft
(QNH 996 mb) (QNH)

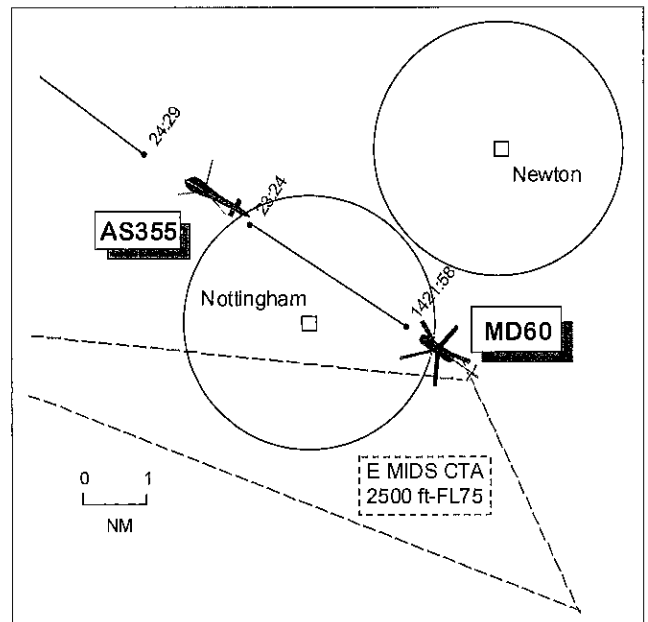
Weather VMC CLBC VMC CLBC

Visibility: >20 km 20 km

Reported Separation:

0 H 100 ft V 0 H 400-600 ft V

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS355 PILOT reports in a hover 2.25 NM NW of Nottingham Airport on a heading of 300° at 1200 ft QNH 996. He was receiving an A/G service from Nottingham Radio on 122.8, squawking a discreet code Mode A and C with strobe and anti-collision lights on. The visibility was >20 km, 2500 ft below cloud, in VMC. Whilst "on task", he heard a pilot call on frequency "half a mile N of the RW at 1400 ft" who was informed by ATC of his presence at 1800 ft, which was his previously stated max. altitude. Before he could transmit a correct altitude report, he heard the other pilot state that he "had the helicopter in sight and was departing to the N". He briefed his passengers about the presence of a conflicting ac and commenced a scan to his R to look for it as he believed it would pass about a mile to his R rear side. A few seconds later, a white helicopter with blue markings flew directly overhead and only just above them on a NW heading; the

pilot and front seat passenger both instinctively ducked. He saw it too late to take avoiding action; the other helicopter continued on a steady track making no correction to its flight path.

He did not see the helicopter's registration but was sure it was a Bolkow or MD NOTAR type due to its characteristic rear profile (skid uc, double sided stabiliser with end plates and wide tail boom). He estimated the vertical separation at about 100 ft which he considered was far too close for safety as he would have been obscured from the other pilot's view as he passed overhead. TCAS, although fitted to his helicopter, did not detect the conflicting helicopter which he presumed was not operating its transponder.

He informed ATC of the Airprox but the A/G operator was unable to furnish him with the helicopter's registration as she had deleted the information and could not recall it. Subsequently he was informed by Nottingham A/G operator that she had attempted

to pass traffic information on the other helicopter to him but had received no response. He assumed that he missed the ATC call as it was "blotted out" by other aural inputs from intercom and other radio frequency transmissions. He assessed the risk of collision as high.

THE MD60N PILOT reports flying solo between private sites at Peterborough and Manchester heading 320° at 125 kt and 1500 ft QNH. The visibility was 20 km, 1500 ft below cloud, in VMC. The helicopter was white and blue, strobe lights were on and he was squawking 7000 with Mode C whilst receiving an A/G service from Nottingham ATC. He was passed traffic information by ATC on a helicopter operating N of the A/D at 1000 ft which he initially did not see. He eventually saw the other ac 0.25 NM ahead at approx. 1200 ft in an out of ground effect (OGE) hover facing away from him, 300 ft below. As he was unaware of the hovering helicopter's intentions and surmising that it could transition away from the hover straight ahead, L or R and would not possibly see him approaching from behind before initiating any manoeuvre, he climbed to pass 400-600 ft overhead, whilst maintaining good visual contact, until he had passed. No risk of collision existed.

UKAB Note: Analysis of the Clee Hill radar at 1421:58 shows a pop-up primary return, believed to be the MD60, 1.5 NM E of Nottingham A/D tracking NW whilst the AS355 is seen 2.25 NM NW of Nottingham A/D in a slow tight RH orbit at 1400 ft (950 ft Nottingham QNH 996 mb). At 1422:29 the AS355 is seen entering a hover. The MD60 fades from radar one minute later, with the AS355 0.6 NM ahead and reappears at 1424:29 1.5 NM to the NW; the incident is not seen on radar. The MD60 is seen to squawk 7000, with no mode C, when 3.8 NM NW of the incident's plotted position.

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.

Pilot members discussed the wisdom of passing overhead another ac to resolve a flight path confliction. The ANO Rule 17 (1) states that an ac that is obliged to give way to another ac shall avoid passing over or under the other ac, or crossing ahead of it, unless passing well clear of it. Also, Rule 17 (4) states that an overtaking ac, whether climbing, descending or in horizontal flight, shall keep out of the way of the other ac by altering course to the R. Members felt that flying overhead had been inappropriate because the overflying pilot would have lost sight of the other ac shortly before and during the manoeuvre whereas moving R and overtaking would have kept the other ac in sight at all times. Also, pilot members believed that handling problems could be induced by the effects of rotor downdraught on the hovering helicopter. Dealing with pilot lookout, members noted that the AS355 pilot, steady in a hover heading 300°, would not have been able to see the MD60 approaching from his 6 o'clock. Conversely, from the MD60's cockpit, the AS355 would have been very difficult to see early as it hovered tail-on to the approaching MD60 pilot. Given the reported sighting range of 0.25 NM, this meant the MD60 pilot had about 8 seconds to take avoiding action. Some thought this might have left him little option other than to overfly the AS355. The AS355 crew had been taken by surprise by the overflight and it is understandable that they both ducked. With these points in mind the Board were unanimous in agreeing that the incident was caused by the inadequate avoiding action taken by the MD60 pilot.

When the risk element was discussed, members were clear that Nottingham had passed traffic information (TI) to the MD60 pilot on the AS355 so he had been forewarned of its presence. Although the AS355 pilot had warned his crewmembers about the other ac, he believed the MD60 helicopter would pass to the E of him on his RHS. The onus was on the MD60 pilot to avoid the hovering AS355 which, unusually, was in an OGE hover. Faced with this he had chosen to fly directly over it by an estimated 400-600 ft. However, members felt that overflying the other helicopter, which could have transitioned in to forward flight at any time without

seeing the MD60, was not the safest course of action. Therefore, they concluded that the safety of both ac had been compromised.

Cause : In adequate avoiding action by the MD60 pilot.

Degree of Risk: B

PART C: ASSESSMENT OF CAUSE AND RISK

AIRPROX REPORT No 190/00

Date/Time: 13 Nov 1544

Position: 5556 N 0325 W (2 NM SW
Edinburgh Airport – elev. 135 ft)

Airspace: ATZ (Class: D)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type</u> :	DHC8	AA5
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<u>Operator</u> :	CAT	Civ Pte
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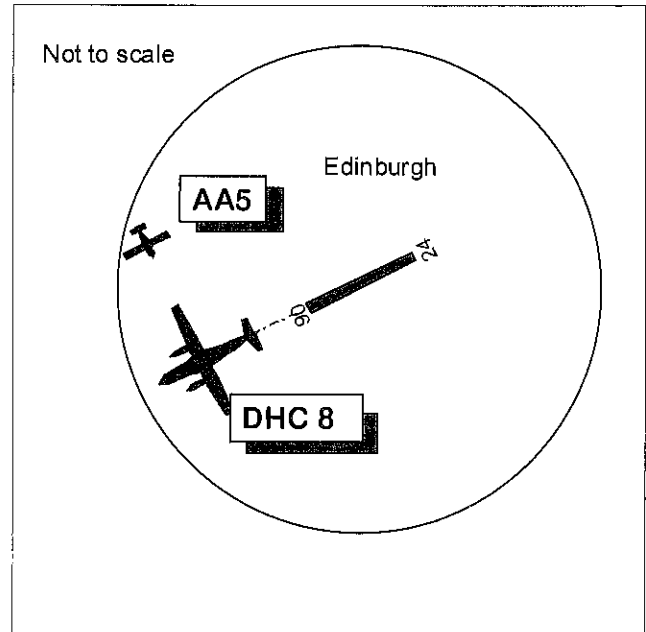
<u>Alt/FL</u> :	1000 ft (QNH 990 mb)	1000 ft (QNH NK mb)
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<u>Weather</u>	VMC CLBC	VMC CLBC
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<u>Visibility</u> :	30 km ↑	>10 km
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Reported Separation: 0 V, 1 NM H/0 V, 1NM H

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports departing Edinburgh RW24 on initial climb out to Manchester on a TLA5C SID. The visibility was 30 km in VMC and he was receiving an ADC service from Edinburgh TWR on 118.7 MHz. Shortly after passing through 1000 ft (QNH 990 mb) climbing straight ahead, he received a TCAS TA on traffic in his 2 o'clock, range 1 NM, 200 ft below. He took no avoiding action except for continuing the climb until passing clear of the conflict which he did not see; he estimated he had zero visibility ahead due to the sun being aligned with the RW QDM. He stated that this would have been a TCAS RA with "increase climb" had this function not been inhibited below 1450 RAD ALT. He also said that he had not been warned of any conflicting traffic by ATC before departure.

THE AA5 PILOT reports flying on a local sortie from Prestwick in a LH orbit approx. 2 NM W of Edinburgh, 1 NM N of centreline RW 06/24 at 1000 ft QNH. He was in receipt of an ADC service from Edinburgh TWR on 118.7 MHz and awaiting crossing clearance of the extended centreline. The visibility was > 10 km in VMC and his anti collision and white strobe lights were on. After the DHC8 was airborne, he was asked by ATC if he was visual, to which he replied "affirm". The DHC 8 was by then crossing his 12 o'clock L to R as he passed a SSE heading still in the turn. He was then cleared to cross behind the DHC8, which he did by passing approx. 2 NM behind. He estimated a minimum distance of 1 NM as the ac climbed through his level.

EDINBURGH ATC reports that the AA5 was operating under a VFR clearance and was holding N of the RW 24 departure climb out awaiting ATC

approval to transit further S. Following traffic information the AA5 reported 'visual' with the departing DHC8 and was therefore cleared to pass behind that ac. The Aerodrome controller reports that he had both ac in sight during this period. Edinburgh ATSU received no indication from the commander of the DHC8 of any TCAS alert or any query about the position of the AA5.

ATSI comments that the AA5 was passed traffic information about the departing DHC8 together with instructions to pass behind it. No details were passed to the pilot of the DHC8 concerning the AA5. Edinburgh ATC did not believe it was necessary to issue traffic information to the DHC8 as the Aerodrome Controller had both ac in sight and had decided that the position of the AA5 was of no consequence to the departing ac. It only became a consequence because the AA5 reported seeing the DHC8 and then routed behind that ac (as cleared). However, if the pilot of the DHC8 had been warned about the presence of the AA5, and its intentions, the Airprox would probably not have been filed.

UKAB Note: The MATS Part 1, Page 2-1, states, under the title "Responsibilities" 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:

- a) aircraft flying in, and in the vicinity of, the aerodrome traffic zone,
- b) aircraft taking off and landing".

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 ATSI adviser reminded members of MATS Part 1 Page 1-3 requirement for Class D airspace for passing traffic information (TI) to IFR flights on VFR flights and traffic avoidance advice if requested and

TI to VFR flights on IFR and other VFR flights. Pilot members were sure that the DHC8 crew were concerned by the TCAS TA alert on the AA5 without having prior knowledge of its presence, or being able to see it visually. An ATCO member, familiar with Edinburgh procedures, understood the scenario faced by the ADC; he was sure that the pattern of events had led the controller to exercise professional judgement in that TI to the DHC8 pilot on the AA5 was unnecessary. The ATCO added that, at busy airports, there often was not enough time to transmit TI to all parties owing to RT congestion. From the ADC's standpoint the DHC8 was climbing straight ahead before turning L, he had both ac in sight and had passed a conditional crossing clearance to the AA5 pilot. This, he felt, was sufficient. Other members understood all of this but felt that had TI been passed to the DHC8 crew, in accordance with the MATS Part 1 requirement, perhaps this Airprox would not have been filed. They pointed out that both DHC8 pilots had been surprised by the TCAS TA and had perceived a confliction from the information presented. This belief was bolstered by the thought that owing to their proximity to the ground that the RA element of the TCAS equipment had been suppressed in accordance with system parameters.

Information available to the Board on TCAS shows that RAs are inhibited below 500 ft AGL, to avoid distraction at low altitudes during approaches to or departures from airports; below 500 ft AGL a TA will be displayed. Additionally, TCAS spoken messages are inhibited below 400 ft AGL. Owing to the 25 second 'gate' for an RA, the effects of "climb" and "increase climb" on ac performance are evaluated for each ac type during the take-off and initial climb, cruise, approach and landing regimes. Where these warnings would involve a speed reduction sufficiently close to induce the stick shaker or buffet in that time, that RA is inhibited for that configuration or altitude. These evaluations are carried out at maximum appropriate weight and temperature and system parameters are listed in Flying Manuals. Inevitably, these advisories result in a loss of airspeed when flying at high weights/altitudes or in high drag configurations. However, speed loss should not result in stick shake or buffet provided appropriate power adjustments are made and normal operating speeds are used, and bank angle is less than 15°.

After much debate, particularly in respect to the need/requirement to pass TI, the Board concluded that this incident had been a perceived confliction by the DHC8 pilot which might well have been avoided if TI had been passed. As to risk, the AA5 pilot had been orbiting N of the RW climbout awaiting clearance to cross which he did after visually acquiring the departing DHC8 whilst both ac were in sight of the ADC. Although the DHC8 pilot had received an unexpected TCAS TA and did not see the AA5, it had passed 1 NM clear on his RHS. Taking all of these points into

consideration it was decided that the safety of the ac had not been compromised and there had been no risk of collision.

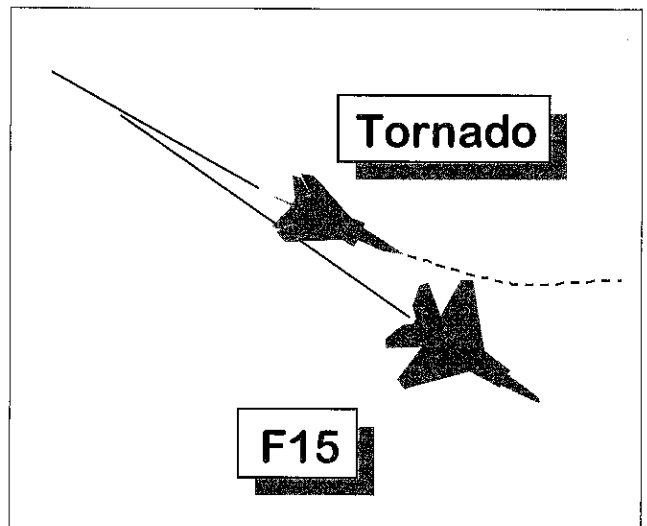
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Perceived confliction which might have been avoided if traffic information had been passed to the DHC8 pilot.

Degree of Risk: C

AIRPROX REPORT No 191/00

Date/Time: 16 Nov 1208
Position: 5550 N 0220 W (N of Duns)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Tornado F3 F15
Operator: HQ STC Foreign Mil
Alt/FL: 6000 ft 1000 ft
(RPS) (agl)
Weather VMC CLNC ∇ VMC
Visibility: 40 km
Reported Separation: 300 yd/1 NM
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports heading 120° at 550 kt and 6000 ft having committed to a target from a CAP. He was in OTA C and conforming to OTA procedures (which are explained in the HQ STC comment). His navigator was looking for the target on radar and had seen a co-speed, co-heading stranger at 10 NM; he was describing the air picture to the pilot when he saw an F15 cross the nose 300 yd ahead, having climbed from beneath. He directed the pilot to jink left 10° to increase separation; the F15 gave no sign of having seen them. On contacting London Mil radar he was advised of a formation of 3 F15s which

appeared to have been conducting PIs in the same airspace. Non 1 Gp ac are permitted to do PIs in the same OTA without communicating with the 'OTA Commander' which he considered to be a major flight safety hazard. Had he come off the CAP 2 seconds earlier, he was in no doubt there would have been a collision.

THE F15 PILOT reports heading 355° at 420 kt; the flight was a 3-ship on an AGM-130 upgrade sortie. No 3 was in a stand off orbit 40 NM to the S. No 1 was launching No 2 as the bomb. Number 1 turned 110° to the right on a PSA leg while No 2 flew the low altitude bomb profile. No 2 saw a Tornado about 1 NM on the nose crossing from right to left. It was no factor so he continued to fly

the bomb profile. All of the flight could see the Tornado in the GBU-15 field of view. Upon tape review they could see the Tornado on the tape and it was no factor. If it had a wingman, no one saw it. PSA stands for "Phased Scanned Array and the 110 degree turn is basically a mapping leg to acquire the target. It was a 10 degree delivery starting at 3000 ft going down to 1000 ft and then a 2000 ft egress altitude after delivery. All of the flight had only the one Tornado in sight.

UKAB Note: LATCC radar recordings show several ac manoeuvring in the area, squawking 7000 and 7001, down to FL 30. The F15s can be identified subsequently from the squawk they changed to for RTB but no other ac are shown within 10,000 ft (V) of them, and when they pass the F3s, neither the F3s nor the F15s are close to 6000 ft. The encounter described is not seen on radar. The F15 Wing was unable to say which ac of the formation was the one involved and the descriptions given of the F3 sightings do not agree with the geometry of the incident. The F3, if seen, would have been above and slightly behind the F15 until just before they passed.

HQ STC comments that the inexperienced Tornado pilot was clearly unsettled by the sudden appearance of another fast jet but reacted appropriately when prompted by his instructor navigator. Although the actual risk of collision was almost certainly low, there is some considerable discrepancy in separation distances given by the crews involved, especially surprising considering that the staff navigator would have been familiar with the F15E having operated alongside it on a regular basis.

The Air Defence Operational Training Area (OTA) System is a geographical system of areas promulgated for the tactical co-ordination and supervisory management of AD formations conducting Air Policing and Defensive Counter Air

training missions in UK airspace. The F15 operating authority has been invited to co-ordinate on OTA usage in the past but has yet to accept.

