UK AIRPROX BOARD

Analysis of Airprox in UK Airspace

Report Number 4

January 2000 to June 2000

A joint Civil Aviation Authority / Ministry of Defence service

Report by the UK Airprox Board,

'Analysis of Airprox in UK Airspace'

(January 2000 to June 2000)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

This Report, like the three others that have preceded it, is aimed squarely 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 incidents in the first six months of 2000. To that end, 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.

There were 95 Airprox during the period, which is exactly the same number recorded in the first half of 1999. However, the mix in 2000 was different; a decrease in General Aviation (GA) involvement was counterbalanced by an increase in both Commercial Air Transport (CAT) and Military aircraft encounters.

Risk results for the first six months of 2000 were broadly in line with those for the same period in 1999:

(January – June)	1999	2000	
Risk Category A:	12	14	(Collision risk)
B:	26	20	(Safety compromised)
C:	57	61	(No collision risk)
Totals:	95	95	

Finally, Airprox 182/99 was not included in UKAB Report Number 3 because the incident was still subject to a military Board of Inquiry at the time. That process has since been completed and the UKAB's findings on 182/99 are included in the Airprox section of this Report. Statistics for the period January to June 2000 exclude Airprox 182/99, but the 'big picture' can be gleaned from the UKAB web site at www.ukab.org.uk.

Gordon McRobbie

Gordon McRobbie
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

RECOMMENDATION: The Board endorsed the ATSI recommendation that CAA/NATS, through LATCC Management staff, should review with the appropriate authorities the vectoring restriction for ac on right turn-out SIDs from RW 26L/26R at Gatwick.

Status — Open

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

221/99 F100 and an A321 14 Dec 99 Risk Category: C

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

Status — Accepted

CAA Action: The CAA has published AIC 100/2000, dated 16 November 2000, which reminds pilots of the response expected when ATC gives instructions using the phrase "Avoiding Action".

16/00 B767 and a B767 9 Feb 00 Risk Category: C

OBSERVATION: Use of the word "maintain" by ATC in UK airspace has a different meaning when used by ATC in USA airspace. This can lead to mistakes by commercial air transport pilots.

Status — Accepted

CAA Action: The ATS Standards Department of the CAA has issued Air Traffic Services Operational Memorandum (ATSOM) No. 35 to all UK civil ATS providers and the Flight Operations Department has issued Flight Operations Department Communication (FODCOM) 11/2000 to all UK operators. These publications alert controllers and pilots to the different interpretations of the word 'maintain'. In addition the ATSOM confirms that the issue will be raised with the appropriate authorities in an endeavour to standardise on the ICAO/UK interpretation.

27/00 B737 and a B737 6 Mar 00 Risk Category: C

RECOMMENDATION: That the CAA considers with urgency, an examination of the new procedures proposed for Manchester/Liverpool operations.

Status — Accepted

CAA Action: The CAA accepts this Recommendation, partially. The new procedures are not yet mature enough for presentation to DAP. Nevertheless, pending changes in the longer term, NATS has introduced measures to ensure that occurrences similar to Airprox 27/00 do not take place in future.

74/00 A320 and a C550 6 Jun 00 Risk Category: C

RECOMMENDATION: That the CAA should review the Luton ATC departure "Free Flow" and "Check" procedures, together with personnel responsibilities, with a view to simplifying arrangements without prejudice to safety.

Status — Accepted

CAA Action: The Luton ATC departure release procedure has been simplified and the number of 'Checks' required have been reduced. Responsibility lies with the Luton INT controller to specify which routes need to be checked. When a route does not require a release, the ADC controller can depart aircraft in accordance with the MATS Pt 2 timed departure arrangements, without reference to the Luton INT controller.

83/00 B767 and a B737 15 Jun 00 Risk Category: C

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 —Open

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

94/00	SAAB340 and a Tornado	28 Jun 00	Risk Category: A

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 —Open

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

75/00	**Harrier and a PA28**	**7 Jun 00**	**Risk Category: A**

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 — Open

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

STATISTICS

JANUARY – JUNE 1999 and 2000

THE UKAB DATA SET

The graphs and tables in the pages that follow provide see-at-a-glance comparisons on Airprox recorded between the first six months of 1999 and the same period for 2000. In either case the statistical sample is too small to extract any meaningful trends, but the profiles emerge from the data are interesting nonetheless.

Information is presented first to show the 'big picture', followed by separate sub-sections covering:

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

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

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

HALF YEAR COMPARISONS

A total of 95 Airprox were reported during the first six months of 1999 and this number was again matched exactly during the first half of 2000. However, the 'mix' in year 2000 was slightly different from the previous one, as can be seen clearly from Figure 1 and Figure 2 (below). In 2000 a reduction of 9% in Civ~Civ incidents was mirrored by corresponding increases in the overall Mil~Mil and Civ~Mil figures.

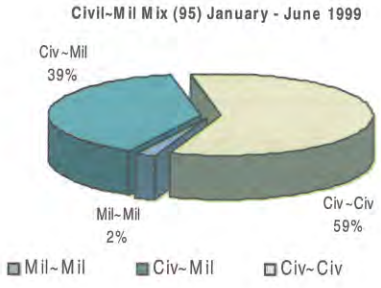


Figure 1

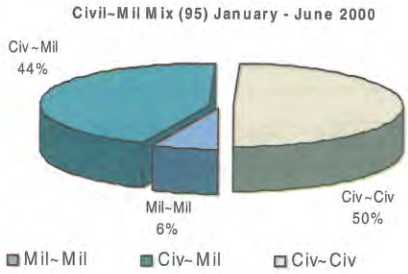


Figure 2

Additional information is set out in the next two pie charts (*Figures 3 and 4 below*) to give a more detailed breakdown of the way in which the various elements met. The most evident change is a significant reduction in the overall percentage figures involving GA aircraft (down from 75% to 52%). On the other hand trends moved in the opposite direction for both CAT (up by 8%) and Mil (up by 8%) incidents.

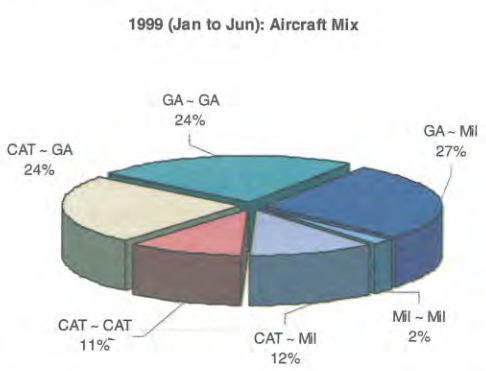


Figure 3: GA = 76%; CAT = 46%; Mil = 41%

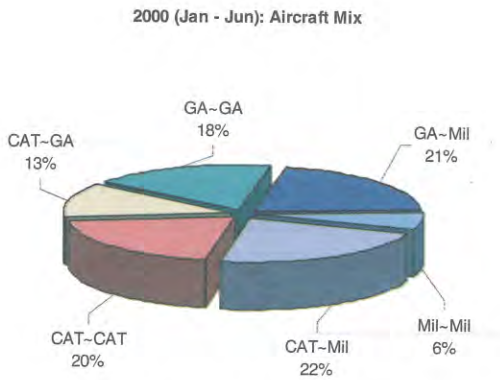


Figure 4: CAT = 55%; GA = 52%; Mil = 49%

Airprox monthly distribution statistics for both periods are set out for comparison in Tables 1 and 2 (*below*). A marked increase in numbers occurred in March 2000, while numbers in May 2000 were quite a bit below the previous year's figure. Finally, numbers for the three aircraft groups show where the changes happened.

1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	0	0	1	0	1	0	2
Civ~Mil	10	4	9	2	3	9	37
Civ~Civ	5	6	6	13	12	14	56
Totals	15	10	16	15	16	23	95

Table 1

2000	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	1	0	1	1	0	3	6
Civ~Mil	6	5	11	4	7	8	41
Civ~Civ	6	5	11	9	2	15	48
Totals	13	10	23	14	9	26	95

Table 2

COMMERCIAL AIR TRANSPORT (CAT) SECTION

RISK RESULTS

The chart at Figure 5 (*right)* provides a direct comparison of risk profiles for each period, set against overall Airprox figures shown in the background. Tables 3 and 4 (*below*) list in detail the various Risk categories by month. Between January and June 2000 there were eight more CAT Airprox than in the same months of 1999. The biggest rise was in March 2000, however, this was partially balanced by a reduction in May 2000. More importantly, the number of 'risk bearing' incidents came down in the first half of 2000; 'Risk A' incidents reduced by 1 and 'Risk B' cases fell by 2. These welcome reductions were balanced by more '*No collision risk'* cases, which moved up from 34 to 45.

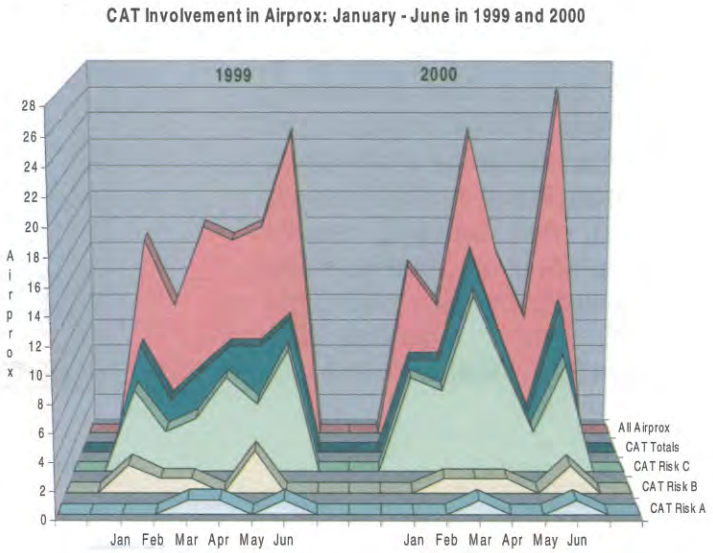


Figure 5

1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	1	0	1	3
Risk B	2	1	1	0	3	0	7
Risk C	6	3	4	7	5	9	34
Totals	8	4	6	8	8	10	**44**

Table 3

2000	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	0	0	1	2
Risk B	0	1	1	1	0	2	5
Risk C	7	6	13	8	3	8	45
Totals	7	7	15	9	3	11	**52**

Table 4

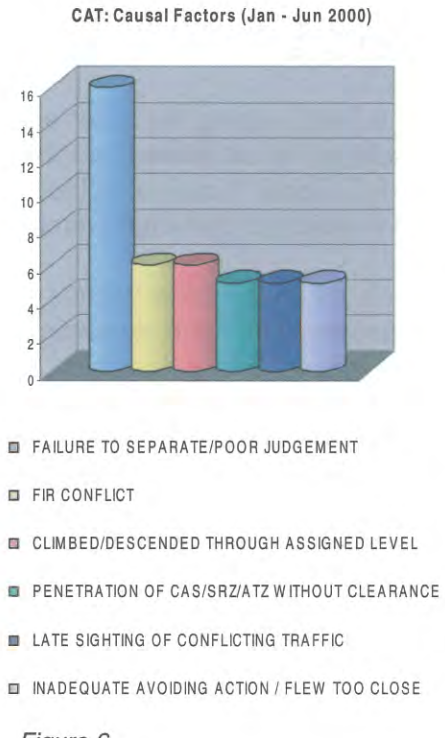


Figure 6

CAT CAUSAL FACTORS

A total of 88 causal factors were identified from the 52 CAT Airprox recorded. Figure 6 (*left*) shows those factors that were repeated at least five times or more. The most common one was attributed to controllers who did not achieve the 'standard separation' distances expected between aircraft. However, none of these incidents was risk-bearing.

Next came conflicts in the ' FIR', together with 'level busts' by pilots. All of the incidents from both of these factors were 'Risk C' assessments bar one 'level bust' case, which was assessed as 'Risk B'.

'Late sightings' caused two CAT 'Risk A' incidents and one Risk B case. All of the remaining 'top 6 causes' resulted in Risk C assessments (no collision risk).

RISK RESULTS

Results for GA aircraft improved across the board. Figure 7 (*right*) shows reduced volumes generally, while the detail is listed in Tables 5 and 6 (*below*). Points to note are that total GA Airprox numbers fell from 72 (1999 period) to just 49 (2000 period). Moreover, risk bearing results reduced by about one third from their previous values (down from 35 to 24). Likewise, 'Risk C' incidents were down from 37 in 1999 to 25 in 2000.

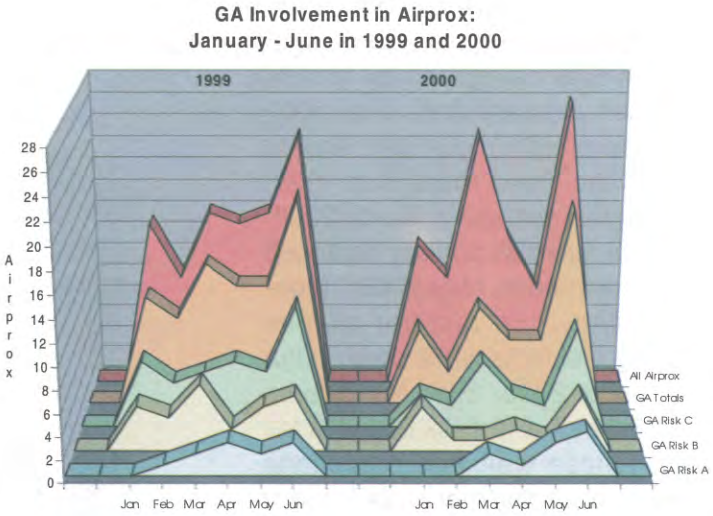


Figure 7

1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	1	2	3	2	3	11
Risk B	4	3	6	2	4	5	24
Risk C	6	4	5	6	5	11	37
Totals	10	8	13	11	11	19	**72**

Table 5

2000	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	2	1	3	4	10
Risk B	4	1	1	2	1	5	14
Risk C	3	2	6	3	2	9	25
Totals	7	3	9	6	6	18	**49**

Table 6

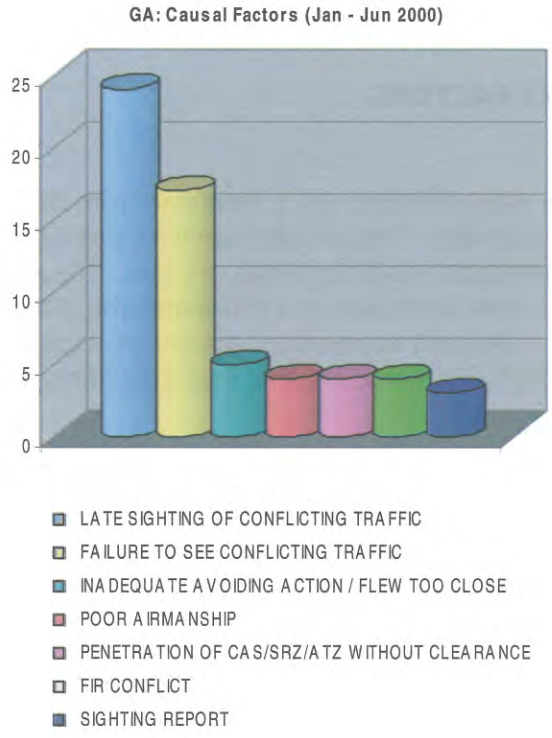


Figure 8

CAUSAL FACTORS

From Figure 8 (*left*), seeing the other aircraft late, or not seeing it at all, dominated the GA causal factor list. Better 'Lookout' is therefore a prime area in which to gain improvements.

By comparison, all of the other factors were far fewer in number, with none exceeding five examples. However, 'Flying too close' and 'Penetrating controlled areas' without clearance are two specific areas where it would pay to seek further improvements. Of note, there were three 'sighting reports', where with the benefit of full information and hind sight, no real conflict had taken place.

MILITARY SECTION

RISK RESULTS

Although the total number of Military Airprox went up from 39 to 47 in the two periods being compared, Risk bearing results showed no change. Results for 2000 (16) were exactly the same as the previous year's figure, for the same period. The bulk of the increased numbers can be attributed to Risk C incidents (*no risk of collision*); these went up from 23 to 31 in the comparable time frames. Specific details on all of this are set out in Tables 7 and 8 (*below*).

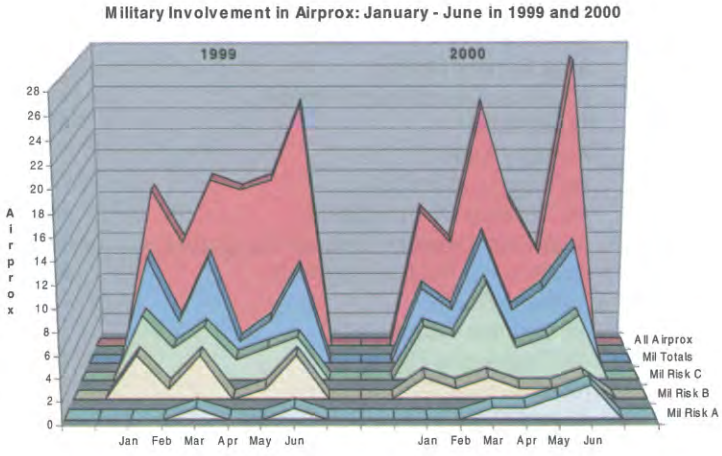


Figure 9

1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	0	0	1	2
Risk B	4	1	4	0	1	4	14
Risk C	6	3	5	2	3	4	23
Totals	10	4	10	2	4	9	**39**

Table 7

2000	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	1	2	3	7
Risk B	2	1	2	1	1	2	9
Risk C	5	4	9	3	4	6	31
Totals	7	5	12	5	7	11	**47**

Table 8

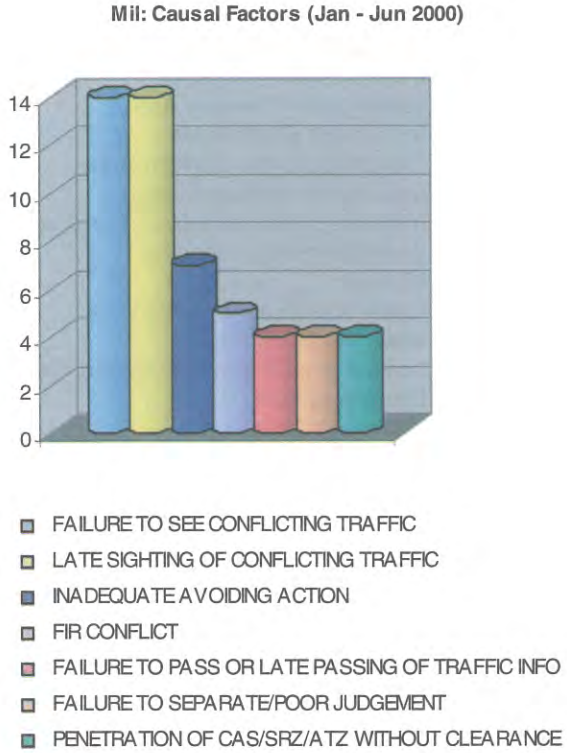


Figure 10

CAUSAL FACTORS

Figure 10 (*left*) shows that the most common causal factor behind military Airprox, was the failure to see, or late sighting of, conflicting traffic.

Next came 'inadequate avoiding action' of which there were seven examples. Of the remaining causes, none occurred more than five times and two factors from this group included shortcomings from air traffic controllers as well as by pilots. The final causal factor is an aspect in which foreign military aircrews could seek to improve standards. In context, however, these nimbers are small statistically and so they should be regarded as 'snapshot' information only.

GLOSSARY OF ABBREVIATIONS

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

MEDA	Military Emergency Diversion
MHz	Megahertz
MRSA	Mandatory Radar Service Area (Military Area)
MSA	Minimum Safe Altitude
MSD	Minimum Separation Distance
MTA	Military Training Area
MTRA	Military Temporary Reserved Airspace
NATS	National Air Traffic Services
NDB	Non - Directional Beacon
NM	Nautical Mile(s)
NOTAM	Notice to Airmen
NVG	Night Vision Goggles
OAC	Oceanic Area Control
OACC	Oceanic Area Control Centre
OAT	Operational Air Traffic
ODL	Opposite Direction Level
OJTI	On-the-Job Training Instructor
PAR	Precision Approach Radar
PFL	Practice Forced Landing
PI	Practice Interception
PIC	Pilot in Command
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
TMA	Terminal Manoeuvring Area
TTA	Tactical Training Area
UAR	Upper Air Route
UAS	Upper Airspace Service
UASRA	Upper Airspace Special Rules Area
UDA	Upper Advisory Area
UDF	Ultra High Frequency Direction Finder
UDR	Upper Advisory Route
UKAB	UK Airprox Board
UIR	Upper Flight Information Region
UKLFHB	UK Military Low Flying Handbook
USL	Under-slung Load
UTC	Co-ordinated Universal Time
VCR	Visual Control Room
VDF	Very High Frequency Direction Finder
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omni Range
VRP	Visual Reporting Point
WIP	Work in Progress
WRDA	Weapons Range Danger Area

AIRPROX REPORT No 182/99

Date/Time: 14 Oct 0956

Position: N5505 W0151 (6 NM NW of Newcastle - elev 266 ft)

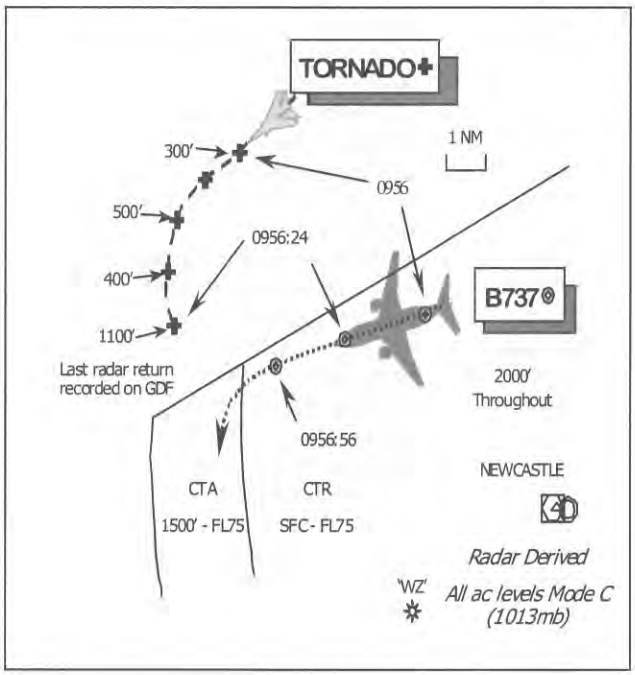
Airspace: Newcastle CTR/FIR (*Class:* D/G)

Reporter: Newcastle ATC

	First Aircraft	*Second Aircraft*
Type:	B737-500	Tornado GR1
Operator:	CAT	HQ STC
Alt/FL:	2500 ft (QNH 1030mb)	NK
Weather	IMC IN CLOUD	NK
Visibility:	NK	NK
Reported Separation:	2 NM H/NK V	
Recorded Separation:	Not recorded	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE NEWCASTLE RADAR DIRECTOR (DIR) reports that the B737 was vectored downwind LHD for an ILS approach to RW 07 at 2500 ft QNH. The B737 crew was number three in the pattern and in receipt of a RCS. At about 0956, traffic information was passed to the B737 crew on military traffic observed operating just west of the CTR boundary, which the crew acknowledged and advised that they were flying in IMC. As the B737 passed N abeam the 'WZ' NDB, one of the contacts was seen to climb into CAS he thought, level off at 2500 ft Mode C and fly directly toward the B737 at the same level. Avoiding action was issued to the B737 crew *"...avoiding action turn left heading 160, 160, avoiding action, similar level traffic 12 o'clock range of 3 miles coming towards"*. Whereupon the B737 crew queried the heading. This was reaffirmed by DIR and preceded by updated traffic information just before 0957, *"...now 1 o'clock range of 2 miles turning northbound similar level"*. By the time the turn onto 160° was seen to take effect he perceived the horizontal separation had reduced to 1 NM, whereupon the observed ac turned L northbound and descended below radar coverage.



THE NEWCASTLE WATCH SUPERVISOR adds that during the period of this Airprox traffic conditions had been extremely busy, owing to military ac participating in an exercise. Most of which passed N and W of the Newcastle CTR/CTA. Newcastle ATC was subsequently advised of an ac accident 9 NM NW of the airport.

UKAB Note (1): The 0950 Newcastle weather was reported as surface wind: 020/2; 8 km Nil Weather; SCT 800 ft; OVC 1000 ft.

UKAB Note (2): The military traffic was identified as a Tornado GR1, which subsequently crashed at a position 55°05'2"N 001°56'25"W, to the N of the northern boundary of the CTA, about 287° (T) Newcastle airport 9·2 NM.

UKAB Note (3): The LATCC Great Dun Fell (GDF) radar recording does not illustrate this Airprox clearly; neither the maximum altitude of the Tornado nor the point of minimum horizontal separation reported by the Newcastle controller are shown. The last recorded GDF radar return occurs at about 0956:24, when the subject ac are shown 4 NM apart as the Tornado, indicating 1100 ft Mode C (1013 mb), turned port about toward the B737, which indicated 2000 ft Mode C.

THE B737 PILOT reports flying a radar vector of 270° at 220 kt and under the control of Newcastle

at 2500 ft (1030mb) positioning downwind L for RW 07. Flying IMC in cloud, HISLs, anti-coll and landing lights were on; TCAS was not fitted. When due N of the airport, ATC advised of traffic on an opposite heading at the same altitude and issued a L turn onto 160°; speed was reduced to 180 kt. ATC issued further information that the traffic was turning north and the range had decreased to 2 NM, although this was closer than he had initially appreciated, the conflicting traffic was not sighted at all. ATC subsequently issued vectors to direct them back onto the localiser from the S and he resumed a normal approach without further incident.

HQ MATO reports that the Tornado crew were one element of a flight of 2 Tornados that established communications with Spadeadam ATC (SPADE) at 0929:54 on the Spadeadam ICF, some 26 min before the incident. SPADE placed the flight under FIS, passed the Tyne RPS (1026 mb) and allocated SSR Mode 3/A codes of 2621 and 2623 respectively. The Tornados changed to an operational frequency at 0932:20, also monitored by SPADE who asked the subject crew to re-select 3/A code 2623, but the Tornado was still not visible on radar. However, the controller assumed that this was due to the ac being below radar cover. Fifteen min later at 0947:20, having aborted their first attempt to enter the range because of poor weather the Tornado crew transmitted *"...we're re-setting out to the east, we're unable to get* (Transmission unclear possibly..*from IP*) *with this weather."* SPADE saw the Tornado on radar about 15 NM E of the range at 4500 ft and offered a cloud break to the crew, which they declined. *"..negative we're just coming* (possibly *coasting*) *out for a TF descent low level now."* SPADE then advised the Tornado crew of their leader's position, which was about 10 NM to the W, tracking NE at 2000 ft. Radar contact with the Tornado was lost as it crossed the coast just S of Amble Light still inbound to the range and descending to low level. However, the ac could be tracked on SSR alone from an adjacent (non-ATC) display, which is used by other range staff to co-ordinate the threat simulations directed at the ac. At 0955:00, the Tornado crew transmitted *"... aborting again..."* the remainder of the transmission is unclear, but it appears to be an enquiry to the lead ac about the route taken into the range. SPADE observed that the Tornado's squawk had disappeared, about 10 NM NW of Newcastle at 0955:25 and attempted to raise the crew on RT to no avail. Further attempts to trace the ac with Newcastle ATC and ScATCC (Mil) were made, but were unsuccessful. At 1001, the controller alerted ScATCC (Mil) D&D regarding his concerns about for the ac.

HQ STC comments that the following is based exclusively on the evidence revealed in the course of the investigation into the loss of the Tornado GR1 and its crew on 14 October 1999. The weather in the Newcastle area at the time of the Airprox was unsuitable for low flying and several other military fast-jets had pulled up from low level in the area within the same 10 min time-frame. The Tornado crew's attempted weather avoidance prompted a L turn onto SE in preference to a positive pull-up, placing the Newcastle CTA 1-2 NM on the nose and perpendicular to the ac track. The crew's choice of a L avoidance turn exacerbated the potential problem by turning the ac towards the Newcastle CTR. Whilst the no-notice penetration of CAS is highly undesirable, emergency procedures cater for the possibility with instructions to squawk emergency and to contact the appropriate agency on Guard (243·0MHz or equivalent). At this point, the avoidance of controlled airspace was the crew's prime concern.

In light of recorded radar evidence and analysis of the ac ADR, it has since been determined that the ac did not penetrate the CTA; nevertheless, the ac did fly extremely close to the boundary, initially on a collision course with civilian traffic. This confliction occurred IMC and the crew of the Tornado would have been unaware of it. The Board of Inquiry undertook an extensive analysis of Human Factors and, although many of their findings have no relevance to this Airprox, it is highly likely that a breakdown in CRM, compounded by a pre-occupation with completing the briefed task, resulted in the near penetration of controlled airspace and the confliction with civilian traffic.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the pilot of the B737, 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 not the purpose of the Board to find out why the Tornado had crashed. This was the sole business of the BOI and would be covered in their findings, which would be issued in due course. Therefore, the Board confined its assessment strictly to the cause of the Airprox filed by the Newcastle controller and the risk.

Some members were concerned that the B737 pilot may not have reacted promptly to the avoiding action instruction issued, which was given in very explicit terms. The situation demanded urgency and pilot members stressed the importance of applying bank quickly when told to turn instead of waiting to query the heading, which could be done whilst in the turn. Evidently the controller thought that the Tornado was going to enter the CTR and turned the B737 away. For the Tornado's part its crew would certainly have been unaware of the B737, whose pilot reported flying in IMC. As highlighted in the STC report, it was unfortunate that the Tornado crew had turned L and thence toward the CTR, where because of the weather they had little chance of spotting the other ac that was just inside the boundary. A military pilot member queried why the B737 would have been so close to the northern edge of the CTR, but civil controller members explained it was to maintain separation on the other ac in the radar pattern ahead of the B737 on finals to RW07. There seemed little doubt from the information available that the Tornado crew would have been endeavouring to remain outside the CAS surrounding Newcastle. Although it had manoeuvred very close there was no evidence on the LATCC radar recording which indicated that the Tornado had crossed the northern boundary of the CTR into Class D airspace. Moreover, the projected radius of turn from the last recorded position suggested that it did not. This point was allegedly verified by data from the ac ADR, according to HQ STC. It was noted also that the B737 pilot had commenced the turn away from the Tornado's perceived track as the latter started to move away to the N. Therefore from the information available, at the CPA both ac were turning away from each other. In no way did this imply criticism of the controller's actions – it was hoped that most would react as he did – but merely a statement of fact. Consequently, members concluded that this Airprox resulted because the Tornado crew flew sufficiently close to Newcastle CAS to cause the Newcastle RADAR DIRECTOR extreme concern for the safety of the B737.

Turning to risk, some members were inclined to believe that in the absence of information from the reported pilot or the report awaited from the BOI and the absence of recorded radar data, there was insufficient information available for an accurate assessment of the risk. However, after lengthy debate a majority view prevailed that sufficient information existed to assess this Airprox. The RT recording gave a clear indication of what the Newcastle controller perceived from his radar display and members agreed that he had little option but issue avoiding action. The Tornado looked to be at a similar level and was turning rapidly toward the airliner. Separation reduced to 3 NM as the Tornado passed through the B737's 12 o'clock and then decreased further to 2 NM, but by that juncture the Tornado's tight turn started to take it away from the other ac. The end result was that neither of the tracks crossed and the Tornado remained outside CAS, but it had been a very uncomfortable few moments for the controller who was the only person to see it all happen. Sticking to what did happen and not what might have happened members agreed by a very narrow margin that the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Tornado flew sufficiently close to Newcastle CAS to cause the Newcastle RADAR DIRECTOR extreme concern for the safety of the B737.

AIRPROX REPORT No 1/00

Date/Time: 6 Jan 1105

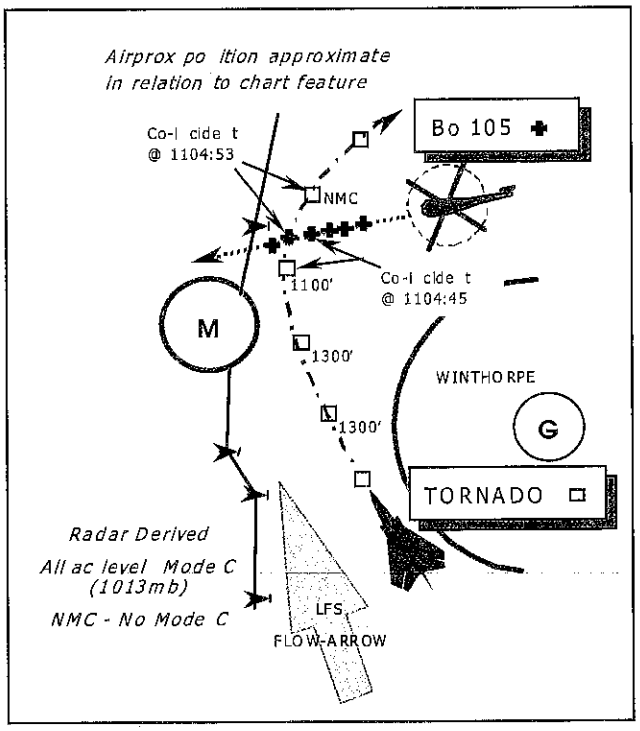
Position: 5308 N 0051 W (4 NM NW of Winthorpe elev - 60 ft)

Airspace: FIR/LFS (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Bo105 Helicopter	Tornado GR
Operator:	Civ Comm	HQ STC
Alt/FL:	500 ft (RPS 1001 mb)	800 ft (RPS 1001mb)
Weather Visibility:	VMC CLBC 30 km	VMC CAVOK 40 km

Reported Separation: 0·25 NMH/200 ft V

Recorded Separation: <0·5 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo105 PILOT reports heading 260° at 110 kt in transit at 500 ft RPS straight and level, whilst in receipt of a FIS from Waddington and squawking 3/A 0020 with Mode C selected on. The helicopter colour scheme is blue and white; HISLs, navigation and anti-collision lights were on. Whilst approaching a position about 4 NM NW of Newark, suddenly a Tornado was seen at 11 o'clock, 0·25 NM crossing from L to R in a 60° R bank, 200 ft above the helicopter. There was no time to take avoiding action and the jet passed by at about the same distance clearing away to the NE. With regard to risk he adds that the safety of his helicopter had been compromised if the Tornado crew had not seen it.

THE TORNADO GR1 PILOT reports heading about 045° at 450 kt, on a low-level sortie at 800 ft RPS. The ac was standard camouflage grey, HISLs were on and a 3/A 7001 squawk selected with Mode C. Though flying out of sun the helicopter was not seen at all.

HQ MATO reports with RT transcript that the Bo105 pilot departed Waddington and called Waddington ZONE that was bandboxed with APPROACH. At 1057:40, the pilot reported *"...two miles W of the field, Flight Information please, en-route and we are less than 1000 ft 996."* ZONE agreed a FIS and reaffirmed the Barnsley RPS (1001 mb). Shortly after 1105, the Bo105 pilot transmitted *"You obviously didn't see that F3 then that came about 100 ft above us"* to which ZONE replied *"...you're only on a Flight Information Service, did you want Radar Information?"* The pilot replied *"No...but I thought you might have mentioned the fact that he was closing on us"* to which ZONE responded *"Roger, you're not being monitored continuously at the moment..."*. The pilot asked that the position be noted, adding that he would file an Airprox on return, which was acknowledged by ZONE who added *"...I'll upgrade you to Radar Information."*

Both ZONE and the Supervisor checked the radar display immediately after the incident; the Bo105's squawk was clearly visible, but the reported ac only appeared as a weak and intermittent primary contact tracking N at high speed with no supporting SSR. The unknown ac was tracked with difficulty for a short period, before contact was lost about 15 NM NW of Waddington. Tracing action by AIS (Mil) subsequently identified the reported ac as a Tornado GR1.

A low flying ac would have been close to, or below, the base of solid radar cover at the Airprox position. Although the Waddington SRE is supplemented with

SSR data from Cranwell, it is not known whether the Tornado was shown on ZONE's radar display before the encounter; given the difficulties experienced in tracking the ac after the occurrence, it probably was not. As the Bo105 pilot had requested FIS, a non-radar service, the controller was not required either to monitor the helicopter on radar, or separate it from other ac in the FIR.

The Bo105 is based at Waddington and its crew should be familiar with the local area and its regular military low flying activity. Though its pilot advised on RT flying *"below 1000 ft"* he reported flying at 500 ft RPS, for which there would not appear to be any specific operational requirement. In the fine weather reported a higher transit altitude may have kept the helicopter in solid radar cover.

HQ STC comments that the Tornado crew was operating in good weather and in accordance with military procedure was squawking 7001 with Mode C. The crew was well briefed and correctly authorised, relying on the principle of see-and-avoid as the primary method of deconfliction. Although the Tornado crew report they did not see the helicopter, they believed they were maintaining a good lookout. The importance of a disciplined and effective look-out has once again been highlighted, but in the absence of a collision warning system such a confliction in the UK LFS remains a factor in military ac operations. There is no apparent reason why the Bo105 pilot elected to transit at 500 ft, an altitude at which he is significantly more vulnerable to the hazards of low-flying military fast jets. The Bo105 pilot's criticism on RT of the ATS provided may indicate an incomplete knowledge of ATC services outside CAS. Based locally, it is surprising that the pilot chose to fly at 500 ft across this LFS choke point. The lesson is clear: if he wanted enhanced safety during transit, he would have been better advised to remain above 2000 ft agl, or above the base of radar cover and obtain a more robust ATC service.

UKAB Note (1): The LATCC Claxby radar recording reveals that this Airprox occurred shortly after 1104:45. The Bo105 helicopter identified by its 3/A 0020 squawk is shown tracking about 260°, but no Mode C is evident throughout the proceeding period although the pilot reports it was selected on. The subject Tornado is shown squawking 3/A 7001 tracking about 340° and converging on the helicopter from the S at 1300 ft Mode C (1013 mb). The encounter is then shown broadly as described by the helicopter pilot; the Tornado turns NE from the helicopter's 11 o'clock at less than 0·5 NM. At 1104:45, just before the respective tracks cross, the Tornado indicates 1100 ft Mode C (1013 mb), equating to about 740 ft RPS (1001 mb). The Tornado Mode C is not evident in the turn.

UKAB Note (2): A further telephone conversation with the Bo105 pilot revealed that he was aware of the LFS choke point and flow arrow that he was crossing at the time of the Airprox, but thought the inclusion of flow arrows on civil air charts would be extremely useful in highlighting areas of potential conflict with fast jet traffic at low level. He added that at the time he believed he was flying on an air ambulance mission to an emergency incident and his comments on RT regarding the ATS provided were not intended to be overtly critical. Indeed, he appreciated of the very effective ATS that is the norm at Waddington.

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 readily agreed with the HQ STC comment regarding the transit altitude at which the Bo105 pilot elected to cross the known LFS choke point. Though entitled to fly at such an altitude it significantly increased the potential to meet a fast jet in the LFS as demonstrated by this occurrence. Accepting fully that the Bo105 pilot was flying to an emergency incident, it was felt, nonetheless, that it might have been wiser to transit at a higher altitude. Doing so would have the added benefit of placing the helicopter in better theoretical radar cover, facilitating the provision of traffic information which would be available if he had requested a RIS. As it was the Waddington SRE had not detected the low-flying Tornado very well, if at all, in this instance. Moreover, it was apparent to the members that in the absence of radar detection, 'see and avoid' shoud have worked. With little need for debate the cause of the Airprox was agreed to be a late sighting by the Bo105 pilot and a non-sighting by the Tornado crew.

Members noted the Bo105 pilot's comment in relation to placing UKMLFS flow arrows on civil charts and there was considerable debate over why this important information is not included on CAA VFR charts. It was evident that the Bo105 pilot was aware of the LFS choke point he was crossing at the time of the Airprox and indeed they are promulgated within the UK AIP (ENR 6-5-2-1) on a 1:1,000,000 scale chart for the information of all civil pilots. A civil pilot member briefed the Board on the differing views for and against the marking of the LFS choke points on CAA VFR 1:500 000 and 1:250 000 charts. On the one hand the Maps and Charts Working Group (MCWG) believed that such information could obscure chart detail and make it more cluttered. Furthermore, the WG thought that such flow arrows were representational only and could mislead pilots into thinking that low flying ac could only be encountered in specific areas indicated on the chart. Other pilots considerd that such information portrayed on charts would be invaluable especially in the GA community, to highlight areas of potential confliction with fast jets. If nothing else, such information would enable civil pilots to plan their flights to avoid such choke points more easily, or adjust their altitudes and apportion their lookout accordingly when in their vicinity. There was unanimous support amongst the members for the latter view point, which had been the subject of two recommendations by the UKAB, also 3 by the AAIB and one by the Inspector of Flight Safety (RAF). However, despite 3 mid air collisions on or near known flow arrows, the MCWG position remained unchanged. There was little more that could be done other than draw the attention of the Chairman CAA and CAS to the matter; UKAB Director had done so.

Turning to risk, it was evident from the radar recording that horizontal separation was recorded at less than 0·5 NM and although the Mode C of the helicopter was not evident, reported transit altitudes reinforced the Bo105 pilot's perception of the vertical separation being about 200–250 ft. He also reported having no time to take avoiding action, which one member found surprising in view of the helicopter's speed and manoeuvrability. Nevertheless, there were no other safety nets available in the shape of traffic information under a radar service or TCAS. This, coupled with the non-sighting of the Bo105 by the Tornado crew, led members to agree with the Bo105 pilot that the safety of both ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Bo105 pilot and a non-sighting by the Tornado crew.

Degree of Risk: B

AIRPROX REPORT No 2/00

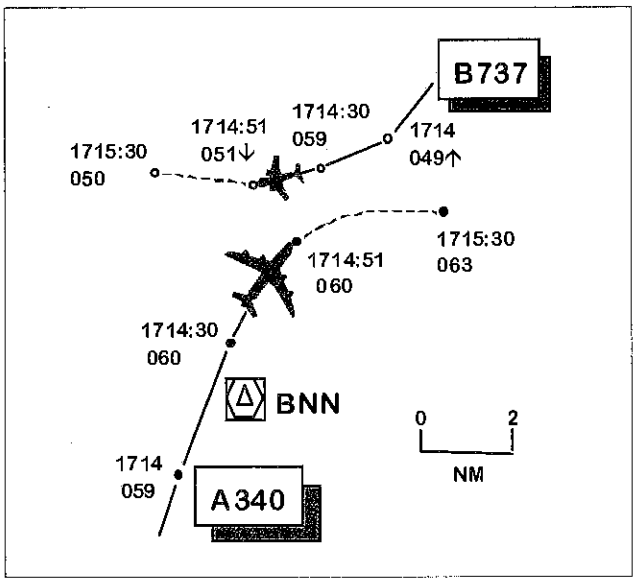
Date/Time: 8 Jan 1715 NIGHT

Position: 5147 N 0032 W (8 NM SW Luton airport)

Airspace: TMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	B73-3	A340 Airbus
Operator:	CAT	CAT
Alt/FL:	6000 ft (1017 mb)	6000 ft (QNH 1017 mb)
Weather	VMC	VMC
Visibility:	30 km	NK

Reported Separation: 200 ft 2 NM NK
Recorded Separation: 1·5 NM d 900 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was in contact with LATCC on 119x77 having departed from Luton on an OLNEY 1B SID. The visibility was 30 km, albeit in darkness. While levelling at 6000 ft at 210 kt and tracking 259°, another ac at a similar level was spotted tracking towards them from their 10 o'clock position about 5 NM away. The traffic triggered a TCAS TA and at the same time ATC told him to descend to 5000 ft. As he complied with this instruction, the TA became an RA giving "climb crossing climb". However, being in visual contact, he followed the ATC descent instruction and at the same time turned R 30° in avoidance. The other ac, which had been given a heading of 095° by ATC, passed about 2 NM to his port side and 200 ft above; he felt there had been a high risk of collision. The controller apologised for the error.

THE A340 PILOT reports that he was heading 020° at 6000 ft following departure from Heathrow on a WOBUN 2F SID. ATC instructed him to turn R onto 090° immediately. While complying, the TCAS momentarily signalled an RA on an ac beneath them. However, as the crew had been watching this traffic continuously there was, in his opinion, little risk of collision. The other ac passed about 2 NM away to his port side and 300 ft below.

ATSI reports that both the workload level and traffic loading were light and the controller was operating the TC Bovingdon and TC North-West Departures roles combined. He had felt fit and adequately rested and the relevant ATC equipment had been serviceable. The SC recalled that he had been temporarily distracted by an unrelated STCA activation shortly before the Airprox occurred, but he did not think that this had influenced his subsequent actions. Apart from this, he could not recall any factors which might have adversely affected his performance.

The A340 departed from RW 27R at Heathrow at 1709 on a WOBUN 2F SID. This procedure required the flight to be level at 6000 ft by a point designated as BUR 360°/LON DME 16, which is about 6 NM W of the BNN VOR. Communication was established with the TC SC at 1710 when the A340 was instructed to maintain 6000 ft and the standard ATC speed restriction was lifted. At 1711, the flight was taken off the SID routeing and assigned the radar heading 020°. This heading took the flight closer to BNN which, the SC explained, was designed to expedite the cross with traffic in the BNN hold, thereby permitting further climb clearance to be issued earlier. The SC then turned his attention to other sector traffic.

The B737 departed from RW 26 at Luton at 1712 following the OLNEY 1B SID. After initially tracking SW and then W, the SID routeing follows the BNN 348° radial. Ac following this SID are required to cross BNN DME 9 level at 5000 ft and BNN DME 15 level at 6000 ft. This ensures that Luton departures are initially provided with vertical separation from Heathrow traffic following the WOBUN SID.

The crew of the B737 established communication with the TC SC at 1712. The pilot reported climbing to 5000 ft, as the SID required; however, the SC lifted the ATC speed restriction and cleared the flight straight to 6000 ft, thus putting it into conflict with the A340. Although a few sec later the pilot of the A340 reported level at 6000 ft, this did not alert the SC to his error. The A340 pilot was advised that the traffic affecting his further climb was in the BNN hold and in his 2 o'clock position at a range of about 4 NM. At that stage the subject ac were about 13 NM apart virtually head-on to each other.

The SC explained that his intention had been to instruct the B737 to maintain 5000 ft. Being well aware of the potential for conflicts with Heathrow departures, such as the A340, he would never normally clear Luton departures on OLNEY SIDs straight to 6000 ft, and he was unable to offer any explanation for doing so on this occasion. He wrote '6A' (i.e. 6000 ft altitude) on the B737's FPS and recalled that the strip had been directly underneath that of the A340 on his display board. Nevertheless, his error remained undetected until he observed the developing conflict on radar about a minute later, shortly before the STCA activated. The B737 was climbing through 5700 ft with the A340 in its 10:30 position at a range of about 6 NM.

The SC issued avoiding action instructions, using the appropriate phraseology, and passed traffic information to both flights. The A340 was instructed to turn R onto heading 090° and the B737 to descend to 5000 ft. The pilot of the B737 reported

visual with the traffic and in receipt of a TCAS alert. The pilot of the A340 advised: *".... we had him as well"*. At about the same time as the SC issued the descent instruction, a 'climb' RA was received by the B737. However, the pilot followed the ATC descent instruction and, of his own volition, initiated a 30° turn to the R. The SC pointed out that he had opted to descend the B737, rather than keeping it climbing, because Heathrow Approach had the use of FL 70 for inbound traffic holding at BNN.

Examination of the LATCC radar recording shows that the B737 reached 6000 ft before commencing its descent to 5000 ft. The A340's Mode C reads 6100 ft throughout the encounter. Lateral separation was 4×8 NM as the B737 reached 6000 ft, thereafter it continued to reduce but vertical separation was increasing as it did so. When the lateral separation was 2×2 NM, vertical separation was 500 ft and at 1×8 NM, 700 ft. Eventually, at 1714:51, the ac passed port to port at a range of 1×5 NM with 900 ft vertical separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

An ATSI adviser said that this was a straightforward error on the part of the TC SC. The two ac departed their respective airfields on SIDs which initially provided standard vertical separation. By climbing the B737 straight to 6000 ft, the SC dispensed with this separation and did not subsequently notice the resulting confliction with the A340 from his strip or radar displays until it was too late to recover the situation. There was no apparent reason for this uncharacteristic mistake. Members concurred, and the Board concluded that the TC SC caused the Airprox by clearing the B737 to a level assigned to the A340. Radar recordings showed that the ac were well apart, both vertically and laterally, as they passed and members agreed there had not been a risk of collision.

Commenting on the contradictory demands of the TCAS and ATC instructions in the B737, a pilot member said that in his opinion the B737 pilot was justified in continuing to descend because he could see the other ac. Moreover, under the circumstances he thought the pilot's self-initiated turn was also sensible. However, others urged caution in respect of both these actions. To disregard an RA following visual sighting could be hazardous because the ac observed may not necessarily be the one indicated by the TCAS; furthermore, it may not be the only ac in the vicinity. Similarly, a turn might take the ac into confliction with other unknown traffic at a similar level. One member asked what was meant by the TCAS instruction "climb crossing climb". It was explained that this term alerted the pilot to the fact that the ac's levels would cross during the course of the TCAS resolution.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TC SC cleared the B737 to a level assigned to the A340.

Degree of Risk: C

AIRPROX REPORT No 3/00

Date/Time: 6 Jan 0907

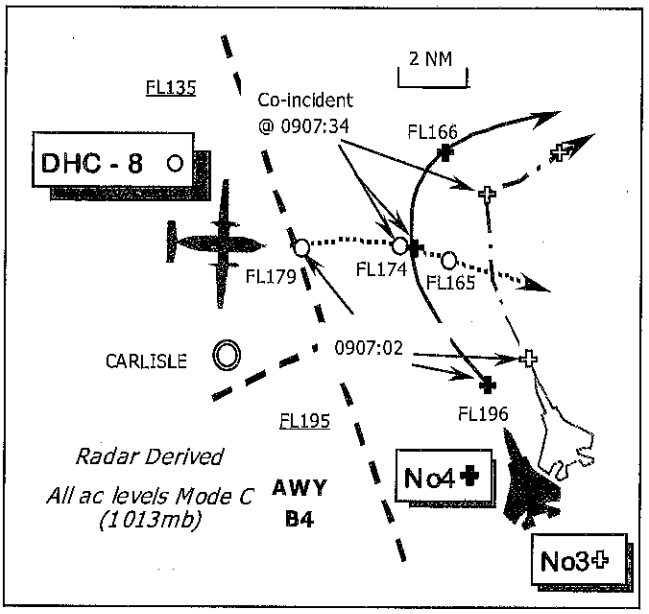
Position: 5458N 0233W (6 NM ENE of Carlisle)

Airspace: L FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	DHC-8	F15 Formation
Operator:	CAT	Foreign Mil
Alt/FL:	FL 190	FL 187
Weather Visibility:	VMC CLAC >18 km	VMC CAVOK UNL

Reported Separation: 1 NM H-Nil V/1 NM H

Recorded Separation: 0·5 NMH - Nil V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 CAPTAIN, the PF, reports that he was inbound to Newcastle IFR and initially under a RIS from ScACC, before being handed over to Newcastle. His ac had an all-white livery and HISLs were on. TCAS is not fitted. Whilst descending en route from FL 180, heading 090° at 210 kt, IMC, a formation of F15s was sighted crossing from R – L at the same level. The 1st was spotted flying straight and level at 12 o'clock, he thought about 3-5 NM away, before ScACC advised of traffic *"unidentified no Mode C"* at 2 o'clock. It was at this point that he thought that he was instructed to contact Newcastle. Another F15 was seen (UKAB Note (1): the formation No3), at 1 o'clock - 3 NM in a turn, it appeared to be banked at 90° but he could not tell in which direction. A further F15 (UKAB Note (2): the formation No4) was then observed by the F/O at 3 o'clock - 1 NM apparently in a dive, heading toward the DHC-8. The autopilot was immediately disengaged when the first F15 was spotted, the seat belt sign illuminated, and he queried if the traffic could be seen on radar. Upon sighting the second ac he increased the ROD and made an avoiding R turn to pass behind it. But when the last F15 was spotted by the F/O, he stopped the turn after a 40° heading change, whereupon it crossed ahead at the same level with a minimum horizontal separation of about 1 NM, with a high risk of collision.

THE F15E FORMATION LEADER reports conducting simulated ground attacks above Spadeadam EWTR with a formation of 4 F15E ac, whilst being targeted by simulated surface to air threats and air defence ac in the vicinity. All formation ac were camouflaged dark grey but HISLs are not fitted. The leader and No2 had completed their simulated attack and were some 8 NM away as the No3 & 4 were running in. Whilst executing a simulated weapons delivery in a straight descent through FL 187, heading 340° at 500 kt, the No3 acquired a radar contact on the DHC-8 at a range of 12 NM but did not assimilate the geometry of the conflict correctly. The DHC-8 was seen after they had completed their simulated attack as they were turning R 'off-target'. At the CPA they passed about a mile apart, as the No3 & 4 were in the 30° nose down descent.

ScACC reports that the DHC-8 was on an IFR flight routeing direct from Aldergrove to Newcastle which resulted in it crossing CAS, N of Dean Cross. Shortly before the Airprox occurred, the flight was under a RCS from the ScACC TALLA SC. Unidentified traffic was observed penetrating CAS E of MARGO by the SC, who recognised that it might conflict with the DHC-8 after it left CAS. Therefore, he monitored the ac until it cleared CAS and turned to the N. When the DHC-8 pilot reported leaving FL 190 at 0906:10, traffic information was passed initially on the No1 & 2 F15s observed in the DHC-8's 12 o'clock - 10 NM, passing FL 183 in descent, which the pilot had in sight. At 0906:30, further traffic information was passed on the No 3 & 4 F15s *"...2 o'clock range of about 10 NM 185 and 195 descending"*, the pilot replied that he was looking. The DHC-8 crew was

instructed to *"..contact Newcastle for further"* and switched at 0906:40, just before leaving CAS.

ScACC controllers are generally prohibited from providing a RAS in Class G airspace, only a RIS can be provided and traffic information was passed on the observed traffic. The controller did not, however, advise the DHC-8 pilot he was about to leave CAS nor the type of ATS being provided. To have advised Newcastle of the situation might also have been prudent. The TALLA SC was unaware of the F15 formation intentions, so when the DHC-8 was transferred it was perceived that a better service would be available to the crew from Newcastle.

UKAB Note (3): ATSI endorse ScACC's report and comment.

UKAB Note (4): A review of the Newcastle Approach controller's report and the RT transcript reveals that the DHC-8 crew contacted Approach at 0907 descending through FL 177 for the assigned level of FL 90 in the vicinity of the subject F15s. The crew reported sighting traffic at 12 o'clock in their initial call and subsequently taking avoiding action. Newcastle assigned a squawk, with an 'ident' request and passed further traffic information , *"...R to L at 3 miles indicating FL 172..."*, which was probably the No 3 F15. The DHC-8 crew acknowledged and added *"...one's just passed pretty close underneath now.."*, whilst heading 120°, which was the No 4. Approach then identified the flight at 32 NM W of Newcastle and placed it under a RIS. Subsequently, Approach reported that the F15s were manoeuvring well above the DHC-8, which continued inbound via radar vectors under a RAS.

HQ MATO reports that the F15s called Spadeadam Range (SPADE) about six minutes before the Airprox. SPADE informed the formation leader that they were identified from the assigned squawks and asked if a radar service was required, which it was not. Therefore, SPADE provided a FIS. At 0905:04, SPADE transmitted to the F15s *".....you're just about to clip .. controlled airspace out to the W there. Can you come back onto E?"* This was acknowledged *"Affirm, R turn."* At 0906:59, SPADE reported to the No3 & 4 *".. traffic...just W of you, 2 miles heading E indicating a thousand below."* The crew's reply was very distorted but possibly *"..that's safe."* No further transmissions were made between SPADE and the F15s, who left the frequency without comment at 0914:30.

The F15s were operating VFR within Class G airspace and advised they did not require a radar service. Nonetheless, SPADE prudently provided traffic information to the No3 & 4 under the FIS that pertained. and quite reasonably, took the response to mean that the pilot was aware of the DHC-8's position. However, at about the same time SPADE experienced a problem with their radar equipment causing double images and the transmitted traffic information was not particularly accurate.

UKAB Note (5): The LATCC radar recording shows the DHC-8, squawking the assigned code with Mode C, heading E at FL 190 passing about 3 NM N of Carlisle. The F15 formation is shown as two distinct sections of 2 ac, displaced about 10 NM apart and squawking their assigned codes with Mode C. The No4 F15, briefly entered BRAVO4 (base FL 195) whilst indicating FL200, before turning R about and descending. The pair then tracked NW towards the DHC-8, which meanwhile had commenced a descent. At 0907:02, about the time that traffic information was passed to the F15 pair, the DHC-8 had just left CAS and is shown 11 o'clock – 6 NM passing FL 179, with the No 3 the lowest of the F15s indicating FL 188. The CPA is shown at about 0907:34, as the No4 passed R - L, about 0·5 NM ahead of the DHC-8, as both ac descended through FL174 and after the No3 has just passed 3 NM ahead of the DHC-8 indicating FL 172.

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 that the inadvertent incursion by the F15 formation into BRAVO4 before the Airprox, whilst probably avoidable, did not contribute to the cause of the Airprox. However, it did focus the attention of the TALLA SC on the ac and traffic information resulted, which enabled the DHC-8 crew to sight the formation as they departed CAS into the open FIR. Members agreed that the actions of the DHC-8 crew were sound but emphasised that flying CAT in Class G airspace was vastly

different to the sanctuary of Class A, where separation was guaranteed. A member very familiar with ScACC explained that the TALLA SC was primarily responsible for the provision of an ATC service to GAT inside CAS, inbound to the busier airports of the Scottish TMA. Consequently, the provision of a radar service outside CAS was not of prime concern. Indeed members noted that a RAS could not be provided in this instance and the TALLA SC's reasoning that Newcastle ATC could provide a better service was understandable. A military controller member compared this situation to constraints placed on controllers at military ATCRUs who are generally required to effect separation on unknown traffic just outside CAS, dependent on the radar service required. Members recognised the differing operational responsibilities placed on controllers by the differing doctrines, but agreed that the Newcastle controller had been placed in an unenviable position yet had promptly provided the best service available in the circumstances.

As the only such range of its kind Spadeadam and the surrounding airspace can get very busy, as illustrated by this Airprox and some members questioned the wisdom of routeing CAT so close to the EWTR, albeit well above it. Members recognised that it was a very convenient route, and did not dispute pilots' right to operate in this area. It was more a question of airmanship; was it sensible to choose a route through an area of known military activity when a slight deviation to the S might avoid any congestion?

The USAF advisor to the Board commented that although the No3 crew had detected the DHC-8 on radar, it was not clear if the wingman had been advised of the presence of the airliner. Nor could the No4 actually recall if it had been spotted as he passed 0·5 NM ahead of it. Nonetheless, the F15 formation was manoeuvring in the open FIR and had been told about the airliner from the prudent warning issued by the Spadeadam Range controller. The No 4 F15 might have been able to afford the DHC-8 a wider berth, but the pilot would have been concentrating his attention ahead of his ac's flight path as he dived towards his simulated target. Although the No 4 crossed 0·5 NM ahead of the airliner they were only at the same level momentarily. Members agreed therefore that this Airprox resulted from a conflict in the FIR. Moreover, since the DHC-8 crew had seen the formation and had turned in sufficient time to avoid, this led the Board to conclude that, in the circumstances that pertained, there had not been a risk of a collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: Conflict in the FIR.

Degree of Risk: C

AIRPROX REPORT No 4/00

Date/Time: 11 Jan 1829 NIGHT

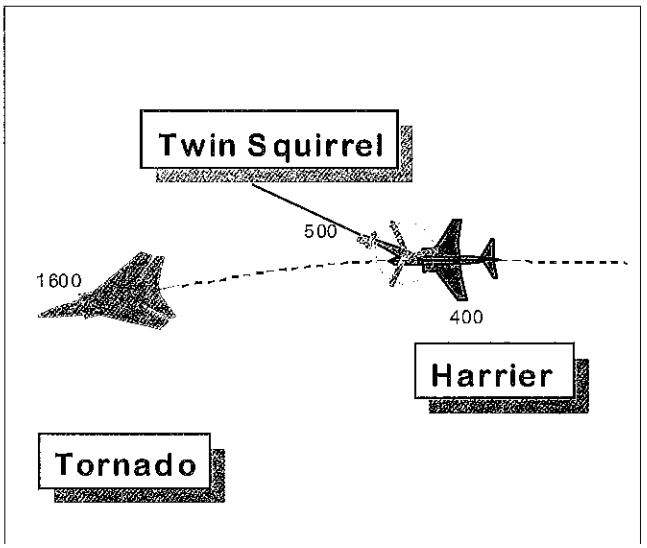
Position: 5207N 0130W (Shipston on Stour)

Airspace: LFS/FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Harrier	Twin Squirrel
Operator:	HQ STC	Civ Trg
Alt/FL:	650 ft (Rad Alt)	500 ft (agl)
Weather Visibility:	VMC CLBC 10 NM	VMC CLOC 10 km+

Reported Separation: 1-200 ft/NK

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER PILOT reports heading 270° at 420 kt using NVG on a night LL training exercise as No 2 to a Tornado which was 2 NM ahead. The Tornado pulled up from LL to turn left onto S towards Brize Norton; using the Tornado's lights for reference he also started to pull up and turn gently left. However the lights turned out to be a helicopter; there was no depth perception on the NVGs and the closure rate was not evident until very late. He passed 1-200 ft below and behind the helicopter at 650 ft Rad Alt. He made a last second bunt when he saw it was a helicopter, and there was a moderate risk of collision. The helicopter was unknown traffic in the night LFS.

THE TWIN SQUIRREL PILOT reports flying various headings at 90 kt maintaining 500 ft agl on a NVG training sortie for overseas students. He had passed his route details to Brize Norton on first RT contact and was receiving a FIS. He did not see any fast jets.

HQ MATO reports that the Twin Squirrel freecalled the Brize Norton Zone (Zone) controller at 1811:06 on 134·3. After a short delay, the pilot passed brief route details and the helicopter's altitude *"..currently 800 ft on 1029.."* (the Oxford QNH) after which, Zone issued a squawk and asked the pilot to state the type of service required. *"...Flight Information will do fine thank you c/s"* was the reply, and this was applied at 1812:10; neither the helicopter's squawk, nor its radar return, were seen on radar. The next RT exchange between Zone and the Twin Squirrel pilot came at about 1826:00, when Zone requested the pilot to *"..report inbound for Oxford"*, which would have been the return leg of his navex.

At 1829:33, a voice, which sounded like a crewmember of a military jet, transmitted *"Is there a helicopter in the region ?"* and then a different (mil jet) voice transmitted *"Say your heading"* followed by a brief exchange of heading and height information between the two. Just over one min later, at 1830:51, the two voices checked in as a Tornado and Harrier pair 15 NM N of Brize Norton requesting transit through the CTZ at 2000 ft. At 1832:02, after a brief inter-formation discussion, the Harrier pilot informed Zone that he wished to file an 'Airmiss' and passed *"..happened approximately .. Shipston-on-Stour to the north of you about 20 miles at 1830 exactly. 500 feet with a helicopter, looks like a Lynx"* shortly afterwards adding *"And just be advised the Lynx looked like it was lights out."* Both Zone and the radar Supervisor checked the radar display in the vicinity of the jets, who had now climbed into cover, but saw no other contacts. Zone requested that the pilot contact the Brize Supervisor after landing and, once clear of the Brize CTZ, the formation changed frequency. Thinking that the reported Lynx may have actually been the Twin Squirrel, Zone questioned the helicopter pilot on RT shortly afterwards. The pilot confirmed that the helicopter's lights were on and that he had been operating in the Shipston-on-Stour area, but he said that he had not seen any fast jet activity in his vicinity. Subsequent tracing action by AIS (Mil) confirmed the Twin Squirrel to be the reported helicopter.

The LATCC Clee Hill radar recording shows the Twin Squirrel, squawking 3714, tracking E at an indicated 500 ft Mode C (980 ft on QNH 1029 mb); the Tornado can be seen tracking about 260° at an indicated 600 ft (1080 ft QNH) with the Harrier 1 NM in trail and 200 ft below. The Tornado passes directly overhead the helicopter (500 ft above) at 1829:23; at this point, the Harrier is 1 NM E and indicating 300 ft Mode C (200 ft below the helicopter). The closest point of approach occurs in the following radar sweep as the Harrier passes just to the N of the helicopter, which is heading about 110°; the radar contacts are merged, the horizontal separation being too small to measure and the Harrier's Mode C indicates 400 ft. The Twin Squirrel's Mode C is not seen, but indicates 500 ft in both the previous and following radar sweeps.

Zone was using the Brize Norton primary and secondary radar heads and did not see any of the ac involved in the incident until after it had taken place (there is substantial high ground between Brize and Shipston-on-Stour). Brize has access to SSR information from the Clee Hill radar, but the changeover between SSR sources cannot be made at the radar console, therefore use of the Brize SSR facility is the normal method of operation.

HQ STC comments that the Harrier formation was operating VFR in the night low flying system, using electro-optical (EO) equipment to provide terrain, obstacle and inter-formation separation. Although

the wingman saw the helicopter's lights, he confused them with those of his leader, on whom he was trying to join, and it was not until very late in the procedure that he realised his error. The leader did not see the helicopter at all.

This incident highlights the growing potential for confliction between military and civilian operators at night, even when all ac are lights-on. Military ac are deconflicted from each other by a rigorous and exclusive system of low flying area bookings. Given that the helicopter was also undertaking a legitimate EO training sortie, there may be some value in establishing procedures to deconflict such operations from military users or at least make each party more aware of potential conflicts in order that collision situations are avoided.

UKAB Note: The CAA advises that the matter of NVG civil conflictions by this company should now be resolved. They will utilise the low flying system and file, well in advance, their very few night NVG training sorties with ALFENS Ops and, and the crews of military low level sorties will be notified.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ingredients of this incident included the lack of depth perception in the view through NVGs and the intrusion of the helicopter into the space between the Harrier and the Tornado. The latter's lights, tail on, would easily have been masked by those of the helicopter which was nearly head-on to the Harrier. Members sympathised with the Harrier pilot who, unaware of the likelihood of encountering the helicopter, mistook its lights for those of the Tornado and consequently took late avoiding action on it. While agreeing that this was part of the cause, the Board also noted that the helicopter pilot did not see either the Tornado (which passed somewhat above) or the Harrier, and concluded that this non-sighting was also part of the cause.

The risk level generated considerable discussion. Some members initially considered that there had been a risk of collision in the incident, but others argued that the Harrier pilot was watching the helicopter and took avoiding action on it when it became clear that it was a conflicting ac. The Board eventually concluded that while there was perhaps not a risk of the ac actually colliding, the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a mistaken ident, the Harrier pi lot took late avoiding action on the Twin Squirrel, whose pilot did not see the Harrier.

Degree of Risk: B

AIRPROX REPORT No 5/00

Date/Time: 12 Jan 1955 NIGHT

Position: 5640N 0210W (35 NM S of Aberdeen)

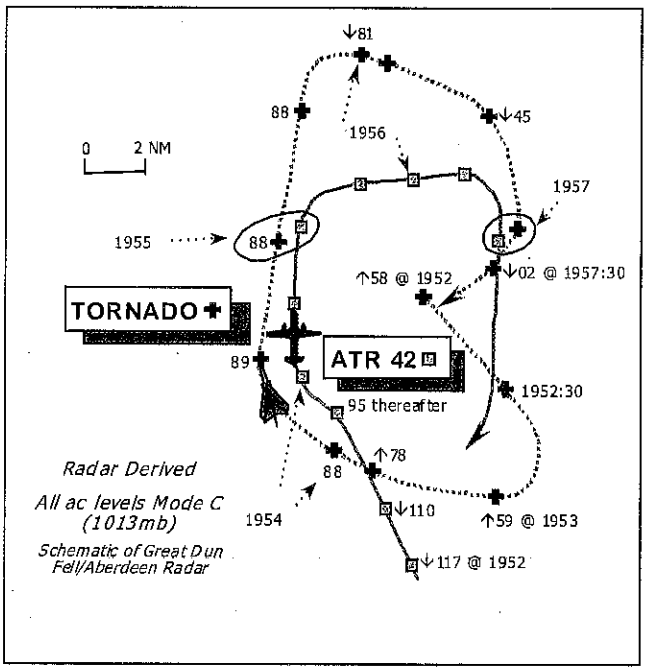
Airspace: S FIR (*Class:* G)

Reporter: Aberdeen ATSU

	First Aircraft	*Second Aircraft*
Type:	ATR42-300	Tornado GR
Operator:	CAT	HQ STC
Alt/FL:	FL95	8500 ft (RPS 1004 mb)
Weather Visibility:	IMC IN CLOUD	VMC CLOC >10 km

Reported Separation: 0·25 NM H/500 ft V

Recorded Separation: 1 NM H & 700 ft V @ 1955



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ABERDEEN APPROACH RADAR CONTROLLER (APR) reports with RT transcript that the ATR42 crew contacted Aberdeen Approach about 50 NM S of the airport descending to FL 90; at 1951:10, the flight was placed under RAS. At 1951:50, traffic information was given on 2 unknown contacts squawking 3/A 7001, one of which was *"...12 o'clock ...8 miles ..L to R 6000 ft unverified"*, together with an advisory avoiding action L turn to head 310º if not sighted. The crew initiated the L turn and the 2 unknown ac were seen to turn westerly, into the ATR42's *"...5 o'clock...3 miles"*; a further R turn onto 360º was given and again, he thought, two ac followed; the lead ac indicated an altitude of 6000 ft and the other ac 3300 ft. Again the two contacts followed but the lead ac then climbed and at 1954:30, APR reported the higher of the two ac at *"...6 o'clock into 7 still 2 miles and turning northbound indicating 9000..."*. Another avoiding action R turn onto 090º was given and he perceived the minimum horizontal separation to be 0·25 NM with 500 ft vertical separation. A further R turn onto 210º was given at 1956, again the contacts followed but the SSR labels merged and became garbled. A colleague believed that the lead ac had descended to 4500 ft. However, he next observed the ac at 3500 ft, tracking S, whereupon the ATR42 was turned R onto 300º. He then handed over the sector and observed that the unknown lead ac was now squawking 3/A 2476, tracking W with another also squawking 2476 further to the W. After a few miles the unknown ac descended below radar cover about 15 NM E of Leuchars. He adds that the ATR42 crew was given traffic information updates several times, but they reported IMC all the time and did not see the reported ac.

UKAB Note (1): The second ac mentioned by the APR has been excluded from the diagram for clarity as it generally maintained 3300 ft, in excess of 5000 ft below the ATR42 and was not flying in company with the other ac mentioned as the 'lead' at this point. This latter ac, the subject 'lead' Tornado GR, was the higher of the two squawking 3/A 7001 and upon which the great majority of traffic information was passed by the APR, as revealed by the RT transcript.

UKAB Note (2): Label overlap prevented comprehensive analysis of the Aberdeen radar recording provided, consequently the Great Dun Fell recording was also used, the composite results of which are shown on the diagram. The 'lead' Tornado climbs steadily to FL 88 Mode C (1013mb) on a westerly heading whilst passing astern of the ATR42 and then turns northbound after the airliner had levelled at FL 95 Mode C as advised by the APR. The CPA is attained at about 1955, as the

Tornado closes to the ATR pilot's 8 o'clock at about 1 NM. After APR issued the R turn onto E, the Tornado opens to the N before turning about southbound and commencing a continuous steady descent; it passed FL 45 unverified Mode C at 1956:30. The ATR42, meanwhile, maintained FL 95 throughout the latter stages of the encounter as the Tornado passed 200 ft Mode C and cleared to the W at low-level. It is difficult to reconcile the Tornado pilot's reported sighting of the ATR42 when heading 255°, which is not apparent from the recording but may have occurred just after 1952:30, in the R turn.

THE ATR42 PILOT reports flying at 220 kt, under radar vectors from Aberdeen APR whilst inbound to Aberdeen at FL 85, he thought, IMC in cloud. Anti collision beacons, navigation lights and HISLs were on but TCAS was not fitted. The traffic reported by APR was not sighted at all. It seemed to him that the military traffic was playing a cat and mouse game, whatever heading changes were given were not enough to shake them off. He queried the wisdom of military ac getting as close as this in IMC conditions and questioned how accurately they could judge the separation on their radar.

THE TORNADO GR 1 PILOT reports flying at 360 kt whilst executing a holding pattern about 35 NM S of Aberdeen, at 8500 ft RPS in class G airspace, prior to descending to low level to join his formation on a night training sortie. Anti collision beacons, navigation lights and HISLs were on and they were squawking 3/A 7001 with Mode C. The remainder of the formation was holding below 3000 ft RPS. They had been established in their hold for about 3-4 min, maintaining good VMC and in sight of the ground. Prior to steadying on the northerly leg, the Tornado pilot reports rolling out on a heading of about 255°, he thought, for timing purposes. Whereupon, another ac was sighted above, approximately 35° R of the nose on a reciprocal heading. The other ac's path was increasingly divergent and they assessed that as the relative bearing was increasing, there was no risk of collision and so they maintained their course. The other ac appeared to remain above them. During this period 1 of their 2 radios was being used to contact a fighter control agency and the second was being used for intra-formation co-ordination.

ATSI reports that the RTF transcript confirms that at the time of the Airprox, Aberdeen ATC were providing the pilot of the ATR42 with a RAS. The APR controller passed appropriate traffic information and avoiding action instructions, including turns and levelling off, albeit only 500 ft above its cleared level. It was unfortunate that, unbeknown to the controller and the crews of both ac, the Tornados were both holding on separate patterns and which, coincidentally, matched the avoiding action turns given to the ATR. It is understandable in the circumstances why the controller and the ATR42 pilot might have thought that the military traffic was carrying out a practice intercept.

HQ STC comments that having established a VMC hold at 8500 ft, the Tornado crew was preparing to join the remainder of the formation and continue with their sortie. The Tornado captain, once visual with the ATR42, assessed that there was no risk of collision and with the civilian ac well clear resumed his northerly heading in the hold. It is unfortunate that this series of manoeuvres was so badly misinterpreted by the civilian crew. There was, in fact, no attempt to intercept the ac or to look at it on 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, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Chairman briefed the Board that this Airprox had generated some unfortunate misconceptions; comments in the report received from the ATR42 pilot and more especially supplementary comments from the ATSU concerned were subsequently shown by the investigative process to be ill founded. The Tornado pilot's report had revealed a different picture entirely and this, coupled with comments from the command, presented the facts; there had been no form of interception flown against the civil airliner or any move to pursue it or look at it on the ac's radar – points fully accepted by members. A former Tornado GR pilot added that unlike the F3, the GR ac's radar equipment fit was not optimised for airborne interception and would not normally be used in this way at all. With all the information before them members understood what had

occurred and the STC Ops LF advisor stressed that military crews were not permitted to conduct intercepts on civilian ac, or any other target of opportunity for that matter, as had been suggested. Moreover, both Tornados reported by the APR to the ATR42 crew were operating independently and one was not leading the other. What had been described as a 'cat and mouse game' turned out to be a chance encounter in the FIR. Military regulations covering these issues were very specific but it was pointed out that unlike civil regulations they were not widely promulgated in the public domain. This situation did not do much to allay any misconceptions among the civil aviation community.

Turning to 'cause', members agreed that at the time the APR could not have known that the Tornados were holding independently under VFR in the FIR, prior to continuing with their sortie at low-level – as they were entitled to do. This situation highlighted the different flight rules under which the respective pilots were flying. On the one hand the ATR42 crew were flying IFR and in receipt of a RAS from the APR, who was aiming to achieve horizontal separation of 5 NM or 5000 ft Mode C. Conversely, the Tornado crew was content with visual separation under VFR. This placed the APR in a difficult position and members understood perfectly his concern and why he had not been able to achieve standard separation minima despite his best efforts. It also illustrated one of the basic differences between many military and civilian flight operations at night; flying under VFR flight is frequently the norm to military crews, but this option is not generally available to commercial pilots. Members suggested that the military crews concerned in this occurrence might visit the ATSU, to foster a better understanding of each other's methods of operation. HQ STC agreed to investigate the feasibility of this constructive idea.

After weighing all these points for relevance the Board concluded that this Airprox stemmed from a conflict in the FIR, at night, between IFR and VFR traffic. In assessing the risk, the Board was unable to reconcile the Tornado pilot's reported sighting of the ATR42 when his Tornado was heading 255°; the majority of members agreed that it had probably occurred as the Tornado turned R west-north-westerly and before it passed well astern of the ATR42. Nevertheless, the minimum horizontal separation at the CPA was 1 NM, when the Tornado was 700 ft below the ATR42, which had been spotted by the Tornado crew. Thereafter, the Tornado remained clear of the ATR42 first in azimuth, and then in the vertical. Members concluded without dissent, therefore, that there had not been a risk of a collision in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace, at night, between IFR and VFR traffic.

Degree of Risk: C

AIRPROX REPORT No 6/00

Date/Time: 18 Jan 0950

Position: 5113N 0007W (1 NM E of Redhill - elev 221 ft)

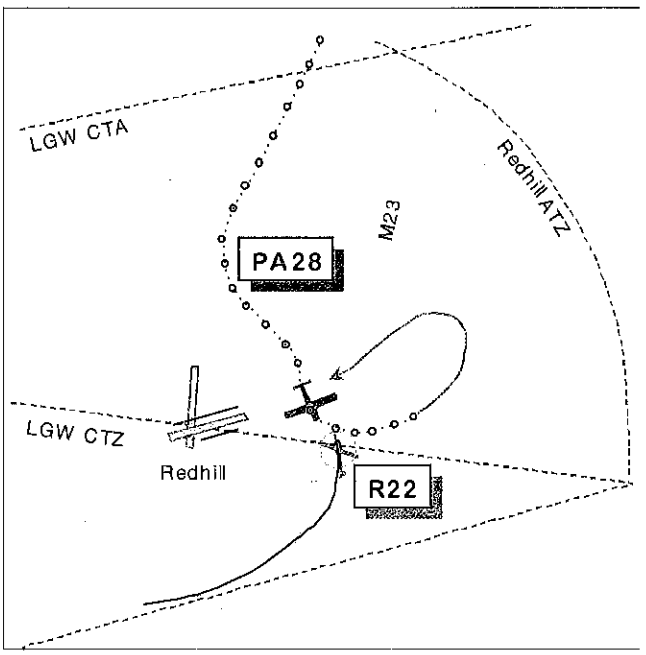
Airspace: ATZ (*Class:* G)

Reporter: Redhill FISO

	First Ac	*Second Ac*
Type:	PA28	R22
Operator:	Civ Pte	Civ Trg
Alt/FL:	1000 ft (QFE 1028 mb)	6-700 ft (QFE 1028 mb)
Weather Visibility:	VMC CLNC 3 km	VMC CLNC 8 km

Reported Separation: 500 ft/3-400 ft

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE REDHILL FISO reports that at about 0947 the PA28 pilot reported just N of Caterham inbound to Redhill from the N with 10 NM to run. Joining information was given; he was requested to advise passing the motorway junction (M23/M25) and was advised that there was no fixed wing circuit traffic and that the L/H helicopter circuit was active. At about 0948 the PA28 reported passing the motorway junction, and therefore was asked to report right base for RW 26 R. At about 0949 he reported downwind but was seen well south of the downwind position for RW 26 R, turning E bound slightly N of the VCR at about 600' on QFE 1027. He was advised that in his current position he was overflying a noise sensitive area and was requested to report final for RW 26 R. At the time there were two R22 helicopters training in the L/H circuit; one dual training and the other a solo student. The first was on the 26 helistrip facing W and the other had turned base leg when the PA28 was observed flying southbound just W of the M23 and just S of RW 26 L. It was within the helicopter circuit at about 600' in direct conflict with the R22. The two ac appeared to be at a similar height. The PA28 pilot was immediately requested to turn left and given further traffic information, and again asked to report final for RW 26 R. He then flew E and positioned from the E to land at 0951 on RW 26R.

THE R22 PILOT reports heading 350° at 60 kt descending through 6-700 ft on base leg when he saw the PA28 climbing and turning left in his 1:30 3-400 ft away and above. No avoiding action was required and the risk of collision was negligible.

THE PA28 PILOT reports that due to poor visibility he spotted the airfield slightly late and had heard the controller talking to the R22 pilot but had not seen it. On seeing the airfield he estimated he would not be able to lose sufficient height to land on 26R and knowing the FW circuit was clear, he turned left to position late downwind. Having turned left (heading 080° at 90 kt) ATC then told him to turn left due to the helicopter on base leg. He had already turned away from the airfield and on looking back could see the helicopter behind and to the right descending towards 26L. He acknowledged and continued to position for 26R. He did not believe that a risk situation had occurred, or that he had caused a threat to the helicopter area.

ATSI reports that the Redhill weather report for 0950 was: Wind = 320/5 kt , Visibility = 6 km, Cloud = OVC at 1500 ft, Temperature = 5 C, Dewpoint = 3 C, QNH = 1035 mb, QFE = 1027 mb.

At 0946 the R22 took off from helicopter RW 26L for a left hand circuit. At 0947 the PA28, arriving from Elstree, with PPR, called Redhill stating he was inbound at 1500 ft and requesting airfield information. This was passed with a request to advise when passing the motorway junction which is one of the VRPs for traffic arriving at Redhill from the north. In response the PA28 acknowledged the pressure settings and said that he was just passing the Junction. At 0948 the FISO requested that the PA28 report on right base for RW 26R and informed the ac that there was no other fixed wing traffic, also that the helicopter circuit was active. The pilot responded that he was positioning for right base. At 0948.30 the FISO broadcast new pressure settings. At Redhill there is no dead side to the active runway used in a westerly direction. The fixed wing traffic circuit is right-hand at 1000 ft QFE using either RW 26L or 26R. The helicopter traffic circuit is left-hand to helicopter runway 26L at 1000 ft QFE. The helicopter runway is displaced to the south of main RW 26L. Because of the foregoing and the proximity of Gatwick CAS it is customary for ac arriving at Redhill from the North to join the circuit at a point appropriate to their position. The FISO requested a position report in accordance with CAP413 para 4.13, Note 2.

At 0949 the PA28 reported having the airfield in sight and positioning downwind when the FISO first saw the ac. He said that it was N of the Tower and turning onto an easterly heading. This is confirmed by radar recordings at 0949.03 showing a 7000 contact 1·25 NM to the N of Redhill with a primary only contact in the downwind left position to the south of the airfield. He estimated the height to be about 600 ft and warned the PA28 that it was about to overfly the noise sensitive area of South Nutfield and to report on final 26R. The pilot acknowledged with "wilco". The next sight that the FISO had of the ac, some 30 seconds later, was high on right base, inside the airfield boundary, and head-on to the R22 at the same height. The track is confirmed by LATCC radar recordings. The FISO informed the PA28 that it was about to go into the helicopter circuit and suggested that he turn left immediately, which the ac acknowledged. The FISO stated that, in his opinion, the PA28 was too close to the runway to have successfully completed an approach and that it was close enough to the helicopter to have caused him concern. At 0949.56 radar recordings show both returns merge in a position less than 0·5 NM E of the airfield. The FISO then saw the ac turn left onto an easterly heading. In subsequent radar photographs the return believed to be the PA28 is seen flying in an easterly direction and then turning back left to re-position on final for runway 26.

At 0950 the FISO requested the PA28 to report final for 26R once he had sorted himself out and once again passed traffic information on the active helicopter circuit. At 0950.30 the PA28 reported on final for 26 and was advised to land at his discretion.

In the radar recording, the return taken to be the PA28 is seen to approach from the north at high speed. (G/S measured from the radar recordings is 125 kt; the 1500 ft wind was 360/25.)

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 at what stage it became apparent to the PA28 pilot that he was not going to be able to join on a downwind or, as requested, on base leg for RW 26R. His arrival appeared to have lacked preparation and he seemed not only to have been caught out by the stronger tailwind at 1000 ft but to have been flying at too high an IAS for the visibility, despite the warning in the UK AIP (AD) (EGKR-1-3) ". . care must be taken on approach and departure from all runways not to drift into the helicopter area". It was suggested that the surface wind passed may have disguised the fact that it was very different at 1500 ft but the PA28 pilot should have understood from his groundspeed during his sortie, or from a pre flight met briefing, what problems this might cause him at Redhill. Fortunately the Redhill circuits were mostly inactive or his high speed career across the patterns might have caused more problems than it did. The Board

concluded that the cause of the incident was that the PA28 pilot had flown into the helicopter circuit and into confliction with the R22 which he did not see until he had passed it. Although the pilots' reported heights and observations indicated that there had been some 3-400 ft of vertical separation, members considered that because neither pilot saw the other ac until their flightpaths had crossed, the safety of the ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: The PA28 pilot flew into the helicopter circuit and into confliction with the R22 which he did not see.

Degree of Risk: B

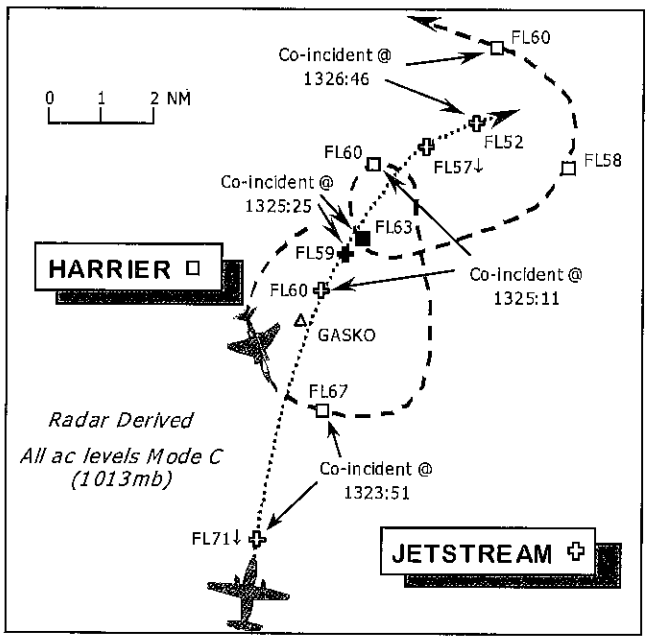
AIRPROX REPORT No 7/00

Date/Time: 19 Jan 1325

Position: 5415N 0155W (1·5 NM NE of GASKO)

Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream	Harrier GR7
Operator:	HQ PTC	HQ STC
Alt/FL:	FL 60	FL 60
Weather	VMC CAVOK	VMC CAVOK
Visibility:	Unrestricted	30 km
Reported Separation:	0·25 NM H & 200 ft V	Not reported
Recorded Separation:	0·3 NM H & 400 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 045° out of sun at 235 kt, flying straight and level at FL 60. The ac colour scheme was red/white and HISLs were on. Whilst under a RIS from Pennine RADAR in the vicinity of GASKO, the controller reported conflicting traffic ahead which was acquired visually at about 4 NM and determined to be a 'Fast-Jet' in a L hand orbit at about the same level. He descended the ac with the intention of achieving about 200 ft vertical separation. Whereupon, the jet turned across their track from L to R, 'belly up' to the Jetstream, rolled out of the turn heading NW and entered a steep descent to low-level. It was not apparent that its pilot had seen the Jetstream, but at the CPA he estimates that the Jet passed about 0·25 NM ahead and 200 ft above his ac. Just after the Airprox they were handed over to Teesside who were informed of the occurrence.

THE HARRIER PILOT reports flying at 330 kt and orbiting L at FL 80, he thought, whilst receiving a RIS from London RADAR, who initially reported traffic to the S, 15 – 20 NM away. As he was preparing to descend to low-level he elected to descend to about FL 55 - 60 to increase separation. When the RIS was cancelled the other traffic was reported 10 NM to the S, descending through FL 95. He did not believe that there had been a confliction with the Jetstream, which he thought was 3500 ft above his ac, but he did not see it because he was concentrating on a rendezvous with his formation at low-level. It was not until he landed back at Cottesmore that he was informed that an Airprox had been filed.

ATSI reports that the Pennine RADAR controller provided timely traffic information under the RIS about the conflicting traffic to the Jetstream pilot, which was updated. The Jetstream pilot reported visual with the Harrier on each occasion.

HQ MATO reports that the Harrier pilot was under a RIS from London RADAR Controller 15 (CON 15) and squawking the assigned code with Mode C while flying a holding pattern at FL 90 in the vicinity of GASKO, some 15 NM W of Leeming. CON 15 passed traffic information on several ac, including the subject Jetstream, which at 1322:06 was descending from FL 95, 10 NM SW of the Harrier. Shortly after the first call about the Jetstream, CON 15 advised "*...the previously reported traffic due S, range of 10 miles, tracking N. Are you happy to go en route now*", though no level was given. Before switching frequency the Harrier pilot asked for the range of his formation. The Harrier was now passing W in a L hand orbit, descending from FL 76, with the Jetstream due S - 8 NM, tracking NNE and passing FL 83. After CON 15 passed the formation information requested, the Harrier pilot reported *"...switching en route"* (UKAB Note (1): at 1323:18).

The Harrier pilot did not believe that he would conflict with the Jetstream because he thought he was 3500 ft below it, probably from the initial traffic information reported by CON 15. If this level had been updated as part of the second call, the Harrier pilot might have considered the traffic more relevant. Consequently, controllers have been reminded of the importance of passing accurate and complete traffic information. Nevertheless, the Airprox occurred about 2 minutes after the Harrier pilot left CON 15's frequency and after he had completed another full orbit.

HQ PTC comments that the Jetstream pilot had obtained an appropriate ATS for this stage of the sortie. This enabled him to acquire the conflicting traffic and descend to avoid it. The Harrier pilot seems to have concentrated on his task to the exclusion of the warning given by London RADAR before he elected to terminate the service. As a result, he did not see the Jetstream.

HQ STC comments that the Harrier pilot made all reasonable efforts to increase vertical separation based on traffic information from London RADAR and it is surprising that the Jetstream captain believed that continuing his descent on heading represented positive avoiding action. A 4 NM visual pick-up in this scenario is quite reasonable and, given the low rate of closure, it is hard to imagine that the risk of collision was anything other than low.

UKAB Note (2): A review of the Great Dun Fell radar recording reveals that this Airprox occurred at 1325:25, 1·5 NM NNE of GASKO, broadly as described by the Jetstream pilot, whose ac is shown tracking about 040° and levelling at FL 60 Mode C by the time the ac passes GASKO. Meanwhile the Harrier is shown orbiting L in a slow descent and at 1325:11, is also at FL60 in the Jetstream pilot's 11 o'clock - 2·5 NM. The Harrier, now indicating FL 63, continues to turn about and at the CPA crosses from L to R about 0·3 NM ahead of and 400 ft above the Jetstream, which at 1325:25 indicates FL 59. The Jetstream then turns NE and descends steadily to FL 52, as the Harrier turns about and crosses ahead from R to L and subsequently descends to LL.

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 Military ATC Ops advisor commented that here was a salutary lesson for controllers, to paint the whole picture, and make sure that level information is included when traffic information is passed. Whilst in this instance, the controller had conscientiously passed it on other occasions, it was omitted from the final transmission, which might have misled the Harrier pilot. However, some controller members disagreed. They argued that the Harrier pilot had switched frequencies minutes before the Airprox and so was flying VFR without an ATS at the time of the encounter. The board was also advised that he had not changed to a 3/A 7000 squawk after terminating the ATS from London RADAR, which could potentially mislead controllers into believing they might be able to achieve co-ordination, when this clearly would not be feasible if the pilot was not talking to the respective ATCRU.

The importance of strict compliance with SSR code setting procedures was emphasised.

However, it was clear that the Harrier pilot had not seen the Jetstream at all during his manoeuvres and he was evidently concentrating on joining the rest of his formation at low-level. This probably had an adverse impact on his lookout and was intrinsic to the cause. Pilot members observed that in a tight turn, the Harrier pilot would be 'belly-up' on one side of the orbit, and blind to the direction from which the Jetstream was approaching in this instance. Whilst he may have been looking into the turn on the opposite side of the orbit to search for other ac, this encounter illustrates well the need to check and clear the blind spot under the wing. Some members said that if the Harrier pilot had seen the Jetstream an Airprox would probably not have ensued. The Board also considered whether the Jetstream pilot's avoiding action 200 ft descent was sufficient to provide satisfactory separation against the manoeuvring Harrier. In this instance, not knowing if he had been seen or not, the Jetstream pilot might have been wiser to have given the Harrier a wider berth. Indeed, notwithstanding the 'right of way' rules in this situation, the Jetstream pilot spotted the Harrier in good time and some members thought that a steeper descent or greater horizontal separation could have been applied without difficulty. After considerable debate, members agreed that this Airprox resulted because, whilst manoeuvring, the Harrier pilot did not see the Jetstream. However, as the Jetstream pilot had seen the other ac and was endeavouring to afford separation, which could have been more robust if he chose, the members agreed unanimously that there had not been a risk of a collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: Whilst manoeuvring, the Harrier pilot did not see the Jetstream.

Degree of Risk: C

AIRPROX REPORT No 8/00

Date/Time: 21 Jan 1500

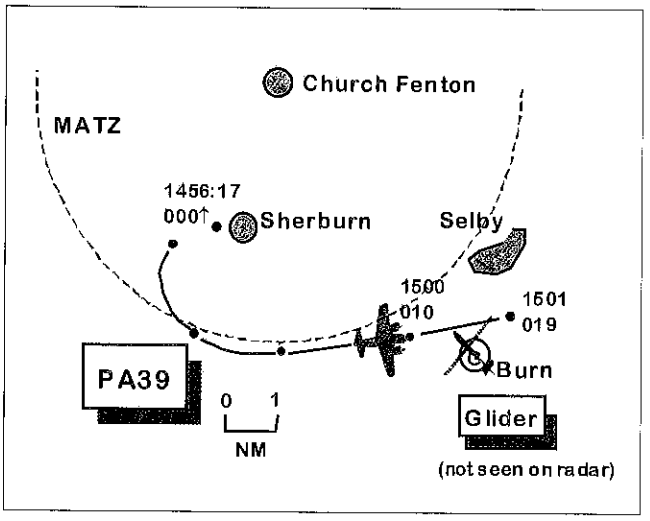
Position: 5345 N 0105 W (Burn airfield - elev 20 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	ASK13 glider	PA39 (Twin Com)
Operator:	Civ Club	Civ Pte
Alt/FL:	1300 ft (QFE)	1500 - 3500 ft (RPS)
Weather Visibility:	VMC CLBC 18 NM	VMC CAVK >10 km

Reported Separation: 0 ft V 50 yd H / not seen

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports that he was being winch-launched from Burn on a heading of 330° at 55 kt. Church Fenton had been advised of the gliding activity. Radio was not fitted to his ac. The visibility was 18 NM in VMC. His pupil saw another ac and aborted the launch at 1300 ft. On levelling out, he saw a low wing twin engined ac at their 1130 position about 200 m away crossing from L to R at the same level. The pupil turned the glider L and the other ac, which had been in view for only 3 – 4 sec, passed about 50 m away on an easterly track

with no apparent avoiding action by its pilot. He felt there had been a very high risk of collision. The encounter was witnessed by ground observers.

The glider instructor comments that vision from the glider was restricted by its 45° climb angle, particularly from the back seat where he was sitting; hence his front seat pupil saw the other ac first.

THE PA39 PILOT reports that he was conducting a local flight from Sherburn-in-Elmet while receiving a FIS from Church Fenton on 126x5. He was squawking 4540 with Mode C. Flying conditions were CAVOK. He could not recollect his exact route but believes that he would have followed the normal LH circuit pattern for RW 29, flying at 1500 ft within the Church Fenton MATZ and then at 3500 ft as he proceeded to the E. Any crossing of Burn airfield during this time would have been unintended and accidental. Neither he nor his passenger, also a licensed pilot, could recall seeing a glider.

HQ MATO reports that the PA39 pilot free-called Fenton radar, which is manned by a controller at Linton-on Ouse, at 1457:18, advising that he was departing Sherburn to the E not above 1500 ft. The ac was placed under a FIS, passed the QFE (1030) and instructed to report at Selby squawking 4540. At 1500:13 the PA39 pilot reported S abeam Selby and climbing to 3500 ft. Fenton acknowledged and passed the RPS (Barnsley 1027). At 1503:49 the pilot changed frequency to Humberside at his request.

Burn gliding site is about 20 NM from Linton-on Ouse and the Airprox appears to have occurred below the base of Linton's radar cover. Linton have separate letters of agreement (LoA) with Sherburn aerodrome and Burn gliding club. These specifically deconflict activities between military ac using Church Fenton and the respective operations at the 2 airfields. The Burn LoA states that the gliding club will inform the Linton Supervisor before flying commences if they intend to operate on days other than Thursdays, Saturdays and Sundays. The Airprox occurred on a Friday, and neither the Supervisor nor the ADC at Church Fenton on duty that day recall being aware that Burn was active; moreover, there is no record of such in either the Linton or Church Fenton watch logs. At the request of the gliding club the LoA with Burn is currently under review.

The Airprox is not recorded on radar, but the LATCC Claxby radar recording shows the PA39's track as it climbs out from the Sherburn area and turns L onto an easterly track at 1000–1100 ft Mode C (equivalent to about 1500–1600 ft QFE). At 1458:00 the squawk changes from 7000 to 4540, and at 1500:13 the ac transits in the vicinity of the Burn gliding site; the glider is not seen on the radar recording. About 15 sec later the PA39 commences climb.

UKAB Note: Burn gliding site is notified in the UK AIP for gliding during daylight hours up to 2000 ft agl. The site is also marked on the ICAO 1:500 000 topographical chart with a warning of cables.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that although the glider pilot believed Church Fenton had been advised of the gliding activity at Burn, this was not confirmed by the watch logs at either Linton or Church Fenton. Although it was not possible to conclude with any certainty whether or not the site had been notified as active, members thought the PA39 pilot may have been operating on the assumption that it was not. Nevertheless, it was his responsibility to ensure his flight in Class G airspace was planned carefully and executed safely. Noting that his track passed very close to Burn on the radar recording, members felt he should have been wary of possible glider activity in the area even if he was not expecting it. The glider pilot reported that the PA39 was estimated to have been within 200 m of the glider when the launch was aborted, which implied that it had tracked not too far from the winch and possibly within an area likely to be occupied by the launch cable. The Board concluded that the PA39 pilot caused the Airprox by flying close to a notified and active gliding site and forcing the glider, which he

did not see, to abort its launch. In view of the PA39's proximity to the glider and the launch cable, members agreed that the safety of both ac had been compromised.

A member commented that the ground launch party had a part to play also. It was their responsibility to clear the area before launch and it was thought that the PA39 ought to have been within their field of view prior to the release of the glider.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: Non-sighting by the PA39 pilot who caused the glider pilot to abort during a winch launch.

Degree of Risk: B

AIRPROX REPORT No 9/00

Date/Time: 20 Jan 0931

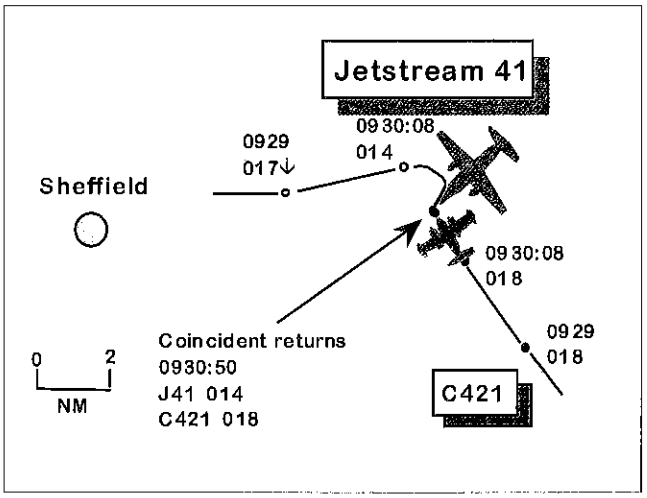
Position: 5323 N 0107 W (9×5 NM E Sheffield airport)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream 41	C421
Operator:	CAT	Civ Pte
Alt/FL:	1900 ft (QNH 1032)	2000 ft (RPS)
Weather Visibility:	VMC >10 km	CAVOK >10 km

Reported Separation: 100 ft V nil H/500 ft V

Recorded Separation: 400 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports that he had been cleared by Sheffield ATC on 128×52 for an NDB approach to RW 28. The Captain monitored the FO as he flew the instrument procedure; cockpit workload was medium. The visibility was over 10 km in VMC. When level at 1900 ft (QNH 1032) 8×5 NM E of the airport and turning R inbound at 160 kt, a Seneca type ac was seen at his 9 o'clock less than half a mile away, about 100 ft above his level; it quickly passed about 100 m behind him and he observed it tracking away to the NW at 2000 ft. He did not take avoiding action because his turn was taking him away from the other ac, but he thought there had been a high risk of collision and reported the incident to Sheffield ATC, who had no knowledge of the other ac.

The pilot comments that this appears to be a classic scenario where the published instrument procedure of an airfield which has no radar capability is situated outside CAS.

THE C421 PILOT reports that he was cruising 175 kt at 2000 ft (RPS) on a flight from Peterborough to Leeds. The visibility was better than 10 km in VMC. He was receiving a RIS from Waddington on 127×35 and squawking 2675 with Mode C. Shortly after passing Gamston, Waddington called an ac at his 1 o'clock range 5 NM and 10 sec later both he and his co pilot sighted a Jetstream which was slightly above their level. While keeping the other ac in sight, he reached to switch off the auto-pilot when he realised that it was now below in a steady descent and would track behind them. He therefore left the autopilot connected and continuously monitored the other ac which then passed at least

500 ft below them; in his opinion there was no risk of collision.

ATSI comments that the C421 was not known to the Sheffield controller but its crew were in visual contact with the Jetstream having been alerted to its presence by Waddington. There were no perceived civil ATC implications in this incident.

HQ MATO comments that no RT recording was available because RAF Waddington's ATC involvement was not discovered until 1 Mar. However, from the C421 pilot's report it is clear that Waddington Zone provided an entirely appropriate service which enabled him to acquire the Jetstream visually at an early stage.

UKAB Note: A recording of the LATCC Claxby radar at 0929 shows the Jetstream descending through 1700 ft Mode C and tracking outbound on the NDB procedure 5 NM E of Sheffield. At the same time the C421 is tracking NW 12 NM ESE of the airfield at 1800 ft Mode C, which it maintains throughout the encounter. At this stage the ac are about 12 NM apart. The tracks converge at about 100° and at 0930:08 the Jetstream, now level at 1400 ft, turns R directly towards the C421 which is now at its 3 o'clock, range 3 NM. At 0930:50, 9x5 NM due E of the airfield, the returns of the ac merge as the Jetstream turns through a southwesterly heading at 1400 ft (1900 ft QNH 1032) and the C421 overflies it at 1800 ft (2300 ft QNH). Vertical separation was therefore in the order of 400 ft; horizontal separation cannot be measured owing to the closeness of the radar returns.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA member pointed out that the instrument approach path to Sheffield is marked on the 1:500 000 topographical chart and GA pilots should anticipate the possibility of encountering civil air transport ac flying an instrument approach when flying through the area. In this case it was noted that the C421 pilot was receiving an appropriate radar service from Waddington and had acquired the Jetstream visually from some distance away having been passed traffic information on it. After assessing the situation, the C421 pilot judged that avoiding action was unnecessary, but a member thought it might have been prudent to heed his initial instinct to disconnect the autopilot and take action to optimise separation; however, it was accepted that this was a matter for fine judgement at the time.

A member commented that prior to the Jetstream's turn from its outbound easterly heading, the C421 had right of way under the Rules of the Air. Given the good flying conditions reported, and notwithstanding that they were engaged in an NDB approach, members thought that the Jetstream crew ought to have been able to spot the C421 before they commenced the base leg turn. This turn took the Jetstream into confliction with the C421, which the pilot did not see until it was about to pass behind him, and caused the airprox. The Board concluded that there had not been a risk of collision; the C421 pilot had always been in a position to take avoiding action, having watched the Jetstream for some time, and the radar recording indicated that vertical separation was in the order of 400 ft.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: While flying an NDB procedure in Class G airspace, the Jetstream pilot flew into confliction with the C421 which he saw late.

Degree of Risk: C

AIRPROX REPORT No 10/00

Date/Time: 24 Jan 1430

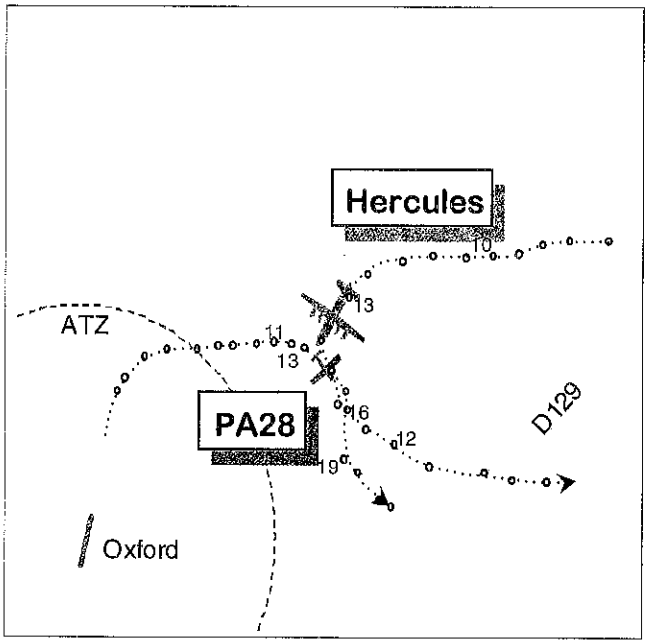
Position: 5152N 0115W (1.3 NM SW of Weston/ Green)

Airspace: D129 (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Hercules	PA28
Operator:	HQ STC	Civ Trg
Alt/FL:	1500 ft (QNH 1024 mb)	2000 ft (RPS)
Weather Visibility:	VMC CLNC 10 km	VMC CAVK 10 NM

Reported Separation: 50-75 m, 100 ft/300 ft

Recorded Separation: <300 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HERCULES PILOT reports heading 180° at 148 kt in a climbing left turn after a para-dropping run at 1500 ft over Weston on the Green (WOG) airfield when he encountered a low wing single-engined ac. It was in his 10 o'clock also in a left turn, 50-75 m away and 100 ft above. There was no time for avoiding action and the risk of collision was high.

THE PA28 PILOT reports having given his student an EFATO on departure from RW 02 at Oxford, to turn right on recovery and depart to the E. He was heading 090° at 75 kt when he saw the Hercules paradropping at WOG; he checked his position and found he was inside D129. The Hercules turned towards him after the drop, so he continued the climb and turned his student onto 120°. The Hercules passed 300 ft below. There was little risk of collision as he kept the Hercules in sight throughout but he agreed it was entirely his fault for being inside D129, particularly since he occasionally flies there as a paradropping pilot.

UKAB Note: LATCC radar recordings show the Hercules tracking W towards WOG within D129 at 1000 ft Mode C as the PA28 turns right out of the N part of the Oxford ATZ and into D129, passing 1100 ft Mode C in a climb. The Hercules starts a left turn and the PA28 a right turn but their labels then merge and Mode C readings become intermittent. The Hercules shows 1300 ft just after it starts to turn but there are no further identifiable readings until after the event when it shows 1200 ft going down wind. The PA28 passes 1600 ft at some point in its turn during which it is underflown by the Hercules, and 1900 ft as it leaves D129.

HQ STC comments that all C130 crews are aware of the high level of GA activity in the area surrounding D129 and of the need for extra vigilance. Although the Danger Area affords them considerable protection, this was a clear reminder that a good lookout must be maintained at all times. The PA28 pilot's admission is acknowledged and appreciated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was aware that the airspace around Oxford is extremely constrained and the requirements of instruction, including an EFATO are difficult to achieve in it. A few extra seconds on an easterly heading was all it took to take the PA28 into D129; members surmised that the instructor may have given more attention to making a teaching point than to his navigation, and appreciated his full

and helpful report. It was agreed quickly that the cause of the incident was the inadvertent penetration of D129 by the PA28 pilot. The risk level generated some discussion. It was not clear from the radar recording how close above the Hercules the PA28 had passed. The surprise factor probably made it seem closer to the Hercules crew, but the separation of somewhere between 100 and 300 ft was fairly close nevertheless. However, the PA28 pilot was watching the Hercules and was in a position to ensure he did not actually collide with it and the Board concluded therefore that there had not been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Inadvertent penetration of D129 by the PA28 pilot.

Degree of Risk: C

AIRPROX REPORT No 11/00

Date/Time: 20 Jan 1106

Position: N5123 W0243 (0x75 NM E Bristol airport - elev 622 ft)

Airspace: CTZ (*Class:* D)

	Reporting Aircraft	*Reported Aircraft*
Type:	F50	AS355
Operator:	CAT	Civ Comm
Alt/FL:	1100 ft (QNH 1034 mb)	500 ft (QNH 1034 mb)
Weather Visibility:	VMC 10 km	VMC 10 km

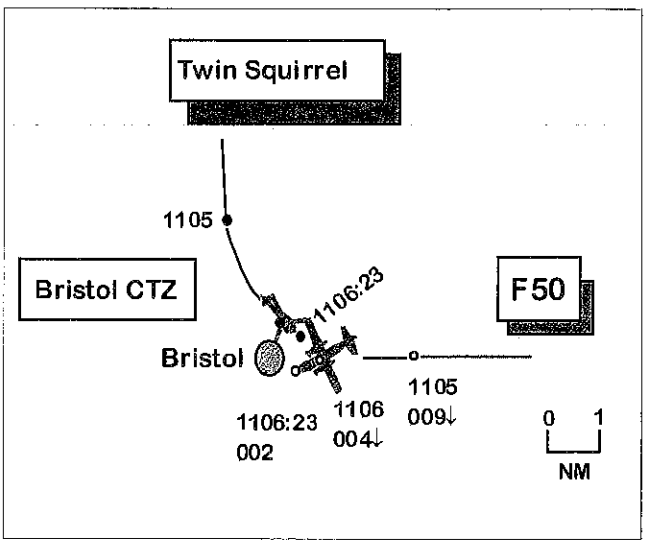
Reported Separation: <0·5NM H 300 m H 200 ft V

Recorded Separation: d 0x5 NM

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports that he was descending through about 1100 ft at 140 kt (QNH 1034) while on a 2 NM approach for the ILS to RW 27 at Bristol. The visibility was 10 km in VMC. He was in contact with ADC on 133x85 and heard the pilot of a helicopter being cleared to follow the F50 visually for RW 27. However, the helicopter closed to less than half a mile from him which was, by his standards, too close for comfort. Although no avoiding action was necessary, the helicopter distracted him while he was concentrating on flying the ILS.

THE AS355 PILOT reports that he was approaching the airfield from the N at 70 kt at 500 ft



(QNH 1034). The visibility, 1500 ft below cloud, was 10 km. The F50 was cleared to land on RW 27 by the Tower and he was then cleared to land on the N side of the airfield. He had watched the F50 from 3 – 4 NM out and informed ADC that he would make a westerly approach for taxiway G, which is the main taxiway parallel to the N of RW 27. Approaching base leg, No 2, he reduced speed in order to position behind the F50 and, as it passed about 300 m ahead of him and 200 ft below, he turned finals onto the N side. At no time did he consider there had been a risk of collision.

BRISTOL ATC reports that the F50 pilot was given traffic information on the helicopter by APC prior to being transferred to ADC. The helicopter pilot was given standard joining instructions and reported visual with the F50. Subsequently the helicopter turned finals onto taxiway G, N abeam the F50. The F50 pilot, however, was not satisfied with the separation between the ac and reported that he would be submitting an Airprox report.

UKAB Note (1): The APC transcript shows that the F50 was transferred to ADC just before the helicopter pilot reported on the APC frequency on a VFR arrival; the helicopter was immediately also transferred to ADC to request onward clearance to the airfield.

ATSI comments that the F50 crew were clearly concerned by the proximity of the helicopter, whose pilot had previously reported seeing the F50 as he approached the northern boundary of the airfield. Contrary to the Bristol controller's report, traffic information was not passed to the F50 with respect to the helicopter and the F50 pilot's report suggests that he thought the helicopter was positioning No 2 for RW 27 rather than for the parallel taxiway. It is therefore not surprising that he felt concerned about the helicopter's proximity, especially at a time when he was concentrating on his approach and landing. The provision of timely and pertinent traffic information to the F50 crew might have allayed their concerns and may have avoided the submission of an Airprox report. Following this incident, the Bristol ATS Manager issued an 'Operations Memorandum' reminding controllers that traffic information should be passed in such circumstances. Moreover, helicopter procedures have been revised in the unit's MATS Pt 2, prohibiting parallel approaches to the taxiway when IFR traffic is on final approach.

UKAB Note (2): A recording of the LATCC radar shows the F50 on final approach to RW 27 with the helicopter tracking S towards the airfield. At 1106 the F50 is descending through 400 Mode C (967 ft QNH) with the helicopter, now in a L turn through a southeasterly heading, at its 1.30 position range 1 NM. The F50 then appears to make a slight turn to port and fades from radar at 1106:23 indicating 200 ft Mode C. At this stage the helicopter is on an almost reciprocal but curving track to the R as it positions for its approach to the parallel taxiway about 0x5 NM N of the F50; it then also fades from radar cover at this point.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The radar recording confirms that at its closest point the helicopter was some 800 m N of the F50; most members were of the opinion that this separation was acceptable and that the helicopter's routeing was consistent with a normal VFR approach to the northern taxiway. That said, the Board acknowledged the genuine concerns of the F50 pilot, which had prompted him to submit an Airprox report. The situation was exacerbated by a lack of traffic information from Bristol ATC, which was assessed to be a contributory factor in the Airprox. Some members felt that even if the F50 pilot had been made aware of the helicopter, he might still have felt disconcerted by its presence, believing it to be too close to him and an unwelcome distraction as he prepared to land. The helicopter pilot, however, did not feel that he had compromised the F50 as he believed he had made a normal visual join, remaining well clear of the active runway and keeping the other ac continously in sight. The Board noted the lateral separation on the radar recording, and agreed that the helicopter pilot was always in a position to remain clear of the F50. It was concluded that there had not been a risk of collision. However, the Board was pleased to note that Bristol ATC had now changed their procedures to ensure that pilots of IFR ac on the final approach will not in future need to feel concerned about the proximity of helicopters.

UKAB Note: In a telephone conversation with the F50 pilot's company subsequent to the Board meeting, it emerged that the pilot had in fact been aware of the helicopter's presence and its routeing. He was mainly concerned about the possible compromise to his safety had he been required to go-around.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: The F50 pilot was concerned about the proximity of the helicopter, of which he had not been advised.

Degree of Risk: C

AIRPROX REPORT No 12/00

Date/Time: 31 Jan 0920

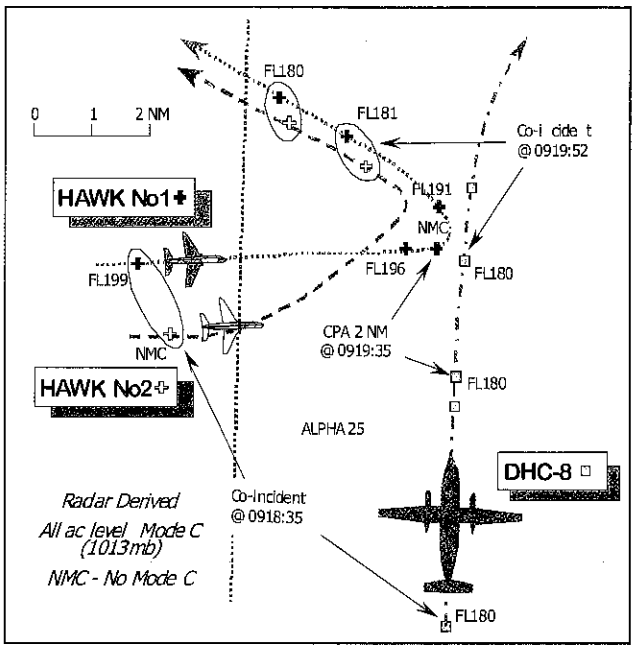
Position: 5241N 0311W (7·5NM N of NITON)

Airspace: AWY A25 (*Class:* A)

Reporter: Manchester ACC

	First Aircraft	*Second Aircraft*
Type:	DHC-8	Hawk x 2
Operator:	CAT	HQ PTC
Alt/FL:	FL 180	18000 ft (RPS 1008 mb)
Weather	VMC NIL SIG	VMC CLBC
Visibility:	10 km	>10 Km
Reported Separation:	Nil V 2 NM H	Not Reported

Recorded Separation: >1100 ft V & 2 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MANCHESTER WEST SC reports being the OJTI to a 10-week familiarisation student who was operating the RT. The DHC-8 was routeing toward MONTY, northbound on A25 at FL 180, when a 3/A 7000 squawk was observed at FL 200 on the western edge of the Awy heading E. Another ac's climb was stopped and she immediately took over the RT from the student and issued a R turn to the DHC-8 crew. The unknown ac squawking 3/A 7000, descended rapidly and levelled at FL 180 Mode C she thought, before executing a very tight L turn onto W. Traffic information was issued to the DHC-8 crew, who reported visual with a pair of military jets.

UKAB Note (1): A review of the MACC W sector RT transcript reveals that at 0919:50, the SC instructed the DHC-8 crew to *"...turn R 20 degrees"*, who acknowledged heading 015°. The SC then reported 10 sec later, *"...traffic information for you 7000 squawk unverified height readout showing 180 currently in your 10 o'clock range of 4 miles came in the airway at 190 turned just before you and has descended to your level now"*. The DHC-8 crew responded that they were visual, whereupon the SC added that the traffic was now *"...9 o'clock range of 7 miles still at 180 heading W"*. The crew reaffirmed visual contact with the two ac and at 0921, the SC advised that they had cleared W of the airway and instructed the DHC-8 crew to resume their own navigation for WALLASEY.

THE DHC-8 CAPTAIN reports heading 005° at 275 kt in VMC, when 2 low wing military fast-jets were spotted at 10 o'clock 3 – 4 NM away. It was evident that the pair had infringed the airway but neither he nor the F/O were alarmed as the jets descended to a similar level, whilst closing L - R to 11 - 12 o'clock – about 2 miles away, before turning abruptly sharp L through N onto W. ATC then advised them to alter course, to the R, which was complied with, but by then the other ac had already turned away.

The Captain opines that neither he, nor the F/O, would have filed an Airprox on their own initiative, as they considered the risk of a collision to be low.

THE HAWK FORMATION LEADER reports heading 090°, into sun at 250 kt, whilst leading a pair of Hawk ac operating below and in the N Wales MTA. This sortie involved battle turns, simulated emergency procedures and a PD to Shawbury as part of his student's training course.

Following the PD the formation departed Shawbury westbound, climbed through A25 with London RADAR and proceeded initially into the MTA. TACAN information appeared to be reliable so the formation switched to a discrete operating frequency and the

role of formation leader was handed to the student. However, as the instructor, he retained responsibility for formation positioning and so elected to operate around the 150° VLY 50 - 55 DME at 20,000 ft Holyhead RPS (1008 mb) to remain clear of D201, A25 and the active Valley Air Tactics Area (VATA) to the N. After several turns on an E - W racetrack S of the VATA, he judged there was sufficient separation from A25 to give his student in the other ac a simulated emergency on an easterly heading. The simulated emergency passed over the R/T was an engine surge, so idle was selected and speed reduced to about 230 kt IAS in both ac.

UKAB Note (2): The southern boundary of the VATA is coincident with the promulgated southern boundary of the Valley AIAA, albeit situated above it.

As the formation began a turn onto 300° towards Valley, the instructor's TACAN indicated about 130° VYL 65 DME, having been at 150° VYL 50 DME just over a minute before. Knowing that they could not have moved 20 NM in that length of time, the instructor suspected the TACAN information to be, or have been erroneous. The TACAN then settled at 135° VYL 60 DME indicating that the formation was within A25, which they exited immediately.

On landing the leader was informed by MACC of the Airprox report. No civilian traffic had been sighted by either of the Hawk pilots during the period.

ATSI comment there was little time to react to the airway infringement and it was fortunate that the DHC-8 crew sighted the conflicting Hawks before traffic information was passed. Whether or not the phrase 'avoiding action' was warranted is open to discussion, but the Hawks had already turned away when the instruction to turn R was issued.

RAF VALLEY comments that Hawk training ac operate in congested airspace, bounded by airways to the N, E and S and a danger area to the W. In order to deconflict local traffic, the VATA at medium level and Valley Areas of Low-Level Intensive Training (VALITs) at low level were introduced. Both must be booked for specific events locally, but may be used by any Valley-based ac operating under VFR when notified inactive. There are no restrictions on non-Valley based ac. VATA E, which was notified as active at the time of the Airprox, extends to 145° VYL 45 NM with the southern boundary running E – W. This explains why the formation was operating 150° VYL 50 NM on an E - W racetrack, thus maintaining separation from the VATA. Above cloud the only navigational aid available to the Hawk pilot is TACAN and, in this case, only one of the 2 TACANS in the formation was serviceable. At a range of 50 – 60 NM it is not unusual for the TACAN to lose lock during manoeuvres and although the lock is nearly always regained this may not occur immediately. In the meantime spurious indications may be given. On the day in question there was a strong westerly jetstream blowing which may have distorted the pilot's mental dead reckoning plot of his position. This, combined with a possible TACAN unlock, resulted in an infringement of A25 and the Airprox.

In a number of recent occurrences, problems with the TACAN were contributory to the cause. On each occasion the importance of making certain of the ac's position has been stressed to FTS aircrew, as have the potential consequences of failing to do so. In this instance, if a RIS had been maintained with London RADAR, the incident may have been avoided and all FTS aircrew have been briefed accordingly. However a RIS may not always be available, leaving the Hawk pilot reliant on TACAN.

We are striving to reduce the number of Airprox involving Valley based ac. However, the pressure on the local airspace is intense as the flying rate continues to increase, thus forcing sorties to utilise fully all the airspace available. With only TACAN and mental dead reckoning for position information there is no room for equipment failure or pilot error.

HQ PTC endorsed the station comments and added that this is another unfortunate by-product of increasingly limited airspace and the undiminished need to train fast-jet pilots. For our part, we appear to be making some progress in the argument for better navigation equipment for the Hawk and other training ac.

UKAB Note (3): A review of the LATCC Clee Hill radar recording shows that the Hawk formation, the No1 squawking 3/A 7000 with Mode C and the No2 an intermittent primary contact only, entered A25 eastbound just after 0918:35, descending from FL 199 Mode C (1013mb). The DHC-8 is shown

northbound on A25, marginally L of centreline and maintaining FL 180 throughout the encounter. The Airprox occurs broadly as described by the DHC-8 pilot. The No1 Hawk descends through FL 196, turns L about at 0919:35, belly up to the DHC-8, as the No2 moves astern of the No1 on the inside the turn and takes station to port as the formation heads NW. The CPA of 2 NM is achieved in the turn at the DHC-8 pilots 11:30. At this point the No1 Hawk does not display Mode C but, by interpolation, was probably passing about FL 194, with an estimated vertical separation 1400 ft and certainly 1100 ft or more above the DHC-8 which turns about 20° to starboard after the CPA.

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.

An advisor opined that it is not unusual for ac to operate VFR close to, but outside, the boundary of Class A airspace. It was clearly evident to the members that the TACAN error precipitated this Airprox and resulted in the inadvertent entry into CAS by the Hawk pair and separation was in effect, lost as soon as the Hawks strayed across the boundary. Controllers must always be alert to incursions into CAS, but members understood they would have little time to react.

The member from PTC explained that they were striving to acquire better navigational equipment for the Hawk, but financial constraints have regrettably impeded progress. Whilst the Board recognised that RAF Valley have taken positive steps to improve their use of the extremely confined airspace available to them some members wondered whether there was not more that could be done by ATC to assist FTS instructors with their demanding tasks. The Board was then briefed that recent consultation between the Station and LATCC (Mil) staff has proved beneficial and it is intended that a service specific to the needs of RAF Valley instructional sorties will be provided, which will include warnings on the proximity of CAS. However, London RADAR are constrained by clearly defined priorities of service, their resources are finite and there might be occasions when higher priority tasks will limit the availability of such a service. Whilst members agreed that this provided a most positive step in the right direction, the danger of becoming reliant on a service which cannot be guaranteed had to be kept in mind. They strongly supported, therefore, the case for better navigation equipment for the Hawk as the best way forward. Some pilot members believed that the instructor's choice of timing for the practice emergency was a little unwise. Given the airspace constraints, with hindsight, it would have been better to have initiated the practice emergency when heading away from the airway on a westerly track. However, from the Hawk leader's commendably full and frank report it is clear that they turned to exit CAS immediately he realised they had strayed into it. Nevertheless, a call on Guard to advise that he was aware of the inadvertent infringement would have been welcomed also and might save needless tracing action. Members were a little surprised that the Hawk pilots had not seen the other ac. Conversely, the DHC-8 crew was not greatly concerned by the occurrence and their good lookout enabled them to spot the errant Hawks in good time before traffic information was passed. Consequently, the Board agreed unanimously that the Airprox was caused by an inadvertent penetration of CAS by the Hawk pilots, who flew into conflict with the DHC-8, which they did not see. However, the respective tracks never crossed and the minimum separation was 1100 ft and 2 NM. When coupled with the early sighting by the DHC-8 crew, members concluded unanimously that no risk of a collision had existed.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: Inadvertent penetration of CAS by the Hawk pilots, who flew into conflict with the DHC-8, which they did not see.

Degree of Risk: C

AIRPROX REPORT No 13/00

Date/Time: 02 Feb 1040

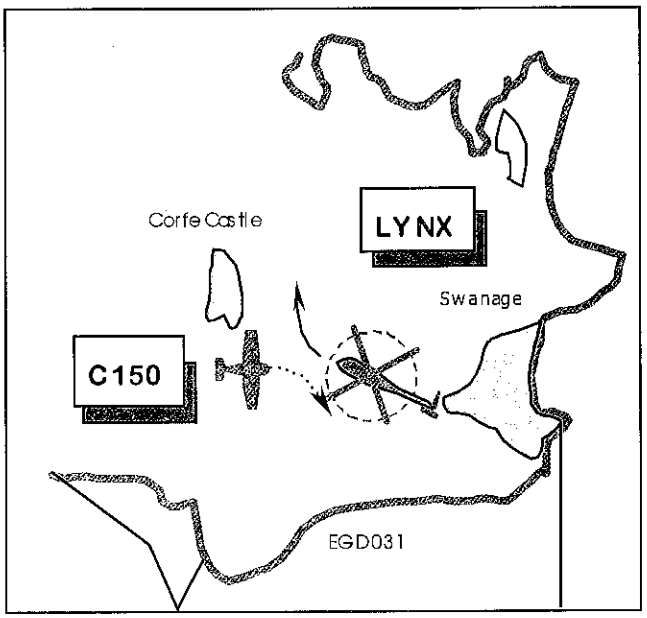
Position: 5037 N 0200 W (1 NM W of Swanage)

Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Lynx HMA Mk 8	Cessna 150
Operator:	HQ FONA	Civ Trg
Alt/FL:	1500 ft (RPS 1017 mb)	2000 ft (RPS 1017 mb)
Weather Visibility:	VMC CLBC 20 km	VMC >10 Km

Reported Separation: 3-400 yd H/400 m H nil V

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX MK 8 PILOT reports heading 315° at 120 kt, returning VFR from the south coast danger areas to RNAS Yeovilton, at 1500 ft RPS under a FIS from Plymouth Military Radar during a student conversion sortie. The weather was good VMC with scattered cloud about 1000 ft above the ac. His helicopter was camouflage grey, the anti collision light was on, but HISLs are not fitted. About 1 NM W of Swanage, a white Cessna was sighted at 11 o'clock 500 yd away down sun at the same altitude and heading in the opposite direction. Both ac immediately broke R and passed about 3-400 yd apart. The windscreen central pillar and the GPS unit on top of the instrument console, port side, had obscured his view. Consequently, he saw the other ac late, as did the rest of the crew, including those in the rear of the ac looking forward. A QOI was seated between the front seat crew members, whilst the ac Captain sat directly behind the handling pilot with zero forward visibility due to the seating arrangement. An Airprox was not reported immediately, but was filed after landing because he considered there had been a certain risk of a collision if no avoiding action had been taken.

THE CESSNA 150 PILOT reports heading 090° (M) at 90 kt, flying VFR at 2000 ft RPS on a trial flight with a student and under a FIS from Bournemouth Approach. His ac has a white/red colour scheme and the anti-collision light was on; SSR is not fitted. From a position about 0·5 NM S of Corfe Castle he turned onto an easterly heading whereupon his student exclaimed and pointed *"..look helicopter"*. He saw a Lynx about 0·5 NM away heading about 300° at the same altitude so he turned R to avoid it; the helicopter also turned R shortly after he saw it and they passed 'port to port' on parallel tracks about 400 m apart. He adds that the Lynx had been obscured by the stbd windscreen pillar, but he did not assess the risk.

HQ MATO reports that the Lynx was receiving a FIS from Plymouth Military LARS (EAST) on 300·175. At 1035:49, the Lynx crew reported *"...coasted in Durlston Head, routeing direct Durlston – Yeovilton...we're in climb 1500 feet, 1017."* LARS acknowledged the call and requested the crew to advise changing en-route, which they did at 1046:25, when they switched to Yeovilton. No other transmissions were received from the Lynx during the transit. Plymouth Mil was not aware that an Airprox had been filed until advised by HQ MATO.

The Lynx crew gave no hint of any concern in the tone of their transmission when they switched to Yeovilton and the LARS EAST workload was assessed as light at the time of the Airprox. The controller was using the remote radar head situated on Portland, (18 NM from Durlston Head) and

although the Lynx's squawk was observed throughout its sortie, the controller could not recall any other radar contacts in the reported Airprox position. The primary radar was assessed as fully serviceable, although the radar picture was optimised for extended range low level coverage over the sea by use of the 'Sea Watch' facility that can affect radar performance overland. However, only a very low setting was in use at the time.

It is unfortunate that the Airprox was not reported to LARS on RT at the time. Delays in reporting can often hamper the subsequent investigation and thus reduce the benefit of any flight safety lessons that may be learned.

HQ FONA comments that whilst there is a possibility that both ac may have been aware of each other's position had they been operating on the same frequency; under a FIS that would not have been guaranteed. This incident, in excellent visibility, highlights the need to maintain a good lookout.

UKAB Note: This Airprox occurred outwith recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although both pilots reported operating at differing altitudes prior to this encounter, they were virtually in agreement about the relative geometry and separation resultant from their avoiding action. This made assessment of this Airprox a little easier in the absence of recorded radar evidence. Neither the Lynx crew nor the C150 pilot had done anything wrong and it was pure chance that placed them in the same vicinity, at about the same altitude, at the same time. It was also evident that each saw the other at a late stage. Some members believed that both pilots' comments about the detrimental effect of cockpit equipment and ac structure on their respective fields of view were worth further mention. It was not good enough to blame the poor visibility around cockpit equipment and seating arrangements in the Lynx or the obscuration promoted by the windscreen pillar in the C150. This very issue was highlighted in a recent edition of the HQ STC Flight Safety publication 'AIR IT', which entreated crews to 'Move your head around' to clear airspace obscured by instrumentation and canopy arches – or move the ac to 'unblank' hidden sectors during 'Lookout'. This is sound advice. The cause of this Airprox stemmed from 'Lookout', which members agreed manifest itself as a late sighting by the Lynx crew and by the C150 pilot. Nevertheless, though each sighting was late, sufficient time remained to enable the respective pilots to manoeuvre their ac safely away from each other, albeit with only about 400 yd between them. Consequently, members agreed that in the circumstances reported there had not been a risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the Lynx crew and a late sighting by the C150 pilot.

Degree of Risk: C

AIRPROX REPORT No 14/00

Date/Time: 5 Feb 1626 (Saturday)

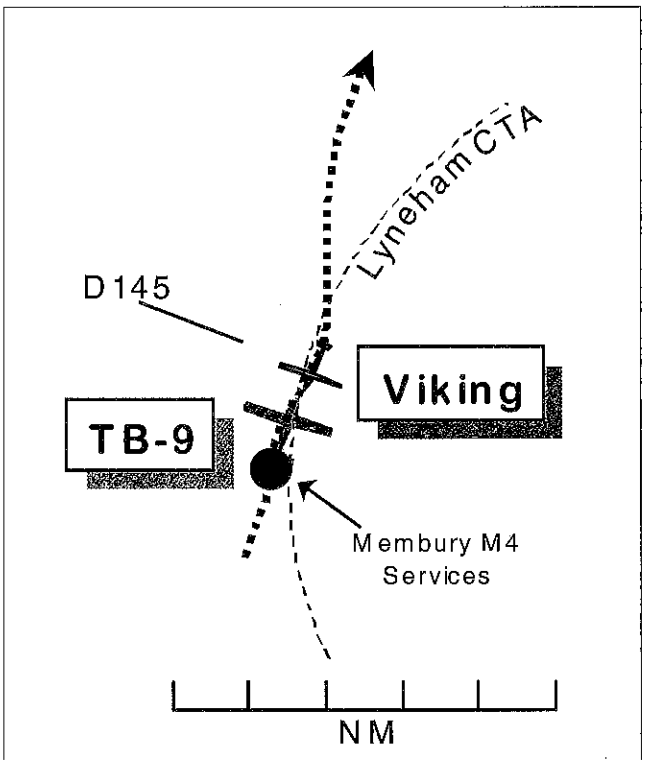
Position: 5132N 0209W (9 NM WNW of Lyneham)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Viking glider	TB9
Operator:	HQ PTC	Civ Pte
Alt/FL:	1400 ft (QFE 1012 mb)	1700 ft (QNH 1017 mb)
Weather Visibility:	VMC HZBC 5 NM	VMC HZBC 4-5 NM

Reported Separation: 100 ft H, 50 ft V/ 50-100 m

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING GLIDER PILOT reports heading 230° at 55 kt and had just completed a winch launch to 1400 ft above Hullavington (elev 343 ft) when the captain spotted a light ac less than 500 m ahead, heading about 020°. He initiated a descending left turn and the light ac passed about 100 ft away and 50 ft above with a high risk of collision.

THE TB9 PILOT reports heading 014° at 105 kt en route to Kemble and receiving a FIS from Lyneham on 123·4. He was cruising at 1700 ft, about 200 ft below broken stratus, having been forced down from his preferred altitude by the lowering cloud. Lyneham had cleared him through the W edge of the zone and he advised them as he passed the service station on the M4. He had turned more northerly to avoid Hullavington when a glider appeared from below and to his right. It was turning away to its port and passed 50-100 m away. He thought the risk of collision depended on whether the glider pilot had seen him; it approached from below and its pilot probably saw him before he saw it. He was using GPS and carried a map; on his outbound journey he had routed closer to Bath and was not sure why he had not done so on this return leg. He had seen Colerne and judged that his distance from it would keep him clear of Hullavington.

UKAB Note: Hullavington is a site notified for glider winch launching up to 2000 ft agl in the UK AIP ENR 5-5-1-3. LATCC radar recordings show the TB9, identified from its Lyneham squawk (no Mode C), tracking as in the diagram, directly over Hullavington. The glider does not show, although an intermittent primary-only contact is seen slightly SW of the reported Airprox position some 30 sec after the TB9 has passed.

HQ MATO reports that the TB9 pilot was in transit to Kemble at a reported altitude of 1400 ft Cotswold RPS and receiving a FIS from Lyneham Zone on frequency 123·4. At 1624:11, Zone transmitted, "*C/s as you approach Hullavington area, Hullavington are active with gliders,*" and the pilot replied "*..roger...I'll steer off to the left of it then.*" About three min later, Zone asked the pilot to report visual with Kemble and in his reply at 1627:37, the pilot added "*By the way, those gliders are active, one of them passed me just now about, only about 300 ft away.*" The pilot changed frequency to Kemble at 1628:59. Later that day, Hullavington contacted the Lyneham Supervisor to advise of the incident, although an Airprox was not mentioned in the call.

Zone appears to have provided appropriate Flight Information about the gliding activities, which were outside the Lyneham CTZ. As is often the case, the gliders were only seen intermittently on radar

and thus, anything more than a general information call to the TB9 pilot about Hullavington activity would not have been possible.

HQ PTC comments that Lyneham ATC did all that was required under a FIS to warn the TB9 pilot of the proximity of Hullavington and had gained some reassurance from him. Despite this the TB9 continued to fly into D145 and the 2 ac came very close to an accident. Gliders in mid-launch are very vulnerable from their much reduced forward view, and other ac approach that cable at their peril, particularly from this (very worst) head-on aspect. Effective preventative measures would probably also prove very proscriptive, but may be needed if such incidents continue to recur at the present rate.

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 commented that one of the most prevalent types of GA Airprox were those that occurred over glider launching sites, below the advertised level to which winching was permitted. A gliding instructor on the Board also made the general point that while ground launch parties were not always in a position to see an ac approaching, it was still important for them to look and listen for conflicting ac pre-launch.

It was clear that despite years of publicity pilots were still putting themselves in extreme danger from a collision with a launch cable or glider which could rise up unseen from below them, flown by a pilot whose climb angle prevented an early forward view of encroaching traffic. Members had run out of tactful ways of describing such pilots' airmanship and hoped that this pilot would take the hint in future. A member suggested the UKAB secretariat should raise the issue of further publicity with the CAA GAD. It seemed unexplainable why the TB9 pilot was where he was. He had been warned by Lyneham and knew exactly where he was in relation to the M4 service station; Hullavington itself is a very visible airfield, and had even said he would 'steer off to the left of it'. The Board agreed that his overflight of a known glider site and his late sighting of the glider were the causes of the Airprox. The glider pilot had fortunately been off the cable long enough to spot the TB9 and remove the risk of a collision, but members agreed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TB9 pilot flew over a notified glider site into confliction with the Viking which had just released the cable and which he saw very late.

Degree of Risk: B

AIRPROX REPORT No 15/00

Date/Time: 7 Feb 2102 (Sunday) NIGHT

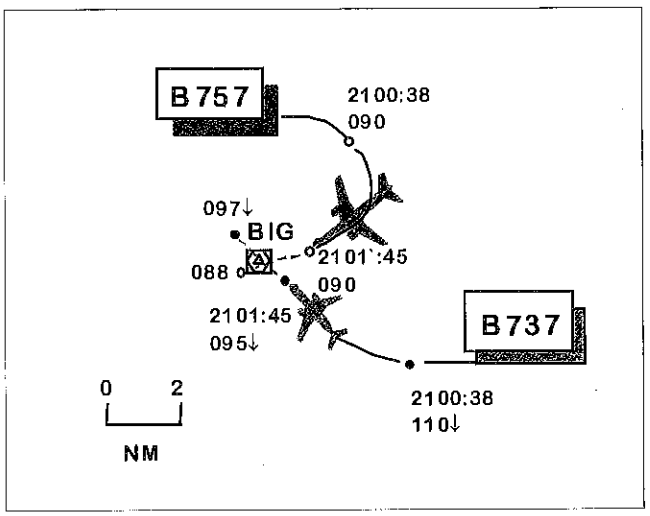
Position: N5120 E0002 (BIG VOR)

Airspace: TMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	B757	B73-4
Operator:	CAT	CAT
Alt/FL:	FL 90	FL 80
Weather	VMC NIGHT	VMC NIGHT
Visibility:	10 km	10 km +

Reported Separation: zero H 300-500 ft V

Recorded Separation: 0x5–1 NM / 600 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports that he was in a level R turn at FL 90 in the BIG holding pattern at 200 kt, the visibility was over 10 km in VMC. A TCAS TA indicated traffic descending about 600 ft above at his 10 o'clock and this was quickly followed by an RA demanding descent. As he initiated a 300 ft descent, ATC instructed him to descend to FL 80. The other ac passed 300 – 500 ft above him descending from L to R. He thought there had been a medium risk of collision.

THE B737 PILOT reports that he was heading 309° at 240 kt having been cleared to descend from FL 110 to FL 80 in the BIG holding pattern by London Control. While descending through about FL 90, ATC instructed him to climb back to FL 100, which was achieved with minimum disruption to the ac's performance and passenger comfort. Despite the 10 km or more night time visibility, the other ac was not seen. TCAS was not fitted to his ac.

ATSI reports that both ac were inbound to Heathrow and receiving an Approach Radar service from the LATCC TC Heathrow Intermediate Director South (DIR). The controller involved reported that the incident had occurred towards the end of a busy and tiring afternoon shift during which he had operated other positions on the Heathrow suite, including two sessions as Final Director. There had been holding delays for most of the day and strong wind conditions had added to his overall workload. All the ATC equipment appropriate to the task was reported serviceable and the controller assessed that in the period leading up to the incident, both traffic loading and workload level had been moderate. Following a rest period, the controller initially operated the Heathrow North Support position before it was closed after about 10 min. At 2054, about 7 min before the incident took place, he took over the DIR position. In this position he was responsible for the level management in both the Ockham and Biggin holding patterns and initial radar sequencing of traffic from the stacks.

The B737 pilot established communications with the DIR at 2054 reporting maintaining FL 120. The controller instructed the flight to maintain FL 120 and hold at Biggin, adding that there would be about a 10 min delay. The B757 had entered the same holding pattern some mins earlier and was maintaining FL 110. As levels below became available, the B757 was cleared to FL 100 and the B737 to FL110. At 2058 the B757, which had just passed over the VOR and was in a R turn outbound in the hold, was cleared to FL 90, and instructed to turn R for the 'BIG' VOR and to leave it on a heading of 270°; at this time the B737 was established on the outbound leg of the holding pattern.

The controller explained that, at the time, there was other traffic which had recently left the Ockham holding pattern and now required to be descended to FL 80. However, he was currently unable to issue the clearance due to traffic ahead in the sequence, and in the meantime he decided to review the levels of the traffic in the Biggin holding pattern. He concluded, correctly, that FL 100 was now available for the B737, as the B757 had reached FL 90. When, however, at 2100:20, he came to issue the descent clearance to the B737, instead of clearing the flight to FL 100 as intended, he erroneously cleared it to FL 80, through the level occupied by the B757. The B737's FPS was marked with a clearance to FL 100, as originally intended. The controller did not notice his error, despite the immediate and correct readback by the pilot of the B737 of the clearance to FL 80. The controller could not readily explain his error; however, he suggested that preoccupation with the pending task of issuing the Ockham traffic with a descent clearance to FL 80 may have caused him unwittingly to quote this level in his transmission to the B737.

Some moments later, while undertaking a routine scan of the radar, the controller was alerted to the B737's height readout of FL 98. By this time a low severity STCA warning had appeared on the radar. Suspecting that the flight had exceeded its cleared level, the controller requested confirmation from the B737 pilot that he was maintaining FL 100. As he was making this transmission he noted the height readout was now indicating FL 97 and in the same message instructed the flight to climb immediately to FL 100. The term avoiding action was not used. The radar recording shows that at this stage the 2 ac were converging, a little over 1 NM apart, with the B737 slightly ahead and in the B757's 11 o'clock position. A high severity STCA warning was now displayed on the radar. The next two transmissions

were from airborne sources and over-lapped in part. They were unintelligible to the controller at the time, but analysis has since revealed that the first was a call from the B757, reporting a TCAS descent, and the second was a response from the B737 reporting *"climbing one hundred"*.

Believing that the B737 had not responded, and noting that the flight was continuing to descend, the controller turned his attention to the B757. At 2101:50, he instructed this flight to descend but, inexplicably, cleared it to FL 100, when intending FL 80, to resolve the conflict; again the controller was not aware of his verbal error. Not surprisingly, the B757 pilot sounded unconvinced by this instruction, responding only with *"er descending er"* - a reference to the TCAS descent instruction with which he was now complying. Over the next few seconds the controller twice instructed the B737 to climb to FL 100, though again he did not employ avoiding action phraseology. On neither occasion was a response obtained from the ac. It was during this period, at 2101:58, that separation between the ac reduced to its minimum of about 0×5 NM and 700 ft as the B737 crossed through the B757's 12 o'clock position. The former was at FL 94, the lowest level it attained, while the latter was at FL 87 following its TCAS descent. At 2102, just after the controller has instructed the B737 pilot to climb to FL 100 for the second time, the RT transcript records a transmission saying ...*"climbing level niner zero"*. No callsign is associated with this statement but analysis of the RT recording suggests that it came from the B757 pilot advising that he was climbing back to his cleared level of FL 90. Immediately after this transmission, and in the belief that he had cleared the B757 to FL 80, the controller sought confirmation that the flight was descending to that level. The pilot responded by reporting that he was now at FL 88, descending to FL 80, and adding that the TCAS descent was now complete. This occurred at 2102:10, by which time the tracks of the 2 ac had crossed and were now diverging. Less than 20 sec later standard vertical separation was established between them, with the B757 passing FL 87, descending, and the B737 climbing through FL 98.

Although it may not have affected the final outcome, the controller has acknowledged that it would have been prudent to have employed the term avoiding action during his attempts to resolve the conflict.

HUMAN FACTORS analysis suggested that the following might provide an explanation for the Heathrow Director's errors:

The controller's plan was accurate and feasible; it was the execution of that plan that was at fault. The controller's analysis of his own performance would appear to be correct. His plan to descend traffic to FL 80 in the Ockham hold had been prevented from activation. On turning his attention back to the Biggin hold, with this plan in mind, he made a slip and in effect said what he was thinking. This type of error is not uncommon and has been a factor in a number of previous occurrences, especially in situations in which there is a delay in putting one part of a plan into action. Perhaps surprisingly, nor is it unusual in such circumstances to find that, as in this case, the FPS had been appropriately annotated. With regard to not registering the readback, one of the means a controller has of checking a readback is the mismatch between what he says and what the pilot says. In this case there was no such discrepancy since the pilot of the B737 accurately readback the controller's, albeit inaccurate, instruction. This does not explain the fact that the FPS had been appropriately annotated, but this annotation may have occurred at a slightly different time and so would not have formed part of this particular sequence of thought processes.

The reason for the error during the conflict resolution sequence is less easy to explain. Believing that his instruction to the B737 had been correct (i.e. that the aircraft was at FL 100 and with the FPS backing up this belief), when the ac was noticed at FL 98 during a routine scan, it is understandable that the controller instructed it to return to the level to which he believed it had been cleared (FL100). Under the circumstances his instruction to the B757 (at FL90) to descend was also correct but FL 100, to which the aircraft was actually instructed to descend, was quite clearly incorrect and in the wrong direction. It remains to explain why the controller said FL 100 when his intention was to descend the aircraft to FL 80. An examination of the relevant section of the RT transcript shows that the last transmission before the erroneous "descent" instruction to the B757 was from the B737 saying ...*"Roger climbing one hundred"*. In other words the last thing the controller heard before issuing the incorrect clearance were the words "one

hundred". It is therefore possible that he "said what he heard" rather than what he intended to say. As in the original error, this type of error is not uncommon and has been termed "attention capture" in the literature. A common example from everyday life might help to illustrate the point. In a situation in which one is "half participating" in a conversation while at the same time trying surreptitiously to read a newspaper, if one's attention is captured by what one reads, it sometimes happens that a phrase or headline gets into the conversation unintentionally.

This explanation is admittedly conjectural, since it would seem unlikely that the controller concerned would be able to analyse his own behaviour at this point. Nor is it possible to be absolutely certain regarding the error mechanism which came into play.

It is worth while bearing in mind that this incident occurred at the end of what had been described as a busy and tiring afternoon shift when the controller's vigilance and attention level was hardly likely to be at its best. The controller, although previously valid, had also had a break of some 9 years from operational ATC during which time he had been engaged in ATC related non-operational tasks. At the time of the incident he had been re-valid less than one year in an environment arguably significantly more complex than the one he had left. While it would be inadvisable to postulate a link between these facts and the incident, they do provide some additional information on the context in which this event occurred.

UKAB Note: A recording of the LATCC radar at 2058:45 shows the B757 heading NW overhead BIG VOR at FL 90 with the B737 on a SE track 8 NM to the E maintaining FL 110. At 2100:38 the B737, now on a W heading with the B757 at its 2×30 position at 6 NM, commences descent from FL 110. The B757 continues turning R in the hold and the tracks of the 2 ac converge towards the VOR. At 2101:45 the B737 is indicating FL 95 with the B757 at its 3 o'clock 1 NM still converging from R to L at FL 90. Shortly afterwards the ac cross overhead the BIG VOR, by which time the B757 is descending in response to its TCAS RA, and the B737 is climbing. At 2102:18 the B757 is indicating FL 88 and the B737 FL 097 as it tracks NW, having passed 0×5 to 1 NM ahead of the B757 at 2101:55. Vertical separation at that time was in the order of 600 – 700 ft (SMF data gives minimum separation distances of 0×69 NM/500 ft at 2101:50 and 0×66 NM/600 ft at 2101:54. However, it should be noted that the SMF recorded separation may differ slightly from the true separation and radar recording because it is based on processed and predictive radar data).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

There was little discussion among members as it was quickly agreed that the controller's errors could be explained and were understandable in terms of the human factors elements outlined in Part A. One controller member described them as classic "cognitive" errors.

The Board concluded that the Airprox was caused by the Heathrow Director's inadvertent descent clearance to the B737, which took it through the level occupied by the B757. However, members agreed that the TCAS in the B757, together with the somewhat confused ATC instructions to both pilots, combined to provide sufficient vertical and lateral separation (supported by the radar recording) to preclude a risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: The Heathrow Intermediate Director South inadvertently cleared the B737 to descend through the level occupied by the B757.

Degree of Risk: C

AIRPROX REPORT No 16/00

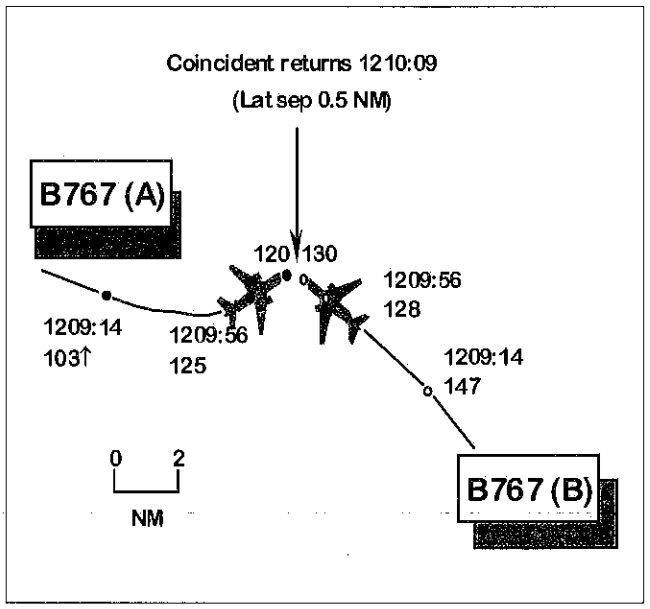
Date/Time: 9 Feb 1210

Position: N5111 E0026 (17 NM SE BIG VOR)

Airspace: LTMA (*Class:* A)

Reporter: LATCC TC SE

	First Aircraft	*Second Aircraft*
Type:	B767	B767
Operator:	CAT	CAT
Alt/FL:	FL 130	FL 120
Weather Visibility:	VMC	VMC 30 km
Reported Separation:	600 ft V	
Recorded Separation:	d 2 NM / 300 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LATCC TC reports that a trainee SC and mentor were operating the Biggin/Timba sectors in bandboxed configuration. Traffic loading was assessed as moderate. The trainee climbed B767(A) to FL 130 against other traffic above. When B767(B) called on the frequency descending to FL 160, the trainee established what heading the ac was on and then instructed the pilot to *'maintain FL 160'*. While not appreciated at the time, however, it appears that the pilot of B767(B) read back *'maintain FL 120'* and continued descending, with the result that he came into confliction with B767(A) some 10 NM SE of Biggin. The mentor immediately assumed control of the RT in an attempt to provide vertical separation. There was insufficient time to use the words 'avoiding action', and the ac were not given turn instructions because their tracks were crossing almost at right angles. The weather was clear and the crews were in visual contact with each other during the encounter. Minimum separation was in the order of 1×38 NM and 300 ft. No TCAS alerts were reported at the time and the STCA activated directly at the red stage.

THE B767 (A) PILOT reports that the FO was handling the ac as they climbed out from Gatwick to FL 130 following a Lambourne departure. While climbing through FL 123, ATC instructed them to level off at FL 125 due to other traffic, and then to turn L (he thought onto 340°). This was immediately followed by an instruction to descend to FL 120. The Captain took control of the ac and complied. The other ac, which was observed by the FO and jump seat pilot, subsequently passed above and slightly behind them. No estimates of separation distances or risk are given.

THE B767 (B) PILOT reports that he was inbound to Heathrow at 250 kt under radar control from LATCC. The visibility was 30 km in VMC. While descending towards the BIG VOR to hold, ATC cleared him to FL 120 which he acknowledged. On passing FL 128 TCAS warned of traffic and another B767 was seen 0×5 to 1 NM away and about 600 ft below at his 10:00 position; at the same time ATC instructed him to maintain FL 130. He complied and also turned L in avoidance. The other ac subsequently passed about 600 ft below from L to R with a high risk of collision.

ATSI reports that the LATCC TC SE SC was acting as mentor to a trainee who was at an advanced stage of training and due to take a Certificate of Competency Board the following cycle. The SC and his trainee had been operating the Biggin/Timba Sectors in a bandboxed configuration for 20 min prior to the incident. The mentor described the

workload as moderate and well within his trainee's capabilities.

B767(B) contacted the TC SE Sector at 1203, reporting passing FL 280 descending to FL 160. The trainee established the ac's heading as 325° and instructed its pilot to *".....continue on that heading maintain flight level one six zero on reaching."* It is the interpretation of the pilot's read back to this level instruction that is fundamental to an understanding of the Airprox. Both the mentor and his trainee were adamant that they believed the pilot replied with the correct level, adding that, as far as they were concerned, they considered there was no ambiguity in the transmission at the time. However, it appears that B767(B)'s pilot understood that his flight was cleared to FL 120 and it was this level that he read back. The SC mentor said that when he listened to a cassette recording of the frequency after the incident it sounded as if the pilot had replied "one *twix* zero". However, following scientific analysis of the tape by the SRG Transcription Unit, it has been proved conclusively that the pilot did read back his clearance as one two zero. The controllers had only one opportunity of hearing the pilot's transmission to decipher what was actually said. MATS Part 1, Page E-8 requires that: "Errors in a read back must be corrected by the controller until the pilot gives an accurate read back". With hindsight, in view of the element of ambiguity in the pilot's readback, the transmission should have been challenged by ATC. In mitigation of the controllers' actions, however, the level instruction was passed in accordance with the CAA Radiotelephony Manual (CAP413), Chapter 3, which states that the term "descend" will be used for requiring ac to change level by descent, and the term "maintain" when no change of level from the original clearance is required, as in this instance. The controllers, therefore, would not have expected the pilot to interpret the trainee's transmission as a clearance to descend. It is also notable that there is no requirement for a controller to reiterate the ac's cleared level once the pilot has reported it on initial contact. Whilst not saying that a controller should not repeat the level in such circumstances, it is possible that a pilot, as on this occasion, may misinterpret the transmission as a re-clearance and react accordingly.

Believing that B767(B) would maintain FL 160 on reaching, the controllers acted accordingly. B767(A), which contacted the sector at 1204 after departure from Gatwick, was given a stepped climb to FL 130, the agreed level for handover to the next sector. The clearance to FL 130 was issued at 1209, just after B767(B) was instructed to resume its own navigation to BIGGIN. A radar photograph at 1209:14 shows the subject ac on conflicting tracks. B767(A) is at FL 103 with B767(B) at FL 147 at its 11 o'clock 10x3NM. Subsequent radar photographs reveal that B767(B) passed FL 160 at 1208:50 and continued descending at about 2700 ft/min to FL 128. The SC explained that he had not continued to monitor the progress of B767(B) because he had turned his attention to tasks elsewhere in the sector. The trainee instructed B767(A) to turn L initially heading 020°, followed by a turn onto a heading of 315°. The SC confirmed that these heading changes were for tactical purposes only and not part of any avoiding action as neither he nor his trainee realised the confliction between the ac at the time. This became apparent shortly afterwards, when he noticed that B767(B) was, to the best of his recollection, descending through FL 142 and B767(A) climbing through FL 118/119. His immediate reaction was to try and achieve at least 500 ft vertical separation. He therefore instructed B767(A) to maintain FL 125 on reaching, but changed this almost immediately to FL 120; traffic information was passed to the pilot on both transmissions. Before a readback was received from B767(A), B767(B) was instructed to maintain FL 130; he reported maintaining FL 130 and sighting the other traffic. The term avoiding action was not used because, the SC explained, he did not think that he had enough time, and anyway he considered the manner of his speech delivery conveyed the urgency of the situation to the pilots. The STCA activated with a high severity warning at 1209:58 when the ac were 2x6 NM laterally and 120 ft vertically apart. The SC commented that he would have expected an earlier warning from this equipment. It is understood that a recommendation has been made by the NATS scientist analysing the STCA aspects of this incident to investigate changing the STCA alerting criteria to improve the warning time for this type of conflict.

UKAB Note (1): Examination of the relevant RT transcript shows that at no time during the incident

does the pilot of B767(B) refer to any operation of his TCAS equipment.

UKAB Note (2): Pictures of the LATCC radar show that at 1209:56, while B767(A) is indicating FL 125 having just begun a gentle L turn from an easterly heading, B767(B) is just over 2 NM to its E on a northwesterly track indicating FL 128. Nineteen sec later, the ac are tracking at almost 90° and B767(A) has levelled at FL 120 having reversed its climb, with B767(B) indicating FL 130 having reversed its descent. At this point the ac are some 0×5 NM apart with standard vertical separation restored. A few sec later the ac cross but their relative positions cannot be accurately assessed owing to data label overlap on the recording; however, it is likely that lateral separation was minimal. Minimum separation was in the order of 2 NM and 300 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Having listened carefully to the RT tape recording of this incident, members agreed that, with hindsight, the readback of the level (120/160) by B767(B) was not entirely clear, but the final syllable sounded like "ix". They could understand how the controllers concerned could have interpreted this as an acceptable readback at the time. Moreover, UK phraseology for issuing descent/climb clearances does not contain the word "maintain", and the controllers were therefore entitled to assume that B767(B) would remain at FL 160, as instructed. However, airline pilot members explained that the word "maintain" had a different connotation in USA ATC parlance. Under FAA Rules, in the absence of the term "at pilot's discretion" or any specifically imposed climb or descent restrictions, a pilot is permitted to assume the implication of a descent clearance on hearing the word "maintain". Any pilot used to operating in the USA, therefore, might make an error of this kind if he was unaware that use of the word "maintain" in UK airspace had a different meaning. The Board concluded that the pilot of B767(B) had misunderstood his cleared level (possibly due to his interpretation of the word "maintain") and ATC had not challenged his distorted read back. It was assessed that these factors combined to cause the Airprox. However, both pilots maintained visual contact throughout the encounter and members agreed that lateral and vertical separation were sufficient to preclude any risk of collision; this was supported by recorded radar data.

Members were sufficiently concerned by the word "maintain" having different usages in USA and UK ATC phraseology to ask the Director to convey their concerns to the appropriate department of the CAA. The Director agreed to do this as an official observation. The ATM and PD adviser noted the confusion surrounding the word "maintain" and said that the matter would be raised at the Level Bust Working Group and also with SRG who are the policy holders for RTF.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The pilot of B767(B) misunderstood his cleared level and his subsequent distorted read-back went unchallenged by ATC.

Degree of Risk: C

Observation: Use of the word "maintain" by ATC has a different meaning in the UK and in the USA. This can lead to pilots making mistakes and needs to be brought to the attention of the CAA.

AIRPROX REPORT No 17/00

Date/Time: 9 Feb 1909 NIGHT

Position: 5134 N 0230 W (10 NM NE of Bristol - elev 622 ft)

Airspace: FIR (*Class:* G)

Reporter: Bristol ATC

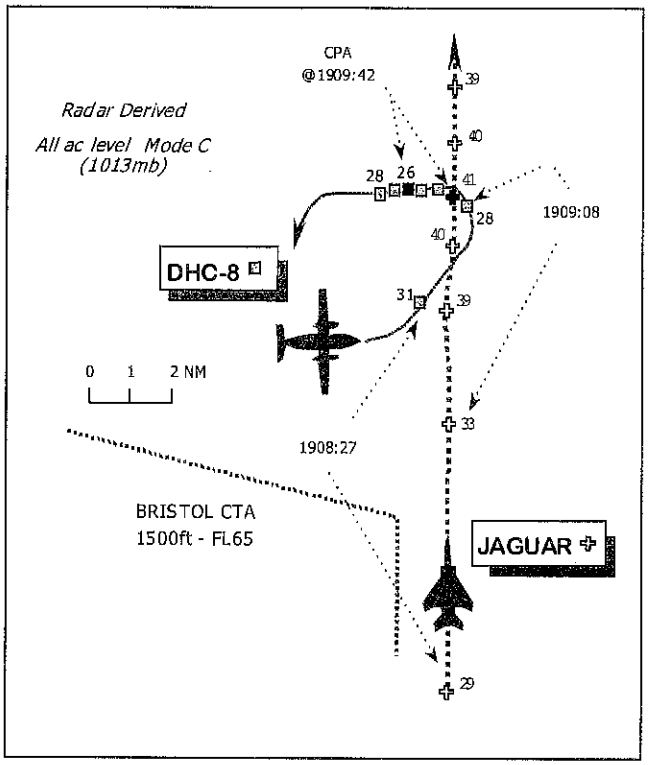
	First Aircraft	*Second Aircraft*
Type:	DHC-8	Jaguar T2
Operator:	CAT	MOD (DPA)
Alt/FL:	3000 ft (QNH 1022mb)	4000 ft (RPS)
Weather	VMC CAVOK	VMC CLBC
Visibility:	>10 km	30 km

Reported Separation:-

By ATC: 1 NM H & 1000 ft V

DHC-8 Pilot nil H - 300 ft V

Recorded Separation: 1 NM H & 1500 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (APR) reports that the DHC-8 crew was descending to 3000 ft Bristol QNH and on a radar vector of 090° under RAS, wide downwind R for an ILS to RW27 and No 2 to traffic on finals. High-speed traffic, squawking 3/A 7000, was observed approaching from the SE at about 3000 ft, which had previously been transponding a Boscombe Down squawk. The unknown ac passed astern of No 1 on the ILS at 10 NM finals, and then turned N in the vicinity of Bath into confliction with the DHC-8. A hard L avoiding action turn onto a heading of 270° was given to the DHC-8 crew but as horizontal separation reduced to 2 – 3 NM the unknown ac appeared to climb above the DHC-8 and then descend after it had passed it. In a subsequent telephone conversation the pilot of Jaguar confirmed that he had seen an ac at Yate and maintained visual separation using night vision goggles (NVG).

UKAB Note (1): The 1850 Bristol weather was reported as surface wind: 210/13; >10 km Nil Weather; SCT 2000 ft; BKN 4000 ft; QNH 1022mb.

THE DHC-8 PILOT reports flying downwind for the ILS to RW27 at Bristol at night, consequently, anti-collision beacons, navigation, landing lights and HISLs were on. About 8 NM ENE of the airport heading 090° at 180 kt, ATC passed traffic information on a light military jet approaching from the S. The jet was seen at a range of about 4 NM closing at a high speed. The TCAS enunciated a TA and displayed the ac initially less than 100 ft below his altitude of 3000 ft QNH, but it then disappeared off the TCAS display possibly, he thought, because its pilot may have switched off the ac transponder. ATC issued an avoiding action turn of 180° onto W. The jet passed less than 300 ft directly overhead, he thought, deviating only in altitude to overfly his ac. His workload was high complying with the avoiding action instructions and he adds that it was a high-risk encounter.

THE JAGUAR T2 PILOT reports that he was flying a routine night vision goggles (NVG) training mission at 450 kt and squawking 3/A 7000 with Mode C. Whilst on a northerly heading E of Bristol Airport, outwith CAS and in a gentle climb through 3000 ft RPS, he spotted strobe lights in his 11:30 position going from L to R, about 8 NM away and about 1000 ft below his ac. He maintained heading and the

other ac moved to the R of the nose and at about 3 NM range the contact was almost static at 2 o'clock, some 2000 ft below his altitude of about 4000 ft. He did not consider there was a confliction at any stage and he was visual with the other ac throughout.

ATSI reports that the RT transcript confirms that the Bristol APR fulfilled his obligations under the RAS. The DHC-8 crew was passed relevant, early traffic information and subsequent avoiding action, though the pilot was not informed of the service being provided, as he should have been. Nevertheless, the DHC-8 crew would appear to be aware they were receiving a RAS.

The high speed of the Jaguar, whose pilot's intentions were unknown to the APR, did not allow him to achieve 5 NM horizontal separation, but it is considered that he did all that he could reasonably be expected to do to resolve the situation.

DIRECTORATE OF FLYING (DoF) MOD DPA comments that this Airprox occurred outside CAS in the open FIR. That said, the wisdom of flying through the extended RW approach centreline of a civil airport, at a height close to the nominal glide path is questionable. The Jaguar crew was undertaking an NVG training mission with a high workload and had planned, quite correctly, to avoid the Bristol CTA/CTR, which they subsequently did. The Jaguar pilot reports that he saw the other ac about 8 NM away, although it is difficult to resolve the reported height difference. Having sighted the traffic – the Jaguar pilot avoided it, and did so by a comfortable margin. Whilst the Jaguar pilot was therefore content with the situation, the Bristol APR controller was faced with the resolution of a serious conflict with a fast moving unpredictable and unknown radar contact. Furthermore, the contact was squawking 3/A 7000 and thus there was no way that the Bristol controller could ascertain the intentions of the conflicting ac, or indeed if the pilot of the Jaguar had sighted the DHC-8 and would be avoiding it. Consequently, the Bristol APR had no other alternative than to take avoiding action with the DHC-8. This Airprox, could, therefore, have been avoided if the pilot of the Jaguar had either contacted Bristol APPROACH and advised them of his position and intended routeing, adding that he had the other ac in sight, or remained in contact with Boscombe Down ATC, albeit under a limited RIS. The pilot of the Jaguar, with hindsight, accepts that he should have contacted Bristol APPROACH but opined that his workload at that point precluded him from doing so. Nevertheless, he now understands the overriding requirement to contact the appropriate APPROACH controller, if it is necessary to fly in close proximity to the instrument pattern of any airfield. It is the policy of this Directorate to give publicity to this Airprox in the expectation that a number of lessons learnt can be passed on to others.

UKAB Note (2): A review of the Clee Hill radar recording and the Bristol APR RT transcript reveals that this Airprox occurred about 10 NM NE of Bristol Airport at 1909:42. The Jaguar is shown northbound at about 1908:27, after crossing the RW27 extended centre-line squawking 3/A 7000 and indicating 2900 ft Mode C (1013mb). Coincidentally, the DHC-8 is shown descending through 3100 ft Mode C (1013mb) after being asked at 1908, *"...can you take a turn for avoiding action ...hard L....onto a westerly heading to avoid this high-speed traffic"*. APR then countered this 30 sec later and instructed the DHC-8 crew to fly heading 080° *".. for the moment that traffic should go behind you"* and then at 1908:40 advising them to, *"...turn hard L 270"*. The DHC-8 crew acknowledged the turn and APR added ten sec later, *"...high speed traffic same level to the S of you by 5 miles"*. Continual updates of traffic information were then given to the DHC-8 crew by APR, who asserted that the unknown ac's Mode C read-out had been lost until just before 1909:30, when it indicated *"...FL 33 and climbing to go above you...due S....3 miles FL 36 climbing"*. At 1909:30, APR advised *"...that traffic now a thousand feet above you and going behind"*, which was acknowledged. The DHC-8 crew did not advise APR they had seen the Jaguar or of any TCAS indications. The CPA occurred at about 1909:42, after the DHC-8 had steadied westbound indicating 2600 ft Mode C, whereupon the Jaguar passed 1 NM astern and 1500 ft above the DHC-8 indicating 4100 ft Mode C.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The members agreed that the comments by DoF had covered most of the salient aspects in this Airprox. However, the most fundamental factor was the differing flight rules under which each pilot was operating. On the one hand the DHC-8 crew were flying IFR and in receipt of a RAS from the Bristol APR - who was aiming to achieve 5NM or 5000 ft. Conversely, the Jaguar crew were content with visual separation under VFR. This placed the APR in a difficult position and members understood perfectly why he had not been able to achieve standard separation minima. The Jaguar pilot had reported that crew workload had precluded them from calling Bristol APPROACH, but Board members were not convinced by this and agreed with DoF that a call could have been made with little interruption to their task. Had they done so, advising they were visual with the DHC-8 and allowing the APR to identify the ac and co-ordinate the Jaguar's transit with his IFR recovery traffic it would have prevented this Airprox. That said, the Jaguar pilot was entitled to fly in the FIR without calling Bristol - members did not question this aspect - it was more a matter of good airmanship.

This Airprox illustrated a fundamental difference between military and civilian flying; in general VFR flight at night is the norm for military aircrews but not for civilian pilots. Some civilian members questioned whether flying VFR on NVG was a factor; advice given to the Board previously on other encounters involving NVG suggested that one of the equipment drawbacks was an adverse effect on the pilot's visual range discrimination. However, in this instance the Jaguar pilot had spotted the DHC-8 at 8 NM and avoided it by what he considered to be a satisfactory margin, so the limitations of NVG did not appear to have been a contributory factor at all. Furthermore, although it was suggested that the Jaguar pilot might have switched off his transponder, this was not so as the SSR return was clearly displayed on the radar recording throughout the encounter. Having weighed all these matters for relevance the members agreed that the cause of this Airprox was a conflict at night in class G airspace between IFR and VFR traffic. Nevertheless, the APR had proffered avoiding action which had been taken and the DHC-8 pilot acquired the Jaguar 4 NM away both visually and on his TCAS display Moreover, the Jaguar pilot kept the DHC-8 in visual contact throughout and passed it by 1 NM astern, 1500 ft above it. Consequently, the members agreed unanimously that there had not been a risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace at night between IFR and VFR traffic.

Degree of Risk: C

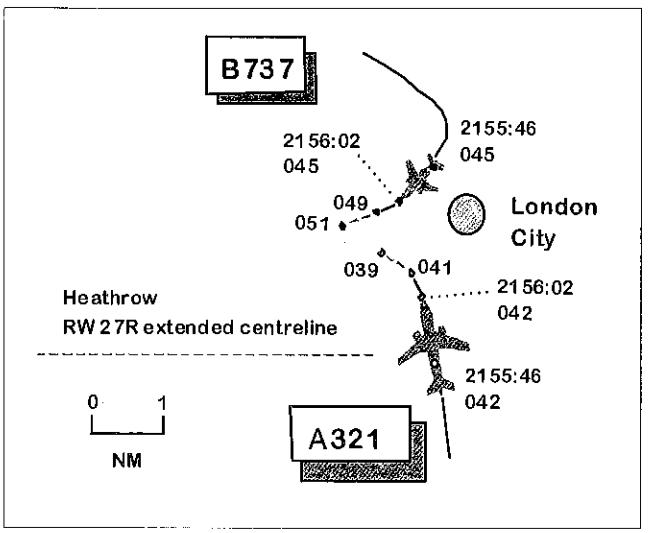
AIRPROX REPORT No 18/00

Date/Time: 28 Jan 2156 NIGHT

Position: N5130 E0001 (17 NM E Heathrow)

Airspace: LTMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	A321 Airbus	B73-5
Operator:	CAT	CAT
Alt/FL:	4000 ft (QNH)	4300 ft (QNH 1005 mb)
Weather	IMC	IMC
Reported Separation:	1·5 NM 0·5 NM 200 ft	
Recorded Separation:	1·2 NM 300 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports that he was on a L base leg for the ILS to RW 27 R at Heathrow in IMC, heading 350° at 4000 ft (QNH); ATC had not cleared him to intercept the localiser. Cockpit workload was high as he managed the approach in strong wind conditions. He suddenly saw the lights of another ac about 1x5 NM ahead, apparently converging towards him. He then heard ATC instruct the pilot of another ac to alter heading to avoid him and immediately afterwards he also received instructions, to descend to 3000 ft and turn, first onto 280° and then, as avoiding action, onto 250°. ATC advised him that reporting action would be taken.

THE B737 PILOT reports that he was heading 235° at 180 kt and descending through 4200 ft (QNH 1005) in IMC while on final approach to RW 27 R at Heathrow. TCAS alerted traffic and the lights of another ac were seen intermittently at his 9 o'clock through cloud. An RA demanding climb was then received and complied with. He informed ATC of this action and they cleared him to climb to 5000 ft. He estimated that the other ac passed about 0x5 NM away on his port side and 200 ft below. No assessment of risk is given.

ATSI reports that the B737, inbound from Warsaw via the Lambourne stack, was being vectored by the Heathrow Final Director (FD) onto R base for RW 27 R. The A321, inbound from Milan via the Biggin stack, was on a L base for the same RW.

The FD said that it had been a long and tiring afternoon shift, trying to optimise landing movements in the prevailing weather conditions. The 3000 ft wind was estimated to be westerly at 65-70 kt, which made it difficult to maintain spacing and not lose any landing slots. As it looked as though the Co-ordinator would be retained beyond the normal shift end time because there was still traffic holding, the FD had given him a short break for the last 20 min of the shift and at the time of the Airprox had been preparing to hand over to the oncoming Director. He had just taken a call from Thames radar informing him that they were closing the position and that there was still a police helicopter airborne over London, and had passed this information on to the Intermediate Director.

The FD started the hand-over to the oncoming controller and remembered that it had been his plan to turn the A321 in towards the ILS first, followed by the B737. However, he became distracted by the handover process and, on looking at the radar display, could not see the A321 (he subsequently believed it was masked by traffic holding at Biggin, which is supported by a print of the radar display for 2154:26 where the A321 is seen beneath another Company ac in the hold descending to FL 90). At 2155:20 he turned the B737, which he could see, towards final approach, though the heading given (260°) would have resulted, at best, in a very shallow interception of the ILS. At 2155:35, when the ac were just over 5 NM apart and tracking directly towards each other, he realised that he had turned the wrong ac and instructed the B737 to stop the R turn and "*..turn left avoiding action heading one hundred.*" This instruction was acknowledged but there is no indication from the radar photographs that the pilot complied because the ac continued to turn R until he called *"TCAS climb"*. The continued turn was probably fortuitous, however, because a L turn would have prolonged the confliction. At 2155:40, with the ac about 17 NM from touchdown, he instructed the A321 to make an avoiding action turn L onto 280° (which was read back by the pilot as 300°), followed by an acknowledged instruction to descend to altitude 3000 ft. Simultaneously the B737 pilot reported a TCAS climb, which the FD acknowledged, at the same time instructing him to climb to 5000 ft. The ac continued to turn R onto a track of about 250° and, at 2156:16, vertical separation was restored as it reached 5000 ft. Minimum separation, at 2156:02, was estimated to be in the order of 1x16 NM and 300 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

An ATSI adviser said that this was an uncharacteristic slip by an experienced and competent controller at the end of a long and busy shift.

Members acknowledged the Final Director's admission that he had been distracted by the

handover process, and noted his comments about the workload and the added difficulties of vectoring and achieving correct spacing in the unusually strong prevailing winds. While ATCO members agreed that this did not excuse the controller, they pointed out that his control position is an extremely busy one, often with an unrelenting stream of inbounds which called for the highest degree of concentration even under normal conditions. Members agreed that the FD was likely to have been suffering the effects of fatigue following such a demanding controlling session, and on this occasion he unfortunately allowed his concentration to slip as he was briefing his successor and lost separation between the subject ac. The Board concluded that this was the cause of the Airprox.

Members noted both pilots were in visual contact (the B737 following a TCAS TA) and that the latter's subsequent "climb" RA, combined with ATC's instructions to the A321 to turn, removed any risk of collision. This was supported by the radar recording which showed that the ac were more than 1 NM apart at their closest.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Distracted by the handover process, the Heathrow Final Director did not ensure standard separation between the A321 and the B737.

Degree of Risk: C

AIRPROX REPORT No 19/00

Date/Time: 16 Feb 0703 NIGHT

Position: 5712 N 0217 W (3 NM W of Aberdeen - elev 215 ft)

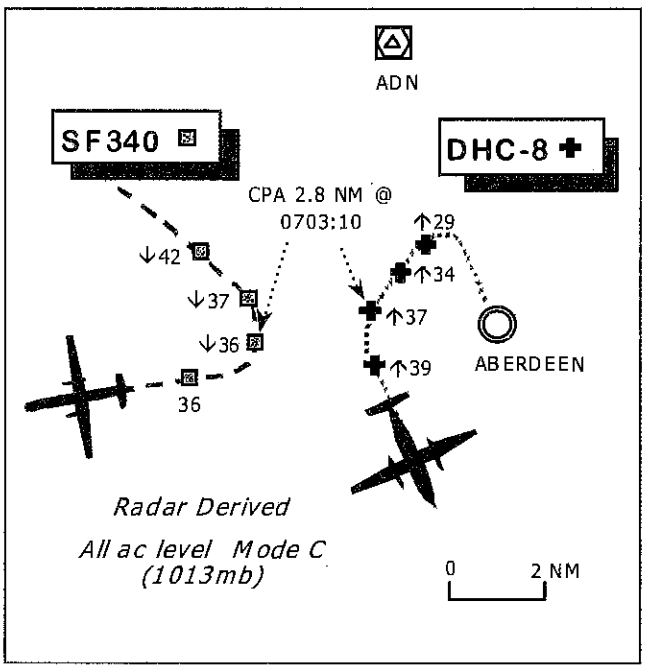
Airspace: Aberdeen CTZ (*Class:* D)

Reporter: Aberdeen ATC

	First Aircraft	*Second Aircraft*
Type:	DHC-8	SAAB 340
Operator:	CAT	CAT
Alt/FL:	3600 ft (QNH 991mb)	3000 ft (QNH 991mb)
Weather Visibility:	VMC CAVOK >10 km	VMC CAVOK >10km

Reported Separation: 2 NM H (by ATC)

Recorded Separation: 2·8 NM H & 100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ABERDEEN APPROACH RADAR CONTROLLER (APR) reports that the SAAB 340 was inbound direct to the 'ATF' (7·5 NM finals to RW34 at Aberdeen) descending to 3000 ft QNH (991mb) under a RCS at 'night'. Approval for a visual approach had been co-ordinated with the Aerodrome Controller (ADC) if the crew wished to convert to a visual approach to RW 34. Whereupon the ADC requested a 'release' on the DHC-8, which was approved but the APR who specified a departure heading of 345°, to vector the DHC-8 behind the inbound SF340, until standard vertical

separation existed. After the DHC-8 was reported airborne, the ac was observed on radar turning L onto a southwesterly heading. Avoiding action was issued to the SF340 crew with a R turn onto 270°, whilst confirming with the ADC that the DHC-8 crew had been given the correct heading instruction of 345°, which they had. The DHC-8 crew then called the APR and was given an avoiding action L turn onto 130° and traffic information. The APR perceived that the horizontal separation was eroded down to 2 NM whilst both ac were at the same altitude. When standard separation had been restored, the SF340 was turned toward finals for RW34 and the DHC-8 continued outbound via GLESK.

UKAB Note (1): The change from official 'night' to 'day' occurred at 0706, some 3 min after the occurrence.

THE DHC-8 PILOT reports that he misunderstood the required departure heading after take-off. He thought the heading required was 245° instead of 345°. Consequently, on departure from RW 34 at 150 kt, they turned L onto 245° upon passing 1000 ft aal, he thought. The avoiding action L turn onto 130° was flown with autopilot 'out'. The other traffic was not sighted, therefore the risk was not assessed. He suggests that if both pilots confirmed the intended heading before take-off and the FO wrote it down, it might prevent a recurrence.

THE SF340 PILOT reports heading 130° at 210 kt inbound to the 'ATF' for RW 34 at Aberdeen; the anti-collision beacon, landing lights, navigation lights and HISLs were on. The ac was NW of the airport and in descent to the cleared altitude of 3000 ft QNH (991 mb), when ATC transmitted an avoiding action R turn onto a heading of 270°. The PF complied promptly with the instruction. However, the PNF perceived the threat to be high and assumed control, disengaging the autopilot whilst applying 45° of R bank. They rolled out on 270° at 3000 ft maintaining a look out and listening watch; after the other ac had been given avoiding action they reported steady on the assigned heading. Although the other ac was not seen he assessed the risk as high. He suggested that a method of guarding the heading 'bug' when issued a radar vector could help prevent a recurrence.

ATSI reports that the RT transcript reveals the DHC-8 crew was given their departure radar heading of 345° by the ADC and read this back correctly. The APR reacted promptly to the incident using the correct avoiding action phraseology.

FLIGHT OPERATIONS INSPECTORATE comment that this is one of a spate of incidents involving non-compliance with ATC instructions. The operator's SOPs are quite clear and require both pilots to ensure that they understand the clearance issued, the departure must be monitored by the PNF throughout. The importance of strict compliance with ATC clearances has been reiterated to all crews within the fleet.

UKAB Note (2): A review of the ScACC radar recording reveals that this Airprox occurred broadly as described by the APR. The DHC-8 is shown in a steady climb on departure turning L onto a southwesterly track at 0702:20, which is the time that avoiding action was issued to the SF340 crew approaching from the W in a steady descent. The CPA occurs at 0703:10, ten sec after avoiding action was issued to the DHC-8 crew; a minimum horizontal separation of 2·8 NM is evident as the SF340 descends through FL 36 Mode C (1013mb), 100 ft below the DHC-8 which was climbing through FL 37 Mode C. The avoiding action turns are evident on radar at this point, as the ac turn away from each other.

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.

Board members speculated why the DHC-8 crew had turned onto the wrong radar heading after departure since they had read back their clearance correctly to the ADC to head 345°- virtually the RW heading. Whilst company procedures required pilots to 'understand' their clearance there seemed to be nothing on how this might be achieved. Writing it down when given, as mentioned by the DHC-8 pilot, could well have forestalled the crew's error in this instance. Some members were surprised that the pilot had not 'bugged' the required heading, which again might have averted this incident. They also noted the suggestion on having a method to guard

the heading 'bug', made by the SF340 pilot. These ideas were ac type dependent to some extent and it was acknowledged that no system was infallible. What was important was to have a practical 'system' in place to 'trap' the sort of errors made in this case. The members agreed unanimously that the cause of this avoidable Airprox was that the DHC-8 crew did not comply with their ATC clearance. Nevertheless, the alert APR quickly spotted the mistake and took immediate steps to retrieve the situation with highly effective avoiding action instructions, firstly to the SF340 crew who reacted with commendable speed and vigour when instructed, and secondly to the DHC-8 crew immediately they called on frequency. These combined actions prevented separation being eroded below 2·8 NM, consequently, the Board agreed unanimously that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DHC-8 crew did not comply with their ATC clearance.

Degree of Risk: C

AIRPROX REPORT No 21/00

Date/Time: 18 Feb 1152

Position: 5259N 0251E (KOMIK)

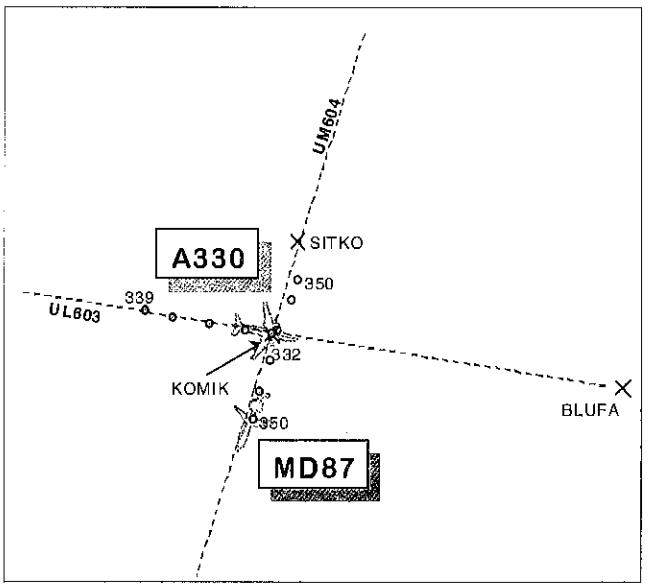
Airspace: UAR (*Class:* B)

Reporter: LATCC NS Sector 33 SC

	First Aircraft	*Second Aircraft*
Type:	MD87	A330
Operator:	CAT	CAT
Alt/FL:	FL 350	FL 330
Weather	VMC CLNC	VMC CLNC
Visibility:	Unltd	10 km+

Reported Separation: 600 ft, 3-4 NM

Recorded Separation: 1·8 NM, 1600 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC NS SECTOR 33 SC reports that the MD87 was southbound on UM604 at FL 350 and the A330 was eastbound on UL603 at FL 390 (en route to Düsseldorf, requiring it to be not above FL 330 on transfer). He had noticed the potential confliction between the ac early and instructed the A330 to descend to FL 330 assessing that its rate of descent would resolve the confliction and his attention was then drawn to other conflictions on the sector which was busy. He was later alerted by STCA to the fact that both ac were at FL 350 and although he asked the A330 pilot to increase his rate of descent he did not pass traffic information.

THE MD87 PILOT reports heading 209° at FL 350 when TCAS gave a TA on an ac approaching from 4-5 NM away to his right and 600 ft below. He saw it and that it was descending, confirmed by TCAS, and it passed 1300 ft below and behind by 3-4 NM. He informed the controller but considered the risk of collision was low because of TCAS and his visual sighting.

THE A330 PILOT reports heading SE at 470 kt but was not aware of any confliction and was not

passed any traffic information. His TCAS gave no alerts and he did not see the MD87.

ATSI reports that the North Sea Sectors 11 and 33 were being operated in band-boxed configuration; the controller explained that the combined sectors were busy prior to the incident but by the time it occurred he described them as quiet, with about five to six ac on frequency. However, these were on potentially conflicting tracks, thereby adding to the workload. He did not consider it necessary for the sectors to be split but confirmed that appropriate staff were available if required. The 34,000 ft wind was forecast as 290/55-65 kt.

The MD87 contacted the N. Sea Sector at 1133 reporting at FL 350 routeing direct to ABSIL. Apart from calls requesting the MD87 to change its allocated squawk, the last of these being timed at 1137, no further transmissions were made to or received from the flight before the Airprox occurred at 1152.

The A330 established communication with the N. Sea Sector at 1144, maintaining FL 390. The Maastricht Flight Level Allocation System requires traffic inbound to Düsseldorf to be transferred at a maximum level of FL 330. The SC had realised the potential confliction between this flight and the MD87 some 10-15 minutes previously when the A330's FPS were added to his display (those for the MD87 were already in position) and he had cocked them out accordingly. The SC added that his plan was to issue descent clearance to the A330 early enough for it to be level at FL 330 before lateral separation from the MD87 was compromised and for this purpose he had requested the previous sector to transfer the A330 earlier than usual. Accordingly, on first contact, he cleared the flight to descend. Because of opposite direction traffic at FL 350 he was only able to clear the A330 to descend initially to FL 370. Shortly afterwards, at 1146:20, when clear of the traffic, the A330 was given descent to FL 350. On this occasion its descent was affected by same direction traffic at FL 330, although this was expected to vacate the level shortly. The SC confirmed that he was aware that, by clearing the A330 to FL 350, it was to the same level as the MD87. However, in his judgement, he would be able to give the A330 further descent soon afterwards to ensure it a continuous descent to FL 330. Clearance to this level was issued at 1147:10. Having passed this instruction the SC said that he turned his attention to the traffic situation elsewhere in the sector. He believed that the subject ac were far enough apart for standard separation to be maintained throughout the A330's descent although he did intend monitoring the situation. The radar recording shows the subject ac on conflicting crossing tracks at 1148:16, about 65 NM apart; the A330 is at FL 370.

The SC stated that, because he was concentrating his attention on the traffic situation elsewhere in the sector, he did not monitor, as intended, the developing problem between the subject ac. He was warned of the potential loss of separation when the STCA activated at 1151. When he returned his attention to the two ac, he noticed that they were both at FL 350. His first reaction was to instruct the A330 to "increase rate of descent flight level three three zero". The radar recording shows the subject ac at FL 350, on conflicting tracks 1151:18, about 20 NM apart. The SC said that, because the A330 was passing FL 350, he was reassured that no risk of collision existed and he anticipated that vertical separation would be restored before the ac came within 5 NM of each other. He added that he could not explain why he did not pass traffic information to either flight, as, with hindsight, he realised that, had he done so, it would have probably helped to have resolved the confliction. He said that he continued to monitor the situation and although realising that separation would be lost, he did not consider it necessary to pass any further instruction to either flight. The radar recordings of the incident reveal that the minimum separation recorded was 1.8 NM laterally and 1600 ft vertically. They also confirm that the A330 made a continuous descent to FL 330 at about 800-1000 ft per minute. The pilot of the MD87 reported on frequency that he received a TA on an Airbus passing 700 ft below. No comment was made by the pilot of the A330.

Subsequently, the SC agreed that a better course of action would have been to issue a conditional descent clearance to the A330 to ensure it was level at FL 330 a suitable distance before reaching the projected track of the MD87 or, possibly, to use headings to ensure separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Controller members commented that the SC concerned had not exercised very positive control before the event, or even after realising there was a problem. Controllers had also found it noticeable that nowadays when an airliner was asked to descend at a point earlier than judged ideal by its FMC, it would descend at a very slow rate; consequently it was increasingly necessary, as suggested in the final paragraph of Part A, to tell pilots to be level at a target level before reaching a geographic position. It was clear to the Board that the cause of the incident was that the SC did not take positive action to ensure separation between the ac, and that there was no risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The NS Sector 11/33 SC did not take positive action to ensure separation between the ac.

Degree of Risk: C

AIRPROX REPORT No 22/00

Date/Time: 25 Feb 1432

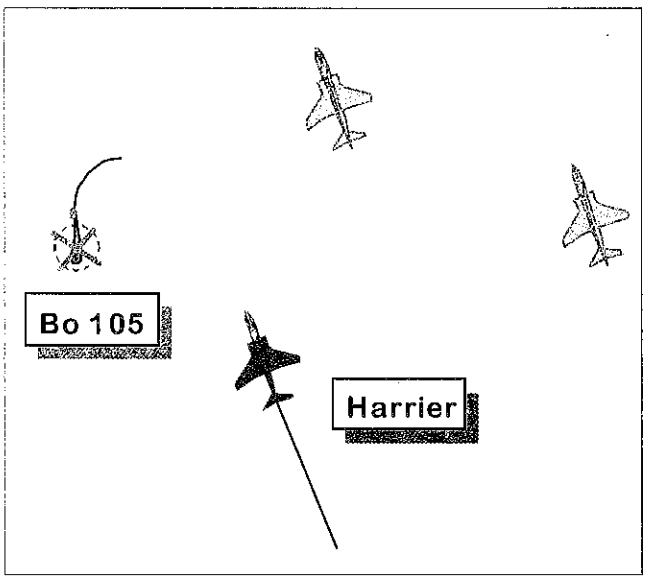
Position: 5510 N 0444 W (10 NM SSE of Turnberry)

Airspace: FIR/LFS (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Bo105	Harrier
Operator:	Civ Comm	HQ STC
Alt/FL:	150 ft (agl)	110 ft (Rad Alt)
Weather Visibility:	VMC CLBC 20 km	VMC CLBC 30 km

Reported Separation: 300 m, 150 ft/ 1400 m, 50 ft V

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo105 PILOT reports climbing out of a wood at 60 kt, while searching for an armed man. Passing 400 ft, he saw the smoke trail from an ac in his 8 o'clock, a Harrier on a northerly track; he turned onto S to find its wingman whilst descending to below 250 ft agl and saw it 3 NM away in his 11 o'clock. He assessed that it passed 2-300 m away and slightly above; by then he was at about 100 ft agl. He considered the risk of collision was moderate.

THE HARRIER PILOT reports heading 337° at 420 kt as the LH ac in a 3-ac escort formation on an OLF sortie. He was at 110 ft when he saw an ac skylined at his 10 o'clock 6 NM away. By the time they had closed to 4 NM the whole formation could see it. He recognised it as a helicopter; no avoiding action was called because he was the closest ac and he could see there was not the remotest chance of a collision. It passed 1400 m away and about 50 ft above.

UKAB Note. The incident took place below the coverage of recorded radars.

HQ STC comments that the formation of 3 Harriers was operating in LFA 20 (T) to 100 ft MSD. The sortie was correctly briefed and authorised, and the crews had checked the relevant NOTAMS and warnings. All elements of the formation were visual with the helicopter by an estimated 4 NM and the minimum separation achieved was assessed as 1400 m laterally and 50 ft vertically. Although the separation assessment by the Harrier formation differs significantly from that recorded by the helicopter, given the obvious vulnerability of a helicopter at low level in the face of a fast-moving military formation, it is disappointing that the Harriers, after a relatively early pick-up, passed close enough to the helicopter to cause concern to its pilot. IFS's 'Feedback' 22-99 advises crews "*to make a positive effort to maximise separation between ac operating in the open FIR. After establishing visual contact with conflicting ac, as wide a berth as feasibly possible should be given, even when operators perceive there to be no actual risk of collision. Remember, the crew in the other ac cannot read your mind; make your intentions obvious!*"

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.

There was no way for the Board to resolve the differences in the pilots' perceptions of the miss distance. Such differences were not uncommon but in this case it was more unusual because both pilots had had plenty of time to assess the ranges. Because of the early sightings, giving both pilots time to decide whether avoiding action was necessary, and carry it out if it had been required, members at least agreed there was no risk of the ac actually colliding.

While members strongly supported the advice from 'Feedback' in Part A, most considered that avoiding action by the Harrier was probably not required in these specific circumstances; a wing rock to acknowledge the sighting might have saved all the paperwork. One member suggested that a wing rock during OLF was not to be advised, but others pointed out that one could always ease up to do it.

After some debate the Board accepted in the end that the miss distance was probably somewhere between the 2 pilots' estimates. Avoiding action had not been required and the Board concluded that the incident was a perceived confliction of flightpaths in Class G airspace.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Percieved confliction of flightpaths in Class G airspace.

Degree of Risk: C

AIRPROX REPORT No 23/00

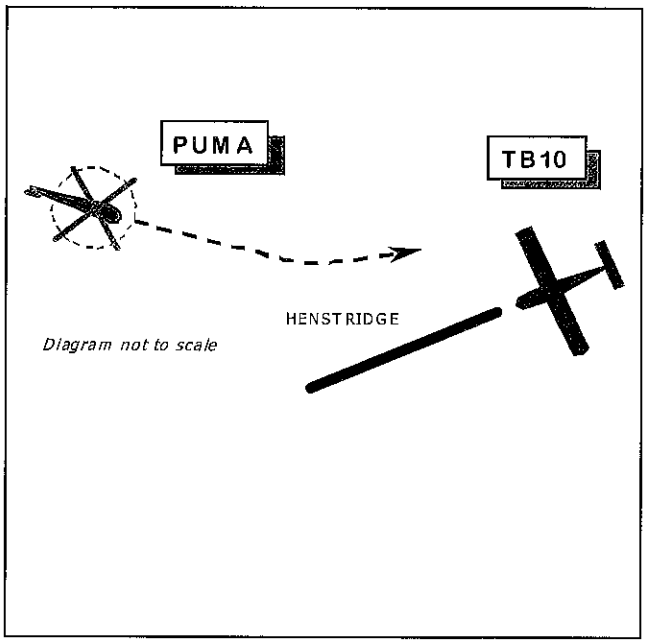
Date/Time: 1 Mar 1610

Position: 5059 N 0221 W (Henstridge – elev 184 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	TB10	Puma
Operator:	Civ Pte	JHC
Alt/FL:	200 ft (QFE)	80 ft agl
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10 km	60 km
Reported Separation:	300 m H &100 ft V	800 m H

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB10 PILOT reports heading 255° at 83 kt on short finals to RW 25 at Henstridge. His ac livery is predominantly white; the landing light, wing tip and tail HISLs were on. After he reported finals the A/G Stn operator advised that there was no known traffic and transmitted the surface wind of 300°- 20 kt. Whilst descending through 200 ft QFE, he became aware of a helicopter about 700 m ahead and to the R and realised that it was heading straight towards him at 1-200 ft. His only option to avoid the helicopter, he thought, was to land, which was accomplished as the helicopter turned away; its relative position made any attempt at a 'go-around' impossible. As his ac touched down the helicopter appeared to be over the RW pavement at the mid-point, before it turned L and passed N abeam of his ac as he was slowing down after landing. The helicopter then turned southbound around the eastern end of the RW and cleared to the E whilst he backtracked the TB10 down the RW. He believed the risk to be very high and aware of how manoeuvrable the helicopter was he did not know what it was going to do next. He adds that the workload was high in the 12 kt crosswind landing and a call on the A/G frequency would have helped let him know that the helicopter pilot had spotted his ac.