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 was not possible to determine at what part of the F15s' sortie this incident occurred although it clearly did not occur during the simulated attack described by them which occurred at a lower level; the Tornado they saw in the GBU15 fov was not the reporting F3 at around 6000 ft. It was not possible to say if the F15 pilots whose ac was seen by the F3 were aware of the F3 as they climbed; it seemed probable that they did not and that neither crew had adequately cleared the airspace above/below that they were climbing/descending into. However, there was insufficient information for the Board to conclude more than that this was a confliction of flightpaths; the risk level could not be determined without knowing if the F15 crew had been aware of the F3.

The Board discussed the OTA issue and concluded that it was an HQ 1 Gp procedure with no other participants, civil or military. It was simply Class G airspace and it would be more appropriate for HQ 1 Gp crews to be reminded of this and to keep a lookout accordingly for all other traffic.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction of flightpaths.

Degree of Risk: D

AIRPROX REPORT No 192/00

Date/Time: 22 Nov 1019

Position: 5208 N 0119 W (8 NM WSW of DTY)

Airspace: DCTA (Class: A)

Reporting Aircraft Reported Aircraft

Type: B757 F15

Operator: CAT Foreign Mil

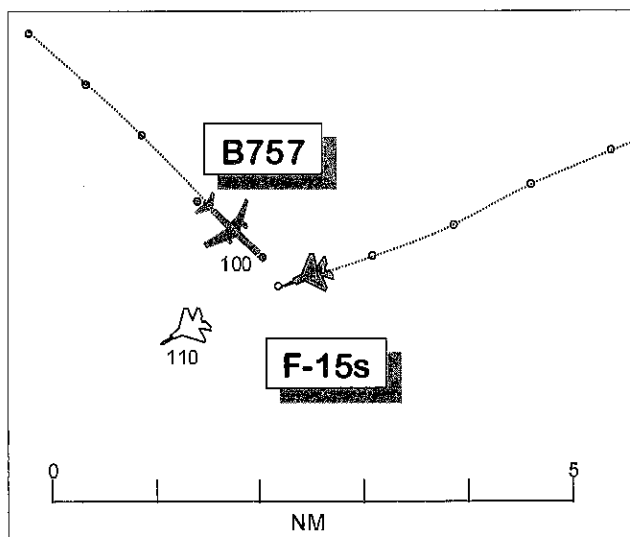
Alt/FL: FL 100 FL 100

Weather IMC INCL IMC INCL

Visibility: NK NK

Reported Separation: 30 m/NK

Recorded Separation: < 0.28 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports climbing out of Birmingham and flying a radar heading of 175° at 300 kt. He had levelled at FL 100, IMC in cloud, and had been advised by LATCC on 130.925 of crossing military traffic at FL 110 which he could see on TCAS but not visually; it crossed 1 NM ahead and 1000 ft above. With no other TCAS traffic showing, both pilots saw visually a military fighter, possibly twin finned, cross very quickly ahead from left to right at the same level. It passed from 10:30 to 2 o'clock at very close range; both pilots heard its engines and they encountered slight turbulence from its wake. He estimated it passed 100 ft away, closer than he would have taxied past it on the ground. (UKAB Note: RT recordings show that the B757 was on an acknowledged radar heading of 140°, tracking 126°. The pilot initially passed a miss distance of 100 ft at the same level and 20 seconds later gave "about a hundred yards directly in front of us.")

THE F15 PILOT'S WING reports that a pair of F15s, heading 250° at 480 kt were crossing the Daventry RC under the control of London Military on 275.35, in a 1-2 NM radar trail. The mission was a training and orientation flight for the pilot of the 2nd ac, whose rear seat pilot was very experienced. Before the RC the No 2's IFF was

set to standby in accordance with procedures. They were at FL 100 in IMC and the leader requested a climb to gain VMC but this was initially denied. Subsequently, the formation was cleared to climb to FL 110 but the No 2 pilots did not hear this. No 2's radar showed his leader at 10200 ft but the target angle was 3-4 degrees above the horizon; the No 2 was about to ask his leader what level he was at when he saw a 'shadow' flash by in his peripheral vision. His rear seater saw nothing unusual. London Radar then asked if the No 2 was also at FL 110, to which level the No 2 immediately climbed.

MIL ATC OPS reports that at 1003 the LJAO Central controller (CEN), who operates in the LATCC civil Area Control Room (ACR) received a prenote from Lakenheath Departures (LKH) for F15 traffic that was to route through the Daventry (DTY) Radar Corridor (RC). CEN already had a printed FPS pending for a similar sortie but with a different callsign and found out from LKH that this was the same flight with a changed callsign. CEN then allocated Mode 3/A SSR code 6401 and prepared a hand written FPS reflecting the new callsign, which he assumed was a single F15; the original FPS, which had indicated 2 ac, was removed and discarded. The control position was then handed over, to enable the first controller to undertake an examination with the ATC Examining Board (ATCEB) who were visiting the Unit. The offgoing controller advised the LJAO Supervisor that traffic

had been prenoted to CEN. Shortly after taking over, the new CEN controller observed a 6401 squawk depart from Lakenheath and, at 1007:40, he telephoned TC Midlands (MID) and booked the DTY RC for a single F15, westbound at FL 100 which MID approved. CEN then accepted a radar handover of the flight from LKH, which followed the (standard) shortened format for an already prenoted track (i.e. Position, Squawk, Level, Type of Service).

At 1008:50, about 15 sec after closing the landline to LKH, CEN was called by Yeovilton with a prenote, but shortly after the conversation commenced, the call failed. At 1009:07, the F15s checked in on the CEN frequency "C/S check," "Two," this call however, was partially obscured by an engaged tone from a landline, as CEN attempted to recall Yeovilton. The lead F15 was placed under RAS and climbed to FL 100; during this and subsequent transmissions, CEN (and the F15 leader) used the callsign of the lead F15 only, as prenoted by LKH. After obtaining a prenote from Yeovilton (on a Hawk), CEN released the F15s 'own navigation' through the DTY RC. At about 1012:00, the control position was handed over to a third controller, who was accompanied by a member of the ATCEB. At 1015:07 CEN changed the radar service to Radar Control as the F15s entered the DTY RC. The lead F15 pilot then transmitted "...C/S looking for a climb to flight Level one one zero if able." CEN responded "C/S standby, maintain flight level one hundred" which was acknowledged by the leader. At 1016:00 CEN transmitted "C/S maintain flight level one hundred, traffic left, ten o'clock range ten miles, crossing left to right descending, not below flight level one one zero." This Traffic Information (TI) call referred to northbound civil traffic whose SSR label indicated that it was inbound to Birmingham and hence, was expected to descend to FL 110. The lead F15 pilot replied "C/S maintaining flight level one hundred...and be advised wingman in one and a half mile trail" at 1016:08, which was when CEN first realised that she was controlling a formation; the No 2 F15 was observed as a primary radar contact behind the lead. CEN then transmitted, "C/S in approximately ten track miles, do you still require a climb to flight level one one zero?" to which the lead F15 pilot responded "Yes ma'am if able" at 1016:21. CEN then opened the landline to MID; MID answered the line at 1016:30 and CEN requested "...Flight

level one one zero for my traffic east of Daventry by eight miles squawking six four zero one." MID approved this and CEN responded "*Climbing now flight level one one zero.*" The conversation ended at 1016:52; immediately afterwards, CEN transmitted "*(F15 C/S) climb now flight level one one zero*" and the lead pilot acknowledged "*(F15 C/S) in the climb now flight level one one zero out of one hundred.*"

At 1018:07, CEN transmitted "*(F15 C/S), traffic right, two o'clock, range ten miles crossing right to left, traffic climbing, co-ordinated not above flight level one hundred*" and the lead F15 pilot responded "*C/S's radar contact.*" At 1020:02, MID telephoned in reference to the F15's track and enquired "*Is there something behind that following it?*" CEN advised that the ac were in 1.5 NM trail, to which MID commented that he had been unaware of that fact and requested the level of the second ac. CEN stated that both ac were at FL 110 (which was her belief); MID then went on to explain that an ac under his control (the B757), had reported "*..something flying across his nose one hundred feet above....*" CEN agreed to check with the F15s and asked the leader "*C/s just confirm that both formation elements are level at FL 110*". At 1021:04, the lead pilot confirmed to CEN "*Affirm at FL 110*" and this was relayed to MID at 1021:17. At 1022:42, MID rang back to advise CEN that the B757 pilot was "*..going to file....*" having described the other ac as an F15; by this time the F15s had been handed over and CEN telephoned Brize Norton, requesting that they advise the pilots accordingly.

The LATCC radar recording shows the lead F15, squawking 3/A 6401, tracking 240° following the centre of the DTY RC at an indicated FL 100 Mode C, with the non-squawking No 2 F15, about 1.5 NM in trail. The B757 can be seen to the SSE of HONILEY, squawking 3/A 5237, tracking about 150° with its Mode C indicating a steady climb; the groundspeeds of all 3 ac are almost identical. The lead F15 commences a climb at 1017:09, reaching FL 110 25 sec later, 1 NM before reaching DTY. At this point, the B757 is 45° R of the lead F15's track, range 15 NM and passing an indicated FL 78. At 1018:07, about the time that CEN passed TI to the lead F15, the B757 is 40° R of the F15's track, range 10 NM and passing FL 92 having appeared to turn about 10° R. The B757's Mode C indicates

FL 100 at 1018:40 and maintains this level throughout the encounter; the lead F15 passes 2 NM ahead of the B757 at 1018:57, indicating FL 110. (UKAB Note: The closest point of approach on radar recordings displayed at 1:50000 scale occurs at 1019:14 as the No 2 F15 passes 0.28 NM ahead of the B757 from L to R on a 110° Track Crossing Angle. AAIB estimated the distance as < 380 ft from analysis of the raw radar data.)

The number of controller changes that occurred during the short period before the Airprox was less than ideal; the changes were simply a result of the need to ensure that the appropriate personnel were assessed by the ATCEB in control positions where there was traffic to control at the time. In all cases however, the controllers concerned undertook their duties in accordance with published orders and there is no indication that the console handovers were rushed or incomplete. Whilst undesirable, the frequency of console changes is not considered to have had an effect on the method of control employed.

It was not until 1016:08 that CEN discovered she was controlling a formation of 2 ac. The method of callsign allocation used by the F15s, where the formation as a whole operates using the callsign of the lead ac (i.e. "[word callsign] 61" is both the callsign of the lead ac *and* the formation) is in common use by the F15 wing; additional elements of the formation are numbered consecutively [word callsign] 62, 63 etc. Whilst it is clear from the RT that the lead F15 pilot also thought his No 2 was at the same level, there is a clear possibility of confusion when a controller issues a control instruction, using the lead ac's callsign, as to whether this also applies to the whole formation. In the past, it was common practice for some controllers, but not a specific requirement, to add the word 'flight' or 'formation' after the lead ac's callsign in order to reinforce the fact that the instruction/message was for all elements; its use however, appears to have reduced over time. Following this Airprox, the JSP318A phraseology entry has been amended and now requires controllers to add a suitable suffix to the callsign, which more clearly reflects the intended recipient(s).

Having discovered that there were 2 F15s at 1016:08, CEN should have informed MID of this fact, in accordance with LJAO Orders (Chap 4 Order 2) and JSP 318A (1514.2.c), when she negotiated the use of FL 110. There were therefore, a number of oversights on behalf of the 3 CEN controllers, which resulted in MID being unaware of the second F15. Placing this in perspective however, the F15s and the B757 were separated horizontally by at least 25 NM at the time CEN became aware of the second ac and 3 min from their tracks merging. With the exception of informing MID that the traffic was a pair in trail, CEN's subsequent controlling actions would not have differed and hence, as the tracks crossed, she and the lead F15 pilot expected both F15s to be level at FL 110. It is considered unlikely therefore, that MID's actions would have been different had he been aware of the second ac as, had there been any further co-ordination, CEN would have confirmed that both F15s were at the same level.

JSP318A (Regulation 1514) stated that a formation was considered to be a single unit for separation purposes provided that all elements were within 1 NM horizontally (laterally and longitudinally) at the same level or altitude. A controller could extend this to 3 NM (horizontally) and/or 1000 ft vertically and additional guidance was provided for controlling formation 'streams' which extend beyond this distance. Whilst specific permission was always required /provided for vertical deviations, controllers tended to regulate the horizontal aspects 'by veto', permitting more than 1 NM spacing in most situations in order to permit the traffic under their control a small degree of flexibility; for example in this case there would be little controlling benefit from 'tightening up' a formation's spacing by only 0.5 NM. On realising that there was a second F15 therefore, CEN saw no reason to require the spacing to be reduced, as the appropriate flight level within the RC was already blocked, and so made no comment on the existing 1.5 NM trail. As is the case with the control of all formation flights, a radar service is provided to the lead ac only with the formation leader being responsible for separation between formation elements.

The second F15 was not allocated an SSR code. The only rule regarding the use of SSR within formations is that, if a formation stream extends for 3 NM or more, the last ac should also squawk and, for longer streams, intermediate ac should squawk as required. CEN's prime considerations however, were the problems associated with SSR label overlap and activation of the STCA; the LJAO norm in this case is only to allocate a second SSR code at the same level when the ac concerned are more than 5 NM apart. With only 1.5 NM between these ac, and with the relatively large (typically 75 NM) radar range scale required to conduct the CEN task, the F15's SSR labels would have overlapped illegibly; and reading the 2nd F15's squawk may have been impossible. A facility to individually rotate SSR labels is available to LJAO controllers within the civil AOR when operating in 'Main Mode', but the process is extremely cumbersome, hence the facility is never used. STCA indications would obviously be a significant distraction to controllers (Civ and LJAO) during any transit of CAS by a formation. If all elements of a formation are actively prevented from being tracked by the LATCC (Civ) system STCA will ignore them, but it can have the effect of 'dimming' the intensity of the SSR returns on the civil controller's displays, giving the impression that the ac are outside CAS.

However, had the second F15 been squawking (with Mode C), the confliction would have been recognised earlier, either visually by the controllers concerned, through the activation of STCA or, at a later stage, by TCAS. The AAIB's Safety Recommendation that all ac should be transponding can only be implemented in the long term. In the short term however, due to equipment limitations at both LATCC and ScATCC, the resultant SSR label clutter and STCA issues have safety implications in their own right. As an interim solution therefore, military formations within CAS are now required to maintain position within 1 NM laterally and longitudinally of each other at the same level or altitude. In addition, the controller will be required to obtain confirmation that all elements are at the assigned level prior to entering, and following any level change within, CAS. Formations unable to comply with these regulations will be split into elements, separated by the prescribed ATC separation minima, and individual squawks allocated. The interim measures, effective from

15 Jan 01, are subject to specific review by the RAF Inspectorate of Flight Safety and will be critically assessed before being implemented on a permanent basis.

AAIB investigated the Airprox and concluded that it was caused when the second F15 crew missed the radio call instructing the formation to climb to FL 110 and as a result separation on the B757 at FL 100 was lost. The LJAO controller was operating in accordance with JSP 318A procedures by not allocating the No 2 F15 a squawk. However, as a result of the ac not squawking, the automatic alerting and collision avoidance systems provided by STCA and TCAS were rendered ineffective and neither the LJAO controller nor MID were able to detect that the No 2 ac had not climbed. If the No 2 ac had been squawking it is unlikely that the Airprox would have occurred.

AAIB therefore recommended that in order for STCA and TCAS to be able to alert pilots and controllers to the possibility of mid-air collisions it is essential that all conflicting ac should be transmitting SSR information. Transponding ac in formation will trigger unnecessary STCAs due to the proximity of their SSR returns, and specific procedures are needed to overcome this. Since this Airprox could have been averted if both ac in the formation had been 'squawking', AAIB has recommended that the CAA and NATS should, without delay, implement procedures by which the safety assurance based on the use of SSR is established for ac operating in formation.

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, a report from the AAIB and reports from the appropriate ATC and operating authorities.

It was clear to members that the Airprox contained a very high risk of collision. All the safety factors designed to prevent such an occurrence had been rendered inactive by SSR procedures and IMC, and the fact that the ac missed was purely by chance. The Board agreed that the cause of the incident was that the No 2 F15 crew did not climb to their cleared level, having not heard the instruction to

climb to FL 110. Members discussed this fact at length as there was more to it than someone simply not hearing something. There were 2 pilots in the No 2 F15; neither heard the climb instruction, nor hearkened to their leader's acknowledgement of it, nor to the subsequent traffic information about the B757 at FL 100. The Board was advised that the senior status of the No 2 rear seat pilot may have led the formation leader to be reluctant to question whether the No 2 had heard the message. Pilot members believed there was a clear duty of a formation leader to ensure his formation followed ATC instructions, and were advised that an instruction to that effect had been issued to the F15 wing shortly after the incident.

The Board agreed that the way of addressing F15 formations, by the leader's call sign without the word 'flight' or 'formation', left open the possibility of misinterpretation, at least subconsciously, by other formation members as to whether an incoming instruction was relevant to them. This had been dealt with by modifications to controller orders. Members agreed that in this incident when about to cross Class A airspace, all formation members should have been highly alert to anything said by the controller as a first priority; the Board could only conjecture about what was going on in the No 2's cockpit to break that concentration.

Members supported the AAIB recommendation concerning the primacy of SSR in controlled airspace and were advised on progress since the recommendation was made. Unfortunately current ATC equipment was incompatible with the aim for all formation members to squawk. While label clutter could be overcome, it was not a problem for TCAS which should still alert pilots to conflicts. However, there was a continuing problem caused by the garbling of SSR emissions from adjacent sources which caused ATC radar processors and TCAS to present incorrect information to controllers and pilots. NATS was continuing to research the problem, and members were advised that Mode S, when introduced, would overcome it.

The Board was not convinced that the revised instructions to formations as to how to dispose themselves while crossing CAS in IMC were significantly different to the situation pertaining at

the time of the incident. ATC members considered that formation elements should be in close formation and elements be spaced from each other sufficiently to permit each element to squawk. It was agreed however that new measures to ensure that controllers knew the level of all formation members were likely to be more fruitful. These measures were either to interrogate individual formations directly, or to instruct formation leaders, when being controlled as a single speaking unit, to ensure that all elements are at the assigned level prior to reporting to ATC.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The No 2 F15 crew did not climb to their cleared level.

Degree of Risk: A

Recommendation: The UKAB supports the conclusions reached by the AAIB and asks the CAA and the MOD to consider the following the following for action:

- a. Military and civil aircraft should each transmit SSR information, particularly in controlled airspace, to enable STCA and/or TCAS equipment to warn controllers and pilots of conflicting flight paths that hold the potential for a mid-air collision.
- b. Introduce procedures that provide safety assurance, based on the use of SSR, for aircraft operating in formation.
- c. Introduce specific procedures that prevent transponding aircraft, flying in formation in controlled airspace, from triggering unnecessary STCA warnings owing to the proximity of their SSR returns.