THE PUMA CAPTAIN reports that the helicopter colour scheme was camouflage green but navigation, landing and hi-intensity strobe lights were all on as they approached Henstridge heading 105° out of sun at 100 kt. A light ac was first sighted by the ac Captain, a QHI and the PNF who was occupying the LHS, at a range of 1000 m and slightly below their transit height of 80 ft agl, apparently on finals to the westerly RW at Henstridge. The PF did not sight the traffic at the same time and so seconds later the Captain instructed the PF to manoeuvre L to pass behind and to the N of the other ac, which he then pointed out to the PF. The minimum horizontal separation was 800 m as the light ac descended through their height and the Puma did not cross the aerodrome boundary before clearing to the E.

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

UKAB Note (2): Henstridge Marsh is listed as an active but unlicensed aerodrome within the UK Mil AIP at Vol 3 Part 1–2-2-5. No mandatory avoidance criteria are specified when operating in the LFS and there is no ATZ.

HQ MATO reports that whilst inbound to Henstridge, the pilot of the TB10 received a FIS from Yeovil RADAR (LARS) whilst descending from FL 55 to 2000 ft RPS, about 8 NM E of Yeovilton. At 1551:29, when the TB10 was S of Yeovilton RW 27 centreline, the pilot freecalled Henstridge.

Two minutes later the crew of the Puma called Yeovil Approach (APP) on UHF after departing Yeovilton, *".....with you now, outbound descending to low level, outbound on track 110, below 100 ft."* APP applied a FIS and issued the Portland RPS (1009 mb), which the Puma crew acknowledged. At 1556:00, when the ac was about 5 NM away, APP advised that the Puma had *"..faded from radar now, squawk 7000.",* because of the ridge of high ground 5 NM ESE of Yeovilton, which causes relatively early loss of radar contact in this area. One min later, APP advised the Puma crew of a RPS change to 1010 mb. Thereafter, APP made 7 attempts to contact the Puma crew on RT between 1602 - 1606, with no response. After checking with other local ATSUs, RT contact was subsequently regained at 1607:35 and the ac left the frequency at 1608:26, without mention of any incident.

Shortly afterwards, the A/G Stn operator at Henstridge telephoned the Yeovil Radar Supervisor (SUP) and advised that a helicopter had just flown very close to a TB10 and in a later call that its pilot intended to file an Airprox.

HQ JHC comments that this incident highlights the differing perceptions of the military crew and the civilian pilot about the proximity of 2 ac. Whilst on finals and at slow speed, the TB10 pilot is going to be very aware of any potential conflict, especially if he sighted the Puma fairly late. However, it would appear that there was not a risk of collision in this case. The Puma captain had seen the TB10 at 1000 m and initiated avoiding action, ordering the PF who had not seen the TB10 to turn L to pass behind it, which they did by about 800 m. There is a fine balance between making a training point to the PF and taking timely action to avoid another ac. Here, the Puma crew initiated timely action, but by the time the helicopter altered course it may have seemed uncomfortably close to the TB10 pilot. Additionally, the Puma crew took gentle avoiding action as they did not feel a harsh manoeuvre was necessary, therefore the helicopter flightpath would not appear to alter dramatically, possibly giving the impression that the crew may not have seen the TB10.

We do not believe there was a risk of collision in this instance, however, all military operators should be aware that they should take avoiding action as early as possible and attempt to make it obvious to the other pilot that positive avoiding action has been taken. JHC HQ have highlighted the potential for confliction with civilian ac in the low flying system and the need to give our civilian counterparts as wide a berth as possible. We will also be writing to all station flight safety officers to increase awareness of this issue.

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 ATC and operating authorities.

Although the TB10 should have been 'skylined' to the Puma Crew, members perceived that the PNF had still only detected it at a late stage - possibly just before the TB10 pilot, whose ac could not climb quickly. Moreover, the TB10 pilot was probably concerned about the turbulence created by the rotor downwash, so judged that landing was the best option available. Some civilian members speculated whether 80 ft agl was an appropriate transit height for the Puma to fly at, but military pilot members contended this was reasonable. Nevertheless, concern was expressed that military operations were planned to take place at this height so close to an active aerodrome, albeit a small and unlicensed one. This was a different matter and it was unfortunate that there was no recorded radar information to resolve the widely differing opinions of how close the Puma passed to the aerodrome and the minimum horizontal separation that pertained against the TB10. As far as military pilots operating in the LFS were concerned no mandatory avoidance was specified for Henstridge. But planning a track that close to an active aerodrome marked on the LFC was probably unwise and military members thought that a 2 - 2·5 NM offset, the more usual avoidance criteria in the UKLFS, would have been a better option. Moreover, a call on the A/G frequency when approaching the aerodrome could only enhance a pilot's 'air picture' and contribute to better flight safety; members

thought the TB10 pilot's comments appeared well founded in this respect. Having weighed all these matters for relevance the Board agreed that the cause of this Airprox stemmed from the Puma pilot flying close enough to the TB10 to cause its pilot concern. Turning to risk, the TB10 pilot's options were very restricted and some members thought that safety had been compromised. However, the consensus was that each pilot had seen each other's ac at a late stage and the Puma crew had taken avoiding action to maintain horizontal separation by what they thought was a satisfactory margin. On balance, therefore, the Board concluded by a wide margin that there had not been a risk of a collision

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Puma crew flew close enough to the TB10 to cause its pilot concern.

Degree of Risk: C

AIRPROX REPORT No 24/00

Date/Time: 1 Mar 1606

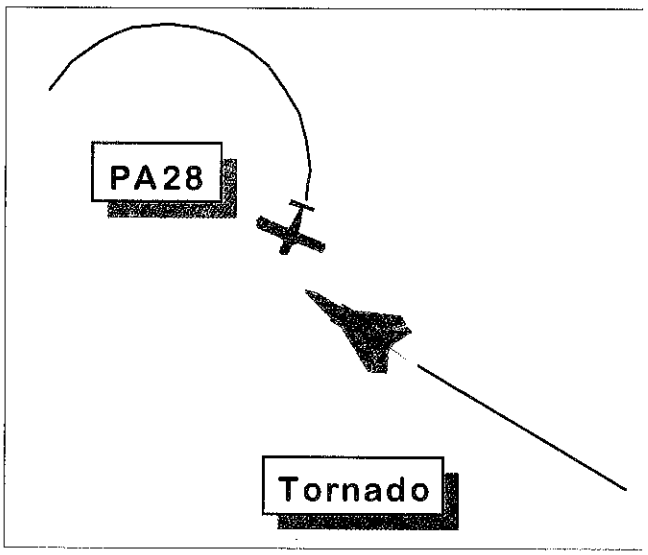
Position: 5407 N 0225 W (15 NM ENE of Lancaster)

Airspace: LFS/FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado GR	PA28
Operator:	HQ STC	Civ Pte
Alt/FL:	300 ft (Rad Alt)	2250 ft (QNH 1021 mb)
Weather	VMC CLNC	VMC CLNC
Visibility:	15 km	25 km

Reported Separation: 350 ft V/NK

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR PILOT reports heading 300° at 450 kt on a line-search at 300 ft agl when he saw a light ac about 1·5 NM in his 12:30 heading L to R across his track, about 200 ft above. At that point there was no confliction but the light ac then turned hard about in the vicinity of Newby village. Initially he could not determine its direction of turn but when it became apparent that it was turning R, towards him, there was little he could do but duck down underneath it. In attempting to avoid it by as much as possible he passed about 350 ft below it; his recce recordings show his height was 188 ft agl at that point. In hindsight he realised he could have avoided the situation by breaking off to the left as soon as he saw the other ac but at that point it was right of his track and moving right. The light ac gave no indication that its pilot had seen him.

THE PA28 PILOT reports flying a map reading exercise at 3000 ft on a QNH of 1021 and, having informed Blackpool, from whom he was receiving a FIS, that he was routeing towards the Ingleton/ Ingleborough area, he set heading 065° at 95 kt. Aware that the area was frequented by fast military jets, he and his ATPL/QFI P2 kept a good lookout. Near High Bentham he let down to 2250 ft which would put him not below 1000 ft agl in his intended operating area. At Ingleton he headed E for about 2 NM and after a careful scan all round, flew an orbit at Newby. He then headed 225° to return to Blackpool. Neither pilot saw any fast jets close to the PA28.

UKAB Note. Although the PA28 (traced from its flight profile and ATA at Blackpool) can be seen on radar before and after the event, the incident took place below the coverage of recorded radars. The PA28 descends in the Newby area and disappears from radar descending through 1900 ft Mode C and reappears some 50 sec later at 1800 ft Mode C, returning to Blackpool. The actual QNH at the time from Met Office records was 1014 mb; 1800 ft Mode C is thus about 1800 ft amsl. The terrain elevation at Newby is about 650 ft amsl but rises to over 1400 ft within 1 NM to the NE.

HQ STC comments that in order to prevent a collision, the Tornado pilot took positive avoiding action which resulted in a breach of his authorised MSD. Although he acknowledges in hindsight that this may not have been the most appropriate avoiding action and that he could have given the other ac a wider berth by manoeuvring in the horizontal plane, he was nevertheless surprised to see a light ac at 500 ft agl.

GASIL 2/2000 discusses the dangers to civil ac inherent in non-essential low flying. The message it conveys is sound. However, military operators should be aware that, in accordance with Rule 5 of the Rules of the Air, civilian ac may be encountered down to ground level in the UK LFS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that with hindsight the Tornado pilot could have avoided the incident by breaking off on sighting the PA28. However, he was actually involved in one of the specific tasks of his sortie and most members considered it reasonable that, on observing the PA28 clear to the right of his track, and going right, he chose at that point to continue. Indeed the Board concluded that the PA28 pilot, although he said he made a careful scan before flying his orbit, had evidently not continued it during the orbit effectively enough to see the Tornado, and had consequently turned into confliction with it; this turn left the Tornado pilot with too little time to take safe avoiding action. Members agreed that this was the cause of the Airprox. It was suggested that the occupants of the PA28 may have been paying too much attention to features on the ground they were orbiting around and this may have reduced their capacity to look for ac at the critical moment.

In discussing the risk, the Board considered the reduction in safety involved in the Tornado pilot breaching his minimum authorised terrain separation. Some members argued that this meant that his safety had been compromised but a majority argued that it was the risk of collision that was being assessed. In this case the Board agreed that the Tornado pilot had been watching the PA28 and his actions had removed any risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot did not see the Tornado and turned into confliction with it.

Degree of Risk: C

AIRPROX REPORT No 25/00

Date/Time: 4 Mar 1351 (Saturday)

Position: 5105 N 0025 W (12 NM SW of Gatwick – elev 196 ft)

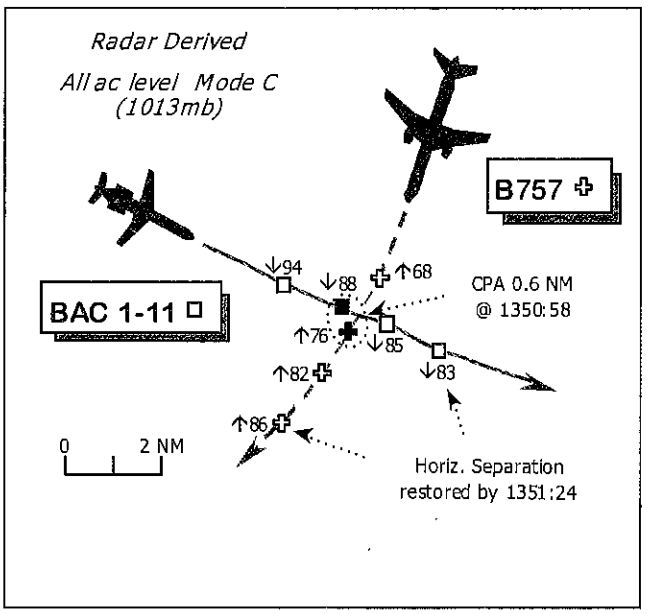
Airspace: LTMA (*Class:* A)

Reporter: LATCC TC

	First Aircraft	*Second Aircraft*
Type:	B757-200	BAC 1-11
Operator:	CAT	CAT
Alt/FL:	6000 ft QNH (1029mb)	FL 80
Weather	VMC	VMC
Visibility:	20 km	10 km

Reported Separation: 1000 ft V/2-3 NM H

Recorded Separation: 1200 ft V @ 0·6 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC TC OCKHAM/WILLO SECTOR CONTROLLER (SC) reports that he had just taken over the bandboxed sector and had been controlleing the sector for about 2 min; the traffic was quite busy and he was considering a sector split, but did not believe that it was urgent. The B757 was outbound from Gatwick on a BOGNA departure, climbing to the cleared altitude of 6000 ft, as assigned by the previous SC just prior to watch hand-over. The BAC1-11 was inbound to Gatwick via MAYFIELD, descending to FL 80, as cleared. A climb clearance was then issued to an L1011 crew, but of the same company as the B757, in another part of the sector to expedite climb through FL 130 for their cleared level of FL 150. As both ac were about to cross he re-iterated the altitude limit to the B757 crew. Moments later when he looked at the radar display prior to transferring the BAC 1-11 to Director he observed the B757 Mode C climbing through FL 74. He immediately questioned the crew, who responded they were climbing to FL 150 and expediting through FL 130. The B757 crew was informed that they had incorrectly responded to a clearance issued to another crew of the same company; the ac passed clear of one another. He said that if the B757 crew had read-back a clearance addressed to another, he did not detect it at the time. There was no STCA alert, he thought, and neither traffic information nor avoiding action was issued.

THE B757-200 PILOT reports departing Gatwick on a BOGNA 1M SID at 250 kt. The Captain was flying the ac and the autopilot was engaged passing 1000 ft in the climb initially to 5000 ft, and then 6000 ft. They were then recleared, he thought, to climb to FL 150 whilst expediting through FL 130. The FO acknowledged this clearance and both pilots confirmed the resetting of their altimeters. Shortly after leaving 6000 ft ATC queried their altitude and issued a radar heading. No significant traffic was shown on TCAS and they were good VMC but the BAC1-11 was not seen. He did not assess the risk.

THE BAC 1-11 PILOT reports flying radar vectors at 250 kt level at FL 80. He noted two ac of the same company were on frequency, one instructed to maintain 6000 ft Gatwick QNH and the other to expedite its climb to FL 150. From the LH seat he observed the B757 at 10 o'clock below them. The B757 had a nose high attitude and appeared to be climbing. At the same time he heard the controller query if the B757 crew was maintaining 6000 ft, which they were not but expediting a climb to FL 150. It would appear that the B757 had mistakenly responded to another flight's clearance and the controller had not picked this up. The B757 continued climbing and passed through their level

at 4 o'clock, 2-3 miles away. The risk was not assessed.

LATCC INVESTIGATIONS reports with RT transcript that the Airprox occurred about 12 NM SW of Gatwick at 1351. The controller's traffic loading was moderate to heavy and he took over the bandboxed OCKHAM/WILLO sectors at 1349 at the start of the afternoon watch. The two sector frequencies, 133·175 – WILLO Sector and 134·125 – OCKHAM were cross-coupled together at the controller's position. Two flights were on frequency from the same company, both had departed from RW26L at Gatwick using callsigns hereafter referred to as Company L1011 and Company B757 respectively. [UKAB Note (1): It is the erroneous response by the B757 crew to transmissions addressed to another flight of the same company that was the catalyst to this Airprox.] The first ac, Company L1011, was on a SOUTHAMPTON SID and had climbed to FL 100 on a heading of 270°, talking on 134·125 the OCKHAM Sector frequency. The second ac, the subject Company B757, had departed 3 min later on a BOGNA SID and was cleared to climb to 6000 ft QNH. The BAC 1-11 was inbound to Gatwick from the NW descending to FL 110 on a heading of 140°. Both the Company B757 and the BAC 1-11 were on 133·175 the WILLO Sector frequency.

As soon as he took over, the SC instructed the Company L1011 to climb to FL 150 and the BAC 1-11 to descend to FL 80 and turn L direct to MAYFIELD. He then turned the Company B757 onto a heading of 225° and immediately thereafter at 1350:00, transmitted "Company L1011 *expedite climb through FL 130*". Unfortunately, the B757 crew responded to the SC's transmission, which had not been addressed to them saying *"expedite climb to FL 130* Company B757". Although the callsign at the end of the B757 crew's transmission was quite clear, the SC's attention focused on the readback error and he did not detect that the wrong crew had replied. At 1350:10, without addressing the transmission by callsign the SC immediately responded, *"yes just check that sir its through 130 your cleared level is still 150"*, thereby reaffirming the original cleared level of FL 150 for the L1011. This was then read back by the crew of the Company L1011 using the numerical element of the callsign without the company prefix "*understand* L1011 *cleared to 150 expedite through 130*". This was followed immediately thereafter by a single transmission of the numerical element of the B757's callsign. No further comment was made by either the L1011 crew or the SC about the original instruction, or that the crew of the Company 757 had responded incorrectly. Both ac were now starting to climb to FL 150. However, immediately thereafter at 1350:20, the SC instructed the Company B757 to *"...maintain 6000 ft traffic descending to just over a thousand feet above you"*. This instruction was acknowledged at 1350:20, by the crew of the B757, merely with their callsign. The B757 was by then was passing FL 60, about 6480 ft London QNH (1029 mb), but had ample time to stop its climb and descend to 6000 ft.

In the understandable belief that he had taken positive action to ensure separation the SC then turned his attention to ac elsewhere on the sector. However the Company B757 continued its climb, fortunately at a moderate rate of about 2000 ft/min. At 1350:44, when separation between the B757 and the BAC 1-11 had reduced to 2 NM and 1900 ft, the STCA activated white. This apparently went unnoticed by the SC and the B757 passed 1.1 NM ahead of the BAC 1-11. At 1350:55, 6 sec later, the ac had crossed, the horizontal separation was 0.8 NM and increasing, whereas the vertical separation was 1600 ft and reducing. At about this point the SC spotted that the B757 was passing FL 74 and asked for confirmation that it was maintaining 6000 ft. The crew replied, *"...we understood we were cleared to climb FL 150 expediting through 13"* and the SC then realised that the B757 crew had followed the instruction transmitted to the Company L1011. Both ac were now diverging and there was no action that the SC could usefully take.

The SC did not detect that the incorrect readback emanated from the wrong ac crew. Subsequently however, the SC clearly instructed the B757 crew to maintain 6000 ft which was acknowledged, but only by callsign. The B757 crew did not comply with the instruction issued, nonetheless, the SC should not have accepted a callsign alone in acknowledgement of a level instruction, contrary to MATS Pt 1 Appendix E-8, which states that controllers are to prompt pilots if they do not read back in full any such instruction.

THE B757's COMPANY comments that after reviewing the RT recording supplied by LATCC it

was clear that the B757 crew answered RT calls not intended or addressed to that flight's callsign. Appropriate action was taken to appraise the crew of their errors. Moreover, all the company's crews have been issued subsequently with a copy of a safety sense leaflet entitled "RT discipline for Pilots and Controllers".

ATSI reiterated the essential detail within the LATCC report and comment that the controller cleared the L1011 crew to climb to FL 150 which was acknowledged by the wrong ac, the B757 crew. The SC did not challenge the callsign or address his second call but corrected the level information read-back. This was then acknowledged by the correct crew, the L1011. At the end of this transmission the B757 crew then acknowledged with the numerical element of their callsign. The controller then instructed the B757 crew to maintain 6000 ft as the BAC 1-11 was descending on top to FL 80. This instruction was acknowledged, but the crew continued the climb and did not comply with it. By the time the B757 crew was challenged they had already passed the conflicting BAC 1-11.

UKAB Note: Standard vertical separation was eroded shortly after 1350:58, when horizontal separation was about 0·6 NM and increasing rapidly as the ac diverged. Vertical separation of 300 ft is evident about 10 sec later and standard horizontal separation of 3 NM was restored by 1351:24.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, transcripts and audio recordings 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 quickly recognised that poor RT discipline on the part of the B757 crew had precipitated this complex occurrence, which had subsequently caught out the SC. The ATSI adviser emphasised that whilst the SC had astutely recognised the initial incorrect readback from the B757 to a clearance addressed to the L1011, he did not detect that it had emanated from the wrong crew. There was no doubt that the B757 crew had reacted to an ATC instruction addressed to another ac and this had been one part of the Airprox' cause. In mitigation, the alpha-numeric callsigns used by the B757 and the L1011 had differed only in their numerics and members felt the similar sounding result had compounded the problem. Additionally, the 'level' instruction addressed to the L1011 crew followed immediately after a 'heading' instruction for the B757 crew. Members understood perfectly how easy it must have been to make the mistake and said this was a known problem faced by commercial pilots when departing from major airline hubs. One answer was to recognise company liveries whilst taxying out, although in this instance the L1011 was a substitute ac from a different airline. Another aspect was that short-haul commercial pilots could fly 3-4 sectors a day, with a different callsign on each one. Some companies issued a small card to display in the cockpit with the callsign handwritten on it as an aide memoire. However, callsign confusion did not appear to be the issue here as the B757 crew had used the correct callsign in their reply. The lessons to be learned from all of this were first, the need to be aware of other company ac on the same frequency and second, the need for especial care when responding to ATC 'level' instructions. On that basis, some members wondered why the L1011 crew had not said anything on RT; although they were on a different frequency they were cross-coupled at LATCC and should have heard everything. One possibility was that both crews had transmitted at the same time. This was feasible but it was not readily apparent from either the transcript or the audio recording. Members noted that the BAC 1-11 pilot had assimilated what had occurred throughout. The B757 crew had made the initial mistake, but the SC had focused on the readback error and had not used any callsign to address his 'correcting' transmission. This was unfortunate and was a further causal factor. The ATSI advisor explained that the SC had felt uneasy about the situation, which may have triggered his traffic information about the BAC 1-11 and his instruction to the B757 crew to maintain 6000 ft; the latter was clear and unambiguous, but seems to have been ignored, suggesting perhaps that effective communication between pilots in the B757 cockpit may have lapsed at that point. Whatever the reason another part of the cause was that the B757 crew had not complied with – or queried – the controller's instruction to level at 6000 ft and had instead merely acknowledged by callsign. Again it was unfortunate that the SC had not challenged this incomplete

response by insisting upon a full read-back from the B757 crew. This omission was determined to be the fourth and final part of the cause of this Airprox.

Turning to risk assessment, Board members noted that the SC had not seen the STCA indication, but observed also that standard vertical separation was not eroded until after the B757 had crossed ahead of the BAC 1-11; this probably explains why TCAS did not react. Moreover, the BAC 1-11 pilot had watched the B757 climb towards him and was always in a position to turn away if necessary. When all these factors were taken into account members agreed that no risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

(1) The B757 crew reacted to an ATC instruction addressed to another ac.

(2) The SC detected the incorrect readback, but did not detect it was from the wrong ac crew and did not address the correcting transmission with the correct callsign.

(3) The B757 crew did not comply with or query the ATC instruction to level at 6000 ft.

(4) The SC did not challenge the incomplete readback from the B757 crew.

Degree of Risk: C

AIRPROX REPORT No 26/00

Date/Time: 5 Mar 1557

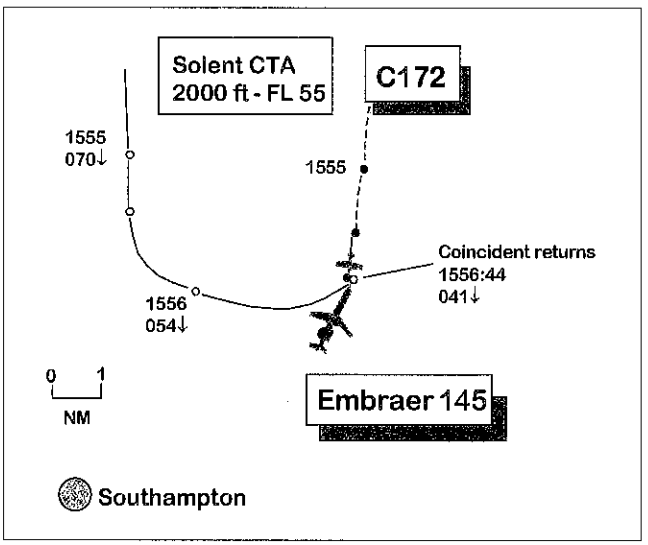
Position: 5102 N 0112 W (7×6 NM NE Southampton airport)

Airspace: CTA (*Class:* D)

	Reporting Aircraft	*Reported Aircraft*
Type:	Embraer 145	C172
Operator:	CAT	Civ Pte
Alt/FL:	3000 ft (QNH 1032 mb)	5000 ft (QNH)
Weather Visibility:	VMC	VMC CLOC >10 km

Reported Separation: 500 ft V / >1500 ft V

Recorded Separation: unmeasurable



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports that he was descending in IMC from FL 70 to 3000 ft at 220 kt under radar control from Southampton on 128×85 while positioning to the ILS for RW 20 at Southampton. On passing 4200 ft (QNH 1032) and turning L through 030° onto a northerly heading, TCAS indicated 2 contacts at his 11 o'clock range 5 NM but with no altitude indication. Both pilots searched for the traffic, initially scanning predominantly in a downward direction, but nothing was seen. Shortly afterwards a TCAS TA was received and the Captain then spotted a light ac, thought to be a C172, as it tracked in a southerly direction towards them, subsequently passing about 500 ft directly overhead. Although there had been only a low risk of collision, had they been at a slightly slower rate of descent he thought the risk would have been much greater. ATC advised him

that the traffic was unknown to them but was squawking 7000 and believed to be outside CAS.

THE C172 PILOT reports that he was on a flight from Wycombe Air Park to Bembridge and return at 5000 ft in VMC. There was no weather and the visibility, almost into the sun, was over 10 km. He was squawking 7000 with Mode C on, and had just left Farnborough radar who had been providing him with a FIS on 125x25. While heading 180° at 110 kt he and his passenger saw an Embraer 145 as it flew from the opposite direction in a L turn, passing about 1200 m to his port side and at least 1500 ft below. In his opinion there was no risk of collision. He had tuned in the Bembridge ADF to assist with navigation but inadvertently strayed westwards into Southampton's airspace. As soon as he realised his error he descended to 2500 ft. The pilot comments that with hindsight he realised that he should have called Southampton immediately on clearing the Farnborough MATZ.

FARNBOROUGH LARS reports the airspace and frequency were extremely busy. A FIS was provided to the C172 between about Woodley and Popham airfield. When it became apparent that the ac's route would take it into Solent's airspace, he advised the pilot accordingly and instructed him to free-call Solent on 120x22 and to change squawk from 0430 to 7000.

SOUTHAMPTON ATC reports that the Embraer 145 was inbound to Southampton at FL 80. As the ac was high, the pilot was advised that he would be vectored through the RW 20 centre line at about 5 NM and then turned L towards the ILS, giving him about 19 track miles to touch down. Further descent to 3000 ft was given and the ac turned L onto 360°. A return was observed about 9 NM NE of SAM squawking 0430 (Farnborough) but soon afterwards changed to 7000; no Mode C was indicated. The pilot of this ac had not called Southampton (Solent) on the ICF (120x22) and he assumed that it was transiting the area below CAS. The Embraer pilot then reported that he had been overflown by a C172 which was at about FL 45. The identity of the ac was subsequently established by a telephone call to Farnborough.

ATSI comments that the C172 had been receiving FIS from Farnborough who alerted the pilot to the fact that he was approaching Solent's airspace and suggested he contact Solent ATC. However, the pilot did not make this call and entered the Solent CTA. Although he had previously reported his level to Farnborough as 3000 ft (see UKAB Note 1), the pilot's report indicates that he was at 5000 ft at the time of the Airprox. In the absence of Mode C information, the Southampton radar controller would have made the reasonable assumption that the ac, which was unknown to him, was skirting the zone and remaining below the CTA.

UKAB Note (1): The Farnborough RT transcript shows that the C 172 pilot first called at 1539, reporting over Reading at 3000 ft. The pilot was provided with a FIS, passed the QNH (1031) and instructed to squawk 0430. At 1553 he was told that he was approaching Solent's airspace and was advised to free-call Solent with a change of squawk to 7000. The pilot makes no mention of any change of level while on the Farnborough frequency.

UKAB Note (2): A replay of the Pease Pottage radar at 1555 shows the Embraer 7 NM N of Southampton airport heading S and descending through FL 70 Mode C, with a 7000 return, believed to be the C172, tracking slowly S about 5 NM to the E. Shortly afterwards the Embraer begins a L turn and, at 1556:44, while descending through 4100 ft Mode C (4600 ft QNH 1032) it passes the C172 on a heading of about 030°. The ac appear to pass close, port to port, but accurate measurement is not possible because the Cessna's radar return is intermittent at this point.

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 comments from the appropriate ATC authority.

GA members were unimpressed by the C172 pilot's conduct of this flight on several counts. Most importantly, he did not heed Farnborough's advice to contact Solent radar following a warning from them that he was about to enter the Solent CTA. At this point he was W of the Wycombe-Bembridge track by some 10 NM but, despite the warning, seemed to remain unaware of his proximity to CAS. His lack of general knowledge of the airspace in

the area was further indicated by his statement that he believed by descending to 2500 ft he would avoid CAS; moreover, he referred to the Farnborough MATZ, which ceased to exist some years ago.

Members noted that, despite being equipped with Mode C, there was no evidence of this on the radar recording. It was not known whether this was owing to equipment unserviceability or mis-selection; however, in the circumstances of this incident, members commented that the display of Mode C was particularly important because it would have warned Farnborough that the C172 was not at 3000 ft, as its pilot had reported, and this information would have allowed the controller to warn in turn both the C172 pilot and the Solent controller of the situation. It would also have enabled the Solent controller to spot the impending incursion early and allowed accurate traffic information to be passed to the Embraer145 pilot. The Board concluded that the C172 pilot caused the Airprox by his unauthorised penetration of the Solent CTA.

The Board noted that the Embraer 145 was indicating about 4600 ft (QNH) as it passed the C172. The latter's pilot stated in his report that the Embraer 145 had passed at least 1500 ft below him, which would translate to an altitude in excess of 6000 ft on the C172. Members chose to accept the Embraer145 pilot's estimate of 500 ft of vertical separation as being the more accurate figure. The Board concluded that this distance, albeit fortuitous, and the Embraer 145 pilot's visual acquisition of the C172, were sufficient to remove any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of the Solent CTA by the C172

Degree of Risk: C

AIRPROX REPORT No 27/00

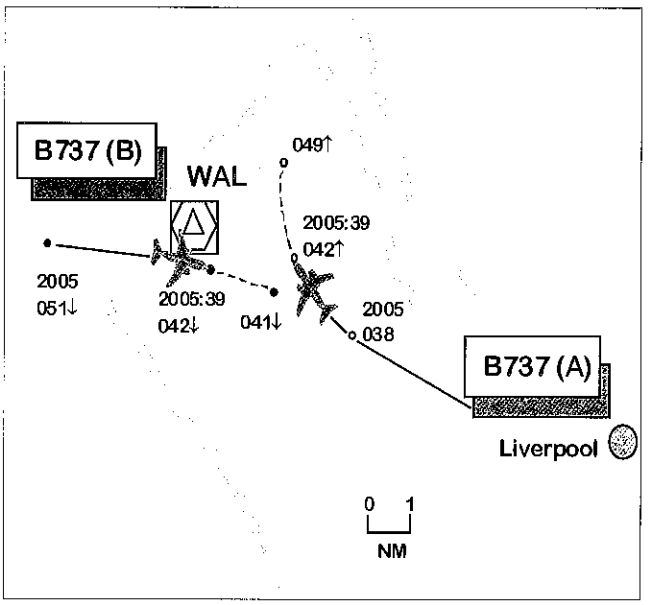
Date/Time: 6 Mar 2006 (Saturday) NIGHT

Position: N5323 W0306 (1·5 NM SE WAL)

Airspace: MTMA (*Class:* A)

Reporter: Manchester/Liverpool

	First Aircraft	*Second Aircraft*
Type:	B737 (A)	B737 (B)
Operator:	CAT	CAT
Alt/FL:	4000 ft (QNH 1021 mb)	3500 ft (QNH 1021 mb)
Weather Visibility:	VMC 40 km	VMC 50 km
Reported Separation:	3 NM same level/ 2 NM same level	
Recorded Separation:	1·7 NM same level	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 (A) PILOT reports that he had been cleared outbound to Belfast on a WAL 2T SID from Liverpool. Having reached his initial cleared altitude of 4000 ft (Liverpool QNH) at 240 kt, heading 300°, the navigation and landing lights of another ac were seen approaching WAL from the W at about co-altitude. This traffic was also indicated by his TCAS some 500 ft above and descending. At this point, the non-handling pilot prompted Liverpool ATC for a frequency change to Manchester, which was normally done when passing 1500 – 2500 ft. On

changing to Manchester radar, he was instructed to turn R onto 360°, and to climb, expediting through the first 1000 ft. He complied immediately and, while turning, received a TCAS TA on the other ac. Manchester ATC advised him that reporting action would be taken because standard separation had been compromised. The other ac, which he could not identify owing to the darkness, passed about 3 NM behind him at a similar altitude. As he had watched it from about 1500 ft following departure until it passed behind them about 4 min later, he considered the risk of collision had been only low.

The pilot comments that because the frequency change to Manchester was delayed, the Manchester controller did not have an earlier opportunity to issue climb/turn instructions to resolve the confliction. However, he commended him for his prompt and effective actions once they were under his control.

THE B737 (B) PILOT reports that he was heading 095° at 250 kt and descending through 4500 ft (QNH 1021) while positioning into Liverpool from Dublin under radar control from Liverpool on 118x47. The visibility was about 50 km. When about 12 NM W of the airport he saw the other ac about 10 NM away and turned R onto 180° in avoidance. The ac passed to his port side about 2 NM away at the same altitude but there was minimal risk of collision.

ATSI reports that IFR traffic operating in and out of Liverpool Airport in CAS is so closely interwoven with Manchester Airport traffic that the operating and co-ordination procedures are contained in a Letter of Agreement (LOA) which is copied in the MATS Pt 2 of both Units. This LOA is supplementary to National regulations. Under these agreed procedures, traffic inbound to Liverpool may be descended by Manchester West Radar to 3500 ft when clear of all conflicting traffic, including Liverpool outbounds. Moreover, West Radar will transfer to Liverpool Approach control of inbound traffic that shall be subject to formal release procedures, including separation against other known traffic as required by MATS Pt 1. Liverpool Approach remain responsible for the separation of inbound traffic already on their frequency against departing traffic. When Liverpool are on RW 27, WAL departures are not subject to "Take Off Subject Radar" (TOSR) restrictions. This means that the departure of an ac on a WAL SID will not be subject to the prior approval of Manchester W Sector. (It should be noted that Liverpool has a Marconi S511 primary radar and no secondary capability).

B737 (A) was cleared to take off from RW 27 on a WAL 2T SID at 2000:30, following release approval by the Manchester Co-ordinator. At about this time there was a changeover of W Co-ordinators at Manchester. The off-going W Co-ordinator did not hand over the co-ordination he had just effected with Liverpool, but he had "cocked" out the ac's departure strip on the display board to indicate that the flight was imminent. B737 (A) took off at about 2002:30. At 2004:10 the pilot reported approaching 4000 ft and was transferred by ADC to the Manchester TMA West frequency. (The Wallasey 2T SID from Liverpool RW 27 requires ac to fly on RW QDM to 1x5 NM DME and then turn onto the WAL 121° radial, to cross WAL 2500 ft or above climbing to 4000 ft).

The B737 (B), inbound to Liverpool from Dublin, first called Manchester TMA W sector at 1954:30 proceeding direct to Wallasey (WAL) level at FL 150. The pilot was informed that the landing RW at Liverpool was 27. At 2000:30 the ac was put on a radar heading of 097°, cleared to descend to 3500 ft on the Liverpool QNH (1021mb) and, at 2004:00, released and transferred to Liverpool Approach. The pilot called Liverpool APC at 2004:30, repeating his previous descent instructions and giving his position as 16 NM W of WAL. Receiving no response to this call, the pilot repeated it at 2004:50 and the controller instructed him to maintain 3500 ft. The pilot then reported visual contact with the airfield; he was passed the QFE and cleared to continue approach visually.

It is the practice at Liverpool for the APC to listen in on the Tower frequency when conditions permit so as to be aware of traffic which is starting up. In this case the APC correctly identified that there would be a confliction between the outbound B737 (A) and the inbound B737 (B) when he received an inbound estimate of 2007 on the latter at 1949:20. At 1959:40, the Liverpool APC telephoned the Manchester W (off-going) Co-ordinator and expressed his concern at the potential confliction. At this stage the Manchester W team should have known that the B737 (A) was imminent (known traffic) because the outbound clearance, including the SSR code, had

been issued via the Sector Assistant to the ac at Liverpool over a minute earlier; however, of the controllers involved only the original Co-ordinator could recall it. The (off-going) W Co-ordinator assured the Liverpool controller that the ac would not get close and that the outbound could be released. The off-going W co-ordinator said that he was unsure as to which outbound the Liverpool controller was referring as another had departed earlier, although the Liverpool APC had used the correct callsign to identify the traffic. The (off-going) W Co-ordinator also told Liverpool APC that W Radar would descend B737 (B) to 3500 ft and that Manchester would call back later with an identification and release. The W radar controller did not recall being advised of this co-ordination being effected on his behalf, nor did he recollect being aware of a pending Liverpool outbound. It was put to the Liverpool APC that as he was the only one of the group involved in the incident who knew exactly when the outbound would become airborne, he should have taken a more proactive role to ensure separation. He responded that Manchester knew of the traffic, had been reminded of the confliction and they had assured him they would provide separation. He also said that having SSR made the task that much easier for Manchester and it was usual for them to establish separation before handing traffic over.

At 2004:20, the Liverpool APC rang the W Co-ordinator (on-coming) to prompt him that the outbound was airborne and again indicated his concern about the separation of the ac. The APC said that although he could see and had an identification on both ac, having no SSR and being used to Manchester resolving such conflictions, there was not much more he could do. The appearance of the outbound ac seemed to take the (on-coming) Co-ordinator by surprise as he responded by telling the APC to turn it R onto 340° and transfer it to Manchester Control, but by that stage (2004:40) ADC had already transferred it. (UKAB Note 1: at this stage the inbound ac was descending to 3500 ft and the outbound climbing to 4000 ft without any procedural separation). Over the next 50 sec a telephone exchange took place between Liverpool APC and Manchester TMA W as to whether B737 (B) was descending to 3500 ft and who was responsible for the separation, which resulted in TMA W telling the Liverpool APC to turn B737 (B) R immediately onto 180°. The controller complied, at 2005:30, using the appropriate avoiding action phraseology, and at the same time passed traffic information on the outbound B737 (A)...*"12 o'clock position range 4NM"*, which the pilot then said he could see. (UKAB Note 2: the radar recording shows that B737 (B) did not take up the turn). At 2005:40 the Liverpool and Manchester controllers exchanged information that both pilots were visual. At this point the Liverpool APC reminded the TMA W Co-ordinator that his off-going colleague had been warned about the potential for confliction between the 2 ac and had undertaken to ensure separation. The W Co-ordinator responded that he would tell him exactly what had gone on when he had found out. When interviewed, the on-coming W co-ordinator acknowledged that he did not fully assimilate the contents of the FPS display when he took over the position. He could not remember whether he could see the outbound B737 on radar and the "cocked"-out strip had not registered on his mind; consequently he was unaware of the outbound ac. However, from radar photographs the outbound B737 is clearly visible passing 2000 ft and turning towards WAL, with B737 (B) descending at high speed towards WAL.

When the pilot of B737 (A) reported on the TMA W frequency at 2004:30 he was instructed to turn R onto a heading of 360°. The pilot acknowledged, then reported seeing the inbound B737 at his 12 o'clock position slightly high to which the controller responded that it was turning R and was with Liverpool ATC. The controller then asked the pilot to climb to FL 90 and to expedite his climb through the first 1000 ft for the benefit of Liverpool. The pilot confirmed he was still visual with the other ac, now at his 9 o'clock position range 3 NM. There followed an exchange between the TMA controller and the pilot of B737 (A) with both parties stating that reports would be filed.

All controllers agreed that the procedure whereby an inbound descends to 3500 ft altitude whilst an outbound climbs to 4000 ft altitude through the same location (WAL) was unsafe. They did, however, point out that it worked because of the requirement on both sides to separate against other known traffic. An alternative, of allowing Liverpool inbounds to use the MIRSI hold, was considered to be unworkable because of the extra workload it imposed in co-ordination with Manchester

Approach, and separation from Manchester departures from RW 24R making a R turn out. This inevitably placed some compulsion on using an unsatisfactory solution and making it work.

ATSI recommends that there is a thorough review of the Manchester TMA procedures for handling and co-ordination of IFR traffic inbound to and outbound from Liverpool.

UKAB Note (3): A recording of the LATCC radar at 2005 shows B737 (A) 6 NM WNW of Liverpool indicating 3800 ft Mode C (4016 ft QNH) as it tracks outbound towards WAL. At the same time B737 (B) is tracking E about 13 NM WNW of Liverpool indicating 5100 ft descending. A few sec later B737 (A) commences a R turn and at 2005:39 passes through B737 (B)'s 1200 position from R to L at about 2 NM. At this point both ac are indicating 4200 ft Mode C, with B737 (A) now climbing and B737 (B) continuing its descent. Vertical and lateral separation increase rapidly thereafter as B737 (A) turns onto a northerly heading and B737 (B) routes directly towards Liverpool.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The adviser from ATM P&D told the Board that following this Airprox, and pending the promulgation of revised procedures, all Liverpool outbound ac were now subject to release by Manchester radar. The Board welcomed this and was also pleased to hear that the ATSI recommendation (in Part A) was being addressed by the CAA.

This was a complex incident for which members assessed there were three main causes. Firstly, it was agreed that the procedures and practices that had been in force for some were not fail-safe. Co-ordination procedures, which had worked in the past to resolve many similar potential conflictions, broke down. Consequently, the 2 ac were put into a position where they were climbing/descending through each other's levels on different frequencies, having been transferred between the units only moments before. Secondly, the handover between the off-going and on-coming W Co-ordinators at Manchester was inadequate. This resulted in both the on-coming Coordinator and the Manchester W Radar Controller being unaware of B737(A)'s departure from Liverpool.

The Liverpool Approach Controller (APC), having foreseen the potential for confliction, had warned the W Co-ordinator twice – once before the B737 was airborne, and again shortly after it took off. He subsequently reminded the on-coming W Co-ordinator (who was the recipient of the second reminder) that his off-going colleague had assured him that Manchester would ensure separation between the ac. B737 (A) was given take off clearance by Liverpool on the basis of this assurance. In the event, Manchester did not provide the separation as they had promised. The Board concluded that this was the final cause of the Airprox.

While recognising that the Liverpool APC thought he had done everything he could to prompt action from Manchester, one further option was open to him. Because he still appeared unconvinced by Manchester's assurances, he could have taken the initiative at that juncture by limiting B737 (A)'s climb to 2500 ft before transferring that ac to the Manchester frequency. Although contrary to the initial requirements of the SID, such action would have had minimal effect on the departure's flight profile but would have guaranteed the integrity of standard vertical separation.

Going on the radar information, the ac passed with almost 2 NM of lateral separation between them, and members agreed that there had not been a risk of collision. Nevertheless, the Board felt the geometry of the situation had been fortuitous on this occasion, and the outcome masked a considerably more serious chain of events.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

(a) Long standing procedures and practices that depended on controller intervention to operate safely. i.e controllers descended inbound ac to 3500 ft while outbound ac were cleared to 4000 ft through the same location (WAL) without a departure release.

(b) Inadequate Manchester W Co-ordinator handover.

(c) The Manchester team did not provide separation as they had undertaken to do.

Degree of Risk: C

Recommendation: That the CAA, through DAP, considers with urgency examination of the new procedures proposed for Manchester and Liverpool.

AIRPROX REPORT No 28/00

Date/Time: 8 Mar 1030

Position: 5048N 0302 W(2 NM E of Honiton Mast)

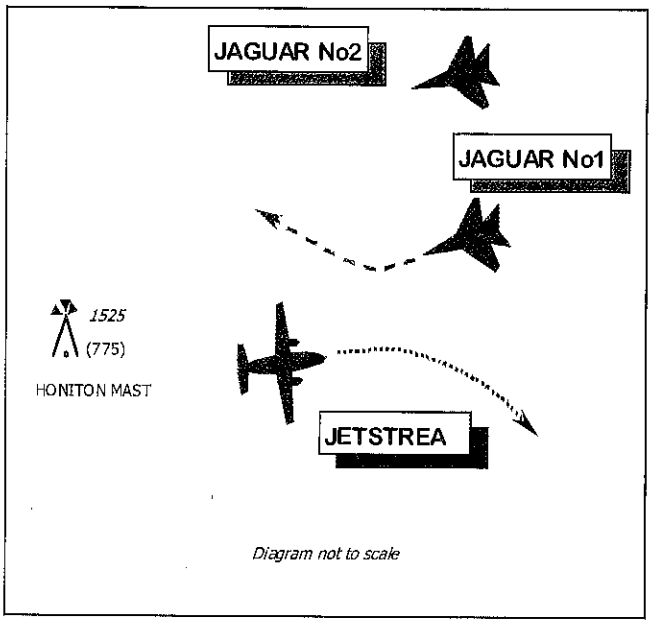
Airspace: LFS (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream	Jaguar
Operator:	COMNA	HQ STC
Alt/FL:	250 ft msd (RPS 1018 mb)	350 ft msd (Rad Alt)
Weather Visibility:	VMC CLOC >10 km	VMC CLBC 5 km

Reported Separation:

100 ft V & 100 ft H Nil V & 1000 ft H

Recorded Separation: Not Recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports conducting a VFR low-level student map reading exercise in LFA 3 & 2. The ac has a blue and white colour scheme; HISLs are not fitted but the landing lights were on to aid conspicuity. They were receiving a FIS from Yeovil Approach, he thought, about 2 NM E of Honiton mast, heading 085° (T) at 180 kt, whilst cruising at 250 ft msd straight and level. Simultaneously, he and the observer, who was occupying the jump seat, spotted a single Jaguar ac at 11 o'clock less than a mile away in a hard R turn at the same altitude and on a collision course. The Jetstream was turned immediately hard R and dived as the Jaguar passed about 100 ft above them displaced about 100 ft to the L with a very high risk of a collision. He adds that earlier visual acquisition of the Jaguar had been impeded by the LH vertical windscreen support.

THE JAGUAR FORMATION LEADER reports leading a pair of camouflage grey Jaguars flying in a 1 NM battle formation with HISLs on, descending VFR into low-level, he thought about 4 NM E of Honiton Mast heading 250°. Just after switching from Yeovil Approach to their tactical frequency whilst flying at 450 kt, 350 ft rad alt the pilot of the No 2 spotted another ac about 1 NM away to the L of his ac and at the same altitude. He saw the Jetstream turning away to the R and immediately executed an avoiding R turn at a range of 1000 ft. Both ac passed about 200 m 'port to port' whilst in the R turn. The risk was not assessed. He added that the weather ahead had been deteriorating, with only moderate visibility his attention had been directed toward finding a suitable route deviation to

enable the formation to remain at low-level. Nonetheless, the Jetstream was seen in sufficient time to avoid it following the prompt sighting report from the No2.

MILITARY ATC Ops reports the Jaguar leader called Yeovil Approach (APP) at 1025:05, for a low-level cloud break to the SW of Yeovilton, initially under a RIS. APP vectored the Jaguar pair through the Yeovilton MATZ towards a gap in the cloud reported by the No3 of the formation that was already safely established VMC 'below', some distance away. Whilst in descent to 2000 ft the RIS was upgraded to a RAS at the request of the leader. At 1027:53, the Jaguar pilot reported *"...tally with the hole"* and reverted to a RIS, about 250° Yeovilton 7-8 NM. APP updated the position of the No3 and instructed the Jaguar leader to freecall en route; the controller could not recall seeing any conflicting traffic on radar. The Jaguar formation switched frequency at 1028:26, before the Airprox occurred.

At 1029:48, the Jetstream crew freecalled APP reporting their position as 5 NM E of Honiton at 250 ft agl and requested a FIS. Moments later, whilst responding to a question about the ac's routeing, a different voice (possibly the Jetstream pilot) enquired *"...did you have any other low level traffic in this area in the last 5 minutes?"* APP responded *"...affirm, ... 3 Jaguars transiting for a low level cloud break descent, now indicating north of Dunkeswell, just changed ... frequency"* to which the pilot replied *"Roger, I understand they are actually astern of me, are they?"* No mention of an Airprox was made, nor any further comment to suggest that any form of incident had taken place. Later that day, Yeovilton ATC was informed that the Jetstream crew had filed an Airprox after landing.

At the time of the Airprox the ac were below the coverage of recorded radar. However, the recording of the LATCC Burrington radar shows that at about the time that the Jaguar pair left the APP frequency at 1028:30, they are shown squawking 3/A 0211, tracking 270° and descending through 3200 ft Mode C (1013mb), whilst the Jetstream is shown about 15 NM WSW of the pair, tracking E at 700 ft Mode C. At 1028:55, the pair turn L to track 240° and increase their ROD slightly. The Jetstream continues to track 095° and fades from radar at 1029:13, indicating 700 ft. At this point the Jaguar pair are 9 NM ENE (at 11 o'clock), passing 1600 ft Mode C and heading directly towards the last recorded position of the Jetstream. The groundspeed of the Jaguars is about twice that of the Jetstream. The Jaguars fade from radar two radar sweeps (16 sec) later, having appeared to turn a further 10° L; their last Mode C readout indicated 1200 ft. An extrapolation of the displayed radar contacts indicates that if the tracks were maintained the subject ac would have been in each other's vicinity at about 1030:13, some 25 sec after the Jetstream crew freecalled APP. Radar contact is re-established on the Jaguar pair at 1031:08, about 3 NM E of Dunkeswell tracking NW.

Therefore, it would appear that the Airprox occurred about 20 NM SW of Yeovilton at, or very shortly after, the time that the Jetstream crew established a FIS with APP and after the Jaguar formation had terminated the RIS and switched frequency. Because the Airprox was not reported on RT at the time, none of the immediate actions, including a specific check of the radar display to establish whether or not the ac concerned were painting, were carried out by the Radar Supervisor. The controllers therefore had little recollection of anything other than a routine Jetstream Navex through their area.

HQ COMNA fully endorsed the comments made by the Jetstream's Unit, who report that both ac would appear to have been booked into the LFS correctly, working to 'see and be seen' VFR rules. However, apart from being informed of "mixed traffic" no other deconfliction advice was forthcoming from ALFENs Ops. More information about particular ac types, times and points of entry/exit may assist in avoiding such instances in the future. Furthermore, a change from the Jetstream's current blue and white livery is being considered to improve the ac's conspicuity, which might have been a factor in this incident.

HQ STC comments that that this confliction in the LFS was resolved by late but positive avoiding action by the Jetstream pilot, but it is unfortunate that the crews involved did not detect the confliction sooner. However, the incident serves not only as a sound reminder to all operators of the need to keep the head moving around the cockpit and prioritise lookout especially when operating without a radar service or in deteriorating weather, but also of the very real need for a collision warning system.

PARTB: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Military ATC Ops advisor briefed the board that although Yeovilton ATC has the luxury of three independent primary radar sources, none detected the ac in this instance. Some thought, that in hindsight, it would have been helpful if Approach had mentioned the Jaguars to the Jetstream crew. It would need to have been done as soon as they had called, however, and may still have been too late to be of any use to the Jetstream pilot. Consequently, there was little else ATC could have done to forestall this encounter in the LFS, that had allegedly left the Jetstream pilot very shaken. The member from COMNA also briefed the Board that consideration was being given to changing the Jetstream's livery to black, a high contrast colour adopted by a number of organisations and which had proved to be quite effective in improving ac conspicuity. Some members thought that this Airprox resulted from a conflict in the LFS resolved by the Jetstream pilot, who having sighted the Jaguar at less than a mile promptly turned hard R and dived to avoid it. Both pilots should have been able to see each other's ac earlier but did not. However, without the benefit of recorded radar evidence it was difficult to conclude which pilot saw the other ac first, as each reported that the other ac was in a R turn when first seen. The Board noted that the windscreen support had impeded the single Jetstream pilot's view, prompting several pilot members to emphasise again the importance of pilots continually moving their heads to see around such obstructions. If this did not suffice, pilots had to move the ac so that a systematic lookout was maintained.

Turning to the Jaguar pair, the No 2 Jaguar pilot was commended for spotting the Jetstream and subsequently warning his leader, just in time for him to take robust avoiding action. Nonetheless, the closing ground speed of about 630 kt, coupled with the reported first sighting at a range of about 1 NM, only left about 6 sec for avoiding action. Members agreed that the cause of the Airprox was a late sighting by both pilots. With this in mind and the short time available in which to take effective avoiding action the members agreed unanimously that 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

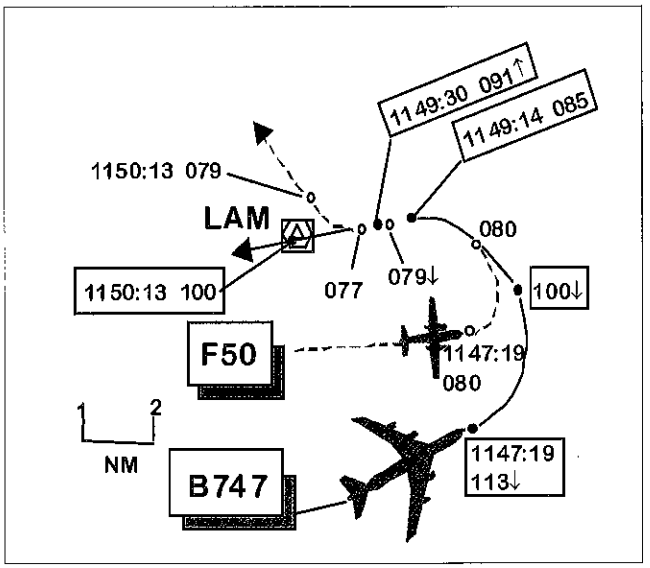
AIRPROX REPORT No 29/00

Date/Time: 28 Feb 1149

Position: 5139 N 0014 E (3 NM E LAM VOR)

Airspace: LTMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	F50	B74-4
Operator:	CAT	CAT
Alt/FL:	FL 80	FL 100
Weather Visibility:	VMC >10 km	VMC
Reported Separation:		
Recorded Separation:	0·6 NM/600 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports that he was maintaining FL 80 in the LAM holding pattern in VMC; the visibility was in excess of 10 km. When on the 086° radial at about 3 NM, he heard ATC instructing the pilot of another ac to maintain his level. At almost the same time TCAS indicated traffic 900 ft above him at about 5 – 6 o'clock and an RA then demanded descent. As he complied, descending to FL 77, he informed ATC of his action and was instructed to leave the holding pattern on a heading of 310°. He believed the conflicting traffic had been above them and had descended below its cleared level. When the confliction was over he resumed his assigned level of FL 80 with the approval of ATC. The pilot gives no estimates of miss distance nor any assessment of risk.

THE B747 PILOT reports that he was inbound to Heathrow and thought he had been cleared to descend to FL 90. However, there was some doubt in his mind at the time about the cleared level and he accepts with hindsight that he should have queried it with ATC before acting on the instruction. In the event, he inadvertently set a lower level on his FMS, the error was not detected by the crew and the ac descended below FL 90. ATC instructed him to climb immediately to FL 100 and at about the same time he received a TCAS RA, also to climb. As a result of these actions he did not feel that there had been a significant level of risk. The pilot comments that he is well aware of the density of traffic in the London area and always strives to maintain a high safety profile. However, he felt on this occasion that fatigue at the end of a long and tiring flight may have contributed to his error.

ATSI reports that the Heathrow Support (SPT) N controller described his workload as moderate when the Airprox occurred; the Heathrow INT Director (DIR) said he was very busy at the time. These two controllers share a common frequency and their relationship is described in the LATCC TC MATS Pt 2 as "Executive and Support". The responsibilities of the SPT controller include "the general monitoring of the radar situation as other responsibilities allow".

About 3 min prior to the Airprox, 3 ac relevant to this incident were in the holding pattern at LAM: the two subject ac and a B737 which was at FL 90 with a clearance to leave LAM heading 275°. The F50 was established in the hold at FL 80. The B747 was not on frequency at the time but was expected, descending to FL 100.

The B747 was cleared by the TC (LAM) SC to descend to FL 100, using the appropriate phraseology; after the pilot had correctly read back the cleared level the flight was transferred to Heathrow Approach. On contacting Heathrow Approach at 1147, the B747 pilot reported his ac

as a B747-400 and advised that he had received the latest ATIS broadcast. The SPT controller answered this call, informing the pilot of a 5-10 min delay in the holding pattern. The pilot had not stated his cleared level on first contact and the SPT controller did not query this omission. The LATCC - TC MATS Part 2, Page GEN 2-13, states, under the heading of "Confirmation of Passing Cleared Level; RTF Procedures - Pilots" that: "It is the responsibility of pilots to report their cleared level on first contact after a frequency change. If the cleared flight level is omitted from the pilot's initial call, it must be confirmed in the ATC reply and an acknowledgement received". (UKAB Note: UK AIP ENR 1-1-3-1 para 1.1.1 states the RT requirement for pilots to quote callsign and level/altitude when changing between frequencies). The SPT Controller admitted that, because of high loading on the frequency, he does not always confirm an ac's cleared level on initial contact. He reasoned that this information was used mainly as a check to ensure that the flight had transferred to the APC frequency at the correct time. He explained that he had experienced occasions when traffic inbound to the hold had called in error when it was not released, and this had been discovered when it was ascertained that the ac was descending to an unexpected level. However, he believed that when ac are already established in a holding pattern the possibility of them calling before being released was unlikely. Nevertheless, since this incident he has changed his method of operation and now always confirms the cleared level on initial contact.

After the B747 called, the SPT Controller said that he was occupied calculating its delay and therefore did not look at its position on the radar display (this is not a requirement of his role, as already described). However, having now seen a recording of the incident, he thought that if he had noticed the B747's high rate of descent (about 1500 ft/min), he would have realised that the ac was not going to level at FL 100. The INT DIR said that he was aware that the B747 called but did not recollect the RT exchange because he was concentrating his attention on other traffic; he therefore did not notice its presence on the radar display. It is not known if the strip marking relevant to B747's call was carried out. The LATCC - TC MATS Part 2, Page DAT 4-3, requires that when ac have been released at a flight level, the pre-printed level to which the ac reports being cleared is to be ringed. The SPT controller, who would normally carry out this annotation, said that he could not recall if he had so ringed the level on the B747's FPS. The INT DIR could not remember if the level was ringed either, but in any case he did not consider FPS annotation to be a contributory factor to the incident. However, it is considered that the correct marking of the level is a relevant check, not only for the SPT controller but also for the DIR, that an ac is descending to its assigned level. Moreover, the INT DIR's FPS display boards are reproduced by CCTV to indicate to appropriate TC sectors the current flight levels of ac being controlled by the SPT/INT DIR controllers, thus showing that those ac are in contact with APC.

The INT DIR said that, either as a result of the activation of the STCA or during a routine scan of the radar display, he noticed that the third ac (the B737) and the B747 were both showing at FL 90. The DIR's immediate reaction was that he must have given the latter descent to that level, using radar separation from the B737. However, he quickly dismissed that notion and, as the SPT controller had been occupied discussing an operational matter with the Final DIR, the DIR realised that he could not have issued any descent clearance to the B747. Consequently, believing that it was a level bust by the ac, he asked its pilot to confirm his cleared level. The pilot replied, hesitantly, that he was level at FL 90. The INT DIR instructed the flight to climb back to FL 100. Radar recordings, at the time (1149) show the B747 3 NM behind the B737. The INT DIR said that despite the overlapping SSR data blocks in the LAM vicinity, he noticed that the B747 continued to descend below FL 90 and on passing FL 87 STCA activated against the F50. Before he could take any action, however, the F50 pilot reported reacting to a TCAS descent in the hold. The INT DIR transmitted to the B747 *"... I say again climb immediately climb flight level one hundred acknowledge".* The INT DIR said that he realised that this would result in the B747 climbing through the level of the B737 at FL 90 but he judged this acceptable as they would remain at least 3 NM apart. Once this instruction had been read back by the pilot, the F50 was instructed to turn R heading 310° to clear the B747's

flight path. At 1149:14 the latter had stopped its descent at FL 85, by which time it was 0×6 NM behind and rapidly catching up with the F50, which had just started to descend and was passing FL 79. At 1149:30 the B747 was climbing through FL 91, with the F50 ahead indicating FL 77, and a few sec later overflew the F50 by about 2000 ft.

UKAB Note: The SMF recorded minimum separation distances of 0×53 NM and 500 ft at 1149:14. However, it should be noted that SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board quickly concluded that the Airprox was caused when the B747 pilot, having correctly read back his cleared level on the previous (TC LAM) frequency, then descended below it. While the pilot acknowledged the crew had set the wrong level on the FMS, there was no explanation as to how this error occurred in terms of flight deck procedures, i.e whether such procedures were effective or had perhaps not been complied with. The Board hoped that the Company concerned would address this issue and if necessary remedy any shortcomings. An airline member was sympathetic to the B747 pilot's comment about fatigue; with only 2 crew members on the flight deck he felt that this could indeed be a significant factor at the end of a long flight. ATCO members did not feel the strip marking annotation was relevant to the incident.

All of the Board agreed that strict adherance to allocated levels is particularly important in a holding stack, where there is a greater chance of an undetected level bust occurring owing to data label overlap on the radar display. In this case, however, the controller detected the error and his instuctions, together with the TCAS alerts in both ac, enabled the ac to be deconflicted. Noting that the B747 was considerably faster than the F50 and had rapidly caught it up, members agreed that any separation achieved was to a large degree fortuitous, and that with a slightly different geometry the encounter could have been considerably more serious. It was concluded, therefore, that the safety of both ac had been compromised.

A further point of detail was that the Heathrow SPT controller did not confirm the B747's cleared level on the pilot's first call, as he was required to do by the LATCC MATS Part 2. While this may not have prevented the B747 descending below FL 100, it might have resulted in its pilot arresting the ac's descent earlier than was the case.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B747 descended below its cleared level.

Degree of Risk: B

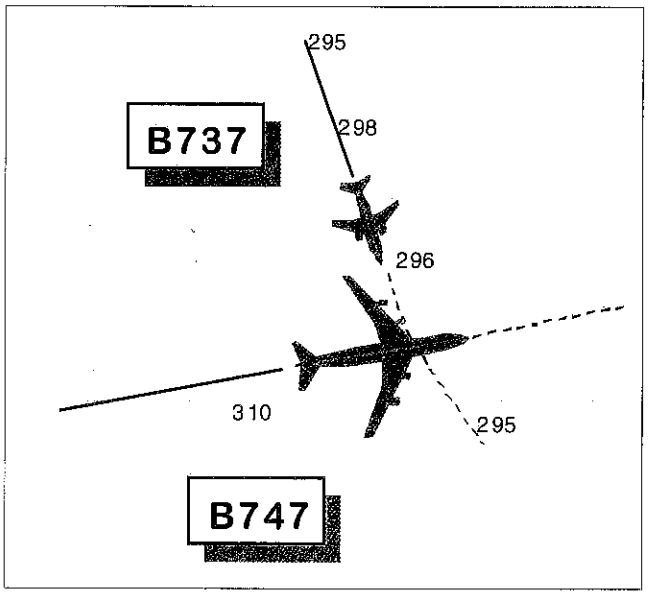
AIRPROX REPORT No 30/00

Date/Time: 10 Mar 0705

Position: 5132 N 0059 W (6 NM NW of Woodley)

Airspace: UIR (*Class:* B)

	Reporting Aircraft	*Reported Aircraft*
Type:	B737-300	B747-300
Operator:	CAT	CAT
Alt/FL:	FL 330	FL 310
Weather Visibility:	VMC CLOC	VMC
Reported Separation:	1200 ft/NK	
Recorded Separation:	1400 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports heading 160° at M 0·74 when, approaching WOD, he was cleared to climb from FL 290 to FL 330. Passing FL 295 he saw traffic in his 1 o'clock crossing right to left. At the same time as TCAS gave a 'Traffic' warning, ATC gave him avoiding action to descend immediately to FL 290 and turn left with traffic at FL 310. The autopilot was disconnected and the ac was descended and turned. TCAS showed a minimum of 1200 ft but a TCAS RA was not triggered.

THE B747 PILOT reports heading NE through the area at FL 310 but could not remember the incident, seeing any other ac, or receiving any TCAS warnings.

ATSI reports that the LUS (W) controller was a Temporary Chief Sector Controller (CSC). This means that 2/3 of her time is spent on CSC duties and although there are times when she feels the amount of radar duty is felt to be less than ideal she confirmed that, at the time of the Airprox, she felt fully competent.

The eastbound B747 was routeing on an Opposite Direction Level (ODL); ac at this level are normally westbound.

The B737, en route to France, was also routeing via WOD and was level at FL 290 which is the agreed level for traffic outbound from the Manchester TMA between Daventry and LUS. The ac was requesting FL 330 and this was known to the sector control team.

It was around 0700 and a shift change was in progress. The LUS (E) controller had taken over from the night shift the sector which was bandboxed onto the R1 position with both frequencies cross-coupled. The incoming LUS (W) controller, who had previously worked for about 5 minutes on the Daventry sector, then arrived and started to take over LUS (W) by splitting it away from LUS (E). This involved accepting the bulk of the traffic on the sector at the time.

At 0657 the B747 reported on the LUS (W) frequency level at FL 310. The LUS (E) controller acknowledged the call and noted that all ac in the sector were procedurally safe. He had also noted that there were a number of ac inbound to France via Dieppe and that the B737 was not climbing particularly quickly. This, he thought, was probably due to a 50 kt tailwind. At 0700:00 the B737 reported on a radar heading of 160° and approaching FL 290.

It was instructed by the LUS (E) controller to maintain this level and to expect further climb shortly. Both controllers stated that the handover was methodical and in no way rushed and that both the B747 and the B737 were pointed out and acknowledged. There was a minor distraction, acknowledged by both controllers, when an ac which normally transits a corner of the sector without calling, called and had to be dealt with. The CSC was nearby searching for a FPS Designator which had probably gone missing during the night.

The B747 was instructed to recall the LUS (E) controller on the correct frequency at 0702:40 and shortly after this the handover was complete with the LUS (E) controller sitting in the correct R3 position. The LUS (W) controller then instructed another ac not involved in the incident to change heading in order to separate it laterally from the B737 and at 0704:30 instructed the B737 to climb to FL 330, having overlooked the B747. The ac commenced climb at 0704:46 and 15 seconds later the Short Term Conflict Alert (STCA) activated. The LUS (W) controller immediately realised her mistake and made 3 rapid transmissions to the B737, 2 with avoiding action descent and 1 with a heading, to try and stop the ac climbing. The heading issued, initially 020°, was queried by the pilot as it was clearly excessive. There followed an exchange in which the pilot of the B737 tried to ascertain whose responsibility it was for the climb and during which he informed the controller that they had climbed to within 1200 ft of the B747 on TCAS. The pilot of the B747 had also received a TCAS alert but had advised that he was taking no avoiding action.

The LUS (W) controller stated that she could think of no reason why she forgot about the presence of the B747. She said that she would have looked for a blue strip holder for traffic at FL 310 as this would denote a westbound ac, but there was none. She also said that the FPS was not annotated to indicate the ODL which would be the normal practice at LATCC. But she also stressed that the handover on the B747 had been correct and acknowledged.

HUMAN FACTORS investigation suggested that the following may have contributed to the LUS (W) controller not taking the B747 into account:

- The incoming controller was aware of the request by the B737 for climb to FL 330. When this request was first made she had not been in a position to meet it but, once it had transferred to LUS, she could now deal with it. That this was on her mind is illustrated by the fact that turning the other conflicting traffic and climbing the B737 were her first executive instructions after assuming control.
- During the handover, control of the B747 was retained by the in situ controller and so was not her responsibility. Having no responsibility for controlling the ac, the controller appears to have mentally "dismissed" it, consequently not taking it in into account when she assumed control.
- The B747 was flying at an ODL, a fact not highlighted on the FPS. Although she had previously been aware of this, the lack of a positive reminder to this effect may have contributed to her not taking account of the ac.
- Following the sector split, the FPS on the subject ac would have been separated, removing a further clue to the potential confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the B737 pilot, transcripts of the relevant RT frequencies, radar video recordings and reports from the appropriate ATC authorities.

Members were advised that the FPS marking for ac on ODLs had been reviewed, but considered

that this may not have helped in this instance where the presence of the B747 had been noted by the controller yet had subsequently slipped her mind when clearing the B737 to climb. Members agreed that this was the cause of the Airprox. Addressing next the degree of risk in the encounter, the Board assessed that the STCA followed by the controller's prompt actions removed any risk of the ac actually colliding. However, it was fortuitous that at the levels concerned the standard vertical separation required was 2000 ft.

PART C: ASSESSMENT OF RISK AND CAUSE

Cause: The LUS (W) SC cleared the B737 to climb through the level of the B747 without taking the latter into account.

Degree of Risk: C

AIRPROX REPORT No 31/00

Date/Time: 12 Mar 1325 (Sunday)

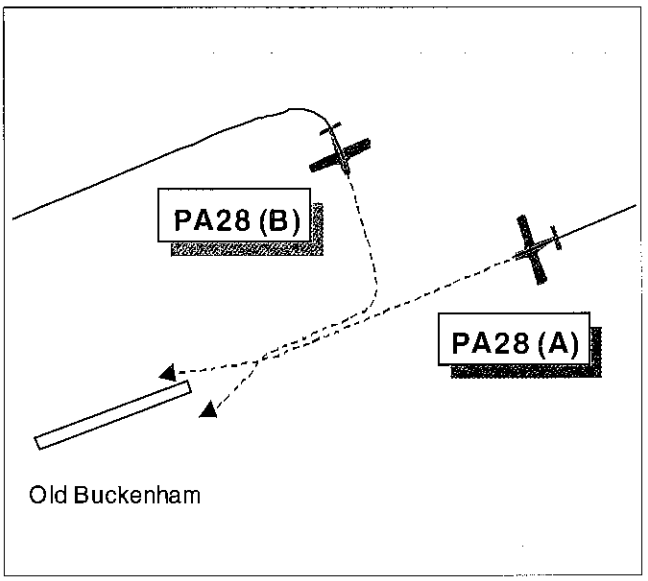
Position: 5230 N 0104 E (Old Buckenham - elev 216 ft)

Airspace: ATZ (*Class:* G)

	Reporting Aircraft	*Reporting Aircraft*
Type:	PA28 (A)	PA28 (B)
Operator:	Civ Pte	Civ Club
Alt/FL:	50 ft (QFE 1021 mb)	200 ft (QFE 1019 mb)
Weather Visibility:	VMC CLOC 8 NM	VMC CLOC 8 NM

Reporting Separation: 4 m/50 ft

Recorded Separation: NK



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 (A) PILOT reports heading 250° at 75 kt on finals for RW 25 at Old Buckenham, in communication with Buckenham Radio on 124·4. He was squawking 7000; Mode C was not fitted. He had joined from the N on a wide base leg after announcing his intention on RT, turned final and called "C/s 4 mile final". He was given the wind and QFE. At 1 NM, he called "C/s 1 mile final" and again received the WV. At about 50 ft his passenger drew his attention to another ac in his right rear quarter, about 50 ft above and 50 m away, but he then lost sight of it. His passenger then said "He's landing on top of us, do something!" and a warning was called by Buckenham radio. He applied full power, called "C/s going around" and kept the ac very low until he saw the other ac appear in his front left hand quarter, climbing away. He had heard no transmissions from the other ac and had not seen it on a base leg during his approach. There had been a severe risk of collision; his passenger advised that the other PA28 had passed about 4 m away.

THE PA28 (B) PILOT reports flying a circuit detail with a student; RW 25 RH was in use and the circuit and RT had become very busy with joining ac. He was not using his transponder at the time of the Airprox. He turned base and final, checking to the left for ac joining straight-in and called final, seeing and hearing no conflicting ac. He was heading 250°

at 75 kt on finals and when passing 200 ft he noticed an ac below and accelerating; it appeared to be going around. He immediately turned left away from it, initiating a go-around, and it turned right and kept low. The minimum separation had been about 50 ft and the risk of collision had been very high. He heard nothing from Buckenham Radio and, because neither pilot heard the other's final call, he supposed that they had transmitted together. It appeared that the other PA28 had made a long, low approach and he had not seen it before turning final. Although sitting in the RHS he deliberately dropped the left wing to check for straight-in traffic before turning final. He could not understand why the other pilot had not started a go-around on first sighting him. He added that joining and circuit patterns are much affected by local noise constraints.

UKAB Note: LATCC radar recordings show an ac (squawking 7000 with no Mode C) joining on the path described by the PA28 (A) pilot and turning onto final in the area of the Tacolneston mast. There are many contacts, some of them probably gliders, around Old Buckenham but one is discernible on a downwind track which turns base in a position which would conflict with the straight-in ac. It then goes below radar cover; the incident itself is not shown.

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.

This type of incident, involving one ac making a straight in approach and the other in the circuit at an airfield without ATC, featured fairly regularly at UKAB meetings. Members took little consolation in recognising that the ingredients in this case were all to familiar and a near-copy of previous incidents. There was a common perception (not necessarily apparent in this case) that by calling finals on a straight in approach, an ac would gain some sort of priority over others in the circuit. Members disagreed with this concept which, while it might accord with Rule 17 (6) (b) (i) if the straight-in ac was lower, was in practice unworkable. Members agreed that it was incumbent on any ac joining a circuit, (either straight in or from an overhead join) to fit in with traffic already in the circuit (Rule 17 (5) (a)). The pilot of PA28 (A) did not do this and the Board considered that this was part of the cause of the incident. Members agreed that it was almost impossible, except by luck, to integrate into a busy circuit without ATC from a straight-in approach and that the proper way to enter such a circuit was from a standard overhead join.

The Board agreed that the other ingredient of the cause, again identified in previous incidents under very similar circumstances, was that neither pilot saw the other ac in time to prevent the confliction. It was not clear why the pilot of PA28 (A) did not see (B) which would have been skylined as it closed on him on its base leg until it turned final above him. It was possible that each had transmitted over the other and hence not heard vital clues, but lookout was essential; there might have been non-radio ac in the area. PA28 (B)'s pilot who was instructing would inevitably have been distracted by the task to some extent and despite looking up the approach, perhaps not at the right moment or in the right place (and sitting in the RHS), did not detect what very nearly collided with him. The Board were of in doubt that the incident contained a very real risk of collision.

Members, advised that both pilots had been helpful to the investigation, agreed that it was to their credit that the incident had been reported; it provided further evidence of the dangers inherent in straight-in approaches at non-ATC airfields which the Chairman agreed to bring to the attention of the CAA GA Dept.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 (A) pilot did not integrate himself safely into the circuit, compounded by ineffective lookout by both pilots.

Degree of Risk: A

AIRPROX REPORT No 32/00

Date/Time: 13 Mar 1808 TWILIGHT

Position: 5142 N 0035 W (2·5 NM SW BNN VOR)

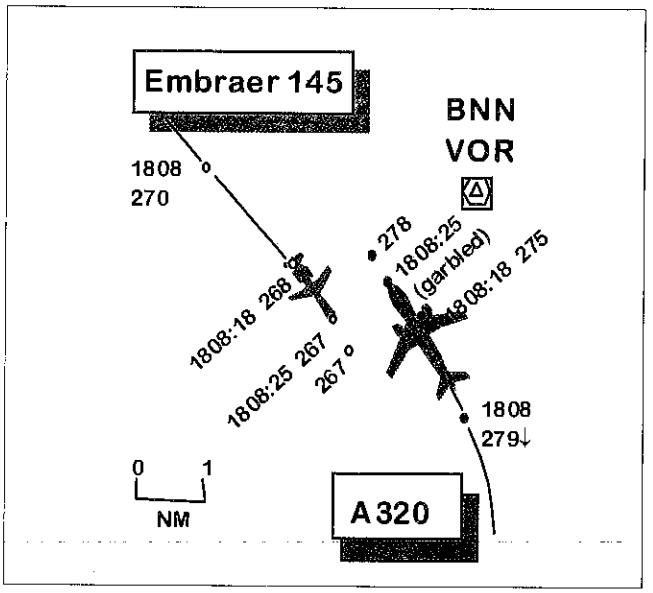
Airspace: UAR (*Class:* B)

Reporter: LATCC AC DTY SC

	First Aircraft	*Second Aircraft*
Type:	Embraer 145	Airbus A320
Operator:	CAT	CAT
Alt/FL:	FL 270	FL 200
Weather Visibility:	VMC	VMC >10 km

Reported Separation: 1 NM/500 ft//1 NM/500 ft

Recorded Separation: d2 NM/700 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LATCC (AC) reports that the Airbus, from Las Palmas to East Midlands, had been handed to the Daventry (DTY) sector from London Upper sector (LUS) at the agreed level of FL 280. The Embraer 145, outbound from East Midlands to Brussels, was cruising at FL 270 under the control of London Middle Sector (LMS). At 1807:04, the Airbus pilot requested further descent; he was cleared to route direct to SAPCO and told to expect descent in about 2 min. However, after only another 34 sec the DTY SC instructed the Airbus pilot to descend to FL 200. At this time the ac were some 10 NM apart and on conflicting tracks. At 1808:09, after the Airbus had left FL 280 and separation had reduced to 500 ft and 3×7 NM, its pilot reported "reacting to TCAS". The pilot was instructed to *"stop descent immediately and climb back up again please"*. A few sec later the pilot of the Embraer reported leaving FL 270 in response to a TCAS RA to descend. At 1808:16 the Airbus pilot reported visual contact with the Embraer passing down his port side, at which point separation was at its minimum of 2×1 NM and 700 ft. As lateral separation further reduced thereafter, vertical separation increased and the ac were 1000 ft apart as they passed in opposite directions at a range of 1 NM.

THE EMBRAER PILOT reports that he was cruising at M 0×73 at FL 270 on a heading of 140° under the control of LATCC. When in the vicinity of the Bovingdon (BNN) VOR a TCAS RA signalled "Descend Now"; he complied, and then saw an Airbus as it passed down his port side about 1 NM away and 500 ft above in the opposite direction. He thought there had been a medium risk of collision. ATC subsequently advised him that the other ac had descended below its cleared level.

THE AIRBUS PILOT reports that he was under the control of LATCC who had cleared him to route direct to SAPCO and to descend from FL 280 to FL 200. The visibility was over 10 km in VMC. When near the BNN VOR at 310 kt, TCAS indicated traffic and then an RA demanded climb. He immediately disconnected the autopilot and auto-throttle, informed ATC of the conflict and complied. The other ac, believed to be an Embraer, passed down his port side about 1 NM away and 500 ft below in the opposite direction. He thought there had been a high risk of collision. ATC accepted responsibility for the error.

ATSI reports that the SC involved in the Airprox was operating the LATCC DTY Sector in bandboxed configuration although appropriate staff were available to split the sector if required. He described the traffic loading and workload level as light at the time of the incident, though it had been busy about 15 min previously.

The Airbus was under the control of the DTY Sector at the time of the Airprox and the Embraer was being controlled by the London Middle Sector (LMS).

The Airbus pilot contacted the DTY Sector at 1805, reporting levelling at FL 280 towards HEMEL. Shortly afterwards the pilot requested descent which the SC replied could be expected in about 2 min, at the same time clearing him to route direct to SAPCO. The SC explained that this delay was to allow the flight to cross the DTY/LMS Sector boundary. However, the next call to the Airbus, some 30 sec later, was to issue the pilot with descent clearance from FL 280 to FL 200, thus taking the ac into confliction with the Embraer cruising at FL 270. A radar photograph at 1807:47 shows the Airbus at FL 280 about 5 NM from the DTY/LMS boundary, with the Embraer at its 10 o'clock at a range of 7×5 NM. The SC could not explain why he had cleared the Airbus to descend before it reached the boundary, especially as an early descent was not considered critical in achieving the agreed level (FL 200) for transfer to the next sector. Moreover, he could offer no explanation for overlooking the presence of the Embraer. The SC confirmed that he was aware of this flight because LMS had previously co-ordinated it into a part of his sector at FL 270 in the vicinity of the Westcott Corridor, albeit at the time of the occurrence it was back in LMS's airspace. He added that a DTY FPS for the ac was displayed on his sector, although, in accordance with normal operating procedures, it was not in the same display bay as that of the Airbus. He also commented that, although he scanned his radar display before issuing the descent clearance, he did not notice the Embraer, possibly because he was concentrating his attention directly ahead of the Airbus.

The SC stated that he first became aware of the situation when the pilot of the Airbus reported "reacting to TCAS" (although not mentioning it at the time, the pilot subsequently said that he had received a TCAS RA to climb). The SC instructed the pilot to stop his descent immediately and to climb back up again. The pilot replied that he was visual with other traffic passing down his LH side.

The LMS SC, meanwhile, was unaware of the confliction until the pilot of the Embraer reported he had received a TCAS RA to descend, and was levelling at FL 266 with traffic in sight on his LH side. He instructed the pilot to turn onto a heading of 180°, but then withdrew this almost immediately, advising the pilot that the ac had by then already passed each other.

The minimum radar separation recorded was about 2 NM laterally and 700 ft vertically at about 1808:18. Standard vertical separation was restored 7 sec later as the ac passed abeam each other at a range of 1 NM.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATCI adviser explained that the incident occurred in light traffic conditions following a busy session. Human factors research has shown that incidents often occur in just such circumstances; a relaxation in mental processes can lead to uncharacteristic errors being made by controllers. Aside from this as a possible mitigating factor, there was no ready explanation for the DTY SC's erroneous and essentially unforced descent instruction to the Airbus. Equally inexplicable were his lack of co ordination with the LMS Sector and the way he overlooked the Embraer, which he knew about. The Board concluded that the Airprox had been caused when the DTY SC descended the Airbus into confliction with the Embraer. Noting that both pilots responded to their respective TCAS RAs and that the radar recording indicated separation distances in the order of 2 NM and 700 ft, the Board concluded that there had not been a risk of collision

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DTY SC descended the Airbus into confliction with the Embraer.

Degree of Risk: C

AIRPROX REPORT No 33/00

Date/Time: 12 Mar 1021 (Sunday)

Position: 5058 N 0045 W (20 NM W of WILLO)

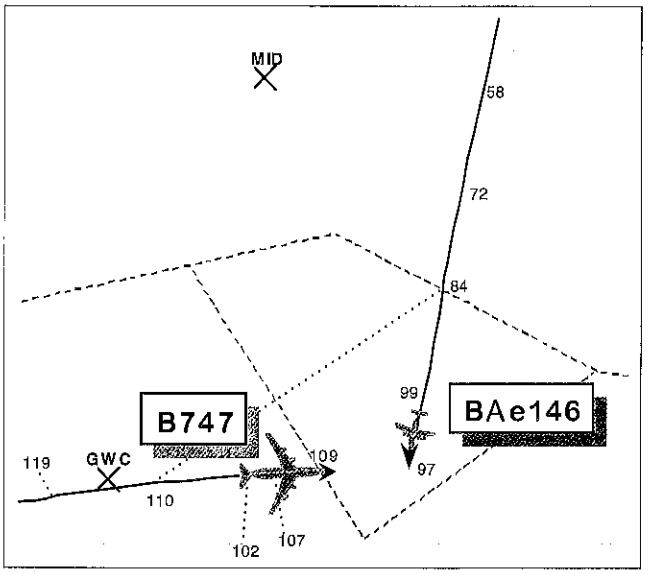
Airspace: LTMA (*Class:* A)

Reporter: LATCC TC (WILLO) SC

	First Aircraft	*Second Aircraft*
Type:	BAe146	B747-400
Operator:	CAT	CAT
Alt/FL:	FL 100	FL 110
Weather	VMC	VMC
Visibility:		20 km
Reported Separation:		
Recorded Separation:	2.2 NM/1200 ft	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC TC (WILLO) SC controller reports that the traffic level was light; the B747 was inbound from the western USA to Gatwick and cleared to descend to FL 110 while the BAe146, having been on a BOGNA SID, was on a radar heading and cleared to FL 100. She noticed the STCA flashing and saw the B747 passing FL 108 with the BAe146 climbing through FL 95. She told the B747 pilot to climb immediately to FL 110 and when this was acknowledged, told the BAe146 pilot to stop his climb. Traffic information was passed to both pilots. The RT recording confirms that at 1018:10 the B747 pilot was told *"C/s descend flight level one one zero"*, to which the pilot replied *"Descend one one zero, standard speed control c/s"*. The controller advised the pilot he could *"maintain two eighty after Goodwood"*. At 1018:30 the controller placed the BAe146 on a heading of 195°, clearing it to climb to FL 80 and to *"Flight level one hundred"* at 1020. Just after 1020:30 the controller told the B747 pilot *"C/s climb immediately, flight level one one zero was your cleared level"* to which the pilot replied *"One one zero c/s"*. The BAe146 pilot was told to stop his climb immediately and given traffic information.



UKAB Note (1): LATCC radar recordings show the B747 descending through FL 110 at 1020:23 while the BAe146 climbs through FL 84. The B747 arrests its descent at FL 102 with the BAe146 passing FL 95; STCA starts flashing (white) as the B747 climbs through FL 105. The BAe146 arrests its climb at FL 99 and crosses through the B747's 12 o'clock 2·2 NM ahead of it at FL 97 as it passes FL 109, at 1021:30. Minimum lateral separation (1·3 NM) occurs shortly afterwards.

THE BAe146 PILOT reports that he saw the B747 and did not perceive a risk of collision; the controller appeared to be dealing with the situation.

THE B747-400 PILOT reports descending at 280 kt to FL 100 when the controller requested an immediate climb from FL 104 to FL 110 due to conflicting traffic at FL 100. He complied. He suggested that either he and his FO both mistakenly set and checked FL 100 or ATC had cleared him to the wrong level. The B747-400 pilot's fleet manager commented that the airline had recently had 2 height busts on the descent into the London area; in each instance the ac had been cleared to descend to FL 110 but the crew set the MCP to FL 100. It was notable that in one instance the readback had been stated as "descend to one zero zero' and in the other (this incident) it was 'descend to one one zero' ATC have commented that neither readback contained the use of 'Flight Level' or the use of the standard phrase 'Flight Level one hundred'.

UKAB Note (2): The airline was asked to investigate the details of the incident because the information provided to the CAA explained what had happened but not why. The airline has comprehensive crew procedures regarding the setting of levels on the MCP. Depending on whether or not the autopilot is engaged (information in this case was not available from the airline) will determine which pilot sets on the MCP the new level he has heard; he will then indicate it to the other pilot, ideally without saying anything because echoic memory is evanescent and will naturally contain the last thing heard, and the other pilot will check what he sees against his 'echoic memory' of what ATC said. Any discrepancy will be re-checked with ATC. In this instance, with the PNF replying correctly "Descend one one zero", something must have happened on the flight deck to break this procedure. However, by the time the incident had been closed between the CAA and the airline, the memory of events had faded to the extent that no further detail was available. It may be relevant that in both the instances referred to by the fleet manager, the pilots had added a query about speed control to the FL acknowledgement. This would have 2 effects; it would degrade the PF's echoic memory of the specified level, and indicated that the PNF was thinking about speed control in the vital seconds while he was, or should have been, observing what PF was setting on the MCP.

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 agreed the cause of the incident was the descent of the B747 through its cleared level and observed that, in common with another 'height bust' assessed at the same Board meeting, the error occurred towards the end of a long flight.

The Board was disappointed that opportunities to investigate the incident fully were lost, and that despite what was said on the RT the B747 captain had not raised an ASR on the incident until requested to do so. Members agreed that not all airlines had such robust cockpit procedures and that it was all the more important for the airline itself to ascertain precisely how the procedure had failed (or not been followed) in this instance. Pilot members agreed that the timing of the speed control query might have been a factor; while stopping short of recommending that such transmissions should be split from readbacks, they agreed that it was not an ideal practice to combine them. Pilot members commented that the many requests for variations to standard speeds tended to clutter RT channels but ATC members pointed out that part of their job was to ensure the expedition of traffic and that where higher speeds could be accommodated, they would be offered anyway.

The Board agreed that any risk of collision had been averted by the controller's timely intervention and the reaction of the pilots.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B747 pilots descended through their cleared level.

Degree of Risk: C

AIRPROX REPORT No 34/00

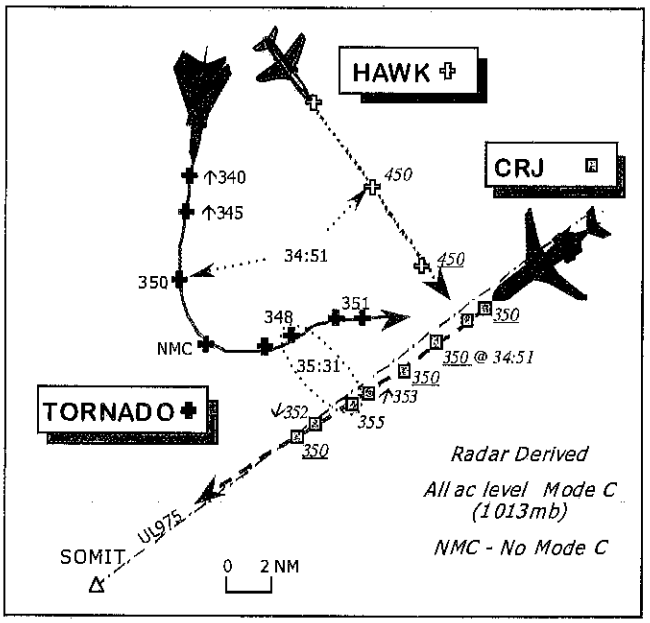
Date/Time: 15 Mar 1435

Position: 5425N 0200E (14 NM NE of SOMIT)

Airspace: UAR – UL975 (*Class:* B)

Reporter: LATCC N SEA Sector

	First Aircraft	*Second Aircraft*
Type:	CANADAIR RJ-200	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL 350	FL 350
Weather	VMC CLOC	VMC CLOC
Visibility:	Good	
Reported Separation:	By ATC 2·5 NM H	
	2NM H/nil V	Not reported
Recorded Separation:	3·85 NM H & 700 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE OFF GOING LATCC N SEA CSC reports that CRC Neatishead initiated co-ordination between their traffic, a pair of military ac squawking 3/A 2432/3 and the CRJ2 cruising at FL 350. It was agreed that Neatishead would maintain standard horizontal separation of 5 NM with their Tornado against the CRJ2 and operate not below FL 260 to avoid further GAT cruising at FL 250, 10 NM behind the CRJ2. When the pair of military ac split, the Mode C indicated FL 350 and started to close with the CRJ2 on a slowly converging track before turning sharply towards it.

THE N SEA SC reports that he was operating the bandboxed N Sea Sectors when the CSC pointed out a pair of ac under the control of Neatishead that were co-ordinated to avoid the CRJ2, which was under a RCS at FL 350. The subject ac were monitored continuously; when he observed one of the military ac indicating FL 430 and garbling above the second that was indicating FL 340 he indicated his concern to the CSC. The military ac at FL 340 then seemed to climb and turn away from the CRJ2, but as it passed FL 345 it turned back towards it. He decided to give avoiding action, but before he could transmit the instruction the CRJ2 pilot reported he was responding to a TCAS RA and climbing. The pilot was informed that there was no other GAT to affect the climb and continuous traffic information was given. When the CRJ2 climbed through FL 353 its pilot reported that he was visual with the other ac. Traffic information on the fighter was continued until the CRJ2 was well past the military ac. Standard separation was eroded to 2·5 NM, he thought.

THE TAKING OVER N SEA CSC adds that when he took over the Sector the off-going CSC advised him of the extant co-ordination agreed with CRC Neatishead. The conflict had triggered the STCA and resulted in a TCAS RA, which was followed by the CRJ2 pilot. He called Neatishead and was told that they were already taking avoiding action with their traffic.

THE CANADAIR RJ-200 PILOT reports cruising at Mach 0·74, level at FL 350 and heading 260° 25 NM NE of SOMIT, whilst inbound from Stockholm to Birmingham. Military traffic converged from his 2 o'clock, resulting in a TCAS RA that demanded a climb; he responded and climbed to FL 354, he thought, as the military ac passed 2 NM down the starboard side on a reciprocal heading with no vertical separation. The pilot did not assess the risk but reports that the TCAS alert was "necessary".

UKAB Note (1): The LATCC N Sea RT transcript reveals that the CRJ2 crew reported at 1435:10,

"[callsign] *TCAS climb*". The N Sea SC responded with traffic information *"...3 o'clock indicating* (FL)*348...*". The crew then advised *"...I see him turning down our R side"* at 1435:20, thereby confirming visual acquisition. The crew reported the *"...TCAS ...conflict is clear"* 10 seconds later.

THE TORNADO F3 PILOT reports flying at 450 kt after completing a practice intercept on a Hawk ac and overshooting from the visual identification to re-engage. He descended from FL 450 to about FL 350 to gain speed and separation from the Hawk. Whilst turning L onto 080° to re-engage an 'avoidance' turn to the R, or tighten the L turn, was called by Neatishead; he complied with the latter but did not see the CRJ2. He thought that the Hawk pilot had advised him `visual confliction no factor`. After the sortie he was informed of the Airprox and comments that a re-attack at altitude imposes a high workload.

UKAB Note (2): A review of the Neatishead RT transcript reveals that the WC instructed the Tornado crew *"...if possible tighten your turn, otherwise take avoiding action to your R" and* the crew responded that they were in *"...a L turn now"*. The WC then passed traffic information *"...you've got stranger traffic E by 10 similar level"* and added *"continue L avoiding action port north"*, whereupon the Tornado crew queried that the information was for them and not the Hawk pilot, who advised the Tornado crew *"...bogeys low R departing"*.

ATSI reports that there are no civil ATC implications apparent within this Airprox which occurred broadly as described in the LATCC reports. CRC Neatishead did not comply with the agreed co-ordination to "take 5". However, the North Sea SC was monitoring the situation and was about to issue avoiding action instructions when the pilot of CRJ2 reported responding to a TCAS RA and sighting the Tornado.

HQ 2 GP ASACS SAFETY & STANDARDS UNIT (ASSU) reports that the Weapons Controller (WC) at CRC Neatishead was controlling 2 F3s and a Hawk, in a block FL 250 – FL 550 for a Hi-Flying supersonic profile sortie. The Neatishead controller co-ordinated with the North Sea CSC on 2 tracks on UL975 but subsequently allowed one of the Tornados to fly into conflict with one of these tracks at FL 350, thereby breaking the agreed co-ordination and eroding standard separation. Despite obtaining co-ordination the Neatishead controller did not provide timely traffic information or direction to the Tornado crews concerning the conflicting traffic. Avoiding action was, in the event, prompted by the supervising Fighter Allocator (FA) but the prescribed separation minima was not maintained. As a result of this serious lapse the WC's Local Operating Endorsement was withdrawn and he has undergone a period of remedial training at the School of Fighter Control.

HQ STC comments that the ASSU report needs no amplification and the local supervisory chain acted swiftly to ensure an appropriate period of retraining for the controller involved.

UKAB Note (3): A review of the Great Dun Fell radar recording reveals that this Airprox occurred at 1435, 14 NM NE of SOMIT. The CRJ2 is shown southwest bound on UL975 maintaining FL 350. The Tornado intercepted and overhauled the Hawk and then turned southbound and descended to about FL 332, whilst the Hawk maintained FL 450, some 10,000 ft above the CRJ2. The Tornado then commences a climb and turns L at 1434:51, indicating FL 350 Mode C and steadies briefly on a reciprocal course to the CRJ2. The two ac pass starboard abeam each other just after 1435:31. At the CPA, 3·85 NM and 700 ft separation is evident after the CRJ2 ascended to FL 355 Mode C in response to the TCAS RA, before descending back to its assigned level and levelling at 1435:54, as the Tornado turned to engage the Hawk.

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, air defence and ac operating authorities.

From the comprehensive reports submitted it was evident to the members that the co-ordination requested by the Neatishead WC and agreed with the LATCC N Sea CSC was breached, as a result of an erosion of standard separation by the WC. The member from HQ STC reaffirmed that the ASACS Standards Unit had taken a very serious view of this Airprox and the robust professional measures taken as a result. A civil ATC member

advised that similar corrective action was commonplace within the civil ATC sphere where, he stressed, this form of re-training was not viewed as disciplinary action or apportioning any blame. Another controller member queried if this Airprox was the result of an individual error or a more fundamental omission in the controller's training. This was not the case. On the contrary, members were advised that poor situational awareness on the part of the WC was the catalyst to this Airprox during a sortie which should have been well within his capabilities and which he was qualified to control. Without further debate the Board concluded that the cause of the Airprox was that the CRC Neatishead WC did not maintain standard separation as co-ordinated with the LATCC N Sea CSC.