Additionally, it is recognised that a full technological answer to resolve all the problems involved may be some way off. Therefore, the UKAB supports strongly any interim solution on procedures for aircraft formations flying in controlled airspace under radar control that *ensures both the controller and the formation leader knows jointly the height or flight level of each aircraft within that formation.*

AIRPROX REPORT No 193/00

Date/Time: 23 Nov 1424

Position: 5353 N 0312 W (18 NM SE of Ronaldsway)

Airspace: CTA (Class: D)

Reporting Aircraft Reported Aircraft

Type: ATP Tornado F3

Operator: CAT DPA

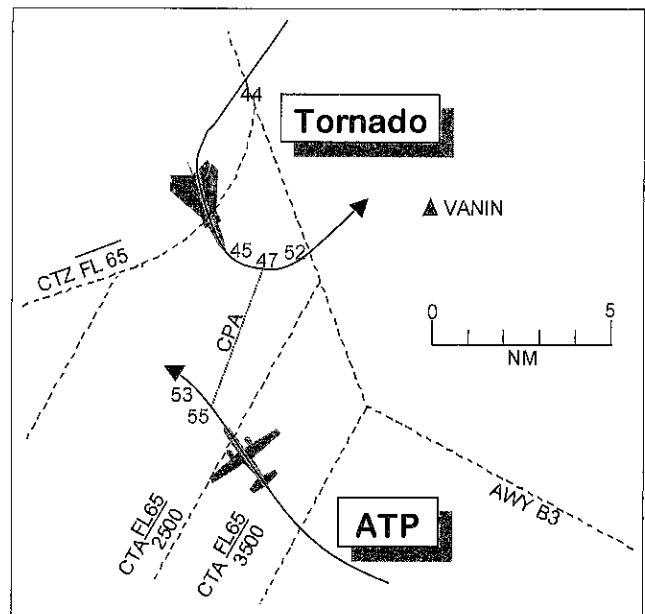
Alt/FL: 5000 ft NK
(QNH 997 mb) (QNH 997 mb)

Weather VMC CLAC VMC

Visibility: 40 km

Reported Separation: 4 NM/NK

Recorded Separation: 4 NM, 800 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATP PILOT reports heading 325° at 215 kt in descent for Ronaldsway when ATC advised of unknown traffic out to the right. A return was seen on TCAS which became a TA at about the same level. PF turned left about 5°, being visual with the airfield and PNF saw the ac which looked like a Hawk at 3 o'clock about 4 NM away on TCAS. ATC advised that the unknown ac had infringed the IOM CTA and was not on an IOM frequency.

THE TORNADO F3 PILOT reports flying a GPWS trial from Warton which required manoeuvring in VMC. There was a lot of cloud over Morecambe Bay and a small suitable area was found adjacent to the IOM Zone. He was receiving a RIS from Warton and the controller advised him not to go any further W below FL 65 just before the incident. While the controller was busy with another ac he continued with the trial in airspace he believed to be clear of the Zone. Subsequently the controller told him to head E to exit the Zone, and later ATC advised that he had flown 2-3 NM inside Class D airspace. He had been VMC throughout and saw no other ac.

UKAB Note: LATCC radar recordings show the Tornado in a left climbing turn through SE and FL 47 as it passes 4 NM from the ATP which was descending through FL 55. The Tornado is about 3 NM inside the IOM CTA when it passes the ATP.

THE RONALDSWAY APR reports, with RT transcript, that when the ATP was transferred from Manchester he put it on a radar heading of 330° for an approach to RW 26 and to separate it from traffic departing and turning left onto 140°. Having cleared it for a visual approach (but to stay on 330° due to the outbound traffic) he advised the pilot of Warton traffic "it's well inside the Zone at the moment off to your right . . . I'm not entirely sure of his intentions but I'll give you avoiding action if necessary". Some 90 seconds later APR noticed that the ATP appeared to have turned left somewhat; when asked about this, the pilot advised he had come about 5° L having had a traffic warning on TCAS, but had not told the controller. APR said that was the previously mentioned traffic and repeated that there was traffic on his left and to turn no further left. In a later conversation with the

pilot the latter explained that he had seen what he thought was a Hawk in conflict at the same level and had judged a turn to be the correct action.

WARTON ATC reports, with RT transcript, that the area controller was providing a service to a Hawk at FL 300 and the Tornado which was manoeuvring between 15000 ft and 1000 ft. The Tornado pilot found the only suitable weather for his trial was the area just E of the Ronaldsway Zone in the area of reporting point VANIN (ADR W2D). When the Tornado's manoeuvring brought it close to the Zone he advised the pilot not to go below FL 65 on a westerly heading. Whilst he was talking to the Hawk pilot, the Tornado turned into the IOM CTZ, heading for a Ronaldsway inbound, and he instructed the pilot to head E as the Ronaldsway controller contacted him to complain. The pilot said that was the only area of suitable weather; the controller considered arranging for the pilot to work IOM but then advised that there would be no point as the Zone was busy with IOM traffic. The pilot continued searching for suitable weather, in the process receiving more warnings from ATC about the Zone and other traffic, and advice that an Airprox was being filed by IOM traffic.

DPA comments that this Airprox reveals a number of factors which, as in any incident, in isolation are not the cause. One is the small number of appropriate areas of airspace within the UK to conduct the necessary trials work that the DERA is required to undertake. That said, having located a suitable area, it is the responsibility of the aircrew to ensure that operations take 'due regard' of the limitations of the surrounding airspace and the effect the weather might have on the ability to discharge that responsibility. Sensibly electing to obtain a radar service from an appropriate ATSU it behoves acceptance of the instructions (and/or advice) issued by that unit. This kind of flying operation always demands good 'look-out' and awareness of the proximity of controlled airspace. The crew appear to have allowed themselves to become very 'task-oriented' and thus the emphasis

in respect of all of the foregoing seems to have shifted in the wrong direction. The re-educative action taken by Wg Cdr Flying is commended and as usual this Directorate will publicise events of this nature in an effort to reduce this type of 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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Members were disappointed that the Tornado pilot had made this penetration of Class D airspace and continued thereafter to require near continuous warnings and instructions from the Warton controller to remain clear of it. Members questioned further the 'limited airspace' point for such trials made by DPA, who explained that full telemetry was required for this type of flying and the areas covered by this were indeed very limited.

With the advantage of all the information presented, the Board considered that this incident was improperly filed as an Airprox; while there was indeed an infringement of airspace, this would more properly have been the matter of an infringement report or MOR which would have been dealt with in exactly the same way. Members agreed there was not the slightest chance of a collision and noted that the Tornado passed so far away from the ATP that its crew were unable to recognise it.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report following an unauthorised penetration of Class D airspace by the Tornado.

Degree of Risk: C

AIRPROX REPORT No 195/00

Date/Time: 17 Nov 1115

Position: 5347N 0036 E (080° OTR 25 NM)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Fokker 50 Harrier

Operator: CAT HQ STC

Alt/FL: FL 210 ↑ ↑FL 240

Weather VMC CLOC VMC CLOC

Visibility: >10 km 30 km

Reported Separation:

400 ft V, <1 NM H Not seen

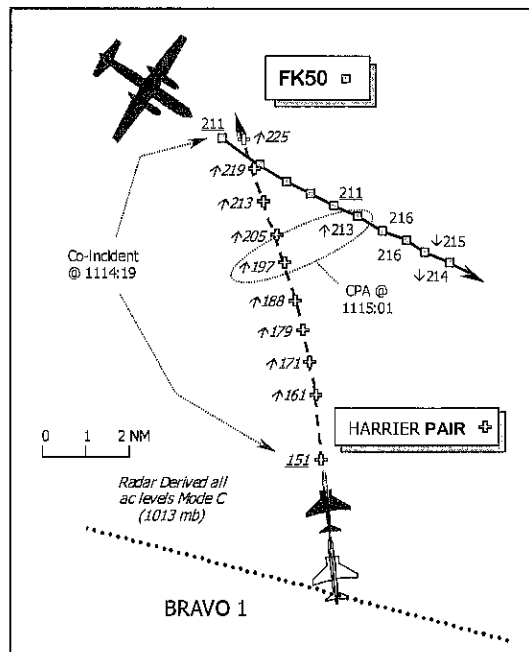
Recorded Separation: 1600 ft V, 2 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FOKKER (FK) 50 PILOT reports he had departed from Teesside outbound to Amsterdam and was under a RAS from Pennine RADAR at FL 210, to join CAS at DOGGA, squawking the assigned code with Mode C.

Flying at 195 kt, at a position 132° NCL 118 NM DME heading 130°, a TCAS TA was enunciated, which was followed immediately by a "Climb" RA that was complied with by the First Officer, the PF. Another ac (possibly two) was shown on TCAS 3000 ft below them and less than 5 NM ahead of his ac. Simultaneously, ATC reported the traffic but by this time they were following the RA and advised the controller accordingly. During this period the workload was high and the ATC RT messages became "blocked" by the TCAS audio.

He estimated from the TCAS display that the other ac closed within 1 NM, 3-400 ft below his ac, before clearing astern. They climbed about 500 ft above their assigned level to FL 215 before TCAS enunciated "clear of conflict", whereupon he advised ATC they were returning to FL 210. The whole event happened in less than 15 sec from the first TA to "clear of conflict" and the speed of the encounter made him think that they were probably high-speed military ac, but they were not seen.



THE HARRIER PILOT reports he was leading a pair of camouflage grey Harriers 300 yd apart, flying in-line astern after departure from Holbeach Range climbing to FL 290. HISLs are not fitted. At the time of the Airprox report they were heading 340° at 300 kt under a RIS from London RADAR, flying out of sun in VMC, with an in-flight visibility of 30 km and clear of cloud. The FK50 was not seen by either of the Harrier pilots who were unaware of any collision risk and, he thought, that they had not been informed about the ac flown by the reporting pilot.

ATSI reports with RT transcript, that the Pennine RADAR Controller was providing a RAS to the FK50 on track to join CAS at DOGGA at FL 210. The frequency was very quiet. He observed military traffic, crossing Airway B1 northbound, at FL 150. The radar recording shows the Harrier pair crossing the northern edge of the airway at FL 150 at 1113:43, 13 NM SSE of the FK50. They start to climb at 1114:23. By the time the controller noticed the conflict, some 20 seconds later, the Harrier pair was passing FL 180.

Three transmissions of traffic information were passed to the FK50 crew by Pennine RADAR about other traffic, before 1114:50, when the controller

transmitted "... just picking up military traffic currently in your half past two position range of about 3 miles showing Flight Level 180 northbound". The FK50 crew responded "copied...at the moment we've got TCAS climb", which the controller acknowledged. Ten seconds later Pennine RADAR reported "traffic now passing behind you range of 2 miles", whereupon the crew advised they were now "...clear of conflict returning back to Flight Level 210".

As the controller was providing a RAS to the FK50 crew, he should have given the flight avoiding action instructions. MATS Part 1, Page 1-41, states that:

"Controllers shall pass avoiding action instructions to resolve a conflict with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5 NM or 5000 ft [Mode C] (now 3000ft) except when specified otherwise by the Authority. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft make unpredictable changes in flight path, it is not always possible to achieve these minima".

The controller's initial reaction was to pass traffic information (at a range of 3 NM), but before any avoiding action could be issued, the FK50 pilot reported climbing in response to a TCAS alert.

MIL ATC OPS reports that the Harrier pair was tracking N at FL 150 under the control of LONDON MILITARY Controller 11 (CON11) and just after clearing the northern edge of Airway B1 was placed under a RIS. At 1113:56, in acknowledgement, the leader transmitted "Radar Information ... looking for a climb to Flight Level 330, to transit to low level in the Wick area." CON11 responded, "... roger, climb initially Flight Level 240, traffic twelve o'clock, 8 miles left right, indicating Flight Level 210." and the leader acknowledged "Two four zero, C/S." The subject of the traffic information was the FK50. The next transmission occurred about 1½ min later, as the Harrier leader advised that they were approaching FL 240 and requested a higher level. CON11 instructed the Harrier pilots to maintain FL 240 due to conflicting traffic on Upper ATS Route UL602.

The LATCC radar recording shows the Harrier pair, squawking 3/A 6117 tracking 355° through BRAVO1 at FL 151 Mode C, whilst the FK50, squawking 6312 can be seen tracking 120° at FL 211 Mode C. At 1113:42, as the Harriers exited BRAVO1, the FK50 is shown 335° - 13 NM from the Harriers and 20°L of their track. At 1114:06, about the time that CON11 instructed the Harriers to climb to FL 240, the FK50 is 15°L of track at 10.6 NM and still indicating FL 211 Mode C. The Harriers appear to turn slightly L at 1114:45, as they pass FL 179 Mode C in the climb, with the FK50 due N at 3.4 NM. The CPA occurred as the FK50 climbed through FL 213 in response to the RA at 1115:01, at which point the Harriers are passing FL 197, at 4 o'clock - 2 NM, 1600 ft below the FK50. In the previous radar sweep, the Harriers are 3 o'clock - 2.5 NM and passing FL 188 some 2300 ft below the FK50. The Harriers pass through the FK50's 5 o'clock - 2.5 NM as it reaches a maximum level of FL 216. The lead Harrier's Mode C indicates an initial ROC of 4500 ft/min up to FL 180, rising to about 6700 ft/min thereafter.

The investigation of this Airprox was severely hampered by late notification from the FK50 pilot as no Airprox report was made on RT. London RADAR first became aware of the Airprox on 4 Dec 00, 17 days after the incident, following receipt of the Harrier leader's signalled report that he had been receiving an ATS from London RADAR. Therefore, the controller concerned could not recollect the event and could not account for his actions. On the face of it, with a CPA of about 2 NM astern and 1600 ft below the FK50, whilst under a RIS in Class G airspace, there appears to be little to comment upon. Especially as reasonably accurate traffic information had been provided to the Harrier pilots.

Although not a contributory factor to the Airprox, it is also evident from the RT transcript that the controller imposed a RIS on the formation pilots after leaving CAS, rather than establishing their requirements. By providing traffic information on the FK50, CON11 had technically fulfilled his remit in providing the RIS, though he had passed the climb instruction first to climb through the level of the FK50.

There were clearly a number of better ways to have conducted the climb of the Harriers. The potential for conflict was evident to CON11, hence the controller's initial call, (which was rather 'mechanical' as opposed to 'thoughtful'). Issuing the clearance to climb before passing the traffic information was not a sensible move and in so doing, the controller was inviting trouble. Passing the traffic information before the climb instruction, or climbing to a level below the conflicting ac, passing traffic information and awaiting confirmation of visual acquisition, may have provided the Harrier pilots with a better alert whilst still achieving the aim of an expeditious climb. Indeed, had the Harrier pilots advised of their requirement to climb earlier (they had been level at FL 150 for 15 NM [about 2min] prior to the request), this could also have been easily accommodated, as the Airway was clear of conflicting traffic.

HQ STC comments that both ATSI and Mil ATC Ops suggest that the respective controllers could have been more proactive, given the radar picture available to them and the clear potential for conflict. That said, the traffic information passed by LATCC (Mil) CON11 to the Harrier pilots should have alerted them to the confliction, thus their decision to initiate the climb at that point may not have been the most appropriate.

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 ATSI adviser postulated that the Harriers climbed so fast that the Pennine RADAR controller could do little to prevent the erosion of separation and passed traffic information without the avoiding action required under the RAS. Some controller members thought the Pennine controller should have been able to spot the potential confliction with the Harriers when they started to climb after crossing CAS. With this in mind some thought that co-ordination with CON 11 might have been appropriate, in view of the apparent low workload

of the Pennine RADAR controller at the time. However, other members thought that the speed of the Harriers' climb precluded any constructive action by the Pennine RADAR controller other than traffic information. They argued that the Harriers had passed FL 160 climbing rapidly only 30 sec before the Airprox leaving little time for the Pennine RADAR controller either to appreciate that they were now climbing into conflict with his traffic, or to contact CON11. An avoiding action turn was feasible but would not have achieved significantly greater horizontal separation and would probably not have prevented the TCAS RA. Moreover, the FK50 crew's report of them following a TCAS RA probably would have nullified any further action by the controller. As mentioned by Mil ATC Ops in their thorough account, CON11 could with the pilot's agreement feasibly have stopped the Harrier's climb at FL 200, 1000 ft below the FK50's assigned level. Though here CON11 may have concluded that the Harriers would pass safely further astern of the FK50 than they did and felt, perhaps unwisely, that there was no need to co-ordinate with the FK50's controller. Controller members opined that co-ordination was still a sensible option in many instances when providing a RIS, as here.

Several CAT pilot members opined it was the Harriers' very high ROC that had triggered the TCAS RA, which even a level-off might not have prevented. A controller member thought that there was a learning point here for all commercial pilots who transit Class G airspace, insofar as military traffic will be encountered climbing rapidly in the FIR quite legitimately – this could undoubtedly result in TCAS RAs for which controller and pilots alike must be prepared. Similarly, military crews should be prepared for the likelihood of Airprox being filed by commercial pilots when the former conduct high-energy climbs below, or in the vicinity of, TCAS equipped airliners rather than giving them a wider berth.

It was apparent that the Harriers were tracking clear astern of the FK50 with a discernible, albeit small, L turn after they passed FL 170. Though this turn might be purely coincidental, the RT transcript revealed the military pilots were mistaken in their belief that traffic information had not been given about the FK50. This part of the transmission might not have been absorbed, but in any case controller members agreed that CON11 should have given

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MACC STAFA RADAR CONTROLLER reports that the B757 was given a direct routing from A25 to DAYNE and step descent clearance to FL 80. The MD88, on initial contact, was given “no ATC speed restriction” and climb clearance to FL 70. As the MD88 approached CONGA, the Short Term Conflict Alert (STCA) activated and he instructed the pilot to maintain FL 70 which he acknowledged. His Co-ordinator then observed the MD88 had continued its climb through FL 70 and reached FL 77. He gave an avoiding action instruction to descend to FL 70. The B757 pilot then informed him of a TCAS RA climb to which he then passed traffic information in reply. After he had passed clear of the MD88 descent clearance to FL 70 was then given to the B757. The MD88 pilot reported being visual with the B757 throughout the incident.

THE B757 PILOT reports inbound to Manchester routing direct to DAYNE maintaining FL 80 at 240 kt. The visibility was 10 km in VMC although there were scattered CBs in the area. When approx. 15 NM from DAYNE, he received a TCAS RA climb on crossing traffic with which he complied; the ac was levelled off at FL 88. Whilst complying with TCAS he saw the conflicting ac visually (range 5 km) and it passed 0.5 NM ahead and 300 ft below. He assessed the risk of collision as potentially high if he had not carried TCAS but stated that compliance with the TCAS RA removed such risk.