With regard to risk, members agreed that although the Tornado F3 crew had not spotted the airliner, they had turned away from it following the WC's avoiding action instruction prompted by the FA. TCAS had also played its part in establishing 700 ft separation at the CPA. Coupling this with the extant horizontal separation and the sighting by the CRJ2 pilot, members concluded that no risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The CRC Neatishead WC did not ensure standard separation was maintained as co-ordinated.

Degree of Risk: C

AIRPROX REPORT No 35/00

Date/Time: 16 Mar 1554

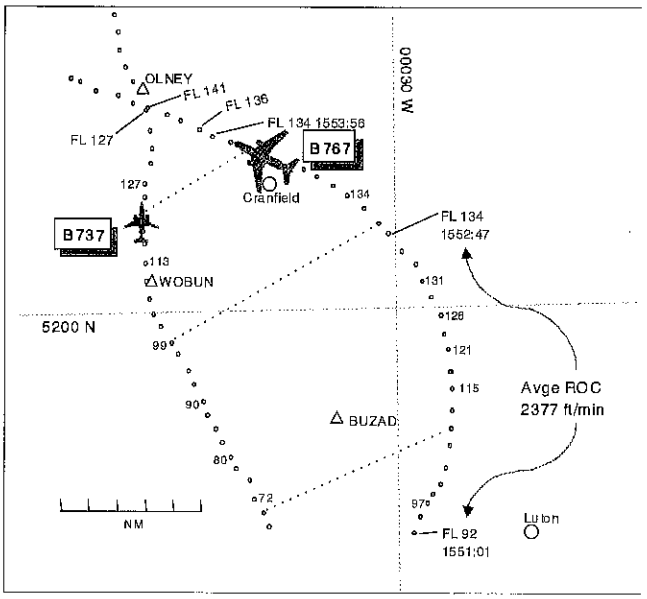
Position: 5207 N 0043 W (5 NM NW of Cranfield)

Airspace: Daventry CTA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	B737-300	B767-300
Operator:	CAT	CAT
Alt/FL:	FL 130	FL 190
Weather Visibility:	VMC CLOC 30 NM	VMC CLOC

Reported Separation: < 1000 ft

Recorded Separation: 1400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports following a heading of 020° at 280 kt in a climb. Approaching FL 130, he received a TCAS TA followed rapidly by a 'Descend' RA which he followed down to FL 122 and at the same time ATC passed an avoiding action left turn. He saw the conflicting traffic, a B767, pass directly overhead at less than 1000 ft separation. He reported the RA event to ATC and heard the other pilot do the same. He did not assess the risk of collision.

THE B767 PILOT reports on climb out, receiving a short duration TCAS RA 'Climb' at about FL 150. London Centre was advised.

UKAB Note: LATCC radar recordings show the B767 climbing as in the diagram and stopping at FL 134 which it remains exactly at for 70 seconds, resuming its climb 30 seconds before passing over the B737 at FL 141. Meanwhile the B737 stops its

climb at FL 127, 2·7 NM from the B767, just as the latter recommences its climb, and descends to pass under the B767 at FL 126/7 which it maintains until resuming its climb.

THE B767'S COMPANY CHIEF PILOT comments that he believed that the level-off observed on radar was caused by a selection of VNAV vertical mode on the autopilot/flight director mode control panel (MCP) at about FL130. This flight had been radar vectored off the assigned SID. If the crew had not revised the Flight Management Computer (FMC), waypoints which had been passed abeam during the vectoring would still form part of the FMC's flight plan route. In other words, waypoints that, in fact, lay behind the ac would remain in the active computer flight plan. These bypassed waypoints would retain any vertical constraints that had been assigned to them. Most of the LHR SIDS are capped at 5000 or 6000 ft. The restrictions are associated with waypoints, for example, 6000 ft at BPK on the BPK 5J/4K SID.

Under the above scenario, if the crew were to select VNAV mode at FL 130 while climbing, the effect would be to level the ac, since a waypoint associated with a lower altitude restriction had not yet been passed, from the FMC's perspective. This being a very rare occurrence, it would have taken the crew a short time to understand the situation and then rectify it. The crew involved filed a minimal report. When contacted some time after the incident, their recollection of the details was imperfect. Therefore, the above represents a 'best fit' explanation.

The Chief pilot also remarked that if tight vertical separation is planned, a request to climb expeditiously through the level in question should be given.

LATCC TC reports that the B767 was placed on a heading of 320° and cleared to FL 190 while the B737 to the SW of it, was turned progressively right onto 020° and cleared to FL 120. When the B767, which had been climbing steadily, showed FL 134 the B737 was cleared to FL 130; the ac were well separated and this cleared the B737 above a BUZAD departure from Stansted. While attending to a co-ordination call from the TC NW sector, he saw the STCA start to flash; it went quickly to red as his trainee gave the B737 an avoiding action turn onto 340°. The pilot replied that he was *"going through an RA manoeuvre at the moment"*. The B767 pilot was seen to be still at FL 134 and was told to expedite his climb to FL 170 which he acknowledged, adding that he had *"just had an RA on TCAS"*. The controller passed him traffic information on the B737 and issued revised headings to both ac.

ATSI comments that the RT transcript and radar recordings confirm that when the B737 was cleared to climb to FL 130, the B767 was showing a Mode C readout of FL 134. Rules for level assessment using Mode C are stated in MATS Part 1, Page 1-44. Paragraph (b) applies [1] although it does say that the ac should be "continuing in the anticipated direction". However, in view of the B767's initial ROC, ATC had no reason to believe that the flight would level off. UK AIP Page ENR 1-1-3-1 applies, whereby the pilot should have informed ATC if he was going to maintain a climb rate of less than 500 ft/min. The B767 remained at FL 134 for about 12 NM unnoticed by ATC as there were other conflictions and climb clearances being resolved.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Airline members were uncomfortable about the B767 pilot's vague report; despite receiving a TCAS report he had not taken sufficient note of the incident to be able to explain it afterwards, which left him open to a repetition. The explanation offered by his management, was one possibility, yet did not fit happily with other pilots' experiences, not least because the incident took place well beyond the end of the SIDs. However, they agreed that there were many ways to mishandle an FMC which might produce effects similar to those experienced; members said that a remark on the flight deck such as, "I wonder why it's doing that", was not uncommon. Nonetheless, it seemed strange to the pilot members that the B767 crew had not noticed the problem sooner and some members wondered if one of the pilots had been engaged in another task, e.g. obtaining oceanic clearance.

Pilot members supported strongly by controller members of the Board agreed that it was very

important in these circumstances to maintain a climb or advise if not doing so. The controller had complied with the requirements for establishing level occupancy, and with the B767 in a steady climb and 400 ft out of FL 130 he was fully justified in assigning that level to another ac. This 'flow' was relied upon all the time in the LTMA. The Board concluded that the cause of the Airprox was the un-notified level-off by the B767. It was clear to members that STCA, TCAS and the trainee controller's actions were timely in removing any risk of the ac actually colliding and that standard vertical separation had been re-established before the ac crossed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Un-notified level-off by the B767.

Degree of Risk: C

[1] An ac climbing or descending may be considered to have passed through a level when the Mode C readout indicates that the level has been passed by 400 feet or more and continuing in the required direction.

AIRPROX REPORT No 36/00

Date/Time: 24 Feb 1020

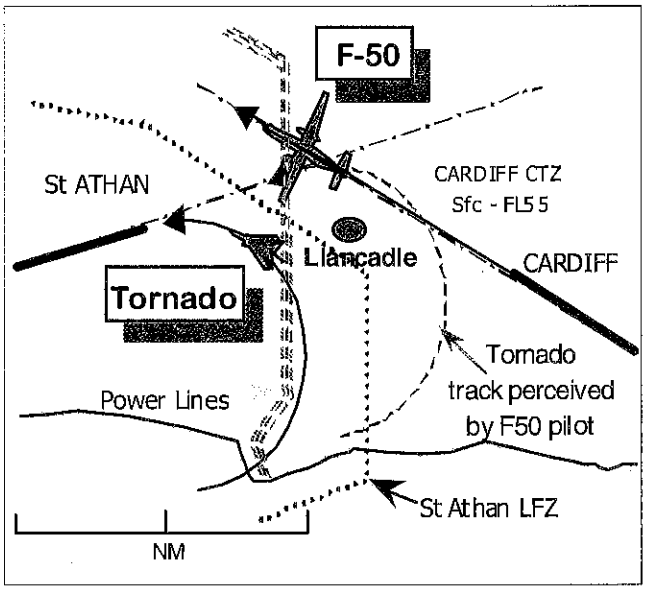
Position: 5124 N 0324 W (2 NM NW of Cardiff Apt - elev 197 ft)

Airspace: CTZ (*Class:* D)

	Reporting Aircraft	*Reported Aircraft*
Type:	F50	Tornado GR
Operator:	CAT	HQ PTC
Alt/FL:	1000 ft (QNH)	NK (QFE)
Weather Visibility:	VMC CLBC 10 km	VMC CLBC 30 km

Reported Separation: 300 ft V/800 m, 400 ft

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports heading 300° at 145 kt after take-off from RW 30 at Cardiff having been told to maintain RW heading. Passing 1000 ft QNH (800 ft agl) he received a TCAS TA and ATC warned him of military jet traffic on left downwind for RW 26 at St Athan. He saw this and decided to climb at his best rate to avoid it. It apparently took no avoiding action and passed beneath him by 300 ft as shown on TCAS and by his estimation. He considered that a take-off should not have been allowed with jet traffic downwind at St Athan. (UKAB Note: The pilot's diagram of the incident showed the Tornado's track crossing beneath his to a position on his starboard before recrossing to port towards St Athan. Because of this, and a lack of recorded radar evidence, he was asked if he had actually seen the Tornado beneath him or if he had drawn what was shown on TCAS. He confirmed that he had seen it pass beneath him.)

THE TORNADO GR PILOT reports flying a LH circuit to RW 26 at St Athan having been advised of the impending departure of the F50 from Cardiff and of a helicopter at very low level by the powerlines crossing finals. Downwind, he saw the F50 take off and started the final turn at 160 kt in the usual place, keeping the F50 in sight. The airliner was ahead of and above his R beam until he was rolling out on short final. (He also had the

helicopter in sight, passing directly over it in his turn.) He passed about 800 m from the F50 and 400 ft below it. There was no risk of collision and he was within the St Athan LFZ throughout. His diagram showed his track round finals within the LFZ which is easily picked out with the aid of the powerlines from a power station on the coast and a cement works. His diagram showed him tracking inside Llancadle village; to cross the Cardiff RW 30 centreline he would have had to fly outside it.

MIL ATC COMMENT. A period of three weeks had elapsed before the (then) HQ MATO, and hence also RAF St Athan, were made aware that an Airprox had been filed. The Tornado pilot called St Athan Tower (TWR) at 1020:22, having been prenoted to recover to RWY 26 via the reporting point Nash South. At the time, TWR was in landline communication with Cardiff Tower (ADC); the controllers had been discussing the position of a low level helicopter operating to the SE of St Athan, but at 1020:45 ADC advised *"St Athan, there's a Fokker 50 departing also off 30."* Four seconds later, having closed the landline, TWR advised the Tornado pilot *"..Fokker 50 departing runway 30"* and later informed him of the low level helicopter; the pilot acknowledged both calls. At 1023:59, the pilot elected to go around from short final; TWR immediately advised ADC of this and also that the ac would be remaining within the St Athan circuit. The remainder of the Tornado's flight was uneventful and the ac vacated the RW at 1026:52. Whilst the ac was in the circuit, an off duty controller had been describing the over-ground flight profile of the returning Tornado to some visitors in the VCR; to him, the Tornado's approach path appeared to have been perfectly normal. Despite the elapsed period between the alleged incident and the notification, the controller could quite clearly recall the flight, as it occurred immediately before an emergency incident involving another ac. RAF St Athan has no radar equipment (SRE or ATM) with which to monitor the overland track of recovering a/c.

UKAB Note: The WV given to the F50 pilot in his take-off clearance was 250/09.

ATSI reports that RAF St. Athan is located 3 NM west of Cardiff Airport within the Cardiff CTZ, which is Class D airspace. St. Athan's runway is aligned 08/26, whereas that at Cardiff is 12/30. The runways are operated independently and are not paired e.g. when Cardiff's runway in use is 30, St. Athan may use either 08 or 26. A Letter of Agreement (LOA) between Cardiff ATSU and St. Athan ATSU defines the specific co-ordination procedures to be followed by both units. The salient aspects of the LOA, relevant to this AIRPROX, are:

A Local Flying Zone (LFZ) is established within the Cardiff CTZ with a vertical limit of altitude 1700 ft QNH, full control of which is delegated to St. Athan ATC provided certain criteria apply. This includes:

> "Military pilots operating military aircraft must be able to fly under VFR within Class D controlled airspace as follows:-
>
> > Aircraft IAS in excess of 250 kt. In flight visibility 8 km, 1500 m horizontally and 1000 ft vertically clear of cloud.
> >
> > Aircraft IAS in excess of 140 ft and 250 kt or less. In flight visibility 5 km, 1500 m horizontally and 1000 ft vertically clear of cloud.
> >
> > Aircraft IAS 140 kt or less. In flight visibility 5 km, 1500 m horizontally and 1000 ft vertically clear of cloud, or, in flight visibility 5 km, clear of cloud in sight of the surface.
>
> These criteria remain pilot interpreted and not ATC interpreted. Whenever the LFZ is active St. Athan Tower will keep Cardiff Tower advised of ac types involved.
>
> Whenever the LFZ is active Cardiff Tower will advise St. Athan Tower when the Cardiff circuit is active."

Additionally, the UK Military AIP, Page AD 2-EGDX - 1 - 12, places certain conditions on ac operating in the LFZ. These include:

> "Aircraft are to be in communication with and comply with instructions from St. Athan ATC. Pilots are not to fly outside the lateral and vertical limits of the LFZ without prior permission from ATC. Pilots operating in the LFZ are responsible for maintaining their own visual separation from other aircraft, including ac on final approach to Runway 12 and departing from Runway 30 at Cardiff which are in close proximity to the LFZ. (Traffic information will be passed by ATC)."

Military ac flying in Class D airspace are exempt from the maximum speed limitation of 250 kt below FL 100. It is understood that it is not unusual for military fast-jet traffic joining the St Athan circuit to fly at speeds of around 400 kt within the LFZ.

The F50 requested start up at 1009, reporting that it had received information India. A message is broadcast on the ATIS, whenever St. Athan is active, warning pilots of its operation. The F50 taxied to the holding point RW 30 at 1014 and was passed a clearance prior to take-off to "climb straight ahead until advised to turn by radar, maintain flight level one hundred on reaching." In accordance with local procedures St. Athan ATC was warned about the imminent departure of the F50 and that unit, in turn, passed information about the presence of a Tornado in a left-hand circuit to RW 26 at St. Athan.

The F50 was cleared for take-off at 1018. No information was passed to the flight concerning the Tornado. The controller interviewed said that, although it is not a requirement to pass such information to departing flights, he would normally have done so but for his workload, which he described as moderate. However, the pilot of a helicopter on a low-level electricity power line check, was given this information on the Aerodrome frequency just after the F50 took off and before the latter flight changed frequency. The pilot of the F50 stated in his report that he was aware of the traffic at St. Athan and believed he had been warned of its presence by ATC. The controller said that he noticed the Tornado turning base-leg adjacent to the position of the F50 but he could not tell if the former had left the confines of the LFZ. The eastern extremity of the LFZ is only about 700 m from the climb-out path from RW 30. Radar recordings of the event are not available from the Cardiff Radar and it occurred below the coverage of NATS Area Radars.

The F50 pilot did not comment on either the Aerodrome or Approach frequency about the encounter.

The implications of the current LOA, with particular reference to where ac are at their closest proximity, as in the case of this Airprox, are being discussed between Cardiff and St. Athan, with a view to changes being made to the procedures in the future.

The possibility of the tracks of departing ac from RW 30 being deviated to the east of the present climb-out path, subject to noise and terrain clearance constraints, is to be explored.

HQ PTC comments that the Tornado apparently carried out his circuit within the agreed Local Flying Zone, had been made aware of the Fokker's departure and kept it (and the helicopter) in sight until such time as their paths could not possibly conflict. We do not therefore believe that this constitutes an Airprox. Clearly TCAS alerts cannot be entirely discounted in any circumstances but their part in the Airprox reporting and investigation process ought perhaps to be examined to establish some policy guidelines. As Cardiff becomes busier, an ATM/DFTI at St Athan is becoming essential if the 2 airfields are to continue to coexist efficiently without compromise to safety.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board's major difficulty in assessing this incident was the difference in the perception of the incident by the 2 pilots and the fact that it took place below the coverage of recorded radar. There was no reason to doubt the description of the event as perceived by either pilot and the Board concluded that while it was unlikely that the Tornado pilot had flown outside the LFZ, he may have been closer to the edge of it than he recollected. The position of the VCR at St Athan would not give a tangential view of the Tornado's flightpath at the critical point so less weight was given to the off-duty controller's comment. Members were advised that St Athan had not accepted that ac on finals often flew outside the LFZ, but video recordings of Cardiff radar showed that infringements did occur sometimes. Unfortunately the radar picture was not being recorded at the time of this incident.

From the ATC viewpoint, the responsibility in Class D airspace was to provide traffic information (TI) to

the IFR and VFR ac to allow the latter to remain clear of the former. The Tornado was informed through ADC and TWR, but the F50 pilot, although he seemed to have picked up the information from what was said to the helicopter pilot, was not specifically warned about the Tornado. Members discussed whether or not the lack of specific TI was part of the cause and concluded that it was not, although if the F50 pilot's attention had been drawn to the Tornado before take-off, the outcome might have been different.

All that the Board could conclude was that the tracks of the 2 ac were close enough to cause the F50 pilot concern. Members were advised that discussions were taking place between Cardiff and St Athan to find ways of ensuring that ac were not in the same place at the same time; this was welcomed, and the Board understood that DAP was looking into the problem of providing Cardiff radar data to St Athan for a DFTI.

Concerning the risk level; members agreed that the Tornado pilot had the F50 in sight until the ac were diverging in track, and both pilots were ensuring a divergence in elevation. The Board concluded that there had not been a risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The tracks of the 2 ac were close enough to cause the F50 pilot concern.

Degree of Risk: C

AIRPROX REPORT No 37/00

Date/Time: 16 Mar 1118

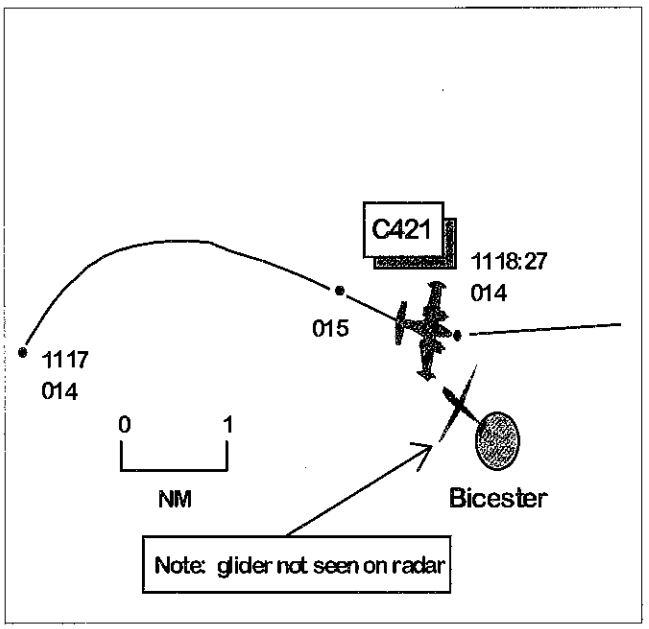
Position: 5155N 0108W (1 NM NW Bicester airfield - elev 267 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Schleicher K21 glider	C421
Operator:	Civ Club	Civ Comm
Alt/FL:	1500 ft (QFE 1026 mb)	2000 ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	>20 km	8 km

Reported Separation: zero H 150 ft V
300 m H same level

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCHLEICHER PILOT reports that whilst in the final stages of an aerotow to 1500 ft QFE (about 1727 ft altitude) from Bicester, heading 300° at 50 kt, he saw a low wing twin engined ac at his 1 o'clock less than 2 NM away tracking in the opposite direction at high speed. His student released from the tow and was decelerating to normal gliding speed when it became apparent that the other ac was on a conflicting course. He took control of the glider and dived, and the other ac passed about 150 ft above him to the R with its starboard wing overlapping his. Without his avoiding action he considered that the risk of collision would have been very high. He then watched the ac, which was tracking about 100°, as it passed between Bicester airfield and the village of Stratton Audley. It did not appear to have taken any avoiding

action. The pilot of the tug ac also saw the ac as it flew directly above him on the downwind leg of his circuit. He later found out from Benson that the ac had departed from Oxford Kidlington for Cranfield.

THE C421 PILOT reports that he was flying from Oxford to Cranfield in VMC. The visibility, 500 ft below cloud, was 8 km. He was squawking 7000 with Mode C and was in the process of changing frequencies from Oxford (125.32) to Cranfield APC (122x85). Cockpit workload was high as it was a short flight between two busy GA training airfields.

He had just turned over Upper Heyford and was setting course for Cranfield at 2000 ft (Oxford QNH) on a heading of about 080° at 180 kt when he spotted a single engined monoplane at his 11 o'clock about 2 NM away, crossing slowly from L to R. Almost immediately it banked sharply R towards the N and rapidly descended out of sight – he later assumed that this was the tug ac which had just released the glider. His co-pilot then spotted the glider at their 12 o'clock range 1 NM crossing very slowly from R to L on a westerly heading at a similar level. He immediately turned R in avoidance, as required by the Rules of the Air, with 20° AOB. About 3 sec later the glider turned L towards him, thus putting the ac back into confliction, and when about 400 m away dived steeply and disappeared out of sight; he estimated minimum separation as 300 m at the same level and thought there had been only a moderate risk of collision. After turning L to resume navigation for Cranfield he remarked to his colleague that he thought the other pilot must have spotted him very late, which would have accounted for his violent evasive action.

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

UKAB Note (2): A video recording of the LATCC Clee Hill radar shows the C421 in a R turn towards E about 4x5 NM W of Bicester. The ac steadies on a track of about 100° and maintains 1400 – 1500 ft Mode C (1700 – 1800 ft altitude). At 1118:27 the ac is about 1 NM NW of Bicester airfield and turns L about 10° to pass N of it a few sec later. An intermittent primary return, which could be the glider, is seen in the reported Airprox vicinity at this time. However, the incident 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 and a radar video recording.

Noting the considerable inconsistencies between the separation distances estimated by the pilots, members wondered whether the C421 pilot had seen a different glider (see UKAB note). A GA member pointed out that the Airprox occurred in one of the busiest GA transit areas of the UK where careful planning is needed to avoid known hazards. Pilots are advised to give sites with gliding or parachuting activity as wide a berth as possible. That said, deciding what constitutes a reasonable distance is a matter of airmanship and individual judgement because both activities can take place at considerable ranges and levels from their origins. In this case, however, some members thought that the C421's route did not make adequate allowance for Bicester and, if the pilot did spot the glider in question, his sighting was late. Moreover, they thought it likely that in the circumstances he could have over-estimated the miss distance. The glider pilot was adamant, on UKAB questioning, that the C421 had passed almost directly overhead without appearing to see him and he was convinced that only his late avoiding action had averted a collision. A majority of members felt that the glider pilot's account was likely to be the more accurate and on that basis it was concluded that the safety of both ac had been compromised.

UKAB Note: In a telephone conversation with the glider pilot following the Board meeting, it emerged that a second glider was airborne at the time which landed at about 1122. This timing would place the ac in a circuit joining position in the area of the Airprox; however, its pilot did not see the C421. The reporting glider pilot went on to say that at no time during the encounter did he make any L turns and, from his recollection, the other ac turned L rather than R. Both of these points run counter to the description given by the C421 pilot, but the glider pilot remained adamant that the C421 had passed over him with wings overlapping and that the vertical separation achieved was purely as a result of his

late dive. This account supports an assumption that the C421 pilot probably saw the second glider and not the one involved in the Airprox.

The reporting glider pilot had been watching the C421 for some 2 NM and, despite his late avoiding action and limited speed, was able, just, to ensure separation. However, the assumed non-sighting by the C421 pilot added further to the Board's conclusion that safety had been compromised in this incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Probable non-sighting by the C421 pilot.

Degree of Risk: B

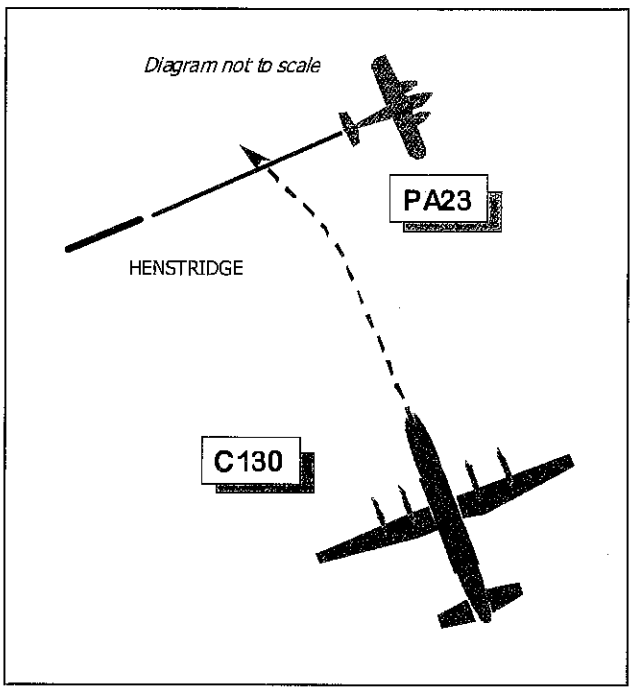
AIRPROX REPORT No 38/00

Date/Time: 20 Mar 1450

Position: 5059N 0219W (1·5 NM E of Henstridge – elev 184 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	PA23-160	C130
Operator:	Civ Pte	HQ STC
Alt/FL:	200 ft aal	500 ft (Rad Alt)
Weather Visibility:	VMC CLBC 8 km	VMC NIL CLOUD 6 km Haze
Reported Separation:	0·2 NM H/100 ft V	1 NM H/250 ft V
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA23 PILOT reports he was climbing through 200 ft aal cleaning up after take-off as he departed Henstridge RW07 at 90 kt. At the mid point of the RW a C130 was spotted in level flight at 2 o'clock – 0·5 NM on a constant bearing, which appeared to have made a L turn towards the airfield. Avoiding action was immediately taken; at that height and speed his only choice was to descend towards rising ground as the C130 passed about 0·2 NM astern and 100 ft above the PA23. His attention was drawn to the C130 by his passenger who saw it just after lift off, otherwise there would have been a high risk of collision. He reported sighting the other ac to the Henstridge A/G Stn operator who also saw the encounter. He opines that he has *"no problem"* with military ac low flying provided they remain clear of aerodromes.

THE C130 PILOT reports flying a low level training sortie at 500 ft rad alt and squawking 3/A 7001 with Mode C. The ac colour scheme was standard camouflage grey/green. The route was planned to pass 1·5 miles to the east of Henstridge, a well-known see and avoid aerodrome. Approaching 1·5 miles east abeam the aerodrome along their planned track heading 340° at 210 kt, a civilian ac

was observed at a range of approximately 2 NM, slightly L of the nose and below. To ensure safe separation he elected to turn 20° L and passed about 1 NM behind and 250 ft above the civilian ac, which

was in sight at all times and whose pilot gave no indication that he was aware of their presence. There was never any risk of a collision.

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

UKAB Note (2): Henstridge Marsh is listed in the UK Mil AIP at Vol 3 Part 1–2-2-5 as an active but unlicensed aerodrome. No mandatory avoidance criteria are specified and there is no ATZ.

THE HENSTRIDGE A/G STN OPERATOR reports that the PA23 was seen to descend shortly after take-off, whereupon its pilot reported a large fast moving ac heading N. The C130 was seen 6 – 10 sec later crossing the extended centre line at about 400 ft aal 0·5 NM E of the aerodrome from S to N.

HQ STC comments that this incident occurred on a routine low-level training sortie, correctly planned, with an appropriate low level booking. After sighting the civilian ac at a range of 2 NM, the C130 captain manoeuvred his ac safely and expeditiously to ensure safe separation. Henstridge March is well known to RAF Lyneham crews who plan their routes to avoid over-flying the RW and to minimise disruption to circuit traffic.

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 ATC and operating authorities.

The HQ STC member reaffirmed that RAF Lyneham crews are aware of Henstridge and although no mandatory avoidance criteria are specified when operating within the LFS, crews do take care to avoid it. Indeed the UKAB database reveals but two Airprox in this vicinity over the last 5 years, though coincidentally they did occur within three weeks of each other. The C130's track was deliberately planned to take the ac clear to the E but the pre-meditated avoidance was not enough. Members pointed out that passing 1·5 NM E of the aerodrome, at 500 ft Rad Alt, would place the C130 at about the same height as an ac on climb-out from the easterly RW, as illustrated by this Airprox. Therefore planning a track this close to an active aerodrome, albeit small and unlicensed, was probably unwise and a 2 - 2·5 NM offset, the more usual avoidance criteria in the UKLFS would have been a better option for the reason already mentioned. The comments by the PA23 pilot about calling on the A/G frequency appeared well founded especially in a multi-crew ac and could only enhance flight safety. The members concluded, therefore, that the C130 crew had flown close enough to the PA23 to cause its pilot concern and this was the cause of the Airprox. That said both pilots were visual with one another in sufficient time to take avoiding action and the Board concluded, therefore, that there had not been a risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C130 crew flew close enough to the PA23 to cause its pilot concern.

Degree of Risk: C

AIRPROX REPORT No 39/00

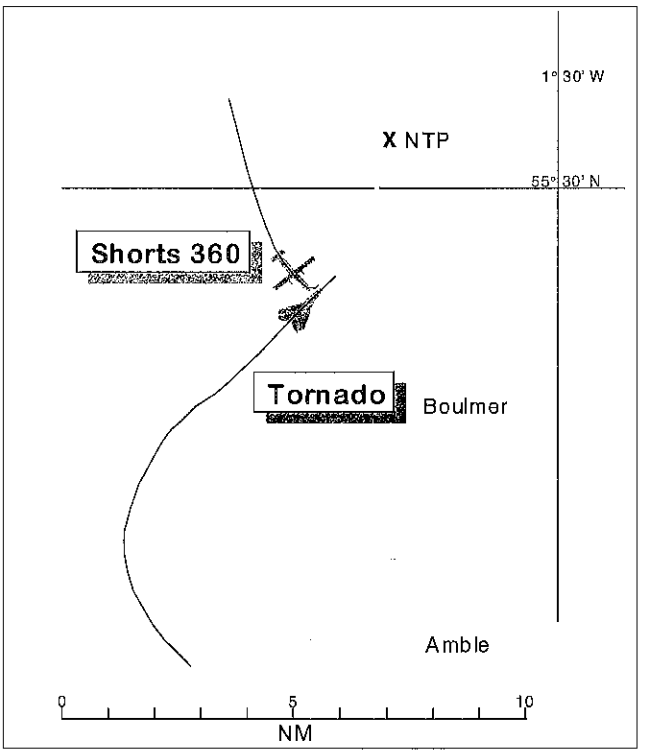
Date/Time: 20 Mar 1846 TWILIGHT
Position: 5527 N 0139 W (4 NM SW of NTP)
Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Shorts 360	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL 50	5000 ft (RPS)
Weather	IMC CLBL	VMC CLOC
Visibility:	1 km	8 km

Reporting Separation: 50 m/NK

Recorded Separation: 0.3 NM, Nil V

BOTH PILOTS FILED



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHORTS 360 PILOT reports receiving a RAS from Newcastle on 124·375 while descending inbound. He had been cleared to FL 50 and after levelling, heading 170° at 180 kt, he was advised of military contacts about 10 NM W of his position with advisory avoiding action onto 100°, which he followed. He was in IMC with 1 km visibility. ATC then advised that the contacts were turning towards him and climbing. A further, 'avoiding action' turn was given onto 090°. As this turn was completed his F/O saw a grey Tornado in his 1 o'clock at the same level, crossing R to L. It crossed their 12 o'clock 50 m away and almost immediately a severe jolt was felt as they crossed its wake. He saw it departing at the same level in his 9 o'clock. TCAS was not fitted to his ac. Navigation, anti-collision and strobe lights were all on.

THE AAIB investigated the incident and reported that the Tornado formation were tasked to participate in a medium scale Tactical Leadership Training night exercise, TLT 1/00. This exercise involved up to 32 fast jets including the flight of four Tornado F3s. Also taking part were an AEW E3D ac, Air-to air refuelling tankers and Falcon EW ac. The scale of the exercise was such that it was notified as an unusual aerial activity via an Airspace Co-ordination Notice (ACN), whose distribution included the ATC managers of Aberdeen and Newcastle, and a NOTAM. The NOTAM provided information that, within the notified area, high-energy manoeuvres would be carried out by fast jet ac, some in large formation packages, and that some ac would be unable to comply with the Rules of the Air. The ACN explained that some participating crews would operate with night vision goggles, some ac might not show standard lighting and that some communications and radar jamming should be expected. The NOTAM stated that all exercise ac would remain clear of regulated airspace unless under the control of the appropriate controlling authority.

The Tornado formation leader experienced a problem during start up and the Nos 2,3 and 4 took off and flew towards Spadeadam to the S before turning E and passing 20-30 NM N of Newcastle towards their AARA over the N Sea. During this period the AEW crew were preparing their equipment for an on-station declaration; while the mission systems came on line for assessment, the Tactical director authorised communication with external agencies but reminded the crew that external agencies and ac were to be told that the ac was not yet on station.

At 1824:04 the Tornado formation contacted the AEW weapons controller (WC). Their call was

acknowledged by the WC who informed them that the ac was not on station and that the E3D's radar was not available. At 1825:32 the formation re-established contact with the WC on the primary exercise frequency. The controller had no radar display and the E3D was not yet 'on station' thus no form of radar service was offered by the WC or requested by the F3 formation. Radar data first became available to the E3D crew at 1843:30, some 7 minutes before the required on-station time.

As the formation turned onto a NE heading to pass between D512 and Newcastle, the No 4 turned away briefly to simulate an attack on another ac. After disengagement this manoeuvre put him about 10 NM behind the rest of the formation. After disengaging from a further target the No 3 crew returned to track 070° at 450 kt towards the AARA. At this time it was twilight with an in-flight visibility of 8 km with some thin small patches of layered cloud 1 NM distant. The No 3 navigator then noticed on his radar a contact which was 50° to 55° left of the nose at the same level at very short range. He warned the pilot to look out to the left. A very short time later the navigator saw a red light and looked to the left '8 o'clock' position to see a small civilian ac very close and slightly below. The pilot did not see the ac until it was in his right '4 o'clock' position. He transmitted that a civilian ac had passed his 6 o'clock position with an estimated clearance of 100 ft vertically and 300 ft horizontally. He asked the WC if he had seen anything. The WC checked his radar display and could see the aforementioned traffic in close proximity to the F3. He reminded the formation however that the E3D was not yet 'on station'. At 1850:14 the controller announced that the AEW was now on station and provided the Tornado formation with a FIS. Recorded RT information showed that in the 1 minute 44 second period before the call about the near miss from No 3, the WC made 2 transmissions to the formation containing radar derived tactical information. These calls related to a low-level fast moving contact being reported by No 3 and not to the conflicting civilian ac. The transmissions by the WC, before the 'on station' declaration and prior to the formal imposition of any form of service, were made with reference to SSR information that had just become available but were contrary to normal procedure and the standard instructions issued to the mission crew by the TD.

Meanwhile, as the SD3-60 crew approached FL 50 the controller had transmitted "*Maintain for the moment there's military contacts. You may see out in your half past two and half past three a range of ten to fifteen miles military contacts manoeuvring various levels. First one is indicating flight level four six on a northerly track I'll keep you advised*". The crew replied that they were maintaining FL 50 and were in IMC. At 1846 the controller transmitted "*If you turn left onto a heading of 100° for a short time just to keep you clear of that traffic*". The crew confirmed that they were turning left whereupon the controller transmitted that the previously mentioned traffic was in their half past two position at FL 47 turning onto an easterly heading. The Newcastle controller then transmitted "*further left heading 090 avoiding action that traffic just passing now in your half past two range of a mile and a half*". The SD3-60 pilot acknowledged the instruction "*Understood thanks onto 090 c/s, oh* (expletive) *and er c/s airmiss*". The controller confirmed that the Tornado had passed and instructed the SD3-60 pilot to continue on his present heading, as there was further traffic five miles in trail. As the conflicting traffic passed clear the SD3-60 was given a heading for the airfield and cleared for further descent. The ac landed without further incident.

ATSI comments that the Newcastle APR identified the Shorts 360 and placed it under a RAS. He observed what was to be the Airprox Tornado in good time and provided traffic information on it even though, at that stage, it had taken up a northerly track which would take it 6-7 NM down the Short 360's starboard side. As a precaution, the APR instructed the crew of the Short 360 to turn left 70°, onto heading 100°, attempting to provide additional lateral separation. The Tornado, with its Mode C indicating FL 47, then turned directly towards the Shorts 360 which was maintaining FL 50. The APR updated the traffic information prior to issuing an 'avoiding action' instruction to continue the left turn onto heading 090°. He then issued a further update on the position of the Tornado. Unfortunately, when lateral separation had reduced to about 1 NM, the Tornado commenced a gentle 500 ft climb so that, as the radar returns of the two aircraft merged, their Mode C readouts both indicated FL 49.

UKAB Note: A replay of the Gt Dun Fell ATC radar recording shows the incident as described by the pilots. The SD3-60 is tracking 165° towards a base

leg position for RW 25 at Newcastle and the Tornado is initially on a parallel, opposing track displaced some 5 NM to the WSW. When the ac are some 10 NM apart the Tornado begins a wide right turn onto a track of 043° to close on the SD3-60 which has levelled at FL 50 Mode C. The Tornado which had been at FL 47 began a shallow climb while the SD3-60 lost some height during its avoiding action turn. The Mode C readings just before they cross are: SD-360: FL 49, Tornado: FL 48, and just after the cross: SD-360: FL 49, Tornado: FL 49. The final crossing angle is about 45° and the distance is too small to measure on the radar recording.

Given the limited information available to him preceding the Airprox, it is assessed that the APR's handling of the situation was both reasonable and timely. Clearly, his actions would almost certainly have been different, had he been aware of the Tornado's intentions. In encounters such as this, between aircraft at opposite ends of the performance scale, it is extremely difficult for ATC to resolve the conflict satisfactorily when only the low performance aircraft is under positive control and, despite the controller's best efforts, it is all too easy actually to make the situation worse. While operating close to Newcastle at such levels, it would be prudent for military aircraft to give Newcastle ATC a call, especially if not in receipt of a radar service from another agency.

AAIB added that the RAF investigation of this AIRPROX suggested that the transmissions by the WC concerning tactical information made prior to the 'on station' declaration may have misled the Tornado crew into believing that they were actually receiving a radar service. However, the form of service under which they operated once the AEW ac was 'on station' was a FIS, a non-radar service under which the ac captain is responsible for maintaining safe separation from other ac. This is standard practice under circumstances where radar and communications jamming is forecast, as for this exercise, and is reflected in documentation relating to the 'Procedures for Early Warning Aircraft within UK FIRs in peacetime' and 'Group Air Staff Orders'. Furthermore, JSP 318A states that the act of identifying an ac does not imply that a radar service is being provided and that a pilot must not assume that a radar service is being provided until the controller makes a positive statement to that effect. In this incident the WC neither positively identified the Tornados nor placed them under any form of service until some minutes after the Airprox had occurred. Despite the potentially misleading RT at the time of the Airprox, the Tornado was not receiving any form of radar service.

The AAIB made the following observations: (a) The separation minima specified under a RAS cannot always be achieved when fast ac not under service make unpredictable manoeuvres. (b) There are a number of regional airports around the UK which are not connected to the airways system. (c) There have been 87 air transport/military Airprox reported in class F & G airspace in the last 10 years E of the main airways structure in the UK. (d) The SD3-60 needed to penetrate the NOTAMed area to reach Newcastle.

The AAIB has recommended (a) that the CAA should, by risk assessment, quantify the risk of mid air collisions between scheduled public transport ac operating in Class F & G airspace with other users of that airspace, and (b) that the CAA and DAP should assess the adequacy of the provision of regulated airspace for scheduled air transport operations to regional airports not linked to airways or ADRs.

HQ STC comments that the AAIB report outlines all the salient features that led to this encounter but in essence, the fundamental flaw was the misunderstanding by the Tornado crew of the service they were receiving from the E3D. Following a transmission of accurate tactical information regarding inbound target ac, the Tornado crew assumed that they would be given information on all ac likely to become a factor in their mission, including stranger warnings, as would normally be the case during an Air Defence sortie. However, as the AAIB has quite rightly highlighted, the Tornado had not been identified nor had it been placed under any form of radar service. Consequently, the crew were incorrect to assume that the E3D were obliged to provide any relevant traffic information since responsibility for separation remained their own.

All appropriate measures had been taken to alert other airspace users to the TLT exercise and all missions had been thoroughly planned and co-ordinated. There is little to suggest that any of the procedures associated with the planning of the exercise, or the conduct of military FJ ops in

general, are inherently unsafe; however, the incident serves as a poignant reminder to all aircrew of the need to establish beyond all doubt what radar service is being provided and to understand the level of 'protection' which such a service affords.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board discussed the incident at length, considering many aspects. The principal means of ensuring safety from collision in Class G airspace are by seeing and avoiding other traffic and, particularly in IMC, by utilising radar services. The SD360 pilot was using a RAS and had declared he was IMC. Members noted the difference in the pilots' opinions on the conditions and accepted that the SD360 was IMC at least to the extent that he was unable to see the Tornado when advised about it, and may well have been in a cloud layer. The Tornado crew had described their weather conditions as VMC. It was agreed that it may indeed have been VMC where the Tornado started its turn, but it did not appear to have been VMC in the direction of the SD360's approach; otherwise, with all its lights showing in the darkening conditions, members reasoned that it should have been clearly visible to the Tornado crew as they turned across its path.

While it was not against regulations for military ac to fly in IMC without a radar service, this was not normally done. Members accepted that since the Tornado crew had, erroneously, gained the impression that they would be warned about strangers by the E3D, this could have caused them to pay less attention to lookout, or be less critical about whether or not they were VMC in the sense of being able to see approaching traffic from far enough away to be able to avoid it, rather than having a horizon and being able to see where they were going. Nonetheless the crew should not have assumed they were receiving a radar service, should have been looking for conflicting traffic, and in the absence of a radar service should have ensured they remained far enough from cloud at least to have been able to see and avoid other traffic emerging from it.

Turning to the part played by the Newcastle controller, the Board agreed that he had acted correctly and done his best to avoid the incident; the possibility of him offering avoiding action in the vertical plane had not been discussed in the investigation, but members agreed that the SD360's ability in this respect, against any sudden change of level by the Tornado, was minimal.

The Board enquired about the Tornado's radar mode and why it had not disclosed the approaching SD360. Members were advised that the crew had just finished intercepting a low level contact during which the radar would have been looking exclusively at it and was not in a wider search mode for other ac. During the turn away, the navigator would have been in the process of resetting the radar into a search mode, which itself would have been limited to an arc either side of the nose, and it was at that point that the navigator found the SD360, right at the edge of his scan, but too late to avoid the Airprox.

The Board concluded that the cause of the Airprox was that the Tornado crew had turned into confliction with the SD360, which was IMC, and which they did not see, and that there had been a real risk of collision in the incident. If they had believed they were VMC, they had a duty to see and avoid such traffic.

The Board went on to discuss what more could be done to avoid such incidents in the future. The most obvious point was that the SD360 in the Airprox had no TCAS. The Chairman advised the Board that another Airprox (152/00), which they would review at a later date, contained almost exactly the same ingredients (a DHC-8 descending into Newcastle which was not seen by the crew of a passing Tornado not under a radar service) but which had a very different outcome because of TCAS in the CAT ac. The Chairman advised that he would bring these 2 incidents to the attention of the department regulating the introduction of TCAS to see if they wished to consider any change to their priorities, although it was understood that a limiting factor was the rate of manufacture of TCAS equipment.

Members discussed the ACN/NOTAM aspects of the incident. It was agreed that it would have been

impracticable for the SD360 operator to have avoided the NOTAMed area geographically. As it was, this incident had occurred some 14 minutes before the NOTAM's period of validity (1900-2130); the SD 360 was on the ground a minute before the NOTAM came into effect. It was not known if this timing was planned as a result of the operator's safety assessment of the dangers of penetrating the NOTAMed area, or merely fortuitous, but it indicated that the TLT exercise in itself was not a factor in this Airprox. Members suggested that if the Tornados were airborne so far in advance of their task, and before the E3D was ready for them, they could and should have contacted Newcastle either for an ATS or at least to find out about traffic likely to affect them, as they would have done on a sortie not involving an E3D.

It was apparent from the ACN that the needs of GAT in the upper airspace had been taken into account, but members asked the Chairman to ascertain whether, in the consultation leading up to the ACN, the commercial operators using Newcastle had been consulted, or arrangements made to enable them to approach and depart safely. Other members pointed out that this was not simply a problem of arranging an ACN, but a permanent one affecting all UK airports which were not connected to the airways system. It was pointed out that changes to the airspace around Newcastle meant that it was now impossible for an unpressurised airliner to get within 35 NM of Newcastle in an airway.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado crew turned into confliction with the SD360, which was IMC, and which they did not see.

Degree of Risk: A

Observations:

a. The UKAB agreed with the AAIB's first two observations and had articulated the same statements in a number of UKAB reports involving CAT.

b. At the time of the incident in question, the NOTAM was not active.

Recommendation: That the MOD should consider including a 'Minimum risk corridor/s' for non-exercise traffic, including CAT, as a standard part of the planning process for major exercises.

AIRPROX REPORT No 40/00

Date/Time: 20 Mar 1100

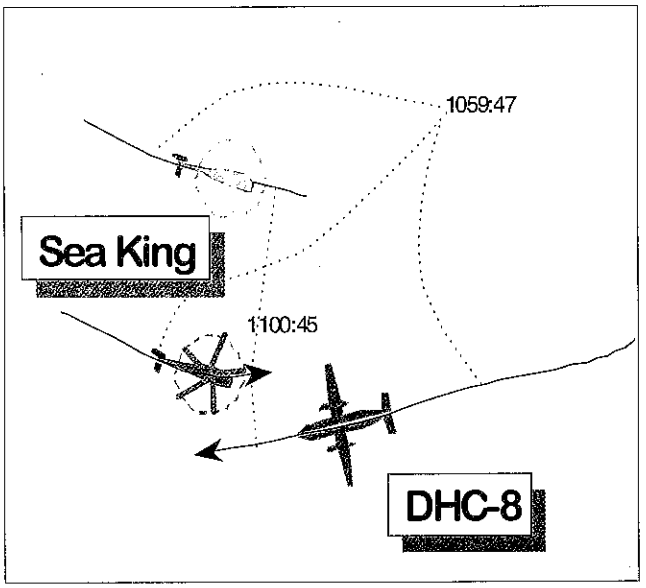
Position: 5022 N 0442 W (12 NM ESE of St Mawgan - elev 390 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	DHC-8	Sea King
Operator:	CAT	HQ STC
Alt/FL:	2900 ft (QNH 1031 mb)	2500 ft (QFE 1018 mb)
Weather Visibility:	IMC CLAC 5 km+	IMC CLAC 30 km

Reported Separation: 1.5 NM/2 NM

Recorded Separation: 0.95 NM, 100 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT reports heading 270° at 180 kt while self positioning for an ILS approach to RW 31 at St Mawgan; he had been cleared by the Director on 125·55 to descend to 2400 ft QNH. While passing through 3000 ft – technically IMC on top of Strato-cumulus cloud (though quite good visibility – 5K or more) the TCAS gave a "Traffic" warning. Traffic showed at 12:30, 400 ft below, range approx 2 NM. He told the F/O (handling pilot) to stop at 2900 ft which was actioned by disconnecting the auto pilot and pressing "ALT HOLD". Several things then happened together; ATC gave a 10° heading change onto 260° as the TCAS gave a 'descend descend' call (about 1500 ft/min) and he observed the traffic at 12:30 slightly below. To descend immediately would have meant going IMC and the TCAS still showed traffic 200 ft below. The TCAS then gave 'climb climb' but as the traffic – a Sea King helicopter – was clear on his Starboard side, the TCAS was ignored. The helicopter passed about 0.5 NM down their starboard side at the same level with a second SAR helicopter slightly higher about 1.5 to 2 NM from them on a similar heading to the conflicting helicopter. ATC then advised him that traffic was at 2500 ft which he queried to be told it was 2500 ft QFE. He advised ATC of the TCAS RA and that a report would be submitted.

THE SEA KING PILOT reports heading 150° at 90 kt under a RIS from St Mawgan Approach on 126·5 while following radar vectors for an instrument approach. He first saw the DHC-8 at about 5 NM in his 11 o'clock, heading about 300°. There appeared to be some confusion on RT between its pilot and ATC about pressure settings or altitudes and it was clear at that point that it would pass closer than he would normally have expected. However, there was no danger of a collision and he told the controller he was visual with the DHC-8 when it was about 4 NM away. It passed about 2 NM ahead at a similar level and he kept it in sight throughout.

Ops Spt (ATC) reports that the Sea King pilot was receiving a RIS from St Mawgan Approach (APP) on 126.5 whilst being vectored for an ILS approach to RW 31 at St Mawgan (the runway in use at the time was 13R, but ILS is only available to RW 31). A second Sea King was also being vectored for an ILS on the same frequency, but was behind the subject ac; both helicopters were heading 110°. Traffic levels were low, therefore the Director (DIR) position was not manned; APP however, was monitoring DIR's UHF and VHF frequencies. At 1055:30, the DHC-8 pilot freecalled on 125.55 (DIR VHF) and advised that he was level at FL 40 and proceeding direct to 7 NM final. All further transmissions from APP were made on both VHF frequencies. Having received the latest weather information, the DHC-8 pilot requested to use RW 31, which was approved as the 2 helicopters were already in the same pattern. Following identification, the DHC-8 pilot requested a RIS, which was applied. At 1057:38, the DHC-8 pilot was instructed to set QNH 1031 mb and recleared to an altitude of 2400 ft (equivalent to 2010 ft AAL). About 1 min later, the Sea King pilot was instructed to set QFE 1018 mb and recleared to 2500 ft. The DHC-8 pilot was turned L onto 260° for positioning as No.1 and requested to advise Localiser Established, following which, the helicopters were advised that they were Nos 2 and 3 in the pattern. At 1100:00, after turning the Sea King L onto 100°, APP requested the level of the DHC-8, and quickly requested the Sea King pilot to confirm level at 2500 ft. The DHC-8 pilot reported passing 3200 ft, whilst the Sea king pilot responded *"..now level two thousand five hundred, steady one zero zero and visual with the* (company name) *traffic."* APP then transmitted *"(DHC-8 c/s) traffic right two o'clock, four miles eastbound, a Sea King at two thousand five hundred feet QFE"* to which the DHC-8 pilot replied *"Understood, we'll hold three thousand c/s."* APP saw the DHC-8 mode C level off at a similar indication to that of the Sea King, but said nothing more as it could be seen that their respective tracks would pass with an estimated 1.5 NM horizontal separation. At 1100:55, the DHC-8 pilot transmitted *"..the chopper's actually the same altitude as us. We actually had a TCAS warning telling us to climb or descend but we have him visual"* then adding, *"Yes he wasn't at two thousand five hundred feet...we levelled off at two nine and he was the same height."* APP then informed the DHC-8 pilot *"I said he was at two thousand five hundred on QFE"* to which the pilot replied *"Ah, slightly different."* The DHC-8 pilot continued his approach, advising that he would have to make a report because of the TCAS warning. Later that afternoon, the ATC Supervisor received a Fax message outlining details of an Airprox report in connection with the TCAS

RA; this was rather surprising, as neither pilot appeared to express any concern at the time of the incident.

The LATCC Burrington radar recording shows the Sea King, squawking 0442, tracking 115°, then about 105° in response to APP's vectoring, and level at an indicated 2400 ft Mode C. The DHC-8 is seen squawking 0460 and tracking 260° whilst in a steady descent at a rate of about 100 ft per radar sweep; the DHC-8's groundspeed is a little over twice that of the Sea King. At 1100:11, about the time of APP's traffic information (TI) call to the DHC-8 pilot, the DHC-8 is passing an indicated 2500 ft Mode C, with the Sea king in its 1 o'clock, range 3 NM and 100 ft below. The DHC-8's level indication then alternates between 024 and 025 each sweep, as the ac passes through the helicopter's 12 o'clock from R to L at a range of 1.5 NM. The closest point of approach seen on radar occurs at 1100:45, with the ac split N-S by 1 NM and the helicopter in the DHC-8's 4 o'clock and passing behind.

There was never any risk of collision between the two a/c; nevertheless, this occurrence clearly highlights the potential pitfalls associated with the mixed use of altimeter pressure settings in the same airspace. In Jan 2000, the DHC8's company made a request to St Mawgan ATC that their a/c make QNH approaches to St Mawgan/Newquay; it is believed that this request was triggered by an instruction from the CAA requiring Commercial Air Transport a/c to use QNH rather than QFE as a pressure datum. Since then, ATC staff had accommodated the request and QNH approaches for this company had been accepted as the norm. With an aerodrome elevation of 390 ft however, St Mawgan controllers are acutely aware of the large vertical differences involved and plan accordingly, as happened in this case.

The pilots of both ac were in receipt of RIS, as requested. Under the conditions laid down for this service, the controller is not required actively to separate ac (this remains the responsibility of the pilot), but radar vectors may be provided for tactical planning (ie. sequencing). APP's plan actually provided for horizontal separation (although less than the 2 NM that the controller had originally intended) and almost 500 ft vertical separation, had the DHC-8 actually descended to 2400 ft QNH as requested. In his report, the DHC-8 pilot states that he was "technically IMC"; had a RAS been requested, more positive steps would have been taken to ensure that the ac were appropriately separated.

The traffic information (TI) passed to the DHC-8 pilot was technically and factually correct in that he was told that the Sea King was at 2500 ft QFE. Subsequent events, however, prove that the pilot misunderstood what was said to him, although (with the benefit of hindsight) there had also been a number of pointers in other transmissions beforehand. This HQ is making continued efforts to publicise the importance of painting the full, but relevant, picture when passing TI to pilots, if necessary going beyond providing the absolute minimum TI as laid down in the definitions. This is particularly so under RIS, where the pilot may be basing his subsequent actions solely on the information provided. In this case, APP had just been told (on the other frequency) by the Sea King pilot that he had the DHC-8 in sight; the simple addition of this fact, in the TI to the DHC-8 (eg. *"...and visual with you"*), may have been sufficient to satisfy the DHC-8 pilot that the continued descent was safely achievable. Similarly, having heard the pilot react to the TI by *"holding"* at the same level as the traffic that had just been pointed out, a rather surprising reaction, it would have been prudent to have gone straight back to the pilot to reinforce the fact that both ac were now co-altitude. As a final point, this incident also highlights the need for considering/passing added information to pilots, when controlling potentially conflicting traffic on different frequencies.

Having visually acquired the DHC-8 himself, the Sea King pilot was clearly aware of the traffic situation. Similarly, despite the ac ending up at the same level, having formulated a reasonable plan for the radar services being provided and in the knowledge that the Sea King pilot was visual, APP could see that there was no risk of their tracks merging.

HQ STC comments that Ops Spt (ATC) has identified all the salient features which led to this Airprox and, clearly, sufficient information was made available to the DCH-8 pilot for him to establish an adequate air picture. It is evident from the reports of all those involved that there was no actual risk of collision.

UKAB Note: The CAA FOI view is that the civil air transport aircraft world-wide standard pressure setting datum for approach and landing is QNH. Operating two pressure settings, one during the approach and another for landing, is not approved. The additional flight deck workload, and the inherent risk for confusion and mix-ups can result in the wrong value being set with potentially catastrophic consequences. For JAR Ops approved airlines, the use of QNH as a landing datum is a mandatory requirement. RAF policy is to use QFE for approach and landing; QNH may be accommodated when traffic conditions permit, but it is standard practice to avoid the mixed use of QFE and QNH. When traffic patterns are busy therefore, all ac will be placed on QFE. Pilots using QNH should remain alert to the altimeter setting included in any traffic information passed to them.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was advised that the issue of whether or not the DHC-8 company should use QNH or QFE at St Mawgan was still under discussion; members were confident that a sensible compromise between the opposed positions would be found. However, it was disappointing to see that the DHC-8 pilot appeared not to be as alert to the use of QFE at St Mawgan for military traffic and members queried whether the company route brief for sectors to and from St Mawgan contained information on this point. The RT transcript showed that the pilot was told that the Sea King was on QFE when first advised about it but appeared from his own report not to have taken the pressure setting on board until further discussion after the incident. The Board considered that the cause of the incident was that the DHC-8 pilot had levelled off because he had not absorbed the significance of the altimeter settings included in the ATC transmissions. Controller members of the Board also considered that a factor in the cause was that APP did not immediately correct the pilot's misapprehension. The controller's reasons for not doing so (the pilot was under a RIS and could take what action he wished, the Sea King pilot had the ac in sight, APP could see there was lateral separation) were accepted but members felt that if the controller had corrected the DHC-8 pilot at that point the Airprox might not have been filed.

Members also pointed out that while APP was vectoring the ac expeditiously, he was also unwittingly putting them into positions where TCAS would activate. It was suggested that controllers should bear this in mind when vectoring TCAS-equipped ac.

Members also noted that, while in clear air above cloud, the DHC-8 was technically IMC. If this had been declared to the controller, it was probable that a RAS would have been offered, the outcome of which in terms of separation applied would have been quite different.

The Board agreed that since both pilots had the other ac in sight in good time, there was no risk of them actually colliding.

Members also observed that it might be advisable for all ATSUs to highlight the fact when more than one altimeter setting was being used by ac under service. The Director undertook to pursue this aspect further with the CAA and MOD.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DHC-8 pilot did not fully absorb the significance of the 2 altimeter settings being used when he levelled off and this was uncorrected by ATC.

Degree of Risk: C

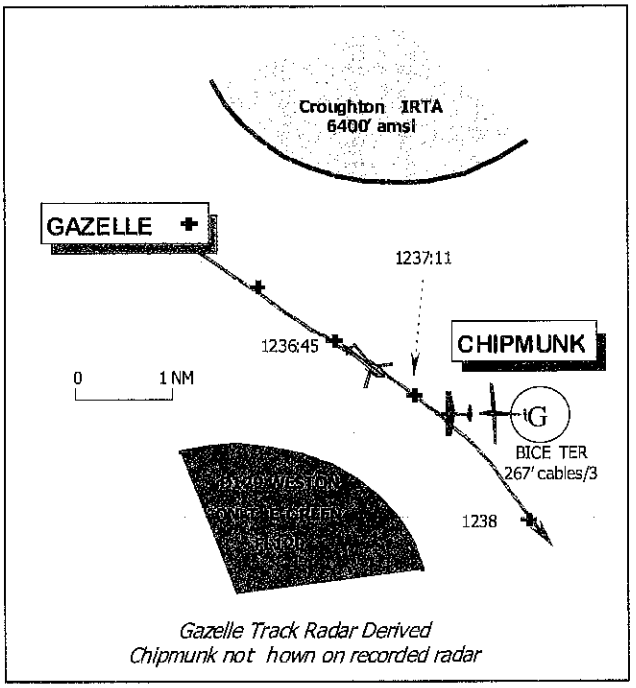
AIRPROX REPORT No 41/00

Date/Time: 7 Mar 1237

Position: 5154 N 0109 W (1 NM W of Bicester Glider Site - elev 267 ft)

Airspace: FIR/AAA (*Class*: G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Chipmunk/Glider	Gazelle
Operator:	Civ Club	JHC
Alt/FL:	1100 ft (QFE 1012 mb)	1500 ft (QNH 1018 mb)
Weather Visibility:	VMC CLBC >25 km	VMC CLBC 7 km
Reported Separation:	100 ft V nil H	300 ft V & 500 m H
Recorded Separation:	Not Recorded	



Gazelle Track Radar Derived
Chipmunk not hown on recorded radar

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHIPMUNK PILOT reports heading 270° at 60 kt climbing out from Bicester, aerotowing an ASK 21 glider whilst conducting early training for its inexperienced student pilot and in communication with Bicester Radio. The ac colour scheme is red/ white and landing lights and HISLs were on; SSR is not fitted. Whilst passing 1100 ft QFE, about 1 NM W of the glider site, just as he had started a gentle R turn, a dark green Gazelle helicopter was first spotted at a range of 200 m and about the same height. He quickly assessed that a collision would result if the climb was maintained, so he bunted the ac to avoid the helicopter, gently at first then somewhat faster as the glider was released from the tow. The Gazelle passed slightly astern, between the Chipmunk and the glider and about 100 ft above them. He adds that the helicopter was spotted late because the relative geometry caused it to be obscured by the canopy arch until he commenced the turn. He adds that the close proximity of D129, Weston-on-the-Green, results in the GA community - and now it would appear military pilots - using Bicester as a turning point.

THE GAZELLE PILOT reports heading 135° to pass the western side of Bicester town at 120 kt in transit to Battersea heliport at 1500 ft RPS, whilst in receipt of a FIS from Benson ZONE. The helicopter colour scheme was camouflage green and HISLs were on. The Chipmunk, with the glider in tow, was spotted at 10 o'clock below his altitude in a banked R turn. He executed a 20° banked avoiding action turn to starboard and passed the tug/glider combination by about 500 m to port and 300 ft below his helicopter. The avoiding action taken was not severe and the tug/glider combination was seen in sufficient time such that there was no danger or risk of a collision. He adds that flying single pilot only the workload was high and he had become involved in selecting the next waypoint on the GPS, which is situated on top of the instrument panel. He spotted the other ac after lowering his L arm and after glancing at his chart.

HQ MATO reports that the pilot of the Gazelle freecalled Benson Zone at 1233:18, 10 NM NW of Bicester, en route to Battersea at 1500 ft (1018mb). The FIS requested was provided by Zone and a squawk of 3/A 7350 assigned. The transit was apparently uneventful and no incidents were mentioned on RT by the pilot at all. At 1244:25, the pilot advised *"...15 miles to run to Northwood, happy to QSY* (switch) *to Heathrow Approach...."*. However, by this time the ATC Supervisor (SUP) had received a call from Bicester about an incident involving a Gazelle. Consequently, the pilot was

requested to telephone Benson ATC after landing, and advised that the Chipmunk pilot might be filing an Airprox. The Gazelle pilot informed the SUP that he had not overflown the glider site and had seen the glider and tug, and had avoided it.

HQ JHC comments that there would not appear to have been a risk of collision in this case as both ac took avoiding action, although it is not clear at which stage each pilot saw the other ac and initiated action. The perspectives of each pilot would have been markedly different as the Chipmunk was climbing and the Gazelle flying straight and level; the actual vertical separation was probably somewhere between the 2 estimates – about 220 ft when the differing altimeter settings are taken into account. However, this Airprox report highlights the potential for an incident if turning points are not chosen carefully and will be used to highlight to all JHC crews the need to be aware of all activity surrounding turning points when planning routes. In this case, the pilot was funnelled into this routeing and it was probably not sensible to choose a turning point so close to a major tug/winch launch gliding centre. This is especially valid in a single-crew ac where it is necessary to go 'heads-in' to adjust the GPS.

HQ DAAvn comments that the Gazelle pilot is very experienced and also familiar with solo operations. He was occupying the starboard seat and his vision below and to port would have been especially limited, when he operated the GPS with his left arm. Nevertheless, the pilot should have been aware that at 1500 ft amsl he should have avoided Bicester glider site by 2 NM radius, although this was not intentional and he did not fly directly over the centre of the airfield. However, at this altitude this piece of airspace is fairly busy. The pilot was trying to avoid flying over the centre of Bicester itself in a single engined helicopter. To the SW is parachuting activity at Weston-on-the-Green and to the NE is Bicester glider site itself. There is also an aerial farm 3 NM to the N of Bicester. Pilot workload would have been fairly high and it is unfortunate that the FIS from Benson did not warn him of glider activity.

UKAB Note (1): The UK AIP at ENR 5-5-1-1, promulgates Bicester Glider Launching Site for winch and aerotow launches where cables and tug ac may be encountered to 3000 ft agl, during daylight hours.

UKAB Note (2): The UK Mil AIP at Vol 3 part 1-2-4-4, GS13 specifies that Bicester Glider Launching Site is to be avoided by 2 NM, below 2000 ft agl.

UKAB Note (3): A review of the Clee Hill radar recording is inconclusive as only the Gazelle helicopter, identified from the assigned Benson squawk, is shown. The tug/glider combination is not evident at all. The Gazelle is shown passing 1 NM W of Bicester Glider site tracking SE at about 1237:19.

UKAB Note (4): A review of the Mil AIP Vol 3 Sect 1, revealed that the requirement for pilots of military helicopters to comply with the avoidance criteria specified therein, when flying below 2000 ft but above 500 ft msd was omitted in error. An amendment has been issued by HQ STC Ops (LF).

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.

Notwithstanding the inadvertent omission from the UK Mil AIP noted, but promptly corrected, military aircrew members thought that this experienced helicopter pilot should have been well aware of the requirement to avoid such glider sites by the requisite margin. It was a matter of good airmanship and the member from HQ DAAvn confirmed that the helicopter pilot had been aware of this requirement but the Airprox had stemmed from a flight planning error. He had incorrectly plotted the normal avoidance criteria on his chart at the pre-flight planning stage. This, combined with his desire to avoid the town of Bicester in his single engined helicopter, resulted in a planned track closer upwind to Bicester glider site than was appropriate. None of these factors became evident to him until he rechecked his route after landing. Members considered a lack of warning from Benson ATC, but Mil ATC ops explained that Bicester was some distance from Benson and the Chipmunk Tug/Glider combination would have been unlikely to show on radar. Moreover, general warnings would not necessarily have been appropriate under the FIS that had been requested by the Gazelle pilot,

whereby the controller was not required continually to monitor the flight.

Though the Gazelle pilot had spotted the Chipmunk and glider, it was at a late stage and members observed that he had allowed himself to be distracted (selecting the next waypoint on the GPS) near a very busy glider site and in an area of known high traffic density. Furthermore, the Chipmunk tug/glider combination had right of way under the 'Rules of the Air', placing the onus on the Gazelle pilot to remain clear. Nevertheless, he had seen it in sufficient time to take avoiding action, albeit after the Chipmunk pilot, who was already turning R in avoidance when spotted. The Chipmunk pilot had also detected the helicopter at a late stage. Some members who were experienced at flying Chipmunk aerotows did not consider the canopy arch should have inhibited effective lookout. There was a balance to be struck between perhaps a gentle weaving turn to clear the path ahead and the abilities of the inexperienced student glider pilot on the tow. From the information presented, members agreed that the fundamental cause of this encounter was a late sighting by both pilots near a notified glider site. However, opinion on risk was not as clear-cut in the absence of recorded radar information and because both pilots' estimates of the observed separation at the time varied greatly. The Board was unable to resolve this difference. The unwieldy nature of the tug/glider combination and the premature release by the glider pilot due to the close proximity of the Gazelle, led some to believe that safety had been compromised. However, others thought that the Chipmunk pilot had just enough time to assess the situation before he took avoiding action, as did the helicopter pilot, thereby removing the risk of a collision. This latter view finally prevailed by a narrow margin.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by both pilots near a notified glider site.

Degree of Risk: C

AIRPROX REPORT No 42/00

Date/Time: 22 Mar 2003 NIGHT

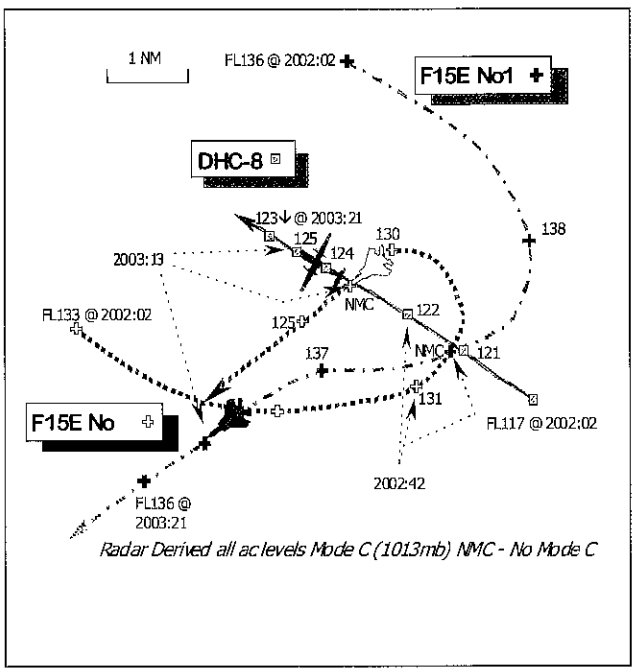
Position: 5512 N 0215 W (21 NM NW of Newcastle)

Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	DHC-8	F15E x 2
Operator:	CAT	Foreign Mil
Alt/FL:	FL 120	FL 135
Weather Visibility:	VMC CLAC Unlimited	VMC CLAC Not reported

Reported Separation: 200 ft V/nil H 1000 ft V/0·66 NM H

Recorded Separation: 2-300 ft V/0·82 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT reports that they had departed from Newcastle on track to HAVEN in receipt of a RAS from Newcastle Approach, squawking the assigned code with Mode C and climbing to their assigned FL 160 at 165 kt. They broke out of a solid cloud layer at FL 110 where the visibility was unlimited and Approach advised them about 2 military ac at 12 o'clock, which were seen on TCAS at a range of 10 NM and about 2000 ft above their

passing level. Landing lights and the logo light were switched on to increase conspicuity and the ROC reduced from 1200 to 500 ft/min. The red lights of the other ac were acquired and seen to split, passing L and R of the DHC-8, whereupon Approach advised them to maintain heading. A jet passed about 2 NM each side, which caused the TCAS to enunciate a TA just before both ac disappeared from view and off the TCAS display, as they flew directly astern. When they reappeared one passed about 200 ft very close, he thought directly overhead, resulting in an RA that demanded a descent at 1500 ft/min. The PF disconnected the autopilot, reduced power, pitched down and initiated the required avoiding action descent, the PNF subsequently reported the level deviation and the Airprox. He perceived a high risk of collision. After the other ac cleared to the SW and the confliction was resolved they re-established the climb.

THE F15E FLIGHT LEADER submitted an abbreviated report stating that the flight was in receipt of a RIS from an E3A AWACS controller, squawking their individually assigned codes with Mode C whilst heading 140° at 420 kt, about 20 NM NW of Newcastle. Red anti-collision lights were on. A twin-engined ac was detected on the ac's radar and acquired visually on Night Vision Goggles (NVG). They flew either side of the other ac at FL 135, staying high to maintain separation which he estimated to be about 0·66 NM horizontally and more than 1000 ft above as they passed. The risk was not assessed.

THE NEWCASTLE APPROACH RADAR CONTROLLER (APR) reports with RT transcript that the DHC-8 crew was under a RAS climbing to FL 160 about 15 NM NW of the Airport. Traffic information was passed at 2000:30, *"...12 o'clock ...15 miles manoeuvring a pair indicating FL 130 I'll keep you advised"*, to which the DHC-8 crew responded that they were IMC. However, advisory avoiding action was not proffered at that stage owing to the unpredictable manoeuvres of the observed ac. A further update was passed to the DHC-8 crew, *"...now...12 o'clock...10 miles a pair splitting one down your R and one down your LHD side suggest you maintain your present track"*. Whereupon the crew advised they were now VMC, together with visual and TCAS contact on the reported ac. As the DHC-8 climbed through FL 112, the approaching pair split to pass either side of the airliner and APR advised *"...the one on your R 1 o'clock indicating 136, on your L 11 o'clock is indicating 133"*, to which the crew reiterated visual contact. Afterwards the unknown ac turned toward each other and the DHC-8, which was now descending from FL 125 following a TCAS RA. At the CPA the minimum separation was, she thought, about 0·5 NM and 200 ft above the airliner.

ATSI reports that the DHC-8 was under a RAS in Class G airspace from the Newcastle APR, who was operating under a moderate workload. APR observed the potential confliction with the pair of manoeuvring F15s and called them twice - at 15 NM and 10 NM. Whereupon, the pair split to pass either side of the DHC-8 before turning back towards it. Given the circumstances, it would have been very difficult to provide avoiding action that was guaranteed to be effective. If it had been known that the F15s were not going to deviate significantly from FL 130, it may have been worthwhile stopping the climb of the DHC-8 below them but the APR did not know that and that would have meant that the DHC-8 crew remained IMC. Taking all factors into account, the APR's handling of the situation was reasonable and she is not considered to be open to criticism.

HQ 2 Gp AIR SURVEILLANCE AND CONTROL SYSTEMS SAFETY & STANDARDS UNIT comment that RAF ASACS units were not directly involved in this Airprox, but CRC Buchan had restricted exercise ac to below FL 145 to ensure an additional safety buffer below the base of CAS. [UKAB Note (1): The base of L602 at the location of the Airprox is FL 195, although further to the NW the base steps down to FL 175 and then FL 155 as it enters the Scottish TCA at HAVEN.] The F15E flight had just completed their exercise in the Spadeadam Range area and were provided with a RIS by a NATO AWACS E3A whilst returning to base. The control team aboard the E3A submitted reports, but as the E3A is not fitted with a communications recording facility, no RT transcript was available. The Weapons Controller reports that traffic information was passed on the 'unidentified' DHC-8 to the F15E flight leader and received an acknowledgement, thereby discharging his responsibilities under the RIS.

HQ STC comments that the AWACS E3A was operating under the tactical control of CRC Buchan. From the information that the crew provided, it is

clear that they fully understood and applied their responsibilities under the RIS. Having been provided with traffic information on the civilian ac, the F15E crew were then solely responsible for ensuring that their ac were not flown in such proximity as to create a danger of collision. Although it would appear that there was no risk of collision, since the F15E crews had both radar and visual contact with the DHC-8, this will not necessarily have been apparent to either the DHC-8 crew or to the Newcastle controller.

UKAB Note (2): The LATCC Great Dun Fell radar recording reveals that this Airprox occurred broadly as described by the reporting pilot and the Newcastle APR. The F15E flight pass about 2 NM either side of the DHC-8 at the levels reported, turning R and L respectively and passing at 2002:42, 1 NM astern of the airliner, which was climbing through FL 122 Mode C. By interpolation the No1 would have been at about FL 138 and the No2 indicated FL 131 Mode C. The No1 steadies SW, as the No 2 continues to turn L, crossing about 0·82 NM astern of the DHC-8 once again at 2003:13, at the CPA. Whereas the DHC-8 climbed to FL 125 at the CPA and before commencing a descent, NMC is shown by the No2; interpolation between the preceding and successive returns of FL 130 and FL 125 would suggest 2-300 ft vertical separation as it passed astern of the DHC-8. The avoiding action descent of the DHC-8 is not evident until 2003:21, down to FL 119 at 2004, when a climb is recommenced.

UKAB Note (3): Archive data from AIS Heathrow reveals that although the encounter took place within the lateral confines of D512A, the danger area was not active at that time.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report 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, Air Defence and operating authorities.

Members queried why the F15 crew evidently flew so close to civilian traffic. According to the ASSU report both crews had been given traffic information from the E3A and were aware of the DHC-8 as they closed on it from ahead. Moreover, the manoeuvres of the No2 after they had flown past it, certainly looked something akin to a practice attack. The USAF advisor took great care to explain to the Board that this was definitely not the case and a comprehensive investigation initiated by HQ 3AF, revealed that there was no intention whatsoever on the part of the crews to carry out a practice attack on the airliner. It would appear that the F15 crews had a radar lock on the DHC-8 and flew either side of it to keep clear rather than cut across the airliner's nose; many members accepted that from a fighter pilot's perspective 2 NM horizontal separation was not close. The members were also advised that a normal USAF rejoin for a flight of two turning R, when operating with NVG, was for the No2 to fly a full 270° turn to port and then join his flight lead in trail.

The limitations of NVGs were then explained. These preclude pilots from looking at conventionally lit ac too closely at night, owing to 'blooming' and a possible loss of definition in the NVG at close range which may even lead to the NVG 'shutting down'. This explanation was supported by the advisor from IFS and members were grateful for the information. However, this still did not explain why the No 2 had crossed so close astern of the DHC-8 during the rejoin. Furthermore the less than full pilot account did not facilitate a clear and complete understanding of what the F15 crews had been doing. Considerable debate ensued over this issue and many members believed that anything less than a full account of the occurrence did little to help the USAF's reputation. Indeed it could lay their crews open to criticism, which might be entirely unjustified. It was also agreed that full and frank reporting enabled the rest of the aviation community to understand the nature of their operations and thereby give due recognition to any difficulties USAF crews may have encountered. The Director reinforced this view, commenting that it was not the Board's intention to apportion blame, but to determine the facts and enable the cause and risk to be comprehensively assessed.

The USAF advisor agreed to represent these views to higher authority. He added that the formation change from 'line abreast' to 'in trail' was purely for the return to base transit and pilot members believed that the No2 crew had probably misjudged the speed of the DHC-8, believing it to be flying faster than the 165 kt reported and then turned about,

thinking that it was further away to the NW. In view of the incomplete information provided, some members wondered if the F15 pilot had flown too close because the range may have been difficult to judge on NVG, which, coupled with the bloom of the lights from the DHC-8 in the No2 pilot's NVG, might have caused a mistaken impression of greater separation.

Turning to the DHC-8, both the crew and the Newcastle APR had been placed in a difficult position. There was little they could have done to forestall the encounter, indeed to initiate a turn in this situation could have compounded the problem. Consequently, having weighed all these matters for relevance the members finally agreed that the Airprox resulted because the No2 F15E pilot flew sufficiently close to cause the DHC-8 pilot concern for the safety of his ac. Nevertheless, it was apparent from the radar recording that the F15s were >1000 ft above the DHC-8 as they passed on reciprocal headings and the TCAS RA occurred as the No2 was descending and crossing 0·82 NM astern. There was a lesson here for the military aviation community; the compulsory carriage of TCAS by CAT ac will probably result in more reported occurrences, if military pilots continue to close to distances previously accepted by them as satisfactory separation. Such distances, especially when associated with energetic manoeuvres in the vertical plane will cause RAs and result in reporting action by civilian pilots. Therefore, as great a margin as practicable should be afforded by military crews to CAT. Whilst the No2 F15 crew supposedly gained good visual contact and a radar lock, the DHC-8 crew would have been unaware of this and they would have been justifiably concerned. However, the pilot of the more nimble F15 was always in a position to give the DHC-8 a wider berth if necessary and in the end, therefore, the members agreed that there had not been a risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The No2 F15E pilot flew sufficiently close to cause the DHC-8 pilot concern.

Degree of Risk: C

AIRPROX REPORT No 43/00

Date/Time: 20 Mar 1536

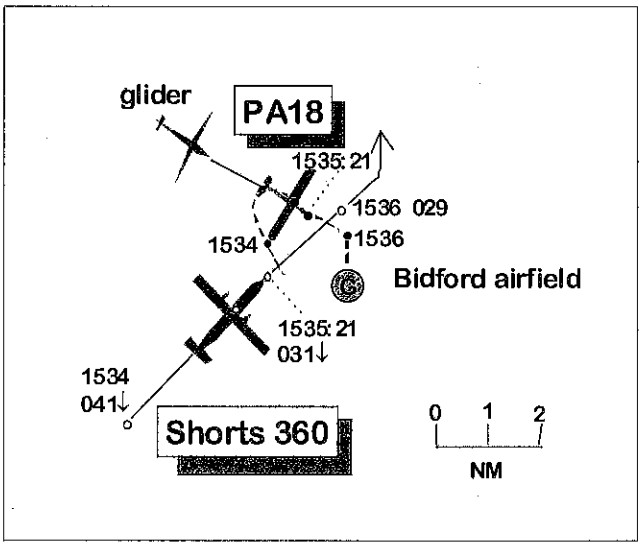
Position: 5209 N 0151W (1 NM NNW Bidford airfield - elev 135 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Shorts 360	PA18 - 180
Operator:	CAT	Civ Club
Alt/FL:	3000 ft (QNH 1028 mb)	3000 ft
Weather Visibility:	VMC 8 km	VMC 10 km

Reported Separation: 500 m 300 ft

Recorded Separation: unmeasurable



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHORTS 360 PILOT reports that he was in descent to 3000 ft (QNH 1028) at 170 kt while being radar vectored for an ILS approach to RW 33 atBirmingham. The visibility was 8 km in VMC. On breaking cloud at 3600 ft, 18 NM S of Birmingham Airport, a Piper Cub ac towing a white high wing glider passed about 500 – 600 m ahead of him from L to R and 300 ft below. Descent was arrested to enable them to pass above the conflicting traffic; he felt there had been a medium risk of collision and reported the incident to Birmingham ATC who advised him that no primary radar returns were observed in his vicinity.

THE PA18 PILOT reports that he was at 3000 ft and first saw the Shorts 360 about 3 NM away to his LHS as it was flying away from him at about co-altitude. He comments that the ac must have initially approached from his blind area to the R where upward vision is obstructed by the PA18's high wing. Consequently he did not spot it earlier.

BIRMINGHAM ATC reports that the Shorts 360 was inbound to Birmingham from Exeter routeing through the FIR. The ac had been identified by R1, placed under a RAS and given a heading to avoid unknown traffic before being transferred to R2. On calling R2, the pilot was given a new heading and advised that this was both to sequence his ac and take it S of the Snitterfield gliding site (although no notification had been passed by Snitterfield that gliding activity was taking place). At 1536 the Shorts 360 was approaching 3000 ft, still outside CAS, when the pilot reported that he had just passed over a glider/tug combination. R2 advised him that no primary or secondary returns were observed on the radar at the time.

The Birmingham ATC Training and Operations Manager comments that unit reporting action on this incident was taken retrospectively because the Shorts 360 pilot did not at any time declare his intention to submit an Airprox report. He adds that the Shorts 360 is one of a number of ac that fly regularly through the FIR into and out of Birmingham. The company has been advised by ATC at Birmingham of the intensity of GA, gliding and military traffic in the FIR which might conflict with their routes. Gliders are particularly difficult to detect on radar, and an agreement has been reached with Snitterfield, the club closest to Birmingham, that Birmingham ATC will be notified when gliding operations begin and end there.

THE BIDFORD GLIDING CENTRE SAFETY OFFICER submitted a letter to the UKAB in which he raises concerns about the apparent routeing of scheduled flights directly over Bidford airfield. He says that the ac in question has frequently been observed overflying the site at various heights around 3000 ft but sometimes as low as 2000 ft. Bidford is clearly marked on the half million topographical chart and from spring to autumn as many as 50 gliders and other ac can be operating in the vicinity, some of which may be in cloud. He feels strongly that it is in the best interests of flight safety if ac such as the Shorts 360 give the gliding site a much wider berth.

UKAB Note: A video recording of the LATCC Clee Hill radar at 1534 shows the Shorts 360 descending through FL 41 towards the area of the Bidford gliding site with a primary return, believed to be the tug/glider combination, manoeuvring in a RH pattern 4 NM ahead of it just NW of Bidford airfield. The Shorts 360 passes about 1 NM to the W of the gliding site at 1535:30 on a track of 045° and the Airprox occurs shortly afterwards as it crosses the track of the combination at almost right angles while descending through about 3000 ft Mode C (3400 ft QNH). The radar returns of the tug/glider are intermittent during this period, so lateral separation cannot be measured.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This Airprox highlighted the familiar problems associated with CAT ac transiting areas of uncontrolled airspace. Although the Shorts 360 was being provided with a RAS by Birmingham ATC, and had been vectored away from unknown traffic, there was no guarantee that all traffic on the Shorts 360's route would be seen on radar. Indeed, at the levels in question and at that range from Birmingham, it would be unlikely that any non-squawking light ac, particularly a glider, would be detected. Hence the onus for ensuring separation

from other ac in Class G airspace rests with the pilots concerned on the 'see and avoid' principle. The extent to which visual acquisition and avoidance can be achieved depends on many factors but weather conditions usually feature high on the list. If, despite good visibility, one or both pilots see each other late or not at all, the Board will reflect this in their assessment of cause. However, if neither pilot could reasonably have been expected to see each other much earlier than happened, as in this case (because the Shorts 360 was in cloud until shortly before the encounter), the incident is usually attributed to a confliction of flight paths in the FIR. And so it was on this occasion. Moreover, the Shorts 360 pilot saw the tug/glider combination on breaking cloud and, despite the fairly short acquisition range, was able to make a considered judgement to avoid it. The Board concluded that by arresting his descent the Shorts 360 pilot removed any risk of collision.

All members agreed that ideally CAT flights should be planned to remain within CAS; however, it was accepted that often this was either impractical or impossible. Therefore, in cases where a transit of Class G airspace was the only option, pilots should be particularly careful to identify and avoid hazards such as glider sites en route. These should be given as wide a berth as possible, at a level least likely to cause confliction with gliders. However, members acknowledged that this was easier said than done because towing and soaring activities often extended beyond a site's immediate vicinity and a chance encounter with a glider was still always a possibility.

UKAB Note: UKAB have since been advised that consideration is being given to establishing a pre-gliding notification system between Bidford and Birmingham, similar to the arrangement currently existing with Snitterfield.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the FIR resolved by the Shorts 360 pilot.

Degree of Risk: C

AIRPROX REPORT No 44/00

Date/Time: 23 Mar 1115

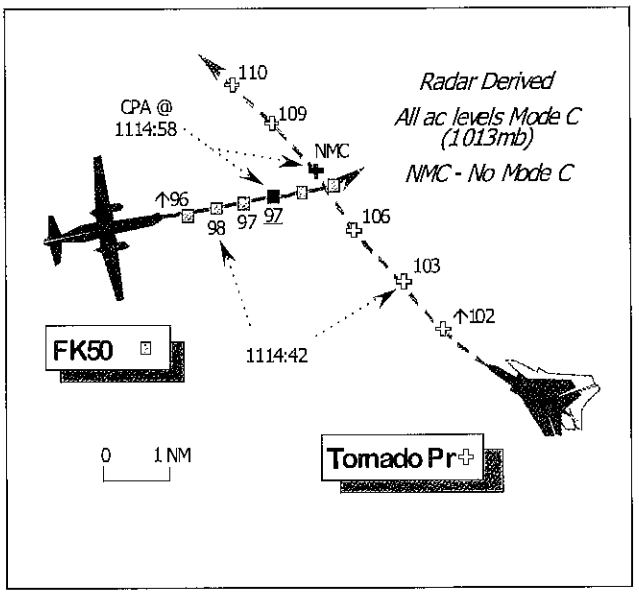
Position: 5425 N 0105 W (14·5 NM ESE Teesside)

Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Fokker 50	Tornado F3 pr
Operator:	CAT	HQ STC
Alt/FL:	FL 85	FL 110-105
Weather	IMC	VMC CLAC
Visibility:	Not reported	Unlimited

Reported Separation: 500 ft V nil H/ NR

Recorded Separation: 0·84 NM H & 1000 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports that after departure from Teesside they were IMC in cloud, climbing to their assigned level of FL 210 routeing direct DOGGA, under a RAS from Pennine RADAR. As they climbed through FL 85 Pennine instructed them to turn L onto 090° to avoid a possible confliction with military traffic, which was observed on TCAS about 8 – 10 NM away. About 8 NM SSW of Fylingdales whilst heading 090° at 160 kt, TCAS indicated a TA

that was followed by an RA several sec later, requiring a reduction in the ROC to zero, which was complied with. He thought that the other pilot might have initiated a high energy manoeuvre, causing the rapid RA as the other ac overflew about 500 ft above his ac, as indicated on TCAS. Afterward, traffic information on several other ac was received from Pennine who then downgraded the ATS to a RIS. The other ac was not seen and he did not proffer any comment on risk.

THE TORNADO F3 PILOT reports leading the first pair of a 4 ship formation recovering independently to Leeming VFR and under a RIS from Leeming Director at FL 110 - 105. Whilst heading 280°, he thought, just NW of Fylingdales at 350 kt, VMC above a solid cloud layer where the visibility was unlimited, traffic was called at 9000 ft crossing L to R. Neither crew of the first pair, nor indeed the second pair, saw any other ac and concluded it must have been below them in the cloud layer flying IMC. Consequently, they did not consider there had been any risk of a collision and the recovery was completed uneventfully.

MIL ATC OPS reports that the Tornado pair was flying at FL 100 under a RIS from Leeming Director (DIR), whilst being positioned for a pairs GCA to RW 16 at Leeming. At 1114:17, DIR, which was manned by a trainee controller and qualified Mentor, passed traffic information, *"... traffic 12 o'clock range 7 miles crossing L to R indicating FL 90"* that was acknowledged. DIR then dealt with a second pair of F3s from the same formation, about 15 NM in trail and recovering independently, which required vectoring around Fylingdales. The recovery continued routinely, with no indication of any incident having occurred. Six days later, Leeming ATC was advised of the Airprox.

When DIR passed traffic information at 1114:17, it was accurate and included *"indicating FL 90"*, all was transmitted in accordance with current practice. Nevertheless, the Tornado lead pilot believed the other ac was in level flight. An additional information call, indicating that the F50 was climbing may have given a clearer and more relevant indication to the Tornado crew.

The reported layer of solid cloud 1000 ft beneath the Tornado pair might explain their unannounced climb to FL 110, shown on the radar recording at the CPA, if the cloud tops were higher in this area.

Nevertheless, the content of the traffic information was sufficient to warn the Tornado crews about the other ac. Additional guidance for controllers about traffic information calls is already scheduled for inclusion in the next change to JSP318A, which will also clarify the phraseology to be used.

ATSI reports with RT transcript that the F50 was climbing out of Teesside and routeing direct DOGGA. The Pennine RADAR controller correctly identified the ac, placed it under RAS and instructed the crew to climb to FL 210. The controller attempted to vector the F50 around the Fylingdales HIRTA and passed traffic information on several ac operating in the vicinity. At 1114:30, the controller passed traffic information on the Tornado pair, *"...just converging toward you ...slightly R of your position R to L range of about 3 miles FL 100 unverified"*. The pilot responded with *"TCAS descent"* and then 20 sec later traffic information was passed on the next pair of Tornados at 12 o'clock – 10 NM, also at FL 100. Pennine then instructed the F50 crew to turn R onto 110°, whereupon the crew acknowledged and added that they were resuming the climb to their assigned level. No avoiding action instruction was issued by the controller before the FK50 pilot reported complying with the TCAS RA. The controller assessed the minimum separation as 1 NM horizontally and 500 ft vertically and downgraded the service to a RIS at 1117:20, because of unpredictable conflicting traffic that was manoeuvring. Although the Pennine controller advised the F50 crew that the Tornado pairs were squawking unverified Vale of York conspicuity codes, the 2 pairs of Tornados were squawking codes assigned to RAF Leeming.

HQ STC comments that it seems likely that the Tornado lead pilot assumed the civilian ac to be level at FL 90 and therefore was content with the relative disposition of the ac. An additional call indicating that the F50 was climbing may have alerted the crew to the reducing separation. With the exception of a 10° heading change and a 500 ft climb, there is no evidence of a high energy manoeuvre on the radar recording.

It is not clear why there was no attempt by Pennine to seek co-ordination or, for that matter, why the controller did not see the confliction with known Leeming recovery traffic developing sooner. A stepped climb would perhaps have represented a

more practical solution if co-ordination had not been possible.

UKAB Note: The Tornado pair are shown as a single radar contact on the Great Dun Fell radar recording tracking about 310°, the lead ac squawking 3/A 0412, level at FL 102 Mode C (1013mb). The F50, squawking 3/A 6326, is shown tracking eastbound in a steady climb of about 1600 ft/min. At 1114:10, about the time that DIR passed traffic information on the F50 it is indicating FL 91 Mode C at L 11 o'clock – 7 NM to the Tornado pilot. At 1114:42, the Tornados make a small 10° 'jink' to the R and are shown climbing with the F50 at 11 o'clock - 2.5 NM now tracking about 110° and indicating FL 98, its highest level during the encounter. The CPA occurs at 1114:58, as the Tornado pair pass just over 0·84 NM ahead of the F50, now tracking 090° and level at FL 97. The Tornados resume their original track of 310°; but NMC is shown by the Tornados in the climb. By interpolation between the preceding FL 106 and successive FL 109 returns they were probably passing about FL 107 at this point, thereby giving vertical separation of about 1000 ft at the CPA. There is no evidence of the 'high energy manoeuvre' mentioned in both the F50 pilot's report and that from Pennine Radar, as the Tornado pair are on a North-westerly track for over 15 NM prior to the encounter.

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 advisor explained that although the traffic information given to the Tornado Leader was accurate under the RIS that pertained, a clearer picture could have been portrayed if DIR had emphasised that the F50 was climbing. The advisor went on to brief the Board that current advice within JSP 318A on passing traffic information was now considered to be too rigid and this was being amplified for the benefit of military controllers in the next update. An F3 pilot member from HQ STC added that although the Tornado leader had been given traffic information about the F50 by DIR he would also have expected the navigator to be monitoring it on radar at that range to keep the pilot appraised. Although the Tornados were flying in clear air with unlimited visibility, some members wondered why the leader climbed the pair to FL 110 and assumed it was probably to maintain VFR (at least 1000 ft above the cloud tops) knowing there was other traffic close by below, which fortuitously also increased vertical separation. The leader would therefore, have been in a position to take rapid avoiding action if it had subsequently been necessary, which evidently it was not as the F50 was flying in cloud, 1000 ft below the Tornados and not sighted at all by any of the four crew members. It was also pointed out that the F50 pilot's suggestion that high-energy manoeuvres by the Tornados had caused the rapid change from TA to RA on TCAS was unfounded; no such manoeuvres were evident.

Although members thought that DIR had complied with the requirements of the RIS, some wondered if the same could be said of the Pennine RADAR controller providing a RAS to the F50 crew. An advisor from ATSI explained that the controller was operating under a high workload at the time and it was probably rather ambitious to provide a RAS to the F50 crew in these circumstances. Nonetheless, (under a RAS) the F50 crew could reasonably have expected not only traffic information, but also avoiding action to effect standard separation from other traffic. The first transmission of specific information about the Tornados occurred at 3 NM range, which was somewhat late to be of use. Moreover, the controller proffered no avoiding action before the pilot reported that he was responding to the TCAS descent. Some members agreed with the comment from HQ STC who considered that the F50's climb could have been stopped at a suitable level and co-ordination effected with Leeming. But others noted that the Pennine controller incorrectly perceived that the Tornados were squawking unverified Vale of York conspicuity squawks, which could explain why he did not initiate co-ordination and may have been the result of garbled squawks. Whilst members understood perfectly that the controller's hands were tied once the pilot reported the TCAS RA, they also recognised that (under a RAS) the separation aimed for should have been a minimum of 5 NM or 5000 ft Mode C against the Tornados, which clearly was not achieved before TCAS intervened. There was much debate about the controller's differing

responsibilities under RAS or RIS, indeed the Board noted that the Pennine controller subsequently downgraded the service to a RIS because of manoeuvring traffic. However, after weighing up all these points members finally agreed by a wide margin that this Airprox resulted because the Pennine RADAR controller did not give effective avoiding action to the F50 crew while providing a RAS. Turning to risk, the F50 crew was in an unenviable situation flying IMC in cloud but unbeknown to them probably a few hundred feet below the cloud tops. Nevertheless, TCAS proved its worth and prompted the F50 pilot to take positive action to level off about 1000 ft below the Tornados as they crossed ahead. This, coupled with the fact that the Tornado crews were aware of the F50 and in a position to take prompt action if necessary led the board to conclude that there was no risk of a collision in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Pennine RADAR controller did not give effective avoiding action to the F50 crew while providing a RAS.

Degree of Risk: C

AIRPROX REPORT No 45/00

Date/Time: 23 Mar 1219

Position: 5225 N 0525 W (30 NM NNW of Strumble)

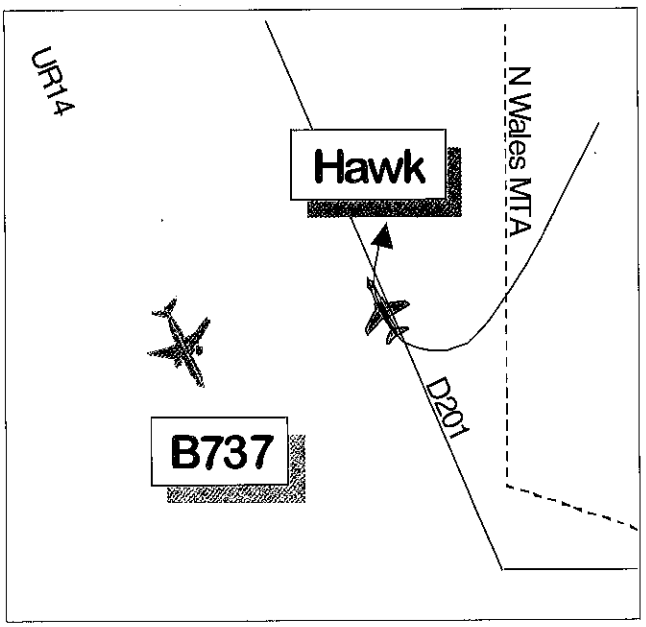
Airspace: UIR (*Class:* B)

Reporter: LATCC BRS ST SC

	First Aircraft	*Second Aircraft*
Type:	B737-200	Hawk
Operator:	CAT	HQ PTC
Alt/FL:	FL 290	FL 270
Weather	VMC CLOC	VMC CLAC
Visibility:	10 km+	20 km

Reported Separation: NK/5-6 NM

Recorded Separation: 3.6 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC STRUMBLE SC reports that the B737 crossed VATRY southbound at 1217, level at FL 290. He noticed an unverified 7000 squawk (later identified as a Hawk) descending below FL 310 and closing from the N on the B737. The unknown traffic was coming from D201; it was also threatening traffic at FL 310 NW-bound from Strumble. The Hawk had been operating in the North Wales Military Training Area, but its track had taken it outside, thus the ac was in Class B airspace, and subject to obtaining a radar control or procedural service under the terms of operating within the Military Mandatory Radar Service Area (MRSA). The pilot had not complied with this requirement.

The SC began to pass traffic information to the B737 as the unknown ac continued to converge and descended through FL 305. By 1218:40 it was in the 10 o'clock of the B737 at a range of 6·8 NM, passing FL 293 in descent, and still on a conflicting heading, with 1·7 NM to run to the edge UR14. The B737 pilot, given information on the traffic which he did not see was next passed avoiding action, to

turn R onto 270°. This was acknowledged and 10 seconds later the SC told the pilot to disregard the avoiding action as the contact had turned sharply about to the right, towards the B737, passing FL 273. During the turn it left D201 and passed less than 5 NM from the B737. The SC was much shaken by the incident; the unknown ac was south of the MTA in an unusual area and squawking 7000 which meant that he could not find out from a military controller what it was doing.

THE B737-200 PILOT reports heading 160° at 460 kt level at FL 290. He did not see the traffic he was advised about and followed the avoiding action given. He did not assess the risk of collision.

THE HAWK PILOT reports heading 210° at 200 kt while carrying out a general handling, QFI work-up exercise in D201; poor weather to the E had forced him into the western half. He was not receiving an ATS. While discussing a point with the other pilot he noticed a TACAN reading of VYL 210/54 and started a right turn away from UR14. As he turned away he was aware of an airliner in the airway, about 5-6 NM away. His 'max' Tacan reading was 210/56 on the outside of the turn (the boundary of D210 is at 58 NM on the 210R) and shortly afterwards London Mil called him on guard to say that he had come close to the UAR. He did not consider there was any risk of collision.

UKAB Notes: LATCC radar recordings show the 2 ac converging; the B737 is slightly left of the UAR and the Hawk in its right turn passes something less than 0·5 NM outside the boundary of D201 which parallels the UAR at a distance of 5 NM. The ac are 3.6 NM apart at their closest; the B737 showing FL 290 Mode C and the Hawk descending between FL 280 and FL 274 Mode C. When the ac were at their CPA, the Hawk was at VYL 212/56.

JSP 318A, the Military Air Traffic Services regulatory document, states "..military aircraft are not permitted to fly within MRSAs without receiving a Radar Control or Procedural Service from the ATCRU except when:

> c. Operating within the Lincolnshire MTRA or the North Wales MTA during their published hours of activity or within active Danger Areas."

D201 is promulgated as being active between 0800 - 2300 (local), Mon - Fri and at other times by NOTAM; the incident occurred on a Thursday and hence, unless any information was received to the contrary, the Danger Area (DA) should have been treated as active. As the Hawk pilot had obtained a clearance from the DA's operating authority (Aberporth) to operate within D201, there was no requirement for him to be in receipt of a service; the active DA had, in effect, created a VFR 'hole' in the MRSA similar to that of the NW MTA. There is, of course, a requirement to remain within the DA and, in this case, the Hawk pilot had the sole responsibility for doing so.

Regarding the use of the '7000' SSR code, unless Aberporth had offered a discrete SSR code on 'booking' the DA, a more suitable SSR code would have been 7002 (Danger Areas General), which would have indicated the ac's intended activity to the LATCC controller. It should be remembered however, that the Mode C information associated with both 7000 and 7002 codes must be considered to be unverified.

HQ PTC comments that at the time of this incident, the pilot was operating within D201 in accordance with a long standing informal arrangement between Valley and Aberporth, and was therefore not bound to obtain a radar or procedural service. (This arrangement is currently being renegotiated to establish a more formal agreement)

We understand why the controller became anxious when he saw the unknown traffic turn towards his at a similar level and, since he could not anticipate the Hawk's tight radius of turn, he was right to initiate avoiding action. The Hawk pilot has explained why he was forced to the limit of the much-reduced airspace available to Valley, and on the information available to him he believed that he had remained within D201. With hindsight, a turn away to the left would have been preferable. The marginal infringement is admitted and regretted; however, we do not believe that this incident belongs properly in the Airprox statistics.

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 considered that this incident did not warrant an Airprox report; while the concern of the Strumble SC was understood, it would have been clear to him when he told the B737 to disregard the avoiding action that there had been no risk of the ac colliding. The Board concluded that the cause of the incident was an inadvertent marginal infringement of controlled airspace by the Hawk pilot. It was observed that the published accuracy of his NavAid was such that the Hawk pilot was unwise to fly so close to the boundary of D201 as indicated on TACAN. A comparison of the actual position on radar and the pilot's given TACAN reading showed a discrepancy of 2° which was as could be expected from a serviceable installation.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Inadvertent marginal infringement of controlled airspace by the Hawk pilot.

Degree of Risk: C

AIRPROX REPORT No 46/00

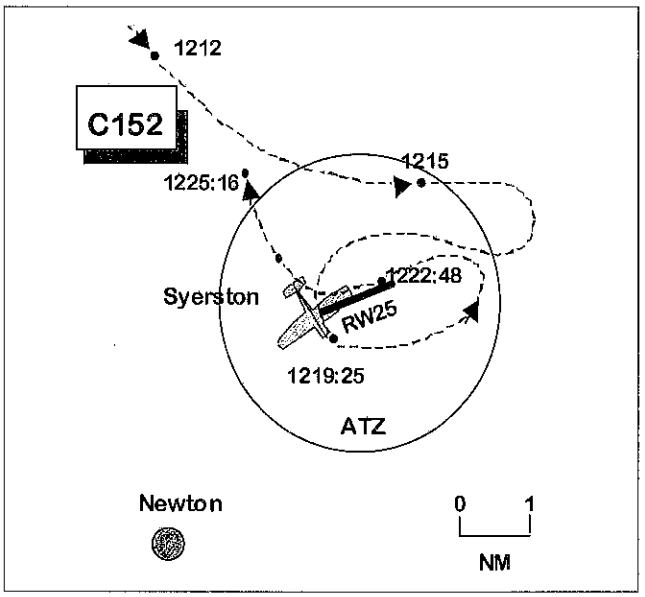
Date/Time: 26 Mar 1219 (Sunday)

Position: 5302N 0055 W (Syerston airfield elev 224 ft)

Airspace:	ATZ	(*Class:* G)
	Reporting Aircraft	*Reported Aircraft*
Type:	ASK13 glider	C152
Operator:	Civ Club	Civ Club
Alt/FL:	1200 ft (QFE)	NK
Weather Visibility:	VMC CLBC 25 km	VMC

Reported Separation: <100 ft V/H

Recorded Separation: not seen on radar



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports that he had just winch-launched from RW 25 at Syerston on an instructional sortie. The visibility was 25 km in VMC. On releasing the cable at 1200 ft (QFE) and 50 kt in clear air, below well broken cloud, he turned L 90° and a C150 type, whose registration he could read, approached from the rear and flew past 100 ft below him and 100 ft to his L. The pilot comments that had the other ac been about 5 sec earlier on its flight path it would have come very close to the launch cable. He felt there had been a high risk of collision.

THE C152 PILOT reports that she did not learn of the incident until some 2 months after the event and therefore had difficulty recalling specific details. The flight, from Derby to Nottingham, was a leisure trip, in company with another PPL holder and, as far as she could remember, the visibility was good with bright cloud above. She and her colleague, who was taking an active part in the conduct of the flight, had planned and cross-checked details of the flight together. She herself was inexperienced and had only landed away twice before without an instructor, both times at an airfield known to herself or an accompanying PPL passenger. She had not previously landed at Nottingham but, being aware that it was close to East Midlands airspace, was

concerned about the possibility of infringing the CTA. At one point during the flight they saw what they thought was a "parachute" descending well below them, some distance away. Being unsure of what this might mean, she manoeuvred away from the area. However, the presence of this "parachute" cast doubt on whether the airfield they were now approaching was Nottingham, and this uncertainty was confirmed when the RW did not 'line up' as expected. She therefore left the area and remembers her colleague notifying Nottingham air/ ground that they were doing so.

UKAB Note (1): Syerston is notified in the UK AIP (ENR 5-5-1-5) for gliding during daylight hours, with a vertical cable limit of 3000 ft. The site is also marked on the ICAO 1:500 000 topographical chart with a warning of intense gliding activity and cables up to 3000 ft.

UKAB Note (2): A recording of the LATCC radars shows a primary return squawking 7000, believed to be the C152, approaching the Syerston area from the NW at 1212. The ac tracks SE then E and at about 1216, 3 NM NE of Syerston, it turns R onto W briefly, taking it N of the airfield, before entering a L turn to cross the upwind end of RW 25 at about 1219; at this point the ac is turning through a SSE heading. The turn is continued into a downwind LH position for RW 25 and the ac appears to turn base leg at about 1221. After a finals leg of about 1 NM, the ac begins a slow R turn at 1222:48, close to the threshold of the RW, and heads NNW. The recording ends at 1225:16 with the ac still tracking away 2·5 NM from the airfield.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA Member pointed out that this short flight was carried out in good weather and excellent visibility in an area abundantly supplied with prominent ground navigational features. He found it a matter of great concern that within the space of only a few miles the 2 PPL holders on board the C152 could have become so comprehensively lost, and members were astonished that they only realised their error at a late stage on final approach; geographically Syerston bears no resemblance to Nottingham, which is situated close to the city boundary, and it would appear that even after leaving the area they had little idea where they had been. The Board concluded that the C152 pilot caused the Airprox by her inadvertent penetration of the Syerston ATZ during which she flew into confliction with the glider, which she did not see. Taking into account the non-sighting, and the glider pilot's inability to take avoiding action because he was approached from behind, the Board concluded that there had been an actual risk of collision. Members thought the 'parachute' referred to by the C152 pilot could have been the one attached to the towing cable.

Some members commented that the glider launch party had a responsibility with regard to clearing the area ahead of the glider prior to launch. In their view, the C152 should have been visible before the launch was commenced which prompted them to question the effectiveness of the ground party's lookout.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C152 pilot inadvertently penetrated the Syerston ATZ and flew into confliction with the glider which she did not see.

Degree of Risk: A

AIRPROX REPORT No 47/00

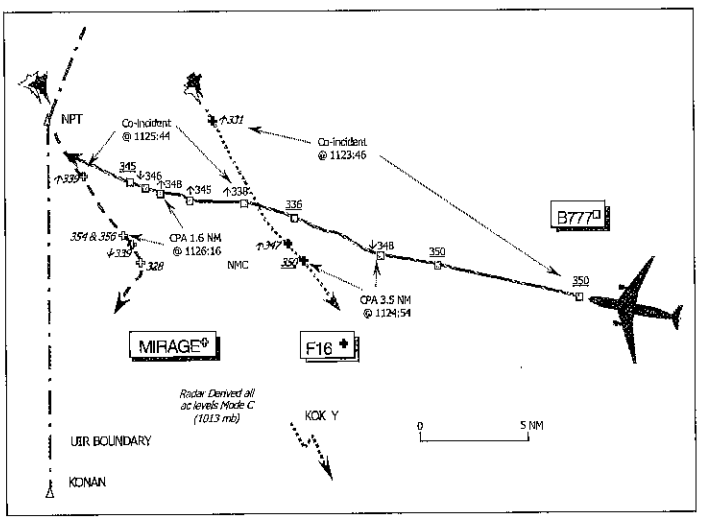
Date/Time: 27 Mar 1125

Position: 5125 N 0210 E (ESE of NORTH POINT

Airspace: UAR - UL610 (*Class:* B)

Reporter: LATCC CLACTON SECTOR

	First Aircraft	*Second Aircraft*	*Third Aircraft*
Type:	B777-200	F16s x2	Mirage x2
Operator:	CAT	Foreign Mil	Foreign Mil
Alt/FL:	FL 350	FL 330	FL 330
Weather	VMC NR	VMC NR	VMC NR
Visibility:	NR	NR	NR
Reported Separation:	v F16s 300 ft V v Mirages 1000 ft V	NR	1·5 NM H
Recorded Separation:		3·5 NM H, 200 ft V	1·6 NM H, 600 ft V



NOTE FOR THE RECORD

Shortly before going to print with this incident, further information on causal factors came to light that need to be assessed. Accordingly, in the interests of accuracy and completeness findings on Airprox 47/00 will now be published in UKAB Report Number 5.

AIRPROX REPORT No 48/00

Date/Time: 3 Apr 1200

Position: 5524 N 0417 W (14 NM SE of Prestwick)

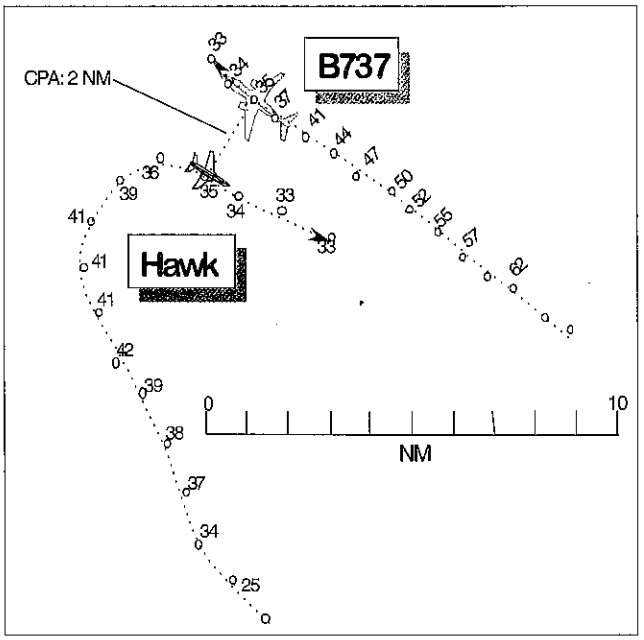
Airspace: FIR (*Class:* G)

Reporter: Prestwick Approach

	First Aircraft	*Second Aircraft*
Type:	B737	Hawk
Operator:	CAT	HQ STC
Alt/FL:	3000 ft	NK
Weather	VMC NK	VMC NK
Visibility:	NK	30 km+

Reported Separation: NK/NK

Recorded Separation: 2 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PRESTWICK APPROACH CONTROLLER (APR) reports that while the B737 was descending for RW 31 at Prestwick it had been receiving a RAS in Class G airspace. When it was passing about 3000 ft, he saw pop up traffic 1 NM W of it, now descending and turning right, indicating 3000 ft Mode C. It then turned away to the right before any avoiding action could be given but traffic information was passed via TWR, to whom the B737 had just been transferred.

THE B737 PILOT was unaware of the incident and was unable to contribute a report.

THE HAWK PILOT was also unaware of the incident. He was manoeuvring in the area and acknowledged that his was the ac involved which was also identified from its squawk.

UKAB Note: The LATCC Gt Dun Fell radar shows the B737 in a steady descent between Mode C readings of 6200 and 3300 ft on the PWK RW 31 extended centreline while the Hawk overtakes it some 6 NM to the SW, tracking NW, and climbing and descending between 2500 ft and 4200 ft. The Hawk then turns right, onto a ESE track, in a gentle descent to 3300 ft, passing the B737 by some 2 NM when both ac are at 3500 ft Mode C.

HQ STC comments that both ac were operating legitimately in Class G airspace. As neither pilot saw the other it has not been possible to determine the full circumstances. This is perhaps unsurprising given that the CPA was 2 miles abeam and therefore, as they passed, both crews are likely to have been prioritising their lookout scans into more critical areas. On the available information, there appears to have been little by way of a flight safety hazard.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Some Board members questioned the wisdom of the Hawk pilot in manoeuvring close to the Prestwick extended centreline at a height where he was likely to come close to approaching airliners. In Class G airspace terms it was not particularly close but members considered this a point worth consideration. Members were more concerned that the Hawk was still showing a Scottish Mil squawk, rather than 7000 or 7001. The UKAB had asked

for this point to be highlighted in military circles after a previous incident where a controller had wasted time calling a military controller to co-ordinate an ac which was showing the relevant military squawk, only to find that the ac had gone 'en route' but had not deselected the Scot Mil squawk. While this was a valid point and one worth highlighting again, it was agreed that it was not part of the cause of this Airprox.

Members questioned whether this incident was in fact an Airprox. Most did not think so, but accepted that the filing controller had perceived that it was. It was pointed out that the Hawk should have been within the coverage of Prestwick's radar for some time, but the controller had apparently only noticed it when it had turned towards the B737, and after he had handed the latter over to TWR. The Board concluded that the incident was a controller perceived confliction, without any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C

AIRPROX REPORT No 49/00

Date/Time: 5 Apr 1457

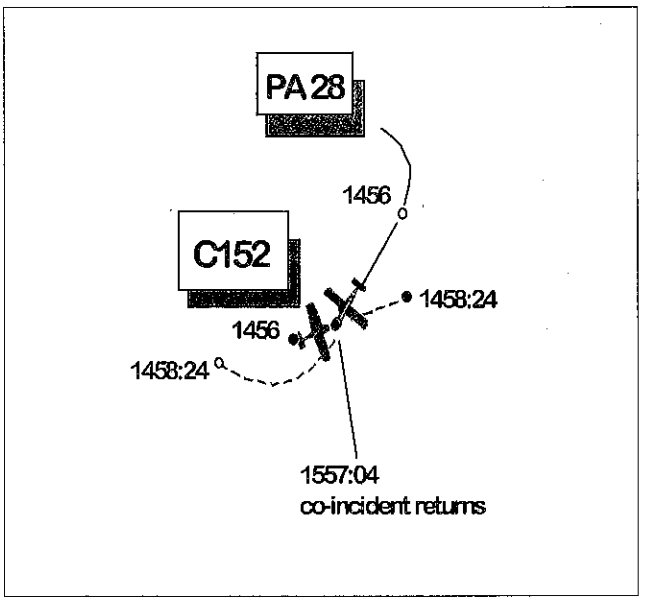
Position: 5154N 0013 E (8 NM NE BIG VOR)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	PA28	C152
Operator:	Civ Trg	Civ Trg
Alt/FL:	2000 ft (QNH 1017 mb)	2400 ft (QNH 1017 mb)
Weather Visibility:	VMC CLBC >10 km	VMC 25 km

Reported Separation: 300 ft V/not seen

Recorded Separation: 0 ft Hor



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was holding at 2000 ft (QNH 1017) in the ALKIN holding pattern on an IF detail, with 2 students on board. The visibility was over 10 km in VMC. He was squawking, probably 7050, and receiving a RIS from Thames Radar on 132·7. Mode C was not fitted. Traffic information on 2 ac had been passed to him during the previous 5 min and he had spotted both. When about 8 NM DME on the BIG 063°R, heading 245° at 95 kt, he saw another ac (a Cessna152/172) 1 to 2 NM ahead at a similar level as it climbed towards him on a reciprocal course. No avoiding action was necessary as he could see that the ac would pass above them, which it did by 200 – 300 ft, and he assessed the collision risk as slight to moderate. He was surprised, however, that although Thames had alerted him to the other 2 ac they had not told him about this one. Having noted the other ac's registration, he reported an Airprox to Thames Radar by RT and later by telephone.

THE C152 PILOT reports that he was in the Swanley area and cruising at 2400 ft (QNH 1017) at 90 kt while on a local VFR training flight from Biggin Hill with a student on board. The visibility was 25 km in VMC. He was receiving a FIS from Biggin APC on 129·40 and thought he was

squawking 7000; Mode C was not selected. The other ac was not seen.

THAMES RADAR reports that the PA28 was in the ALKIN holding pattern at 2000 ft under a RIS when its pilot reported an Airprox with a C152. The latter was not in contact with Thames and was not seen on radar as either a primary or secondary return.

UKAB Note: A recording of the LATCC Heathrow radar shows the PA28, identified by its 7050 squawk, as it flies the ALKIN holding pattern. A slow moving primary only return, believed to be the C152, can be seen tracking NE in the vicinity. At 1456, the PA28 has just completed a R turn and is tracking SW with the C152 at its 1 o'clock range 2·5 NM. The ac's tracks converge at an angle of about 140° and at 1457:04 their returns merge about 8 NM NE of the BIG VOR. Following the encounter the C152 continues tracking in a northeasterly direction and the PA28 turns R into the pattern.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a radar video recording and a report from the air traffic controller involved.

A GA member pointed out that it was rare for a 2000 ft holding pattern to be marked on the 1:250 000 topographical chart, as in ALKIN's case. The purpose was to highlight its presence to GA operators, particularly those at nearby airfields, such as Biggin Hill. The C152's instructor should have been aware that on his chosen route he was likely to conflict with ac using the holding pattern, yet, despite the good reported visibility, the C152 pilot did not see the PA28. This was considered a part cause of the Airprox.

No SSR response from the C152 was seen on radar although the pilot reported that he was squawking. He also indicated that he had not selected Mode C, which prompted members to remind GA pilots that the Board has frequently urged the use of this equipment when it is fitted as not only does it assist controllers in enabling the provision of accurate traffic information, but it is also vital to the successful operation of TCAS. Moreover, failure to select Mode C can result in a TCAS equipped aeroplane receiving a TA even if it is 10 000 ft above - a significant and unwanted distraction on the flight deck.

Turning to the PA28, members agreed that its pilot seemed to be more concerned that he had not been given traffic information by Thames Radar than he was about the proximity of the C152, which he had spotted 1 - 2 NM away. Notwithstanding that he was conducting an IF sortie in a holding pattern, it was his responsibility in Class G airspace to see and avoid other traffic. In this instance, he saw the C152 coming towards him but elected to continue with the procedure. Members assumed, therefore, that if avoiding action had been necessary the PA28 pilot should have taken it and not waited until the Cessna passed within 200 – 300 ft before retrospectively registering alarm. Some thought that having seen the C152 in good time the PA28 pilot then flew close enough to it to cause himself concern, but others were less critical. In the end the Board concluded that the PA28 pilot's lack of avoiding action was a part cause of Airprox. However, as the PA28 pilot had been watching the C152 for some time and was therefore always in a position to ensure that the ac did not collide, the Board concluded that there had not been a risk of collision.

Returning to the PA28 pilot's concern about a lack of traffic information from Thames, ATCO members wondered if he believed that because he had received information on the two other ac it was somehow guaranteed that he would be advised on all traffic in his vicinity. This was never the case, and this incident demonstrated that low altitude non-squawking light ac in Class G airspace are often not detected on radar and therefore traffic information on them cannot be passed; GA pilots should be aware of these limitations and give emphasis to maintaining a good lookout.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Lack of action by the PA28 pilot having seen the other ac 1 – 2 NM away, and a non sighting by the C152 pilot.

Degree of Risk: C

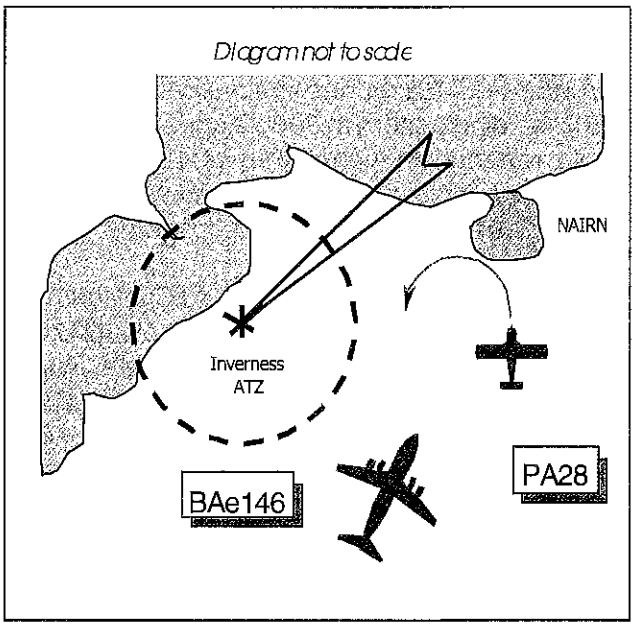
AIRPROX REPORT No 50/00

Date/Time: 6 Apr 1005

Position: 5733N 0355 W (2 NM W of Nairn)

Airspace: Scottish FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	BAe146-200	PA28
Operator:	CAT	Civ Club
Alt/FL:	2000 ft (QNH 1027 mb)	1500 ft (QNH 1027mb)
Weather Visibility:	VMC CAVOK 60 km	VMC CAVOK >30 km
Reported Separation:	500 ft V & 2 NM H	200 ft V/nil H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe146 PILOT reports that he was inbound to Inverness in CAVOK and about 5 NM S of the airport having received clearance for a visual approach from Inverness TOWER (TWR) to join downwind L for RW24. Whilst flying at 160 kt, late downwind at 2000 ft Inverness QNH (1027mb), a single engined light ac crossed ahead slightly below his ac heading N toward NAIRN. He thought that TWR was unaware of the traffic or the intentions of its pilot, so he positioned astern of the ac which then turned L onto S toward them. The TCAS enunciated an RA 'climb' instruction that was complied with by climbing 500 ft. They were visual with the ac throughout the encounter, which passed 500 ft below his ac and 2 NM away with a 'low' risk. However, he did not know the other pilot's intentions, which made his job a little difficult. Before the Airprox they had been receiving a RAS from Lossiemouth LARS (LOS). He added that although he and the PA28 pilot were flying VFR, better information/ control from LOS would have significantly reduced the risk.

THE PA28 PILOT reports that he was flying from Dundee to Inverness; the ac livery is white/green and wing tip strobes, anti collision and landing lights were on. During the transit he was in receipt of a FIS from LOS, squawking the assigned code with Mode C selected on. About 15 NM to the SE of Inverness, LOS requested that he fly no further W, so he turned onto N and informed them accordingly. About 2 NM S of Nairn, LOS reported traffic 5 NM to the SW also inbound to Inverness. A 3/A 7000 squawk was selected with Mode C and he switched to Inverness TOWER. He reported his position at Nairn at 1500 ft, whereupon he was informed of traffic and told to look for a BAe146 that was L base for RW 24. A LH orbit was initiated over the southern edge of Nairn at 100 kt, whilst looking for the other ac, which was sighted whilst turning through 260° 1 mile away to the S, slightly above his altitude, heading toward him. He rapidly lowered the nose and descended to avoid the BAe146, which overflew 200 ft above his ac. He believes the risk of a collision was minimal.

THE INVERNESS AERODROME/ PROCEDURAL APPROACH CONTROLLER reports that he was operating the combined position and had received Inverness estimates from LOS for the BAe146 of 1007 and for the PA28 of 1010. The BAe146 crew made their initial call about 12 NM S of Inverness descending to 4000 ft Inverness QNH (1027 mb) and visual with the airport. He issued approval for the BAe146 to join downwind L for RW24 and gave traffic information about a helicopter passing S of the airport at 500 ft. As the BAe146 turned L base RW24 the crew enquired if there was any known traffic SE of the airport. Whereupon the PA28 pilot called, advising that he was visual with the

BAe146 and that he was commencing an orbit overhead Nairn. Traffic information was given to the PA28 pilot.

UKAB Note (1): A review of the Inverness ADC/APP RT transcript reveals that at 1004, TWR advised the BAe146 crew *"...I see you downwind report final you're number 1"*, who responded *"...do you have one on L base at the moment.... level 2000 ft?"* TWR reported they did not, suggested LOS might have and advised they were trying to contact them when the PA28 pilot called on frequency at 1004:30, *"...Nairn 1700 ft descending inbound to land"*. TWR did not respond immediately but advised the BAe146 crew *"...that's in fact Cherokee traffic about to come on my frequency that's just called ...at Nairn this time VFR"*. The BAe146 crew queried *"...where's he going 'cause we're turning towards him"*, TWR did not respond but called the PA28 for the first time asking *"...are you visual with the 146...just turning L base?" "Negative...overhead Nairn I'll orbit this position at 1500 ft"* was the initial response from the PA28 pilot before he added in the same transmission at 1005, *"...I'm visual with the traffic now he's just passing above"*. TWR subsequently instructed the PA28 pilot to *"...remain well clear ...Nairn...and remain there before I bring you on"*, which was acknowledged. The BAe146 was subsequently cleared to land at 1007:20. No mention was made of a TCAS RA until the BAe146 was taxying to the stand, when the crew commented *"just to let you know...the* (PA28) *not his fault I know but...did give us an RA on base so we will have to do the paperwork"*. TWR responded that LOS had given an estimate for the PA28 *"..but there was no inclination at all* (from LOS) *that...he was gonna be in the way of you...the first thing I knew was when he called me obviously approaching Nairn"*. The BAe146 then added, *"...the first we saw of him was on the TCAS of course..."*. No comment was made by the PA28 pilot on frequency.

Mil ATC Ops reports that the PA28 pilot was inbound to Inverness at FL 65 and in receipt of a FIS from LOS who had already received notification of the BAe146 estimating Inverness at 1007. The PA28 pilot had given an Inverness estimate of 1010 for a VFR approach. This was passed to Inverness TWR at 0949, the controller adding that the PA28 was still about 25-30 NM SSE of the airport. TWR asked if the BAe146 would be ahead of the PA28, LOS responded *"He should be yes, but I'm not speaking to the 146."*

The BAe146 crew checked in with LOS on the same frequency as the PA28 at about 0955:49, the flight was placed under a RAS, instructed to descend to 5500 ft Inverness QNH (1027mb) and advised *"...no delay for the overhead RW 24."* At 0957:01, the PA28 pilot advised that he was descending to 1000 ft Inverness QNH and confirmed that he was visual with the surface. Whilst the BAe146 crew were on frequency, at 0958:16, LOS advised the PA28 pilot *"... we've got a* (BAe146 callsign) *inbound down the advisory route now, are you able to maintain no further W than your present position?"* The PA28 pilot replied *"affirm and ...visual with the field."* LOS then reported that the BAe146 was *"...about 15 miles behind you and will be passing down your L hand side shortly"*, which the PA28 pilot acknowledged *"copied ... turning N this time."*

During a prolonged landline conversation with TWR at 1000:02, LOS advised that the PA28 had *"...turned onto a northerly track he's E of the advisory route now in the descent to 1000 ft passing 3500 ft I'll keep him until* (the BAe146) *is with you."* TWR agreed saying *"well as long as you pass traffic on to him then on the* (BAe146) *that's fine then"* after which, LOS advised that the BAe146 was now descending to 4000 ft. After the call, LOS passed traffic information to the BAe146 crew *"..further traffic NE of you ten miles on a northerly heading, a PA28 also inbound to Inverness, in the descent to 1000 ft..."* The BAe146 crew acknowledged with their callsign and at about 1001:14, switched to Inverness TWR on 122·6.

At 1002:45, LOS passed traffic information to the PA28 pilot about 4 other contacts before advising at 1003:04, *"...further traffic SW of you 6 miles, NE bound indicating 2800 ft is the* (BAe146 callsign) *inbound to Inverness also."* The PA28 acknowledged the call and switched frequency to Inverness TOWER, also on 122·6, at 1003:25. Shortly afterwards, LOS saw the BAe146 turn R onto a northeasterly heading 5 NM S of the INS and fly a track described as an abbreviated 'arc' procedure, the normal 'arc' procedure being 10 DME from Inverness. At 1004:10, TWR called LOS on the landline enquiring if the PA28 was to the SE of Inverness. LOS responded that the PA28 was *"supposed to be ENE of you now"* and whose pilot

could be heard calling in the background; the LOS controller advised that the PA28 was not at Nairn and gained the impression that this was the PA28 pilot's first RT call.

The Airprox occurred outwith the coverage of recorded radar, but before the PA28, identified from its assigned squawk (3720) descended below cover, it is shown tracking NNW towards Inverness. The PA28 turns R at about 0958:30, in response to the *"no further west"* request from LOS, passing FL 49 Mode C (1013 mb) and tracking parallel to, but displaced about 6 NM to the E of, ADR W3D. The PA28 fades from radar at 0959:50, indicating FL 43 in the BAe146's 1 o'clock - 13·5 NM, whilst the BAe146 is descending through FL 80 Mode C. The BAe146 tracked along W3D and faded below cover at 1001:50, about 10 NM SSW of Inverness airport indicating FL 49 Mode C.

LOS complied with the requirements of the LOA concerning control and transfer of CAT ac inbound to Inverness. Additionally the controller obtained the agreement of the PA28 pilot to turn and fly parallel to the ADR, albeit under FIS, thus giving the BAe146 crew a clear track to the Inverness overhead. Moreover, pertinent traffic information, including destination, was passed to the respective pilots of each ac. It would appear that the BAe146 crew then positioned their ac where they might have expected the PA28 to be, according to the information passed to the crew and TWR. The PA28 was transferred to Inverness immediately after LOS passed traffic information, which was acknowledged. However, the apparent 1 min gap between leaving the LOS frequency and the PA28 pilot's initial call to TWR cannot be accounted for.

ATSI reports that although the INV controller knew that the PA28 was inbound from the S he did not know its exact position relative to the BAe146. He was aware that the PA28 pilot had received traffic information from LOS about the BAe146 and could assume that it would remain clear. He was not aware of the close proximity of the two ac until it was reported by the BAe146 pilot, which was before the PA28 contacted Inverness TWR. LOS had informed the BAe146 crew about the presence of the PA28 to the E, before it turned downwind. The requirements of the LOA would appear to have been fulfilled in this instance.

UKAB Note (2): The UK AIP, at AD 2—EGPE 1-6, promulgates the Inverness ATZ as a 2·5 NM radius centred on the longest notified RW (06/24), surface to 2000 ft aal (elevation 31 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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

An airline pilot member pointed out that technically the BAe146 pilot was still flying under IFR whilst conducting the visual approach approved by Inverness TWR, as he had not apparently cancelled his IFR plan. Therefore a 'visual approach' in this instance was still under IFR, whereby Inverness TWR retained responsibility for separation against IFR traffic and the provision of traffic information on VFR traffic.

Resolving the geometry of this encounter was difficult without the benefit of recorded radar and similarly there was little to help members clarify the disparity over the separation that pertained. The BAe146 crew had been forewarned of the PA28 by LOS, had seen it visually in front of them, but, as they positioned behind it, they were uncertain what it was going to do next. In the event it turned back L towards them and triggered a TCAS RA to climb, which was complied with. The end result was that the BAe 146 crew believed they had cleared the PA28 by some 500 ft vertically and 2 NM horizontally. Events had seemed slightly different from the PA28 pilot's cockpit. He had been forewarned about the BAe146 by LOS but was unaware that it was approaching him from behind. Turning L into an orbit to look for the airliner his action unwittingly reduced the separation further. When the PA28 pilot eventually saw the BAe146, Board members tried to deduce why he thought it overflew him by just 200 ft. From other Airprox examples it was not uncommon for pilots to underestimate vertical separation when suddenly and unexpectedly confronted with a larger ac. This may have been the case here, although this was conjecture and most members simply felt that the BAe146 pilot's estimate was probably more accurate because he had the benefit of a TCAS readout. One controller

added the observation that it was unfortunate that the PA28 pilot had not called Inverness TWR straight away after switching from LOS, an earlier call would probably have given the controller more time to pass traffic information about the BAe146 – its location and intentions. This might well have forestalled this Airprox altogether.

Some members were unsure why the BAe146 pilot had submitted the report – he had been in visual contact with the other ac throughout, was always in a position to keep clear of it – with or without TCAS - and had said the risk was "low". A civil ATC member suggested that the encounter amounted to no more than a conflict of flightpaths and he hoped that the TCAS 'RA' had not been interpreted by the pilot as an automatic reason for filing an Airprox. This notion drew concern from some Board members who were worried that many company ASR forms seemed only to require a 'tick in the box' without further explanation. However, most felt this had not been a TCAS induced Airprox report and the BAe146 pilot had filed because he did not know what the other ac was going to do as he approached it from behind.

Some surprise was expressed at the BAe146 pilot's comment concerning the service provided by LOS. For their part they had complied with the LOA, fulfilled their responsibilities under the RAS and ensured that standard horizontal separation was effected against the PA28, as the BAe146 flew along W3D towards Inverness and descended for the 'Overhead' Approach. However, LOS were unaware that Inverness TWR subsequently approved the LHD downwind visual approach for RW24 that converged on the PA28. LOS could not provide a radar service to any ac below their radar coverage, as had been the case here, but closer co-ordination about the visual approach by Inverness TWR should have been effected with LOS. Moreover, it would have been helpful if Inverness TWR, who were aware that the PA28 was inbound from the S, had reminded the BAe146 crew about it before they turned downwind. Weighing all these matters for relevance members agreed that this Airprox resulted from a conflict in the FIR which was resolved safely by the avoiding action of both pilots.

With regard to the degree of risk involved, both pilots concurred that it had been low. This, coupled with the early sighting by the BAe146 pilot, plus the avoiding action taken after the TCAS RA, followed by the separation reported and the concomitant sighting and avoiding action taken by the PA28 pilot, led the Board to conclude that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

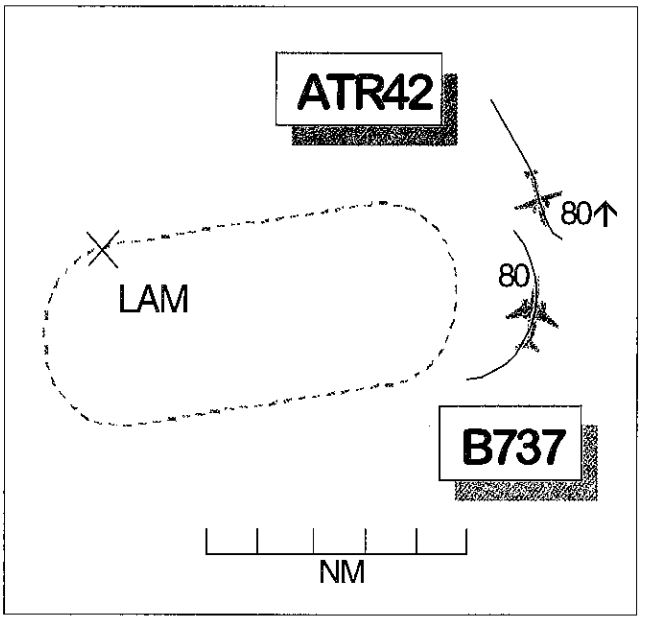
Cause: Conflict in the FIR resolved by both pilots.

Degree of Risk: C

AIRPROX REPORT No 51/00

Date/Time: 7 Apr 0745
Position: 5139 N 0022 E (8 NM E of LAM)
Airspace: LTMA (*Class:* A)
Reporter: LATCC

	First Aircraft	*Second Aircraft*
Type:	B737-500	ATR42-300
Operator:	CAT	CAT
Alt/FL:	FL 80	FL 110
Weather	VMC	VMC
Visibility:	10 km+	10 km
Reported Separation:	0.5 NM/NK	
Recorded Separation:	0.6 NM	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC TC NE DEPS controller reports that his workload was high but not excessive. The ATR had departed Luton and been given a stepped climb to FL 70. An ac which had departed from London City reported that he thought another ac (he did not identify it) had read back his climb clearance to FL 110. By the time Deps had checked his FPS and the radar to identify the relevant ac the STCA started flashing. He passed avoiding action to the ATR which did not appear to turn for some time but reported 'traffic in sight'. The LATCC Heathrow INT N SC was controlling the B737 at FL 80 in the Lambourne hold and had instructed it to leave LAM heading 270°. As it started the inbound turn the STCA went red with traffic climbing through FL 73 about 3 NM N of the B737. The pilot reported that he could see it and the climbing traffic (the ATR42) passed about 0·5 NM to his right at FL 80.

THE B737 PILOT reports heading N at 210 kt in a left turn at FL 80, inbound to LAM having been cleared to leave the fix heading 270°. In the turn the ATR was seen closing in his 2 o'clock at the same level. At the same time he was given an avoiding action left turn onto 240° and he saw the ATR begin a left turn before passing astern of him about 0·5 NM away.

THE ATR42 PILOT reports that on departure from Luton he had been cleared to FL 70. His F/O, in charge of communications, understood the following message: "C/s climb to flight level 110" and immediately replied on the RT: "C/s climbing to flight level 110". During this time he was watching an ac outside which appeared to be closing but which was still relatively distant and higher; conditions were VMC. During the FO's RT exchange, cabin crew called on intercomm asking the captain to make a passenger announcement on the PA; because of this the captain was not concentrating entirely on the RT, his attention being divided between looking out and the PA message. Meanwhile his F/O confirmed to him that he had clearly understood the message to climb to FL 110 which he had acknowledged properly.

Having actually heard the message being acknowledged and ATC having not corrected any error, the captain had at that moment no reason to think there had been a mistake. Later on ATC called him and ordered a turn to head 090°, which was unremarkable since he was under radar control. A little later when he had already started the turn ATC called again and again ordered him to turn quickly onto 090° in avoiding action; he was by then passing FL 77, and turned quickly. It was only then that the controller ordered him to stop the climb and descend to FL 70. He was not asked for a report until 4 days after the incident.

He added "Clearly we made a mistake between (the other callsign and ours) and responded to an instruction which was not for us. In mitigation, despite our acknowledgement, the controller did not correct our error as he should have done."

ATSI reports that the B737 inbound to Heathrow was in the Lambourne (LAM) holding pattern and called the Heathrow Intermediate North (INT N) controller at 0731:50. It was in the process of being given descent in the pattern and at 0743:00 had been instructed to return to LAM and leave the hold heading 270°. In response to a request the B737 reported level at FL 80 at 0744. At 0745:30 the INT N controller instructed the B737 to turn left now onto a heading of 270° as avoiding action. The instruction was repeated and the pilot responded that they were in visual contact with the traffic. Traffic information was not passed.

UKAB Note: The symbols *** and «««« in the following paragraphs represent the 2 very different callsigns of the company ac involved in the callsign confusion.

The ATR42 (C/s ***302 was an outbound from Luton on a Dover 7C departure. The routeing for this SID is to Brookmans Park (BPK) and thence on the 100° radial from BPK to intercept the 338° radial from Detling (DET) and route inbound to DET. The final SID altitude is 5000 ft. The route inbound to DET passes through the LAM holding area.

***302 reported on the North East Departure frequency at 0736:30 and after the identification request the controller cleared the ac to 5000 ft. At 0737:40 the ac was cleared to 6000 ft followed at 0739:30 with further clearance to FL 70. At interview the NE DEPS controller stated that his task with relation to ac on this route was to climb the ac to Minimum Stack level, on this day FL 70, and hand over to the next sector when clear of the LAM holding area. ***302 indicated level at 0740:52. It should also be noted that while the controller slightly mispronounced the *** part of the ***302 c/s, the pilot had understood it throughout.

Between 0741 and 0743 the controller picked up two incorrect read backs from another ac and corrected them. He also stated that, having climbed the ***302 to FL 70, there was nothing more he could do with the ac until it was clear of the LAM holding area. He was also directing a ««««312, a F50 outbound from London City on a Clacton departure which had to climb beneath ***302. He also remarked that the two pilots' voices sounded similar with "Euro accents". At 0744:40 the NE DEPS controller instructed the ««««312 to climb to FL 110. This call was clearly acknowledged by ***302 using the full callsign. After a transmission to another ac there was a blocked transmission followed by a clear callsign ««««312. Having confirmed with ««««312 that his cleared level was FL 110, the pilot responded with a warning that the first read back was from *"*** 312"*, unfortunately using his own numbers in the reported c/s. At interview the controller said that he had missed the incorrect callsign because a similar voice with a similar callsign read back the correct clearance that he was expecting. He also said that he needed to climb another ac first in order to transfer it to another sector, so that it was not until after this that he attempted to identify whether any other ac was climbing.

At 0744:25 the Short Term Conflict Alert (STCA) went straight to red as ***302 passed FL 73, in direct conflict with the B737 turning left and with the ac 2 miles apart the controller issued avoiding action instructions to the ATR42 *"C/s London avoiding action turn left heading 090"* repeating the same words a few seconds later when there was no reply. The pilot then responded with a part callsign following which the controller repeated the instruction, again including the words 'avoiding action'. At 0745:40 ***302 reported, again with part callsign, that the traffic was in sight. From the radar photographs it does not appear that the ***302 turned until 0746:00 by which time the ac had passed each other. The NE DEPS controller then instructed ***302 to turn right again onto 140° and descend to FL 70 which the pilot seemed reluctant to do. The minimum separation was 0.0 ft and 0.6 NM. Neither ac was fitted with TCAS.

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 agreed that the main cause of the incident was that the ATR42 (***302) crew took an instruction addressed to ««««312 and climbed into confliction with the B737. While members were not aware of the importance of the cabin crew's request for a PA message, if it did not concern a matter of supreme importance, it seemed untimely to say the least. Airline pilot members of the Board considered that the Captain should have ignored any such request from the cabin during this stage of flight and paid more attention to monitoring his FO. The company's CRM did not show up well in this incident; cabin crew should not interrupt at that stage of flight except in emergency. (After concluding their discussion of the Airprox, the Board was advised that the same company had had a similar incident, climbing unauthorised through the Lambourne hold, a few days after this Airprox.) Members also noted that the ATR42 pilot was wrong in suggesting he had quickly initiated avoiding action when told by the controller; the RT recording indicated he had been what some described as unacceptably slow in responding.

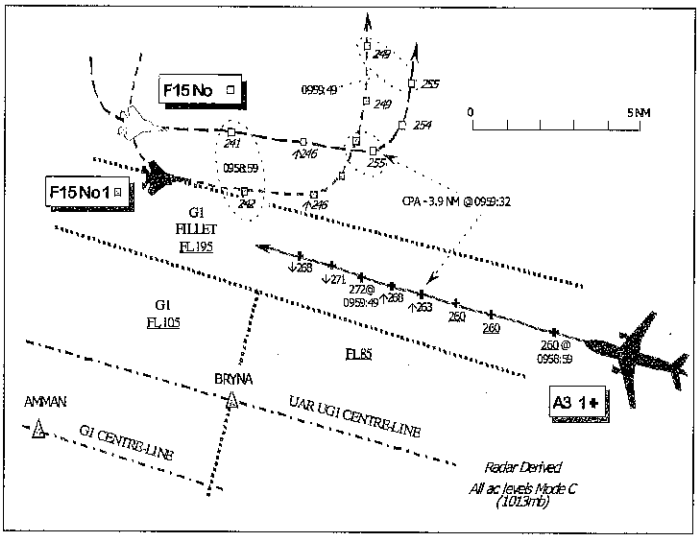
The London TC NE DEPS controller did not detect the readback error when ***302 responded to the climb instruction given to ««««312, and the Board considered that this was also part of the cause. Some 15 seconds later ««««312 told him about the error but he appears not to have absorbed the company part of the erring c/s passed by ««««312. Instead of searching his radar for a climbing ac, controller members considered he should have asked ««««312 to 'say again'.

Because there was only 1000 ft for the ATR42 to climb before conflicting with the B737, and the slowness of the ATR pilot and the controller to respond, members assessed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ATR42 pilots responded to a climb instruction passed to another ac, and the NE DEPS controller did not correct the readback error.

Degree of Risk: B



AIRPROX REPORT No 52/00

Date/Time: 10 Apr 0959

Position: 5155 N 0340 W (6 NM NE of BRYNA)

Airspace: UAR/MRSA (*Class:* B)

	Reporting Aircraft	*Reported Aircraft*
Type:	A321-211	F15 x 2
Operator:	CAT	Foreign Mil
Alt/FL:	FL 260	FL 250
Weather	VMC CLOC	VMC CLAC
Visibility:	10 km	Not reported

Reported Separation: 3 NM H / 3-5 NM H

Recorded Separation: 3·9 NM H & 800 ft V

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AIRBUS A321 PILOT, in a very comprehensive report, stated they were routeing UG1 westbound to Dublin, cruising at 420 kt, level at FL 260. London CONTROL instructed them to fly a 4 NM R offset track, which they did and once established were asked their heading, which they were instructed to maintain as a radar vector. This heading (295°) maintained a perfect track 4 NM N of the UG1 centreline, which he cross-checked frequently. At about 40 NM E of STRUMBLE VOR, TCAS displayed two contacts dead ahead at a range of 10 NM - 1400 ft below them and climbing. TCAS then enunciated *"traffic traffic"*, followed by *"climb"* – *"increase climb"*, then – *"monitor vertical speed"*. During the encounter, two grey military ac in close formation were seen to close to 1 o'clock - 4NM - 1000 ft below them. At the closest point they were 2 o'clock – 3 NM – 600 ft below, before passing down the starboard side as they turned quickly away to the N. He added that the risk had been "high", and he was concerned about any other civil ac above them as they responded to the TCAS climb RA – they reached FL 275 before they were *"clear of conflict"*. He reported the Airprox to LATCC.

THE F15E PILOT reports leading a flight of 2 ac engaged in air combat training with another similar flight whilst under a RCS from London RADAR and squawking their assigned codes with Mode C. His ac was standard camouflage grey, but HISLs are not fitted. They were flying in good VMC, out of sun, 2000 ft above cloud and his No 2 was flying 2

NM line abreast, a maximum of 1000 ft below his level. Whilst level at FL 250 turning L through E at 500 kt, another ac was acquired on AI radar at a range of 3-5 NM and above their level. As they were already heading E to avoid UG1, no further avoiding action was considered necessary. London MIL then asked them to turn onto N for traffic avoidance, which was complied with. He added that they had no other distractions, they were aware of the traffic and had avoided the 5 NM 'buffer' of UG1 he thought by about 2-3 NM.

LATCC reports the Airprox occurred 4 NM N of AMMAN at 0959. The STRUMBLE SC described the traffic loading as 'heavy'. The Airbus was maintaining FL 260 on a radar heading of 295°, tracking about 4 NM N of the centre line of UG1. The F15 flight tracked southbound towards G1 at FL 233 and commenced a hard L turn apparently to take them away from CAS, this manoeuvre resulted in the flight turning toward the Airbus and during the turn the flight commenced a climb.

At 0959, the Airbus crew reported *"...two TCAS... traffic 1400 feet beneath us climbing have you got them on radar?"* The SC explained that they were military ac operating just outside of the N Wales MTA and indicating FL 246 Mode C. Just after 0959:20, the Airbus crew advised that they could now *"...see him moving away from us...we are climbing on a TCAS... through 260..."*. In the background of this transmission the aural TCAS instruction *"increase climb"* can be heard and at this point the No1 F15 was 12 -1 o'clock from the Airbus - 8·4 NM, in a climbing L turn on to a northerly track. The CPA occurred at 0959:32, when the No 2 F15, was R 2 o'clock - 3·9 NM from the Airbus and 800 feet below it. The Airbus crew subsequently reported clear of the conflict and returned to FL 260 later stating that it wished to file an 'Airmiss' (sic) against the two military ac.

MIL ATC OPS reports that two F15 flights of 2 ac were in receipt of a RIS from London RADAR Controller 32 (CON32) whilst conducting Air Combat Training, 1000 ft Holyhead RPS (30.01 inches) - FL 450, in and below the North Wales Military Training Area (MTA). Another unrelated formation of 4 ac was also being provided with a RIS.

As the subject F15 flight flew S towards G1 climbing slowly through FL 215 about 12 NM N of AMMAN, CON 32 observed the westbound Airbus 4 NM N of the centreline of UG1 at FL 260, 15 NM ENE of AMMAN. Just after 0958, the flight was instructed to, *".. turn onto northern heading now to remain north of ... Golf One"*, which was acknowledged *"... already headed E"*. This is substantiated by the radar recording which at 0958:25, shows the flight in a L turn climbing through FL 227 about 7 NM N-NE of AMMAN and steady on an easterly track at 0958:51, (UKAB Note (1): passing FL 238 right on the northern boundary of Class A airspace). Shortly afterwards, CON 32 transmitted *"... can you continue onto a northerly heading... there's airways traffic just to the SE range of 5 NM westbound"*. This traffic information was acknowledged and the flight turned onto a northerly heading. The radar recording reveals the flight initiated a L turn at 0959:22, passing FL 246 in a slow climb 8 NM NE of AMMAN, with the Airbus 5 NM to the SE and tracking 290° at FL 260. Ten sec later, the AIRBUS is seen climbing through FL 263 in response to the TCAS RA, maintaining track 4 NM N of the centreline of UG1, whilst the No 2 F15 is shown 2 o'clock - 3·9 NM in a climbing left turn onto N, passing FL 255. At 0959:49, the Airbus indicates FL 272 Mode C - at the top of its TCAS climb and six seconds later horizontal separation is restored as the F15s clear northbound, 6 NM N of the Airbus.

CON 32 passed the flight a timely warning regarding the proximity of CAS and reasonably accurate traffic information regarding the Airbus; both calls were entirely consistent with the RIS provided at the time. The F15 flight leader reports that he was aware of the lateral confines of UG1 prior to the traffic information and had turned to remain clear of it. Moreover, he also reports he was well aware of the Airbus, which he had correctly identified as being above the flight. At the time of CON 32's first call, the flight was clear of CAS, below FL 245 and perfectly entitled to occupy the airspace in which they were manoeuvring. However, shortly after the traffic information call, the F15s climbed above FL 245 and into Class B airspace S of the MTA, where CON 32 should have ensured that either 5 NM or 5000 ft separation was maintained, because the previous instruction to operate from 1000 ft RPS to FL 450 had not been amended when the formation flew S of the southern MTA boundary. CON 32 should have either changed the upper operating level of the flight to FL 240 under the RIS, or issued mandatory avoiding action instructions in

accordance with the RCS above FL 245. Nevertheless, it appears that the safety of the subject ac was never in question, as the minimum horizontal separation was never less than 3·9 NM.

UKAB Note (2): The southern boundary of the N Wales MTA is about 12 NM N of the UG1 centreline at BRYNA.

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 adviser from HQ 3 AF explained that the F15 crews thought they had applied a sufficient buffer against CAS (2-3 NM), but with hindsight this was not enough. Moreover, they may not have appreciated that GAT could be displaced on a parallel track either side of the UG1 centreline and still be considered to be 'on-route', as in this instance. A civilian ATCO member explained that with the levels of CAT now commonly encountered it is more often the case that airliners will be tracking off the UAR centreline. Members noted that the radar recordings showed that the No1 F15 flew right up to the northern boundary of the fillet of Class A airspace, where the base is FL 195 and adjacent to the UAR when they climbed up into Class B airspace. It was unsurprising, therefore, that the F15's climb triggered the TCAS RA for the Airbus crew. With the advent of TCAS, the lesson here for military crews is to allow a greater margin against CAS/UARs - this Airprox graphically illustrates what can occur when this does not happen.

From the Airbus pilot's perspective it was evident that TCAS had worked 'as advertised' and they reacted promptly and correctly, advising the STRUMBLE SC accordingly – which is most important. But the Airbus crew should not have had to rely on TCAS to keep them clear of the F15s. Fortunately, there were no other airliners above them on UG1, but the Airbus crew did not know that at the time.

It was evident that CON32 was endeavouring to provide the F15 crews with the ATS they had requested, whilst still allowing them the freedom to manoeuvre they required to complete their mission. Some members believed that the offset track of the Airbus also caught out the London RADAR controller, who had left it too late to impress on the F15 crews what he wanted them to do. Fortunately, the F15 crews were aware of the Airbus from their AI radar, but CON 32 would not have known that at the time. Although the controller had correctly assimilated the developing scenario, his instructions to turn the F15s away from CAS and back toward the N Wales MTA were quite late. This delay, albeit short, resulted in horizontal separation being eroded still further. The urgency which this action warranted may have been more apparent to the F15 crews if CON32 had used the phrase 'avoiding action'. It was recognised that, controlling multi element manoeuvring formations posed a significant challenge particularly in such a vast height block when climbs and descents might involve changes to the ATS. To this end the Board found much to agree with in Mil ATC Op's report findings. However, notwithstanding these difficulties, military ATCO members suggested that this Airprox stemmed from a lack of positive control by CON32, which the Board agreed, was contributory to the cause. The erosion of standard separation down to 3·9 NM was also noted when the flight performed a crossover climbing turn onto N bringing the No2 closer to the A321 as both F15s went above FL 245 into Class B airspace. Members could not understand why the leader had climbed, knowing the airliner was above them. Taking all these factors into account members agreed that this Airprox resulted from an inadvertent penetration of CAS by the F15 pilots, compounded by a lack of positive control by CON 32. However, as the F15s were already turning away from the Airbus and never got closer than 3·9 NM, coupled with the visual sighting by the A321 crew, it was agreed that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Inadvertent penetration of CAS by the F15 pilots, compounded by a lack of positive control by CON 32.

Degree of Risk: C

AIRPROX REPORT No 53/00

Date/Time: 11 Apr 0928

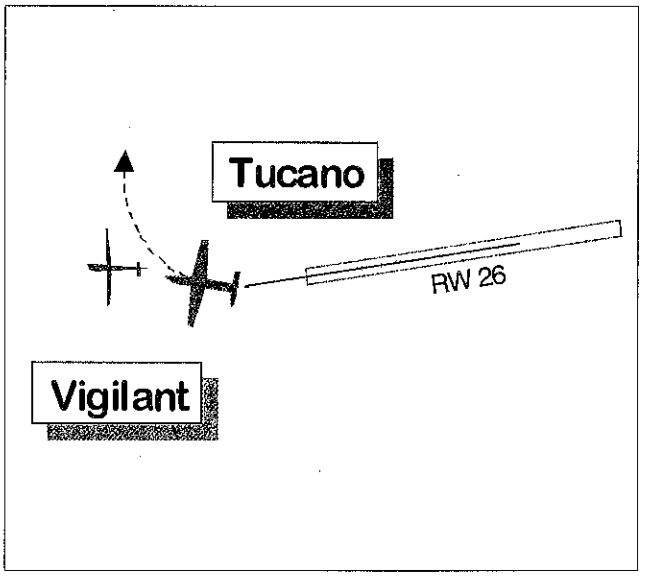
Position: 5739 N 0334 W (RAF Kinloss - elev 22 ft)

Airspace: ATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Vigilant	Tucano
Operator:	HQ PTC	HQ PTC
Alt/FL:	750 ft (QFE 994 mb)	750 ft (QFE 994 mb)
Weather Visibility:	VMC CLBC 10 km+	VMC CLBC 8 km

Reported Separation: 50 ft H/NK

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT PILOT reports heading 280° at 60 kt, climbing after take-off from RW 26 at Kinloss; he was in communication with Kinloss tower on 122·1. Passing 750 ft he saw a Tucano closing from his left, slightly lower, in a climbing right turn. It passed very close (about 50 ft) behind him still in a climbing turn while he turned slightly right to keep it in sight. There was a high risk of collision; he had not seen the Tucano in time to take avoiding action. His ac was white with red rudder and wing tips and his wing tip strobes and HISL were on; the incident occurred 1000 ft below cloud.

THE TUCANO PILOT, an instructor on a dual sortie, reports heading 260° at 140 kt while climbing away from a roller landing on RW 26 at Kinloss, having joined downwind when the circuit was reported clear; he was communicating on 336·35. He did not see the Vigilant and had not heard it cleared for take-off. He commented that the Vigilant is extremely difficult to see from behind in the pertaining conditions of light overcast. He was instructing his student on circuit flying at the time.

MIL ATC OPS reports that the Tucano pilot was flying visual circuits at Kinloss following a downwind join to RW 26 RH. The Tucano pilot was operating with Kinloss Tower (TWR) on UHF frequency 336·35 and was the only ac in the circuit. At the same time, the pilot of the Vigilant was in communication with TWR on VHF frequency 122.1 whilst taxying for RW 26. All TWR transmissions were made simultaneously on both the UHF and VHF; however, it was not possible to cross couple the frequencies. The weather at the time was rain with 3 oktas at 1800 ft and 14 km visibility. At 0925:59, whilst the Tucano was on the downwind leg of his second circuit, the pilot of the Vigilant was given clearance to take-off by TWR. By the time TWR received a finals call from the Tucano pilot one-minute later, the Vigilant was airborne and climbing away, and so the Tucano pilot was cleared to roll. At 0928:42, as the Tucano climbed away after the approach and commenced a right turn to position for downwind, the Vigilant pilot transmitted *".....that Tucano was very, very close.....I don't believe he saw me as he broke, he broke astern of me"*. TWR acknowledged the call and replied *"C/S, he was in the visual circuit and should have been aware of your departure"*. The Vigilant pilot then transmitted that he would discuss the incident after his landing. The Tucano pilot made no other transmissions other than his normal positioning calls.

The Tucano was part of a week-long detachment from Linton-on-Ouse. The detachment had reported that they were experiencing problems with their VHF radios and had requested to remain on UHF frequencies whenever practicable. Whilst the Kinloss FOB stipulates that ac in the circuit should

operate on the same VHF frequency, TWR allowed the subject Tucano to operate on UHF as the Vigilant was intending to 'clear' the circuit. Furthermore, all RT calls were made on both VHF and UHF simultaneously. The tape transcripts for both TWR frequencies concur with this statement; however, the Tucano pilot did not hear a take-off clearance being given to the Vigilant pilot. The degree of control exerted by TWR over circuit traffic was entirely consistent with the current military ethos: controlling within the visual circuit has evolved to meet the needs of various operators and calls for controllers to provide participating aircrews with accurate information regarding circuit and instrument approach traffic. The emphasis is generally placed upon aircrew to position themselves appropriately to carry out their intention safely and expeditiously. As a result, only the minimum of positive control is provided and controllers will normally only pass mandatory ATC instructions when they believe flight safety may be affected. This system of control would normally allow aircrews to develop an accurate airborne picture; however, with hindsight, it may have been prudent to highlight the Vigilant's departure to the Tucano pilot given the high speed differential and the complexity of multi-frequency operations in the visual circuit.

The Tucano pilot commented that Vigilant ac are difficult to see from behind and especially so in light overcast conditions. This, coupled with the slight deterioration in Met conditions may also have been a contributory factor in this incident.

HQ PTC comments that with hindsight, there is clearly a reason why the Kinloss FOB stipulates that TWR should exercise control on VHF – so that everybody else can keep a handle on where the slowest and least visible ac (the Vigilants) are. Departure from this rule should at least have flashed a warning in someone's consciousness. While the Tucano pilot should have seen the Vigilant, he received few clues that the circuit was no longer his own, and his lookout may have been degraded by a need to monitor his student. Notwithstanding the current military policy of loose aerodrome control, we are at a loss to explain why the slower ac was allowed to depart into the path of the faster without a possible escape vector; nor why the latter was not at least warned about the Vigilant's position before being cleared to roll. Frequency cross-coupling might have provided a safety net.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

While members accepted that close control in the circuit would inhibit RAF operations, pertinent traffic information was necessary in order to enable pilots to position themselves safely. It had been recognised in the FOB that circuit operations on split frequencies was to be avoided; the Board considered that in deciding to allow this exception, the controller should have satisfied himself that the Tucano pilot was aware of and could see the Vigilant climbing away ahead of him. Members agreed that a Vigilant tail-on against an overcast backdrop could be almost invisible, but the controller may not have been fully aware of this. Combined with the speed differential between the ac, this presented a considerable hazard.

The Board concluded that the main cause of the Airprox was that the Tucano pilot did not see the Vigilant. This was a simple fact, not a criticism; under the circumstances it was not surprising. Members also agreed that a lack of traffic information from TWR to the Tucano about the Vigilant was a contributory cause.

Because the Tucano pilot flew close across the tail of the Vigilant without having it in sight, the Board assessed that there had been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tucano pilot did not see the Vigilant, compounded by a lack of traffic information from TWR.

Degree of Risk: A

AIRPROX REPORT No 54/00

Date/Time: 11 Apr 1831

Position: 5600 N 1000 W

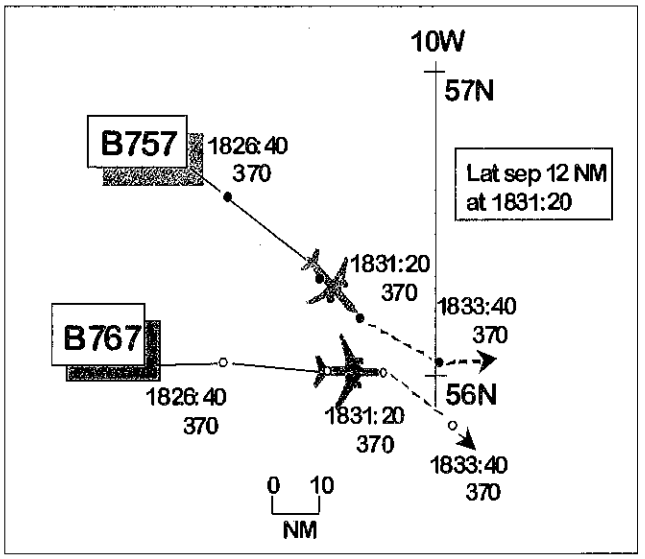
Airspace: Oceanic Control Area (*Class:* A)

Reporter: ScOACC

	First Aircraft	*Second Aircraft*
Type:	B767-200	B757-200
Operator:	CAT	CAT
Alt/FL:	FL 370	FL 370
Weather Visibility:	VMC	VMC

Reported Separation: 12 NM

Recorded Separation: 12 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

ScOACC reports that Shanwick Oceanic was operating during a routine outage of the Flight Data Processing System (FDPS). An estimate was received from Gander OAC on a B767 from Kennedy to Heathrow via 57N 30W - 56N 20W - 56N 10W and accepted at FL 370. Another estimate was received from Iceland OAC on a B757 from Keflavik to Faro also at FL 370, routeing via 61N 19W - 58N 15W to enter the Shannon UIR at MASIT. In order to keep the B757 clear of the westerly Track A, the Oceanic en-route controller decided to re-route it to 56N 10W, which was one degree N of the entry point for Track A. As the two flights converged towards 56N 10W, the Scottish radar controller noticed the confliction as soon as the B767 called on her frequency; she issued it with a turn to the R to increase separation and informed Oceanic of the situation. The Oceanic controller, via the Shanwick Radio Operator at Ballygirreen in Ireland, issued the B757 with a turn to the L before transferring it to Scottish Control. The minimum distance between the flights was 12 NM. While there was no loss of separation in radar terms, this represented a considerable reduction in the time separation required under Oceanic's procedural criteria.

UKAB Note: Both ac were flying at about 8 NM/ min. Procedural separation should have been 10 minutes on the same track or 60 NM laterally.

THE B767 PILOT reports that he was inbound to Heathrow and cruising at FL 370 eastbound towards UK airspace. The visibility was 30 km in VMC. Shannon ATC instructed him to route direct to the Isle of Man, which was not on his flight plan so he questioned it. At no time was there any mention of an Airprox or confliction with another ac.

THE B757 PILOT reports that he had been re-routed from 58N 15W to 56N 10W at FL 370. He was unaware of any confliction and the other ac was not seen.

ATSI reports that the Airprox occurred as the ac converged on 56N 10W. The ac were entering the coverage of ScACC radars and would normally have been transferred from the Prestwick OACC procedural area control service to the radar based area control service provided by ScACC in the vicinity of 56N 10W.

Prior to the Airprox, the ac had been under the control of the POACC En Route (ER) FL 350+ controller. POACC was operating in Manual Reversion (MR) mode as the Flight Data Processing System (FDPS) was undergoing routine maintenance. Consequently the POACC ER controller was "quite busy". The ScACC Domestic controller, to whom the subject ac were to be transferred, was responsible for the Dean Cross, Central and Southwest Sectors combined. She was operating without a Planning ('P') controller but retained the view that the manning

had been adequate, given the "light" workload and traffic loading at the time of the Airprox.

The B767 entered Shanwick airspace at FL 370 on the flight planned route, crossing 30W at 1705. The B757's route to MASIT would involve it crossing a number of the predominantly east-west aligned traffic flows. The FDPS can cope with such routeings quite readily and quickly predict potential conflictions, but, this task is time consuming for the controller during MR. Consequently, the POACC controller chose to re-route the B757 on a track which would remain north of the east-west tracks while it was in Shanwick's airspace. The revised route, via 58N 15W - 56N 10W - TADEX, was passed to Reykjavik for onward transmission to the B757. The POACC MATS Pt 2 states, in the section dealing with MR:

> "Experience has shown that during manual operations it is beneficial to reduce the freedom of routeing normally available to operators filing routes outside the NAT OTS, thereby reducing the number of crossing track problems which are experienced during normal operations. To achieve this aim Ghost Tracks are established and brought into operation when Manual Reversion is declared.
>
> By definition Ghost Tracks are a set of short term contingency tracks agreed between the OACCs and determined by Shanwick immediately following the NAT OTS negotiations. These tracks will not be notified to the operators unless Manual Reversion is declared when they can be brought into operation at short notice".

The re-route for the B757 did prevent the flight crossing other tracks but resulted in it entering domestic airspace at the same point, and the same level, as the B767. The POACC controller explained that the original intention had been to route the B757 via 57N 10W, because of other traffic routeing via 56N 10W, however, he subsequently referred to the Organised Track Structure (OTS) and Ghost Tracks and saw that the northernmost track routed via 55N 10W. Apparently his original, valid reasoning then slipped his mind and he thought that potential conflicts from his other traffic would be achieved by routeing the B757 through 56N 10W.

The B757 entered Shanwick airspace, at 61N 19W, at 1743, following the new routeing. The pilot passed an estimate for his next reporting point, 58N 15W at 1808, and advised that his next co-ordinate was 56N 10W. When this report was relayed from Ballygirreen, the controller annotated his FPS with the information, together with an estimate for 56N 10W (1827) which he calculated himself. The controller was using FPS generated by the computer before starting MR. (Normally Shanwick controllers work with information displayed on computer screens.) The FPS on the B757 showed the original flight plan routeing but was amended, correctly, to show the revised routeing. This was a "standard" eastbound, buff coloured FPS. Because the B767 had been in the 'system' at the time of the MR, a white MR FPS was produced, reproducing the flight information held in the FDPS. As well as the co-ordinates, this included printed estimates for 40W, 30W, 20W and 10W. The estimate for 56N 10W was 1834, ie 7 minutes behind the B757. The minimum separation required is 10 minutes. At 58N 15W, the pilot of the B757 included in his position report an estimate of 1833 for 56N 10W and this was recorded on the strip. In his 56N 20W position report, the pilot of the B767 passed an estimate of 1830 for 56N 10W but the controller did not record this on the strip. Thus the FPS on the subject ac showed them routeing via 56N 10W at the same level with only one minute separation. The controller recalled both FPS had been displayed with that on the B757 above the B767 with one strip in between.

The POACC controller did not pick up the developing conflict from his strip display and the subject ac converged on 56N 10W, the B767 from the west and the B757 from the north-west. When scanning his strip display, the controller did not absorb the details on the subject ac, which should have clearly indicated the conflict, because, in his mind, he had routed the B757 north of his other traffic. He admitted that his experience of detecting conflicts using FPS during MR was limited, having been confined to exercises during his Emergency Continuation Training (ECT). His most recent ECT had been in November 1999. Although the FDPS is regularly shut down on a Tuesday evening, for one reason or another he had not been working when previous shut-downs had taken place. Therefore, for practically all of his operational experience, he had relied on FDPS to provide conflict detection.

One further consideration raised by the POACC controller and his colleague was that the FPS produced by the FDPS prior to MR are different in design to the "standard" FPS. The latter are coloured buff for eastbounds and blue for westbounds, whereas the MR FPS are all white and rely on coloured strip holders to indicate the direction of flight. The layout of the FPS is similar but does differ in detail. Collectively, these factors may have made it marginally more difficult to detect the conflict from routine scanning of the FPS display but, notwithstanding this, all of the relevant information was available on the strips and they were close together in the strip display. During MR, the controller should have made frequent checks of the strip display; firstly to ensure that his traffic remained adequately separated, and additionally to pick up possible ATC errors such as the one which led to the Airprox.

Meanwhile, the ac converged on 56N 10W. The ScACC Domestic controller received FPS on both but did not pick up the conflict from the strip display. The ScACC MATS Pt.2 (Page GEN 1-6, Para. 5.6.2 (a)) lists amongst the specific responsibilities of the 'P' controller : *"The initial prediction of potential conflicts within the sector from the flight data display and the appropriate acceptance of, or amendment to, the flight profile of subject ac. The 'P' Controller may also use radar to assess potential traffic conflicts. Conflicts are to be brought to the attention of the 'E' Controller."* In mitigation, however, whereas strips should be produced about 20 minutes prior to the boundary, in the case of the B757, the strips arrived late. The ScACC Domestic ATSA reports that the estimate on the B757 had been one in a batch of 7. No details were held on the flight so Shanwick were asked to provide the flight plan information. (On its original routeing, the B757 would not have entered Scottish Domestic airspace which probably explains why no information was held.) Whilst the Domestic ATSA was inputting the flight details, at 1823:30 the POACC controller passed the time revision on the B757 (from 1827 to 1833) and this was the time used to activate the flight plan. It is likely that several more minutes would have elapsed before FPS were produced and delivered to the sector, so the Domestic controller would have probably have had the relevant FPS for less than 5 minutes when she noticed the radar returns of two ac at FL 370 approaching 56N 10W, shortly before 1830. At 1829:50, she telephoned the Shanwick controller to point this out, having evidently deduced, correctly, that the ac in question were the B767 and the B757. At that stage the ac were about 18 NM apart with the B757 virtually due north of the B767. The B757 had retained its Reykjavik SSR code (coincidentally that allocated to a UK domestic flight, so a spurious callsign was displayed) and the B767 was squawking 2000 to indicate an ac from a non-SSR environment.

The ScACC Domestic controller advised her POACC colleague that she would see whether either of the ac were listening out on her frequency. At that stage the B757 was not but the pilot of the B767 did respond. The flight was identified and then instructed to turn right 40°. The controller did not provide any explanation for the turn and neither did she pass traffic information. However, the B757 was in the B767's 8 o'clock position at a range of about 14 NM. On hearing that the Domestic controller was not in communication with the B757, the POACC controller contacted Ballygirreen and requested them to relay a message instructing the flight to turn left due to traffic on its right-hand side. Once the instruction had been acknowledged correctly, Ballygirreen instructed the B757 to contact Scottish Domestic. Communication was established with the Domestic controller at 1833:30. The pilot did not report on a heading but requested to turn on course for TADEX. No mention of the incident was made. Following identification, the controller instructed the B757 to descend to FL 360 and cleared it direct to TADEX once it had levelled. A short time later the B767 was also cleared to resume its own navigation and the remainder of both flights were uneventful in ScACC airspace. From the radar recording, it is estimated that the minimum separation achieved was 11 NM, however, the B767 was always going to arrive at 56N 10W ahead of the B757 and it is estimated that the latter would have arrived at that position 8-9 NM in trail had no action been taken by ATC. Although a 5 NM radar separation minimum is applicable and acceptable in Scottish Domestic airspace, this constituted a serious loss in terms of Shanwick procedural separation.

UKAB Note (1): Radar pictures show the subject ac converging towards 56N 10W at FL 370, the B767 from the W and the B757 from the NW. At 1831:20, the B767 makes a R turn through about 40°, resulting in a slightly divergent track from the B757 which is about 12 NM to its NW. Separation

then increases slowly to about 13 NM with the tracks almost paralleling until 1833:40, when the B757 turns from a SE to an E heading, widening the track divergence and quickly increasing lateral separation. Both ac maintain FL 370 throughout the encounter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

An ATSI adviser told the Board that the POACC controller, having correctly recognised that the B757 was on a track likely to conflict with the predominately E/W orientated traffic flows, made an elementary error in resolving the situation. Because the flight was entering his airspace during a period when FDPS was not available, rather than attempting to devise a conflict-free flight profile "manually" he elected to clear the flight on a track which would not conflict with, or cross, existing tracks. This was a reasonable plan; however, he wrongly assessed that routeing the ac via 56N 10W would achieve his objective. Thereafter, the only hope of detecting the confliction was from his strip display. The relevant strips showed the 2 ac 7 min apart at 56N 10W and 1 min latterly, but this did not alert him to the developing confliction and standard procedural separation was lost. The Board commended the SCACC Domestic Controller for detecting the conflict from a routine scanning of her radar display.

The Board noted with some surprise that the controller was not accustomed to using the strip display for error or conflict detection, as was necessary under conditions of manual reversion. Members expressed concern that the emergency continuation training programme which should have prepared him for such an eventuality appeared not to have been effective. An ATCO member, familiar with the environment in question, explained that, in practice, planned withdrawal of the FDPS for maintenance purposes occurred only about 5 times a year and on such occasions traffic loading was usually light. Emergency continuation training was planned whenever possible to coincide with busy periods in order to provide realistic and demanding conditions. Watch managers had assured him that a high priority was placed on such training and errors such as the one which caused this Airprox were extremely unusual. The Board accepted these points and concluded that the Airprox was caused during a period of FDPS manual reversion when the POACC controller did not provide the requisite standard separation between the subject ac.

In view of the 12 NM separation actually obtained, some members queried whether this incident constituted an Airprox. However, an ATCO member reminded colleagues that standard separation over the Atlantic should have been 60 NM or 10 min, and said that, in his opinion, separation in this case was fortuitous. Indeed, had the encounter taken place further west, outside the cover of domestic radar, the confliction would have remained undetected and the outcome might have been more serious; on these grounds he thought that safety had been compromised. However, the Board as a whole took a less critical view and concluded that there had not been a risk of collision. This did not detract from the serious loss of procedural separation, however, and members agreed that the incident was correctly reported as an Airprox.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The POACC ER Controller did not provide standard separation between the ac during a period of FDPS manual reversion.

Degree of Risk: C

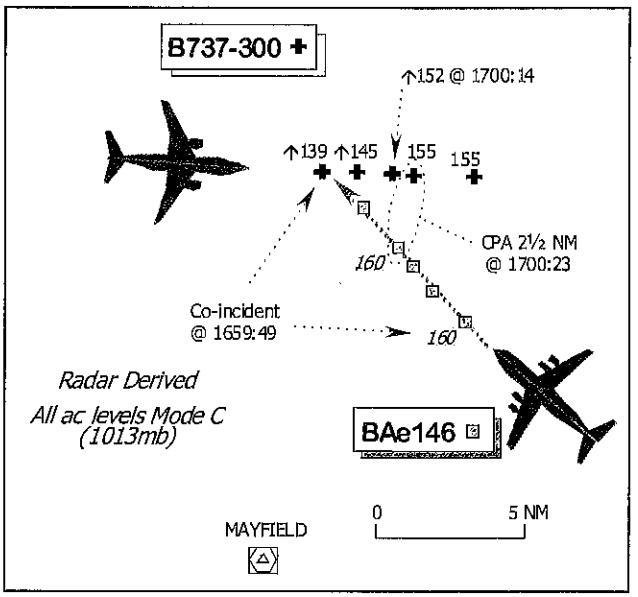
AIRPROX REPORT No 55/00

Date/Time: 5 Apr 1700

Position: 5110 N 0019 E (12 NM NE of MAYFIELD)

Airspace: London TMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	BAe146	B737-300
Operator:	CAT	CAT
Alt/FL:	FL 160	FL 150
Weather	VMC CLOC	VMC CLAC
Visibility:	*"Good"*	Not reported
Reported Separation:	0·5 NM H	Not reported
Recorded Separation:	2·5 NM H & 500 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe146 PILOT reports heading 320° whilst inbound to Heathrow under a RCS from LATCC. Just after levelling at FL 160, another flight that was crossing his track was heard to report a *"TCAS Climb"* on the frequency, whereupon LATCC informed the other crew that his ac was above them. LATCC also advised him of the situation and the other ac stopped its climb at FL 156. The B737 passed, he thought, about 0·5 NM ahead of the BAe146 from L – R, on a track almost perpendicular to his with a medium to high risk of a collision. No warnings were enuciated by TCAS.

THE B737-300 PILOT reports heading 100° outbound from Gatwick on a DOVER SID climbing to their assigned level of FL 150. Passing through FL 140, TCAS enunciated a TA against descending traffic about 5 NM to starboard. On passing FL 146 the TA changed to an RA with an aural *"climb climb"* instruction. He disconnected the autopilot and autothrottle whilst maintaining the climb as the first officer reaffirmed the RA. The climb was continued to FL 156 at which the RA stopped and a descent to FL 150 was initiated. The other ac was not sighted.

LATCC ATC INVESTIGATIONS report that the Airprox occurred 12 NM NE of MAYFIELD VOR at 1700:23. The BAe146 was inbound to Heathrow from Lyon via the BIGGIN VOR; the crew contacted the BIGGIN SC at 1654 and reported descending to FL 160. The B737 departed from Gatwick for Brussels, established contact with the BIGGIN SC at 1656 and was climbed in stages to FL 90 and then to FL 150 against the descending BAe146. At 1659:49, as the BAe146 levelled at FL 160, the B737 was crossing from left to right through it's 12 o'clock at a range of 7 NM and climbing through FL 137 for FL 150. At 1700:14, the SC observed that the B737 was climbing above its cleared level of FL 150, as the crew reported a *"TCAS climb"*. The SC acknowledged the call from the B737 crew and advised them of the BAe146, 1000 ft above and maintaining FL 160, which was about to pass astern. The SC confirmed that the B737 crew were aware their assigned level was FL 150 and then queried why they had climbed above it, whereupon the crew reiterated that they had received a TCAS climb instruction. The B737 exceeded its assigned level by 500 ft and reached FL 155. Once the controller assessed that it was no longer in conflict with BAe146 he issued a further climb to FL 170. The CPA occurred at 1700:23, as the B737 passed through the BAe146's 2 o'clock - 2·5 NM, 500 ft below it. The BAe146 maintained FL 160, passed astern of the B737 and separation was restored within 20 sec.

FLIGHT OPERATIONS POLICY comments that the B737 had a ROC of over 4000 ft/min when the crew received the TCAS warning. It is probable that the climb RA aimed to achieve the largest vertical displacement at the CPA, therefore the B737 crew probably responded correctly. It would appear likely that at the point the crew was about to reduce

power to level at FL 150, TCAS commanded a climb to maintain the appropriate projected TCAS vertical separation from the BAe146.

ATSI concurred fully with the LATCC report and concluded that the erosion of separation was due to the B737 crew climbing above their assigned level in response to a TCAS RA. A contributory factor was the high ROC selected by the B737 crew when climbing the 6000 ft from FL 90 to FL 150.

THE B737's COMPANY suggested that if a maximum ROC when within 1000 ft of assigned level was stipulated, in a similar manner to the minimum ROC stipulated in the UK AIP, it might reduce the potential for such an occurrence. The subject ac's TCAS has now been upgraded to version 7.0.

UKAB Note (1): As a result of the apparently anomalous RA generated by the B737 TCAS, DERA Malvern was consulted for a possible explanation, but they were unable to reconcile the encounter with a crossing climb RA as reported. Generally, TCAS will generate crossing RAs from time to time, particularly when there is a significant miss distance such as the CPA of 2·5 NM in this instance. Furthermore, when there is a high rate of climb, the 'chances' that a crossing RA will work and a non-crossing RA will NOT work are both increased; the desirability of requiring ac to reduce their vertical speed to less than 1500 ft/min when within the last 1000 ft of assigned level is to be discussed again at a forthcoming ICAO conference. However, the TCAS logic is biased or 'prejudiced' against crossing RAs and if the intruder, the BAe146 in this instance, is level TCAS will not generate a crossing RA until the vertical separation is less than 600 ft. DERA were unable to reconcile the reported climb RA in this situation unless it occurred later than passing FL 146 – 1400 ft below the BAe146 as reported in this encounter. The following alerts are specifically associated with the TCAS logic for version 6.04, as fitted to the B737. If TCAS diagnosed that the B737 was climbing at >1500 ft/min, when a climb RA was generated it would be enunciated as *"monitor vertical speed"*; an RA to level-off would be enunciated as *"reduce climb"*; if the B737 was climbing at <1500 ft/min a climb RA would include the word *"crossing"*. The B737 pilot reports that *"climb climb"* was enunciated but does not detail the VSI indications. However, it is possible that the RA was *"reduce climb"*, which the crew might have misheard - this has occurred in the past.

UKAB Note (2): NATS was also asked to review this TCAS encounter, which was simulated from recorded radar data in an attempt to understand the B737 TCAS reaction. They report that the Airprox has been simulated several times, but the computer model did not re-create the TCAS resolution that occurred during this event. Without any more information they cannot deduce definitely what happened, but they believe that it is unlikely that this was a *"Crossing Climb"* and suggest that one or other of the TCAS units was malfunctioning, or, that the B737 crew might have misheard a *"reduce climb"* RA as a *"climb"* RA.

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 members noted the work done by NATS to simulate the TCAS event and the possible explanations for this seemingly odd occurrence postulated by the technical experts at DERA. Whilst it was feasible that both pilots might have misheard the aural enunciation, this would have been at odds with the VSI indications. An airline pilot member advised the Board that in responding to the RA the handling pilot would increase pitch to follow the displayed VSI indication, usually in a red sector at that stage and continue with the climb until separation was restored. It was unfortunate that this aspect had not been reported in greater detail by the pilots concerned. Consequently, members tried to think of other factors, which might have given rise to the circumstances that caused this Airprox. All of the pilot members were surprised at the high rate of climb employed by the B737 as it approached FL 150. They wondered if some form of autopilot malfunction might have been present at the time which meant the autopilot might have been unable to capture the level set, causing the B737 to climb through the correctly set level. Under normal circumstances pilots explained that the autothrottle should have reduced power as the

autopilot commenced reducing the climb rate smoothly anticipating reaching level flight at FL 150; this would have been before FL 140, when the TA was enunciated. However, the B737 pilot reported receiving the RA passing FL 146 when he then deselected the autopilot and autothrottle. Another possibility was that the level had been inadvertently set above FL 150 but there was no evidence of this and so it did not engender unanimous support. Members also thought it odd that the BAe146 crew did not receive any TCAS indication; confirmation that it was fitted and that no indication had been received was sought from the company; it transpired that while fitted in the ac, TCAS had not yet been activated. In the end with the information available to it, the Board was unable to reconcile the TCAS RA as reported with the dynamics of the situation and the various expert technical and pilot advice received. The B737 pilots had responded to the TCAS RA in the correct manner and in doing so had climbed through their cleared level. There could have been a TCAS malfunction as suggested by NATS giving rise to an anomalous RA. Although rare, an occurrence has been recorded of a TCAS induced Airprox - the fault lying in erroneous altitude reports being fed to TCAS and not detected by the altitude comparator, which had been accidentally disabled. All of this was speculation however and it was agreed, that without further evidence, a TCAS unserviceability could neither be substantiated nor discounted. In any case, the subject B737 TCAS had now been upgraded. On balance, therefore, members concluded that that this Airprox resulted because the B737 crew climbed above their cleared level whilst responding to a TCAS RA.

Turning to risk members recognised that this was not a particularly close encounter – 7 NM horizontal separation as the B737 passed ahead of BAe146 and 2·5 NM at the CPA when the B737 was well past to starboard of the BAe146. Although the B737 crew had not spotted the BAe146 visually, the geometry of the situation led the members to agree unanimously that there had not been a risk of a collision.

The Board was advised that although the B737 company had suggested a maximum ROC when within 1000 ft of assigned level be stipulated, this had not been adopted as company policy. CAT pilot members said the suggestion was sensible and was already company policy on some UK airlines; it was common practice to reduce vertical speed to below 1500 ft/min within 1000 ft of an assigned level and they saw no reason why it should not become a standard operating procedure.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The B737 crew climbed above their cleared level whilst responding to a TCAS RA.

Degree of Risk: C

AIRPROX REPORT No 56/00

Date/Time: 8 Apr 1442 (Saturday)

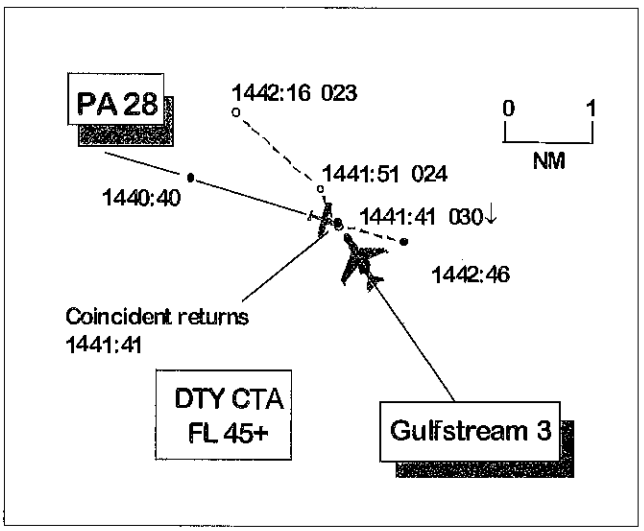
Position: 5217N 0113 W (4 NM ESE Draycott Water VRP)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reporting Aircraft*
Type:	Gulfstream 3	PA28
Operator:	Civ Exec	Civ Club
Alt/FL:	2500 ft (QNH 1020 mb)	3300 ft (QNH 1020 mb)
Weather	VMC	VMC
Visibility:	5 NM	10 km

Reporting Separation: 100 ft V/100 ft V

Recorded Separation: 0 ft Hor



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GULFSTREAM 3 PILOT reports that he was inbound to Coventry from Biggin Hill under IFR. Cockpit workload was light and vision from the cockpit good; the visibility was 5 NM in VMC. Initially he received a RAS from Birmingham ATC who cleared him to the CT NDB at 2500 ft (QNH 1020) for a procedural ILS to RW 23. He was then transferred to Coventry Tower on 119·25, who reiterated his clearance. Neither Birmingham nor Coventry ATC had passed traffic information to him on any ac flying between his position and Coventry. While descending through 3000 ft, heading 320° at about 200 kt, he saw a PA28 on a reciprocal track about 100 yd ahead at about the same altitude. He immediately pushed down hard on the control column and the other ac passed 100 ft directly above him. He assessed the risk of collision as 'critical'.

The pilot comments that he understood later that the PA28 was equipped with SSR but that the pilot had not switched it on; consequently, no TCAS warning was possible in the Gulfstream. He also believed that the pilot of the other ac was not given traffic information on the Gulfstream.

THE PA28 PILOT reports that he had taken off from Coventry airport on a local VFR flight to the SE via Draycott Water. The visibility was 10 km in VMC. He was receiving a FIS from Coventry on 119·25 and squawking standby; Mode C was not fitted. While tracking 110° from Draycott VRP at 90 kt and cruising at 3300 ft (QNH 1020), he observed another light ac at his 10 o'clock about 3 NM away tracking W, about 1000 ft below him. Having satisfied himself that there was no potential confliction with this ac, he turned his attention to scan ahead whereupon another ac, which he subsequently recognised as a Gulfstream, passed about 100 ft directly beneath him on a heading of about 290°. There was no opportunity to take avoiding action and he felt there had been a very high risk of collision.

The pilot adds that after they had passed he heard the Gulfstream pilot giving his location and describing the encounter to Coventry ATC. After landing he submitted an Airprox report having discussed the incident with his CFI.

ATSI reports that the Air Traffic Service at Coventry on the day of the Airprox was being provided by a student ATCO under the supervision of a fully qualified mentor. The service combined Ground Movement Control, Aerodrome Control and Approach on one frequency, which was very busy with a number of ac requesting one or more of the individual services. Coventry radar was not manned.

The PA28 departed from Coventry at 1432. During taxy and take-off the pilot received no instructions regarding Flight Rules, route, level or squawk, and in his report he stated that the ac's transponder was selected on 'stand-by'. In the Coventry MATS Pt 2, transponder equipped ac which leave the circuit and operate in the local flying area without landing away are required to be instructed to squawk 4650 as a conspicuity code. This enables local radar equipped approach units to recognise that the traffic is VFR and working Coventry Approach. Another PA28 which took off 4 min later on a similar route received Flight Rules, turn, and squawk instructions. As the first (subject) PA28 was rolling, the controller passed traffic information to a preceding departure, routeing via Daventry, that there were at least 5 ac operating to the SE of the airfield, height and position unknown. After take-off, the PA28 is seen on radar to turn L and depart the Coventry ATZ in an ESE direction towards Northampton via Draycott Water, which is a Coventry VRP. There was no further RT contact with the PA28 until the pilot called for a rejoin at 1457.

The Gulfstream G3, inbound to Coventry from Biggin Hill on airways, called Birmingham at 1437:30 descending to FL 80 and routeing direct to the "CT" beacon. Birmingham Approach provides an initial service to IFR inbounds to Coventry via airways, and hands them over to Coventry Approach when they are clear of other relevant IFR traffic. The "CT" beacon is the Initial Approach Fix (IAF) for Coventry. At 1438, the Gulfstream was cleared to FL 50 and at 1439:10 its pilot was informed by Birmingham Approach that Coventry would accept the ac descending to 2500 ft altitude towards the "CT" beacon. This was confirmed and then acknowledged, at which point Birmingham placed the ac under a RIS outside CAS and, at 1439:50, transferred the ac to Coventry Approach. From the radar print taken at the time of the transfer there is

little traffic observed between the Gulfstream and the "CT" beacon.

The Gulfstream pilot called Coventry Approach at 1440:00 and was cleared to the "CT" at 2500 ft with the QNH (1020) and the current ATIS information letter. At 1441:10 the pilot was informed that it would be a procedural ILS approach to RW 23 and to expect no delay on reaching the beacon. No traffic information, either general or specific, was passed. At 1441:50 the pilot enquired whether Coventry had any knowledge of traffic opposite direction to him at 3000 ft, reporting that conflicting traffic had just passed overhead. The Gulfstream was level at 2500 ft and identified the conflicting traffic as a Cherokee. Approach checked with the pilot of an AA-1A, which had departed at 1438:40 to track to the NE towards Leicester, and passed traffic information on it to the Gulfstream pilot; however, the AA-1A was at 1200 ft and could therefore not have passed overhead the Gulfstream. In the report of the Manager ATS it is stated that the controller thought that the Gulfstream was quite near to the "CT" when it called Coventry, and that Birmingham Approach had transferred the ac quite late. In fact the ac was about 15 NM to the SE of the "CT" when the Airprox occurred, at which time its pilot was talking to Coventry ATC. At 1444, the Gulfstream pilot reported field in sight and requested to continue visually. The ac was so cleared, routeing via the "CT", and landed at 1446.

UKAB Note: A recording of the LATCC Claxby radar at 1440:40 shows the Gulfstream 5 NM NW of the DTY VOR descending through 4500 ft Mode C on track to the CT NDB at Coventry. At the same time a slow moving primary return, believed to be the PA28, is tracking ESE 9 NM NW of DTY. The tracks of the 2 ac converge at an angle of about 130° until they merge at 1441:41 about 4 NM ESE of Draycott Water. At this point the Gulfstream's Mode C shows 3000 ft; 10 sec later it shows 2400 ft, indicating the ac's rapid descent described in the pilot's 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, a radar video recording, and a report from the appropriate ATC authority.

The Board was advised that a radar service was not available at Coventry owing to staffing difficulties. It was clear to members that the trainee ATCO was performing the combined functions of ADC, GMC and APC under considerable pressure and they felt he was too busy to provide ac with a consistent service as a result. While the need to give trainees an opportunity to work to capacity was appreciated, particularly if they were at an advanced state of training, this required fine judgement on the part of the mentor who was responsible for ensuring the overall safety of the operation. In this case it was felt that intervention or more effective guidance would have been appropriate.

Members agreed that this was a very serious encounter and, given the pilots' descriptions, supported by the recorded radar information, they were in no doubt that but for the Gulfstream pilot's last moment action a high risk of collision would have existed. The incident took place in Class G airspace in reasonably good VMC and members agreed that the main cause of the Airprox was the very late sighting by both pilots. It appeared that the PA28 pilot had not gained any awareness of the situation by listening to RT transmissions between the Gulfstream and Coventry. He saw the Gulfstream only as it was passing beneath him and could not, therefore, have taken any avoiding action. The PA28 pilot was not given a Squawk by ATC, as was required, and he did not query this omission or take the initiative to Squawk 7000 by default. Had he done so his ac might have been detected by Birmingham and the Airprox possibly avoided. Additionally, and despite the absence of Mode C, it might have triggered a TCAS TA in the Gulfstream thus warning its pilot of a possible confliction.

Knowing that Draycott Water was a 'honeypot' for local VFR flyers from Coventry, and that there were several ac operating in that area at the time, Coventry ATC should have issued a generic warning of this activity to inbound IFR traffic. While it was recognised that this in itself may not necessarily have prevented the Airprox, it might at least have alerted the Gulfstream pilot to the intensity of activity in the area through which he would be descending. Members assessed that the lack of traffic information by Coventry ATC was a compounding factor in the Airprox.

Given the busy circumstances, the unqualified allocation by Coventry of 2500 ft to the CT NDB was considered questionable. Birmingham ATC was unaware of the extent of Coventry's VFR activity because they had not been advised of it and it was not evident on their radar. Hence, they could make no contribution with regard to traffic information, and correctly transferred the Gulfstream to Coventry on the basis of the latter's 2500 ft/CT clearance. Once the ac was under Coventry's procedural control (still some 15 NM away to the SE) Coventry ATC became responsible for providing the Gulfstream pilot with information on known traffic. Moreover, a general broadcast to the VFR operators that jet traffic was descending inbound from Daventry would also have been helpful. With hindsight, and accepting that the ac would still have been in Class G airspace, it might have been wiser to restrict the Gulfstream's descent to a higher level, say FL 40, where a chance encounter with VFR traffic would be less likely. Alternatively, while slightly extending its track distance to touch down, an initial routeing towards the HON VOR on Birmingham's frequency would have kept the Gulfstream within the protection of CAS until a safer handover could be effected.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by both pilots compounded by lack of traffic information from Coventry ATC.