THE MD88 PILOT reports climbing en route to Barcelona from Manchester to FL 70 at 250 kt. On levelling off, approx. 10 NM S of MCT VOR, he received a TCAS TA “traffic...traffic”; both he and his co pilot focused their attention on trying to observe and avoid the conflicting traffic, a B757, which passed 4 NM away and 500 ft above. He then noticed that the altimeter sub scale was still set on QNH 990 mb instead of 1013.2 mb and that they were flying erroneously at FL 76. Coincidentally, ATC issued avoiding action descent instructions to FL 70 with which he complied. He apologised to ATC that he had not performed the after take off procedures checklist correctly (i.e. change of altimeter setting when crossing the transition level). He assessed that there was no risk of collision.

ATSI comments that the MACC STAFA Radar Controller cleared the MD88 pilot to climb to FL 70 and the pilot read back the instruction clearly and correctly. The controller, subsequently, reiterated the clearance by instructing the pilot to maintain FL 70 on reaching. When the pilot of the B757 reported climbing in reaction to a TCAS alert, the Radar Controller reacted immediately and effectively by passing the MD88 pilot an avoiding action descent clearance.

UKAB Note: Analysis of the Clee Hill, Gt Dun Fell and Claxby radars at 1252:02 shows the MD88 passing FL 57 abeam LOVEL tracking 160° with the B757 7.3 NM WSW of CONGA tracking 055° maintaining FL 80. At 1253:00 the B757 is 2.5 NM W of CONGA whilst the MD88 is in his 11 o'clock range 3 NM passing FL 71. The point of closest approach occurs 16 seconds later; the B757 having commenced a climb passing FL 82 with the MD88 in his 11 o'clock range 0.6 NM crossing L to R at FL 76.

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 were impressed by the MACC controller who had reacted well, by giving the MD88 pilot an avoiding action descent after the B757 pilot had reported climbing with a TCAS RA. There was no doubt that the incident had been caused by the MD88 crew climbing above their cleared level whilst using the wrong altimeter setting. Pilot members discussed the cockpit procedures that normally would be used during the en route climb sector of a flight. Even though the Manchester Transition Altitude (TA) was 5000 ft, some companies required their pilots to change the altimeter sub scale to 1013 when cleared to a FL even if the ac was still below the TA. The only exception to this would be when a pilot was asked to report passing an altitude whilst climbing. It was not known precisely what SOP the company in question used but members noted that the MD88 crew had not completed their ‘after take-off’ checklist (set 1013.2 mb on passing the

TA). The Board reflected on the MD88 pilot's reported separation of 4 NM whereas the recorded minimum was 0.4 NM (there were no other ac crossing the area at the time of the incident) and that difference remained unresolved. In assessing the risk element, members noted that the MACC controller had issued avoiding action instructions to the MD88 when the B757 pilots had reported a TCAS RA climb. Moreover, the MD88 crew had watched the crossing B757 throughout the incident. These points led the Board to conclude that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MD88 crew climbed above their cleared level whilst using the wrong altimeter setting.

Degree of Risk: C

AIRPROX REPORT No 197/00

Date/Time: 8 Nov 1631

Position: 5123 N 0249 W (4.5 NM W of Bristol Apt - elev 622 ft)

Airspace: CTZ (Class: D)

Reporting Aircraft Reported Aircraft

Type: F50 PA42 Cheyenne III

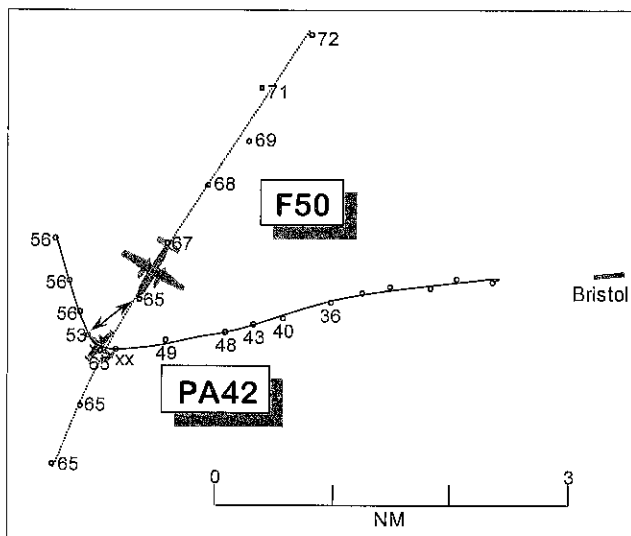
Operator: CAT Civ Comm

Alt/FL: ↓ FL 60 ↑ FL 50

Weather IMC CLBL VMC

Reported Separation: 800 ft NK

Recorded Separation: 900 ft 1 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports heading 220° and cleared by Bristol ATC to descend to FL 60 during a descent into Cardiff. He was given traffic information on an ac departing RW 27 at Bristol and cleared to climb to FL 50; because he was IMC he did not expect to see it but anticipated its appearance on TCAS. Shortly afterwards it appeared, produced a TA and soon afterwards an RA - Monitor VS, less than 700 ft/min. He levelled at FL 65 and the other ac passed

800 ft below on TCAS as he received the RA, however, no significant further manoeuvre was required. He filed the Airprox by telephone after landing.

He later explained that he had filed the Airprox because he considered that vertical separation was very important and that close attention should be paid to any breaches. In this case the traffic departing Bristol initially reported "climbing 5000

ft". The transition level at Bristol is 3000 ft and the QNH was 992 mb; the controller appeared not to notice the danger in this transmission although he then cleared the ac to FL 50. Without TCAS he would have flown to within 400 ft of the other ac, the incident would not have been detected, and no investigation or improvement to flight safety would have occurred.

THE PA42 PILOT is based outside the UK. When traced, he could remember nothing of significance about the sortie.

ATSI reports that it would appear that the PA42 pilot did not set the standard pressure setting when climbing to FL 50. Transition altitude at Bristol is 3000 ft. The pilot's initial call was climbing to 5000 ft. It is the Approach Radar Controller's responsibility to verify the accuracy of Mode C data, once the ac has been identified, by checking that the readout indicates 200 ft or less from the level reported by the pilot. If the ac is climbing or descending, the pilot is to be instructed to give a precise report as the aircraft passes through a level. Accordingly, at 1630:37, the APR asked the pilot his passing level. The pilot responded "four thousand" and was instructed to maintain FL 50 on reaching. This latter instruction was read back by the pilot. The radar recording, timed at 1630:38, shows the PA42 at FL 46. This, therefore, did not correlate with the pilot's report and should have been challenged by the APR. The APR did not realise the potential for conflict and took no action to prevent the loss of separation.

UKAB Note: LATCC radar recordings show the incident as described by the F50 pilot. The Cheyenne pilot was climbing at 2400 ft/min, was passing FL 46 when he replied "passing four thousand" after which he was told to maintain FL 50 on reaching. Some 16 seconds later he passed ahead of and below the F50, Mode C not showing but between readings of FL 49 and 53, and stopped his climb at FL 56 after the F50 had passed his position.

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 frequency, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities. Members agreed that the cause of the incident was that the PA42 pilot climbed above his cleared level. He was based in a country where the transition altitude is (generally) 5000 ft amsl, and it appeared from his RT calls and Mode C readings that he had probably not set his altimeter to standard pressure on passing the Bristol TA of 3000 ft. He had also not absorbed the import of the controller's remarks: "*report your passing level*" and "*maintain **Flight Level 50 on reaching***". However, the F50 pilot had taken all this in, and members commented favourably on his awareness and airmanship; his understanding of the situation and response to TCAS had removed any risk of collision from the situation. ATC members of the Board agreed with ATSI that, in view of the PA42 pilot's initial call "*climbing five thousand feet*", and because time was short and the F50 was conflicting, it would have been good controller practice to have told the pilot directly to set 1013 mb and maintain FL 50 on reaching.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA42 pilot climbed above his cleared level.

Degree of Risk: C

AIRPROX REPORT No 198/00

Date/Time: 29 Nov 1116

Position: 5231 N 0022 W (7 NM SE of Wittering)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR Cessna 172

Operator: HQ STC Civ Trg

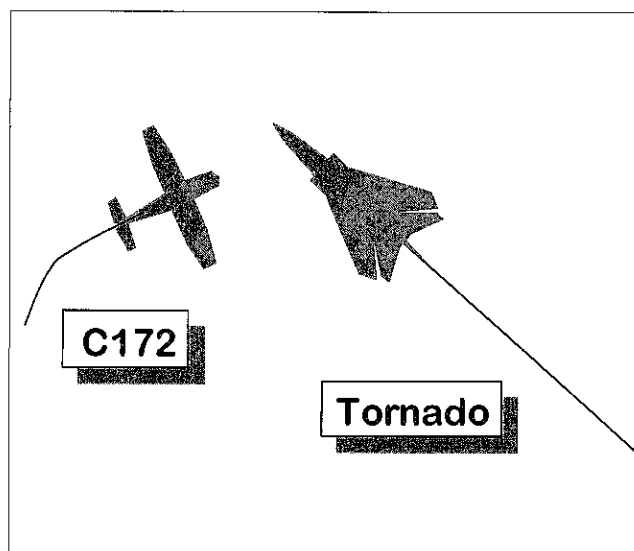
Alt/FL: FL 50 5000 + ft (QNH)

Weather: VMC CLBC VMC CLBL

Visibility: 10 km+ 10 km

Reported Separation: 100 ft V
200 ft H/200 m

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 310° at 450 kt having rolled out of a navigation turn when his navigator shouted "Push down". He did so and a Cessna, white with red stripes, passed about 100 ft away and above, without deviating. He had not seen it approaching from behind the canopy arch, and the risk of collision was high.

THE CESSNA 172 PILOT reports heading 120° at 100 kt on an IF training sortie with IF screens up which slightly impaired vision. He saw a Tornado closing from his 1 o'clock which passed 200 m away to his left, in a descent, before he could react. It departed in his 7:30. He considered that if the Tornado pilot had seen him there was no problem, and the risk of collision was low, but there had been no time for him to take any avoiding action.

MIL ATC OPS reports that events in the tape transcript are timed about 2 minutes 30 seconds ahead of when they are observed on the radar recording. The C172 pilot was receiving a FIS from Cottesmore Zone (ZONE) on frequency 130.2 whilst operating in a block between 2000 and 7000 ft (RPS 985 mb), about 5 NM S of Sibson. Zone had a moderate workload, monitoring both UHF and VHF frequencies, and both primary and

secondary radar systems were serviceable. After the initial contact at 1049:17, there were no transmissions made between the C172 pilot and ZONE for over 26 minutes. At 1115:53, ZONE transmitted "C/S, traffic south-east 2 miles, crossing right left, indicating similar altitude, fast moving"; the C172 pilot acknowledged the call and then reported visual with the conflicting traffic. At 1127:38, the C172 pilot reported complete and advised ZONE that he was returning to Sibson; he left the frequency at 1127:46 without further comment.

The radar recording shows the C172 manoeuvring in the vicinity of Sibson within the altitude block that was passed to ZONE. At 1115:53, the time of ZONE's traffic information, the C172 is tracking 020° squawking 4640 indicating FL 54, whilst the Tornado is 3 NM south-east tracking 315°, squawking 7000 indicating FL 51. The Tornado had performed a very wide right turn of 38 sec duration but had been on a steady track for some 20 sec before the Airprox. The Cessna starts a descending turn to the R onto 057° some 18 sec before the Airprox and steadies as the 2 radar returns merge 3 NM SSE of Sibson, with the C172 indicating FL 52 and the Tornado indicating FL 51, 50 on the next return. Under the conditions of FIS (JSP 318A 1506), controllers are not responsible for the separation or sequencing of ac; however,

Cottesmore's Local ATC Orders make provision for the congested airspace in their vicinity and controllers are required to pass traffic information to FIS ac when conflictors pass closely (1 NM/1000 ft), workload permitting. In this instance, ZONE passed both timely and accurate traffic information which resulted with the C172 pilot gaining a visual acquisition on the Tornado.

HQ STC comments that although the Tornado had been receiving a RIS earlier in the sortie, the level of RT traffic on the frequency was preventing the crew from communicating with each other effectively and they had hence elected to operate on a quiet frequency. The limitations of the Tornado canopy are well documented, but it remains a cause for considerable concern that the Tornado pilot did not see the other ac in time to avoid a potential collision. Yet again, the value of a technology-based collision warning system has been highlighted.

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 agreed that the crews of both ac were responsible for seeing and avoiding conflicts. The Tornado navigator was to be commended for spotting and reacting appropriately to the traffic but this was still a late sighting by the Tornado crew and the Board agreed that this was part of the cause of the Airprox. Members all agreed that fast jet crews, notwithstanding their exemption from the

250 kt below FL 100 rule, had a responsibility under VFR to see other more vulnerable ac in time to avoid them safely, and in most cockpits this required continuous, careful head movement to clear the areas behind windscreen and canopy arches.

The Cessna pilot's IF screens, it was considered, were a possible problem to his left, but not to the right whence the Tornado approached. The radar recording showed the Tornado approaching in the Cessna's 4 o'clock before the latter's right turn. In that position, GA members felt it could have been spotted in the careful lookout the pilot would have made before turning right. Once in the turn, with the right wing down, he would have been unable to see in the direction of the Tornado's approach and it appeared from the radar recording that the Airprox occurred very soon after roll-out. It was not possible to say, because of the discrepancy in recorder timings, when the traffic information was passed by Zone relative to this turn. It was a fact however that the Cessna pilot had not seen the Tornado in time to take avoiding action, and the Board concluded that this was also part of the cause of the Airprox. The Cessna pilot had considered the risk to be low if the Tornado pilot had seen him; however the Tornado pilot had not seen the Cessna until the last moment, and considered the risk of collision to be high. Members concluded that there had been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the crews of both ac.

Degree of Risk: A

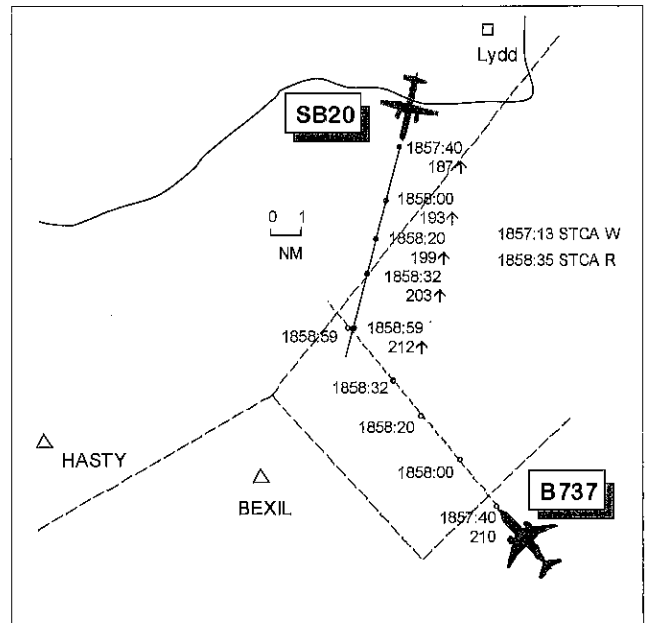
AIRPROX REPORT No 199/00

Date/Time: 4 Dec 1859 NIGHT
Position: 5047 N 0049 E (6 NM NE BEXIL)
Airspace: CTA (Class: A)
Reporting Aircraft Reported Aircraft
Type: SAAB 2000 B737-500
Operator: CAT CAT
Alt/FL: ↑FL 220 FL 210
Weather VMC CLOC VMC CAVOK
Visibility: >10 km 50 km
Reporting Separation:
300 ft V, 300 m H <500 ft V, 50 m H
Recorded Separation: 200 ft V, 0.2 NM H

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 2000 PILOT reports flying outbound from London City climbing at 240 kt. The visibility was >10 km in VMC at night and he was receiving an Area Control Service from London on frequency 128.42 MHz. After initially following a LYD 3T SID to DET VOR, he was issued a radar heading of 205° and was cleared to climb to FL 220, he thought. On passing FL 213, with a rate of climb 800 ft/min, he noticed the headlights of another ac on his LHS which then passed 300 m ahead, L to R, and 300 ft below. It was the B737. He assessed the risk of collision as high and was able to identify the ac's airline from its colour scheme. No avoiding action was taken as he had seen the other ac very late. He also stated that he had kept his landing lights on because the LTMA was busy with traffic; he had only seen the B737 when its crew switched their headlights on just before crossing ahead. He thought there had been an error by London Control who had not passed any avoiding action heading or traffic information and he also believed that if TCAS had been fitted it would have assisted in preventing this incident.



UKAB Note (1): Rate of climb for the SB20 until the time of the Airprox was measured at 2000 ft/min.

THE B737 PILOT reports inbound to London Heathrow heading 320° at 280 kt and level at FL 210 approx. 20 NM S of TIGER. The visibility was 50 km in CAVOK and he was receiving an Area Control Service from LATCC on 128.42 MHz. He saw an ac in his 1 o'clock, estimated range 5 NM; its port navigation light remained on a constant bearing and it appeared to be flying at about FL 210. He selected his landing lights on as the other ac moved to his 2 o'clock position and continued to converge. London ATC then issued traffic information on "ac, 12 o'clock, 300 ft below". Both he and his co-pilot urgently scanned the 12 o'clock position whilst continuing to monitor the previously observed conflicting ac, whose landing lights were on; it was seen to pass <500 ft above and 50 m behind them. No avoiding action was taken as he had kept the subject ac in sight and had received traffic information from LATCC; he assessed the risk of collision as medium to high. He stated that had his ac been TCAS equipped, he could have monitored the developing confliction and taken timely and appropriate avoiding action.

ATCI LATCC reports the Airprox occurred 6 NM NE of the BEXIL intersection at 1859 UTC. The Sector 16/17 (DOVER/LYDD) Sector Controller (SC) was acting as a mentor to a controller under training. Traffic loading was reported as light and Sectors 16 and 17 were being operated in a combined configuration (bandboxed); all facilities were reported as serviceable.

The B737 crew established contact with the sector at 1849, reporting level at FL 270 and were cleared direct to TIGER for a BIG 3B arrival for Heathrow. Subsequently, the B737 was cleared to descend to FL 210. The SB20 crew established contact with the sector at 1854, reporting at FL 140 on course to LYDD; they were then instructed to continue on their present heading and to climb to FL 200. The SB20 crew clearly and accurately acknowledged this instruction and, one minute later, they were instructed to fly a heading of 190°. This instruction was again accurately acknowledged as was a further R turn on to a heading of 205°.

The SB20 continued its climb through FL 200 at 1858:25 and at this point the B737 was in its 10 o'clock at a range of 5.3 NM, crossing from L to R, and 900 ft above. The AC Short Term Conflict Alert (STCA) had activated earlier at 1857:13, but this would have been in accordance with the parameters of the equipment. At the time of first activation the B737 was in descent to FL 210, with the climbing SB20 passing FL 178. However, there was no reason to believe the SB20 would climb above its cleared level and this 'routine' alert may have delayed the recognition of the confliction.