Degree of Risk: A

AIRPROX REPORT No 57/00

Date/Time: 13 Apr 1516

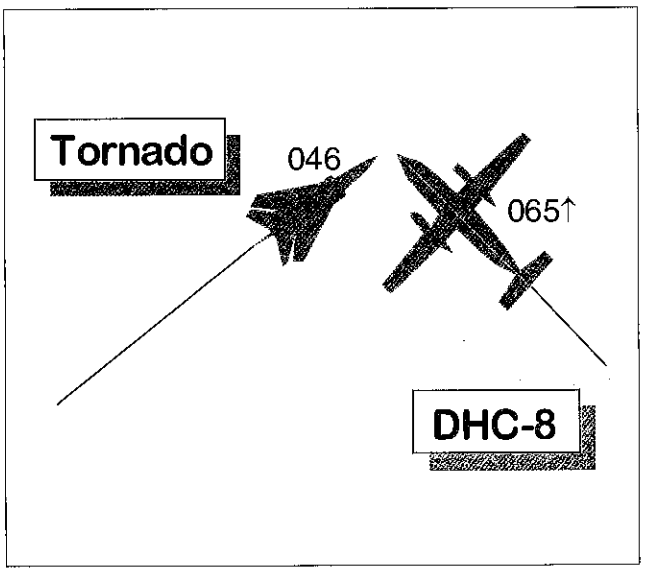
Position: 5129 N 0254 W (9 NM NW of Bristol)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado GR	DHC-8
Operator:	HQ STC	CAT
Alt/FL:	FL 100	FL 100
Weather Visibility:	VMC CLBL 15 km	VMC NK 10 km

Reported Separation: 4-500 ft v/1900 ft

Recorded Separation: 1900 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 030° at 400 kt intending to climb to FL 100; he was receiving a RAS from Cardiff who had cleared him to climb to 4000 ft on a QNH of 987 mb. He climbed in IMC and on asking what the climb restriction was for, was given information on conflicting traffic ahead and above. At 3500 ft he saw a DHC-8 in his 2 o'clock some 500 ft above about 3 km away. He told Cardiff he was levelling at 3700 ft and that the other ac appeared to be at 4000 ft. He heard Cardiff ask another ac its altitude and its pilot replied that he was at 6000 ft and that the Tornado was indicating 2000 ft below on TCAS. The DHC-8 then passed directly overhead at about 4100 ft, heading NW. Both Tornado crew members checked their altitude and agreed that the DHC-8 passed above by about 400 ft. Had he been IMC and levelled at his cleared level there would have been a strong chance of collision.

THE DHC-8 PILOT reports heading 320° at 165 kt in a climb to FL 100. He heard the Tornado pilot requesting climb and being cleared to 4000 ft. It passed below (his TCAS said by 1900 ft which

confirmed his visual estimate) and the pilot said it looked as if the Tornado was at 4000 ft. Cardiff asked his passing level and he replied "Passing 6000". His altimeters showed FL 66 on 1013 mb and 6000 ft on 993 mb. He was visual with the Tornado and there was no confliction.

UKAB Note: LATCC radar recordings show the Tornado levelling at FL 46 and passing slightly ahead of the DHC-8 which was passing FL 65 in a steady climb at the time.

CARDIFF ATC reports that the Tornado pilot asked for a service coasting out from Minehead and advised that he would be climbing to FL 100 for the Daventry RC. Because this would conflict with the DHC-8's NW climbing track, Cardiff ATC asked Bristol to transfer it to Cardiff Radar; this was done. In due course the Tornado was asked to stop his climb at 4000 ft to keep him clear of the DHC-8 and was put under a RAS but the pilot advised that he was stopping at 3700 ft, querying the level of the DHC-8 which he could see. The DHC-8 pilot confirmed he was 'out of six thousand' and could see the Tornado, which showed 2000 ft below on TCAS. Once the ac had passed, the Tornado was cleared for further climb.

HQ STC comments that the Tornado crew clearly believed that there would have been an extremely high risk of collision had they continued climbing to their cleared altitude. The LATCC radar recordings, however, confirm a significant altitude split between the 2 ac from which it would be logical to conclude, in the absence of any other evidence, that there was a mistaken impression of vertical separation by the Tornado 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, reports from the air traffic controllers involved and reports from the appropriate operating authorities.

The Mode C readings confirmed the DHC-8's TCAS indications (and its pilot's estimate) that the vertical separation between the ac had been in the order of 2000 ft. Members agreed that the cause of the Airprox report was a mistaken impression of the vertical separation between the ac by both Tornado crew members. This seemed surprising and members asked what level the DHC-8 was passing when the Tornado was at 3700 ft on 987 mb. This equated to FL 44; at that point the DHC-8 was passing FL 60. It was surmised that there may have been a sloping cloud layer concealing the true horizon which could have caused a visual illusion, or perhaps the DHC-8 was larger than expected by the Tornado crew, but whatever the reason, members agreed that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Mistaken impression of vertical separation between the ac by both Tornado crew members.

Degree of Risk: C

AIRPROX REPORT No 58/00

Date/Time: 14 Apr 1148

Position: 5204N 0101 W (Silverstone - 502 ft)

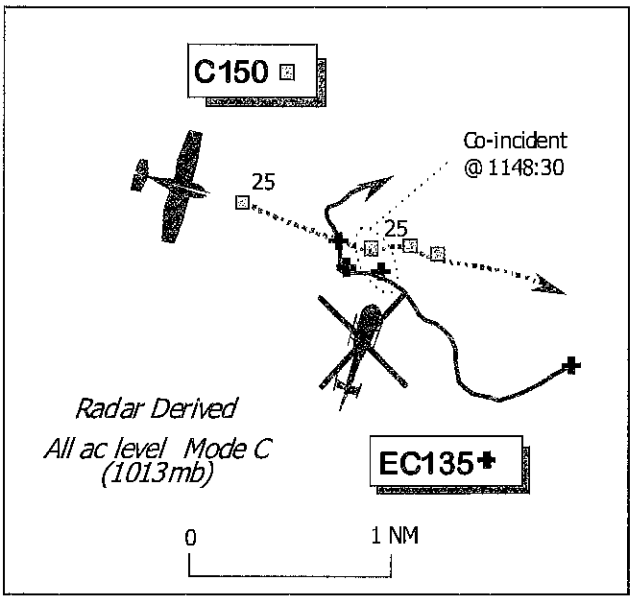
Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	EC135T	C150
Operator:	Civ Comm	Civ Club
Alt/FL:	2500 ft (QNH 1001 mb)	1800 ft (QNH 1000 mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10 km	>13 km

Reported Separation:

200 ft V, 0·25 NM H / 250 ft V, "CLOSE" H

Recorded Separation: about 0·15 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135T HELICOPTER PILOT reports he was conducting a photographic reconnaissance of Silverstone Racing circuit for security purposes prior to the Grand Prix. The helicopter has a distinctive blue and yellow livery; navigation lights, anti collision beacon and HISLs were all on. He was receiving a FIS from Coventry and squawking 3/A 4574 with Mode C. Just after establishing a high hover into wind at 10 kt heading 020° at an altitude of 2500 ft, TCAS alerted him to a contact very close on the port side. A high-wing single engined monoplane was then acquired visually across the cockpit at 9 o'clock, - less than 0·5 NM away, crossing from L – R. (Prior to the sighting his observer, who was occupying the LHS, had been ensconced in their task) He elected to break L as a RH break would have reduced separation still further. The Cessna passed less than 0·25 NM ahead from L – R 200 ft below his helicopter, with a high risk of collision. It did not appear as though the Cessna pilot deviated from his course or altered speed, nor showed any sign of doing so, until overhead the race circuit, when he observed a slight left bank. He adds that racing car testing was in progress at Silverstone and could have caused a distraction.

THE C150 PILOT reports heading 100° at 90 kt, squawking 3/A 7000 with Mode C on as he approached Silverstone at an altitude of about 1800 ft, under a FIS from Cranfield. No other conflicting traffic was seen at that stage and a climb was initiated to 2100 ft. Immediately after selecting a climbing attitude he saw the helicopter above and to starboard approaching from 2 - 3 o'clock. He dived the ac for 2-3 sec to avoid the helicopter, which passed about 250 ft above them; he could not estimate the horizontal separation but thought it was "*close*" and assessed the risk to be high. He added that the helicopter pilot had banked to port to avoid him.

COVENTRY ATC REPORTS that the helicopter pilot was listening out under a FIS from Coventry APPROACH, whilst conducting a photographic detail at Silverstone about 25 NM SE of Coventry Airport. The helicopter pilot reported that an ac had passed close to him and that he would be filing an Airprox report when back at base and passed the registration of the reported ac. When the helicopter pilot telephoned after landing he stated that he had been hovering at 2500 ft on the western perimeter of Silverstone when the TCAS alarm warned him to look L. He reported making a sharp L turn to avoid the Cessna, which was heading towards Milton Keynes and appeared to go directly underneath him. He did not believe the other pilot had seen the helicopter.

UKAB Note : A review of the Debden radar recording reveals that the EC135 helicopter, identified from

its 3/A 4574 squawk, is shown just before the Airprox proceeding in a generally west north-westerly direction at a similar speed to the C150; a Mode C indication is not evident at all. The 10 kt hover on a heading of 020° prior to the sharp avoiding action L turn reported by the helicopter pilot is not evident from the recording, possibly due to its short duration. The C150 is shown squawking 3/A 7000, but the Mode C indication is intermittent as it approached the helicopter from the W. The CPA was about 0·15 NM and occurred at 1148:30; the C150 indicating 2500 ft Mode C (1013 mb) which would have equated to about 2140 ft (1001 mb). The avoiding action dive reported by the C150 pilot is not apparent on the recording as successive Mode C returns also indicate 2500 ft.

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 a report from the air traffic controller involved.

The helicopter pilot's task was in preparation for an event at Silverstone and therefore outside the period of availability of an ATS from Silverstone heliport that might have been provided during the event itself. Moreover, it was also outside the period of applicability of the event's Airspace Co-ordination Notice (ACN). A GA member thought it might be a good idea generally if pre-event activity was also included in ACNs, but this particular locality was described as something of a 'Black Hole' in terms of ATC coverage with scant radar cover of any form to provide a service at the altitudes involved 2000-2500 ft. Members familiar with the geography of this area noted that the EC135 Helicopter pilot had utilised a FIS from Coventry, some 25 NM distant, whereas the C150 pilot had obtained a FIS from Cranfield. It was difficult to gauge which unit was best placed to provide an ATS, especially with the large number of flying schools operating in the area from Cranfield and Kidlington. Noting that Turweston was 3 NM to the SW, but with an A/G station and not an ATSU, some members thought that on balance Cranfield might have had better knowledge of the local VFR traffic.

The Board was unable to resolve the anomaly of the helicopter pilot's reported hover (prior to the Airprox) which did not show up on the radar recording. That aside, it was uncommon to come across a helicopter in a high hover at an altitude of 2500 ft and the C150 pilot, who was required in this instance to give way under the Rules of the Air, may have had difficulty spotting a virtually stationary ac at range. Although the helicopter pilot reported that his observer in the LHS seat was focussing on his task, a helicopter member opined that a high hover was not an easy thing to do. It required a lot of concentration, with a reasonable amount of 'head-in' the cockpit time scanning instruments. It may have been fortuitous that the helicopter pilot managed to detect the other ac across the cockpit at a range of 0·5 NM as it approached from the port side. Similarly, it was clear that the C150 pilot had seen the helicopter at a late stage. This led members to agree unanimously that this Airprox resulted from a late sighting by both pilots.

The short 2-3 sec avoiding action dive reported by the C150 pilot was not apparent from the ac's Mode C indications, possibly because of the radar data update rate. However, the avoiding action L break reported by the helicopter pilot was seen by the C150 pilot and clearly did the trick, although it was still a close encounter which the radar recording revealed to be in the order of 0·15 NM – 300 yd. As a result of the robust action required to avoid each other's ac, both pilots thought the encounter carried a high risk, a view concurred by members who agreed that 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 59/00

Date/Time: 18 Apr 0943

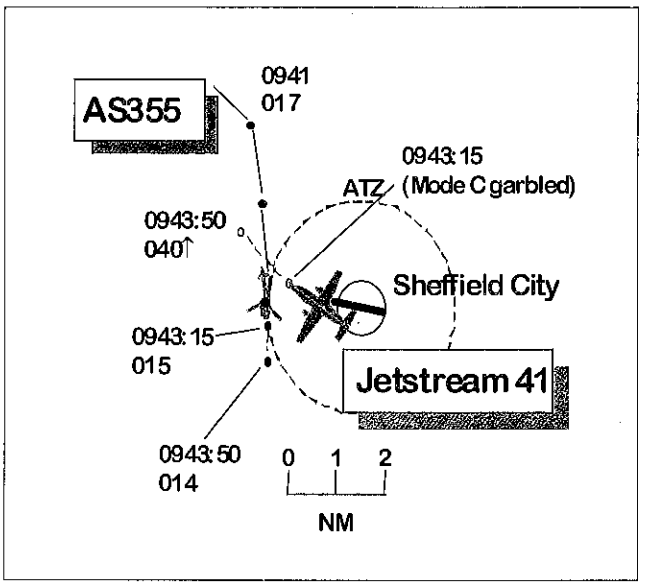
Position: 5324N 0126 W (2·1 NM W Sheffield City airport - elev 231 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream 41	AS355 Twin Squirrel
Operator:	CAT	Civ Comm
Alt/FL:	1500 ft (998 mb)	1000 ft
Weather Visibility:	VMC 10 km	VMC >3 NM

Reported Separation: 500 m/500 ft

Recorded Separation: approx 1 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports that prior to departure from RW 28 at Sheffield airport, ATC advised him that a helicopter was operating to the N of the airfield not above 1200 ft (QNH). This was not considered a potential confliction so take-off was initiated with the FO handling the ac. The visibility was over 10 km in VMC. On passing 1500 ft (QNH 998) in the climb at 170 kt, the helicopter was seen to cross the RW extended centreline from N to S, 500 m ahead and 500 ft below. Whilst there was no immediate threat of danger, he questioned the wisdom of permitting an ac to pass in front of departing traffic. The pilot comments that the incident occurred within the Sheffield ATZ.

THE AS355 TWIN SQUIRREL PILOT reports that he was heading SSW at 120 kt and cruising at 1000 ft (QNH 998) while on route to a task in Sheffield city. The visibility was over 3 NM in VMC. His route took him through the RW 28 extended centreline to the W at a range of about 2·7 NM. The other ac, a Jetstream, was under continous observation from the moment it started to taxi. At no time, in his opinion, were the ac in close proximity and no avoiding action was necessary.

SHEFFIELD CITY ATC reports that traffic information was passed to the helicopter pilot on the Jetstream. Information was also passed to the pilot of the Jetstream and he reported seeing the helicopter before departure. The Jetstream was cleared for take off, subject to the standard noise abatement procedure (climb on RW heading to 1500 ft (QNH) before turning), and the pilot was instructed to report passing 2500 ft. On passing that altitude he reported that the helicopter had just passed 500 ft below him. No mention was made of an Airprox at the time and subsequently, on visiting ATC, the Jetstream pilot confirmed that he would not be taking reporting action. However, following consultation with his company he did later submit a report.

The controller comments that the helicopter pilot had reported flying to a site which was, according to the grid map held in ATC, WNW of the airport. (UKAB Note 1: UKAB staff have had access to this map; the southern boundary of the grid square in question is some distance south of the airfield boundary). At the time of this call DF indicated that the helicopter was to the NW of the airfield. When the Jetstream pilot reported the incident the controller saw the helicopter SW of the airfield. The controller adds that the helicopter was not kept constantly in view; its pilot later confirmed by telephone that he had watched the Jetstream throughout, and it was also indicated on his TCAS.

ATSI comments that the AS355, operating to the N of the airfield, reported moving its operating area to a position S of the RW extended centre-line. (The RT transcript reveals that the pilot reported moving to a numbered square on a grid map of the city; a copy of this map was held by ATC. This method is used to avoid referring to actual locations on the RT for security reasons). The call was acknowledged by the controller and traffic information was passed to the pilot on the departing Jetstream. The Jetstream pilot was informed about the AS355 prior to departure and reported visual with it. However, the helicopter's position was given as NNW of Sheffield and no mention was made of its intended routeing to the S. The Jetstream pilot was, therefore, surprised to see the AS355 cross his path. The AS355 pilot confirmed he had the Jetstream in sight. Appropriate traffic information should have been passed to achieve Aerodrome control responsibilities as stated in MATS Part1, Page 2-1.

UKAB Note: A recording of the LATCC Claxby radar at 0941 shows the helicopter on a southerly heading at 1700 ft Mode C (1300 ft QNH) about 4 NM NNW of Sheffield City airport. At about 0942:30 the ac crosses the RW 28 extended centre line 2·2 NM from the airfield (i.e just outside the ATZ) and at 0943:15 is 1·3 NM S of the centreline when the first radar contact on the Jetstream appears 1 NM NE of it following its departure from RW 28. As the data blocks of the ac are superimposed at this point, the level of the Jetstream cannot be seen; however, 35 sec later it is 3 NM NW of the airfield tracking NW and climbing through FL 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, a radar video recording, reports from the air traffic controllers involved and comment from the appropriate ATC authority.

Much of the Board's discussion concerned the location of the grid square to which the helicopter was routeing. From the map provided by Sheffield ATC, it was evident that the square in question encompassed Sheffield city centre and to get to it the helicopter had to fly a heading somewhere between WSW and S; its pilot had not been specific about what part of the grid he was proceeding to and had not specified a heading. One member pointed out that security could have been compromised had a heading been mentioned over the RT. Nethertheless, an ATCO adviser expressed the opinion that if the controller had informed the Jetstream pilot that the helicopter was moving from its location to a different area the Jetstream's captain might not have been so concerned when he saw it cross his flight path; an airline pilot member strongly supported this view. He felt the Jetstream pilot was entitled to assume, from the traffic information given, that his departure track would not be compromised while the helicopter remained to the NNW of the airfield. In his opinion, incomplete information from ATC had led the Jetstream pilot to take off into confliction with the helicopter. However, with one exception, all other Board members disagreed; they maintained that both pilots had been given information about each other - the Jetstream pilot confirming visual contact prior to take off, and the helicopter pilot having watched the Jetstream as it taxied out - and from that point on it was their responsibility to maintain separation visually in Class G airspace. A member commented that this was of particular relevance to the Jetstream as its departure heading took it towards the sector in which the helicopter was operating. The radar recording confirmed that the helicopter was in Class G Airspace, outside the Sheffield ATZ, operating VFR, and its pilot was entitled to manoeuvre in any direction he chose. In the event the helicopter passed through the RW 28 extended centre line, marginally outside the ATZ, and at a distance and level its pilot judged would ensure safe separation. Radar information suggested that lateral separation at that point was in the order of 1 NM. Therefore, the Board concluded, by a majority, that the incident amounted to a sighting report with no risk of collision.

Members noted that in his report the Jetstream pilot had dismissed any threat of immediate danger, and that his main concern seemed to be directed at what he perceived to be a shortcoming in the ATC service provided; the Airprox report was apparently submitted following consultation with his company management. While the Board accepted that post-

incident discussion is often necessary, particularly in the case of inexperienced pilots who can benefit from the advice of their CFIs, members emphasised that the sole arbiter for determining whether an Airprox report should be made is the pilot or controller concerned, based on their own perception of the degree to which safety had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report

Degree of Risk: C

AIRPROX REPORT No 60/00

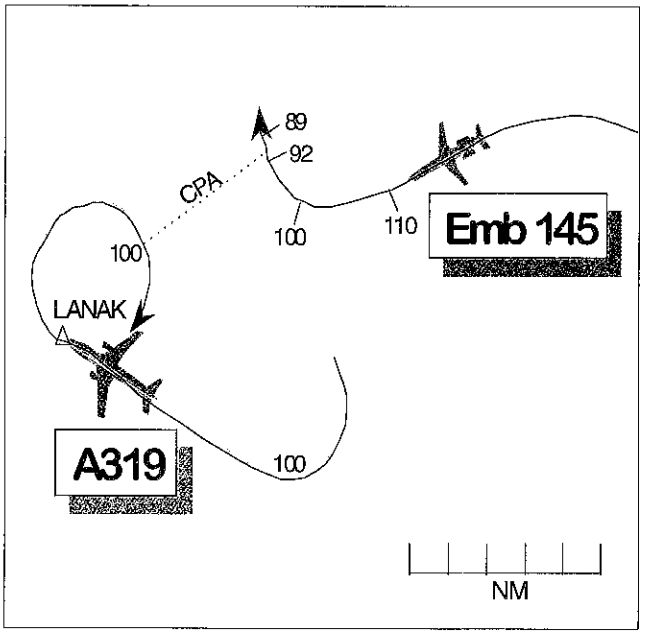
Date/Time: 26 Apr 0659

Position: 5545 N 0349 W (19 NM SW of Edinburgh)

Airspace: STMA (*Class:* D)

Reporter: Glasgow APR

	First Aircraft	*Second Aircraft*
Type:	A319	Embraer 145
Operator:	CAT	CAT
Alt/FL:	FL 100	FL 105
Weather Visibility:	VMC	VMC 7 km
Reported Separation:	NK/4.5 NM, 300 ft	
Recorded Separation:	3.7 NM, 800 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLASGOW APR reports that the A319 was holding at FL 100 at LANAK; ScACC (Talla) had initiated the hold and co-ordinated the ac with Glasgow. When Edinbugh ATC called on the direct line she saw they had the Embraer 145 (E145) high, inbound. She advised Edinburgh that she could see it and pointed out the A319 at FL 100 in the LANAK hold. The Edinburgh controller said she was turning the E145 onto 060° but it continued to descend through FL 110. She (GOW APR) re-called Edinburgh and although assured the E145 was turning, she told the A319 pilot, who was in the outbound turn, to continue round onto W and as the separation continued to reduce, updated the turn instruction to 'avoiding action'; the pilot then said he could see the traffic and had received a TCAS RA. (UKAB Note: RT recordings show that the pilot received a TA.)

THE A319 PILOT, inbound to Glasgow, reports that he was unaware of anything untoward during the sortie and declined to submit a report. However, RT recordings show that he acknowledged avoiding action passed by Glasgow APR and advised receiving a TCAS TA, having the traffic in sight to his left.

THE EMBRAER 145 PILOT, inbound to Edinburgh, reports being aware of congestion as he approached the STMA with many inbounds to Glasgow and Edinburgh. His descent was delayed considerably (he was still at FL 260 when 30 NM from Edinburgh) and he was given a delaying vector onto 050° while his speed was progressively reduced to 210 kt. He used airbrakes in the descent and he was then vectored 230° and 280° apparently on a downwind leg. On transfer to Edinburgh Approach he was turned right onto 060°; this was

followed by 'avoiding action' onto the same heading. He took control, banked at 30° and reduced his rate of descent, unaware at this stage of the conflicting ac's level. His FO then advised him of traffic at 11 o'clock about 5 NM away, confirmed by TCAS which showed it tracking rapidly left. He recommenced descent and saw the traffic on TCAS and visually as it passed about 4·5 NM away in his 9 o'clock, about 300 ft above. He thought a hold at Tweed would have been a better idea; it appeared that the Edinburgh controller was presented with a problem which she dealt with in good time, removing any risk of collision.

ATSI reports that prior to the Airprox both ac had been in receipt of an area control service from the ScACC Talla Sector (mentor and trainee) but, at the time that it happened, they were receiving approach radar control services from their respective destination airfields. The controllers described themselves as "moderately busy" due, in part, to the complex nature of the traffic pattern. About 12 minutes before the Airprox, a military ac, which had declared an emergency, was co-ordinated through the sector on a south-easterly heading at FL 195. To a certain extent this caused a distraction and disrupted the normal flow of traffic inbound to the TMA airfields. The Talla trainee was relatively inexperienced and the mentor found he had to monitor him closely and make a considerable number of inputs. Consequently, the traffic had not been handled as it would have been if the mentor had been operating solo but he had been keen to let the trainee devise and implement his own plan.

Both ac were among a group entering the Scottish TMA to land at Glasgow and Edinburgh. In the absence of instructions to the contrary, the A319 and the E145 would have followed, respectively, the LANAK 1A STAR (MARGO-TALLA VOR-LANAK) to Glasgow, and the TWEED 1A STAR (MARGO-ESKDO-TARTN-TWEED) to Edinburgh. However, because of the complex traffic situation, both flights were radar vectored. At 0650:00, the A319 was cleared to resume its own navigation to LANAK to take up the hold, descending to FL 160. Meanwhile, the E145, which was about 32 NM behind the A319, was descending to FL 140 and being vectored towards LANAK, rather than TWEED, to keep it clear of the emergency ac referred to earlier, which was routeing close to TWEED. The mentor explained that, although it was quite often necessary to hold Glasgow inbounds at LANAK, it was seldom necessary to hold Edinburgh inbounds at TWEED. The plan was to transfer the E145 to Edinburgh, on a downwind heading for RW 06 at Edinburgh.

At 0652, both ac were given further descent clearance, the A319 to FL 130 and the E145 to FL 120. At that time, the A319 was just entering the LANAK hold, with the E145 approximately 28 NM in trail. At 0654:20, the E145 was instructed to turn right onto heading 050° for delaying action and advised that it was number six in traffic. A few seconds later the flight was stopped off at FL 160, presumably because the A319 was turning back towards it in the hold, descending through FL 155. At 0655:30, the A319 was given further descent clearance to FL 100 in the LANAK hold.

By 0656:10, the E145 was level at FL 160 and about 7 NM E of the A319, which was descending through FL 130 on a south-easterly heading in the hold. The trainee cleared the E145 to FL 80, approved a speed reduction to 210 kt and then instructed it to turn left onto heading 280°. This heading was designed to position the flight downwind right-hand for RW 06 at Edinburgh, however, it also had the effect of turning the ac back towards the LANAK holding pattern. The radar recording indicates that, on heading 280°, the E145 would have remained north of the A319's track but, at 0657:15, the ScACC trainee controller telephoned Edinburgh to provide a radar handover on the E145. There was a number of ac ahead in the sequence so, to assist in providing adequate spacing, the Edinburgh controller requested that the E145 be turned left and handed over on heading 250° and this was agreed. Meanwhile, Glasgow had telephoned the Talla Planning ('P') controller to advise that they could see the A319 in the hold and to request that the ac be transferred to them, so that they could take the ac out of the hold, subject to the previous Glasgow inbound. Again this was agreed. Both co-ordinations were carried out, taking into account only other traffic inbound to the respective airfields. Any possible interaction between the subject ac was not considered by the Talla controllers and the approach controllers were not advised, nor did they initially notice the conflict developing.

The TMA section of the ScACC MATS Pt 2 described 'Standing Agreements' with associated 'Silent Handover Procedures' for handling arrivals to

Glasgow and Edinburgh. Basically these required inbound ac to cross LANAK or TARTN level at the Minimum Stack Level (MSL - FL 80 at the time) and one of the specified conditions was that ac *"... must be clean of all traffic under the control of ScACC."* On this occasion, neither ac was able to cross LANAK and TARTN at the MSL, in which case the MATS Pt 2 stated that the 'Reduced Radar Handover Procedure' was to be applied. However, in the case of traffic inbound to Edinburgh, if the transfer of communication/control could not be completed at or before TWEED, a full radar handover was to be effected. This would have applied to the E145 except that the flight was not 'clean' (because of the presence of the A319) and, therefore, it should have been the subject of a radar release. One of the conditions for a radar release, specified in MATS Pt 1 (Page 1-49), is that : *"details of all conflicting aircraft are passed to the approach radar controller."*

Much of the investigation revolved around why the Talla 'E' mentor and trainee did not recognise the conflict. It emerged that they operated on the basis that both Edinburgh and Glasgow would retain traffic under their control within the lateral confines of their respective local areas and, in so doing, provide separation. In the case of the E145, they believed that Edinburgh would keep the ac on their side of the buffer zone which separates the Glasgow and Edinburgh local areas. The ScACC controllers were not aware, nor were they required to be, that Edinburgh had co-ordinated the use of the buffer zone, as is permitted by the relevant procedures, which would permit the E145 to route slightly further west and closer to the LANAK hold than normal. The local areas and buffer zone are described in both the Glasgow and Edinburgh MATS Pt 2s. The following description is from the Edinburgh MATS Pt 2 (page 4.2, para 6):

> "Flights contained wholly within Edinburgh, Glasgow or Prestwick local areas may operate without reference to ScACC. The Edinburgh local area is established from ground level to 6000 ft amsl. ScACC will not operate below the Minimum Stack Level (MSL) within the local area without prior co-ordination.
>
> A buffer zone, 3 miles wide is established between the Edinburgh and Glasgow local areas, to permit the use of 3 miles radar separation between aircraft under control of the adjacent radar unit.
>
> The buffer zone is available for use by either unit, subject to prior co-ordination. The unit that has approved use of the buffer zone shall keep its own aircraft at least 3 miles on its own side of the buffer."

The local areas only extend vertically to 6000 ft amsl and, as long as traffic operating within their lateral confines remains at 6000 ft and below, the arrangements should operate without problem. On this occasion the subject ac were transferred to Glasgow and Edinburgh above the MSL. Even then, if both ac had been operating within the lateral confines of the respective local areas, this incident probably would not have arisen. However, the A319 was transferred to Glasgow at FL 100 in the LANAK hold which is not contained within the boundaries of the Glasgow local area.

Information supplied by the Directorate of Airspace Policy (DAP) has confirmed that traffic holding at LANAK cannot be considered procedurally separated from traffic, at the same level, operating in the south-western portion of the Edinburgh local area. In the normal course of events, traffic holding at LANAK will be at or above the MSL and, by definition, traffic in the Edinburgh local area should be at or below 6000 ft, so there should be no problem. Both approach controllers operated in accordance with the published procedures, the Edinburgh controller kept the E145 within the lateral confines of the local area and the buffer zone and, whilst it is unfortunate that she did not initially observe the A319 in the LANAK hold, in the absence of information on its presence, there was no specific requirement for her to look for it. Similarly, the Glasgow controller, unaware that traffic had been transferred to Edinburgh high and heading towards the LANAK hold, was content for the A319 to be released to her at FL 100 in the hold.

The crew of the A319 established communication with Glasgow at 0658:20, reporting that they were shortly reaching FL 100 in the LANAK hold. A few seconds later the crew of the E145 contacted Edinburgh. Although the pilot reported heading 280°, the radar recording indicates that the flight had taken up the heading of 250°, assigned by ScACC. At about this time, the Glasgow and Edinburgh approach controllers observed the

developing conflict. Telephone co-ordination took place and both flights were instructed to make 'avoiding action' right turns. Both crews reported visual and the pilot of the A319 added that he had received a TCAS TA. While this was taking place the STCA activated at ScACC and the mentor telephoned Edinburgh to point out the conflict. The Edinburgh controller advised him that both ac had been instructed to turn right.

When the E145 contacted Edinburgh it was descending through about FL 125, with the A319 in its 12 o'clock position at a range of about 12 NM, level at FL 100, just past LANAK turning right in the hold. Separation reduced further as the flights converged and the E145 continued its descent. The option to level the E145 at FL 110 was not available because of following inbound traffic. However, both ac responded well to their avoiding action instructions and they passed port to port at a range of about 3·5 NM. At that point vertical separation had been re-established as the E145 descended through FL 90. Previously they had been 5·5 NM apart at the same level, 4·5 NM apart with 300 ft vertical separation and 3.6 NM with 800 ft.

If the relevant published procedures had been closely followed, it is unlikely that this Airprox would have occurred, however, following the investigation, it was quickly recognised that the existing procedures, as written, did not fully cater for the fact that traffic in the LANAK hold was not always laterally separated from traffic being radar vectored for Edinburgh and that they might require some clarification. Both Glasgow and Edinburgh were alerted to this and a meeting convened between the three units involved. Following the meeting, the ScACC MATS Pt 2 Supplementary Instruction SI:015/00(A) was issued and became effective on 22 June 2000. This instruction rationalised, clarified and amplified sections of the relevant procedures and, if properly adhered to, should prevent similar incidents occurring in future. In addition, a SCON (Scottish Airways Operational Notice) was issued to all staff drawing attention to the SI and highlighting the lessons arising from this Airprox. Pertinent extracts from the SCON are as follows :-

"Controllers must ensure that Mats Part 2 is applied; in particular to Edinburgh inbounds who should be achieving the minimum stack level by TARTN and; traffic information to be passed with radar handovers to Edinburgh on aircraft that are not separated from others in the sector, including the LANAK hold."

"At a meeting with Glasgow and Edinburgh, both airfields asked that the Talla sector refrained from offering too many multiple tracks descending to min. stack on parallel headings, ScACC controllers must be aware that, with rising traffic levels, both airports may require to hold on a more regular basis. It is important that ScACC are able to comply with late requests to hold, and that presenting an airfield with more than two aircraft on parallel headings, descending to the min. stack, could lead to unnecessary complications. Controllers should plan for subsequent aircraft, after the first two, to route to the hold. ScACC should also consider initiating holds in periods of busy traffic."

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It appeared to members that the action taken by the Glasgow and Edinburgh controllers had prevented an incident from occurring and the Board was unsure why an Airprox had been filed. It was suggested that there was no loss of separation in the incident because Glasgow and Edinburgh are allowed to use 3 miles radar separation. However it is understood at Glasgow and Edinburgh that this applies only between ac at altitudes within their respective local areas whereas both the ac involved in the Airprox were still at FLs. The radar recording shows that the E145 had always remained within the lateral, if not vertical, confines of the Edinburgh local area. Members thought that the situation had been untidy and that clearances given to the E145 had not been fail-safe. When the Edinburgh controller had asked the Talla SC to apply a heading of 250° to the E145 the latter should have realised this would conflict with the LANAK hold and vectored the ac elsewhere while reducing its altitude. Although it was suggested that the Edinburgh

controller should have foreseen the consequences of this request, members considered that the Talla SC was the person with the full picture and who was in a better position to sort out the problem. It was recognised that the emergency ac had interfered with the option to hold at Tweed, but other arrangements could have been made to help the E145 to reduce its energy before transferring it to Edinburgh. The Board concluded that the cause of the incident was that the Talla mentor had allowed his trainee to vector the E145 into confliction with the A319 in the LANAK hold. At the same time members understood the constraints of the training environment and the difficulty of knowing exactly when to override students while still allowing them to learn. Resolution of the confliction was assisted by the pilots of both ac who, promptly and with due urgency, actioned the avoiding action instructions they were given; members agreed that this had removed any risk of the ac actually colliding. The Board was pleased to note this but observed that controllers should not rely upon it because many pilots still appeared to be unaware of the degree of urgency with which they should react to "avoiding action".

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Talla SC mentor allowed his trainee to vector the E145 into confliction with the A319 in the LANAK hold.

Degree of Risk: C

AIRPROX REPORT No 61/00

Date/Time: 28 Apr 0857

Position: 5429 N 0302 W (2 NM N of Grasmere)

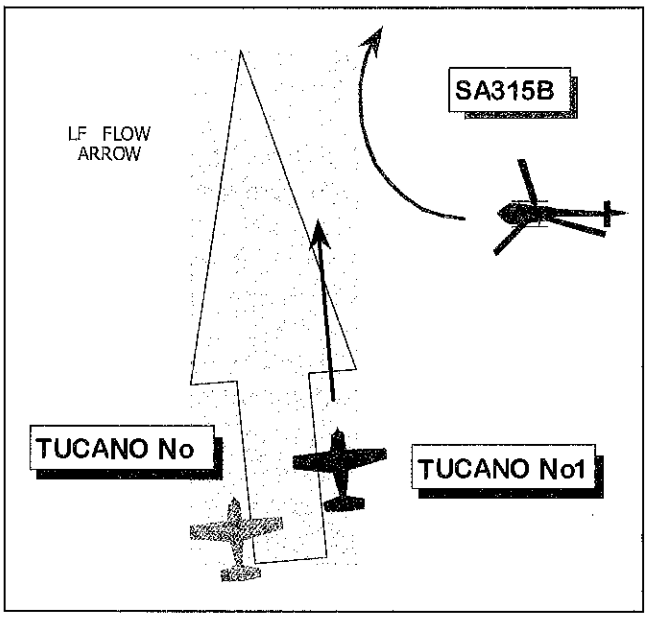
Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tucano x2	SA315B
Operator:	HQ PTC	Civ Comm
Alt/FL:	250 ft (RPS 1004 mb)	100-150 ft (1013 mb)
Weather Visibility:	VMC CLBC 30 km	VMC CAVOK 10 km

Reported Separation:

2-300 yd H & 2-300 ft V 100 ft

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT reports leading a pair in fighting wing formation at 250 ft msd in a valley between Ambleside and Keswick. As the formation crested a ridge heading 349° at 240 kt, a helicopter was seen by the leader at a range of less than 0·5 NM and about 5 sec flying time away. A 2-3g formation climb was initiated to avoid the helicopter and the No 2, on the L, pulled-up with the lead ac. The helicopter passed about 2-300 yd to starboard and when abaft the beam, entered a descending R turn away from them at a height of about 50-100 ft agl. The helicopter had been masked by the crest in the ground and only their prompt avoiding action averted what had been a high risk of collision.

He adds that the previous day a mandatory low-level Civil Aircraft Notification Procedures (CANP) 'avoid' had been in force. However, on 28 Apr, the CANP warning had not been issued at 0840, when they departed from base and there was still no CANP in force when the formation landed at 0950.

However, one was filed at 1016, some 79 min after the Airprox.

THE SA315B PILOT reports turning R through W onto N at 45 kt whilst climbing through 100-150 ft agl with an underslung load (USL), when he spotted two Tucanos departing to the N at about the same height. His ground crew subsequently told him that they had passed about 100 ft from the helicopter. No avoiding action was taken as he did not see them until after they had passed, but he assessed the risk to be high. A CANP had not been filed due to an administrative error.

He adds that a 1:250 000 chart is available to military pilots showing the boundaries of low flying areas and more importantly flow arrows showing the direction of military low level traffic. This series of charts with the military LFS overprint is not available to civil pilots. If such a chart could be made available to all civil pilots engaged in low level operations it could improve their awareness of the direction and likely intensity of any potential low-flying military traffic.

THE TUCANO PILOT'S UNIT comments that a high risk of collision was avoided by the Tucano crews' good lookout. The helicopter appeared to be operating in an environment where the UK AIP recommends ALFENS OPS be informed under the low-level CANP and where it could not fully comply with the principle of 'see and avoid'. CANP 7286 was transmitted at 1016:28 on 28 Apr, after this Airprox had taken place, promulgating a mandatory CANP avoidance because of helicopter underslung load lifting, within a 4 NM radius of 54°29'N 3°1·2'W, up to 1500 ft agl, encompassing the position of this Airprox. Whilst the CANP is a voluntary procedure, this Airprox graphically illustrates the possible consequences of non-compliance, which might lead to far more tragic and expensive consequences.

HQ PTC comments that it is fortunate that the Tucano crews saw the helicopter as soon as they crested the ridge and were able to take reasonable avoiding action, as it seems that the helicopter pilot did not see them until they had passed. If there had been a CANP in force they could have planned to avoid the area. In passing, it should also be noted that a CWS would have been of little benefit in an encounter such as this, since it would have offered little or no earlier warning than the Tucano leader's visual sighting.

THE SA315B HELICOPTER PILOT'S COMPANY comment that the pilot did not notify the company operations department that the previous day's work had not been completed and that the task would be continued the following day. Appropriate action has been taken to prevent a recurrence by issuing further guidance to their operations department to anticipate any likely extension of the CANP in the event of scheduled operations not finishing at the promulgated time. Similarly, the CANP could be cancelled should they finish early.

UKAB Note: 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 reports from the appropriate operating authorities.

The Board noted that a CANP had been filed for the task carried out by the SA315B helicopter during the previous four working days. It was evident that the helicopter pilot's omission (he did not ensure that the CANP was extended to cover the uncompleted task) was a significant contributory factor to the Airprox and members were reassured by the company's action to prevent a recurrence. There was a useful lesson here for other operators on the value of a CANP - had one been filed, the Tucano pilots would have planned their track to avoid the activity by an appropriate margin. Considering the terrain in the area of this Airprox the Tucano pilots could not have been expected to see the helicopter any earlier than they did. Similarly, the helicopter pilot would have been unable to see the Tucanos any earlier as they approached from the S below the ridgeline, especially if he was concentrating on his take-off with the USL at the time. With this in mind members agreed that the cause of the Airprox was a conflict in the FIR, which could have been prevented by the CANP. In the event the helicopter pilot had not seen the Tucano pair at all until they had flown past, but fortunately the Tucano leader had seen the helicopter in sufficient time, just, to take positive

avoiding action. As both pilots thought that there had been a high risk of a collision, on balance, the members agreed that the safety of the subject ac had been compromised.

Turning to the issue raised by the helicopter pilot about the availability of UKLFS information and a chart depicting the flow arrows, this attracted understanding from the Board who had made 2 such recommendations in the past. Like other examples this Airprox occurred where a low flying flow arrow is situated on the military Low-Flying Chart (LFC) as depicted on the diagram above. These flow-arrows are promulgated within the UK AIP at ENR 6-5-2-1, for the information of all civil pilots. However, the 1:1,000,000 scale chart is designed for use at the flight planning stage only.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the Tucano leader.

Degree of Risk: B

AIRPROX REPORT No 62/00

Date/Time: 5 May 1306

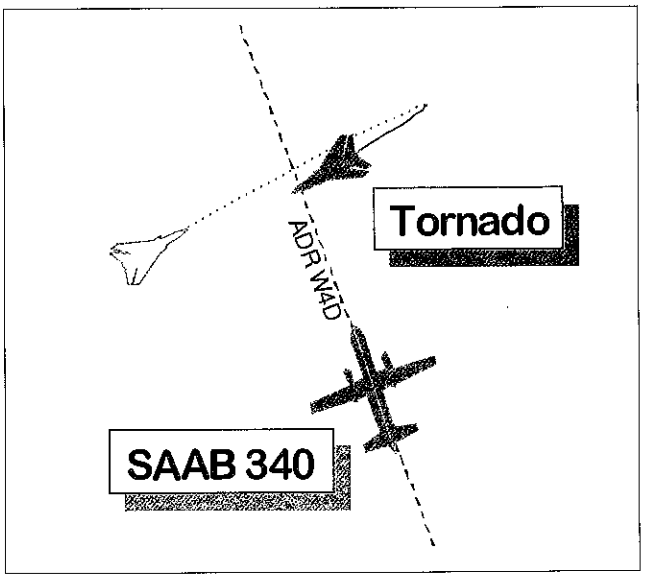
Position: 5759 N 0245 W (30 NM SE of Wick)

Airspace: ADR (*Class:* F)

	Reporting Aircraft	*Reported Aircraft*
Type:	SAAB 340	Tornado GR
Operator:	CAT	HQ STC
Alt/FL:	FL 150	14500 ft (QNH 1021 mb)
Weather	VMC CLOC	VMC CLNC
Visibility:	60 km	Unltd

Reported Separation: 1 NM/3.5 NM H, 500 ft V

Recorded Separation: 1.14 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT reports heading 351° at 220 kt on ADR W4D at FL 150 and receiving a RAS from ScACC. He was alerted by TCAS with a call of 'Traffic, descend descend'. He began a descent as the F/O advised she could see a Tornado; it was in their 1 o'clock, same level crossing R to L 1-2 NM ahead. When it was 1 NM in his 12:30 it rolled inverted and descended vertically. He regained the 600 ft lost and continued en route. ATC did not appear to have seen the traffic on radar.

THE TORNADO PILOT reports flying a general handling sortie and receiving a RIS from Lossiemouth; he was given information on traffic at FL 150 10 NM in his 10 o'clock. While at 14500 ft QNH, heading 240° at 200 kt, he was given an update of 10 o'clock at 4 NM and both crew members saw an ac 3-4 NM away. To avoid any possibility of confliction he descended rapidly; at no time did he or his navigator consider there had been a risk of collision. (UKAB Note: 14500 ft on 1021 mb equates to 14250 ft on 1013 mb.)

MIL ATC OPS reports that the Tornado crew were receiving a FIS from Lossiemouth Approach (APP), whilst operating VFR to the NE of Lossiemouth up to FL 240. The ac had been allocated a 3701 squawk before departure, however its SSR was not showing on APP's radar and therefore, the ac was not formally identified. APP's workload was low, the Tornado being the only ac on frequency. Having observed northbound traffic on ADR W4D, APP transmitted to the Tornado crew *"C/S, traffic believed to be you has traffic south east of you,*

range of ten miles, north westerly heading, believed to be on the advisory route indicating FL 150," which the crew acknowledged. One min 43 sec later, APP updated the information *"C/S, that previously reported traffic believed to be south of you now, range of four miles, north west bound, indicating FL 150."* The Tornado crew responded *"Visual"* and just over one min later added *"And C/S is well clear."* The a/c continued to operate under FIS and landed at 1320. About 2½ hours later, Lossiemouth ATC was informed of the Airprox.

In providing a FIS to the Tornado crew, APP had no requirement to identify or track the ac. Despite this, the controller had a reasonably good idea of where the a/c was and, seeing a potential confliction within the advisory route, made a sensible traffic information call to the Tornado crew, updating it at a range which enabled the crew to acquire the other a/c visually. FIS is a service established for providing information which is useful for the safe and efficient conduct of flight; in this case therefore, APP provided an entirely appropriate service.

UKAB Note: ScACC radar recordings show the SAAB 340 tracking along W4D at FL 150 and the Tornado crossing well ahead on a NE track intermittently showing FLs around 50-60 and QRY or QRY; its Mode 3/A shows 0000. After crossing the ADR the Tornado's track reverses upon itself, closing into the 12:00 of the SAAB 340 and briefly showing FL 142 before crossing just over 1 NM ahead of the SAAB and descending again.

ScACC reports that the Moray SC was providing the SAAB 340 with a RAS on ADR W4D and had seen the 0000 squawk tracking NE at the base of the ADR just to the south east of MORAY and saw no reason to pass traffic information on it to the SAAB crew. The first indication of a conflict was the SAAB calling a TCAS descent as the STCA started to flash. The Tornado's return had reversed onto a reciprocal after passing clear of the SAAB to the NE and its Mode C had changed from FL 50 to QRY.

HQ STC comments that the SAAB captain's report suggests that there was neither traffic information nor avoiding action passed by the ScOACC controller which clearly did little to resolve this confliction. The Lossiemouth controller passed timely and accurate information, over and above that which he was contracted to provide, to the Tornado. Had the crew assimilated the TI more accurately, a more modest adjustment to their flightpath would have prevented this Airprox. As it was, the late visual acquisition necessitated more positive avoiding action to remove any risk of collision.

The high energy vertical manoeuvre which the pilot performed is not uncommon in fast jet operations but the wisdom of undertaking it in the middle of an advisory route, designed specifically for the regular

use of commercial traffic, is questionable and it is to be hoped that the Tornado pilot cleared his flightpath thoroughly prior to the manoeuvre. (UKAB Note: The Tornado pilot's Station has added that the Tornado pilot perceived that he had been clear of the ADR during his manoeuvres but recognises that he may have crossed it. Crews have been reminded to cross ADRs expeditiously, at the correct quadrantal, and under a radar service where 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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

ATC members noted that the Moray SC had seen that the Tornado was squawking 0000; they observed that (unless he had been advised that the Mode C was serviceable) he should have treated it as unserviceable. As the incident developed, the Tornado's subsequent apparent looping manoeuvre proved too quick for the controller to notice the one return showing FL 142 in time to warn the SAAB. There was no doubt in the Board's mind that this was an inappropriate manoeuvre to perform in or across an ADR and it was all the more surprising since the pilot had already been warned by Lossiemouth of the SAAB NW bound on the ADR. Members agreed that this manoeuvre was the cause of the Airprox.

While the incident had some potential risk of collision, both pilots saw the other ac in time to take appropriate avoiding action to provide some vertical

separation, in addition to the 1 NM or so of horizontal separation. On these grounds the Board assessed there had been no risk of the ac actually colliding.

Members commended the reminder from the Tornado pilot's station to crews about the way to fly through Class F airspace, and suggested a similar prompt might be appropriate in the light of a repeat incident on 28 Jun (Airprox 94/00).

PART C: ASSESMENT OF CAUSE AND RISK

Cause: The Tornado flew into confliction with the SAAB while manoeuvring in the vertical across ADR W4D.

Degree of Risk: C

AIRPROX REPORT No 63/00

Date/Time: 5 May 1003

Position: 5622 N 0252 W (1·5 NM NW of Leuchars - elev 38ft)

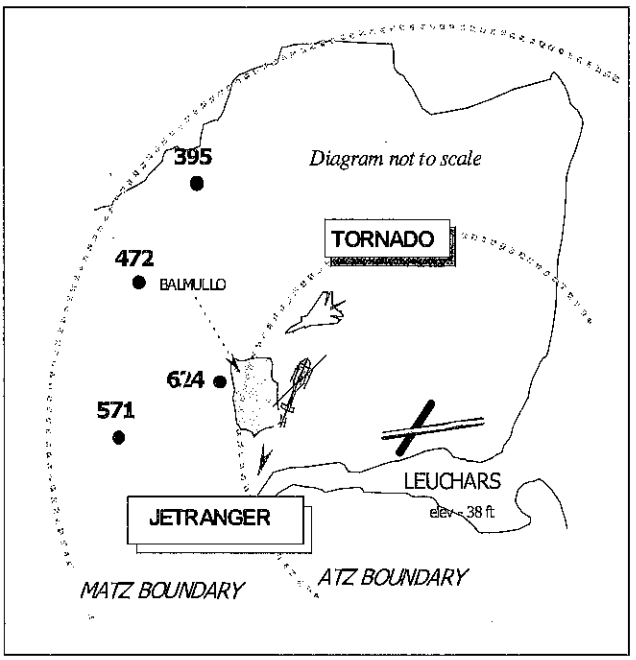
Airspace: MATZ/ATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado F3	JetRanger
Operator:	HQ STC	Civ Pte
Alt/FL:	700 ft (QFE 1023 mb)	500 ft (QFE 1023 mb)
Weather Visibility:	VMC CLBC *"Good"*	VMC CLBC

Reported Separation:

200 ft H, 200 ft V / 150 ft H, 400 ft V

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports that landing lights and HISLs were on whilst recovering to Leuchars and joining the visual circuit for RW 09, fuel priority, from a radar to visual approach at 1000 ft QFE (1023 mb). A low break was requested but declined by ATC due to another ac crossing theMATZ from N to S. At initials, he asked ATC for theposition of the MATZ crosser that was reported at "BALMULLO", which is situated at about 1·5 - 2 NM on the extended centre line of RW09. He elected to break into the visual circuit at the upwind end of RW 09 to maximise separation and turned L downwind. After reporting "finals" about halfway around the finals turn passing 180°, descending through 700 ft QFE at 160 kt, the navigator spotted a helicopter heading NE at about 500 ft QFE, 100 ft L and 200 ft below the port engine intake. The navigator called it to him and told him to *"roll level"*, whereupon he spotted the helicopter himself. He rolled R and climbed to avoid the helicopter, which passed about 200 ft above and behind with a high risk of a collision, whereupon he thought the helicopter then entered a hover, reversed the turn to the R and proceeded southbound. If they had not spotted the helicopter they would have flown over his flight path. Furthermore, he believed they had not been told the MATZ crosser was a helicopter or that its pilot had been told to hold at Balmullo. Therefore, they expected the reported

ac to be some miles to the S of the airfield. He added that although reported as crossing the MATZ N to S, the helicopter was at the time of the Airprox, heading S to N within the area of the visual circuit.

THE B206 JETRANGER PILOT reports flying from Dundee to Teesside and crossing the Leuchars MATZ under a RIS, he thought, on 126·5 MHz at 80 kt. ATC requested him to fly at 500 ft after initial contact and whilst following his track of about 160° it was difficult to maintain sensible ground clearance over high terrain and maintain 500 ft QNH before the ATZ, with high ground at an elevation of 624 ft amsl to the L and 571 ft to the R over cables – 500 ft agl would not have been a problem. Tower (TWR) then asked him to hold, which he did in a LHD orbit over a village at about 750 ft QNH – the Rad Alt showed a lot less as he tried to maintain a reasonable height above the village and separation from other ac. A military fighter was first sighted in the Leuchars visual circuit at about 1-2 NM. As he passed NE turning L he reversed into a descending R turn to avoid the jet and remain in the hold. The other ac passed about 150 ft to port and 400 ft above his helicopter but no avoiding action was advised by ATC and he assessed any risk to be low. He adds that wind shear was causing him some difficulty and he was very concerned about maintaining sufficient terrain clearance especially over the village in his single engine helicopter.

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

MIL ATC OPS reports that at 0958:40, the pilot of the JetRanger helicopter was heading 160° over Dundee water at 600 ft (1022 mb) when he called Leuchars Radar on 126·5 MHz for a southbound crossing of Leuchars MATZ. Meanwhile, the Tornado was also with Radar positioning for a radar to visual approach RW 09, but on 292·475 MHz. Radar's VHF and UHF frequencies were not cross-coupled and transmissions were made independently. At 0959:33, Radar instructed the JetRanger pilot to *"....stop climb 500 ft, one jet inbound to Leuchars, Leuchars QFE 1023"*, which the pilot acknowledged *"...remain at 500 ft..."*. (UKAB Note (2): the JetRanger pilot was climbing to 3000 ft originally.) At 1000:04, Radar made an internal call to TWR, stating that the Tornado pilot had declared a Fuel Priority and also a *"...MATZ crosser coming to you...JetRanger 500 ft...QFE, north to south"*, which TWR acknowledged. Radar subsequently instructed the JetRanger pilot to continue with TWR on 122·1 MHz at 1000:47. Two seconds later the Tornado crew contacted TWR on 259·12 MHz, who provided standard joining information, including the circuit state (which was clear) and acknowledged their fuel priority status. At 1001:00, the pilot of the JetRanger also made initial contact with TWR on 122·1 MHz reporting, *"...we have your fixed wing on the deadside..."*, which was acknowledged by TWR. TWR frequencies were not cross-coupled, but unlike Radar, transmissions were made on both UHF and VHF simultaneously. At 1001:17, the pilot of the Tornado requested a low break, which TWR declined because *"...there's a MATZ crosser civil helicopter 500ft north to south"*. The Tornado crew immediately requested the range of the MATZ crosser and TWR advised *"...he's approaching Balmullo"*, which is WNW of the aerodrome (about 1·6 NM from the threshold of RW09 and 0·5 NM N of the centreline), which the Tornado crew acknowledged. At 1001:49, the Tornado pilot reported on the break to land and shortly afterwards at 1002:02, the pilot of the JetRanger requested *"permission to cross the extended centreline"?* TWR responded *"... hold your present position, there is one fast jet turning inbound to land"*, to which the JetRanger pilot replied *"holding..."*. Thirteen sec later TWR asked the helicopter pilot to *"...confirm that you're at 500 ft on the QFE 1023?"* to which the pilot reported *"Negative, I'm just over some buildings at 800 ft but dropping to 600, 500 ft..."*. Immediately after TWR acknowledged the transmission on VHF, the Tornado pilot reported finals with gear down and at 1002:39, was cleared to land. Two seconds later the pilot of the Tornado stated, *"....there's a helicopter just underneath us now"*. As the transmission finished, the JetRanger pilot reported to TWR *"500 ft on the QFE..."*. TWR then advised the Tornado pilot that the helicopter was at 500 ft QFE. At 1003:08, the Tornado pilot transmitted *"For your information, the helicopter looks as though he's turned S now, hanging around about 500 ft Balmullo – not a good area for finals"*. At 1003:20, TWR cleared the JetRanger to cross the extended centreline and, when he reported clear, the pilot of the JetRanger was instructed to continue with Radar. At 1004:57, the pilot of the Tornado transmitted to TWR, *"....can you find out what the helicopter was doing please"*. TWR replied a few seconds later, *"He wanted to cross the centreline.*

I held him at Balmullo and he actually turned eastbound – he was at 500 ft". The Tornado pilot reiterated *"....it's not the best place to hold him and as we turned finals, he was a couple of hundred feet underneath us and then he turned southbound just behind us".*

The Leuchars ATC Guide stipulates that Radar is to co-ordinate requests for MATZ crossings with TWR, whilst considering the RW in use and Director's pattern. Furthermore, the Controllers' Order Book requires notification to be effected by the time the ac reaches the MATZ boundary, and is to include both the direction and the point of crossing in relation to the airfield *(x miles east/west etc).* From the RT transcript, the pilot of the JetRanger initially reported his position as *"approaching the other side of Dundee water"*, which would have placed the ac 5 - 7 NM NW of Leuchars, depending on whether the pilot was referring to the north or south shore. At the same time, the Tornado was approaching the Initial Point (IP) to RW 09 on an easterly track either at, or descending to, 1000 ft QFE. As both ac were with Radar, the controller was in an ideal position to plan a safe and expeditious service by applying vertical or horizontal separation and resolve any confliction prior to switching the ac to TWR.

Although a discrete SSR code was allocated to the JetRanger pilot by Radar, the helicopter was not identified or placed under service. Radar's decision to stop the JetRanger at 500 ft QFE would have been a timely way of achieving separation against the Tornado, and probably the best option available under the circumstances. However, this action should have only been a short-term measure, giving Radar time to plan for and properly position the JetRanger, in order to deconflict with known traffic approaching the visual circuit. Radar's landline call to TWR at 1000:04, failed to clarify where the ac would transit past the airfield and gave TWR few clues to the scenario that was building. With hindsight, it may have been practical and sensible for Radar to interrogate the JetRanger pilot more thoroughly and ascertain his intended track prior to the notification call to TWR. Moreover, with a 'Fuel Priority' Tornado about to join a visual circuit with a northerly LHD pattern, it may have been prudent for a helicopter at 500 ft QFE to have been routed directly towards the aerodrome and crossed at the mid-point of the RW.

Whilst both ac had previously been controlled in 'isolation' on their respective frequencies, (and therefore, probably unaware of each other), TWR was able to operate VHF and UHF simultaneously. On initial contact with TWR, the JetRanger pilot indicated that he was visual with the Tornado on the deadside of the visual circuit. TWR reported that he had the JetRanger in sight as it approached Balmullo and, when the Tornado pilot requested a low break, TWR declined the request and provided traffic information on a helicopter crossing N - S. Whilst the traffic information appears to have been reasonably accurate and was acknowledged, it was passed to the Tornado pilot during the latter stages of his recovery, rather than with the joining instructions on initial contact. In his report, the Tornado pilot stated that he broke deliberately late into the circuit over RW 27 threshold to *"maximise separation"* against what he thought to be a fixed-wing MATZ crosser. However, whilst the Tornado was on the break, its crew missed TWR's transmission for the JetRanger pilot to hold in the region of Balmullo.

Despite having been passed the QFE and an advisory height of 500 ft to cross the MATZ by Radar 3 minutes earlier, the JetRanger transited at approximately 800 ft as he approached the extended centreline. In his report, the JetRanger pilot appeared concerned with his proximity to high ground, cables and the effects of wind shear at 500 ft *QNH,* although he estimated that 500 ft *AGL* would have been *"no problem"*. After being told to hold in the region of Balmullo, the JetRanger pilot estimated his orbit height to be 750 ft QNH. The relatively inexperienced TWR controller did well to notice the JetRanger's height discrepancy and issue a timely instruction to descend, particularly as the Tornado crew later estimated that they had passed 200 ft above the JetRanger with a high risk of collision. However, TWR appeared to be unaware that the helicopter was orbiting in an area where the Tornado would be descending on finals, and did nothing further to rectify this in the short time available. Furthermore, by descending the JetRanger, TWR lost visual contact with the helicopter. As the Tornado pilot fully expected the MATZ crosser to be *"some miles to the south of the airfield'*, he did not expect to encounter rotary traffic orbiting at about 1·5 NM finals to RW 09.

Despite having ample opportunity to integrate a slow moving MATZ crosser with a fast jet joining an empty visual circuit, ATC do not appear to have planned and reacted correctly to what should have been a routine procedure. In the initial stages, early planning, pro-active teamwork and adherence to Controllers' Orders may well have been enough to ensure a safe and expeditious flight for both ac, where timely traffic information from TWR may also have resolved the confliction. The Tornado pilot was warned of the MATZ crosser but misinterpreted TWR's traffic information and so did not sight the JetRanger until very late.

HQ STC comments that there are a number of elements of this Airprox worthy of further comment. The JetRanger crossing the MATZ had been poorly positioned in relation to recovering fast-jet traffic and the flow of information to the F3 from ATC was not ideal. Nevertheless, it would have been sensible of the F3 crew to ensure that they were visual with the JetRanger before placing themselves in its last reported position. In the event, the F3 crew sighted the helicopter, of which they were forewarned, relatively late but took appropriate action to avoid flying over the helicopter's flightpath.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was encouraged to learn that robust measures had been taken locally to rebrief those concerned and commended the comprehensive report provided by Mil ATC Ops that had identified all the main ATC factors associated with this rather disappointing sequence of events. Members agreed that this was a routine ATC situation, which could have been handled more smoothly. It seemed that TWR had been handed the problem by Radar, who had done little to resolve it. Poor planning by both Radar and TWR led to this situation. It was Radar that stopped off the helicopter's climb, when height separation could have been effected against any traffic in the visual circuit and the helicopter fed overhead the aerodrome. That said the helicopter pilot was visual with the Tornado when he switched to TWR and was instructed to take up a hold adjacent to the Tornado pilot's finals turn; this instruction compounded the problem. There was a strong feeling amongst controller members that there was no apparent need to hold the helicopter in the location chosen and some felt a more expeditious crossing of the RW09 centreline could have forestalled this Airprox. Moreover, the helicopter pilot was instructed to fly at a height of 500 ft QFE, which he appears to have interpreted incorrectly as 500 ft QNH, an altitude that did not allow him to maintain appropriate terrain clearance over Balmullo in his single engine helicopter. In these circumstances, he should have advised TWR that he was unable to fly safely at the height given to hold, especially as this was adjacent to high ground above him up to 624 ft amsl.

Turning to the Tornado crew, it was evident that traffic information had been passed to them by TWR, but they had missed TWR's other call to the helicopter pilot instructing him to hold at Balmullo. Balmullo was not the ideal place to hold a MATZ crosser, but if TWR had re-emphasised the presence of the holding helicopter to the Tornado crew when they were downwind they would not have been taken by surprise in the finals turn. That said they had been informed about a MATZ crosser at 500 ft and might have asked for an update on its position if they had not seen it, rather than assuming it would be further to the S. A pilot member suggested that TWR might have overreacted to the Tornado's fuel priority call, which with an empty circuit should have caused little difficulty.

After weighing all these factors members agreed that the Airprox occurred because of a lack of positive control by Leuchars ATC as a whole. Turning to risk, members agreed that this was a close encounter forestalled by the quick reactions of both Tornado crew members who were placed in an unenviable position. This led the members to agree that although the action taken was enough to remove any risk of collision the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Lack of positive control by Leuchars ATC.

Degree of Risk: B.

AIRPROX REPORT No 64/00

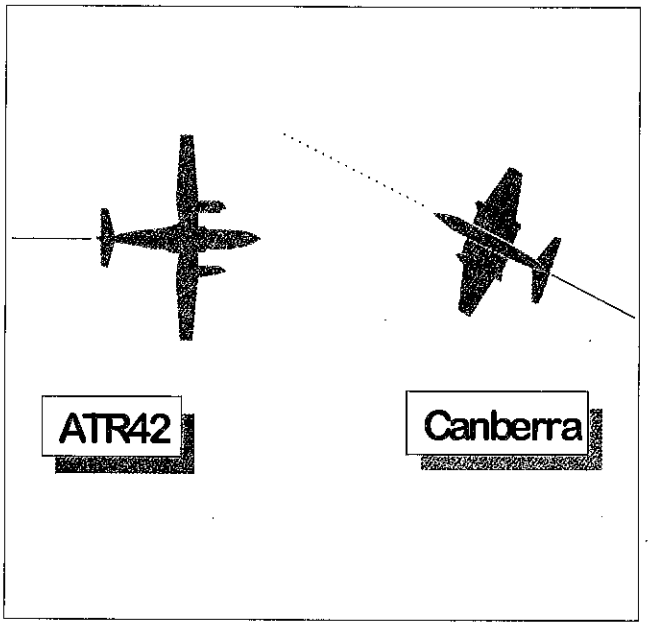
Date/Time: 8 May 1439

Position: 5458 N 0353 W (11 NM SW of Dumfries)

Airspace: Airway A1 (*Class:* A)

Reporter: ScACC Galloway SC

	First Aircraft	*Second Aircraft*
Type:	ATR42	Canberra
Operator:	CAT	HQ STC
Alt/FL:	FL 170	FL 180
Weather Visibility:	VMC CLAH 30 km	VMC CLOC 40 km
Reported Separation:	1 km, 500 ft V/NK	
Recorded Separation:	0.5 NM,600 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC GALLOWAY SC reports that he was monitoring the descent of a Canberra, tracking NW, which had been cleared to FL 180 until clear of the ATR42, level at FL 170 and just entering controlled airspace, tracking E. As the ac converged he saw the Canberra's Mode C reduce to 179 and continue down to 176 as it passed just ahead of the ATR42, under a RCS. There was no time to pass avoiding action. About 2 minutes later the ATR42 pilot asked if there had been 1000 ft separation. The Canberra's Scottish Mil controller had also seen the Canberra's descent below FL 180.

THE ATR42 PILOT reports heading 091° at 275 kt and maintaining FL 170 when the ScACC controller informed him of traffic in his 1 o'clock at 10 NM descending to 1000 ft above him. He turned his landing lights on to increase his conspicuity and did not see the ac, a Canberra, until it was crossing his 12 o'clock about 1 km ahead and less than 1000 ft above. He took no avoiding action and considered the risk of collision was low because of the flight conditions and the existing separation.

THE CANBERRA PILOT reports heading 290° at 400 kt and receiving a RCS from Scottish Mil while crossing controlled airspace. He was cleared to descend to FL 180 and did so, but subsequently, while referring to his map, allowed the ac to descend further. Scottish Mil alerted him to this and he stopped his descent at FL 175 and climbed back to FL 180. He did not see the ATR42.

MIL ATC OPS reports that the Canberra pilot was under the Radar Control of ScATCC (Mil) Console 3 (CON3) at FL 280 and in transit prior to a descent to low level. At 1536:15, whilst the Canberra was in the vicinity of SHAPP, CON3 initiated co-ordination with the ScACC Galloway SC, in connection with an ATR42 which was level at FL 170. It was agreed that the Canberra would not descend below FL 180 until 5 NM clear of the ATR42. The Canberra pilot requested descent at 1537:10 (in the vicinity of DCS) and CON 3 instructed a descent to *"..Flight Level one eight zero initially"* adding a few seconds later *"..that's against traffic left eleven o'clock, twenty miles, crossing left right, co-ordinated at flight level one seven zero."* At 1438:45, the Canberra pilot advised *"..approaching one eight zero for further."* CON3 instructed the pilot to maintain FL 180, adding *"...that co-ordinated traffic now left ten o'clock, five miles, crossing left right, Flight Level one seven zero"* and the pilot responded *"Roger."* As the a/c converged, CON3 observed the Canberra's Mode C read FL 179 and asked the pilot to *"..confirm your level"* at 1439:20. The pilot responded *"Levelling one seven...one eight zero."* The controller observed the subsequent Mode C readouts indicate FL 176, then 183. Once 5 NM clear of the ATR42, descent to low level was initiated and the pilot changed to his en-route frequency.

The ScACC radar replay shows the Canberra's track descending to an indicated FL 176 whilst passing just less than 0.5 NM ahead of the ATR42 (radar contacts overlapping). As the Canberra emerges, it climbs rapidly back to FL 183. The ATR42 maintains its easterly track, and level (FL 170) throughout the encounter. CON3 achieved appropriate co-ordination well in advance and passed a clear descent instruction, along with relevant and accurate information on the conflicting a/c.

HQ STC comments that this regrettable and wholly avoidable incident was caused by an inexperienced Canberra pilot who allowed his instrument scan to break down whilst in controlled airspace. Crews at the station concerned have been reminded of the need to 'fly the ac'.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board agreed that the cause of this incident was that the Canberra pilot descended below his cleared level – all the more regrettably because he had twice been warned about the ATR42. Members considered that CON 3 had done well to pick up the Canberra's divergence immediately and pass a prompt warning; this, the Canberra pilot's prompt reaction, and the existing lateral separation led members to conclude that there had been no risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Canberra pilot descended below his cleared level.

Degree of Risk: C

AIRPROX REPORT No 65/00

Date/Time: 3 May 1650

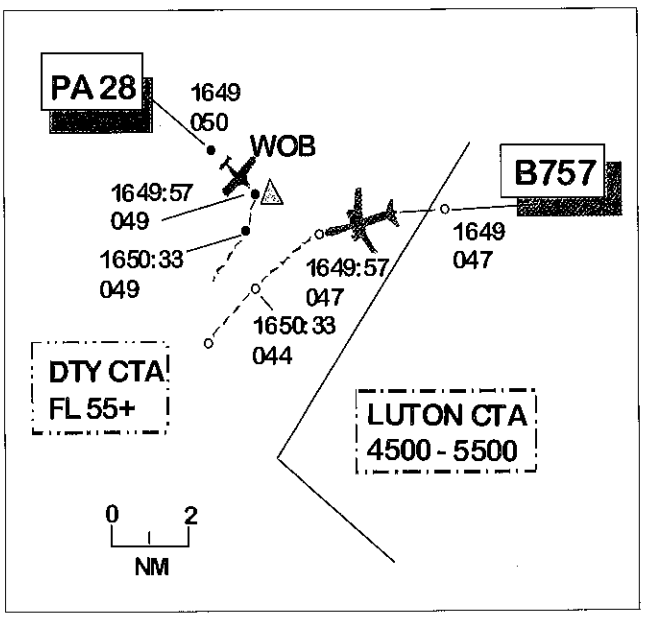
Position: 5200N N 0044 W (1 NM S WOBUN)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	B757	PA28
Operator:	CAT	Civ Trg
Alt/FL:	5000 ft (QNH)	FL 50
Weather Visibility:	VMC >10 km	VMC CLAC >25 km

Reported Separation: 400 ft/ 0·5 NM not seen

Recorded Separation: 1·2 NM/300-400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports that he was under the control of Essex Radar while inbound to Luton. When about 9 NM NW of Luton, cruising at 5000 ft and decelerating from 250 to 210 kt on a westerly heading, he and his FO were remarking on what seemed to be an unusually late handover to Luton when a TCAS TA indicated traffic at 1 o'clock range 4 NM. Essex radar then transferred him to Luton's APC frequency (129·55). The other ac was then

spotted at their 1230 position range 2 NM at about co-altitude. As he began a L turn in avoidance, an RA demanded descent and this was followed by an ATC instruction to turn L onto 210° for avoiding action. The descent and turn instructions were followed but descent was arrested at the cloud tops (about 4000 ft) in order to remain VMC, and to avoid other traffic seen close to his port side, but below. Visual contact with the first ac was lost during the descent/turn and it was therefore difficult to assess the miss distances. However, he thought they had been in the order of 0·5 – 1 NM and 400 – 500 ft. He felt there had been a medium risk of collision.

THE PA28 PILOT reports that he was engaged in an IFR Navex routeing Oxford – DTY – WOB – WCO – Oxford at FL 50 at 100 kt. The visibility, partly into sun, was over 25 km in VMC. Normally the leg from DTY to WOB would have been flown at a lower level but on this occasion the cloud tops at around 4000 ft precluded descent. He was receiving a FIS from Oxford APC and monitoring Cranfield on 122·85; SSR was selected to 7000 with Mode C on. Normally, he would have obtained a RIS from Brize; however, due to staff shortages Brize had advised that they were unable to offer this service between 1200 – 1400 or at weekends, and a notice frequently seen on the Oxford ops board said 'Brize only taking airways joins'. He could only assume that such a notice was up at the time otherwise he would have contacted Brize. He adds that Oxford instructors have also been discouraged from using Luton ATC for a RIS. Given the time of day and flight conditions at the time, he felt Luton would have been too busy to provide a service and it would be inappropriate to call them; had he encountered IMC he would certainly have called either Brize or Luton.

Neither he nor his student (flying the ac behind IF screens 1 and 2) saw the other ac. However, it later emerged that a second student in the rear of the ac did see it and was about to point it out, but he assumed, because the PA28 was in a turn at the time, the handling crew had also seen and were avoiding it. The reporting pilot concluded by saying he always strives to be vigilant with his lookout and feels that, on this occasion, he must have been concentrating on watching his student's intercept of track and turn and consequently omitted to look to the L when resuming his lookout scan.

ATSI reports that the Boeing 757 was on a positioning flight from Gatwick to Luton. An uneventful transit through TC South-East and North-East airspace was followed by a transfer to TC Essex Radar for integration with other traffic inbound to Luton, Stansted and Cambridge via LOREL. Again the flight through Essex Radar's airspace was uneventful and, in accordance with published procedures, it was radar vectored through the 'Luton Gate' at 5000 ft heading west. Unfortunately, the Essex Radar INT/FIN controller forgot to transfer the ac to Luton. As a consequence, the B757 continued heading west at 5000 ft and eventually flew out of controlled airspace. Shortly after doing so it came into conflict with the PA28, resulting in a TCAS 'Descend' RA. This coincided with the late transfer of the flight to the Luton APR who issued an 'avoiding action' instruction to turn left. The crew of the B757 subsequently filed an Airprox report. The crew of the PA28, who were conducting an instrument training detail outside CAS, were unaware of the incident and probably did not see the B757.

Essex Radar was being operated by a SPT plus the INT/FIN controller. The workload and traffic loading was reported as moderate to high. Luton and Stansted were using Runway 08 and 05 respectively, a runway configuration that complicates the Essex Radar task considerably. The SPT controller, who had been monitoring a trainee at the time of the Airprox, attended the interview with the INT/FIN controller and neither could recall any other significant factors which might have adversely affected their performance.

The crew of the B757 established communication with Essex Radar, at 1636:30, reporting heading 360° at FL 70. The flight was subsequently assigned a series of radar headings and a speed of 250 kt and was cleared to 5000 ft, in order to position it through the 'Luton Gate' (a line marked on the radar video map extending north from LOREL) in accordance with the relevant procedures. The B757 duly passed through the 'Gate', the release point for ac following the procedure, at 1644.

The Essex Radar INT/FIN controller explained, at interview, that he would normally transfer ac to Luton at or before the 'Gate' but, on this occasion, he simply forgot. Normally, once ac inbound to LOREL

are cleared to descend below the Minimum Stack Level (MSL), the fps is placed under the Luton or Stansted designator, as appropriate. He recalled that the fps on the B757 had initially been placed under the Stansted designator to serve as a reminder that the flight was in potential conflict with a Stansted inbound. Unfortunately, once the conflict had been resolved, he forgot to move the fps back under the Luton designator. He thought this a possible reason why he overlooked the fact that the B757 had not been transferred to Luton. The error went undetected for almost 5 minutes after the B757 had passed through the 'Gate'. It came to light when another TC controller queried "Where's the B757 going?". At 1648:40, the INT/FIN controller confirmed that the B757 was still on frequency and then transferred it to Luton immediately. The previous communication with the flight had taken place 7 minutes earlier, at 1641:40. The Essex Radar controllers did not notice a developing conflict, with an ac at a similar level squawking 7000 (later identified as the PA28), prior to transferring the B757. At that stage, the PA28 had been in the B757's 1 o'clock position at a range of approximately 8 NM. The INT/FIN controller's radar display had been set to a range of 30 NM and the B757 had been right at the edge of his display, requiring him to extend the range to see it, prior to transfer. The adjacent SPT controller's radar display was set to a range of 60 NM but was 'filtered' so that only the SSR labels of ac inbound to Luton, Stansted and Cambridge were displayed.

In accordance with procedures, the B757's estimate (LOREL 1646) and SSR code (6233) had been passed to Luton. Unfortunately, the Watch Manager, who happened to be standing in for the ATSA at the time, input the SSR code as 6235 when entering the data into Luton's code/callsign database. Thus, Luton's radar displayed the B757's radar return as a 'raw' SSR code, 6233, instead of the callsign, which would have been far more conspicuous. Arguably, the Luton Radar controller should have noticed an ac go through the 'Gate', level at 5000 ft and heading west, close to the estimate provided on the B757 and queried it. However, it is accepted that, whilst concentrating on other traffic, receiving no call from the ac and not having the callsign displayed on radar, it could easily have been overlooked. Since this Airprox occurred, Luton has been linked to the LATCC Host Computer System (HCS) and has access to the LATCC Code Callsign Distribution System (CCDS). Thus, estimates and code/callsign conversion data should be transferred to Luton automatically, removing the opportunity for errors such as the one which occurred on this occasion.

As the Essex INT/FIN controller was transferring the B757, the SPT controller telephoned Luton to apologise. A fairly protracted conversation ensued because the Luton controller had difficulty locating the flight for the reasons stated earlier. The Luton controller told the B757 to standby initially but, once he had noted its position and proximity to conflicting traffic, he then issued an immediate instruction to turn left heading 210° for avoiding action. The pilot of the B757 acknowledged the turn instruction and advised he was monitoring the traffic on TCAS. A few seconds later he reported *"TCAS descent"*. The Luton controller went on to pass traffic information on another 7000 squawk in the vicinity with no Mode C and the pilot reported *"visual"*. In his report, the commander of the B757 states that, when responding to the TCAS RA, he only did so to the extent that he would remain above a cloud layer. Subsequent enquiries established that the latter traffic was probably a PA28 whose pilot reported operating below the cloud layer at 1500 ft. It is therefore concluded that when the pilot reported "visual", it meant that he was monitoring it on TCAS.

The Luton APR placed the B757 under a RAS while it remained outside CAS and later updated this to a radar control service when the flight re-entered controlled airspace. The heading of 210°, which was revised to 230° less than a minute later, took the B757 between the two unknown radar contacts. The first, the PA28, which had originally been on a south-easterly heading, turned right onto a south-westerly heading to roughly parallel the B757 as it turned left. When this ac was traced, the instructor reported that this had been a routine turn overhead WOBUN and that neither he, nor the pilot under instruction, had sighted the B757 at the time, however, an "orange B737" was sighted by a rear seat passenger as they tracked towards the Westcott NDB. This description did not fit the B757 but the next inbound ac was a B737 with a predominantly orange colour scheme, so this may have been the ac which was sighted. The second unknown ac, not displaying Mode C, was on a reciprocal heading to the B757. The APR kept the crew updated on the position of this ac and it

eventually passed approximately 1 NM down their port side.

Once the conflict was resolved, the B757 returned to 5000 ft and the remainder of its flight was uneventful. When asked by the Luton APR, the pilot of the B757 stated that he would not be submitting an Airprox report, just a TCAS report but, evidently, he later changed his mind.

UKAB Note: A recording of the LATCC radars shows the B757 heading W at 4700 ft Mode C (equivalent to 4970 ft QNH 1023) and exiting the Luton CTA at 1649 about 4 NM E of WOBUN. At the same time a return, believed to be the PA28, Squawking 7000 with Mode C indicating 5000 ft, is seen approaching WOBUN 2 NM from the NW. At 1649:57 both ac begin to turn, the B757 left and the PA 28 right; at this point the ac are some 2 NM apart with the PA 28 Indicating 4900 ft and the B757 4700 ft. By 1650:33 the ac are on parallel tracks, the B757, indicating 4400 ft, having overtaken the PA28 which is now at its 4 o'clock position range 1·5 NM. Minimum Separation was in the order of 1·2 NM and 300 – 400 ft as the ac passed at about 1650:10, 1 NM S of WOBUN.

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 GA member expressed concern that the rear seat passenger in the PA28 had not pointed out to the pilots the traffic that he had seen in the Woburn area. Drawing attention to other ac was always worthwhile, especially during a simulated IF sortie where cockpit screens can obscure the view significantly.

Civil pilots on the Board wondered if the B757 crew was locally based as this could have affected their situational awareness and understanding of the Luton procedures. The crew had passed through the 'Luton Gate' and continued for 5 minutes on a radar heading before being transferred to Luton Approach. Members were surprised that the B757 pilot had been content to fly for nearly 7 minutes without RT communication and noted that the situation was eventually picked up by a TC controller querying the B757's routeing; this led to the late handover occurring as the ac left controlled airspace. Discussion followed as to whether the boundaries of CAS and their classifications were marked on the B757's FMS displays as this would have alerted the pilots to their unintended excursion into the FIR. Airline pilot members explained that CAS was not marked on ac displays and that pilots expected to be kept inside CAS at all times on flights into Luton. However, they agreed that it was reasonable to expect pilots to be aware of their position at all times but pointed out that none of the charts commonly used these days provided airspace boundary information.

The civil ATC airfield member agreed that the code callsign data system in use at Luton at the time was an old one installed in 1974 and was well beyond its 'sell by date'. The error in data input for the B757 that caused a raw SSR code to be displayed, along with the late handover from TC and assimilation by the Luton controller, had both contributed in part to the ac leaving CAS. However, the new link to the LATCC Host Computer System and Code Callsign Database had now removed the need for manual code/callsign insertion.

The ATC TC member went on to explain the TC mode of operation. The INT/FIN controller's display would be set at 30 NM, and would show all SSR codes, while the adjacent SPT display would be set at 60 NM, but filtered to show only Luton, Stansted and Cambridge traffic. During this incident, by the time the problem had been identified, the B757 was at the edge of the INT/FIN controller's display as it was transferred to Luton with the adjacent SPT display set up as usual.

The Board concluded that the primary cause of the incident was that the TC Controller had allowed the B757 to fly outside CAS into subsequent conflict with the PA28.

The PA28 had been flying adjacent to CAS under simulated IF without being in receipt of a radar service. Even though he had been discouraged from contacting Luton and Brize Norton for a service on previous occasions, it would have been prudent on this sortie to do so; Benson radar was suggested as a possible alternative. Members thought that its

pilot should have seen an ac as large as a B757 at Woburn.

With regard to risk, members noted the effect of the avoiding turn by the Luton controller and that the TCAS RA descent had allowed the B757 pilot to acquire the PA28 visually. Additionally the turn by the PA28 to the SW led members to conclude that no risk of collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Essex Radar INT/FIN controller allowed the B757 to fly outside CAS into conflict with the PA28.

Degree of Risk: C

AIRPROX REPORT No 66/00

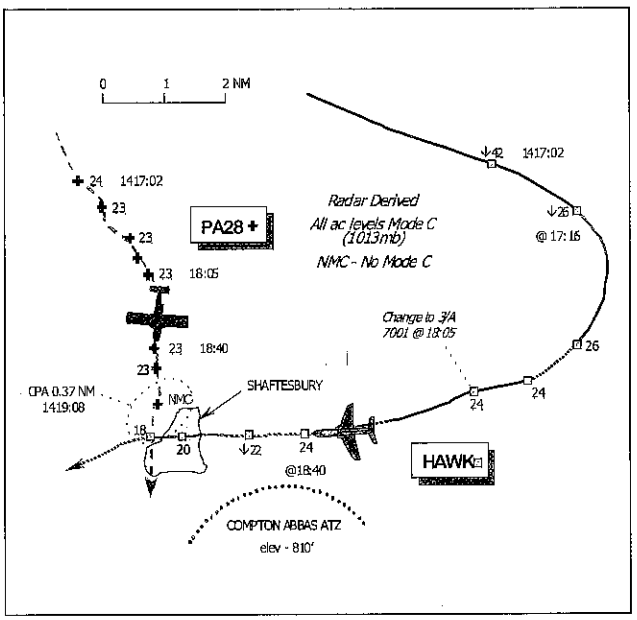
Date/Time: 16 May 1419

Position: 5101 N 0212 W (3·6 NM NW of Compton Abbas - elev 810 ft)

Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	PA28R	Hawk
Operator:	Civ Pte	MOD (DPA)
Alt/FL:	2000 ft (QNH 1004 mb)	2000 ftâ
Weather Visibility:	VMC CAVOK 25 Km	VMC Not reported
Reported Separation:	200 m H, nil V	Not reported

Recorded Separation: 0·37 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA28R ARROW IV PILOT reports he was under a limited RIS from Yeovil RADAR, in transit at 120 kt from Gloucestershire aerodrome (Staverton) to Bournemouth (Hurn) at 2000 ft Portland RPS (1004 mb) in CAVOK. The ac has a white colour scheme with green trim; anti collision lights and HISLs were on and he was squawking the assigned code of 3/A 0230 with Mode C. Whilst approaching Shaftesbury, heading 195° (M), a black Hawk jet was first sighted closing from the L at a range of about 1 NM, flying westbound straight and level. No avoiding action was taken as the jet passed from L to R about 200 m ahead of his ac, he thought, at the same altitude. He did not assess the risk.

THE HAWK PILOT reports that he was not aware of the Airprox until AIS (Mil) made contact 8 days after the event. Consequently, as he had flown 4 sorties in the intervening period he did not have a clear recollection of seeing another ac at the time of the Airprox. However, he enclosed a chart fragment with his report illustrating the track flown, which from 1418, he believed was accurate to within 0·5 NM and 30 sec. His ac has a black colour scheme and HISLs were on. He was squawking 3/A 2620 with Mode C, whilst conducting general handling until about 1415, in the FIR between Boscombe Down and Yeovilton. A descent from FL 50 to attain VMC was executed under a RAS, he thought, from Boscombe Down RADAR, which was cancelled at about 1418 after descending from 3000 ft to 2000 ft amsl VMC. The squawk was

changed to 3/A 7001 and he supposed that the Airprox might have occurred at this point as he descended to 250 ft agl into the LFS on a heading of 227°, but no other ac was sighted. Consequently, he was unable to provide further detail.

UKAB Note (1): AIS Military advise that the reported ac was identified, subsequent to tracing action and a review of the radar recording on 18 May. Boscombe Down Ops were subsequently contacted the following day some 3 days after the Airprox occurred. Contact was not established with the reported pilot until 24 May, when all details known to AIS (Mil) about of the Airprox were passed to the Hawk pilot. The Hawk pilot was unable to provide a complete report.

UKAB Note (2): The Jersey radar recording illustrates this Airprox clearly, but both ac are only displayed as SSR responses. At 1417:02, the PA28 squawking 3/A 0230, is shown tracking generally southbound, whilst the Hawk is about 6·5 NM E, squawking 3/A 2620 and tracking about 120°, whilst descending through FL 42 Mode C (1013 mb). At 1417:16, the Hawk is shown turning R and descending through 2600 ft Mode C, with the PA28 about 8 NM W, indicating 2300 ft Mode C – about 2030 ft RPS and in accord with the pilot's report. The Hawk's SSR code is changed at 1418:05, to 3/A 7001 and the ac continues westbound at 2400 ft Mode C. At 1418:40, the Hawk is in the PA28's 10 o'clock - 2·85 NM indicating 100 ft above. The Hawk pilot commenced the descent to LL just after 1419:02, when the ac is shown over Shaftesbury at 2000 ft Mode C – about 1700 ft RPS. The closest point of approach (CPA) is shown at 1419:08, when the Hawk indicated 1800 ft Mode C in descent and crossed from L – R about 0·37 NM ahead of the PA28. Due to SSR label overlap, the PA28's Mode C indication cannot be determined but it indicated 2300 ft and 2200 ft respectively, immediately before and after the CPA. Just after the CPA the PA28 pilot turned R about 30° and then resumed a southerly track. The Hawk faded from radar coverage at 1419:26, descending through 1300 ft Mode C.

MIL ATC OPS reports that the PA28 pilot was in receipt of a limited RIS – close to the base of radar cover at 2000 ft Portland RPS (1004mb) - from Yeovil RADAR (LARS), on 127·35 MHz. At about 1419:16, the PA28 pilot transmitted "*...we're just on the western edge of Shaftesbury at the moment, 2000 feet, one double oh four. We've had a Hawk pass in front of us ...about four hundred metres our level. Did you have him on radar?*", to which LARS replied "*...I'm afraid not.*" The RT conversation then continued as a brief discussion about what radar contacts could be seen, how busy the airspace was and which units may have been operating Hawks, before the PA28 pilot added "*.... and that was an Airprox*" at 1420. The LARS controller who had seen nothing else on the radar informed the Radar SUPERVISOR, who immediately checked the radar display; the only other ac visible in the vicinity was to the N of the PA28 at about FL 50. Shortly afterwards, the PA28 pilot confirmed that the other ac had "*crossed the bows*" at the same altitude.

The Hawk pilot was in receipt of a RIS from Boscombe RADAR (BDN) on 276·85 MHz whilst operating to the W of Boscombe Down. At about 1416:00, the pilot requested a radar cloud break, in order to continue into the LFS. BDN instructed the Hawk pilot to head 120° and descend to 2000 ft Boscombe Down QFE (996 mb). At 1417:10, having advised the Hawk pilot that the cloud base at Boscombe was about 2600 ft, BDN transmitted "*..if you turn right heading 180 now, that will put you into low level roughly to the NE of Compton Abbas by 5.*" Whilst acknowledging the turn, the pilot confirmed that he was VMC below and happy to leave the frequency, which he did at 1418.

The Yeovil RADAR LARS controller had a reasonably high workload during the period of this Airprox with 6 ac on frequency including two crossing the Yeovilton MATZ. LARS was correct in limiting the radar service being provided to the PA28, as high ground to the E and SE of Yeovilton is known to affect the base of solid radar cover in that area. The Hawk was not seen on the controller's display, presumably due to the fact that its turn westbound, and subsequent descent, occurred just below radar cover. Shaftesbury is equidistant between Yeovilton and Boscombe Down and therefore, there would have been little benefit in transferring the PA28 to BDN; Yeovilton ATC were also working other traffic in the area, hence retaining the PA28 on frequency as 'known' traffic would have been a distinct advantage to the unit.

The BDN controller was fully aware of the risks involved in descending the Hawk towards Compton Abbas and its ATZ, and so conducted the descent on an ESE track, later turning the ac S when adequate clearance had been obtained. The Hawk left the frequency just over 1 min before the Airprox, whilst on a southwesterly heading and in descent to low level. At the time, the Hawk's track would have passed well ahead of the PA28 and thus a confliction would not have been apparent to BDN on that heading. Therefore, the actions of the controllers involved are not open to criticism.

MOD DIRECTORATE OF FLYING (DPA) limited their comment on the Hawk pilot's F765A dated 18 Aug 00, saying only that in view of the lack of any sighting of another ac by the Hawk pilot, they were unable to make any useful contribution to the investigation of this 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 photographs/video recordings, reports from the air traffic controllers involved and a report from the appropriate ATC authority.

The Mil ATC Ops advisor reiterated that the confliction had not been apparent to BDN before the Hawk switched frequency, neither was it evident to Yeovil RADAR. Consequently, the Board agreed that the respective ATSUs would have been unable to prevent this Airprox and good lookout was all that remained to forewarn the respective pilots of the presence of each other's ac - a salutary lesson on the importance of a good systematic visual scan outside the cockpit.

It was the Hawk pilot's responsibility to 'give way' in this situation under the 'Rules of the Air', but he reports he did not see the PA28 at all. Conversely, the PA28 pilot saw the Hawk, but some members believed that at the reported range of 1 NM, it was at a late stage. In his initial airborne report by RT the PA28 pilot told Yeovil RADAR that minimum horizontal separation was 400 m but he changed this subsequently to 200 m in his written report. The Board noted that the former figure was more in line with the horizontal separation shown on the radar recording. Some members thought that a '1 NM pick up' amounted to a late sighting, but this was understandable given the small size of the Hawk and perhaps reduced relative motion had also played a part – which also applied equally to the Hawk pilot. However, others contended that, notwithstanding the 'Rules of the Air', having seen the Hawk, the PA28 pilot did not appear to take any avoiding action at all and allowed himself to fly too close to it. Members believed that it was usually safer to take positive action quickly to maintain or improve separation against another observed ac, that might otherwise get too close. The PA28 pilot might have thought, quite reasonably, that the Hawk pilot should have seen and avoided his ac by a greater margin. However, the 'Rules of the Air' can only work when both pilots sight each other's ac, which was not the case here. The members agreed, therefore, that this Airprox resulted from a non-sighting by the Hawk pilot and a late sighting by the PA28 pilot.

Turning to risk, the PA28 pilot had spotted the Hawk and could have changed his flight path if necessary - which apparently it was not. This, coupled with the measured (from radar) horizontal separation of 0·37 NM as the Hawk crossed ahead of and about 400 ft below the PA28, led the members to agree that there had not been a risk of a collision in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non sighting by the Hawk pilot and a late sighting by the PA28 pilot.

Degree of Risk: C.

AIRPROX REPORT No 67/00

Date/Time: 24 May 1426

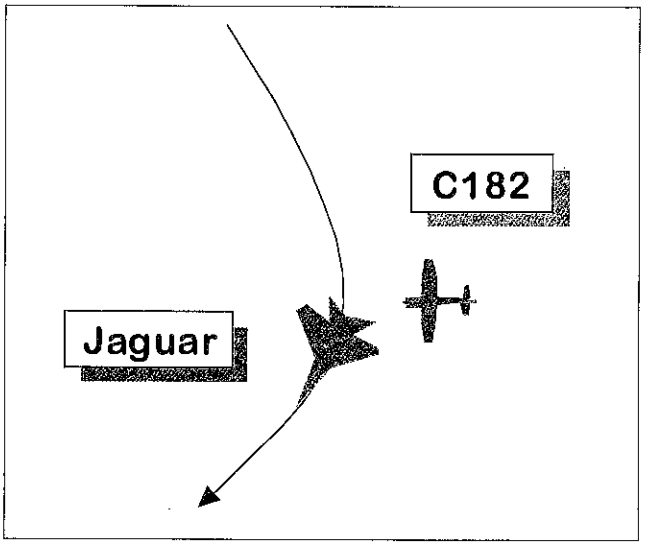
Position: 5532 N 0141 W - Brunton airfield 130 ft

Airspace: FIR/LFS (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Cessna 182	Jaguar T4
Operator:	Civ Club	HQ STC
Alt/FL:	200 ft (QFE)	300 ft (Rad Alt)
Weather Visibility:	VMC CLBC 10 km+	VMC CLBC 25 km

Reported Separation: 2-300 ft V/NK

Recorded Separation: 200 ft V, ? H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 182 PILOT reports heading 260° at 70 kt on take off from Brunton airfield in his mainly white ac. When passing 200 ft, while still over the runway, a military jet passed right to left 2-300 ft ahead and above with a medium to high risk of collision. It was turning right and he could hear its engine noise above his own full power and max rpm. He took no avoiding action because it was already passing when he saw it.

THE JAGUAR PILOT reports heading 210° at 450 kt on a dual tactical sortie as one of a pair; they had just evaded a 'bounce' ac and during the process had lost sight of the leader. The instructor was allowing the student to decide how to regain formation. While doing so the ac routed close to Brunton; while he did not prevent this because the airfield has LFS 'warning' status, not 'avoid', he 'would have' suggested at the debrief that this was not good airmanship. Neither pilot saw the Cessna which would have been below their level and probably obscured by the Jaguar's nose in the latter stages of approach.

UKAB Note: The incident occurs on the margins of recorded radar coverage. An intermittent 7001 return can be seen approaching Brunton from the NW. A single return of 7001 at 800 ft Mode C appears overhead Brunton airfield at 1426:41 to be replaced at the same location 8 seconds later by a 0033 return at 600 ft Mode C. (The Cessna was on a paradropping sortie.) The 7001 squawk reappears shortly afterwards, tracking SW.

The UK AIP entry for Brunton (under free-fall parachuting) is as follows:

> **Brunton**, Northumberland Circle 1.5 nm radius of 553128N 0014027W. FL 150 Opr/ User: Not applicable. Newcastle ATC: 0191-2860966.
>
> **Remarks:** Activity notified on the day to Newcastle ATC.
>
> **Hours:** Normally during daylight hours. The airfield is also notified in the UK LFS manual as a 'Warning' for light aircraft activity and free fall parachuting.

HQ STC comments that the art of good instruction is to allow students to make mistakes in a controlled environment so that learning can take place. In this case the pilots did not infringe any 'avoids' but flew closer to Brunton than they intended. Good airmanship dictates that such airfields should be avoided wherever possible; however, if they are overflown, meticulous lookout all round the ac, including below, is essential.

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.

Board members considered the Jaguar pilot would have been wiser in the circumstances at least to have pulled up and checked beneath for other ac before passing right over Brunton. The incident demonstrated that ac taking off are likely not to be seen by pilots overflying at low level. Furthermore, the wisdom of flying right over a free-fall landing zone, bearing in mind how hard parachutists are to see, was also questioned by members. There was little more to add to these lesson points and the Board agreed that the cause of the Airprox was the non-sighting of the C182 by the Jaguar pilots, and their flightpath right over the runway at Brunton.

Because the ac passed close to each other, with the Jaguar pilots unsighted and the Cessna pilot unable to react, the Board assessed that there had been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jaguar pilots did not see the C182 over a notified airfield/paradrop zone.

Degree of Risk: A

AIRPROX REPORT No 68/00

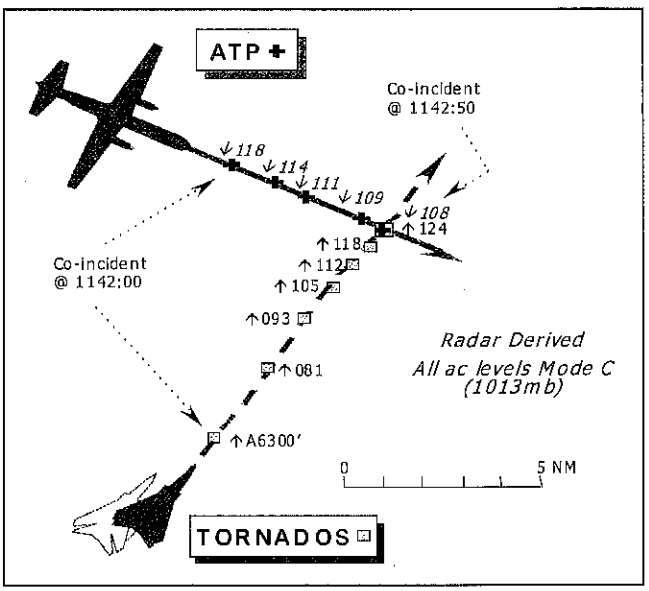
Date/Time: 31 May 1142

Position: 5605 N 0516 W (5 NM NW of FYNER)

Airspace: ADR (*Class:* F)

Reporter: GLASGOW APR

	First Aircraft	*Second Aircraft*
Type:	ATP	Tornado GR 1
Operator:	CAT	HQ STC
Alt/FL:	FL 70	FL 190
Weather	IMC CLAC	VMC CLOC
Visibility:	Not reported	>30 Km
Reported Separation:	GLASGOW APR – Nil	
	Not Reported	200 ft V & 2-3 NM H
Recorded Separation:		1600 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLASGOW APPROACH CONTROLLER (APR) reports that he had received a radar handover on the ATP from the ScACC WESTCOAST SC, which was inbound to Glasgow, via ADR N573D. Before the crew called him on the RT, the WESTCOAST SC called again on the landline and pointed out conflicting OAT, squawking 3/A 4647, heading toward the ATP and climbing. The ATP crew then called on 119·1 MHz and by the end of the initial transmission the ac were so close that no effective avoiding action could be issued. The only course of action he believed was to advise the ATP crew to increase their rate of descent, which he did before passing traffic information. The crew then reported spotting a pair of fast-jets, subsequently identified as Tornados, which were at least 3000 ft above the ATP and climbing rapidly. The ATP pilot was informed that an Airprox report would be raised when he declined to file one himself.

THE GLASGOW ATC WATCH MANAGER added that the ScATCC (Mil) controller could have notified the WESTCOAST SC, especially as they have direct line communications between consoles in the same Ops Room. This would at least have pre-warned the SC, who could have pre-warned the APR who could then have passed traffic information to the ATP crew. More co-ordination of this nature would prevent unnecessary Airprox of this sort in the *"Open FIR"* (sic).

ScACC report that the ATP was receiving a RAS from the WESTCOAST SC southeast bound on ADR N573D. The crew was instructed to descend to FL 70 and then transferred to Glasgow RADAR about 35 NM NW of the airport. In response to an STCA alert the WESTCOAST SC called Glasgow to point out a possible conflict between the ATP and a 3/A 4647 squawk, subsequently identified as a Tornado pair, heading and climbing toward the ATP. No co-ordination had been received from ScATCC (Mil).

THE ATP PILOT reports descending into Glasgow at about 1200 ft/min, 200 kt, when close traffic was displayed on TCAS at 1 o'clock, climbing. At this point they were in clear air about 500 ft above 7 oktas of Strato-CU. He instructed the PF to reduce vertical speed, which he did down to about 600 ft/min. TCAS then enunciated monitor vertical speed and displayed a red arc from 500 ft/min - max climb. At about the same time ATC called, the TCAS display cleared and when he looked out he saw two military jets in their 7 o'clock well above and heading away at about right angles to their track.

THE TORNADO GR1 PILOT reports he was leading a pair, VMC, on recovery to Lossiemouth. The ac are camouflage grey/green and HISLs were on. They free-called ScATCC (Mil) climbing out from low-level heading 030° at 300 kt, and were placed under a RIS. The controller subsequently passed traffic information about the ATP, which was sighted by both crews at about 5 NM or more. It was flying straight and level, he thought, heading SE, perpendicular to their track and passed L – R about 2-3 NM ahead of the pair and several hundred feet below them. No avoiding action was taken, as there was no confliction between their respective tracks and level, so the climb profile was maintained and there was no risk of a collision.

MIL ATC OPS reports that the leader of the Tornado pair, freecalled the ScATCC (Mil) ALLOCATOR (ALLOC) on the ICF reporting *"...two ac, presently 20 miles N of Machrihanish, just pulled out of low level for RTB Lossiemouth, looking for Radar Information, Flight Level 190."* ALLOC issued the leader with a squawk of 3/A 4647 and ascertained that the two ac were Nos 3 & 4 of a larger formation, but returning as a pair. *(The No 5 had called about 1 min previously and was still on frequency)* On identification, ALLOC also observed the conflicting ATP on ADR N573D and at 1142:00, immediately advised the leader *"... you are identified, traffic in your left 10 o'clock 7 miles, left - right, FL 115 descending inbound Glasgow. Do you wish to maintain your present level at FL 70, or do you want to continue climbing?"* The Tornado crew elected to continue the climb and ALLOC then advised, *"roger, climb FL 190, traffic now left 11 o'clock, 5 miles left right, 115 descending."* The Tornado crew responded *"... visual."* (Immediately afterwards, the Nos 1 & 2 of the same formation called ALLOC. These ac had checked in on the frequency about 25 sec earlier, just before the first item of traffic information had been passed to the leader of the subject pair and the controller turned his attention to identifying these ac. Afterwards, ALLOC handed over No.5 to another console for the transit to Lossiemouth and, following identification of Nos1 & 2, the remaining 4 Tornados were also handed over to the same controller and switched frequency at 1144:45.

The ATP, with its SSR code converted to show its c/s, is shown on the Lowther Hill radar recording tracking SE along the centreline of the ADR and in a gentle descent of about 100 ft per radar sweep. The Tornado pair is shown S of the ATP, tracking about 030° and climbing at an initial rate of about 300 ft per sweep. The Tornado SSR code changes from 7001 to the assigned 3/A 4647 at 1141:40, their Mode C indicating an altitude of 5300 ft and the ATP, which is 9 NM to the N, is shown passing FL 122. At 1142:00, the time of ALLOC's first report of traffic information, the ATP is shown in the Tornado's 11 o'clock - 7 NM passing FL 118, whilst the Tornado is climbing through 6300 ft altitude. Fifteen seconds later, at the time of the second traffic information call, the ATP has remained on a constant bearing 30° L of the Tornado's track, at a range of 5 NM as it descends through FL 114 Mode C. The Tornado is indicating FL 81 in a climb and the SSR labels of

both ac are flashing, indicating that the STCA had activated. The radar returns merge at 1142:50, as the tracks cross at 90°, with the ATP indicating FL 108 and the Tornado 1600 ft above it indicating FL 124. After the merge, the ac open without any apparent change of heading.

The incident occurred during a busy period for ALLOC, when 3 separate elements of the same formation freecalled in succession within a fairly short period. The radar information indicates that the traffic information was accurate enough to paint a good picture of the ATP's flight profile, enabling the pilots of both Tornados to acquire the ATP visually at range. ALLOC also offered the leader the option of maintaining a suitable level below the ATP, which was declined under the RIS.

ATSI reports that under the terms of the RAS, which the ScACC WESTCOAST SC provided, the ATP crew was entitled to receive traffic information and avoiding action advice in respect of unknown conflicting traffic. When asked if he could recollect the presence of unknown traffic in the vicinity that could have presented a threat to the ATP prior to its transfer to Glasgow, the controller involved could not do so. He added, however, that at the time his attention may have been temporarily focused on another part of the sector where a flight was experiencing an SSR problem. Nevertheless, it is surprising that immediately before transferring the ATP, the controller, apparently, did not detect the traffic displaying SSR code 4647, then in the ATP's 2:30 position, range 7 miles at FL 70. If he had identified this traffic as potential 'traffic' to the ATP he stated that he would not have hesitated to delay the ATP's transfer to Glasgow while he monitored the situation. At 1142:03, the WESTCOAST SC instructed the ATP to contact Glasgow Approach. About 12 seconds later the STCA equipment activated which alerted the SC to the proximity of the unknown traffic. He immediately telephoned the Glasgow APR to warn him and advise that the traffic was unknown. The ATP made its first call to Glasgow Approach at 1143:00 and the radar controller responded immediately with *" (callsign)...if you make a good rate of descent there is traffic just passing over the top of you this time er unidentified"*. The pilot replied *"....yes I've got him on a TCAS thanks"* and then moments later reported *"I've got them visual a pair of.... Tornados or Jaguars"*. The Glasgow controller then asked the pilot if he wished to 'file' to which he received the reply *"oh no no not at all"*.

HQ STC comments that the Tornado crew's report suggests that any risk of collision was eliminated when they called visual with the ATP and avoided it by a suitable margin. This, however, may well have been an insufficient margin for IFR separation and it is understandable that the Glasgow controller perceived a conflict.

It has been established by Mil ATC Ops that ALLOC acted quickly and appropriately in order to provide the Tornados with an accurate air picture and, when the lead pilot called visual, he was then able to switch his attention to the other pair. Neither the Tornado crews nor ATP captain appear to have been unduly concerned about this encounter and TCAS seems to have worked as advertised.

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 explained that the Tornados should have been displayed to the WESTCOAST SC before he transferred the ATP to the Glasgow APR. However, it seemed that the WESTCOAST SC had not seen them and consequently took no action until alerted to their presence by the STCA, (a facility not available to the APR) some 12 sec after the ATP crew had switched frequency. An ATCO member found this whole situation rather surprising, as controllers will generally look at ac on radar, or the fps, when transmitting to them. Nonetheless, it was explained that the WESTCOAST Sector covered a large geographical area and the SC would have been using several radar sources, which might explain why he just did not spot it at the time. Some controller members wondered if the handover to the APR had been complete. However, it was explained that this transaction would probably have been limited to an ident on the ATP and the level it was descending to. Nevertheless, it was clear to the Board that when the handover was accepted, neither the WESTCOAST SC, nor the APR spotted the

confliction initially and it was the ALLOC who had done so when he identified the Tornados and passed traffic information about the ATP.

The ATP crew did not appear to have been overly concerned about the situation. TCAS had forewarned the pilot of the presence of the Tornado pair and he had followed the RA, which required him to maintain a ROD. This supplemented by the APR's advice to increase the ATP's ROD helped maintain separation against the Tornados which the pilot saw passing clear well above them. It was appreciated, however, that things would have looked more critical to the APR, who was taken by surprise when suddenly confronted with the situation. He had reacted well and colleagues understood why he had reported the incident which investigation subsequently revealed to be a controlled situation.

From the ALLOC's perspective it was recognised that he was working hard at the time being involved with three different elements of the same formation. But he had allocated his priorities correctly and had passed traffic information to the Tornado pilots promptly enabling them to acquire the ATP visually at a range of more than 5 NM. Moreover, although arguably outside his remit under the RIS requested, ALLOC had acted positively and proffered a resolution to the conflict. However, the Tornado pilot who was evidently content with the situation elected to continue the climb and achieved visual separation of 1600 ft above the ATP, as they overflew it. It was encouraging to see that the Tornado pilot had obtained a radar service for crossing the ADR. All of the foregoing factors led members to conclude that this Airprox resulted from a confliction in Class F airspace resolved by the ALLOC and Tornado pilot.

With regard to risk although WESTCOAST and the APR identified the confliction at a late stage after the STCA triggered, TCAS had played its part and forewarned the ATP crew. Unbeknown to the APR, the ALLOC and Tornado pilot had the situation under control, which led the members to concur with the latter's view that no risk of a collision had existed.

The Board was unable to agree with the Glasgow ATC Watch Manager's point that the ALLOC should have initiated co-ordination with the WESTCOAST SC. The Tornados had spotted the ATP more than 5 NM away (at the position marked on the diagram at about 1142). Under RIS, there was no compulsion to co-ordinate, particularly since the pilot had reported visual with the traffic and the second formation element had become a higher priority than co-ordination at that juncture. Nevertheless, some members felt there was nothing to stop the APR initiating co-ordination when he spotted the squawk. If ALLOC had called the WESTCOAST SC informing him that the Tornados were visual, followed by WESTCOAST relaying this information to Glasgow and the ATP crew, it was thought unlikely that this sequence could have been accomplished in the intervening 50 sec before the Tornados overflew the ATP. In any case the second pair of Tornados had to be identified and provided with a radar service. On these grounds, ATC members agreed that ALLOC's priorities were correct.

The member from HQ STC mentioned that it was unfortunate that unnecessary criticism was levelled against ALLOC's actions by Glasgow ATC in their supplementary report.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class F airspace resolved by the Allocator and Tornado pilot.

Degree of Risk: C.

AIRPROX REPORT No 69/00

Date/Time: 31 May 1339

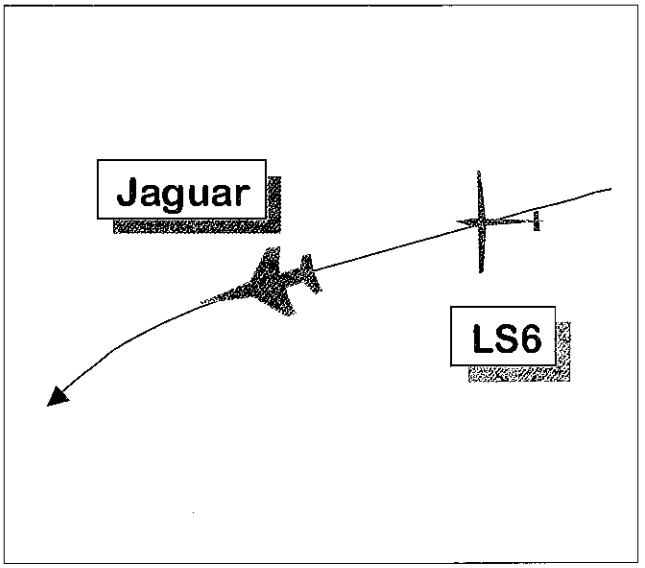
Position: 5242 N 0058 E (1 NM NE of E Dereham)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	LS6 Glider	Jaguar
Operator:	Civ Pte	HQ PTC
Alt/FL:	1700 ft (1003 mb)	2000 ft (RPS)
Weather	VMC CLBC	VMC CLBC
Visibility:	30 km	50 km

Reported Separation: 100 ft V

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS6 GLIDER PILOT reports passing 270° at 48 kt in a turn while centring in a thermal; he had just started the turn when he heard a jet approaching. Less than 2 seconds later a Jaguar passed about 100 ft below him having approached from behind; it turned left onto SW about 10 seconds later. The risk of collision had been high. He pointed out that his all white LS6 has an 18 m wingspan.

THE JAGUAR PILOT reports heading 240° at 420 kt and maintaining 2000 ft on the RPS. He did not see the glider. He thought the incident may have occurred as he was changing frequency from Coltishall to Marham.

HQ MATO reports that whilst impounding the RT recording to assist the investigation, it was discovered that the RAF Coltishall RT recording equipment was unserviceable; an RT transcript is therefore not available and the information below is based solely on the recollections of the controllers involved.

At about 1330Z the Jaguar departed Coltishall VFR to the W and established a FIS with Coltishall Approach (APP). Very shortly afterwards, and before the ac had left the MATZ, the pilot indicated that he was happy to change to his en-route frequency. APP had observed several radar contacts in the area between Shipdham and Swanton Morley and warned the pilot accordingly. As he left the frequency, the pilot indicated that he intended to route further to the N of Swanton Morley; the Jaguar however, appeared to maintain heading and passed to the S. APP's workload was assessed as being low and all radars were serviceable.

Later that afternoon, a glider pilot telephoned to inform Coltishall ATC that his ac had been underflown by a Jaguar, which he estimated had passed between 100 and 200 ft below and slightly displaced; the details of the incident, as described, fitted in with the above transit.

The Airprox occurred after the Jaguar had left APP's frequency; the controller however, appears to have passed appropriate Flight Information on observed radar contacts along the Jaguar's immediate flight path.

UKAB Note (1): The Jaguar can be seen on LATCC radar recordings departing from Coltishall, turning right to avoid Norwich airport and passing the Airprox position at 1339, 1800 ft Mode C, Mode 3 apparently u/s. Up to 17 primary-only contacts lie across the Jaguar's track between the latitudes of Shipdham and Swanton Morley, moving generally along the glider competition track.

UKAB Note (2): Mixing fast jets with hard-to-see gliders should be avoided where possible and the NOTAM system should have provided the Jaguar

pilot with the means to do this; the NOTAM aspects of this encounter were therefore investigated. On 8 May, AUS issued an Airspace Co-ordination Notice (ACN) and a NOTAM for the Eastern Regional Gliding Championships at Tibenham. The NOTAM announced the event (dates, number of gliders involved) but no details of the routes could be included that far in advance. In any case the NOTAM appears not to have reached AIS for distribution; no NOTAM J or U numbers were issued and the event was not included in the BIDNWS. However, the ACN reached the gliding organisers who, as requested, informed ALFENS Ops in good time of the route to be flown on 31 May, and consequently UKLB 2795 was issued at 0846 which warned that up to 38 gliders would fly within 5 NM of the given route, possibly up to 5000 ft. The Airprox occurred on the penultimate leg of this route. Unfortunately the Jaguar pilot elected not to use the LFS for his transit but to fly above 2000 ft agl and was therefore not strictly obliged to brief himself on UKLB (LFS) NOTAMS. Ops LF advises that his office is only empowered to issue information/ instructions to ac using the LFS up to 2000 ft agl. However, UKLB 2795 did advise that the gliding activity could be encountered up to 5000 ft. It would therefore have been up to AUS, on seeing the UKLB, to decide whether or not to issue a more detailed NOTAM containing the route information. It is arguable that a pilot transiting at 2000 ft, on the margin of the LFS, should take account of UKLB information because activities (such as this gliding, or parachuting) would be of relevance. A safer alternative would be to fly above the Transition Level, which would also have the advantage of avoiding all the light ac that operate at 2000 ft to avoid the LFS.

HQ PTC comments that as the Jaguar pilot saw nothing of the glider, the Station can shed no further light on the matter through F765A action. The pilot was operating under VFR in accordance with all extant military regulations. However, without access to the UKLB notification, he was unaware of the number of glider movements taking place in the area through which he planned to transit. Had the glider competition been the subject of NOTAM action, information on it would have been available to him before he departed from Coltishall, and the area avoided.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board agreed that the cause of the Airprox was that the Jaguar pilot did not see the glider. The ac passed very close without the Jaguar pilot's knowledge, and the glider pilot not in a position to affect the outcome; these factors led the Board to conclude that there had been a risk of collision.

Members discussed the NOTAM aspects at length. Clearly a 'wall' of some 38 gliders at various heights across a fast jet's track is a considerable problem in that even if a pilot knows about them, routeing to avoid them is not easy. Arguably, an update from ATC on departure, giving the actual positions of gliders, could have been more use than a NOTAM detailing their route but without timings. However, in this instance the call from ATC referring to several radar contacts would not have meant as much to the pilot as it would have done had he realised it referred to some of a phalanx of up to 38 hard-to-see obstacles that he had read about in a NOTAM. It was clear that a lot of preparation had gone into the promulgation of information about this gliding competition, and the Board observed that the process by which the competition organisers had provided timely information to ALFENS Ops, and by which the UKLB had been issued, had worked well. However, it was argued that gliders are rarely down at the levels used by low flying ac (except in extremis) and that the route information published in the UKLB would have been of even more use to ac not low flying, like this Jaguar, and indeed to any civil ac transiting E Anglia. It seemed to members that the possibility of providing the sort of up-to-date information contained in UKLB 2795 to the wider aviation community should be examined. The Chairman agreed to bring this matter to the attention of DAP.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jaguar pilot did not see the glider.

Degree of Risk: A

AIRPROX REPORT No 70/00

Date/Time: 31 May 1232

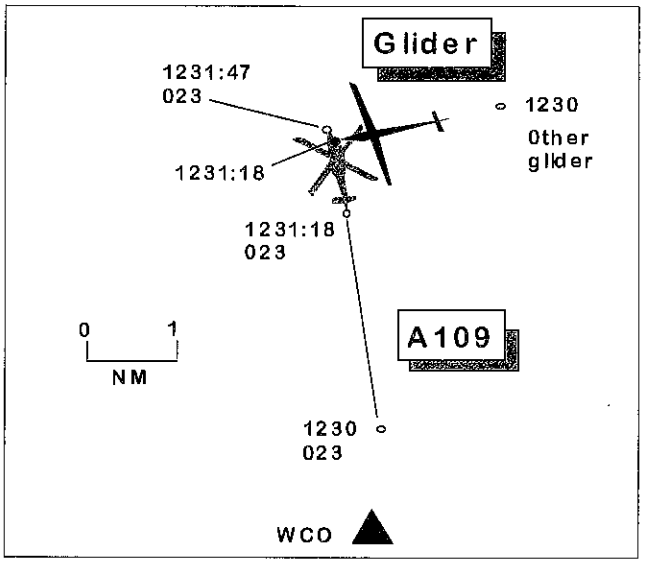
Position: 5156 N 0059 W (5 NM NNW WCO)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Agusta 109	ASW 24W Glider
Operator:	Civ Comm	Civ Pte
Alt/FL:	2500 ft (RPS 1020 mb)	2000 ft â
Weather	VMC CAVOK	VMC
Visibility:	30 km	good

Reported Separation: <30 m // 300 m/50 ft V

Recorded Separation: not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA 109 PILOT reports that he and his co pilot were flying from Wycombe Air Park to Coventry in CAVOK. The visibility was over 30 km. He was squawking 7000 with Mode C. When about 2 NM SW of Buckingham, cruising at 2500 ft (RPS 1020) at 140 kt and heading 335°(M), a single seat white glider was seen 30 m away to his R and above in a steep dive. The ac appeared to have started a roll to its R in an attempt to avoid him as it crossed his track from R to L; it then disappeared from view below and to the left. He had no time to take avoiding action as the encounter had occurred "in the blink of an eye", and he felt there had been a high risk of collision.

The pilot comments that the upward view from the A109's cockpit is very limited. At the time of the incident he was receiving a FIS from Coventry APC on 119·25 and preparing for a direct join from the DTY VOR for an ILS to RW 23 at Coventry.

THE GLIDER PILOT reports that he was operating out of Gransden Lodge (elev 254 ft) and at the time of the Airprox was thermalling to the E of Bicester at about 2000 ft in VMC; visibility was good. While passing through S in a R turn at 60 kt, a small dark helicopter appeared 300 yd away and slightly below him on a northerly heading; it appeared to be heading directly for the centre of his thermal turn so he immediately straightened out onto a westerly heading and descended sharply to gain speed to avoid the helicopter's flight path. He did not think the other pilot had seen him at this stage. Shortly afterwards he lost sight of the helicopter but thought it had passed some 300 m to his L and slightly below. The pilot does not give an estimate of risk.

UKAB Note: A recording of the Heathrow radar for the time of the Airprox shows a 7000 return, believed to be the A109, indicating 2300 ft Mode C (equivalent to about 2500 ft QNH 1020) as it tracks N from WCO at 1230. At the same time, two intermittent slow moving primary returns, believed to be gliders, are seen operating to the SE of Buckingham. These returns disappear until 1231:18, when one pops up for 1 sweep of the radar at the helicopter's 12 o'clock, within 0·5 NM. Though not seen on radar, the Airprox is believed to have occurred at about 1231:40.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This Airprox occurred in good flying conditions within class G airspace where the onus is on pilots to maintain safe separation from each other on the 'see and avoid' principle. In the event, the glider

pilot saw the A109 late, and the A109 crew saw the glider later still; the Board concluded that these late sightings had caused the Airprox. A GA member commented that, having the benefit of two pairs of eyes, the A109 crew might have been expected to spot the glider in time to initiate avoiding action, as was required of them under the Rules of the Air. However, the difficulty often experienced in spotting white gliders against a bright background was well known.

Although some members were puzzled by the glider pilot's avoiding action, which appeared to take it across the nose of the A109, it was generally accepted that an increase in speed was the best option in the short time available, and this could only be achieved by a rapid descent. However, members felt that, given the short duration of the event, this action probably had little effect in changing the geometry of the situation, and they concluded that there had been a risk of collision. With regard to the A109 pilot's comment about upward visibility from the ac, a helicopter member, familiar with the A109, said that the ability to be able to look upwards from a helicopter was important, especially when turning. Most helicopters therefore had reasonable visibility upwards and, in his experience, the A109 was no worse than others in this respect.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the glider pilot and a very late sighting by the A109 pilot.

Degree of Risk: A

AIRPROX REPORT No 71/00

Date/Time: 4 Jun 1133 (Sunday)

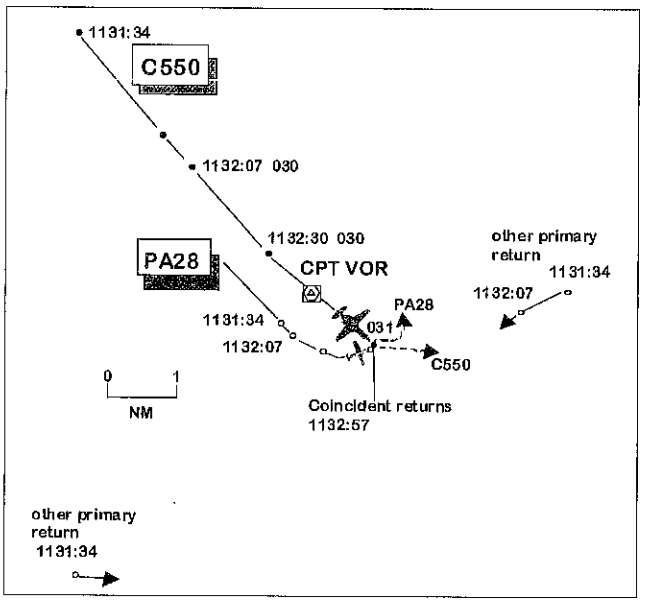
Position: 5128N 0112W (1·25 NM SE CPT VOR)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	PA28	C550
Operator:	Civ Club	Civ Exec
Alt/FL:	4000 ft (RPS 1013 mb)	3000 ft (QNH)
Weather Visibility:	VMC HAZE 40 km	VMC CAVOK >30 km

Reported Separation: 300-400 m / 2·5 NM

Recorded Separation: <500 m



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was on a general handling training flight from White Waltham with a student and receiving a FIS from Brize Norton LARS on 134·3. He was squawking 3713 (he could not remember whether he had selected Mode C). The visibility was 40 km in VMC. He had instructed his student to climb to 4000 ft and turn L 90° onto due E prior to commencing stalling practice. When about 5 NM SSW of the CPT VOR, in the climbing turn and passing 2500 ft (RPS 1013) at 100 kt, a Citation jet appeared at his 10 o'clock about 300 – 400 m away at speed on a southerly heading and at a similar level; it began a steep L turn and passed about 300 m ahead of him and 150 ft above on a southeasterly heading. He thought there had been a high risk of collision and reported an Airprox to Brize on 134·3. He believed he made a steep R

descending turn in avoidance but cannot remember for certain.

While he appreciated that the incident occurred in the FIR, he questioned the other pilot's wisdom in flying at such a high speed in this airspace. The pilot wondered whether his and the other pilot's lookout was inadequate or if the ATC service had not provided them with adequate warning of the confliction.

THE C550 PILOT reports that he was routeing from Hawarden to Blackbushe at 3000 ft in VMC; his TAS was 280 kt. The visibility was over 30 km. He was squawking 7000 with Mode C and in the process of calling Farnborough on 125·25 to request a RIS when he saw the other ac, a PA28, about 4 NM away. A L turn was made to avoid it by some 2·5 NM (a R turn would have brought the ac closer together). He was flying VFR outside CAS in good visibility and had seen and avoided as required; therefore, in his opinion, there was no risk of collision. He thought the other pilot might have been surprised by his sudden appearance and as a result underestimated the distance between them.

Mil ATC OPS reports that the pilot of the PA28 freecalled Brize Norton LARS (134·3) at 1119:58, having previously departed from White Waltham aerodrome. The pilot reported his position as overhead Reading at 2000 ft, and requested a FIS. This was acknowledged by LARS, who provided a FIS and passed both the Cotswold (1013) and London (1016) RPSs; the PA28 pilot acknowledged the Cotswold RPS. Ten min before the incident, the PA28 pilot transmitted *"C/S maintaining 2900 ft, 1013"*, which was acknowledged by LARS. At that time, the LARS workload was medium to high and the frequency was extremely busy. At 1132:52, the PA28 pilot transmitted *"C/S Airmiss"*, followed by *"Just experienced an Airmiss, jet, similar altitude, 3000 ft"*. LARS answered and reminded the PA28 pilot that he was operating under a FIS. The PA28 pilot enquired if the other ac was visible on radar. LARS confirmed that the unit had been working a jet that might have been in the vicinity of the PA28, and that traffic information had been passed to the jet pilot before the ac freecalled Farnborough. The PA28 pilot indicated that he would telephone Brize Norton with details later in the day. Tracing action subsequently revealed that the other ac was a Citation under the control of the Brize Norton ZONE Controller.

At 1125:02, the Citation was handed to ZONE (119·4) descending to FL 55 inbound to Farnborough under RIS. On initial contact with ZONE, the Citation was re-cleared to FL 40. At 1126:37 the RIS was limited for 15 NM owing to the ac's proximity to the Brize overhead. At 1129:01, the Citation pilot was instructed to *"Set the Cotswold 1013, descend report level 3000 ft"*. At 1131:34, ZONE transmitted *"...traffic right, one o'clock, 4 miles, manoeuvring, no height"* and the Citation pilot responded *"Copied traffic, C/S"*. At 1131:42, ZONE informed the Citation pilot that Farnborough was too busy to take a handover, passed the Citation's position as 3 NM NW of CPT, and instructed the pilot to squawk 7000. At 1132:07, Zone transmitted *"..... traffic left, 11 o'clock, 3 miles, left to right, no height. Traffic right one o'clock 4 miles, manoeuvring, intermittent, no height"*. The Citation pilot acknowledged *"All copied, C/S"* and was freecalled to Farnborough at 1132:16.

The LATCC Heathrow radar recording shows the Citation, squawking 3703, 7 NM NW CPT tracking 150° and indicating 3000 ft Mode C. The PA28 is seen about 0·5 NM W of CPT manoeuvring on a SSE track and squawking 3713 without Mode C. The Citation's groundspeed appears to be at least 4-times that of the PA28 (UKAB Note: measurements from the recording indicate that the groundspeed was around 275 kt). On the radar sweep timed at 1131:34, about the time of ZONE's first traffic information transmission, the PA28 is positioned 8° R of the Citation's 12 o'clock, at a range of 4·75 NM and on a similar track. At 1132:07, the time of the second traffic information call, the PA28 is still slightly R (now 10° R) of the Citation's track, although the range has reduced to about 3 NM; the Citation's squawk has now changed to 7000. A non-squawking contact can be seen in the Citation's 11 o'clock (26° L) at 4 NM on a westerly track, with a second contact, squawking 0441 without Mode C, in the Citation's 1:30 (45° R), range 6·8 NM, tracking E. At 1132:58, just over 1 NM SE CPT, the Citation passes less than 0·25 NM ahead of the PA28. The radar contacts are merged at this point, hence the horizontal separation is too small to measure accurately. Momentarily before the contacts merge, the Citation turns L and climbs 100 ft (to 3100ft), resuming its original track and

level just after the ac have passed. The PA28 is tracking 090° as the radar responses merge, having just turned about 30° L.

That Sunday, both the LARS and ZONE frequencies had been extremely busy and in such cases the requested air traffic services have to be applied strictly. LARS provided a FIS to the PA28 pilot (as requested) and, although a squawk was allocated during initial contact, the controller was not obliged to identify, monitor or provide a separation service to the PA28. Prior to leaving the frequency, ZONE provided traffic information on 3 contacts to the Citation pilot in 2 separate transmissions. The first information on the PA28's movements, approximately 90 sec before the Airprox, was R 1 o'clock/4 NM, whereas in fact the ac was much closer to 12 o'clock (or possibly 12:30), and the distance slightly under estimated. In the second traffic information call at 1132:07, the ZONE controller was reasonably certain that he had updated the information on the PA28, although the word 'update', or similar, was not mentioned on RT. It is most likely that the intended update was the R 1 o'clock /4 NM call; again, the ac was much closer to 12 o'clock (10°R), but this time the range was over estimated. However, on a 40 NM radar range scale, such as that used by ZONE, such relatively small over/under estimations of range are to be expected. The difference between 'slightly' R and 1 o'clock is also difficult to discern at small separation ranges, although the relative reduction in range between the two ac ought to have been noticed. As the information in both RT calls, relative to the Citation, was identical (R 1 o'clock/4 NM), there is a remote chance that the Citation did not consider there to be a risk of collision, although from the Citation pilot's report, this appears unlikely. On both occasions however, the Citation pilot acknowledged the traffic information and appeared content to continue unabated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Noting the respective tracks of the 2 ac and the lack of any apparent turn by the C550 until the radar returns merged at 1132:57, members found some of the reported aspects of this incident difficult to reconcile. They also felt that the C550's speed was unecessarily high as it approached the CPT VOR.

UKAB Note 1: Rule 23 (1) of the Rules of the Air restrict pilots to an Indicated Airspeed (IAS) of 250 kt in Class G airspace below 10000 ft. Archive met information for the time and location of the Airprox gives a wind velocity of 270/20 at 3000 ft, and an OAT of +7°. Taking the pilot's own reported figure of 280 kt TAS, his IAS at 3000 ft and 7°C is calculated at 270 kt. Measurements taken directly from the radar recording show that the C550's groundspeed until 1132:07 (2·5 NM before the VOR) was 283 kt, which, using the archive data, equates to a TAS of 270 kt or 260 kt IAS. Thereafter, until the Airprox some 50 sec later, groundspeed reduced to 266 kt (253 kt TAS –244 kt IAS). Therefore, as the C550 approached the VOR the IAS was about 10 kt in excess of the 250 kt permissable.

Members noted that in the initial stages of the encounter the tracks of the ac were paralleling about 1 NM apart, with the C550 overtaking on the L with a high-speed differential. This situation continued until about 1132:30, when the C550 was about 1 NM NW of CPT, still with no discernible track alteration, and the PA28 had begun its turn onto E, some 1·75 NM away at its 12·30 position. Subsequently the C550's track quickly converged on the PA28 which was by now tracking ENE. Members could not fit this geometry with the C550 pilot's statement that he had seen the PA28 from 4 NM and turned to avoid it by 2·5 NM. Three possibilities were postulated by members: one was that the C550 pilot had seen another ac. However, this was thought unlikely because no other possibilities were apparent on the radar recording at the time. Secondly, the traffic information passed to the C550 pilot (possibly inaccurately) may have led him to underestimate the potential for confliction. Thirdly, and thought to be the more likely explanation, was that the C550 pilot saw the PA28 ahead and to his R, paralleling his track, so he altered heading a few degrees to port in order to overtake it, assuming that he was giving it a wide enough berth. Meanwhile, the PA28's L turn, possibly unseen, then quickly eroded the planned separation. Subsequent analysis of the radar showed that the ac actually passed within about 400 m of each other. The Board concluded that, whatever his reported perception of events, the C550 pilot did not take adequate steps to ensure

he avoided the PA28 by a safe margin and that his excessive speed exacerbated the encounter. One Member thought there had been an actual risk of collision but the majority concluded that the PA28 pilot saw the C550 in time to ensure deconfliction. Nethertheless, on the basis of his late sighting and the recorded radar information, the Board concluded that the safety of both ac had been compromised.

Members emphasised once more the importance of using Mode C. The PA28 pilot could not remember selecting this, but the radar tape suggested that he had not. With regard to his query about the efficacy of the ATC traffic information, members wondered if the PA28 pilot appreciated fully the limitations of a FIS. Under this service a controller is not required to identify ac and will pass advisory information to participating ac subject to his workload at the time. The presence of a Mode C in these circumstances could have simplified his task.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Inadequate avoiding action by the C550 pilot.

Degree of Risk: B

AIRPROX REPORT No 72/00

Date/Time: 5 Jun 1004

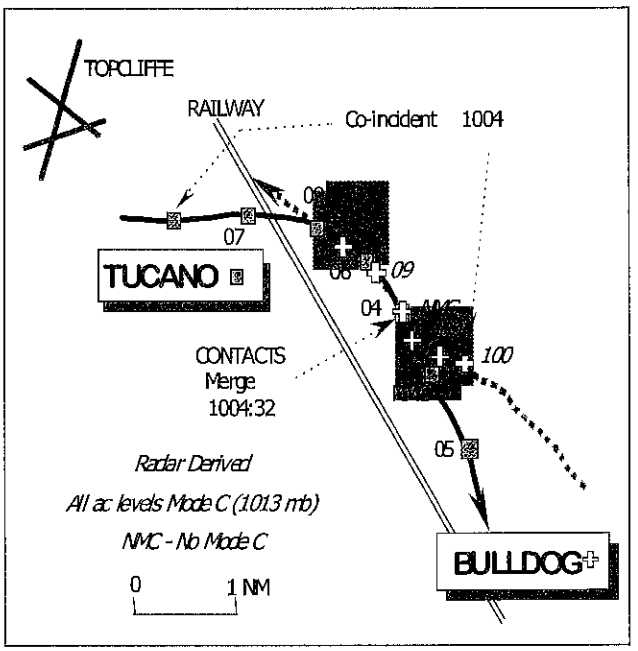
Position: 5412 N 0123 W (3 NM SE of Topcliffe - elev 92ft)

Airspace: MATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Bulldog	Tucano
Operator:	HQ PTC	HQ PTC
Alt/FL:	1000 ft (QFE 1017 mb)	1000 ft (QFE 1017 mb)
Weather Visibility:	IMC In Cloud Not reported	VMC CLBC 'Good'
Reported Separation:	200 ft V nil H	300 ft V, 2-400 m H
Recorded Separation:	Contacts Merged	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BULLDOG PILOT reports he was heading 300° at 100 kt, flying a PAR to RW 31 at Topcliffe, to circle subsequently onto RW 03. He had specifically asked for a RAS from Linton Approach because of the weather conditions and was squawking the assigned code with Mode C. Whilst descending IMC through about 1000 ft Topcliffe QFE (1017 mb) on the final approach with Topcliffe TALKDOWN, he cleared the base of the cloud just in time to become visual with the ground and see a



black Tucano pass about 200 ft directly beneath his ac on a reciprocal course. He immediately pulled back on the control column and climbed about 100 ft to avoid the other ac, with which there had been a high risk of a collision. At the time of the Airprox, TALKDOWN's instructions had ceased, prompting him to request a radio check. Whilst still visual with the ground he continued with the approach and was subsequently given clearance to land on RW 31. He adds that Topcliffe were in the process of changing from RW 03 to RW 31 and the circling minima was 460 ft QFE. The second crewmember, an experienced navigator, also estimated the vertical separation above the Tucano had been about 200 ft.

THE TUCANO PILOT, a solo student, reports that after positioning for a downwind join for RW 03 at Topcliffe, the Duty RW was changed to RW 31, whereupon he elected to depart the circuit and recover to Linton. He informed Topcliffe TOWER (TWR) of his intentions and was instructed to report when changing frequency to Linton. At the end of the downwind leg for RW 03 he turned SE, and when clear of the Topcliffe circuit changed to the Linton Tower frequency and proceeded to climb to 1400 ft QFE. He then realised that the weather conditions would not permit a normal VFR transit and informed Linton TOWER that he was transiting at 1000 ft Linton QFE. Whilst establishing on the RHD side of the railway lines, heading 150° (T) at 180 kt, he saw the Bulldog descending down through the cloud. To increase separation he pitched down, descended and turned L, whereupon the Bulldog passed about 300 ft above him and about 2-400 m to starboard. No information was received from any ATC agency about the proximity of the Bulldog.

UKAB Note 1: The 1000 Topcliffe weather was reported as - surface wind: 010/06 kt; 6000 m Haze; OVC 1000 ft. The 1000 Linton weather was reported as - surface wind: 330/06 kt; >10 Km nil Weather; BKN 1300 ft; OVC 2500 ft.

MIL ATC OPS reports that the Bulldog pilot had elected to fly a PAR to RW 31 at Topcliffe and then circle for RW 03, which was the RW in use by visual circuit traffic and selected because it did not conflict with traffic patterns at Leeming and Dishforth. At 1002:24, Talkdown identified the Bulldog at about 6·5 NM from touchdown, Topcliffe Tower (TWR) had monitored the handover of the Bulldog from Linton Approach (APP) and advised Talkdown that she was aware of the Bulldog pilot's intentions. The Bulldog pilot commenced his descent on the 3° glidepath at 5 NM from touchdown and the approach continued normally until 1003:58, when Talkdown requested the clearance from TWR for the Bulldog to circle RW 03. TWR initially responded *"... clear to circle RW 03, one in"*, which was relayed to the Bulldog pilot by Talkdown. However, the Bulldog pilot responded with a request for a 'radio check', which was acknowledged by Talkdown. Almost immediately, TWR amended the clearance issued to "... *clear to land RW 31, one in"*. At 1004:15, Talkdown replied to the Bulldog pilot's request for a radio check, stating that he was loud and clear and then transmitted, *"... you're clear to land RW 31...c/s, you have an ac approaching your 12 o'clock passing underneath...are you visual with the ac"*. The Bulldog pilot replied *"... roger, I think I got it just as it passed me"*.

Meanwhile, the pilot of the Tucano had joined the visual circuit at Topcliffe following a PAR to RW 31 and then circled for RW 03 to the NW of the airfield. TWR's workload was low at the time with one other ac in the visual circuit. However, the weather had been slowly deteriorating during the morning and, as the surface wind had begun to favour operations on RW 31 it was decided to change from RW 03 to RW 31. At 1002:56, TWR made a broadcast on the Tower frequency *"Topcliffe all stations, Topcliffe all stations, changing runway to RW 31, reposition"*. Whilst still on the downwind leg RW 03, the Tucano pilot elected to depart the circuit and at 1003:16, informed TWR of his change of intentions. Local procedures allow a VFR transit, known as a 'Tower to Tower', between Topcliffe and Linton routeing along a railway line using the 'Right Hand Traffic Rule' at 1400 ft Linton QFE. Therefore, TWR instructed the Tucano pilot to report changing to Linton Tower, which he did at 1003:56, but TWR did not acknowledge his call. Three sec later Talkdown requested the clearance for the Bulldog at 3·5 NM finals via the intercom. At first, TWR issued the clearance for the Bulldog to circle RW 03. However, when Talkdown asked that the number of ac in the circuit be repeated, TWR changed the clearance to *"...now cleared to land RW 31, one in"*. TWR then turned her attention to the only ac in the visual circuit whose pilot had just made a downwind call, before broadcasting incorrectly at 1004:42, that the subject Bulldog was *"...5 NM roll"*. A few seconds later, the pilot of the remaining ac in the visual circuit reported *"going around"*, which was relayed to TALKDOWN by TWR. At 1004:56, Talkdown used the channel intercom to relay to TWR *"2 miles...C/S is now visual, just confirm we are cleared to land RW 31?"*. TWR responded *"... you were cleared to land RW 31"*. At 1006:05, APP made a call to TWR asking *"..have you got a Tower to Tower"?* TWR responded *"C/S has just departed 'Tower to Tower', we couldn't get through on the line previously"*. The Bulldog pilot filed an AIRPROX after landing at Topcliffe.

Visual circuit traffic at Topcliffe should be advised of ac joining from radar by broadcast transmissions made by TWR, normally at 7 NM and 3 NM, thereby allowing pilots the opportunity to assess their position and sequence in the circuit. TWR had

acknowledged the Bulldog pilot's intentions at 6·5 NM from touchdown, but made only one broadcast, when the Bulldog was between 3 and 2 NM, incorrectly transmitting *"Bulldog, 5 miles roll"*. At that stage the ac was at least 2 NM closer to Topcliffe and had been cleared to land some moments earlier. Unfortunately the Tucano had already left the frequency and it is possible that the impending RW change had momentarily distracted TWR leading to some basic procedural errors. It would have been prudent for TWR to have warned the Tucano pilot of the inbound traffic before the ac left the circuit. Moreover, given the workload at the time, it may well have been sensible for TWR to delay the runway change until the Bulldog had joined the visual circuit.

The Tucano pilot was aware of the dual runway operations at Topcliffe. Therefore, his decision to depart the visual circuit on a reciprocal heading and very close to the approach lane to RW 31 was surprising, especially in such marginal weather conditions. Moreover, he was unable to maintain the normal transit height of 1400 ft QFE and descended to 1000 ft, which was not communicated to Topcliffe TWR. Whilst timely traffic information from Topcliffe TWR may well have prompted the Tucano pilot to give inbound radar traffic a wider berth, he was, nonetheless, flying a VFR procedure and was responsible to 'see and avoid' conflicting traffic. The 'Tower-to-Tower' procedure provides an expeditious and convenient means of transit between local airfields. Because the Tucano pilot appears to have crossed E of the railway line, contrary to the procedure, this placed him in close proximity to the instrument approach of RW 31.

The Bulldog pilot reported that around the time of the 3 NM clearance, *Talkdown's instructions ceased, prompting a radio check"*. It is likely that Talkdown merely curtailed transmissions to the Bulldog pilot at this point while clarifying the clearance from TWR. Given the intercom distractions and the narrow scan of the PAR, Talkdown did well to spot the conflicting traffic and passed reasonably accurate traffic information to the Bulldog pilot in the limited time available, whereupon the talkdown 'patter' resumed.

In summary, TWR did not highlight the presence of the inbound Bulldog to the inexperienced Tucano pilot, who then flew VFR in marginal weather conditions at an inappropriate height, on the wrong side of a line feature. Additionally, TWR did not have to implement the runway change whilst radar traffic was still inbound for RW 31.

UKAB Note 2: The Claxby radar recording shows the Tucano passing S of Topcliffe eastbound at 1004, as the Bulldog tracks inbound toward the aerodrome and descending. Comparison of the radar recording with a topographical chart that also accurately depicts the alignment of the RW centrelines, suggests that the Tucano crossed E of the railway line before turning SE toward Linton as shown on the diagram. Immediately before the contacts merged the Tucano indicated 600 ft Mode C (1013mb) and is shown at 12 o'clock to the Bulldog, which indicated 900 ft Mode C. When the contacts merged at 1004:32, the Tucano displays 400 ft and the Bulldog NMC. However, the next return shows the Bulldog at 900 ft, suggesting that vertical separation was about 500 ft at the CPA.

HQ PTC concurred with the Tucano pilot's Unit, who believed the confliction stemmed not from a poorly designed procedure but rather from its improper use in unsuitable weather and, after a review, was satisfied that the transit procedures required no amendment. They commented that the Tucano pilot had made an error of judgement by attempting a visual tower-to-tower transit procedure in marginal weather conditions, leading to a late visual sighting of the Bulldog. His decision may not have been helped by his inexperience (240 Hrs total). Had he remained with Topcliffe Tower he may also have been able to maintain better situational awareness of the Topcliffe circuit area. The Tucano departed the visual circuit from what was effectively a down wind position on RW 31 and the pilot chose to change frequency whilst still inside Topcliffe MATZ, albeit clear of the visual circuit pattern, but he had not been made aware of the instrument traffic inbound before changing frequency. ATC might have been able to prevent the incident by providing traffic information on the Bulldog enabling timely avoiding action. Although the runway change did not contribute to the had apparently strayed to the East of the railway line, a dead straight feature and difficult to miss, thereby bringing the Tucano into conflict with the Bulldog. However, the radar recording had been examined carefully and compared closely with relevant charts to ensure accurate interpretation. A member

geometry of this Airprox, the distraction caused to ATC was probably significant.

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.

Those members familiar with the locality of this Airprox were surprised that the Tucano student pilot queried if the Tucano pilot's mistake could have been a fault of the training system, but members were assured that the student pilot had been taught these procedures correctly. The member from PTC explained that the student involved was about half way through initial flying training and he was used to flying the procedures applicable to the 'Tower to Tower' transit. Nevertheless, flying this route below 1400 ft QFE was not an option open to him and in this instance the weather was not suitable for this procedure. Some members suggested that the procedure was not 'fool-proof' and perhaps the training system expected too much. However, the Board was briefed to the contrary and arrangements were kept deliberately simple for use by students and were perfectly safe when followed correctly. Unfortunately on this occasion they were not. The message here was clear - procedures are established for good reasons and this Airprox is a salutary lesson as to what can happen when they are not followed correctly - pilots who bend the rules introduce unwelcome risk. This was the root cause of the Airprox, but members believed that the Topcliffe TWR controller had played a part too; appropriate and timely traffic broadcasts by TWR might have forestalled this close encounter. As it was, the Tucano pilot switched to the Linton TOWER frequency a little prematurely perhaps, and was not provided with information about the known PAR traffic. He remained completely unaware of the Bulldog until he saw it descending through the clouds in front of him. If information broadcasts had been done correctly the outcome might have been entirely different.

It appeared to the Board that after initiating a runway change the Topcliffe TWR controller was not fully on top of the situation. Indeed members believed that it was a poor decision to change runways at that point. It introduced an unnecessary complication which could and should have been left until after the Bulldog had completed the PAR. Some members wondered if there was a Duty instructor in the Tower at Topcliffe monitoring what was going on, but the PTC member explained there was one at Linton only. Members commended the Tucano pilot's prompt and robust action, as shown by the Mode C, to avoid the Bulldog. This was probably about the same time that the Bulldog crew had spotted the Tucano, perhaps following the traffic information issued by the TALKDOWN controller although it was unclear if this 'heads-up' had assisted the Bulldog pilot's sighting. Whatever, the TALKDOWN controller acted well once he had spotted the Tucano's radar contact, moving up the approach path the wrong way. The Bulldog pilot had been placed in a very difficult position emerging from cloud and suddenly confronted with opposite direction traffic. Nonetheless, he managed to take avoiding action but only just in time as the radar recording showed the two contacts had merged in azimuth.

Members concluded therefore, that this Airprox resulted because the Tucano pilot did not fly the Topcliffe – Linton 'Tower to Tower' procedure correctly and was compounded by a lack of timely traffic broadcast by Topcliffe TOWER. However, the Mode C indications showed that vertical separation had been in the order of 500 ft and probably more than the 200 ft separation reported by the Bulldog crew, because each pilot's avoiding action had time to take effect. Members agree that this lessened the risk of a collision to a degree, but that the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tucano pilot did not fly the Topcliffe – Linton 'Tower to Tower' procedure correctly, compounded by a lack of a timely traffic broadcast by Topcliffe TOWER.

Degree of Risk: B.

AIRPROX REPORT No 73/00

Date/Time: 5 Jun 0945

Position: 5220 N 0141 E (Southwold)

Airspace: LFS (*Class:* G)

	Reporting Aircraft	*Reporting Aircraft*
Type:	Tornado GR (A)	Tornado GR (B)
Operator:	HQ STC	HQ STC
Alt/FL:	600 ft (Rad Alt)	1000 ft (Rad Alt)
Weather Visibility:	VMC CLNC 10 km+	VMC CLNC 10 km+

Reporting Separation: 200 m H

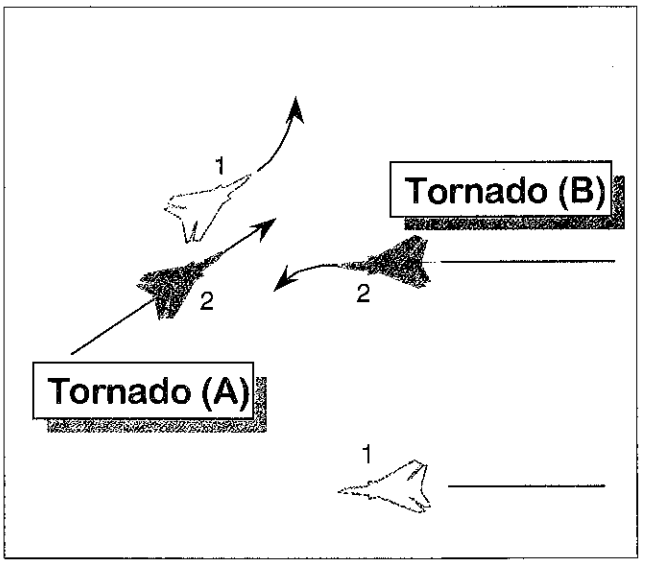
Recorded Separation: 80 ft V, 150 ft H

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR PILOT (A) reports heading 060° at 380 kt while climbing from low level in a formation join-up. He saw a Tornado head-on about 300 m away and broke hard left; he did not see it pass but estimated a 200 m miss distance from his HUD video. His No 2 did not see it and did not react; the risk of him colliding with the other ac was high. They had partaken in an Exercise Clean Hunter sortie from RAF Brüggen to the UK. The booked low level times were 0845-0945 and during these times no other non-exercise traffic was allowed in that part of the UKLFS. The Tornado (B) formation was booked into LFA5 from 0945 and entered low level on time. If he (A) had maintained his original time on target (TOT), he would have exited at Southwold at 0930. Unfortunately his TOT had been delayed by 15 min which allowed the Airprox to take place. A buffer needs to be built into future exercise low level bookings such that exercise traffic exiting low level is deconflicted from non-ex traffic entering low level.

THE TORNADO GR PILOT (B) reports heading 270° at 420 kt entering the UK LFS at 1000 ft over Southwold; displaced to the right of his leader. He saw 2 ac in close formation very close in his 1 o'clock and slightly below. He broke hard left and



saw the leader of the other pair do the same. The No 2 of the pair passed 80 ft below and about 150 ft to his right.

HQ MATO comments that it is up to exercise planners to build in any required timing buffers to LFS bookings, not for the booking system to add them.

HQ STC comments that both formations were correctly briefed, authorised and booked in to the UK LFS. Low level routes were faxed between both squadrons and the (B) formation noted that they were time deconflicted with regard to Exercise Clean Hunter traffic. In addition, the (A) formation expected their exit from low level to be clear given that their delay had been initiated by the exercise controlling authority. However, the crux of this incident hinged on the fact that both formations unwittingly used the same popular navigation feature as their entry and exit points. Until there is an automated low level booking system, capable of presenting planned routes, and with the ability to accept real time amendments, this type of conflict is inevitable. In the absence of an effective CWS, crews must continue to rely on good lookout and a positive reaction to any perceived confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

involved and reports from the appropriate ATC and operating authorities.

The Board agreed that this had been a very close call indeed with a high risk of collision and that the cause had been that no member of either formation had seen the other formation in time to prevent such a close encounter. Although this indicated a breakdown in formation cross-cover, particularly for the Tornado (B) formation, at 800 kt closing speed such late sightings become more likely. This is why the LFS has so many flow restrictions in it to reduce the likelihood of head-on encounters. In this case the Sqns at Brüggen had been unwisely using the same point routinely for coasting in and out, thereby creating their own head-on situation and although there was only a short time remaining for them, members hoped that local action at Wing level would remove this specific source of danger.

Members also agreed that exercise planners should build in to LFS bookings sufficient buffers to account for changes in TOTs.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both Tornado formations.

Degree of Risk: A

AIRPROX REPORT No 74/00

Date/Time: 6 Jun 1505

Position: 5148 N 0028 W (6 NM SW Luton airport)

Airspace: LTMA (*Class:* A)

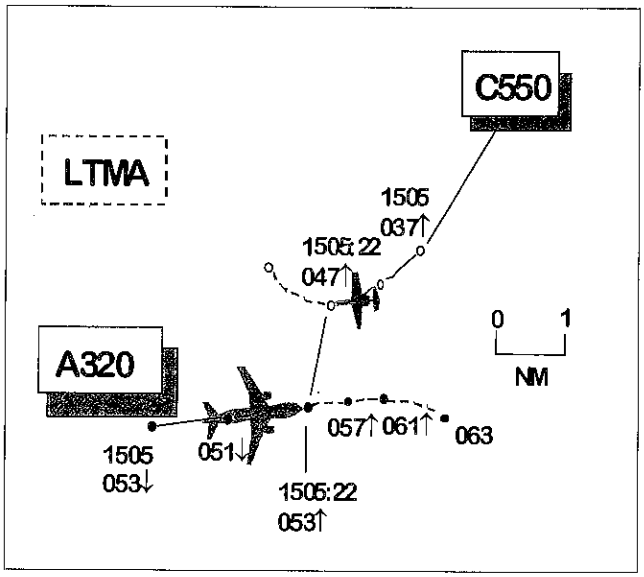
	Reporting Aircraft	*Reported Aircraft*
Type:	Airbus A320	Citation 550
Operator:	CAT	Civ Comm
Alt/FL:	â5000 ft (QNH 1018 mb)	5000 ft (QNH)
Weather Visibility:	IMC in cloud	VMC scat cloud 9 km

Reported Separation: 400 ft 1 NM

Recorded Separation: 1·3 NM 600 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AIRBUS PILOT reports that he was heading 080° and descending from 7000 ft to 5000 ft at 240 kt in IMC while positioning downwind LH for RW 26 at Luton. He had just been transferred by LATCC to Luton Radar on 129·55. Two initial calls to Luton were unanswered but on the third the QNH (1018) was confirmed. On passing 5500 ft, a TCAS RA demanded "descend descend" followed instantly by "climb climb" – the VSI showed that a max rate climb was required. TCAS showed a target at 11 o'clock 1 NM, 800 ft below and climbing. Simultaneously, Luton ATC instructed an immediate



R turn onto 180°, with which he complied. The other ac appeared to be climbing with them about 400 ft below. He climbed to 6100 ft to comply with TCAS and the target disappeared. Normal descent and vectors were then resumed under the control of Luton Radar. He felt there had been a high risk of collision.

THE CITATION PILOT reports that he was heading 260° at 230 kt and climbing through about 4300 ft for 5000 ft (QNH 1018) on a CPT 3B departure from Luton. Luton Tower had just transferred him to London on 121·2. On initial contact with London he was instructed to turn R heading 360° for avoiding action against traffic 2 NM ahead. Owing to scattered cloud the other ac

was not seen and he was unable to assess the degree of risk.

ATSI reports that Luton Airport operates in an extremely complex portion of airspace where both inbound and outbound Luton tracks are interwoven with those of neighbouring airfields. Northolt, Stansted and Heathrow SIDs and STARs merge and cross in this area, and the NW stack for Heathrow (Bovingdon) is just 15 NM to the SW. This configuration means that opportunities for tactical radar separations and unrestricted departures are limited. Moreover, improvements to taxiing arrangements on the airfield and increasing traffic demand have created pressure to increase the outbound movement rate.

The Luton MATS Pt 2 clearly states that initial separation between departing ac is the responsibility of the Luton Intermediate Director, delegated to ADC and subject to certain conditions. The departure separation groups and tables align with those in operation at other airports and, in the case of Luton, are known as "Free Flow Procedures". The Intermediate Director may impose departure restrictions in order to effect separation between departures and conflicting inbounds or overflights by requiring ADC to "Check" departures, which may be "All" or just those in a specific direction. When "checked", the ac would typically be subject to an initial altitude restriction and transfer to the Intermediate Director when airborne.

The normal method of arrival for IFR traffic inbound to Luton RW 26 is via LOREL and the Luton Gate Procedure. In order to expedite traffic, and entirely at the discretion of the Luton APR, airways traffic approaching from the SW may be accepted from TC NW, with certain conditions, to join the radar circuit in a downwind position. These ac are subject to a full release and the major conditions are that: APC must separate that ac from others under Luton control operating under the Gate Procedure; separation must be arranged with outbounds; and, once released, the ac must remain within the confines of the Luton Radar Manoeuvring Area (RMA).

At 1458, TC NW informed Luton Approach that the A320 was S of Woodley and co-ordination was agreed for the ac to join downwind LH for RW 26 descending to 5000 ft, with the ac being released to APC passing 6000 ft. This was in accordance with the Full Release procedure in the Luton MATS Pt 2. The pilot first called Luton Radar at 1504:15, but there was no response. He called twice more before the Radar Controller responded (at1504:20) and instructed him to maintain altitude five thousand.

Meanwhile, at 1458:30, the Intermediate Director instructed ADC to "Check All" (departures). The ADC acknowledged this instruction both before and after being given information by the Director on an unrelated ac. Whilst this conversation was in progress, the C550 pilot reported to ADC that he was taxiing. At 1501 the ADC asked the Intermediate Director whether APC was being manned in the split mode with a Final Director in position, the reason being that the ADC had observed a large rain shower to the W of the airfield; the reply was negative. At interview, the ADC stated that he was concerned as to whether the weather might affect VFR traffic recovering. At 1502, the ADC obtained an airways release for the C550 from TC NW in accordance with published procedures. This was granted and no mention was made of the inbound A320 as the Intermediate Director, having accepted the full release, was already responsible for separation of outbound ac against inbound traffic. At the same time, the ADC informed the Approach Assistant (ATSA), who was sitting in the Final Director position, of the imminent departure of the C550. The ATSA responded correctly, with the SID, a Compton 3B (initial cleared altitude 5000 ft). At 1503 the ADC (without "checking" with the Intermediate Director) cleared the C550 pilot for take off and, at 1504·20, instructed him to contact TC NW.

When there is a requirement to "check" departures it is normal procedure in the Tower for a specially prepared strip, engraved with the restriction to be applied, to be placed somewhere in the ADC's strip display. The ADC, at interview, thought that the process was a good one although he admitted that he now puts this particular strip in a more prominent position, i.e. by the RW designator. He also commented, speaking as a Tower only qualified controller, that the "Free Flow" procedures had been in place for 8-9 months and generally seemed to work quite well. He did feel, however, that the Approach Assistant, who sits in the Final Director position when it is not manned by a controller, should

be fully informed on which "Check" departure is current so as to provide a reminder to the ADC.

The departure "Check" and "Free-flow" procedures do not appear to have unanimous support on the Unit. They were introduced as a means of providing some form of free flow for departures but seem very complicated in their execution. There are a number of different options in terms of the "Check", i.e. "North", "East", "West" or "All", and these are generally put on in relation to a particular inbound or overflight, but it is not obvious when the check is no longer needed. It was the opinion of the Intermediate Director, who also holds a certificate of competence for the Tower, that the placing and changing of checks provided nothing in the way of efficiency gain or improved expedition. Neither does the process provide any significant reduction in workload for the controllers. Furthermore, with the wide variety of options available, the potential for errors is increased. The ADC always has to ring TC N for an airways release, and then either the Final Director or the Approach Assistant (depending on whether checks are in force and Final Director position is manned) before clearing an ac to depart; therefore, the number of telephone calls are the same under "Checks" as they are under "Free Flow". The Intermediate Director did admit, at interview, that he had not informed the Approach Assistant, who was sitting at the adjacent radar display, that there was a "Check" procedure in place and that had he done so it might have helped prevent this incident.

At 1504:20, following take-off, the C550 pilot attempted to contact NW Deps but was blocked by a simultaneous transmission from the TC controller. His next call was blocked by another ac and it is believed a third attempt was made whilst the NW Deps controller was in conversation with another ac manoeuvring to avoid weather. At 1504·30, the Intermediate Director, having seen the C550 appear on the radar, rang the ADC to instruct the C550 to contact APC and was told that the ac had already been transferred to London with no restrictions. At 1505, in a conversation with the TC N Co-ordinator, the Intermediate Director tried unsuccessfully to have the C550 stopped at 4000 ft. At about the same time (1504:20) the A320 pilot contacted the Luton Intermediate Director at his third attempt. At interview, the Intermediate Director said that he thought the best way of resolving the conflict was to stop the C550 at 4000 ft, which was why he did not reply immediately to the A320 pilot. In the event, by 1505 the C550 was already climbing through 4000 ft.

At 1505, the A320 pilot reported a TCAS event to which the Intermediate Director responded with an instruction to make an avoiding action R turn onto heading 180°. The pilot complied. It was not clear whether the TCAS report was a TA or RA as the end of the transmission was broken. The Director agreed at interview that the ATC instructions were inappropriate once the ac had declared a TCAS manoeuvre. At 1505:30 the A320 pilot reported turning onto the heading and descending from 6000 ft to 5000 ft, and at 1505:45 reported ready to take radar vectors. Normal vectoring was then resumed for an ILS approach. Simultaneously, there was a telephone exchange between the ADC and the Intermediate Director as to whether the requirement to "Check all" departures had been imposed. Meanwhile, at 1505:10 the C550 pilot had finally succeeded in making contact with TC NW Deps, whose first transmission was to issue an avoiding action turn onto heading 360° owing to traffic in the ac's 11 o'clock at 2 NM. At 1505:40 the controller informed the pilot that the reported traffic had now passed clear down his left-hand side. The C550 then resumed normal navigation.

ATSI recommend that Luton ATC reviews departure "Free Flow" and "Check" procedures from the point of view of simplification and their safe operation.

UKAB Note: A recording of the LATCC Debden radar at 1505 shows the A320 tracking ENE and descending through 5300 ft Mode C 8·5 NM to the SW of Luton. At the same time the C550 is just beginning a R turn from a SW track and climbing through 3700 ft Mode C, 4·3 NM SW of Luton. 22 sec later the A320, having descended to 5100 ft, now indicates a climb through 5300 ft as the C550 passes in the opposite direction 1·3 NM to the N of it indicating 4700 ft climbing. Thereafter, the A320 begins a slow R turn accompanied by a rapid climb, reaching 6300 ft Mode C at 1505:42, while the C550 turns onto a northerly heading and continues climbing to 5000 ft. Minimum separation was in the order of 1·2 NM and 600 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members quickly concluded that this Airprox happened because the Luton ADC did not "check" the C550's departure with the Director, as he was required to do, and allowed the ac to take off into confliction with the descending Airbus.

ATCO members briefly discussed the point raised in the ATSI report concerning how controllers knew when the "Check" was no longer needed and who initiated such a change. It was agreed that this was a matter of simple co ordination between controllers; if the ADC had been in any doubt about the "Check" status it only required him to ask for confirmation.

An ATSI adviser said that the Luton procedures should be examined with a view to simplification. ATCO members agreed, and commented that in addition to the procedures, the responsibilities of individuals involved in the information chain also needed clarification, particularly those with respect to the ATSA. The Board endorsed the ATSI recommendation, as quoted in Part A, together with the question of individual responsibility, and the Director agreed to forward a UKAB recommendation accordingly. An adviser from ATM P & P advised the Board that proposed route changes in the Luton area during the early part of next year (2001) would obviate this type of error.

Commenting on the TCAS/ATC related aspects of the incident, an ATCO member pointed out that it was acceptable for ATC to issue executive instructions to a pilot in receipt of a TCAS RA provided those instructions did not contradict the TCAS RA climb/descent demands (see MATS Pt 1 SI No 2 of 1999 para 5). This prompted further discussions. In previous Airprox incidents, where ATC had applied lateral avoiding instructions after a declared TCAS RA, it had been explained that initial pilot reaction was usually to roll wings level just before applying the pitch change (i.e. climb/ descent attitude). Any instructed movement in the lateral plane was therefore likely to be delayed until the ac was established in the climb/descent. An ATCO adviser felt that, in this particular incident, the timing of the turn instruction issued to the A320 by the Luton Director, who had not replied to the pilot's first 2 calls and then barely acknowledged his "Climb" RA declaration on the third before instructing the heading change, was inappropriate.

With regard to risk, members agreed that the 'TCAS' resolution flown by the Airbus and the ATC avoidance instructions to the C550 had combined to deconflict the ac by some 600 ft and 1·3 NM. This led the Board to conclude that there had not been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Luton ADC allowed the C550 to take off into confliction with the descending A320.

Degree of Risk: C

Recommendation:

That the CAA should review the Luton ATC departure "Free Flow" and "Check" procedures together with personnel responsibilities with a view to simplifying arrangements without prejudice to safety.

AIRPROX REPORT No 75/00

Date/Time: 7 Jun 1310

Position: 5204 N 0039 E (11 NM SW of Wattisham)

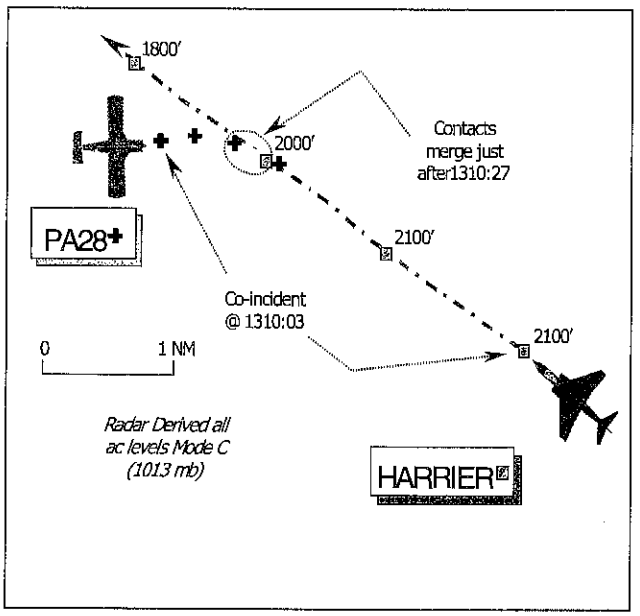
Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Harrier GR7	PA28
Operator:	HQ STC	Civ Pte
Alt/FL:	2000 ft (Rad Alt)	2000 ft (RPS 1020 mb)
Weather Visibility:	VMC CLOC >10 Km	VMC CLOC >10 Km

Reported Separation:

<100 ft H, "slightly" above/nil H, 100 ft V

Recorded Separation: Contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER PILOT reports that he was heading 310° at 2000 ft RAD ALT after climbing out of the LFS at 420 kt to the south east of Clacton and squawking, he thought, 3/A 7001 with Mode C. Cloud prevented him from climbing any higher than 2000 ft Rad Alt initially. He tried unsuccessfully to contact London (Mil) on the ICF until he realised that he had used the wrong frequency. About 13 NM W of Wattisham, after finally contacting London (Mil) he was asked to change Squawk, he thought, and as he was carrying out the code change he saw a dark flash or shadow of an aeroplane go down the port side co-altitude or possibly slightly above. The whole shape of the ac could not be determined but he estimated it was about 100 ft away as it flashed by, possibly heading eastbound, with a high risk of a collision. He was unable to take any avoiding action as it occurred too quickly. The incident was reported to London (Mil). Though his ac is camouflage grey, HISLs were selected on during the flight. He thought that the other ac might have appeared from below the canopy arch.

UKAB Note (1): Although initial information on this Airprox was passed to AIS (Mil) by LATCC (Mil) on 7 Jun 00, 14 attempts to contact the reporting pilot at various locations throughout the UK proved fruitless until 19 Jul 00. A completed 765A Airprox report was received eventually on 4 Oct 00. The pilot had moved Stations and was then deployed at short notice afloat.

THE PA28 PILOT FLYING reports he had departed Little Gransden for Andrewsfield at 2000 ft QNH (1020 mb), 95 kt, whilst in receipt of a FIS from Wattisham. His ac has a burgundy/white livery. Whilst heading 100° he was looking at the RW at Wattisham to spot any ac, when the PNF, who was navigating and operating the radio, looked up from his chart and suddenly saw a Harrier at 11 o'clock - 350 m away slightly below, heading straight toward them. The PNF told him as the handling pilot and he saw it too and immediately turned R to avoid the jet, which passed 100 ft beneath his ac, slightly to port on a reciprocal heading. With regard to risk, he added that the Harrier passed by too close for comfort, but he assumed its pilot knew they were there as they were under a FIS from Wattisham.

THE PA28 PILOT NOT FLYING also submitted a report which confirmed the details provided by the PF and reiterated the vertical separation was about 100 ft as the Harrier underflew them and the horizontal separation nil. However, he added that a minute or so after the Harrier passed, Wattisham advised them to keep a lookout for an ac in their vicinity and he told them they had seen the Harrier.

UKAB Note (2): Tracing action by AIS (Mil) was hindered in this instance by initial confusion over the position of the Airprox. They were unable to resolve this for some time and the identity of the PA28 was not established until 19 Jul. By the time it became apparent that Wattisham had been providing an ATS it was too late to capture the RT tapes. These had already been erased. Moreover, the controller could recall nothing of significance.

HQ STC comments that this was indeed an alarmingly close call and there is every reason to believe that the PA28 pilot accurately assessed the miss distance. If either pilot had been receiving a RIS from Wattisham, then this incident may well have been avoided. Nevertheless, there was no absolute requirement for either to do so. It is, therefore, essential in the absence of a technology-based collision warning system, that aircrew maintain a meticulous lookout, particularly when flying at those altitudes frequented by the GA fraternity.

UKAB Note (3): A review of the Debden radar recording reveals this Airprox occurred about 11 NM SW of Wattisham. The Harrier is shown NW bound indicating 2100 ft Mode C (1013 mb). The PA28 is shown eastbound without Mode C. The contacts merge with no discernible horizontal separation just after 1310:27, when the Harrier indicated 2000 ft Mode C. This would equate to about 2210 ft QNH (1020 mb), however, this is misleading as both the PA28 PF and PNF report the Harrier underflew the PA28. The Harrier maintains a steady track as it descends to 1800 ft Mode C squawking a London (Mil) allocated code, not 7001 as reported. An "ident" is apparent at 1310:47, which may be the code change referred to in the Harrier pilots report, he was not in receipt of a radar service from London (Mil) 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, radar video recordings and a report from the appropriate operating authority.

The STC member briefed the Board that the Harrier pilot readily admitted that this was a very close call indeed – about 100 ft away as the other ac flashed by - and probably occurred during a momentary distraction when 'heads in' the cockpit. Some members suggested that it would have been more appropriate for the Harrier pilot to have called Wattisham as he transited past rather that London (Mil), but for whatever reason he did not and was relying purely on the principle of see and avoid before climbing up through the cloud. Some others thought that the Harrier's speed of 420 kt was excessive, until it was pointed out that the higher the speed the more manoeuvrable the ac. There was always a trade-off between flying at a slower speed and gaining time to acquire and react to conflicts or maintaining speed for manoeuvrability. Nevertheless, only good fortune it seemed had prevented a collision between these two ac. The radar recording showed that the contacts merged in azimuth, supporting the pilots' reports of a very close pass. A pilot member had estimated that at the speeds and distances involved there would have been about two seconds from visual acquisition by the PA28 pilots to the Harrier underflying their ac – virtually no time at all - to look, see and react. This led the Board to agree unanimously that the cause of this Airprox was effectively, a non-sighting by both pilots and that there had been an actual risk of a collision.

Turning to comments by the PA28 pilot that "he assumed that the Harrier pilot knew they were there as they were under a FIS from Wattisham", this misconception caused members considerable concern. While not criticising the service provided by Wattisham at all, ATC members pointed out that under a FIS, which is a non-radar service, the controller was not required either to identify the PA28 or to monitor it continuously. Moreover, military ATSUs will not necessarily know about all military ac in their vicinity – a point commonly misunderstood by the GA community.

It appeared to the Board that here was a prevalent misconception, more common amongst GA pilots but also encompassing some other sections of the aviation community, that under a FIS pilots will always receive traffic information from an ATSU about other ac in their vicinity. Pilots must understand they will not get a radar service if they have asked for a FIS. That said, a controller MAY, subject to the workload imposed by other higher priority tasks, provide pilots with information concerning collision hazards to ac operating in the FIR, when self-evident information from any source

indicates that a collision risk MAY exist. Whilst providing the FIS, the Wattisham controller was not compelled and would not necessarily have passed traffic information about the Harrier even if he could see it on radar. Although in this instance some form of warning appears to have been given after the Airprox. Similarly, if the Harrier pilot had been in receipt of an FIS from Wattisham, there was no guarantee at all that information would have been passed to him about the PA28. Here then was the crux of the members concern. Under a FIS neither separation nor traffic information is mandated, nor will it necessarily be proffered. If pilots in transit want traffic information based on observed radar contacts they must ASK for a radar service – a RIS. Furthermore, if they require to be separated from other traffic they must ask for a RAS and fly IFR, even if VMC. Given this commonly held misunderstanding, some pilot members wondered if the names of the respective air traffic services should be changed to make them more self-evident. Members explained that some pilots thought that the term FIS implies that 'traffic information' will be 'given', whereas the principle is that general (flight) information must be asked for. Others however, thought it was a matter of education, adding that the different forms of ATS are all clearly laid out in many documents. Yet this incident showed that 'services' are still apparently being misinterpreted. There was a groundswell of opinion amongst the members that something should be done to redress this and the Board asked the Chairman to forward an observation on this issue to the appropriate bodies.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by both pilots

Degree of Risk: A.

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'.

AIRPROX REPORT No 76/00

Date/Time: 11 Jun 1012 (Sunday)

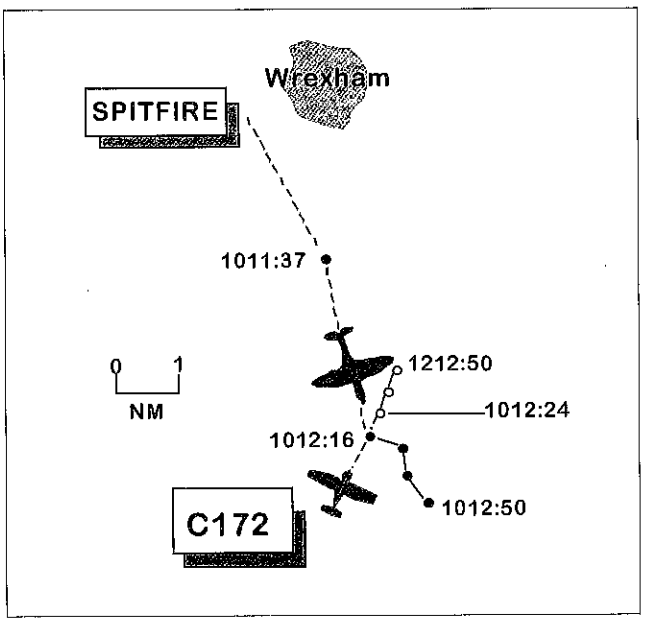
Position: 5257N 0258W (6 NM SSE Wrexham)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	C172	Spitfire
Operator:	Civ Trg	Civ Pte
Alt/FL:	2000 ft (QNH 1016 mb)	2000 ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	30 km	30 km

Reported Separation: 150 ft V / 200 ft H 50 ft V

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports that he was conducting a VFR navigational training flight from Welshpool to Liverpool with a student, who was occupying the LHS. There was no low cloud and the visibility was 30 km in VMC. At the time of the incident he was listening to Liverpool's ATIS prior to requesting zone entry clearance. His SSR transponder was switched off. When about 5 NM SE of Wrexham, heading 010° and cruising at 2000 ft (QNH 1016) at

105 kt, he saw a Spitfire less than 1 NM away approaching him head-on at a similar level. He began a R turn in avoidance but, on seeing the Spitfire turn L, he reversed this and climbed; he assumed that the other pilot had seen him. The Spitfire passed about 150 ft directly beneath him with a high risk of collision. After landing he reported an Airprox to the UK Airprox Board by telephone.

THE SPITFIRE PILOT reports that he was routeing to Sleap airfield at 2000 ft (QNH) in VMC and in contact with Sleap radio on 122·45. The visibility was 30 km. He was heading 150° at 200 kt, and had just finished writing down data for his destination when, on resuming his lookout scan, he saw an ac at his 1 to 1.30 position about 300 ft away at the same level tracking towards him. He immediately turned L and descended and saw the other ac, a high-wing Cessna type, also turn L; he assumed its pilot had seen him. The ac passed about 150-200 ft to his R and 50 ft above with a high risk of collision.

UKAB Note: A recording of the Clee Hill radar at 1009:45 shows a pop up primary radar return about 5 NM NW of Wrexham. Further returns appear at 1010:01 and 1011:37, establishing the ac on a track of about 150°; groundspeed is measured at about 240 kt. These returns are consistent with the Spitfire's reported track. At 1012:16, about 6 NM SSE of Wrexham, a fourth return appears on the Spitfire. Eight sec later another primary return, believed to be the C172, shows about 0·5 NM NE of the Spitfire's 1012:16 position, moving slowly NE. The next return on the Spitfire, at 1012:33, shows that it has turned L some 45°. Further returns, until 1012:50 when the ac disappears from radar, show it back on its original track. Although the Airprox is not seen on the recording, analysis suggests that it occurred at about 1012:16. Measurements between that time and 1012:50 also indicate that the Spitfire's speed had reduced to around 160 kt during the avoidance manouevre.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA member commented that this incident demonstrated the prime importance of balancing time devoted to cockpit activities against an effective lookout scan. The Spitfire pilot was flying at fairly high speed in an area known for considerable high GA activity and should have ensured that his note taking was frequently punctuated by effective glances out of the cockpit. This was particularly relevant since he was doing 200 kt which, some members felt, was an unneccessarily high speed. He saw the C172 late and, although he did not initiate an Airprox report he was, nevertheless, sufficiently concerned to assess the risk of collision as high. For his part, the C172 pilot saw the Spitfire only just in time to take avoiding action despite the 30 km reported visibility. In mitigation, members agreed that the acs' conspicuity would have been considerably reduced by the almost head-on aspect of the encounter. Nevertheless, both pilots could, and should, have seen each other earlier, and it was concluded that their late sightings were the cause of the Airprox. While there is no doubt that their combined evasive manouevres had successfully averted a collision, the ac still came uncomfortably close to each other and members agreed that the safety of both had been compromised.

It was noted that the C172 pilot had not selected his transponder and this drew some critical comment. Previous Airprox had revealed that this was a frequent omission by GA pilots and the Board had repeatedly emphasised the importance of using SSR when it is fitted. While not materially affecting the outcome of this incident, there are few circumstances where the use of SSR does not significantly enhance flight safety. This important message needs to be understood and supported widely.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both pilots.

Degree of Risk: B

AIRPROX REPORT No 77/00

Date/Time: 6 Jun 1221

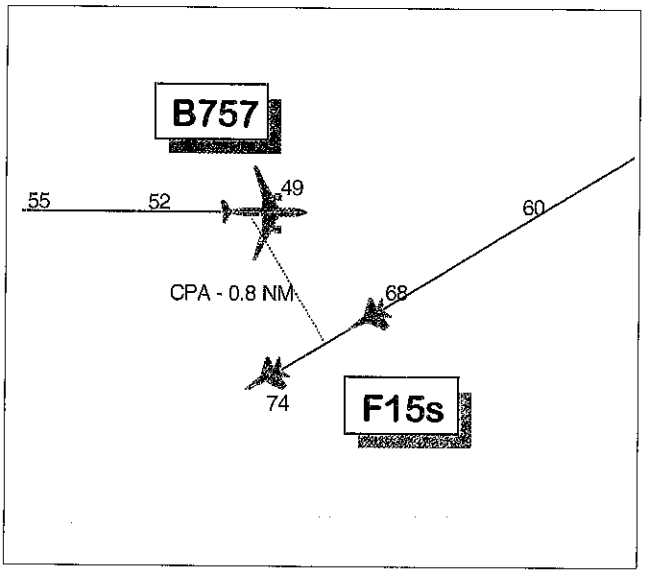
Position: 5235 N 0116 E (5 NM S of Norwich Airport)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	B757	F15 x 2
Operator:	CAT	Foreign Mil
Alt/FL:	5000 ft (QNH)	FL 60
Weather Visibility:	VMC IICL 0-10 km	VMC CLBL Unltd

Reported Separation: 500 ft, 1 NM

Recorded Separation: 0.8 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports heading 100° at 250 kt under 'Radar Control' from Norwich Airport and descending to the S of the airport for an approach to RW 27. He saw traffic on TCAS 10° L of the nose at 5 NM and closing rapidly. There was a call from Norwich about avoiding action which was unclear and his TCAS gave him a climb RA and then a descend, which he followed. The traffic was a pair of F15s which crossed his nose 500 ft above and 1 NM away, from his 11 o'clock to 4 o'clock. He considered the risk of collision was moderate.

THE F15 PILOT reports heading 260° at 300 kt, recovering to Lakenheath through scattered clouds, with his No 2 in 2 NM trail, and receiving a RIS from London Mil. Passing 7000 ft London called traffic at 10-15 NM, 10° right of the nose and he obtained a radar lock on it, turning a further 10° to the left although it did not appear to be a confliction. When passing 6000 ft London Radar updated the range of the traffic at 10 NM and at 3 NM asked if he was visual; he was not because of intervening cloud. On passing the cloud he saw the traffic and that it was in confliction so he climbed the flight immediately to 7500 ft, passing 1000 ft from the airliner. His No 2 was radar locked to him, not the airliner.

HQ MATO reports that the 2 F15s were receiving a RIS from London Radar (LRAD) console 11 (CON 11) on 277·775, and descending to FL 100 whilst recovering to Lakenheath. The CON 11 controlling team consisted of a trainee and qualified mentor, who had just taken over the control position. During the handover of the control position, the outgoing controllers, another trainee/mentor team, had pointed out a radar contact squawking 3703 tracking E (the B757). They advised the oncoming controllers that they had just handed this ac over to Norwich Approach (NOR) under RAS (the B757 pilot had requested and was placed under a RAS by CON11 at 1214 as the ac left CAS to the NE of BKY). During the B757's handover, NOR had requested Traffic Information (TI) on the F15s which, at the time, had been manoeuvring between FL 100 and FL 200 to the E and NE of Norwich; this request however, concerned a potential confliction with 2 ac about to depart from Norwich, rather than any confliction with the B757. At 1220, the F15 leader, who by now had been released on his own navigation to Lakenheath and was tracking SW, requested a descent to FL 50. CON 11 approved this adding *"...traffic south west, fifteen miles, tracking north east indicating Flight Level seven zero"* which referred to the B757. Shortly afterwards, at 1221, NOR called CON 11 to commence a radar handover on another ac. This ac had not been pre-noted to CON 11 and hence the handover became rather complex. Whilst the landline was open, NOR said *"Just standby one"*

following which CON 11 heard NOR passing TI to an ac. The CON 11 trainee quickly realised that NOR's TI referred to the F15 flight and in turn transmitted *"C/s, traffic south west, three miles tracking east, large transport aircraft descending through Flight Level five five, report aircraft in sight."* The F15 leader responded *"C/s popeye"* and then almost immediately *"C/s tally ho!"* before requesting further descent. CON 11 immediately advised NOR (who by now could be heard passing avoiding action to the other ac) *"Mine are visual with you..."* The mentor observed the lead F15 climb (the No 2 was about 1 NM in trail but not squawking), in what was assumed to be a visual avoidance manoeuvre, as they passed the B757. The handover from NOR was then completed, following which, the F15 flight was handed to Lakenheath.

The LATCC radar recording and the F15 pilot's report indicate that the TI calls given by CON 11 were reasonably accurate and that the initial call enabled the pilot to establish his own AI radar contact with the B757. Although the B757 was in effect 'unknown traffic' to the new CON 11 team, knowing that it had previously been a RAS track, it may have been prudent not to have given the F15 flight a descent into potential conflict, particularly as it was also descending (a fact that was not passed in the first TI call). In mitigation however, the F15 flight had requested the descent to FL 50 under RIS, were passed TI as they were re-cleared to FL 50 and CON 11 had been given no indication of the extent of weather conditions in the area until after the second TI call; unless the controller had some experience of tactical controlling however, the meaning of a brevity codeword such as 'popeye' would have gone unrecognised. The convoluted radar handover from NOR undoubtedly distracted the trainee (who had not experienced such a profile before) and hence the mentor, from monitoring the progress of the F15s and thus had some bearing on the incident. By a strange paradox however, CON 11's TI update at 3 NM, which assisted in the resolution of the confliction, was a direct result of events that occurred during this handover.

ATSI reports that the Norwich APR did not inform the pilot of the B757 of the type of ATC service being provided. The pilot reported that he believed he was receiving a Radar Control service whereas, outside CAS, it should have been a RAS. It is debatable whether this had any effect on the incident. The pilot had been cleared to 2000 ft on QNH 1018 and requested a turn onto E to avoid Norwich town, which was approved. Whilst in the process of handing another ac to London Mil, the controller noticed a pair of high speed contacts off the Norfolk coast tracking towards the B757 and descending, and transmitted *"(*B757 C/s*) traffic your eleven o'clock range five miles reciprocal looking descending passing flight level six eight ???? avoiding action will be left thirty immediate"* to which the B757 pilot replied, *"C/s understand you wish us to turn left now?"* The controller confirmed: *"C/s left three zero now avoiding action traffic crossing your 12 o'clock right left"* and then corrected the crossing direction. Once the avoiding action was repeated the pilot reported visual with the traffic and commencing a TCAS descent. Radar recordings indicate that the B757 did not take the turn. In effect, it is considered that the lack of clarity of the initial avoiding action instruction did not materially alter the course of the incident as it was repeated about 10 seconds later and in any case the pilot responded to his TCAS to resolve the confliction. The radar recording shows that the F15s stopped their descent at FL 60 and the lead ac (with Mode C) passed some 2000 ft above and about 0·8 NM from the B757 before resuming its descent.

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 concluded that the incident was a confliction in the FIR which was resolved by both parties as soon as they had sufficient information to do so, but observed that timely avoiding action by the Norwich controller might have removed the confliction. The controller was providing a RAS but he did not formally establish the contract with the B757 pilot. Had he done so he might have been more aware of the need to scan for conflictions and seen the F15s earlier. As it was, his first avoiding action was at 5 NM range which was far too late; it was rushed and consequently misunderstood by the pilot. Members acknowledged that the protracted handover distracted the controller but agreed that tasks had to be prioritised. The Board

assessed that both pilots took timely avoiding action which removed any risk of the ac actually colliding. Members considered there were 2 other points meriting further comment:

The CON 11 controller did not inform the F15 pilot that the B757 was descending at an early enough stage. If he had done so, the F15s might have delayed their descent and the confliction might have been averted.

The F15 pilot used a word ('popeye') which was meaningless to CON 11. The Board was advised that it meant IMC. Because the F15 pilot saw the B757 almost immediately afterwards, this had no effect but a reply "I'm India Mike" will usually prompt a controller to provide more regular TI updates.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Confliction in the FIR resolved by both pilots, compounded by late avoiding action passed by the Norwich Controller.

Degree of Risk: C

AIRPROX REPORT No 78/00

Date/Time: 15 Jun 1421

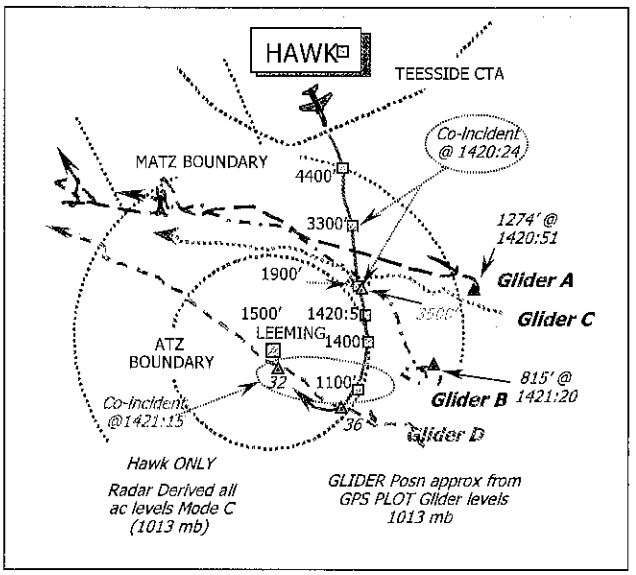
Position: 5417 N 0131 W (1NM SSE of Leeming - elev 132 ft)

Airspace: MATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk	Gliders
Operator:	HQ STC	Civ Club
Alt/FL:	â500 ft (QFE 1020 mb)	NR
Weather	VMC IN HAZE	NR
Visibility:	8-10 Km	NR

Reported Separation: 1 NM H, 500 ft V/NR

Recorded Separation: NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT provided a detailed narrative and reports that he was inbound to Leeming from Lossiemouth flying a radar to visual recovery for RW34RHC at 390 kt, under a RIS from Leeming APPROACH (APP). He was aware of the NOTAM'd gliding activity from Pocklington and was advised on recovery by APP that activity was mainly to the W of Leeming but there were also some contacts to the E. He elected, therefore, to turn L and approach the airfield from the E. Unusually, he was cleared to continue his descent through the Teesside CTR, but was informed of a number of radar contacts ahead. Whilst in descent he saw 2 gliders at 2 – 3 NM circling ahead of him at 2 – 3000 ft and avoided them by turning R onto about 210°. When clear he turned L back onto 180° to be confronted by 2 more gliders circling at 2 – 3000 ft 1 NM ahead. He again turned R and continued descending to 1500 ft QFE. APP then informed him of further contacts at about 3 NM finals, height unknown and a Bulldog in the visual circuit at 500 ft. He started a tight turn to the visual circuit deadside for (W) but did not initially see the reported contact at 3 NM final approach path, although he was visual with the Bulldog in the RW34RHC. The TWR frequency was selected and SSR deselected during the turn. Just before rolling out on RW heading (340°) at 500 ft QFE - 1 NM from the threshold he spotted a glider, again circling, over the IP for RW 34 at about 2000 ft. He avoided it by about 1 NM and 500 ft, but thought it represented a high risk of a collision because it was so difficult to see. He added that once he was established in the

visual circuit gliders were visible on most points of the compass. He believed that all of the reported gliders were inside the Leeming MATZ.

UKAB Note (1): Despite extensive tracing action AIS (Mil) were unable to resolve the identity of the reported gliders and enquiries with the organising committee of the Pocklington competition proved entirely unproductive. Thereafter, UKAB staff requested the assistance of the BGA who were able to conduct an analysis of the competition data logger GPS plots. These indicated the identity of 4 gliders, which were in the vicinity of Leeming, but there appear to have been others. No reports have been received by the UKAB from any of the Glider pilots.

The BGA, have provided some comment about the relative positions and estimated separation derived from comparison of the GPS and radar data.

UKAB Note (2): The cross-country glider competition was the subject of NOTAM UKLB 2997, transmitted by ALFENS Ops at 0923:43. This NOTAM promulgated a warning of up to 35 gliders and 6 ac between 10 – 1700 UTC, following a route: Pocklington – Barnard Castle – Lanchester Mast – Masham, flying at altitudes up to the cloudbase.

UKAB Note (3): The UK AIP at ENR 2-2-3-3, promulgates Leeming ATZ as a circle radius 2·5 NM, centred on RW16/34, from the surface to 2000 ft above the aerodrome elevation of 132 ft and permanently active H24.

THE BGA comments that the pilot of Glider A did not recall seeing this Hawk but did see a number of other ac, but not close enough to cause concern. At the closest point they were at about the same altitude and about 2·5 NM apart, on reciprocal tracks. Glider pilot B, saw some aeroplanes but had no specific recollection of the Hawk; at the closest point the Hawk was 2 NM W of his glider, turning away, 300 ft above it. Glider pilot C, had no clear recollection of the Hawk, which passed 1600 ft below him. Glider pilot D, was flying a glider which passed about 1 NM SSE of Leeming; he was at 3200 ft (1013 mb) and some 2500 ft above the Hawk. Two other Glider pilots did recall seeing this Hawk, but were both more than 5 NM W of the Hawk's track.

MIL ATC OPS report that the pilot of the Hawk was recovering to Leeming RW34 RHC, descending to FL 95 and in receipt of a RIS from APP. After passing joining information for a radar to visual, APP instructed the Hawk pilot to descend to 4000 ft QFE (1020 mb). At 1417:27, APP advised *"...as you approach the Leeming overhead, there are lots of gliders showing at the moment on a route up to Barnard Castle and back to Masham"*. The Hawk pilot then asked whether the airspace to the E of Leeming was any clearer to which APP replied, *"..most of them are out to the W, there are some out to the E as well – I'll call as many as I can"*. Soon after, the Hawk pilot transmitted that he could see gliders in the overhead and APP stated that gliders had been reported between 2000 – 3000 ft, which was acknowledged. At 1418:01, APP stated *"... traffic 12 o'clock, range of 4 miles slowly moving on a westerly track, no height"*, which prompted the Hawk pilot to turn further to the east and stop his descent at 9000 ft QFE. At 1419:18, the Hawk pilot transmitted that he was visual with the field, but wished to stay with APP until closer to the aerodrome. At 1419:44, APP transmitted *"...traffic right 1 o'clock 5 miles manoeuvring, slow mover, possibly a glider, and 2 contacts 12 o'clock 6 miles reciprocal, no height, again possibly a glider"*; the Hawk pilot acknowledged and stated that he was turning to the W. At 1420:24, further traffic information was passed and the Hawk pilot reported visual with a glider *"...about three and a half"*; soon after, APP descended the Hawk to 1000 ft and provided traffic information on 2 contacts manoeuvring close to the initial point (IP) for RW 34RHC. The Hawk pilot acknowledged the call and asked whether the glider pilots were speaking to anyone; APP replied that they were not. At 1421:08, APP stated *"....previously called contacts just R of 12 o'clock, 2 miles - 2 contacts"*. The Hawk pilot replied *"..at least one of them is a glider, looks to be about two and a half thousand feet at initials"*. APP reiterated that there were 2 contacts in the area and updated the traffic information with *"..there's one on your nose and one north of you ½ mile"*. The Hawk pilot replied *"This is dangerous"* before switching to Leeming Tower at 1421:34. As he approached the IP, the Hawk pilot reported seeing a glider 1 NM from the threshold, circling at about 2000 ft. The Hawk pilot later filed an Airprox.

Leeming ATC reported that during 15 June 00 radar returns were often small and intermittent, which

made conflicting traffic difficult to spot. Nevertheless, the traffic information passed by APP was commensurate with the RIS provided and on 2 occasions led directly to the Hawk pilot obtaining visual contact with gliders. Both the Hawk pilot and APP were aware of the NOTAM stating that up to 41 ac would be taking part in a cross country gliding competition in Class G airspace close to Leeming. Whilst the gliders' routeing was planned to transit through Class G airspace, the multitude of slow moving contacts encountered by both APP and the Hawk pilot posed a significant problem to flying operations, and made both recoveries and departures demanding for both controller and pilot alike. Even with the good weather conditions and 20 km visibility at the time it was not considered best practice for glider pilots to manoeuvre their ac in and around the approach lane to a busy fast-jet station. Moreover, it would have been more sensible for the competition participants to have given Leeming a much wider berth, given the difficulty in visually acquiring and then avoiding a glider from a fast-moving jet.

HQ STC comments that this experienced Hawk pilot was no doubt concerned to find himself amidst a stream of gliders transiting through the airfield overhead. A laudable service from APP furnished him with sufficient information to navigate the hazards ahead but he was clearly, and understandably, anxious with the scenario presented to him and it is highly probable that the glider which he encountered just south of the threshold proved the final straw. There is, however, no evidence at this juncture to support the allegation that the glider had penetrated the ATZ.

The issue seems to be not so much one of proximity but more of a statement of concern regarding the wisdom of a mass glider launch, intentionally planned to arrive in the RAF Leeming overhead, and the resultant confliction with military departures and recoveries. Furthermore the notoriously poor conspicuity of most gliders, the absence of IFF and the lack of appropriate 2-way comms with APP serve only to aggravate an obviously contentious plan by the competition organisers.

UKAB Note (4): A review of the Great Dun Fell (GDF) radar recording is inconclusive. The Hawk is shown as it transited initially about 7 NM W of Teesside on a track of 155°; 3 intermittent primary contacts are shown: 5 – 7 NM SW of Leeming, 6 NM NW of Leeming and a further contact 3 NM NE Leeming. As the Great Dun Fell Radar head is 39 NM from Leeming, not all of the contacts reported by APP would have been detected by the GDF. At 1419:56, about the time of APP's traffic information, the Hawk can be seen turning R onto a track of 170° and a primary contact is shown in the Hawk's 12 o'clock – 6 NM. The Hawk passes 2 NM to the W of the primary and maintains track whilst descending, until the Hawk descends below coverage about 2 NM SE of Leeming. There are no other primary contacts seen in the vicinity of the Hawk.