The SC trainee continued with other sector tasks, in particular the monitoring of another ac inbound to Stansted that was not descending at a rate compliant with its descent clearance. By 1858:32 the SC trainee had observed the SB20 climbing through FL 203 and instructed the crew to descend to FL 200. The term 'avoiding action' was not used and neither was traffic information issued. The SB20 pilots replied "*two zero zero, ac c/s*". The subject ac were 4.3 NM apart at this point. The mentor quickly took control of the frequency advising the B737 crew of traffic in their 12 o'clock, 300 ft below; they replied that they were looking but had just seen an ac flash behind.

UKAB Note (2): Replays of the Heathrow and Pease Pottage radars at 1858:56 shows the SB20 at FL 211 with the B737 in its 12 o'clock at a range of 0.5 NM. The CPA occurs at 1858:59 when the SB20 was on the B737's RHS and passing behind by 0.2 NM and 200 ft above. Standard vertical separation was restored by 1859:24.

ATSI endorsed the ATCI report and after reviewing the tapes of the radar and the RTF reports there were no apparent ATC implications in this Airprox.

CAA INTERNATIONAL SERVICES contacted the SB20's operator and requested further information from the crew on the incident. The airlines Flight Safety Dept. (FSD) responded and stated that they were very concerned by this event. The captain, PF, and the instructor (it was a line check for the Capt) had filed an air safety report. A study of the RT transcript supplied by LATCC ATCI was carried out and the crew were asked to relate the event from their point of view.

Following that, the airline's FSD concluded that the initial clearance from ATC was to climb to FL 200, which was acknowledged by the Capt; he was busy at the time answering his instructor's questions. Perhaps they became confused between a heading and flight level, but it was not clearly established. They didn't realise their clearance error because the altitude select was selected to FL 220. Finally, they were surprised by the ATC message and, immediately after, by the visual contact with the B737. That was why they did not want to descend to FL 200 again, as requested by the ATC; for them, this traffic appeared to be below.

As the ac passed through FL 203, ATC asked them to descend the FL 200. This message followed 3 other messages for heading changes; no word was used that would have allowed the crew to realise their error (immediately, for example).

Clearly the crew had not followed normal procedures. They should have noted the level clearance, cross-checked it between crewmembers and they should have been concentrating on the traffic. On the other hand, ATC could have used different phraseology to permit a better understanding of the situation by the crew.

This event would be used to teach all their crews about the importance of the strict adherence to procedures and phraseology.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The initial discussion focused on the ATC aspects of this incident. ATCO members felt that the early activation of the STCA on the AC sector, which the SCs were unable to cancel, probably became a distraction. The trainee SC quickly noticed the SB20's climb above FL 200 (its cleared level) by 300 ft and had probably thought that the descent instruction to its crew to FL 200, which was acknowledged, had resolved the confliction. However, the SB20 continued its climb and triggered a high severity STCA which must have taken the mentor and trainee by surprise. This left them very little time to react and members felt that passing TI to the B737 pilots was all that could reasonably have been expected in the circumstances. An ATCO member said that during discussion with colleagues within LATCC, some controllers had started passing TI to pilots that were given step climbs/descents against conflicting traffic, as reinforcement to the ATC clearance.

Members then turned to the piloting side of the incident. The FSD of the SB20 had contributed additional information in their report, which the Board noted. There was no doubt what had caused this Airprox. The SB20's crew had climbed above their assigned level and members were critical of the apparent breakdown in Cockpit Resources Management procedures used, particularly surprising since this was a 'line check' flight. Pilots wondered why the crew had not carried out the

flight in accordance with their company SOPs, (eg crosschecking clearances), especially within the busy LONDON/WORTHING CTA. The crew should have been concentrating more on what was going on around them; even though they had erroneously set the altitude select to FL 220, they should have complied with the ATC instruction to descend back to FL 200. Moreover, the criticism of the ATC phraseology used during the critical period was thought to be unjustified. Members also commented on the SB20 crew's perception of the confliction. With a 2000 ft/min ROC, as well as the late sighting at night, the SB20's flight path could possibly have led the crew to believe the B737 had been just below and not just above as it was in this case.

What was clear, however, was that this incident had been a close encounter, at night, when it was difficult to judge heights and distances with any great accuracy. Moreover, neither ac had the advantage of TCAS which surprised the Board. The ATCOs involved had done well to see the confliction and, in their own minds, had resolved it with the acknowledged descent instruction. However, the SB20 had continued to climb into confliction, facing the SC mentor with a quickly deteriorating situation in which TI to the B737 crew was given as a last resort. Fortunately, the B737 crew had seen the SB20 for some time, had recognised that both ac were on crossing flight paths and were always in the position to avoid the other ac. These factors combined led the Board to conclude that although there had been little likelihood of a collision, the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SB20 crew climbed above their cleared level and flew into conflict with the B737.

Degree of Risk: B

AIRPROX REPORT No 201/00

Date/Time: 9 Dec 1304 (Saturday)

Position: 5123 N 0003 W (5 NM NW BIG VOR)

Airspace: TMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: A319 A320

Operator: CAT CAT

Alt/FL: 6000 ft ↓ 4000 ft
(QNH 1003 mb) (QNH 1003 mb)

Weather VMC SHWR VMC CLOC

Visibility:

Reported Separation: 100 ft V 2.5 NM H /NK

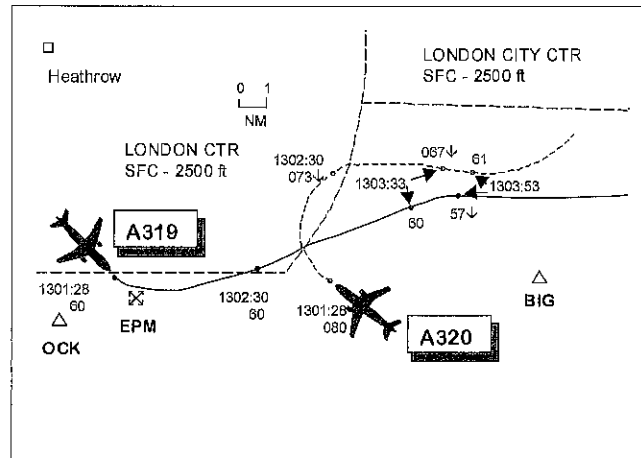
Recorded Separation: 400 ft V 1 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports departing Heathrow on initial climb to 6000 ft receiving a radar control service from LATCC on frequency 120.52 MHz. Whilst heading 085° for weather avoidance, owing to a large CB cloud on his SID track, and maintaining 6000 ft he received an avoiding action R turn and descent instructions from LATCC. Simultaneously, he received a TCAS RA "descend, descend", with which he complied, finally levelling at 5500 ft. As he commenced descent he saw the conflicting ac on his LHS, range 2.5 NM and 100 ft above and he assessed the risk of collision as high.

THE A320 PILOT reports flying inbound to Heathrow on a radar heading of 110° in descent from 6000 ft to 4000 ft; he was receiving an approach radar control service from Heathrow Director. On passing 5500 ft (he thought) he received a TCAS RA "climb" with which he complied, finally levelling at 6300 ft. Simultaneously, he received an avoiding action L turn from Heathrow; he saw the conflicting ac on his R hand side and below.

ATSI reports that throughout the morning of the incident, the prevailing weather conditions, in the form of strong winds and isolated thunderstorm activity, had been affecting ATC operations within the London TMA. The TC BIG SC described his



traffic loading as moderate at the time of the Airprox, although he considered his workload, because of the effect of the thunderstorm activity in the vicinity of BIG, as high.

At the time of the incident, the Heathrow Intermediate (INT) positions were banded onto the INT N position. The manning for the Heathrow position was, therefore, INT N, Support (SPT) N and the FIN DIR. The latter controller, with the INT N DIR immediately to his R, was situated five positions to the R of the BIG SC.

The A319 pilot established communication with the BIG SC at 1258; he reported passing 2200 ft for 6000 ft on a DET 2G SID from RW 27L at Heathrow. This SID routes "Straight ahead to I-LL DME 1, then turn L onto QDM 141 to Epsom (EPM) NDB, then (but not before LON DME 10) DET VOR R 274 to DET VOR". The flight was advised that no speed restriction applied and was instructed to maintain 6000 ft. Shortly afterwards, in view of the thunderstorm activity in the BIG area, the SC asked the A319 pilot if he would be able to comply with the SID routing after EPM; he replied that he would need a L turn of about 15°. The SC commented that he was unsure if the pilot meant a 15° L turn from his present track or the actual SID track after EPM. Previous ac had requested tracks between E and S from EPM. In either case, he was happy to approve the pilot's request as his intention was

to monitor the flight's progress and to take appropriate action, such as initiating any necessary co-ordination, as required.

The BIG SC confirmed that he continued to monitor closely the routing of the A319 and noted that, after passing EPM, it tracked about 15° L of the SID track. Realising that this routing would result in the A319 entering the Heathrow Radar Manoeuvring Area (RMA), the SC telephoned Heathrow radar to initiate co-ordination for the flight. At the same time he asked the pilot if he needed to go any further L because of the potential for conflict with Heathrow traffic. The pilot confirmed that his present heading was acceptable. The radar replay at 1302:30 shows the A319 at 6000 ft, 4.5 NM SW of the A320, which is passing FL 73 on a NE track. Whilst waiting for a reply to his telephone call, the SC requested the A319's pilot to turn R heading 130°, when possible. The SC explained that, when he initiated the telephone call to Heathrow, his intention was to request that the A320, which he could see within the RMA, was routed to the N of the centre-line of the RW for positioning RH downwind. This had occurred earlier, when it had been necessary for previous departures to leave the SID routing and to enter the RMA, thereby causing a potential conflict with Heathrow inbound. As time passed, his initial plan, based on the still anticipated co-ordination with Heathrow, changed to resolving the conflict, between the subject ac, by the use of vertical separation. However, after he had tried to contact Heathrow radar for over a minute, initially by telephone, including the use of the priority facility and latterly by shouting down the Control Room, and as the STCA activated straight to a high severity alert, he passed avoiding action instructions to the A319. He said that, at this stage, the A320 had descended through FL 70 and this had prompted his reaction. He added that he had been loath to instigate a R turn for the A319 previously because of the perceived inherent danger of turning the ac into thunderstorm activity. The A319 was instructed to turn R immediately, although no specific heading was given, followed by traffic information on the A320. The radar at 1303:33, shows the STCA activating, with the A319 at 6000 ft, 1.9 NM SW of the A320, which is passing FL 67 (6400 ft QNH 1003). The A319 reported turning R immediately and, following an update of traffic information, confirmed visual contact with the

other ac. Although the pilot of the A319 did not state on the frequency that he was reacting to a TCAS warning, he reported, subsequently, that he had descended in reaction to a Resolution Advisory (RA) alert. Radar reveals that the ac descended to 5500 ft, before the pilot reported, on the frequency, climbing back to 6000 ft. As soon as the pilot of the A319 reported sighting the other traffic, the SC said that he ceased attempting to contact Heathrow radar by telephone. He still did not understand why he had not received a reply to his call.

The A320 pilot contacted the Heathrow FIN DIR at 1303, on handover from the INT N DIR, descending to 4000 ft and was given a slight heading change of R heading 110°. Shortly afterwards the FIN DIR said that he became aware, from the activation of the STCA, that the subject ac were in conflict. He confirmed that he had been unaware that the BIG SC had been trying to contact Heathrow. He immediately passed the A320's pilot an avoiding action L turn heading 060°, followed by traffic information about the A319. The pilot reported a TCAS alert and stated he was leaving 6000 ft. The FIN DIR issued a further L turn heading 010°, whereupon the pilot replied that he had the traffic in sight.

It was noticeable that, in spite of the avoiding action turns given to both ac, they continued to follow approx. their pre-action headings throughout the encounter. The minimum separation reduced to 1.0 NM horizontally and 400 ft vertically as the A319 approached the A320. As they passed, the distance was 0.9 NM, with vertical separation of 800 ft.

Subsequently, it was revealed that when the INT DIR positions had been bandboxed, the telephones had not been correctly selected. The process involves deselecting the INT S to BIG SC direct line, followed by selecting it on the INT N position. Although it is understood that the first part of the process was completed, the reselection on the INT N position did not take place. Consequently, when the SC tried to telephone Heathrow radar, it did not ring at that position. It was apparent that the direct telephone line from the BIG Sector to the SPT N position had been correctly selected as the Co-ordinator had used it previous to the incident occurring. It was suggested during the interview with the Heathrow FIN DIR, that some method of

reminding controllers about the importance of selecting telephone lines correctly during bandboxing should be sought. It has been agreed that this issue will be covered in the quarterly LCC bulletin, the next edition of which will be issued shortly.

The LATCC-TC MATS Part 2, Page SEA 3-4, states that: "TC Departure Control is responsible for maintaining standard separation between outbound ac, deviated from the Standard Instrument Departure route or climbed above the Transition Altitude, and inbound ac under the control of Heathrow Directors".

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 wondered whether the LCC Bulletin was the correct forum to publicise this important safety matter and thought that it should have a wider circulation to capture all interested parties. ATSI reported that further to this, a Supplementary Instruction (SI) had been issued within LATCC TC to prescribe the correct procedures to be used when bandboxing and splitting sectors. (UKAB Note post meeting - the SI issued, SI 19/01, is only applicable to telephone and camera selections for the Heathrow INT S – INT N positions scenario). ATCO members were sympathetic to the BIG SC's situation and felt he had been unfortunate that the telephone failed to connect on this occasion. It appeared that he had formulated a plan which he seemed reluctant to change even when the intended co-ordination could not be effected. Perhaps he was thinking about the CB activity in the area but which were not showing on his display when he persevered for so long before giving an avoiding R turn at the last minute. However, in not co-ordinating the A319 with Heathrow when it deviated from the SID, the BIG SC had allowed it to fly into conflict with the A320 which led to the Airprox. Therefore, the Board were clear that the BIG SC's inability to communicate with the Heathrow controller had exacerbated the situation

and fundamental continuity checks should be carried out by ATCOs when bandboxing or splitting positions.

The processing/filtering out of weather clutter on radar displays to present a clear picture to the controller has its drawbacks; in this case it also did not allow him to select an unprocessed picture tactically, so denying the ATCO flexibility to formulate/plan tracks early enough. Although the merits of being able to display weather on radar was open to debate, this facility was only available at LATCC TC at the Traffic Manager's position showing 15 minute time frame pictures (i.e. past weather) which would not be of benefit on an operational position. The ATCO members were unanimous in agreeing that thunderstorm/CB activity caused varying degrees of disruption to traffic particularly within the busy LTMA area. On a separate point, pilot members wondered whether the removal of the ATC speed restriction had become habitual or automatic on replying to a pilot's first call on frequency after departure. Also, whether the meaning of this phrase was fully understood across the breadth of the pilot community. In weather conditions encountered during this incident, the aircrew would be expected to fly their ac at the recommended turbulence speed which would give the controller more flexibility for tactical vectoring. One pilot member stated that, even if ATC remove the speed restriction, it was still the pilot's decision whether to accelerate and that best practice was to remain within the 250 kt limit below FL 100. It was agreed that in these conditions, any turns for weather avoidance by the pilot should be requested as early as possible. However, some members felt that some pilots were increasingly declaring their intentions to turn, at the last minute, to avoid weather which only exacerbated the traffic situation for ATC. This unwelcome trend raised questions about who kept 'control' in CAS.

Returning to the scenario, it was acknowledged that the subject ac had continued to follow their pre-action headings during the encounter as they were both carrying out TCAS manoeuvring in the vertical plane, as recommended. Also, it was noted that the A319 pilot had been a little slow to inform ATC of his TCAS alert and subsequent compliance.

Moving on to the risk, even though the BIG SC had left passing the avoiding action instruction late to the A319 pilots, both crews received TCAS RA alerts, which were complied with, during which they visually acquired each other. As such, they were always in a position to ensure separation. This led the Board to conclude that there had been no risk of collision.

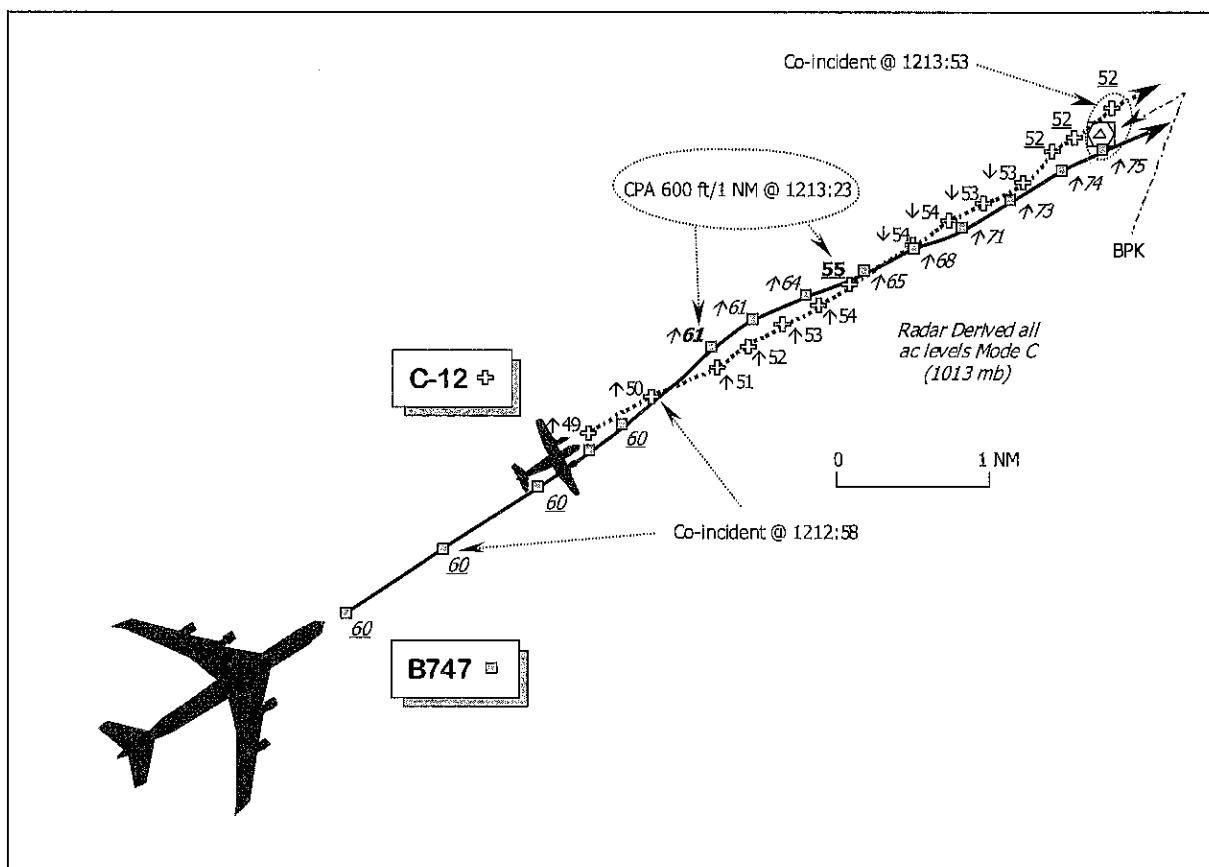
Cause: During a period of weather avoiding instructions, the BIG SC allowed the A319 to conflict with the A320, while unable to achieve co-ordination.

Degree of Risk: C

Recommendation: That the MOD and the CAA considers a review of mandatory checks to be carried out by controllers, on communications continuity, whenever Sectors/Control positions are bandboxed or split.

PART C: ASSESSMENT OF CAUSE AND RISK

AIRPROX REPORT No 202/00



Date/Time: 11 Dec 1213
Position: 5146 N 0008 W (2 NM SW of BROOKMANS PARK)
Airspace: LONDON TMA (Class: A)
Reporting Aircraft: B747-200
Reported Aircraft: C12M (Beech 200)
Type: B747-200

Operator: CAT Foreign Mil
Alt/FL: 6000 ft (QNH 1012 mb) 5000 ft (QNH 1012 mb)
Weather: IMC IN CLOUD IMC HAZE
Visibility: Nil NR
Reported Separation: 500 ft V, 1 NM H/NR
Recorded Separation: 600 ft V, 1 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B747-200 PILOT reports heading 070° at 278 kt outbound from London HEATHROW approaching BROOKMANS PARK (BPK) under an ATC service from LATCC. After being held initially at 6000 ft LONDON QNH (1012 mb), IMC in cloud, they were given clearance to climb to FL 110. As the climb was initiated TCAS enunciated a "traffic message", followed shortly afterwards by a "climb" RA, demanding a higher ROC in excess of 2000 ft/min, which was complied with immediately though the ac was 'heavy'. Traffic was displayed on TCAS initially 700 ft below them, but during the manoeuvre closed to about 500 ft below his ac. The other ac was not sighted as it passed down, he thought the starboard side about 1 - 1.5 NM away on TCAS. ATC was informed of the TCAS climb and reported that the other ac should have levelled at 5000 ft. A TCAS system test confirmed the equipment was okay. He assessed there had been a "high" risk of a collision.

THE C12M (BEECH 200) PILOT provided a very comprehensive and frank report, stating that after landing at Northolt at about 1140 they were informed that if they did not depart before 1210 then they would be delayed. Consequently, they proceeded to launch before that time. They were cleared for takeoff from Northolt and to depart via a DOVER 5Y SID in a matter of minutes; this departure was rushed but well within their capabilities and normal procedures. The DOVER 5Y SID has several step-up altitudes of 3, 4 & 5000 ft as well as several radial intercepts. He was sitting in the RHS handling the radios and the navigation, while the co-pilot, a former helicopter pilot with little fixed-wing time, flew the ac from the LHS, which is normal procedure. The co-pilot was at the time the newest and most inexperienced pilot on the squadron.

They departed on the SID and encountered IMC at about 3000 ft QNH. Whilst heading 070° at 220 kt toward the BPK in IMC and with light turbulence, he began setting up for the next radial intercept and double-checking and cross checking the GPS/FMS/NAV set-up when LATCC cleared them to climb from 4000 to 5000 ft QNH. The GPS is located down on the pedestal between the pilots and so he was looking down at the display while

entering the appropriate data. In this 10 - 15 sec period the co-pilot, the PF, missed the level off altitude of 5000 ft. Just as he noticed they had exceeded their assigned altitude (he believed it was at not quite 5400 ft on his altimeter) LONDON asked if they were maintaining 5000 ft. He replied something to the effect of "roger levelling 5000" and then LONDON again queried their altitude giving a QNH of 1011 mb, which he read as 5200 ft on his altimeter (this reads 60 ft higher than that of the LHS pilot's altimeter). They had taken off with 1012 mb set and had not been given a new setting before LONDON queried their altitude. They levelled their ac at 5000 ft and after a discussion with the other ac, LONDON informed them that a report would be filed, which was acknowledged.

During the rest of the flight they had a thorough discussion as to what transpired. To reduce the potential for a recurrence, training was conducted on the Northolt departures and general instrument procedures at their next pilot training session. The co-pilot (PF) has also been counselled by the training department.

ATSI endorsed the LATCC report, which states that the Airprox occurred 2 NM SW of the BPK VOR just after 1213. The B747-200 departed Heathrow on a BPK 6F SID. The crew established contact with the LATCC TC NORTH EAST SC (TC NE) at 1207, was instructed to maintain 6000 ft LONDON QNH on reaching and the ATC speed restriction lifted. The C12 crew established contact with TC NE 1 min later after departing Northolt on a DOVER 5Y SID. The C12 crew reported passing 1000 ft and the TC NE SC instructed them to climb to and maintain 3000 ft initially.

At 1209:15, the C12 crew was instructed to climb to 4000 ft at which point the B747 was 7.7 NM to the SW but with a faster groundspeed of 347 kt. The C12 crew was cleared up to 5000 ft LONDON QNH at 1212:00, this instruction was clearly and accurately acknowledged. The C12 groundspeed was 237 kt with the B747 a little over 3 NM behind it and overtaking the C12 by 110 kt, but level at 6000 ft.

The LATCC radar recording reveals that the C12 crew continued climbing through their cleared altitude eventually indicating 5500 ft Mode C (1013 mb) at 1213:23. At about 1213:00, the B747 crew

was instructed to climb to FL 110 and to maintain their heading of 070°. A short while later the SC, observing the activation of the Short Term Conflict Alert (STCA), sought assurance from the C12 crew that it was maintaining 5000 ft. The crew replied *"roger level at er 5000 feet"*. The SC then sought confirmation from the ac that it was operating on the LONDON QNH of 1011 mb, to which the ac replied *"switching to 1011"*. At 1213:40, the SC advised the C12 crew that Mode C showed an altitude discrepancy (UKAB Note (1): the SC actually said *"...four thou.."* instead of 400 ft), to which the crew replied *"we're showing 5200 right now"*.

Fifteen seconds later, at 1214:00, the B747 crew reported a TCAS RA, *"..we've just had an RA within 500 ft of us in the climb below and slightly up to the right hand side"*. The SC replied that the crew of the C12 had assured him that it was maintaining 5000 ft QNH, and issued further climb clearance to the B747 crew up to FL 150. The B747 crew replied that the on board indications at the time showed that the other traffic was climbing and they in turn had complied with TCAS climb RA instructions. Subsequently, the C12 crew reported on RT that they had ascended to 5400 ft in the climb, but gave no explanation for this. The SC advised the C12 crew that a report would be filed about the TCAS event.

The CPA occurred at 1213:23, when the C12 was 12 o'clock - 1 NM and 600 ft below the B747 indicating 6100 ft Mode C (1013 mb). Standard vertical separation was restored 11 seconds later as the C12 descended back to its assigned altitude of 5000 ft and the B747 crew climbed, quickly to their assigned level of FL 110.

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, a report from the air traffic controller involved and reports from the appropriate ATC authorities.

It was clear to members that this Airprox was caused by the C12 crew climbing 400 ft above their assigned altitude of 5000 ft London QNH. Noting

the apparent change in the QNH from 1012 to 1011 mb, the Board did not consider this fundamental to the outcome of this Airprox as both pilots reported the set QNH as the same value. Members tried to fathom why the C12 co-pilot would have climbed above the SID altitude. Evidently, the departure was 'against the clock'. Although reportedly not a factor from the C12 pilot's perspective, members thought this probably had some adverse effect on any departure briefing conducted between the crew as the co-pilot apparently did not think he had to level at 5000 ft – assuming he had not misread the instruments. Discussion centred on the departure brief between captain and co-pilot; if the PF was that inexperienced, some pilot members believed the captain could have foregone a prompt departure to ensure that the PF was fully conversant with all aspects of the SID before take-off. Other members also believed that the captain should have shown greater crew co-operation by paying more attention to what the PF was doing while flying the SID. Whilst understanding entirely the need to monitor navigation aids closely, the captain should also have recognised the need for closer supervision of the inexperienced PF; this should have been the higher priority not the GPS. It seemed to pilot members that the co-pilot had become overloaded, a point which may not have been recognised by the captain at the time. These points led the Board to agree unanimously that this Airprox was caused when the C12 crew climbed their ac above their assigned altitude.

A CAT pilot member commented on the speed of the B747 whilst in this very busy TMA. Though the controller had removed the ATC speed restriction, the member's view was that it was better to keep the speed down, which allowed more thinking time in difficult situations such as this. Although the B747 crew were in cloud and could not see the C12, TCAS again proved its worth when it alerted them to the C12 crew's errant climb and demanded that the B747 be climbed at a higher rate. However, the B747 crew reported that the C12 passed about 1-1.5 NM down the starboard side; the radar recording illustrated how the system might be potentially misleading and members emphasised that whereas TCAS was extremely effective at resolving conflicts in the vertical plane, discrimination in azimuth was not as accurate. Notwithstanding the minimum vertical separation of 600 ft, the SC had been alerted by the STCA

and was already aware of the problem before the B747 crew advised they were following the RA. Thus he was already taking steps to ensure resolution of the conflict, clarifying and actively monitoring that the C12 was being descended back down to its assigned altitude. This led members to agree that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C12 crew climbed above their assigned altitude.

Degree of Risk: C.

AIRPROX REPORT No 203/00

Date/Time: 12 Dec 1411

Position: 5313 N 0122 E (18 NM N of Cromer)

Airspace: Wash ATA (Class: G)

Reporting Aircraft Reported Aircraft

Type: Hawk Tornado GR

Operator: HQ STC HQ STC

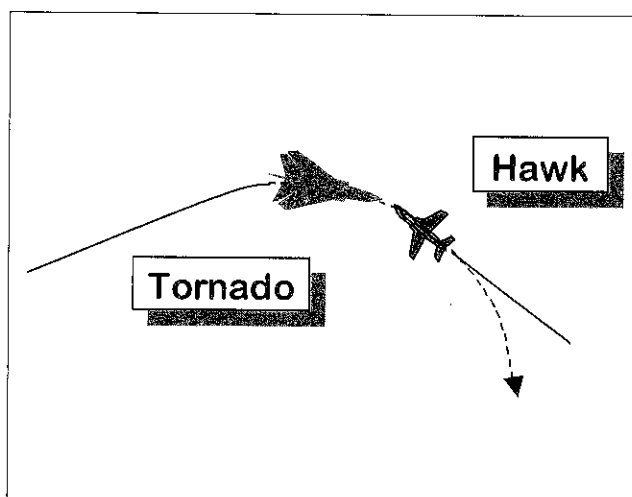
Alt/FL: ↑ FL 150 ↑ FL 180

Weather IMC INCL VMC HAZE

Visibility: 500 m 5 km

Reported Separation: 300 ft/2-300 ft V

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT, part of a mixed formation that had split up, reports heading 300° at 300 kt and receiving a RIS from Neatishead as he climbed to FL 150 to cross airway B1. Neatishead was very busy and he was on a minimum deviation, fuel critical RTB. Neatishead advised of a stranger 10 NM to the NW and again at 5 NM at FL 115; he replied that he was passing FL 135. As he began to level from a 5° climb, IMC in cloud, he saw a Tornado closing from 500 m away in his 12 o'clock; it was also climbing on a reciprocal track. He bunted to level flight and the Tornado passed 300 ft above; he assessed the risk of collision as high. He had not asked for a RAS because of the high level of communication on the frequency.

THE TORNADO GR PILOT reports heading 080° at 300 kt and climbing to FL 180 while conducting an IRT from the rear seat. Due to the usual high

level of activity in the Wash ATA he requested a FIS from Marham who initially had difficulty identifying him, so he kept a good lookout. The visibility started to deteriorate and as he was about to ask for a RAS, the handling pilot saw the Hawk about 2-3 NM ahead. Since they were climbing they assessed that no avoiding action was required. The Hawk took no avoiding action and passed 2-300 ft below and 1-200 m to the right. As the Hawk had been seen in good time, there was no risk of collision.

MIL ATC OPS reports that the Hawk pilot was in receipt of a RAS from London Radar Controller 10 (CON 10). The ac had recently been handed over from Neatishead for a recovery to Leeming and the pilot had requested an upgrade from RIS to RAS at 1412:12, during his initial RT call. At 1416:25, the Hawk pilot advised CON 10 that he wished to "...report an Airprox on the previous controlling frequency, before I was handed to you." The pilot described an encounter with a Tornado

GR1 which passed *"..over the top of us. He had been reported as traffic at one one five."* When asked by CON 10, he added that he had been *"..under Radar Information but was IMC."* After landing, the Hawk pilot confirmed the details with the LATCC Senior Military Supervisor, who in turn informed Neatishead.

The Tornado crew freecalled Marham Director (DIR), which was manned by a trainee and qualified Mentor, on frequency 293.775 advising *"...I'd like to operate in the Wash area. I'm approximately thirty five miles to the north of you and I'd just like an Information Service,"* at 1410:18. DIR placed the ac under a FIS and instructed the pilot to squawk 3640, which was acknowledged. At 1411:57, DIR transmitted to the Tornado crew *"c/s request the levels you wish to manoeuvre between?"* to which the Tornado crew responded at 1412:08, *"Ah just standby one, c/s"*, followed by *"c/s request Radar Advisory"* 3 sec later. After confirming that the ac was still squawking, the Tornado crew was requested to squawk ident at 1412:24 and placed under RAS (limited due to radar suppression) at 1412:38, following which DIR again requested details of the ac's operating levels. DIR spent the next few minutes passing the Tornado a number of avoiding turns before the ac commenced its recovery to Marham at 1416:28.

The LATCC radar replay shows the Hawk, squawking 2404, tracking 325° in a climb with the Tornado, squawking 7000, tracking about 060° and also climbing. The Tornado's squawk changes to 3640 at 1410:54, at which point the Tornado is 10 NM W of the Hawk (in the Hawk's 11 o'clock), passing FL 73 whilst the Hawk is passing FL 44. At 1411:24, the Tornado is 10° L of the Hawk's track, range 4 NM and passing FL 116, with the Hawk, now squawking 6102, passing FL 105. The next radar sweep shows the Tornado turn R onto an easterly track towards the Hawk, whilst passing FL 126 although the Hawk's Mode C is not seen. The closest point of approach is not seen on radar, as it occurs between radar sweeps. At 1411:41, the Tornado is 5° L of the Hawk's nose, tracking 075° at a range of 1.5 NM but there are no Mode C indications. The following sweep, 8 sec later, shows the Tornado emerging from the Hawk's 5 o'clock at about 0.25 NM, with the Hawk indicating FL 148. Both Mode Cs can be seen again at 1411:57, the Tornado indicating FL 150, the Hawk still at FL 148;

at 1412:05, both ac indicate FL 150. The Tornado then opens to the S and resumes a climb, squawking ident, in response to DIR's request, at 1412:36.

RAF Marham ATC was first made aware of its involvement in this Airprox a month later on 11 Jan 01; the recollections of the controllers concerned are therefore rather limited. The Tornado crew's request for RAS, like the Hawk pilot's, appears to have been made immediately after, and probably as a result of, the encounter. Until that point, DIR had been providing FIS for about 1 min. The Airprox occurred about 45 NM NNE of Marham, which is 5 NM beyond the 40 NM radar range typically used by DIR and thus, until the request for RAS, the controllers would not have been actively monitoring the Tornado's progress.

ASACS SSU reports that the Weapons Controller (WC) at CRC Neatishead was a School of Fighter Control student being supervised by an instructor. The Neatishead Fighter Allocator (FA) was also under training and being supervised by an instructor. The incident occurred as the Hawk was under an Air Defence Information Service (ADIS) recovering to base. The WC's intention was for the Hawk to climb and cross airway Bravo 1 at FL 150 using the AD Crossing Slot with LATCC Mil. The conflicting traffic had been called to the Hawk under the terms of the contracted service (a RIS) on 3 separate occasions prior to the contacts merging. The first call was made to the entire formation, then later specifically to the Hawk as indicated in the transcript, *'C/s that stranger's BRA 270 10 heading North East indicating seven and half thousand in the climb'* which was acknowledged by the Hawk. The WC called the stranger again at range 3 NM (*"Northwest 3 heading E indicating 115"*), then at the plan-position merge and subsequently reported the stranger's position clearing behind the Hawk's track. Shortly thereafter, the trainee WC handed the Hawk to LATCC (Mil) unaware of the Airprox which the pilot, later, reported to the LATCC (Mil) controller.

At the time of this incident, the Hawk's progress was being monitored by no less than 4 pairs of eyes at Neatishead. The WC fulfilled his obligations under a RIS by providing timely and accurate traffic information to the Hawk; neither the WC instructor, the trainee FA nor the latter's instructor saw any

need to intervene. The responsibility for maintaining the required safe separation at the time of the incident rested with the ac captains, neither of whom seems to have requested a higher form of service in the light of the prevailing in-flight conditions until after the Airprox had occurred.

HQ STC comments that at the end of the airborne exercise, the Hawk pilot, a relatively inexperienced first tourist, was understandably keen to expedite his recovery to RAF Leeming, conscious of his need to cross controlled airspace, whilst preserving his limited fuel reserves by climbing to height as quickly as possible. His decision to climb under a RIS through several layers of cloud was flawed and although he took adequate steps to separate his ac from the remainder of the formation, he did not appreciate the stranger's relative position and increasing height in spite of satisfactory traffic information from Neatishead. The Tornado crew saw the Hawk in sufficient time to take avoiding action but deemed it unnecessary.

When operating on a busy radio frequency and in marginal weather conditions, the priority should always be the safe handling of the aircraft: maintain VMC, obtain a clear flightpath and then monitor the situation for any conflicting traffic, using an appropriate radar service. The pilot has been debriefed accordingly but was commended for his honesty throughout the investigation of this 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.

Members sympathised with the inexperienced Hawk Pilot who had not asked for a RAS because he could hear how busy the controller was. That same activity level should perhaps have prompted him, especially in marginal visibility, to ask for a RAS. At the same time members agreed that from the traffic information as passed it would have been difficult for the Hawk pilot to deduce that the Tornado was closing on him in a climb. Crucially

the WC did not add the word "*climbing*" to his call at 3 NM. Initially the Hawk outclimbed the Tornado but the situation reversed as the Hawk began to level off, and had the WC said something like "closing on you, also climbing" the situation would have been made much clearer.

As with the Hawk, the Board agreed that a RAS would have been more appropriate for the Tornado pilot. He had been aware that the airspace was busy and had therefore called Marham, but requesting a FIS was pointless and did absolutely nothing for him. The Airprox appeared to have caused both pilots to accept that a RAS was necessary in the prevailing conditions. The 2 pilots' reports differed somewhat and there were inconsistencies in the Tornado pilot's report which suggested his recollection of the event was not clear. If he had seen the Hawk 3 NM away, members thought it extremely unlikely that he would have deliberately flown so close above it. Furthermore, at 3 NM the Tornado had not begun its turn towards the Hawk; again it was considered unlikely the pilot would have turned towards conflicting traffic. It seemed more likely that the Tornado pilot, whose view of the outside world during an IRT should at the least have been somewhat limited, was mistaken about the Hawk's range when he saw it, and that the reason he considered avoiding action unnecessary might have been that the Hawk was about to pass below.

Under their respective ATSS, the pilots of both ac were responsible for seeing and avoiding each other. The Board therefore concluded that the cause of the Airprox was the late sighting by both crews while flying without an appropriate radar service in marginal weather conditions. Good fortune appeared to have played a part in the eventual fairly close separation and members considered that because of this the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by both crews while flying without an appropriate radar service in marginal weather conditions.

Degree of Risk: B

AIRPROX REPORT No 204/00

Date/Time: 14 Dec 1018

Position: 5406 N 0132 W (1.5 NM S of Ripon)

Airspace: FIR/LFS (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR Squirrel

Operator: HQ STC Civ Comm

Alt/FL: 320 ft 200/250 ft
(Rad Alt) (agl)

Weather VMC CAVK VMC CLBC

Visibility: 10 km+ 10 km+

Reporting Separation: NK/50-100 ft V

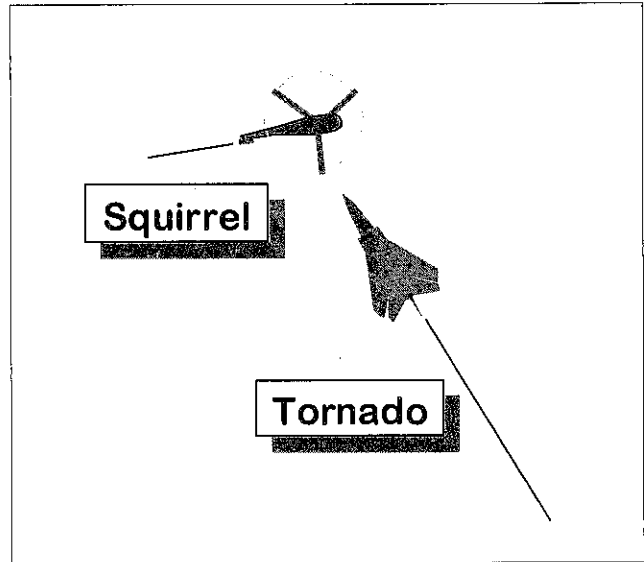
Recorded Separation: NK

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 328° at 420 kt as a single ac and not receiving an ATS. His navigator drew his attention to an ac in his 1 o'clock and while his attention was in that direction he became aware of a sudden movement in his peripheral vision. A helicopter appeared from behind the canopy structure and g-meter at the same level and he applied a 3-g pull. As the helicopter passed on his right he saw it enter a steep turn descending slightly. He considered the risk of collision had been high.

THE SQUIRREL PILOT reports heading 080° at 60 kt in a hold between inspecting sections of 11 kv power lines, while his observer familiarised himself with the line diagram. His helicopter is burgundy coloured and his HISL, strobes and nav lights were on. He was receiving Flight Information from Linton on Ouse and had been scanning to left and right for other ac but had seen none. On his next scan to the right he saw the Tornado behind his shoulder at the same height on a constant bearing, and closing very, very fast. He instinctively lowered the lever and pushed forward violently on the cyclic, losing sight of the Tornado as it passed 50-100 ft above (about 2 seconds after he first saw



it) and hearing jet noise very close. The Tornado continued without deviation and he encountered no wake from it. He then landed in a field so that he and his observers could calm down and regain composure. After resuming his task he asked Linton whether they saw the confliction on radar; they had not. He considered a collision would have been certain without his avoiding action. His workload had been minimal at the time but vision from the helicopter is impaired by door and window frames.

The task he had been undertaking involved flying within 30 ft of power lines which are suspended on poles some 20 ft tall while observers on board inspected them. He was operating below Linton's RT coverage (and was not expecting traffic information from them) and at a level which was below military low flying heights. However, at the end of each section helicopters are obliged to climb before moving on to the next section; the incident occurred during such a repositioning.

MIL ATC OPS reports that the Squirrel pilot was receiving a FIS from Linton Zone (ZONE), manned by a trainee and qualified mentor, on 129.15. He had initially called ZONE at 0900:00, to advise that he would be performing a powerline patrol, below 200 ft for "...the next three hours" and he undertook

to provide an 'Ops Normal' call every 45 min. The helicopter pilot next checked in at 0947:33 and, other than this communication, there were no other RT exchanges before the incident. ZONE was unaware of the helicopter's position as it spent the vast majority of its flight below both primary and secondary radar cover. At 1013:29 the Tornado crew freecalled ZONE on 292.8 at FL 65 and requested a RIS for a letdown to low level near Harrogate. The controllers experienced problems seeing the Tornado's squawk and hence the ac was never positively identified. Other SSR returns were observed in the area however, and several items of traffic information were passed to the Tornado crew using the 'traffic believed to be you' format. At 1016:36, having confirmed that they had now descended to low level, the Tornado crew elected to change to their en-route frequency in a position about 5 NM SW Linton-on-Ouse. At 1038:46, a short while after taking over the control position, the new ZONE controller initiated a radio check with the Squirrel pilot; during the conversation, the helicopter pilot added "*...just for your information, we had a very close airmisss about ten minutes ago...in this location...missed us by about fifty feet, if that...*" The pilot also asked if ZONE had had any contact on radar, but ZONE explained that when the helicopter descended to very low level, all radar contact on it was being lost.

The Airprox is not recorded on radar. The Squirrel is seen briefly at 1017:37, squawking 0036 without Mode C, manoeuvring slowly E, about 5.5 NM WSW Dishforth; after this its contact fades. The Tornado can be seen, squawking 7001 with Mode C, tracking NW; its radar contact is lost at 1017:49, but reappears at 1018:12 for 2 radar sweeps, 3 NM SE of the helicopter's last recorded position, indicating 900 ft Mode C. The contact fades for 1 sweep before reappearing at 1018:38, as it passes about 0.5 NM E of the helicopter's last recorded position at 11-1200 ft Mode C. The Airprox therefore occurred some 2 min after the Tornado had left the frequency and at a time when the Squirrel pilot was receiving a FIS below radar cover.

HQ STC comments that the Tornado pilot had called RAF Linton-on-Ouse to notify them of his presence but had just cleared their frequency when the incident occurred. The size and aspect of the helicopter, coupled with the cockpit structure and

HUD obscuration reported by the Tornado pilot, undoubtedly combined to cause a very late sighting. Whilst both pilots detected the presence of the other just in time to avert a collision, it was an extremely close run thing. There were no NOTAMS or PINS notified for the area in which the incident occurred, which lies within the natural corridor between the Leeds Bradford zone to the west and the Vale of York airfields to the east.

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 clear to members that the cause of the Airprox was a late sighting of the other ac by both crews; this was a simple fact, not a criticism. The Board agreed that sightings in these circumstances (high closure rate on small objects against a terrain background) are often late, leaving very little time for avoiding action, and a BHAB representative forcefully expressed his concern for the danger posed by military fast jets to helicopters on essential power- and pipe-line patrols. This led to a wide but inconclusive discussion; it was apparent that neither PINS nor the CANP applied to the helicopter pilot's sortie. While the most part of the inspection (as stated in Part A) was flown below military operating heights, the danger arose when the pilot was required, by the constraints in his exemption from Rule 5e, to climb and descend between sections.

The Board noted that while both pilots had in fact seen each other just in time to take avoiding action, it was not clear if this was what saved the day, or if the ac were always going to miss by a small margin. Members acknowledged that either way, there had been a high risk of collision in this incident. Members asked if the risk level of such helicopter operations could be assessed since it appeared that while incidents like this occasionally occurred, actual collisions were extremely rare. The last collision between a LL fast jet and a helicopter was in 1993, since when there had been 32 fatal

helicopter accidents due to other causes which indicated that a collision with a fast jet was low on the list of risks facing helicopter pilots; events showed that flying into the ground or wires, and mechanical failures appeared to pose far greater risks. The Board was advised that in a year there are about 45,000 military fixed wing low flying sorties and an average of 1 'A' Risk and 4 'B' risk Airprox with LL helicopters. Members all agreed that fast jet crews, notwithstanding their exemption from the 250 kt below FL 100 rule, had a responsibility under VFR to see other more

vulnerable ac in time to avoid them safely, and in most cockpits this required continuous, careful head movement to clear the areas behind windscreen and canopy arches.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by both pilots

Degree of Risk: A

REPORT No 206/00

Date/Time: 15 Dec 0904

Position: 5209 N 0312 W (12 NM N of TALGA)

Airspace: London FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA46 SHAR FA2

Operator: Civ Pte COMNA

Alt/FL: FL 70 ↓ 8000 ft (RPS 1001 mb)

Weather Intermittent IMC VMC

Visibility: 10 km 25 km

Reported Separation:

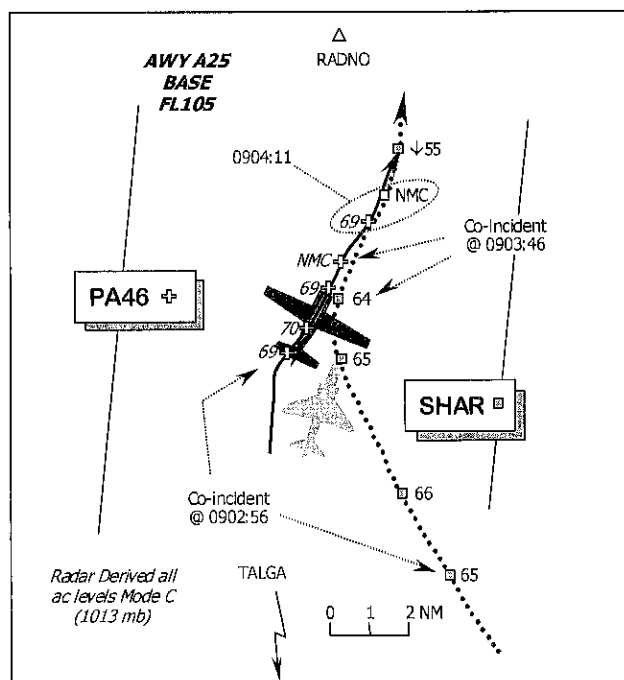
3-400 m H, nil V 0.5 NM H, 500 ft V

Recorded Separation: Contacts merged

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA46 PILOT reports that his ac has a white/blue livery and HISLs were on. He had been under a RIS from Cardiff RADAR who terminated the RIS, advising him to contact London INFORMATION for further service whilst inbound to Liverpool IFR, at FL 70. Hence, he was Squawking A7000 with Mode C.

About 10 NM N of TALGA, as he was intermittent IMC – about 800-1000 ft above cloud, though the visibility ahead was unlimited he was only 0.5 NM clear of cloud horizontally in between layers - he elected to free-call Shawbury for a RIS. Whilst



heading 020° at 175 kt, checking his chart for a VOR and the Shawbury frequency, he became aware of another ac, which he thought was a Harrier, coming out of the sun. He first saw it about 1000 m away at 4-5 o'clock as it moved down his starboard side at about the same level, and "strangely" not excessively fast. The 'Harrier' passed 3-400 m away to starboard before it overtook him and made a very rapid descent to low-level between layers. He immediately free-called Shawbury for a RIS and descended to 3000 ft RPS to establish VMC as he felt quite

"vulnerable". He believed the risk to be "real", as before he saw it he had no idea the 'Harrier' was there.

He added that the view to starboard was degraded by ice on the side window and sunlight, his lookout was also affected whilst checking his chart and the simultaneous squawk and frequency change.

THE SEA HARRIER FA2 (SHAR) PILOT reports he was flying from Yeovilton to Valley under VFR, squawking 3/A 7000 with Mode C selected on. His ac is camouflage grey, navigation lights and anti-collision beacons were on, but HISLs are not fitted.

Whilst heading NW at 500 kt, flying at 8000 ft RPS (1001 mb) he thought, he was searching the area ahead for a military 'Target of Opportunity' when a radar contact was acquired at a range of 7 NM. Believing the "fast moving" contact to be a military ac, he turned onto an intercept heading of 350°. When the range had closed to 2 NM it was evident that the contact was not a military fast jet, so at a range of 1.75 NM he broke off the 'attack', passing 500 ft below and 0.5 - 0.75 NM to starboard of the other ac. He added that there was absolutely no risk of a collision whatsoever.

ATSI comments that Cardiff ATC were unaware that an Airprox had been filed by the PA46 pilot until informed by ATSI and despite his comments about the RIS being terminated, ATC carried out their responsibilities, in respect of his ac, correctly. The controller informed the pilot of the type of ATC service the pilot was being provided with throughout the time he was on the Cardiff frequency, changing from a RIS to a Radar Control Service as the PA46 entered CAS and back to a RIS when it left.

UKAB Note (1): The PA46 pilot declined an airways join for the portion of his flight N of BRECON, which would have necessitated a climb to FL 120, instead, he remained at FL 70 and continued the flight within the FIR.

When the radar service was terminated the ac was about 38 NM N of Cardiff Airport. The Cardiff MATS Part 2 states that a LARS service is provided by Cardiff APPROACH to ac flying within a 40 NM radius centred on the aerodrome reference point. Consequently, in accordance with MATS Part 2 and additionally MATS Part 1, Page 3-13, whereby radar

services are provided by an approach control unit subject to an overall limit of 40 miles from the ATZ, the ac was very close to the position where a radar service could not be provided. In addition, when radar service was terminated, the SHAR was 16 NM SE of the PA46, on a similar track and 3000 ft below it. There was no indication that these two ac would conflict. It is standard practice for Cardiff APPROACH to inform pilots about the availability of a FIS from London INFORMATION as, in the words of the Unit, "*it is a bit of a black hole to the N of BRECON for radar services*".

UKAB Note (2): This Airprox occurred below Airway ALPHA25, where the base of Class A airspace, between 07-2000 UTC, is FL 105.

MIL ATC OPS comments that at 0903:23, the pilot of the PA46, freecalled Shawbury ZONE on frequency 120.775 MHz stating that he was "*...just at TALGA at seven zero, descending to three thousand five hundred feet, then I'd like to route direct to WHITEGATE to join Liverpool, request Radar Information Service.*" ZONE asked the PA46 pilot to "*standby*" initially and at 0903:56, ZONE instructed him to "*.. squawk 0223.*" The pilot acknowledged the SSR code change and then, at 0904:11 transmitted, "*Er ... actually er fourteen miles north of TALGA and er I'd like to report an Airprox actually...*" The pilot then continued to describe the encounter with a Harrier adding, "*...he obviously saw me and broke off. I didn't see him after he was in my er five o'clock.*"

The Airprox occurred during the identification process. At 0903:23, when the PA46 pilot started his initial call to ZONE, the SHAR was 3 NM SE of the PA46 and much closer by the time the call was completed. TALGA is 55 NM from Shawbury and the actual position of the Airprox 43 NM distant; normally ZONE would use a maximum 40 NM range radar display. As the SHAR approached the PA46 from behind and further away, it would have taken a finite period to increase range/offset the radar picture and allow the picture to settle before being able to assimilate the new information. In theory ZONE could have identified the PA46 more quickly and thus passed some form of warning, but realistically there was little hope of this being achieved.

UKAB Note (3): The LATCC Clee Hill radar recording shows the PA46, squawking 7000, tracking 005°, following the centreline of AWY ALPHA25, but below it at FL 69 Mode C. The SHAR is shown squawking 7000, tracking NW directly toward the PA46 at FL 65 Mode C. The PA46 turned R and steadied on a northeasterly track at 0902:56, placing the SHAR in its 4 o'clock position at a range of 6 NM still indicating FL 65. The CPA occurs about 12 NM N of TALGA at 0903:54, the radar returns merged as the SHAR passed the PA46. At this point the Mode C indications of each ac are overlapped and the individual levels cannot be determined. Nevertheless, in the preceding radar sweep, the SHAR indicated FL 64 and immediately after the encounter, the PA46 indicated FL 69 Mode C, suggesting that vertical separation was not more than 500 ft. The PA46's squawk changes to 0223 about 1 min after the CPA.

COMNA comments that the Sea Harrier pilot was on a routine training exercise whilst conducting a medium level transit from RNAS Yeovilton to RAF Valley, operating VFR clear of CAS. Part of his exercise involved searching for military 'Targets Of Opportunity' operating close to his planned track. Whilst approaching the Welsh border from the SE, he obtained a radar contact at 7 NM on a fast moving target, slightly below and crossing L - R. Convinced from its movements that the target was a military ac he pressed home an intercept for visual identification. He gained visual contact at a range of about 2 miles and, immediately upon realising it was not a military ac, he broke off the intercept. Although he avoided the other ac by a margin he considered safe, it is understandable that the pilot of the PA46 was surprised by the sudden appearance of a SHAR passing down his starboard side at less than 0.75 NM.

Despite the fact there was no risk of collision the SHAR pilot did press home his simulated attack inside the minimum range allowed against a civilian contact. A recent change to JSP 318 imposes a requirement on naval pilots to obtain a minimum separation of 5 NM or 5000 ft against civilian ac in this context. The pilot's belief that the contact was a military ac resulted in him infringing these minima, which contain an extremely generous safety margin. The SHAR pilot's Unit have taken appropriate action to highlight this important regulation to all station pilots and controllers in order to reduce the potential for a similar occurrence.

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 the PA46 pilot had flight planned to join ALPHA 25 at FL 70 and fly IFR to Liverpool within the CAS structure. Some wondered if he had been aware that during the period of the Airprox the base level of ALPHA 25 N of TALGA was raised to FL 105 between 07-2000 UTC, thereby making FL 120 the lowest useable level northbound in CAS at the time. Assuming pressurisation was not an issue, it seemed surprising to some members that the PA46 pilot had rejected the sanctuary of CAS when he declined a climb to FL 120 to join ALPHA 25. On this point a CAT pilot member pointed out that information about the base level of ALPHA 25 was not readily apparent from the chart unless the appropriate note was scrutinised. (It is also contained in a note in the UK AIP - currently ENR 3-1-1-6 Note 5). Nevertheless, the Board recognised that the PA46 had reached the limit of Cardiff's radar service area, and no other ATSU was available to hand the ac over to that had overlapping radar cover. Members agreed that the controller had operated entirely in accord within his remit. The same could not be said of the SHAR pilot, indeed the regulations which RN aircrews must follow if they have inadvertently 'intercepted' civilian ac were formulated and introduced as the result of a previous Airprox (55/98). There was total agreement that civil traffic should never be used as a radar target at close range. Though the SHAR pilot contended that the intercept was broken off as soon as he realised the radar contact was not a military ac, he reported this was at 2 NM and well inside the prescribed 5 NM minima. In this respect the Board agreed that intercepts should not be pressed home inside the stated minima if the ac could not be positively identified by that distance. To this end it would seem sensible to obtain a radar service from an ATSU or Air Defence Unit if available, which might be able to assist in this important task, alas in this instance it was not. CAT pilot members were concerned that a military pilot had intentionally flown his ac in close proximity

to another ac, which he could not confirm was a military ac, at an overtaking speed of about 325 kt when the intercepted ac's pilot was completely unaware of the presence of his SHAR. The radar video recording revealed that the contacts had merged in azimuth. Whilst some pilot members contended the SHAR pilot might have misjudged the closing speed, if he had not, then pressing home this intercept to within these ranges was, in one pilot member's opinion, a reckless action, though the SHAR might have been about 500 ft below the PA46 at the time. Members were in no doubt that the SHAR pilot had contravened naval regulations by flying too close, as highlighted by COMNA, which was fundamental to the cause. The PA46 pilot was clearly placed in a difficult position and he was not able to spot the SHAR until it overtook him, moments after ZONE had instructed him to squawk for identification. Consequently, the Board recognised that the Shawbury controller could not have prevented this close encounter. However, it is fortunate that a R turn was not required for identification, which one member

thought could have been very awkward for the SHAR pilot. Taking all this into account, the Board determined that this Airprox was caused when the SHAR pilot flew too close to the PA46 during a practice intercept that should have been broken off much sooner as required by naval regulations. With regard to the risk, the Board recognised that the SHAR pilot had acquired radar and visual contact with the PA46, and was always in a position to turn away or descend and afford greater separation if need be. As this was a premeditated action by the SHAR pilot and not a random encounter the board agreed that no risk of a collision had existed.

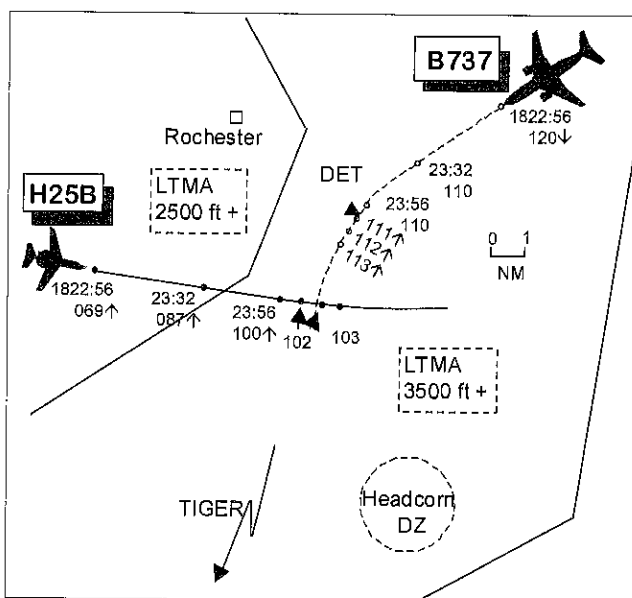
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SHAR pilot flew too close to the PA46 during a practice intercept and in contravention of naval regulations.

Degree of Risk: C.

AIRPROX REPORT No 207/00

<u>Date/Time:</u>	6 Dec 1824	NIGHT
<u>Position:</u>	5218 N 0036 E (2 NM S DET VOR)	
<u>Airspace:</u>	TMA	(Class: A)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	B737	H25B
<u>Operator:</u>	CAT	Civ Pte
<u>Alt/FL:</u>	↓FL110	↑FL100
<u>Weather</u>	VMC SHWR	IMC
<u>Visibility:</u>	>10 km	
<u>Reported Separation:</u>	300 ft V 1 NM H/NK	
<u>Recorded Separation:</u>	1000 ft V 1.6 NM H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to London Gatwick on a Timba 2E STAR in descent to FL 100 (he thought) at 280 kt. The visibility was >10 km in VMC and rain. On passing FL 110, he received a TCAS RA "climb" and acquired the crossing traffic visually whilst disconnecting the A/P and initiating a climb; he finally levelled at FL 113. The conflicting traffic passed 1 NM ahead R to L and 300 ft below which he had in sight at all times during the incident.

THE H25B PILOT reports flying en route from Biggin Hill to Frankfurt on the date and at the time of the incident but does not recall being informed by ATC of any TCAS alert. His report was completed nearly 2 months after the incident and he believes that the weather was IMC. TCAS was fitted to his ac but no warnings were received.

ATCI LATCC reports the Airprox occurred 2 NM to the S of the DET VOR at 1824 UTC. The H25B, that had departed Biggin Hill for Frankfurt, established contact with the Biggin Sector Controller (BIG SC) at 1822, advising that it was climbing to 6000 ft and routing towards Dover. The ac was cleared up to FL 100 and the ATC speed restriction lifted. The H25B pilot accurately acknowledged this clearance with further climb being restricted by the presence of the B737 inbound to Gatwick from Venice. This ac, under the control of the Timba Sector Controller (TIM SC), had been cleared to FL 110 in accordance with standard practice.

Approx. one minute after issuing the climb clearance to the H25B pilot, the BIG SC advised him to maintain FL 100 on reaching, owing to traffic crossing from L to R and above. The pilot acknowledged the instruction, stating that he had the other ac on TCAS. At this point the H25B was climbing through FL 87 with the B737 in its 10 o'clock at a range of a little over 7 NM and level at FL 110.

At 1824.00 the B737 pilot reported to the TIM SC that he had initiated a TCAS climb. The SC advised the B737 pilot that traffic in his 11 o'clock was about to level at FL 100, but that he had observed it climbing above by 300 ft. The B737 pilot reported that he had a 'Hard TCAS' and on being informed

that the traffic had descended, returned to FL 110, and was subsequently cleared down to FL 100. He advised that he could see the other ac at all times.

The cause of the TCAS RA was the action of the H25B climbing through its cleared level by 300 ft. Coincident with the TCAS action taken by the B737 pilot the BIG SC observed the level of the H25B and sought confirmation from its pilot that he was at FL 100, quickly followed by instructions to descend to and maintain FL 100.

Due to the TCAS action taken by B737 pilot vertical separation was not lost at any time. The point of minimum lateral separation occurred at 1824.16 when the B737 had the H25B in its 10 o'clock at a range of 1.6 NM and 1000 ft below.

The LONDON QNH was 1003 mb and it is possible that the ac was still operating on that pressure having failed to adjust its altimeter to the standard setting 1013.2 mb on being cleared up to a Flight Level.

ATSI comments that both ac's crews were issued with and read back ATC clearances correctly. The incident was caused by the H25B exceeding its cleared level by 300 ft, the B737's TCAS responded well and standard vertical separation was only marginally infringed.

CAA INTERNATIONAL SERVICES comments that the H25B pilot was unaware of the situation at the time of the alleged height bust and felt that he would have been able to recall more had he been informed of the problem at the time. He was also made aware of the importance of adhering precisely to cleared levels because of TCAS particularly in busy airspace and will pay more attention in future. He will also brief his co-pilot, who was PF at the time, accordingly.

UKAB Note (1): The B737 pilot states that he obtained the horizontal separation from his TCAS and ATC informed him of the 300 ft vertical distance. The RT transcript at 1824:10 shows "c/s, traffic 11 o'clock 2 miles now is level at one hundred he's just gone through the level by in fact he's gone up through three hundred feet now"

UKAB Note (2): The H25B pilot's report was submitted nearly 7 weeks post incident and only after extensive telephone tracing action owing to this ac operating in Europe away from its registered base office.

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 operating authorities.

Pilot members were dismayed that this appeared to be a situation where a 'level bust' had occurred but the pilot had not reported his deviation. The RT transcript indicated that the H25B pilot had been instructed to maintain FL 100, on reaching, owing to crossing traffic, which he had acknowledged, and backed-up with "we've got him on TCAS". Despite this, however, the ac was seen by the BIG SC to fly through its cleared level by 300 ft and had to be instructed to descend back to FL 100, which was complied with. Pilot members wondered whether this incident may have been an autopilot 'failure to capture assigned level' or possibly a 'failure to set the standard pressure setting 1013.2 on being cleared up to a flight level'; the London QNH 1003 would give the 300 ft difference recorded

during this Airprox. Also discussed was whether a TCAS RA (hard) alert in the B737 would be reciprocated with any alert in the H25B. The H25B had been climbing at 3000 ft/min immediately prior to levelling off whereas the B737 had been level for nearly 30 seconds. These anomalies were unresolved owing to lack of information from the reported H25B crew except that he had not received any TCAS alerts. However, the Board was clear that this Airprox had, in the end, been caused by the H25B climbing above its cleared level.

In discussing the risk element, members noted that the H25B crew had been passed TI on the B737, which had been seen on TCAS, and descent instructions back to his assigned level by the SC. Meanwhile, the B737 pilots reacted to a RA alert whilst also visually seeing the crossing H25B which resulted in standard separation being only marginally infringed. These factors combined led the Board to conclude that safety had not been compromised and that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The H25B pilot climbed above his cleared level.

Degree of Risk: C

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Serial No	Date	Types	Position	Risk	Page
47/00	27 Mar	B777/F16s/Mirage	ESE of North Point	B	22
98/00	5 Jul	Dauphin 2/Untraced Mil Jets	Kyle of Lochalsh	D	29
99/00	9 Jul	B737/Spitfire	3 NM WSW of Duxford	D	30
100/00	10 Jul	PA28/Sikorsky S76	BPK VOR	B	32
101/00	12 Jul	Airbus A320/BAC 1-11	10 NM WSW Dean Cross	C	34
103/00	14 Jul	Bulldog/C172	Badminton	B	39
104/00	18 Jul	B76-2/C402B	2 NM N SAPCO	C	41
105/00	19 Jul	Gazelle/Bulldog	3 NM NNE of Cullompton VRP	A	45
106/00	18 Jul	C406/Discus Glider	Gaydon	A	47
107/00	21 Jul	Tucano/Slingsby T61F	7 NM SW of Linton on Ouse	C	49
108/00	21 Jul	B733/Global Express	9 NM NE LUTON	C	51
109/00	12 Jul	Cessna 152/Robinson R44	1.5 NM W of Halton Aerodrome	C	56
110/00	27 Jul	B737-300/PA34	Letchworth	C	58
111/00	28 Jul	B747-200/B767	14 NM WNW of Donegal	C	61
112/00	2 Aug	JetRanger/Tornado GR4	3 NM SSW of Sandtoft	B	65
113/00	3 Aug	Hawk/Microlight (Flexwing)	5 NM SW of Linton	C	67
114/00	6 Aug	Cessna208B /C130	8 NM ESE of Langar	C	69
115/00	9 Aug	Jetstream 41/Cessna 208	11 NM SSW CPT VOR	C	72
117/00	7 Aug	ATP/Beech 55	6 NM NW of Farnborough	C	74
118/00	7 Aug	A321/Viking glider	3.5 NM NE of Wethersfield	A	78
119/00	11 Aug	LS6 glider/Cessna 172	2 NM E of Midhurst	B	80
120/00	16 Aug	Chipmunk/Tornado GR	0.25 NM W of Brighton Aerodrome	B	81
121/00	13 Aug	C152/PA28	5.5 NM NNE WCO NDB	A	83
122/00	22 Aug	SAAB 340/F15 x 2	3.2 NM E of Kirkwall	C	85
123/00	22 Aug	Islander/F15 x 2	6.7 NM NE of Kirkwall	C	86
124/00	16 Aug	B727/Mirage 2000	UIR Boundary 2 NM SW of ALESO	C	87
125/00	23 Aug	PA25 Tug/Glider/F15E	1 NM NW Aboyne aerodrome	C	90
126/00	25 Aug	B73-3/Learjet 35A	12 NM WSW Luton	C	91
127/00	29 Aug	PA25 TUG/GLIDER/F15C	1 NM W of Aboyne Glider Site	B	94
128/00	16 Aug	Tornado GR1/C130	10 NM WSW of Insch aerodrome	C	96
129/00	30 Aug	DG202 glider/Tornado GR	4 NM N of Burford	A	98
130/00	30 Aug	Vigilant Glider/Tornado GR	2.75 NM NE of Syerston Aerodrome	C	100
131/00	30 Aug	Glider K6CR/C152	7 NM NW Great Malvern	B	102
132/00	29 Aug	Saab 2000 (SB20)/Glider	2 NM SE HON VOR	C	103
133/00	2 Sep	LS6C Glider/PA28R	1 NM SE Halton	C	105
134/00	1 Sep	BAC 1-11/Sea Harrier FA2	6 NM ENE of Bournemouth	C	107
135/00	29 Aug	B747/BAe 146	20 NM NW of DOGGA	C	110
136/00	31 Aug	PA23 Aztec/Jet Provost	Blackpool airport	C	112
137/00	8 Sep	Jetstream/Tutor	3 NM W of Horncastle	C	114
138/00	8 Sep	S76/Tornado F3	14 NM NNE of Cromer	C	116
139/00	4 Sep	C152/PIPER PA28 R	4 NM W of Greenham Common	B	120
140/00	10 Sep	DG 505 Glider/Helicopter	1 NM NW Nympsfield	C	122
141/00	12 Sep	B777-200/SHAR FA2	15 NM ESE of MERLY	C	123
142/00	13 Sep	Cessna 152/Grob Tutor	2 NM SW of Conington	C	128
143/00	11 Sep	C-9A/Sea Harrier x 2	4 NM ESE of Cambridge	C	129
144/00	14 Sep	Griffin HT1/Sea King HAR 3	1 NM E of Valley	B	132
145/00	15 Sep	BAe146/DHC 8	8 NM WSW Southend airport	C	136
146/00	16 Sep	LS 6C glider/PA28	1 NM SSE Halton	B	139
147/00	17 Sep	Ka13 Glider/C172	Halton Aerodrome	B	141
148/00	15 Sep	B737/G4	8 NM SW OCK	C	143
149/00	16 Sep	BAC 1-11/B747-41	Manchester Airport	B	146
150/00	20 Sep	Denney Kitfox/Tornado GR	Shotteswell near Banbury	C	151

Serial No	Date	Types	Position	Risk	Page
151/00	17 Sep	Yak 52/F16 x 2	1 NM SE of Dunkeswell	B	152
152/00	18 Sep	DHC-8/Tornado F3	9 NM N of Hexham	C	154
153/00	13 Sep	A319/PA38	5.5 NM SE HON VOR	C	157
154/00	22 Sep	ATP/BAe146	1.5 NM E MIRSI	C	161
155/00	26 Sep	Squirrel HT1/Untraced	2 NM SSE of Chetwynd RLG	C	163
156/00	28 Sep	B733/C172	1 NM NE Glasgow Airport	C	167
157/00	28 Sep	Tornado GR/Cessna 152	3 NM W of Inverness	C	170
158/00	29 Sep	B737-400/Harrierx2	2 W of TILNI	C	171
159/00	2 Oct	A330/A340	330 NM W of Stornoway	A	174
160/00	4 Oct	Cirrus Glider/Hunter	1.25 NM SSE Aston Down	C	180
161/00	5 Oct	Gulfstream GA7/PA28	258° SAM 10 NM	B	182
162/00	29 Sep	MD90/B737-300	2 NM W LAM	C	185
163/00	10 Oct	Twin Squirrel/PA28	1 NM S of Sittingbourne	A	188
164/00	11 Oct	Bo105/Harrier T10	4.5 NM N of Syerston	B	189
165/00	11 Oct	A319/B767	5 NM W of BNN	C	193
166/00	12 Oct	PA25/Tucano	0.5 NM NNW of Milfield aerodrome	B	195
168/00	11 Oct	ATR 72/EC135T	1 NM ENE Newcastle Airpor	C	197
169/00	11 Oct	B737-300/IL 76	10 NM W of Stansted	C	199
170/00	14 Oct	A319/LongRanger	3 NM ENE of Edinburgh	C	202
171/00	13 Oct	Gazelle/APACHE AH1	Middle Wallop	A	204
172/00	11 Oct	G4/SB20	6 NM E LAM VOR	B	208
173/00	19 Oct	Jetstream/Mirage	8 NM ESE of Waddington	B	212
174/00	19 Oct	Tornado GR1/Bell 206L	8 NM SSE of Inverness	B	214
175/00	13 Oct	Jaguar/Paraglider	10 NM S of Sedburgh	B	217
176/00	23 Oct	B737-400/B767	TIMBA Hold	C	218
177/00	24 Oct	B757-200/A319	2 NM E HON VOR	C	221
179/00	4 Nov	PA28 x2/Model ac	2.5 NM NE Brize Norton	A	224
180/00	7 Nov	Jetstream/Mirage	6.5 NM WSW of Cranwell	C	226
181/00	4 Nov	R22/LongRanger	Sherburn in Elmet	C	228
182/00	4 Nov	C152/PA60	RW26 threshold Tatenhill A/D	B	230
183/00	9 Nov	Tornado GR1/Tornado GR1	10 NM N of Barrow-in-Furness	A	232
184/00	7 Nov	B747 (A)/B747 (B)	Class: A	C	234
185/00	6 Nov	KC-135/Tornado GR	13 NM NW of Mildenhall	C	237
186/00	2 Nov	Tornado GR 1/AS350 Squirrel	CROMARTY FIRTH	A	239
187/00	15 Nov	ATR42/AS332	2 NM NNW Aberdeen Airport	C	242
188/00	16 Nov	S76/ATR42	2 NM NW of Coltishall	C	244
189/00	13 Nov	AS355/MD600N	2.25 NM NW NOTTINGHAM A/D	B	246
190/00	13 Nov	DHC8/AA5	2 NM SW Edinburgh Airport	C	248
191/00	16 Nov	Tornado F3/F15	N of Duns	D	250
192/00	22 Nov	B757/F15	8 NM WSW of DTY	A	252
193/00	23 Nov	ATP/Tornado F3	18 NM SE of Ronaldsway	C	257
195/00	17 Nov	Fokker 50/Harrier	080° OTR 25 NM	C	259
196/00	26 Nov	B752/MD88	1.25 NM NW CONGA	C	262
197/00	8 Nov	F50/PA42 Cheyenne III	4.5 NM W of Bristol Apt	C	264
198/00	29 Nov	Tornado GR/Cessna 172	7 NM SE of Wittering	A	266
199/00	4 Dec	SAAB 2000/B737-500	6 NM NE BEXIL	B	268
201/00	9 Dec	A319/A320	5 NM NW BIG VOR	C	271
202/00	11 Dec	B747-200/C12M (Beech 200)	2 NM SW of BPK	C	274
203/00	12 Dec	Hawk/Tornado GR	18 NM N of Cromer	B	277
204/00	14 Dec	Tornado GR/Squirrel	1.5 NM S of Ripon	A	280
206/00	15 Dec	PA46/SHAR FA2	12 NM N of TALGA	C	282
207/00	6 Dec	B737/H25B	2 NM S DET VOR	C	285