With the assistance of the BGA the GPS data logger plots were obtained and the track compared to the radar recording. Comparison of the GPS plotted position of Leeming was significantly at variance to the ¼ mil chart and the radar recording video map. Therefore, it is difficult to reconcile the two data recordings, but the GPS information does give a general impression of the relative geometry, which is depicted graphically on the diagram.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the Hawk pilot, transcripts of the relevant RT frequencies, radar video recordings, GPS data logger traces, reports from the appropriate ATC and operating authorities together with association comment.

The Board was dismayed at the somewhat negative, defensive response at attempts to trace those glider pilots, which may have been involved. Tracing had been protracted, but the availability of the gliders' GPS plots was of great assistance, when finally obtained through a BGA member five months after the event.

The STC member felt the Hawk pilot had filed the Airprox to highlight the concern of military pilots who operated regularly within the promulgated Vale of York Area of Intense Air Activity. Of most concern was not the proximity of the gliders to the Hawk, but the principle of planning a competition so close to Leeming's climb-out lane. The Chairman pointed out that from the Hawk pilot's own report, nobody had seemed to get too adjacent - the closest being

1 NM/500 ft away. However, the Hawk pilot had to execute some rapid turns and descents to manoeuvre around the many gliders in the vicinity. The Board was briefed on the gliders' GPS data logger information; this was difficult to relate exactly to the track of the Hawk, but it did illustrate the situation faced. Moreover, it was feasible that other gliders had been present, not just those traced by the BGA (in the Pocklington competition) as depicted on the diagram. Equally there was no certainty that those illustrated were the ones seen by the Hawk pilot.

A gliding member explained that a local club official, acting as the competition director, set the planned competition track. This was a small competition by national standards, with about one third of the competitors coming from the local area. Three similar competitions had been run during the summer, without causing such problems. The competition organisers believed that planning a track to pass 3 NM N of Leeming merely repeated what had been flown previously with little difficulty, as far as they knew.

One pilot member queried why the glider pilots had not called Leeming and another explained that although they carried a 720 channel VHF radio, competition entrants were loath to give away their position as this would put them at a competitive disadvantage. The question of conspicuity was also raised - the members recognised that these gliders, usually predominantly white in colour, were very difficult to see against a cloud background and at certain aspects - e.g. head-on - their very small frontal area made them practically invisible. One ATC member asked if the Hawk pilot should have asked for a RAS but the same conspicuity limitations were replicated by the gliders' small radar signature. High hopes for a 'light-weight transponder' to improve glider radar conspicuity were in decline. It was explained that some were in use in France but it was unlikely that they would be accepted for certification in the UK. Moreover there seemed little likelihood of the project coming to fruition in the near future. All that aside APP had provided a good service to the Hawk pilot including obtaining a clearance from Teesside to transit their Class D airspace.

The competition organisers had required competitors to fly through some fairly constrained airspace and the Board recognised fully the glider pilots' right to transit within the FIR without contact with ATC. However, most members thought that the organisers could and should have liaised more closely with Leeming in the interests of safety before finalising the competition track. Members noted that the competition entrants had been excluded from penetrating the Teesside CTR, within which the Hawk pilot had sought sanctuary. They thought it was a pity that similar consideration had not been given to the airspace around Leeming. The STC member reaffirmed the view that closer liaison between the competition organiser and Leeming could have done much to reduce the adverse impact of this competition on Leeming's operations, with the benefit of enhanced flight safety for all concerned, a point which the Board wholeheartedly endorsed.

It was evident that the alert Hawk pilot's look-out supported by traffic information from APP, had enabled him to spot the gliders and steer clear of them. Weighing these and the other factors for relevance, including the minimum separation experienced, members agreed that this was a multiple sighting of gliders by the Hawk pilot, with no actual risk of a collision in the circumstances that pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 79/00

Date/Time: 15 Jun 1437

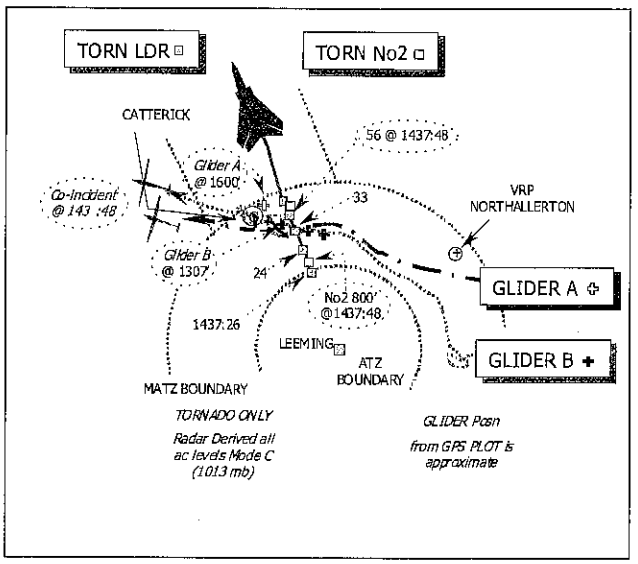
Position: 5421 N 0134 W (3 NM NNW of Leeming - elev 132 ft)

Airspace: MATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado F3	Glider
Operator:	HQ STC	Civ Pte
Alt/FL:	1500 ft (QFE 1020 mb)	NR
Weather	VMC	NR
Visibility:	>10 Km	NR

Reported Separation: 0·5 NM /NR

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports that he was leading a formation of 3 F3s on departure from Leeming RW34 RHC, under a RIS from Leeming APPROACH. The ac are camouflage grey and HISLs were on. Very shortly after take-off, on RW heading of 340° at 350 kt, he reported a pair of gliders at 1800 ft, 0·5 NM to his R. He initiated a zoom climb to get above cloud quickly and saw one glider at 3000 ft agl 0·5 NM to his L. The Nos 2 & 3, on receipt of his RT warning stayed low and encountered the same gliders just above them to L and R. He believed that the risk of a collision was moderate to high, because the gliders were in the Leeming climb-out lane. Their white colour scheme was indistinct against a white cloud background, they were difficult to spot and they were not in RT contact with ATC. He believed the gliders may have been from Pocklington who were holding a gliding competition.

UKAB Note (1): Despite extensive tracing action AIS (Mil) were unable to resolve the identity of the reported gliders and enquiries with the organising committee of the Pocklington competition proved entirely unproductive. Thereafter, UKAB staff requested the assistance of the BGA who were able to conduct an analysis of the competition GPS plots. These indicated the identity of two of the reported Gliders A and B, but there appear to have been others; the pilot of Glider B provided a narrative at the request of the BGA, who have also provided comment about Glider A.

UKAB Note (2): The cross-country Glider competition was the subject of NOTAM UKLB 2997, transmitted by ALFENS Ops at 0923:43. This NOTAM promulgated a warning of up to 35 gliders and 6 ac between 10 – 1700 UTC, following a route: Pocklington – Barnard Castle – Lanchester Mast – Masham, flying at altitudes up to the cloudbase.

BGA comments that the Airprox appears to have taken place where the Notam'd competition track crosses the Leeming RW34 climb out lane at about 3 NM from the airfield. There were 2 gliders in the reported position at the time from their data loggers. The pilot of Glider A crossed the RW34 centre line at 90° about 3 NM out at 2100 ft (1013 mb) minutes before the Airprox. This track would have given him the best view of any departing traffic and suggest that he used good airmanship. Once clear of the centre line Glider A continued on track and tried to find a thermal as he was already low, it was while he was flying parallel to the climb out lane that he saw the 2nd or 3rd Tornado pass well clear and below, he did not see the Leader pass above at >4000 ft. As the Tornados came from behind, the pilot would not have seen them until they were almost abeam.

GLIDER PILOT B filed a narrative at the request of the BGA and reports that he was participating in the Club Class Nationals, based at Pocklington aerodrome. The first turning point on the route for

the set task was Barnard Castle. To reach it, his route took him over the eastern edge of the Leeming ATZ and to avoid entering it, it was generally necessary to divert E of track, and then turn W before reaching the Class D Teesside CTA/CTR, NE of Leeming. They were prohibited from entering Teesside for the duration of the competition.

At about the reported time of the Airprox, he had passed near Northallerton to the NE of Leeming, and was heading generally W to cross the Leeming extended centre line. He did not stop to thermal until well past the centre line and over Catterick airfield, where he was getting low and required to climb in order to avoid landing. At 1437, he estimated he had been approaching the extended centre line from the E and saw 2 Tornado ac taking off. He saw one climbing past him and though his recollection was vague, he thought he saw the underside of the ac as it climbed. The other Tornado was very low (only a few hundred feet), and passed ahead of and beneath his glider. At the time, he did not consider that this was "close", and felt there was a reasonable separation - vertically from one and horizontally from the other.

UKAB Note (3): The UK AIP at ENR 2-2-3-3, promulgates Leeming ATZ as a circle radius 2·5 NM, centred on RW16/34, from the surface to 2000 ft above the aerodrome elevation of 132 ft and permanently active H24.

MIL ATC OPS reports that the formation of 3 F3s was lined up on RW 34 RH for departure from Leeming. Whilst still on the runway, 1 min before departure, the formation was transferred to Leeming Approach (APP) to receive traffic information on a number of gliders taking part in a gliding competition which passed in the immediate vicinity of the airfield. At 1436:03, APP reported *"... there are 3 gliders showing in the MATZ in your 12 o'clock, range 2 miles manoeuvring just to the E of Catterick airfield, no height, possibly gliders".* The formation leader acknowledged the transmission and stated that he was looking for the traffic. At 1437:20, as the formation was conducting a streamed take off, APP transmitted *"C/S 1, traffic believed to be you has traffic slightly right of 12 o'clock range 1 mile, right to left, believed to be a glider, and left 11 o'clock 2 miles going away, believed to be a glider".* The leader acknowledged and reported visual with traffic in his 3 o'clock, slightly low, to which APP replied, *"Roger, that's the first, there's another in your 11 o'clock and 12 o'clock, 2 miles and 3 miles respectively, possibly gliders".* A few seconds later, the crews of No 2 and 3 called airborne, the No 2 elected to transit at a lower height than the leader. APP advised the leader that he could transit through the Teesside Zone once he was above FL 40, as that airspace was known to be clear. There then followed a series of calls in quick succession. At 1437:58, the crew of No 2 transmitted *"...glider above me now 500 ft – clear"* following which, APP transmitted *"C/S 3, glider 12 o'clock, range 2 miles, right to left no height"*, which was acknowledged. Shortly afterwards, the crew of C/S 2 reported *" ...gliders, 2 gliders going down our, in our left 500 ft high" whilst* the crew of C/S 3 reported visual with both gliders a matter of seconds later. APP passed traffic information to the crew of No 3 in their 10 o'clock – 1 NM, and *"..just left of 12 o'clock 3 miles"* before the formation was handed to CRC Buchan to continue their sortie.

The Great Dun Fell radar recording showed intermittent primary returns in the vicinity of Leeming, which were inconclusive and of little benefit to the investigation.

Leeming ATC personnel were acutely aware of the presence of the gliders, as Airprox 78/00 had occurred about 15 min earlier. Therefore, the decision to transfer the formation to APP for TI prior to departure was sound as APP could see the glider returns on primary radar, although only as very small and/or intermittent contacts. The TI provided by APP both before and during the formation's departure was as full and accurate as could have been expected given the situation presented to the controller.

Whilst the gliders' routeing was planned to transit through Class G airspace and promulgated by NOTAM, the multitude of slow moving contacts posed significant problems to the Station's flying activities and a further 20 min elapsed before the gliders were reasonably clear of the airspace immediately surrounding the airfield. With hindsight, it would have been more sensible for the glider pilots to have given Leeming a much wider berth, given the difficulty in visually acquiring, and then avoiding, a glider from a fast-jet.

HQ STC comments that with the Tornado formation lined up and ready for departure, APP correctly alerted them to the presence of multiple gliders either in or crossing the climb-out lane. Nevertheless, the formation leader elected to roll, with his wingmen following on in stream. Although the formation leader may well incur some criticism for launching into a known 'hostile' environment, the crews of all three ac were acutely aware of the gliders and worked hard to clear their flightpaths. They achieved this initially by staying low, content that they were now all visual with the previously called gliders at around 3000 ft agl. In further mitigation, the sortie was constrained by a rigid timeline and APP estimated that the next clear window would have been 20 min later. Although flight safety, of course, remains paramount, a delay of that magnitude would have rendered the sortie non-effective, and there would therefore have been considerable pressure on the leader to launch on or as close to time as possible.

The key elements in this incident have much in common with those of Airprox 78/00 which occurred some 15 min earlier and the potential for disaster in this scenario should not be underestimated. It would be unnecessarily harsh to level major criticism at any of the pilots involved. It would seem more appropriate, therefore, to question the organisational aspects of both incidents. The wisdom of a mass glider launch, intentionally planned to arrive in the RAF Leeming overhead, in confliction with military departures and recoveries, is questionable and given the well documented poor conspicuity of most gliders, the absence of IFF and the lack of appropriate 2-way comms, the need for careful and intelligent planning of major events is essential.

UKAB Note (4): A review of the Great Dun Fell radar recording is inconclusive as only the Tornado Leader is shown consistently from 2400 ft Mode C (1013 mb). With the assistance of the BGA the GPS data logger plots were obtained and the track compared to the radar recording. Comparison of the GPS plotted position of Leeming was significantly at variance to the ¼ mil chart and the radar recording video map. Therefore, it is difficult to reconcile the two recordings, but the GPS information does give a general impression of the relative geometry, which is depicted graphically on the diagram.

Primary contacts which might be Glider A are shown for a short period from 1437:09 until 1437:48. The Tornado Leader came into radar coverage at 1437:26, climbing steadily until 1437:48, when he indicated 5600 ft Mode C (1013 mb). This is the same time as the last recorded primary which might be Glider A, about 0·8 NM on the port beam and from GPS data at 1600 ft (1013 mb). Glider B thermals over Catterick after turning to the S. The No 2 Tornado is shown at 800 ft Mode C at 1437:48. Glider B is not shown at all on radar, but data from the GPS plot would suggest it was about 1340 ft (1013 mb) just before crossing the RW 34 extended centre-line and 1307 ft at 1437:48, just before entering a thermal over Catterick.

The No 3 Tornado is first shown at 800 ft Mode C at about 1438:43, some 7 NM NNW of Leeming but is omitted from the diagram.

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, GPS data logger traces and reports from the appropriate ATC and operating authorities, together with association comment.

The Board was disappointed to learn that, like Airprox 78/00, a defensive attitude had been portrayed in trying to trace the glider pilots involved, resulting in a fairly protracted affair. However, the availability of the glider pilots' GPS plots when finally obtained through a BGA member five months after the event was of great assistance. A briefing on the glider GPS data logger information provided, explained that it was difficult to relate this exactly to the track of the Tornado formation, but it did illustrate the incident geometry. Members realised that other gliders might have been in the vicinity not just those traced by the BGA participating in the Pocklington competition; whilst it was entirely probable that these were the gliders sighted by the Tornado formation crews, it could not be guaranteed with 100% certainty.

The STC member believed this event was significantly different to Airprox 78/00, insofar as the Tornado formation Leader had a choice of whether to stay on the ground or climb through an area

where gliders had been reported to him. In the event he chose to climb, relying on see and avoid to keep himself and his wingmen clear of the gliders. With the assistance of Leeming APP's radar information, this worked. The real point of contention, however, was the unnecessary 'pressure' introduced by the seemingly unco-ordinated planning behind the competition. A modicum of liaison with Leeming operations staff beforehand, by the competition organisation, could have prevented this incident and Airprox 78/00.

A gliding member, familiar with the event, explained that a local club official acting as the competition director, set the planned competition track. This was a small competition by national standards, with about one third of the competitors coming from the local area . Three similar competitions had been run during the summer, without causing such problems. The competition organisers believed that planning a track to pass 3 NM N of Leeming merely repeated what had been flown previously, with little difficulty as far as they knew.

A pilot member queried why the glider pilots had not called Leeming and another explained that although a 720 channel VHF radio was carried, competition entrants would be loath to give away their position as this would put them at a competitive disadvantage. The question of conspicuity was also raised - members recognised that white gliders were very difficult to see against a cloud background and at certain aspects - e.g. head-on - were practically invisible. Similarly, the gliders' small size, shape and construction made them just as difficult to see on radar. Longstanding hopes were fading for the introduction of a 'light-weight transponder'. Although some were in use in France it seemed unlikely that they would be accepted for certification in the UK. Nethertheless APP appeared to have detected most if not all gliders in this incident and had provided a very effective RIS to the Tornado pilots including obtaining a clearance from Teesside for the Tornado Leader to transit their Class D airspace above FL 40.

The competition organisers had required competitors to fly through some fairly constrained airspace and it was noted that Gliders A & B had entered the Leeming MATZ. Board members recognised fully glider pilots' right to transit the MATZ, but like the previous Airprox, they thought it was unwise. Moreover, the competition rules had excluded entrants from penetrating the Teesside CTR, but no thought had been given to crossing through Leeming's climb-out and descent lanes. The STC member reaffirmed the view that closer liaison between Leeming and the competition organiser could have produced a much better solution all round, a point which the Board endorsed.

It was evident that having been alerted to the gliders' presence, the Tornado pilots' look-out, supported by traffic information from APP, had enabled them to steer clear of trouble. Taking all these factors and the minimum separation into account, members agreed that this was a multiple sighting of gliders by the Tornado pilot, who had then removed the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

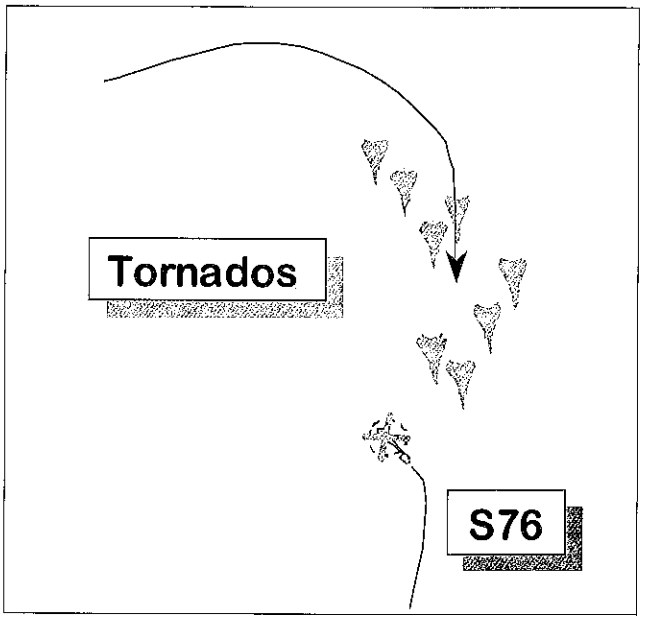
AIRPROX REPORT No 80/00

Date/Time: 15 Jun 1316

Position: 5312 N 0130 E (27 NM NNE of Cromer)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	S76	Tornado GR/F3
Operator:	CAT	HQ STC
Alt/FL:	2000 ft (RPS 1022 mb)	2000 ft (RPS 1022 mb)
Weather Visibility:	VMC CLNC 15 NM	VMC CLNC 10 km+
Reported Separation:	400 m	100 m, 500-750 ft V
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S76 PILOT reports heading 017° at 145 kt en route at 2000 ft from Norwich. He was receiving a modified RAS from Anglia Radar who warned him of 3 returns crossing left to right at 8 NM with a Mode C of 1600 ft. He replied that he could see 4 Tornados. He saw the formation turn right towards him, joined by 2 further formations, all of which continued to turn until head on to him at the same level. Due to their proximity and rate of closure he departed from the rules of the air by turning left and descending, informing Anglia. The formations passed above and to his right, the closest ac was 400 m away at the same level. If he had not taken avoiding action there would have been a collision. NOTAMs were generally available before flight but he advised later that he had not been aware of a NOTAM for this formation activity.

THE TORNADO GR PILOT reports heading 170° at 360 kt leading a formation of 4 ac with 3 other 4-ac formations in close proximity. He first saw the helicopter 2 NM ahead and called it to the formations. He and the formation of F3s behind and to his right climbed and passed about 100 m from the helicopter and somewhat more above it. He reckoned the RH half of the section of F3s behind and to the right would have come closer to it but they climbed more vigorously. There was no risk of collision because the helicopter was seen in time but since the flypast practice had been NOTAMed he was surprised to find a helicopter crossing the holding area of such a large formation. His limited formation manoeuvrability meant that they passed closer than ideal to it.

ANGLIA RADAR reports, with RT transcript, that the controller applied a RAS and confirmed that the S76 pilot was VMC before advising him that a formation flypast for royalty was about to assemble off the coast of E Anglia and that there were about 3-4 returns about 5 NM ahead of the helicopter. The pilot replied that he was "*visual*" at 1315:10. The controller continued to pass traffic information including Mode C readings and at 1315:20 advised that they were turning towards the S76, adding that *"you can expect up to 22 ac now formating very shortly"*. At 1315:50 the pilot advised he was descending to avoid and that there were about 20 ac; the controller replied that the service was now a FIS as he had lost the S76's return in amongst those of the formation. The controller later expressed a belief that the formation activity should not have started until 1327, and the pilot subsequently advised that he would file an Airprox.

UKAB Notes (1): The relevant NOTAM (U3391), as summarised in the BIDNWS, advised of a formation flypast with ac assembling in the Wash

area from Marham and Coningsby between 1308 and 1311, to hold on a racetrack (turning points given) until 1331 before departing towards Southwold. The height given in the ACN for the hold (1000-3000 ft Humber RPS) was included in the NOTAM issued by AUS and passed to AIS for transmission but was not included in the BIDNWS. Aviators were advised to avoid the route by 2·5 NM. The ACN contained full details of the flypast including a map of the route and hold; Anglia Radar and SATCO Norwich were on the distribution list, and the S76 pilot's company confirms that the NOTAM had been available to the pilot at the planning stage. While the incident took place 3 NM from the NOTAMed track, the S76 had flown across the pattern before the incident.

(2) LATCC radar recordings show the confliction; the S76 is tracking N at 1900 ft Mode C and 2-3 Mode C readings from the formation show at 1800 to 1500 ft. The ac pass within 100 ft vertically at distances commensurate with the pilots' estimates, with the S76 turning left and descending to 1600 ft while the Tornados climb to 2000 ft.

ATSI reports that the Anglia controller was aware of the assembly area. Unfortunately on the day of the incident the S76 was being controlled by Coltishall and was only handed over to Anglia as it approached the edge of their airspace. By this time it was too late for the helicopter to be vectored away from the forming up area, as it had been the previous day. Anglia controllers believed that it was impractical to speak to the formation any earlier than was planned (for the transit of the SNS Helicopter Corridor) due to the complexity of the manoeuvres the ac use to form up. It would be difficult to identify and provide the formation with a service. Anglia and Norwich have made suggestions which might alleviate this problem on any future occasion of this nature.

HQ STC comments that although this incident occurred marginally outside the NOTAMed holding pattern, this should not detract from the major learning point. Had the S76 pilot been aware of the NOTAM, this seemingly unexpected encounter with multiple fast jets in close formation might have prompted a more sympathetic response.

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 considered that this incident was a confliction of flightpaths which was ultimately resolved by the pilots involved. However, while the S76 pilot was not barred by the NOTAM from routeing as he did, members guessed that if he had seen the NOTAM he might have chosen to route differently, or asked Norwich for information on the formation before changing to Anglia's frequency. The Board considered that the route taken by the S76 pilot helped to promote this awkward confliction, bearing in mind the formation's lack of manoeuvrability and the extensive efforts made to warn the aviation community about it. Members also wondered why Norwich ATC had not played a more active part in resolving or preventing the incident but no information on this aspect was available to the Board; it was in any case considered that it was more the S76 pilot's responsibility to brief himself on matters likely to affect his flight than to expect ATC to do it for him.

As to the risk of collision, members observed that the S76 pilot had seen the formation in good time and was always in a position to descend out of their way earlier had he considered it necessary. The Tornado pilots, although they saw the helicopter later, saw it in time to remove any risk of actually colliding with it.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The S76 pilot flew into confliction with the NOTAMed Tornado formation.

Degree of Risk: C

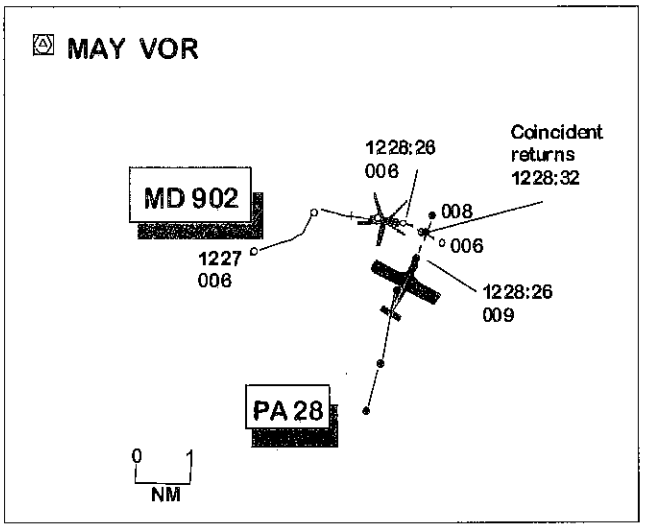
AIRPROX REPORT No 81/00

Date/Time: 12 Jun 1228

Position: 5058N 0018E (2 NM E Heathfield)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	MD 902 helicopter	PA28
Operator:	Civ Comm	Civ Club
Alt/FL:	800 ft (RPS 1026 mb)	900 ft (QNH 1026 mb)
Weather Visibility:	VMC CLBC >10 km	VMC CLBC 15 km
Reported Separation:	100 ft V // 100 ft V	
Recorded Separation:	200 - 300 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HELICOPTER PILOT reports that he was flying a surveillance sortie from Shoreham airfield in VMC; the visibility, 200 ft below solid overcast cloud, was over 10 km. His ac colour scheme is dark blue/yellow. He was squawking 7022 and not in receipt of an ATC service.

While heading 100° at 100 kt, in straight and level flight at 800 ft (RPS 1026), he was looking ahead to identify the next ground target when he and his crew member were startled by a Piper Cherokee which flew 100 ft directly overhead them from R to L; it was on a steady heading and he believed its pilot had not seen them. He felt there had been a high risk of collision and reported an Airprox to Shoreham ATC after landing.

The pilot adds that his lookout had been impaired because he was concentrating on the task in hand. However, he accepted it was his responsibility to give way in the circumstances.

THE PA28 PILOT reports flying from Goodwood to Redhill via the Eastbourne area with one passenger on board. His ac is painted white on top and blue underneath. Wing tip anti-collision lights were on (plus nav lights) and he was squawking 7000 with Mode C. Prior to departure, he had listened out on Goodwood's frequency and heard the pilot of an ac which had just taken off report that the cloudbase was around 1300 ft and lifting. To the W, from where the weather was coming, there were clear skies. He noted the cloudbase as he climbed out so as to return to Goodwood should he not be able to comply with Rule 5 when crossing the hills to the E of the airfield. Remaining clear of cloud and in sight of the surface, he climbed to 1400 ft (QNH 1026). Before reaching Parham, he emerged into clear air, though visibility to the N, where he could just see Gatwick, was hazy. Because of this he decided not to fly towards Gatwick, as originally planned, but to route via Burgess Hill. Just prior to crossing the M23 he selected the London Information frequency (124·6).

Approaching Lewes, a lowering cloudbase forced him to descend to 500 ft agl in a flight visibility of around 5 km. However, visibility and cloudbase to the N now looked good so he turned in that direction and climbed. Owing to congestion on the RT he had not previously been able to call London for a FIS and he was now too occupied with flying and navigating the ac to do so.

When SE of the Heathfield mast, heading 010° at 70 kt and climbing through about 900 ft, he became aware of a fast moving object to his L which he then recognised as a McDonnell Douglas Explorer helicopter. It was in view for no more than 3 to 4 sec before passing from L to R about 100 ft directly below him. There had been a very real risk of collision. He was aware that he had the right of way in the circumstances and assumed that he

had been seen, albeit no change of course by the helicopter was observed. Vision in the direction from which the helicopter had come had been partially obscured by his (the PA28's) port wing.

The pilot comments that he maintained visual reference to the ground throughout the flight, keeping clear of cloud, and was aware of his position at all times. At no time during the flight did conditions deteriorate below VFR minimums, but the proximity of certain geographical points made compliance with Rule 5 difficult. Had he realised that the weather would change as quickly as it did he would not have commenced the flight.

UKAB Note: A recording of the Pease Pottage radar at 1227 shows the helicopter, identified by its squawk, tracking E about 3 NM S of Heathfield. The ac maintains 600 ft Mode C throughout the encounter. At the same time a 7000 return, believed to be the PA28, is tracking NNE, also indicating 600 ft, about 3 NM to the SE of the helicopter. By 1228:26 the PA28 has climbed to 900 ft and the ac are 0·6 NM apart with their tracks crossing at right angles. Six sec later the radar returns merge, about 2 NM E of Heathfield; the Mode Cs are unreadable at this time due to label overlap. However, the next returns, at 1228:44, show the helicopter still at 600 ft and the PA28 at 800 ft. Vertical separation was therefore in the order of 200 to 300 ft as the ac passed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members felt that the PA28 pilot had put himself under some pressure to carry out this flight, perhaps because he was anxious to return to the ac's base at Redhill. He appeared to have had reservations about commencing the flight owing to the weather but finally convinced himself to go because conditions were improving from the W. A GA member wondered therefore why he had elected to route E, where weather was still a problem, when the alternative of taking a westerly route in clearer conditions might have been more sensible. Perhaps this was a sign of inexperience. In the event, the visibility and cloudbase in his chosen direction deteriorated to the extent that many would have considered it wise to abort the flight and return to Goodwood, or divert elsewhere. However, with conditions taking on an uninviting look in every direction, he had decided to press on. As the cloudbase lowered, he found that all his skill and capacity were absorbed in flying and navigating the ac to remain within the legal limits for low altitude flying. In the area where the PA28 pilot judged he could safely turn and climb, shortly before the Airprox occurred, members noted that the helicopter pilot had reported flying just 200 ft below solid cloud cover; therefore they thought it likely that the PA28 could not quite have had the unrestricted climb its pilot reported at the time of the encounter.

Turning to the helicopter, it was felt that the crew should have seen the PA28 earlier in the reasonable visibility they reported, notwithstanding the demands of their operational role. A member ventured, however, that they would probably not have expected to encounter a light ac flying at such low altitude in the prevailing weather conditions. Others accepted this suggestion, but it did not alter the criticism. Although both pilots reported seeing each other, their sightings were very late and the Board concluded that this was the cause of the Airprox. Moreover, neither pilot had then had any time to take avoiding action and any separation had been entirely fortuitous. This persuaded the Board to conclude that there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sightings by both pilots.

Degree of Risk: A

AIRPROX REPORT No 82/00

Date/Time: 15 Jun 1238

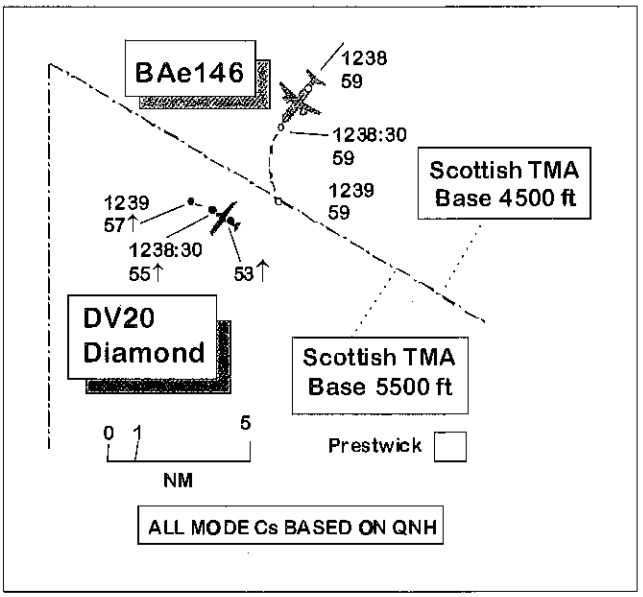
Position: 5540 N 0448 W (17 NM SW Glasgow airport)

Airspace: TMA/FIR (*Class:* D/G)

	Reporting Aircraft	*Reported Aircraft*
Type:	BA46	DV20 Diamond
Operator:	CAT	Civ Pte
Alt/FL:	6000 ft (QNH 1026 mb)	FL 65
Weather	VMC CLBL	VMC
Visibility:	10 km	40 km

Reported Separation: 500 ft 2.5 NM/not known

Recorded Separation: 400 ft 3.6 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA46 PILOT reports that he was heading about 210° at 250 kt under radar control from Scottish on 124·82 and maintaining 6000 ft (QNH 1026) following a TRN 2A SID from Glasgow. He was squawking 4464 with Mode C. The visibility was 10 km in VMC.

When on the GOW 234°R at 14 NM, ATC instructed him to turn L heading 090° for avoiding action. The other ac was not seen but was thought to have passed about 500 ft below and 2·5 NM away. He felt his safety had been compromised.

THE DV20 DIAMOND PILOT confirmed that he was flying in the area at the time of the Airprox. He reports that he had departed from Prestwick for Kirkwall in VMC; the visibility was 40 km. His planned route was via the Southern tip of Bute and he remembers being SW abeam the VRP at West Kilbride. He informed Prestwick APC of his intention to climb to FL 65, but the controller was busy and he felt his transmission may not have been heard so he repeated it. Had his intentions not been approved he would have expected the controller to respond appropriately, but there was no reply. However, some 10 min later APC asked him to telephone them on landing, giving no reason for the request.

ATSI comments that the DV20 pilot called Prestwick APC at 1231. He was instructed to squawk 7000 and offered a FIS. At 1233 he was instructed to climb not above 4500 ft altitude and to remain clear of CAS. At 1246 he was informed that there was no known traffic to affect a climb to FL 75, and at 1247 he was advised that an Information Service was available from Scottish Centre. At 1237:30 the BA46 pilot reported on the Galloway sector frequency and was instructed to squawk 4464. On reporting level at 6000 ft, at 1238:30, he was given an avoiding action turn onto heading 090°. The controller reported the conflict clear at 1239:30 and the ac resumed its own navigation. There is no perceived Civil ATC involvement in this incident.

UKAB Note: Pictures of the Scottish radar at 1238 show the BA46 as it tracks SW of Glasgow maintaining 5900 ft Mode C. At the same time another return is observed moving slowly NW and squawking 7000 about 14 NM NW of Prestwick climbing through 5300 ft. At 1238:30 this return, believed to be the DV20, passes 3·6 NM in front of the BA 46 from L to R indicating 5500 ft. The latter commences a L turn at this point and by 1239 is passing through SSE some 2·8 NM behind the DV20, which is now indicating 5700 ft. At the time of the incident the DV20 is within the portion of the Scottish TMA where the base of CAS is 5500 ft, and about 2 NM SW of the boundary where it steps down to 4500 ft. Minimum separation was therefore of the order of 3·6 NM and 400 ft, albeit it did briefly reduce to 2·8 NM and 200 ft but this was after the ac's tracks had crossed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, radar photographs, an RT tape recording, reports from the air traffic controllers involved and a report from the appropriate ATC authority.

From the DV20 pilot's report it is clear that he remembered few specific details of his flight, but his main recollection was his inability to verify his intentions with Prestwick ATC. He mistakenly assumed that a lack of response from the controller gave him tacit approval to climb directly to his planned level of FL 65, notwithstanding the limitation posed by the base of the Scottish TMA at 5500 ft until his track reached the southern tip of Bute. Contrary to the DV20 pilot's report that he had received no positive response from Prestwick ATC, analysis of recorded RT shows that he was given an instruction by Prestwick APC to "remain clear of CAS" with an altitude restriction to climb "not above 4500 ft", some 5 min before the Airprox. The pilot did not read back this instruction but acknowledged with "wilco" (i.e I have received and understood your message and will comply with it).

Members noted that the DV20 had approached the TMA base (passing 5300 ft) as it came into the BA46's 12 o'clock at 4 to 5 NM. The Scottish Galloway SC, observing that the DV20 (which was unknown traffic to him) was continuing to climb towards the TMA, had no option but to instruct the BA46 to turn L in avoidance, thereby removing any risk of collision. Had the unknown radar return not been displaying Mode C, the controller would have been entitled to assume it was operating below CAS and could therefore have ignored it. As it was, the DV20 penetrated the TMA base immediately after the Airprox and continued to climb to FL 65 within CAS, without ATC clearance.

Members found it difficult to formulate a cause because the DV20 was not actually inside the TMA at the moment of the Airprox. Nevertheless, the DV20 pilot had generated a situation by continuing his climb which necessitated the Galloway SC taking avoiding action with the BA46. The Board concluded that the Airprox was the result of a confliction near the base of CAS which was resolved by the Scottish Galloway SC.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A confliction near the base of CAS which the DV20 Diamond pilot subsequently entered with out a clearance, resolved by the Galloway SC.

Degree of Risk: C

AIRPROX REPORT No 83/00

Date/Time: 15 Jun 1152

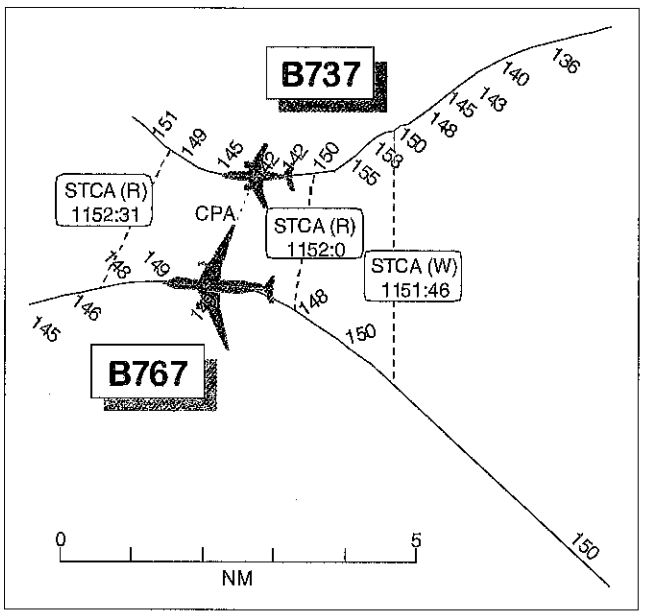
Position: 5152 N 0015 W (4 NM ESE of Luton)

Airspace: LTMA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	B767	B737
Operator:	CAT	CAT
Alt/FL:	FL 150	FL 160
Weather	VMC CLAC	VMC CLOC
Visibility:	50 NM+	10 km+

Reported Separation: 1.5 NM/0.6 NM

Recorded Separation: 1.6 NM, 400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports heading 330° at 380 kt on a positioning flight to Birmingham; he was cruising at FL 150 under the radar control of LATCC on 118·825. TCAS showed conflicting traffic at 1-2 o'clock at about 5 NM which he then saw. It was a B737 which appeared to be climbing. When it reached FL 148 TCAS produced a TA at the same time as ATC gave an avoiding action left turn and descent. There was a low risk of collision; the B737 closed to a minimum of 1·5 NM as it passed through his level and he filed the Airprox by phone to LATCC after landing.

acknowledged and reported the other ac in sight. At 1152:10 the controller instructed the B767 to descend to FL 140. By 1153, the ac had been instructed to climb back to FL 150 and turn right onto heading 335°. At 1154 the ac was transferred to TC WELIN.

Neither pilot reported reacting to TCAS alerts on RT although the B737 pilot reported responding to an RA in his ASR. In fact, the pilot of the B737 expressed unease in his report that the avoiding action issued by the controller included instructions to descend when the TCAS RA was to climb.

Both TC NW Deps controllers stated that they had forgotten about the presence of the B767 when the climb and heading instructions were issued to the B737. They could not explain this because all of the correct co-ordination and FPS display procedures had been followed. The trainee controller also stated that when he saw the developing conflict being highlighted by the STCA, he thought he could resolve it by descending the B737 and instructing it to turn left to go behind the B767. In both of these judgements he was wrong and when this was pointed out by the mentor he changed the corrective action. This was fortuitous because, at the closest lateral separation, both ac were descending.

Minimum separation was 1.6 NM horizontally and 400 ft vertically.

The TC NW mentor, and his "colleague" who accompanied him at the interview, expressed views on training in TC at LATCC. These were statements of fact and were not meant to be a mitigation of responsibility for the Airprox. With traffic levels rising, TC NW has become one of the busiest sectors in the Terminal Control Room. The complexity of the sector is enhanced by the split being functional rather than geographical. The split on the NW side is into Departures and Bovingdon with a requirement for inter- and intra-sector co-ordinations being carried out by the Co-ordinator. With all positions open, the mentor is forced to stand to one side of the trainee and behind as other staff need access to the control position. These include Sector Assistants, who put in and remove FPSs, and the Co-ordinator who may require access from either side. The result is that the mentor is moving constantly from one side to the other and, with the current levels of traffic loading, is finding it increasingly difficult to retain a full picture of what is going on. They both stated that they spend about 50% of their time providing on-the-job training.

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 Board concluded that the cause of this Airprox was that the TC NW Deps mentor had allowed his trainee to climb the B737 into confliction with the B767. Although the FPS were there to display the confliction, the mentor and his trainee both missed it; members were advised that the mentor would have been able to see the FPS display from where he was sitting. Note was taken that traffic from Gatwick on the B767's route would normally be above FL 160, and that it was not in communication with the sector, and that both factors had contributed to the incident. It was also pointed out that the mentor should have been plugged in with the trainee all the time to hear any telephoned co-ordination, but he had done so before the Airprox occurred.

The resolution of the confliction appeared somewhat untidy; the Board agreed that the B737 pilot should have informed ATC that he was following a TCAS RA, which would have stopped the controller providing contrary vertical avoiding action. Airline pilot members described to the Board the situation on the flight deck when a TCAS RA

THE B737 PILOT reports heading 245° at 300 kt in a climb to FL 160 from Stansted, and receiving a service from LATCC on 119·775. The controller gave him an immediate right turn and descent; because of the urgency in his voice a rapid turn and descent was made but TCAS then gave a 'Climb Climb' RA which gave him cause for a good deal of concern. His diagram indicated other traffic 2 - 3 NM to his left at a similar level.

ATSI reports that prior to the Airprox the LATCC TC NW mentor had been monitoring his trainee from the adjacent Bovingdon (BNN) position as the sector was being operated on the TC NW Deps position. He stated that he was happy to do so as the trainee was competent on another sector and was due to be examined for a Certificate of Competency on TC North the next day. Whilst this arrangement allows the mentor to see the radar and listen to the RT, it does not allow monitoring of the telephones. Co-ordination for the B767 was carried out by the TC North Co-ordinator. Shortly before the Airprox, the TC NW controllers decided to split the sector as an increase of traffic was foreseen, and, as a result, the mentor had to move from the TC BNN position to the TC NW Deps position and plug in with the trainee. He stated that he paid specific attention to the handover that the trainee gave to the oncoming BNN controller. There is a further reference to training in a general paragraph at the end of this analysis.

The B767 was co-ordinated into TC NE airspace from TC TIMBA at 1143, climbing to FL 150. It reported on TC NE frequency at 1144 and was level shortly after 1145. At 1147, the TC NE controller instructed the B767 to continue on a radar heading of 315°. The normal ATC procedure would then be for TC NE to co-ordinate with TC NW and transfer the ac to that sector. On this occasion, however, the trainee TC NW controller, who was carrying out extension training onto this sector, elected not to work the ac but to have it remain with TC NE and then, when clear of other TC North traffic, transferred directly to TC WELIN. This is a routine option which may be exercised on TC North where the split is more functional than geographical. However, the requirement remains to have an appropriately marked FPS in the TC NW Flight Progress Board to provide a reminder. All controllers concerned stated that the correct procedure was followed and that an FPS, pilot appropriately marked, was transferred from TC NE to TC NW Deps and placed in the Flight Progress Board under the WELIN designator.

All 3 controllers mentioned distractions occurring shortly before the Airprox. One was an ac which was going to carry out a departure from Luton turning left from RW 26 with a climb back overhead the airfield and routeing to the N; this required prior co-ordination. The other was a TCAS RA reported by an ac which had just checked in with TC NE. The RA is believed to have been triggered by 2 light ac in formation 500 ft below, close to the base of Controlled Airspace. The Short Term Conflict Alert (STCA) on the TC radar system was also triggered. The controllers concerned stated that this inevitably catches the attention of controllers providing a service in that vicinity.

At 1142 ,TC NW Deps was notified of the B737's departure from Stansted, on a Compton SID. At 1148, the pilot reported on the TC NW Deps frequency climbing to FL 70 on a Compton 3 Romeo. The TC NW Deps trainee responded with a radar heading of 270° and lifted the speed restriction. At 1148:20, the B737 was instructed to climb to FL 100 and, at 1149:10, was further cleared to FL 160. This is the agreed exit level for the transfer of ac from the TC North sector in the direction of Compton. It is possible to assess from the radar recording that, at this stage, the climb rate of the B737 was in excess of 2500 ft/min.

At 1151:10, the TC NW Deps trainee instructed the B737 to turn left onto heading 255°. This was to keep it clear of a previous slower departure but was the heading which now brought it into direct conflict with the B767. At 1151:50, the trainee controller issued avoiding action instructions to the B737 to descend immediately to FL 130 and turn left heading 160°. This was acknowledged by the pilot but immediately countermanded by the trainee controller who instructed the ac to maintain FL 160 as the other traffic was now below. It was also followed 10 seconds later by the instruction to turn right heading 360°.

At 1151:50, the TC NE controller, who had previously been dealing with the distraction of the ac which had reported the TCAS RA, issued avoiding action instructions to the B767 to turn left heading 180° and passed traffic information. The

occurred; there was often considerable surprise effect and this, coupled with the noise of the announcement, subsequent altitude deviation warnings and the need to take manual control, produced some hectic moments. (Indeed the RT recording showed that all of the B737's communications during the resolution were accompanied by audio alarms in the background.) During all this it was not always possible to find a gap in the RT traffic in which to inform ATC. However, members considered that since the B737 pilot replied several times to the controller during the resolution, he could (and should) have added *"Following TCAS Climb"* (or as appropriate) to one of these messages. The B767 pilot appears not to have received an RA during the encounter. The Board observed that there had been several Airprox where pilots had not told controllers they were following RAs and suggested that SRG Flight Operations Inspectorate should be invited to consider publicising the need to do so. Members were advised that FOI were aware that TCAS was very new to many operators in the European area and that once more pilots were used to it, its operation would be reviewed.

The Board agreed that both pilots were aware of the other ac in good time and despite the untidy resolution of the confliction, there had been no risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TC NW Deps mentor allowed his trainee to climb the B737 into confliction with the B767.

Degree of Risk: C

Observation: Neither crew reported reacting to a TCAS alert on 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.

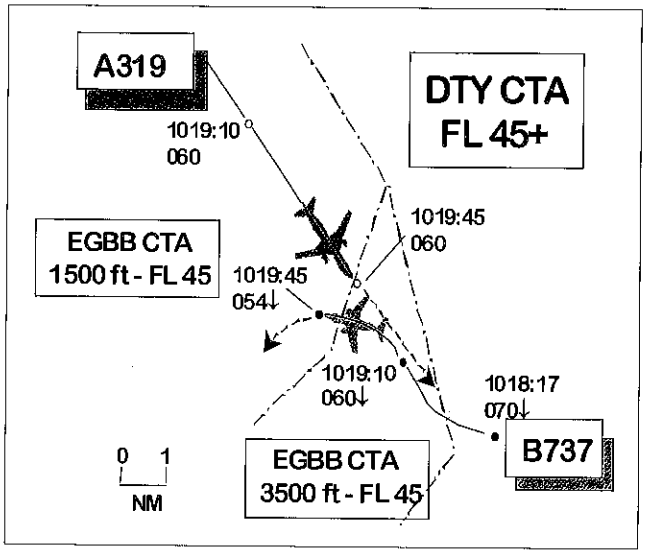
AIRPROX REPORT No 85/00

Date/Time: 15 Jun 1020

Position: 5221 N 0126 W (9 NM E HON VOR)

Airspace: CTA (*Class:* A)

	Reporting Aircraft	*Reported Aircraft*
Type:	Airbus A319	B73-3
Operator:	CAT	CAT
Alt/FL:	FL 60	FL 50
Weather Visibility:	VMC 50 km	VMC
Reported Separation:	0·5 NM/500 ft 1000 m/100 ft	
Recorded Separation:	1·4 NM/600 ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports that following take-off from RW 33 at Birmingham he was maintaining FL 60 on a radar heading of 150° as instructed by APR. His speed, which had been approved by ATC, was 330 kt. The visibility was over 50 km in VMC. Another ac was observed approaching from the opposite direction descending below their level. As it passed 500 ft below them about 0·5 NM to their starboard side, a TCAS RA signalled "monitor vertical speed". No ATC avoiding instructions were

passed to him and no avoiding action was taken. He believed there had been a high risk of collision.

THE B737 PILOT reports that he was descending to FL 50 at 750 ft per min and heading 330° at 210 kt while inbound to Birmingham under the control of APR on 118·05. A TCAS TA alerted traffic 1 NM ahead and 100 ft above. ATC instructed him to turn L onto 240° and shortly afterwards an RA demanding descent was received. He complied by increasing his rate of descent. Despite good VMC the other ac was not seen. He estimated that the other ac, which ATC subsequently told him was an Airbus, passed about 1000 m to his R and 100 ft above with a medium risk of collision. ATC advised that they would be filing a report.

ATSI reports that the Birmingham Radar 1 position was manned by a mentor and a trainee. The former had been operating for about one hour and his trainee for 45 min prior to the incident. The trainee, who holds a Certificate of Competence for ADC at Birmingham, had completed about 250 hours APR training at the time of the Airprox. The traffic loading was described as light although the situation was considered by the mentor to be complex, thereby adding to the overall workload.

At Birmingham, RT training boxes are provided which assist mentors in allowing immediate access to RT, intercom and telephones whilst monitoring trainees. It is a unit management requirement that training boxes are used whenever operational controller training takes place.

Prior to either of the subject ac contacting Birmingham APC, the mentor said that he discussed with his trainee a traffic problem concerning another outbound and inbound ac. The outbound flight was operated by a B727, which both the mentor and his trainee realised would be relatively slow climbing, consequently adding to the time needed to climb it through the inbound ac's level. It was agreed that they would monitor the situation and obtain further climb above the SID level of FL 60 from the LATCC TC Midlands Sector. This was subsequently arranged, but not acted upon until after the Airprox had occurred.

The B737 pilot contacted Birmingham APC at 1014, reporting descending to FL 90 on course to the HON VOR. He was instructed to continue on his heading of 290°, with a speed of 250 kt, to expect vectoring for an ILS approach to RW 33. Just prior to the ac making its first call, ADC had informed radar of the departure of the A319. When this ac called APR, airborne and following its SID, the pilot was instructed to maintain FL 60 on reaching. The B727, about 8 NM ahead of the A319, was then issued with a R turn heading 170°. This track was chosen, the trainee explained, to clear the departure track for the faster climbing A319 and to assist TC by positioning it further W to facilitate its subsequent routeing. The mentor said that, if he had been operating on his own, he would have left the B727 on its SID routeing as, in his opinion, a more westerly track would present a problem when clearing the B737 to descend through its level, thereby adding to the workload. Nevertheless, he believed that the situation would be resolved safely and allowed his trainee to continue with the routeing, as he considered that it would provide good de-briefing material after the session.

The mentor said that he discussed the traffic situation, concerning the 3 ac, with his trainee. Both controllers confirmed that the plan agreed was to leave the A319 on its SID routeing, whilst the B737, would be placed on a heading of 240° to go behind the outbound B727 as the inbound B737 descended through its level from the SE. The B737 was given descent clearance to FL 80 and subsequently to FL 70 on top of another ac inbound to Birmingham from the S. Meanwhile, the B727 was instructed to turn R heading 190°, to route it away from the B737.

The mentor explained that he was confident his trainee would carry out the agreed plan. He was reassured when the trainee placed the A319 on a radar heading of 150° before issuing further descent clearance to the B737 (still on a radar heading of 290°) to FL 50. The trainee stated that, because he was not certain that the heading of 290° would ensure the requisite 3 NM lateral separation from the B727, he decided to instruct the B737 to turn R heading 330° for a short while before clearing it to turn onto the planned heading of 240°. However, this heading placed the B737 head-on to, and descending through the level of, the A319. The trainee admitted that he had overlooked the presence of the A319 when clearing the B737 to turn. The mentor stated that he was not aware that his trainee had issued the instruction. He could

not readily explain why he had missed this call, but said he may not have heard it because he was discussing the traffic situation with his colleague on R2 at the time. Following a call from another inbound ac, the trainee, still not recognising the confliction, instructed the B737 to turn L heading 240°.

The mentor said that he became aware of the situation when he returned his attention to the radar display following his discussion with the R2 Controller. He said that he noticed the A319 and the B737 head-on to each other about 5 NM apart and immediately selected the switch on the training box to allow him to transmit on the frequency. However, when his trainee had plugged in, some 45 min earlier, the mentor had not relocated his headset plug to account for the training box. Consequently, it was not connected to his headset and he did not have the ability to transmit using the training box. Unaware of this situation, the mentor "transmitted" avoiding action instructions to both flights. He said that, reacting to the situation as he saw it, he instructed both ac to turn right and the B737 to expedite descent. He did not appreciate that the B737 pilot had already been instructed to turn L at the time. He only realised that the instructions were not going out when the assistant, who happened to be listening in on the frequency, told him. His immediate reaction was that the training box was faulty. Being unable to take the appropriate action himself he told his trainee to resolve the situation without giving him any specific advice. The trainee's first call was to reiterate the avoiding action turn given by the mentor to the A319 i.e. a R turn heading 240°. Fortuitously, the pilot did not respond to this instruction as it would have resulted in him turning towards the B737 which was by now turning L onto a heading of 240°. Before any further transmissions could be made by the trainee, the pilots of both ac reported receiving TCAS RAs. A radar photograph at 1019:30 shows the two ac head-on, 2·3 NM apart, with the B737 400 ft below the A319. The next photograph, eight seconds later, reveals that the B737 is in a L turn at FL 54, 1·4 NM from the A319, which is tracking 155° at FL 60 on its RHS.

Following this incident, a safety notice was issued by NATS management at Birmingham requiring mentors to carry out a verbal transmission check on the frequency using the training box before allowing a trainee to take control.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

There was little discussion about the mechanics of this Airprox which, members quickly agreed, was caused by inadequate monitoring by the Birmingham APR mentor. The chain of events leading to the incident was started by the mentor who did not connect his headset to the training box when his trainee plugged in. He then did not notice his trainee give the B737 pilot 2 alterations of heading, first onto 330°, which took it head-on to the Airbus, and then left 240° onto base leg (both these omissions were presumably owing to the mentor being in discussion with the R2). Consequently, the mentor's avoiding instructions to the ac, had they succeeded in being transmitted, would have compounded the confliction, as he had not recognised his trainee's (entirely fortuitous) second turn instruction (onto 240°) which had the effect, unintentionally, of deconflicting the tracks. As events unfolded, the Airbus pilot fortunately did not take up the trainee's re-transmitted instruction to turn R which would have taken his ac towards the B737. At 1019:10, immediately prior to the second turn instruction to the B737, the ac had been head-on, about 5·5 NM apart, at a closing speed of some 560 kt with no vertical separation (the B737 indicating FL 60 descending). Had the B737 not turned L when it did, the ac would have passed in opposite directions less than 1 min later with minimal horizontal separation and probably less than 500 ft of vertical separation. The Board was in no doubt that under such circumstances the safety of both ac had been compromised.

An airline member commented that, in his opinion, the speed of the Airbus (330 kt) while not necessarily being a factor in this incident, was nevertheless excessive given its level and the nature of the airspace. Other pilot members concurred, and there was general feeling that unnecessarily early

lifting of speed restrictions by ATC, particularly in confined CAS conditions, might not serve the interests of safety.

Members commended the action taken by Birmingham's management that now required mentors to carry out a functional check of the training box at the commencement of training. This was a sound idea, and an ATCO member wondered whether other units using such training boxes had similar precautions built into their procedures. The ATM P & P adviser said that he would make appropriate enquiries.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Birmingham APR mentor did not monitor adequately his trainee's instructions which put the B737 into confliction with the Air bus.

Degree of Risk: B

AIRPROX REPORT No 87/00

Date/Time: 17 Jun 1133 (Saturday)

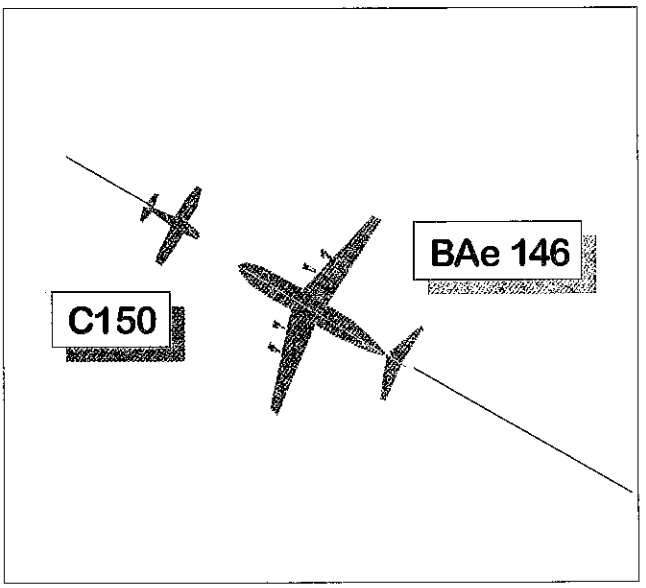
Position: 5209 N 0100 W (4·5 NM ESE of DTY)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Cessna 150	BAe 146
Operator:	Civ Trg	CAT
Alt/FL:	4000 ft (QNH)	4100 ft (QNH)
Weather Visibility:	VMC CLAH 10 km+	VMC CLNC
Reported Separation:	100 ft V, 7-800 ft V	
Recorded Separation:	NK	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA 150 PILOT reports heading 105° at 100 kt on an IF instructional sortie; he was receiving a FIS from Cranfield on 122·85 at 4000 ft QNH; his transponder was not fitted with Mode C. While explaining instrument readings he saw a BAe 146 approaching head-on from ¼ - ½ NM ahead and just above. He lowered the nose and the airliner passed 100 ft directly overhead and his ac was then disturbed by its wake. Although he quickly saw the ac would miss him he assessed the risk of collision had been very high. Cranfield advised that they had no knowledge of it. He initially considered that the incident was a normal FIR hazard but decided to file the report because of the potential danger to the airliner.



UKAB Note (1): The BAe 146 was identified by LATCC; its company was contacted and undertook to obtain a report from the pilot. After many reminders, the company informed UKAB that the flight had been operated on their behalf by another, overseas-based, company. This incurred further delay before the pilot was found and a report obtained from him. He had apparently routed in Class G airspace because a computer failure at LATCC had prevented his flightplan from being accepted.

(Note 2) The National Airspace System (NAS) computer at LATCC failed at about 0820 on 17 Jun. Amongst this computer's tasks are the production of FPSs in respose to the submission of flight plans, and SSR code/callsign conversion. The BAe 146 Captain, planning his departure for Ireland from London City, would not have known, during the failure (which lasted some 3 hrs), when the NAS would come on line again or when his flight plan

would be accepted. He consequently elected to route outside LATCC controlled airspace.

THE BAe 146 PILOT reports (on 26 Aug) heading NW at 4100 ft QNH in very clear visibility on a VFR flight. (UKAB Note: His groundspeed, measured from ATC radars, was 280 kt.) He was advised by ATC of an opposite direction small ac at 12 o'clock low. He reported it in sight and passed over it by 7-800 ft with no risk of collision.
UKAB Note: The incident is shown on LATCC radars; the ac are on exactly opposing headings for some minutes before the encounter which occurs at 1133:25. The BAe146 shows 3600 ft Mode C as it passes over the Cessna (squawking 7000), which was identified from its flight profile. 3600 ft Mode C equates to 3924 ft on the pertaining QNH of 1025 mb. The radar recording (showing the BAe 146 carrying a Luton Squawk) did not become available in time to obtain an RT transcript or controllers' reports from LUTON ATC.

LUTON ATC reports that the controller concerned had some recollection of the day in question because of the LATCC computer failure. He remembered giving the BAe146 a RIS and passing traffic information, but he could not remember where this was, or the geometry of the encounter. He said he would have been transferring the ac to Birmingham in the area of the Airprox, and commented that Birmingham had been reluctant to take the ac on a RIS, probably because of knock-on effects of the computer failure.

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 a report from the air traffic controller involved.

The late and 'thin' report obtained from the BAe146 pilot meant that it was impossible for the Board to tell if the light ac seen by the pilot (some way beneath) was the reporting Cessna, or some other ac. It was clear that the radar recording, reported altitudes, and the effect on the Cessna of the airliner's wake all confirmed that the separation between the ac was more in line with the Cessna pilot's estimate. The possibility therefore existed that the BAe146 pilot had not seen the reporting Cessna, but another ac instead. No other conflictions show on the radar recording in the area between Luton and Birmingham, but if there had been another ac without a transponder some 7-800 ft below, it might not have shown on the recording. However, the low level radar coverage in the area is good. The Board came to no conclusion on this point.

In Class G airspace the primary means of deconfliction is by lookout and avoiding action, and members agreed that this appeared to have been lacking from both ac. While the Board agreed that the Cessna pilot acted responsibly in filing the Airprox, members thought he might be the first to admit that he should have seen something as big as a BAe146, head on at a similar level, somewhat earlier than 'just in time'. This late sighting was considered to be part of the cause of the Airprox. From the BAe146 pilot's standpoint, members thought that keeping an 'FIR' standard of lookout would not have been a normal mode of operation for the crew and that it was a bold decision to take a passenger ac through a busy piece of GA airspace without maintaining an appropriate quadrantal level. This situation should have had both pilots sitting forward in their seats scanning continuously for ac such as the Cessna. Members concluded that while it was impossible to tell if the BAe146 crew had seen this C150, the fact that the BAe146 had flown close enough to the Cessna to cause it flight-path disturbance by wake was also part of the cause of the Airprox.

In discussing the risk level, the Board concluded that while the Cessna pilot had seen the BAe146 in time to remove the risk of the ac actually colliding, the safety of the ac had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the Cessna pilot, and the BAe146 flying close enough to the Cessna to cause it flight-path disturbance by wake.

Degree of Risk: B

AIRPROX REPORT No 88/00

Date/Time: 20 Jun 1252

Position: 5520 N 0132 W (Coquet Island)

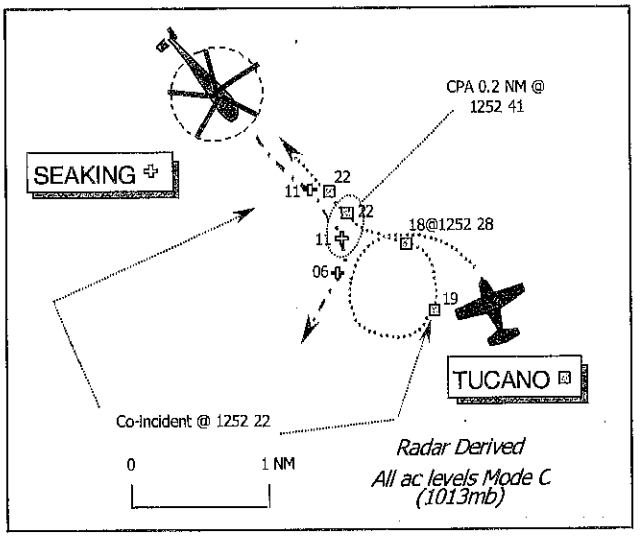
Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Sea King	Tucano
Operator:	HQ STC	HQ PTC
Alt/FL:	1000 ft (QNH 1008 mb)	1500 ft (RPS 1003 mb)
Weather	VMC CLOC	VMC CLBC
Visibility:	7 km in Haze	10 Km

Reported Separation:

300 m H,150 ft V / 0·5 NM H, 200 ft V

Recorded Separation: 0·2 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SEA KING PILOT reports heading 140° at 90 kt whilst flying at 1000 ft QNH (1008 mb) between Boulmer and Blyth for an SAR training sortie about 500 ft below cloud. The helicopter has a yellow colour scheme; forward facing lamps and HISLs were on and they were squawking 3/A 7000 with Mode C. The transit was conducted under simulated IF conditions with a safety lookout provided by the crew who first spotted the black Tucano through the port bubble window at 8 o'clock, 5 – 600 m away. He broke R and descended to avoid the Tucano, which also turned R and climbed as it passed astern. At the closest point the Tucano was about 1 – 300 m away and 150 ft above his helicopter, before the Tucano pilot reversed his turn, climbed, and then descended to low level N of Amble Light. An Airprox was reported to Boulmer RADIO. He adds that there had been a high probability of a collision up until the point that avoiding action was taken by both pilots.

THE TUCANO PILOT reports that the ac colour scheme is black, HISLs were on and he was squawking 3/A 7001 with Mode C whilst descending through 1500 ft RPS, to enter low level at 240 kt in the vicinity of Coquet Island, just to the E of Amble Light. Whilst turning L from N through to W at 45° aob some 3000 ft below cloud, a yellow Sea King was sighted L of the nose - 1·5 NM away flying S along the coast and about 500 ft below his ac at 1000 ft agl. He rolled the ac R to turn behind the Sea King. During the change of bank from L - R, the descent was arrested and the ac bottomed out at about 1200 ft. A climb was initiated and he passed 0·5 NM behind and 200 ft above the helicopter, which appeared to continue on its track. He assessed the risk to have been *"low due to the separation"* that pertained, but the Tucano would have been *"over the Sea King"* if the L turn had been continued.

UKAB Note (1): From archive data the Tyne RPS was 1003 mb for the period 12-1300 UTC.

HQ STC comments that this incident occurred in the open FIR, on a day with less than perfect visibility and in an area popular as a low level entry point. Clearly, the ac came closer to one another than was comfortable but both crews were looking out, saw each other's ac and took positive avoiding action.

HQ PTC comments that this encounter took place in good weather adjacent to a conspicuous and well-used entry point for LFA12. The Tucano pilot saw the Sea King in plenty of time to take good avoidance, during part of which he may have been in the helicopter's blind spot.

UKAB Note (2): The Great Dun Fell radar recording shows the Tucano orbiting L and descending SE of Coquet Island, as the Sea King closes from the NE level at 1100 ft Mode C (1013 mb) - equating to

about 950 ft QNH (1008 mb). Just after 1252 the Tucano crew selected the low flying squawk of 3/A 7001, presumably after any ATS with Newcastle was terminated. Following the second turn in the orbit at 1252:28, the Tucano reverses the turn to the R at a range of about 0·65 NM from the Sea King, whilst indicating 1800 ft Mode C - equating to about 1650 ft QNH (1008 mb). No Mode C is shown by the Tucano on the next return. However, at 1252:41 the minimum horizontal separation is about 0·2 NM as the Tucano, indicating 2200 ft Mode C passed into the 8 o'clock of the Sea King which still indicated 1100 ft Mode C – it may have been just before this point that the Sea King crewman first spotted the Tucano. On the next return the Sea King indicated 600 ft Mode C – about 450 ft QNH (1008 mb), following its pilot's avoiding action descent.

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 pointed out that this Airprox occurred in the vicinity of the prominent geographical features of Coquet Island and Amble Light. These landmarks make for popular entry points into the low-flying system and whilst flying in their vicinity heightened lookout should be the norm. From the Tucano pilot's perspective he spotted the helicopter whilst in a LHD descending turn at a range of 1·5 NM and took robust action; he reversed the turn, levelled and cleared above and to port of the Sea King. This resulted in a minimum horizontal separation of 0·2 NM on the radar recording (and 1100 ft Mode C) at the CPA, with vertical separation of not less than about 700 ft Mode C as the Tucano bottomed out. The member from HQ STC explained that this was an unusual Airprox in that the Sea King safety pilot did not see the Tucano, which had been spotted instead by the crewman, through the port-side rear bubble window after the event, when the Tucano was at 8 o'clock and clearing astern. Whilst this 'spot' resulted in the Sea King pilot taking equally robust avoiding action, as evident on the radar recording, it was already too late. This led the members to agree that the Airprox had resulted from a conflict in the LFS resolved by the Tucano pilot, but unobserved by the Sea King safety pilot.

Turning to risk it was evident from their respective reports that the pilots considered the encounter to be closer than it appeared on the radar recording. Possible Mode C errors could account for some of the difference here. Weighing all these matters for relevance, members agreed that as the Tucano pilot had seen the Sea King in time to take effective action this removed any risk of a collision in the circumstances that pertained.

Some ATCO members questioned the efficacy of flight under simulated IF conditions. A military pilot member explained there was nothing unusual in these arrangements and it was the task of the safety pilot and crew to ensure an effective lookout was maintained. Furthermore the Board was advised that when simulated IF flight was conducted with a crew consisting of only two pilots, SOPs required that a Radar Advisory Service had to be used as an additional safety measure. However, when a crewman was carried, as in this instance, the requirement for a radar service was not mandatory. This explanation did not satisfy ATCO colleagues entirely and some still questioned the wisdom of conducting simulated IF flight without a radar service. That said, the position of this Airprox was about 20 NM away from the nearest radar equipped ATSU at Newcastle. Consequently, at the Sea King's transit altitude of 1000 ft in all probability it would have been below the base of theoretical primary radar coverage. A radar service under these parameters was therefore unlikely, and at best would probably have been limited to information on transponding traffic only. Nevertheless, the Tucano was squawking and a warning to the Sea King's crew may have been feasible. The Board agreed that, all things being equal, it was worthwhile obtaining a radar service whenever feasible and practicable

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict resolved by the Tucano crew, but unobserved by the Sea King safety pilot.

Degree of Risk: C.

AIRPROX REPORT No 89/00

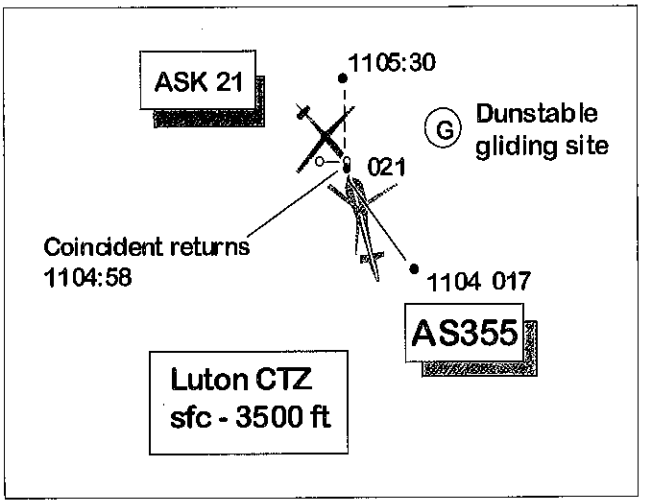
Date/Time: 21 Jun 1105

Position: 5149N 0034W - 2 NM WSW Dunstable

Airspace: CTZ		(*Class:* D)
	Reporting Aircraft	*Reported Aircraft*
Type:	ASK 21 Glider	AS 355 Twin Squirrel
Operator:	Civ Club	Civ Pte
Alt/FL:	1000 ft (QFE 991 mb)	2000 ft (QNH 1010 mb)
Weather Visibility:	VMC CLBC 15 km	VMC CLBC >10 km

Reported Separation: 50 ft H, 50 ft V
400 - 500 ft V

Recorded Separation: 0 ft H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 21 GLIDER PILOT reports that he was conducting a training flight from Dunstable in VMC while in contact with Dunstable tower on 129·9. The visibility was about 15 km. Prior to joining the circuit he instructed his pupil to attempt continuous 360° turns to demonstrate his ability to control speed. When over Eddlesborough church (2 NM SW of the gliding site) at 1000 ft (QFE 991) almost two turns had been completed when he saw a black and yellow helicopter 1 to 1·5 km away at his 1 o'clock at a similar level approaching him at speed. He immediately took control, levelled the wings and descended to increase speed, while keeping the other ac in sight; it passed 50 ft to his R and 50 ft above on a northerly heading with no alteration of heading. He turned to look for the registration but was unable to read it. He thought there had been a high risk of collision.

THE TWIN SQUIRREL PILOT reports that he was flying from Elstree to a private site near Toddington at 2000 ft (he thought the QNH was 1010) in VMC. The visibility, 1000 ft below cloud, was over 10 km. He was receiving a radar information service from Luton on 129·55 and squawking (he thought 4671) with Mode C. While heading 360° at 120 kt, ATC advised him of 3 gliders operating in the area ahead of him and he spotted one in a R turn 2 to 3 NM away at a similar level, so he climbed about 500 ft and it passed some 400 – 500 ft below him; in his opinion there had been no risk of collision. No other gliders were seen. The pilot comments that white gliders against a white cloudy background are notoriously difficult to spot. In his opinion Dayglo patches, while spoiling the colour scheme, would do much to enhance conspicuity.

LUTON ATC reports that the helicopter pilot was given clearance to transit the Luton CTZ not above 1500 ft (QNH 1008) on a squawk of 4662, provided with a FIS and instructed to route W of the Dunstable gliding site. As the helicopter approached the area being used by the gliders the pilot was informed that the site was active and that at least 3 gliders could be seen on radar ahead of him. The pilot replied that he could only see one. About two min later the helicopter left the frequency and landed at Toddington, to the N of Dunstable.

UKAB Note (1): A replay of the Heathrow radar at 1104 shows a slow moving primary return believed to be the glider in a R turn in the reported area. At the same time the helicopter, identified by its 4662 squawk, is tracking NNW 2 NM to the SE of the glider at 1700 ft Mode C. At 1104:58, the returns merge 2 NM WSW of Dunstable gliding site with the helicopter's Mode C indicating 2100 ft

(equivalent to 1965 ft QNH or 1465 ft above Dunstable's 500 ft elevation). No other returns are seen in the area during the reported period of the Airprox.

UKAB Note (2): Dunstable Downs is notified for glider launching up to 2000 ft agl during daylight hours (ENR 5-5-1-2). The site is also marked on the ICAO 1:500 000 topographical chart with a warning of cables and intense gliding activity.

UKAB Note (3): As the the helicopter's Mode C indicated vertical separation was in the order of 465 ft, the glider pilot was contacted to confirm his reported height of 1000 ft QFE. He said that he had noted the level only after the encounter and could not be sure exactly what it had been before. While he accepted that the helicopter might have been a little higher than he thought, he was adamant it was within 150 ft above him.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a radar video recording, and a report from the air traffic controller involved.

The Board addressed the considerable difference of opinion between the two pilots on the vertical separation that had existed as their ac passed each other. The actual separation could not be gleaned entirely from the radar recording which showed the incident in plan view, much as described by both pilots; the helicopter's Mode C readings confirmed the reported climb (approximately 400 ft) about 1 min before the radar returns merged. This '400 ft separation' was at odds with the glider pilot's estimate of 50 ft and could only be explained if the glider had been somewhat higher at the time of the encounter than its pilot had perhaps realised. Members noted that both pilots had said they were at similar levels when they first saw each other. The glider was spotted first from a range of 2 to 3 NM and the helicopter pilot had climbed (confirmed on radar) to fly over it. While this was taking place the glider pilot then saw the helicopter – at a similar height – only 1 to 1.5 km away. A gliding specialist said there would not have been any specific reason, at that point in the glider's flight, for the pilot to note his height with any particular accuracy. Members accepted this but were conscious that glider pilots are, by the nature of the type of flying they do, adept at estimating distances. In this instance the glider pilot, conceded that he might have underestimated the separation up to a point, but he remained convinced the helicopter had passed him much closer than the margin reported. In the absence of any further information the matter could not be resolved conclusively and in the end members suspected that the actual separation was probably somewhere between the estimates given by both pilots.

The Board concluded that the Airprox was the result of conflicting flight paths in Class G Airspace which was resolved by the actions of both pilots. This successfully deconflicted the ac and removed any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A confliction in Class D airspace resolved by both pilots.

Degree of Risk: C

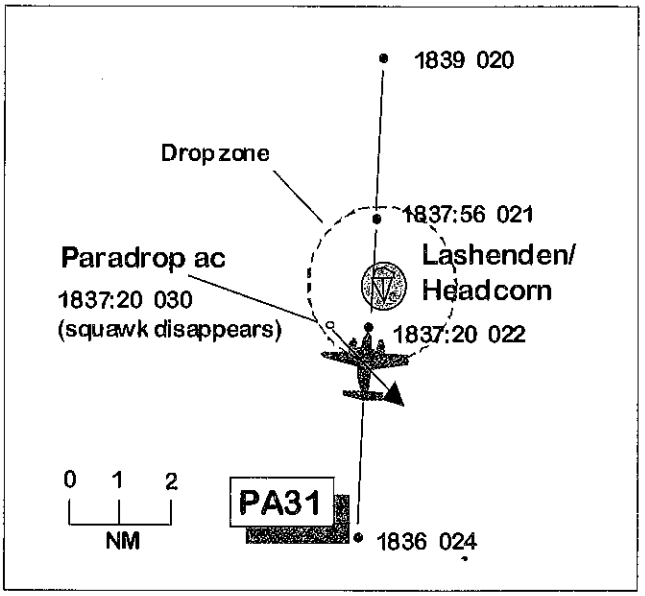
AIRPROX REPORT No 90/00

Date/Time: 15 Jun 1837

Position: 5109N 0039E (Headcorn - elev 72 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Parachutist	PA31
Operator:	Civ Club	Civ Pte
Alt/FL:	2500 ft	3000 ft (QNH 1027 mb)
Weather Visibility:	VMC	VMC CLBC 10 km
Reported Separation:	300 ft H 0 ft V	
	100 m H 0ft V	
Recorded Separation:	not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARACHUTIST reports that he checked his canopy at 2900 ft after making a 5 sec delayed free-fall jump over Headcorn. Shortly afterwards, while manoeuvring over the drop zone, he was advised by radio of an ac tracking through the area. He started a slow 360° turn and about halfway round it spotted a low wing twin engined ac coming towards him at co altitude. He remained facing towards the ac in order to present as large a view of his canopy as possible and judged that it would pass to his L, which it did by about 100 m, at exactly his altitude, giving no indication that its pilot had spotted him. Without the warning by radio he thought he might have come a lot closer to it. Had a large number of parachutists been deployed the ac's presence would have constituted an even greater hazard. He would like to see this incident given prominence in the GASIL to alert GA pilots to the dangers inherent in overflying notified parachute sites.

THE PA31 PILOT reports that he was flying VFR from an airfield in France to Southend. The visibility, 500 ft below cloud, was 10 km. He was receiving a FIS from London Information on 124·6 and Squawking 7000 with Mode C.

When about 0·5 NM N of Lashenden/Headcorn airfield, heading 010° at 180 kt and cruising at 3000 ft (QNH 1027), he saw a parachutist 100 m to his port side at the same level. No avoiding action was necessary as he was already heading away from the parachute when he first saw it; he did not feel there had been any risk of collision unless the parachutist had not seen him. He immediately began looking for other parachutists and saw the dropping ac as it flew about 2 NM behind and above him heading in an easterly direction.

The pilot comments that he was surprised that parachuting was taking place at that time of the day and he would have expected the parachute ac to be working the London Information frequency when operating above the Headcorn ATZ. He received no warning from London Information either about the other (paradropping) ac, or that parachuting was in progress. The following day he contacted the parachute club to discuss the incident and was told that an Airprox report was being submitted. In future he plans to avoid overflying Headcorn without first calling on the airfield frequency.

UKAB Note (1): Letters were received from a club parachute instructor who witnessed the incident, and from the Aerodrome Owner/Operator. They advised that the transiting pilot, whose ac was subsequently identified following enquiries with Southend ATC as a PA31 Navajo, did not contact Lashenden's RT frequency as he overflew the ATZ. The ac flew within an estimated 100 m of a student parachutist at the same height. The pilot telephoned

the parachute club the following day, explaining that he had seen the parachutist, and it was pointed out to him that the site was clearly marked on the aeronautical charts with a warning of intense parachuting. The aerodrome operator comments that this incident was one of the most serious to date. He feels that everything possible should be done to publicise the dangers inherent in coming into close contact with free falling parachutists, and to encourage GA pilots to call on the airfield frequency if they intend to fly close to a drop zone.

UKAB Note (2): A recording of the Pease Pottage radar shows the PA31 heading NNE and passing the paradropping ac, identified by its squawk, at 1837:20. At this point the PA31 is less than 1 NM SSW of Headcorn and flying at 2200 ft Mode C (equivalent to 2578 ft QNH 1027), with the paradropping ac about 0·75 NM to his portside heading SE at 3000 ft Mode C. About 10 sec later the PA31 overflies the drop site and continues on its northerly track towards Southend.

UKAB Note (3): Lashenden/Headcorn has a notified ATZ of radius 2 NM, extending 2000 ft above its 72 ft elevation and active from 0900 to sunset throughout the year (UK AIP AD 2 EGKH 1-2). The airfield is notified for paradropping within a 1·5 radius circle centred on 5109N 0039E up to an altitude of 3500 ft. Drops may, however, be made from up to FL 150 with the permisson of LATCC. Parachuting activity, which normally takes place during daylight hours, is notified on the day to Manston ATC or, if outside the hours of Manston, to LATCC (UK AIP ENR 5-5-4-2). The site is also marked on the 1:500 000 topographical chart with a warning of intense parachuting activity.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Board members were dismayed that despite considerable recent publicity directed at highlighting the dangers inherent in flying close to notified paradrop zones, here was yet another example of poor airmanship on the part of a GA pilot who had overflown a notified drop zone at an altitude likely to conflict with both para-dropping ac and parachutists. A GA member said there was no justification for the PA 31 pilot's surprise at parachuting taking place, since it was clearly notified in the UK AIP (see UKAB Note 3). Neither was there any justification for his expectation that the dropping ac would be in contact with London Information – it was just as likely to be in contact with London Control if dropping from above 3500 ft. Another GA member, familiar with drop zone operations, concurred, adding that the incident was very disturbing and he was disappointed that the PA 31 pilot had not attempted to call the Headcorn frequency, as he could and should have done. He advised the Board that in an effort to minimise this type of encounter it has been suggested that paradrop zone operators could adopt an appropriate nearby 'parent' unit as a contact point for disseminating information. Operators would pre-note the unit with details of their day's programme and the information would be available subsequently on contact to any pilot requesting it. It was also pointed out that there was a responsibility on the part of the jump master for clearing the area below the ac prior to releasing parachutists. However, it was acknowledged this was not always an easy task as much depended on which way the dropping ac was pointing prior to despatch. Moreover, fast moving ac, such as the PA 31, could be very difficult to spot in time to provide adequate warning.

Members were surprised at the apparent lack of concern expressed by the PA31 pilot, who did not see the parachutist until after he had passed within 100 m of him. Also puzzling was the pilot's statement that he 'did not consider that there had been a risk of collision unless the parachutist had not seen him'. Parachutists have limited ability to manoeuvre quickly, even under aerofoil canopies, and are particularly vulnerable when faced suddenly with a high speed intruder. Furthermore, it is well known that freefall parachutists are almost impossible to spot before canopy deployment. The Board was in no doubt that in this instance there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA 31 pilot flew through an active and promulgated paradrop site without communication and close to a parachutist who he did not see in time to avoid.

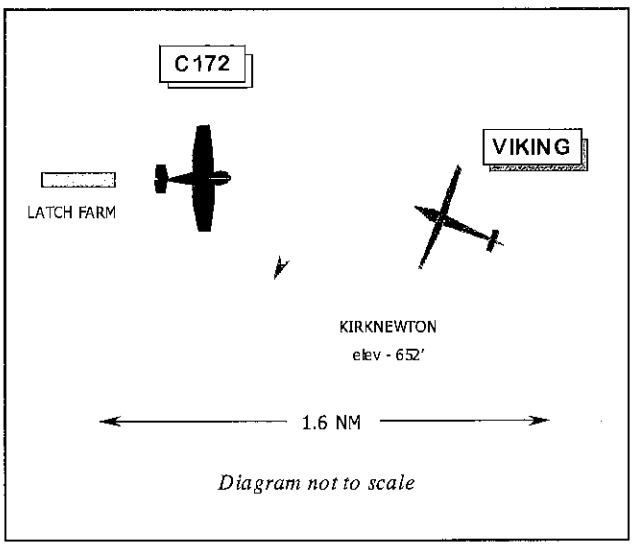
Degree of Risk: A

AIRPROX REPORT No 91/00

Date/Time: 24 Jun 1350 (Saturday)
Position: 5552N 0325W Kirknewton elev 652 ft
Airspace: Edinburgh CTR (*Class:* D)

	Reporting Aircraft	*Reported Aircraft*
Type:	Viking glider	C172
Operator:	HQ PTC	Civ Pte
		Foreign Registered
Alt/FL:	800 ft (QFE 993 mb)	Not reported
Weather	VMC CLBC	VMC
Visibility:	30 km	'Good'

Reported Separation: 100 ft H, 100 ft V
Recorded Separation: Not Recorded.



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING T Mk 1 GLIDER PILOT reports ascending to 800 ft QFE at the top of a winch launch from RW31 at Kirknewton Glider site. He did not detect any other ac during his lookout prior to the L crosswind turn and he had not been aware of any other ac in the vicinity whilst in the climb. However, when he turned L through 260° at 50 kt another ac, subsequently identified as a C172, was observed climbing out from Latch Farm light ac landing strip. The other ac was veering to starboard of his glider and its pilot did not appear to have spotted him, so he dived and turned L to avoid it. He estimated that at the closest point of approach the minimum horizontal separation was about 100 ft as the C172 crossed ahead from L to R and 100 ft above him when it passed down the starboard side in a climb with a high risk of collision.

UKAB Note (1): The UK AIP at ENR 5-5-1-3, promulgates Kirknewton glider launching site, elev 652 ft amsl, for winch launches where cables may be encountered to 2000 ft agl, during daylight hours. It is situated in the Edinburgh CTR, 5 NM SSW of Edinburgh Airport and marked on CAA ¼ and ½ 'mil' charts.

THE C172 PILOT reports that he departed Latch Farm light ac strip near Kirknewton for a private strip in the vicinity of Aberdeen at 90 kt and in receipt of an ATS from Edinburgh APPROACH. The glider was not seen, therefore, he was unable to provide any further detail for the investigation.

UKAB Note (2): In a subsequent telephone conversation the C172 pilot stated that he was the owner of the land at Latch Farm and regularly flew into the site. He was cognisant of Kirknewton Glider site, but he advised that no formal arrangement existed between himself and the VGS for the operation of the two sites – this was also confirmed by the OC of the VGS – and was unaware it was active. He had contacted Edinburgh ATC by mobile telephone about 15 min before take-off, who approved his departure, but no mention was made of Kirknewton Glider site being active. On previous occasions, Edinburgh had advised him when Kirknewton was active and he was very appreciative of the good service received from Edinburgh ATC, which was the norm. He added that he had not observed any glider operations at the site prior to departure and was unaware that it was active at the time – he reiterated that he did not see the glider flown by the reporting pilot at all as he climbed to his transit altitude of 2000 ft.

THE EDINBURGH APPROACH RADAR (APR) CONTROLLER reports that he observed a 3/A 7000 squawk, which appeared to have just departed from Kirknewton Glider Site. Shortly afterwards a C172 pilot called and was identified as the same ac. A few moments later a call was received from Kirknewton to report that a Cessna had just

overflown their gliding ops. He assessed that it was the C172 that had departed from Latch Farm, whose pilot reported that he was not aware that gliding had been in progress at Kirknewton.

UKAB Note (3): The Edinburgh MATS Pt II (Amend 32) specifies procedures whereby permission may be granted for the conduct of VFR gliding operations at Kirknewton. In addition to the meteorological criteria specified, it states that *"...Edinburgh ATC will pass traffic information on gliding at Kirknewton under VMC".*

Two supplementary Instructions (13/99 & 7/00) also relate to operations at Latch Farm, but these procedures are specifically for microlight operations. However, the routes specified into and out of Latch Farm, appear to have been those followed by the C172 pilot.

UKAB Note (4): This Airprox was not shown on recorded radar.

ATSI reports that an entry in the Edinburgh ATC watch log reveals that approval for the commencement of glider operations at Kirknewton was granted at 0430 on the day of the Airprox. A member of the support staff at Edinburgh ATC recalls receiving the telephone call from the C172 pilot, prior to his departure from Latch farm. However, it appears that the pilot was not informed, during this conversation, that gliding operations at Kirknewton were in progress. As a result, a local instruction has been issued to ATC staff at Edinburgh which requires that *"When pilots of light ac at Kirknewton or any ac at Latch farm contact ATC (Edinburgh) to arrange departure details they are to be informed of activity at the adjacent location".* It is anticipated that pilots departing from Kirknewton would be informed by RT at the time they request a departure clearance and in the case of Latch farm, at the time of booking-out by telephone.

HQ PTC comments that it is worrying that the C172 pilot came so close without seeing the glider which, although above him was nevertheless in his forward quarter. We share the HQ AC's concerns regarding the apparent lack of notification from the Cessna, and the potential for a more serious incident. However, with Latch Farm being so close to Kirknewton glider site, a more pro-active response might be more appropriate and there could be considerable benefit should the VGS seek to establish with Latch Farm some means of exchanging details of each others activities. This could go a long way towards eliminating a similar encounter in the future.

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 and operating authorities.

Members were dismayed that this Airprox had occurred in circumstances that would seem to have been entirely preventable. One member postulated that the C172 pilot might have been lulled into a false sense of security when Edinburgh ATC made no mention of gliding taking place at Kirknewton when he contacted them by mobile telephone or on RT. It was evident that Edinburgh as the ATSU responsible for the provision of an ATS within the CTR had made careful arrangements for passing traffic information to pilots about such activities. For whatever reason these measures seem to have gone awry. However, the Board welcomed the local instructions issued subsequently by Edinburgh ATC to ensure that such information was disseminated correctly in future. This should minimise the potential for a recurrence. As for the C172 pilot he could have asked if Kirknewton was active and ought to have taken the possibility into account when planning his departure from the landing strip and CTR.

Nevertheless, members were encouraged by the pro-active role taken by HQ PTC in promoting a more formal arrangement between the VGS and the C172 pilot, who owned Latch Farm. Although not associated with the microlight flying which also takes place on the owner's land, there appeared to have been a misconception by Edinburgh ATC that an LOA existed with the VGS, which was not the case. It was hoped that the initiative from HQ PTC would remedy the situation and provide the safety improvements required.

Some members wondered if the Glider pilot could have seen the C172 earlier, but concluded that the very steep nose-up attitude during the winch launch would have prevented this until he suddenly saw it

climbing out from Latch farm after releasing the cable and turning crosswind. Members quickly agreed that the fundamental cause of this Airprox was a non-sighting of the glider by the C172 pilot. With regard to risk, the Board had no reason to doubt the accuracy of the Glider pilot's report who was the only one to witness the event; members accepted that the C172 had passed 100 ft to the R and 100 ft above the glider after it had dived in avoidance. This had been a close call in which the alert glider pilot had little time to react, but fortunately had done so. The members agreed, therefore, that although the risk of collision had been removed, the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the C172 pilot.

Degree of Risk: B.

AIRPROX REPORT No 92/00

Date/Time: 25 Jun 1110 (Sunday)

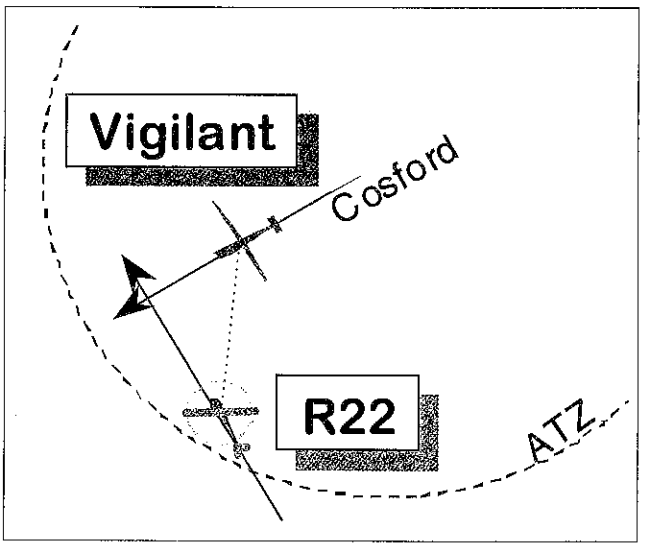
Position: 5237 N 0219 W Cosford - elev 271 ft

Airspace: ATZ (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Vigilant motor glider	R22
Operator:	HQ PTC	Civ Trg
Alt/FL:	700 ft (QFE 1013 mb)	1500 ft (RPS 1006 mb)
Weather Visibility:	VMC CLBC 10 km+	VMC CLBC 20 km

Reported Separation: 100 ft V/NK

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT GLIDER PILOT reports heading 240° at 60 kt after take off from RW 24 at Cosford. While passing 500 ft, 1 NM upwind of the runway, an R22 was seen about 1 NM away in the 10:30 tracking about 330° at about 800 ft. He took control from his student, levelled at 700 ft and the R22 passed about 100 ft almost directly overhead; he remained wings-level to keep it in sight. The risk of collision would have been high if the climb had been continued. The duty instructor confirmed that no call had been heard from the R22 on 128·82.

THE R22 PILOT reports flying a solo navex at 80 kt from Halfpenny Green via Stafford, Telford and Bridgenorth at 1500 ft RPS, having previously completed the route dual. He thought he had turned early at Telford and made a track correction subsequently. (UKAB Note: The incident is more likely to have occurred on the R22's final leg northbound.) He called Cosford on 128.82 and having heard no response assumed the airfield was non-operational. He did not see the Vigilant.

UKAB Note: Neither ac is visible on recorded radar. Cosford is listed in the UK AIP as follows:

The Cosford frequency change to 128.825 was notified by hand amendment on 24 Feb; this was actioned at Halfpenny Green.

HQ PTC comments that the lack of 2-way contact on this occasion is unexplained. Robust arrangements exist for the transfer of operation of the MATZ (APP) frequency from ATC to the VGS when the former has closed and the VGS is primed to give an appropriate response to transit ac, should they call during VGS operations. Nevertheless, the Vigilant instructor was keeping a good lookout.

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.

Members were advised that the lack of 2-way contact with Cosford had been looked into carefully but remained a mystery. It was suggested that the call by the R22 pilot might have been made on his earlier dual sortie, possibly when the VGS was not in action, and that he might have assumed the airfield was still inactive on his solo repeat sortie. However, as a government aerodrome, listed as H24 in the UK AIP, the R22 pilot should have assumed the ATZ was active even on hearing nothing and remained clear of the ATZ. Members raised the possibility that the R22 pilot may have intended to avoid the ATZ but was uncertain of his position. Furthermore, there was no confirmatory evidence that the encounter had occurred inside the ATZ; the diagram was based purely on the reporting pilot's estimates of where he was when he saw the R22, and of its range, relative bearing and track. The Board concluded that while there was some slight possibility that the flightpaths might have crossed just outside the ATZ, it was clear that the R22 pilot had flown into confliction with the Vigilant which he did not see, and that this was the cause of the Airprox.

In discussing the risk level, members noted that while the ac passed fairly close, the Vigilant pilot was watching the R22 from some way away and was always in a position to ensure the ac did not collide.

The Board noted that there may be various interpretations of the significance of 'H24' with respect to government aerodromes, and the Chairman undertook to take up the matter with DAP.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R22 pilot flew into confliction with the Vigilant which he did not see.

Degree of Risk: C

AIRPROX REPORT No 93/00

Date/Time: 23 Jun 0830

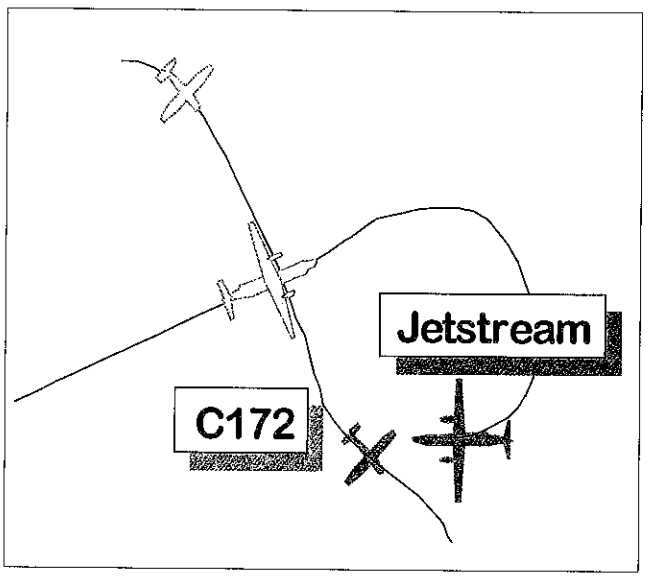
Position: 5323 N 0110 W (8 NM E of Sheffield - elev 231 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream 41	Cessna 172
Operator:	CAT	Civ Pte
Alt/FL:	1900 ft (QNH)	2000 ft (RPS)
Weather Visibility:	VMC CLBC 10 km+	VMC CLBC 10 NM

Reported Separation: 100 ft, 0.4 NM/1 NM

Recorded Separation: 300 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports heading 280° at 130 kt on the approach to Sheffield with whom he was communicating on 128·52, at 1900 ft. A Cessna appeared in his 12:30, slightly above and crossed R to L about 0·25 NM ahead and 100 ft above as he started taking avoiding action. TCAS

is not fitted to this company's J41s; the ac is outwith the parameters which mandate its fitment.

THE CESSNA 172 PILOT reports heading 150° at 100 kt and receiving a RIS from Waddington en route to Cranfield at 2000 ft on the RPS. He and his 2 passengers had watched the Jetstream for a good 3 minutes before it turned right towards their track and he informed Waddington that he could see it. As it approached he was preparing to turn sharp right but judged that it would pass behind him in its turn. It was about 1 NM away when he lost sight of it going behind.

UKAB Note: LATCC radar recordings show the 2 ac tracking as in the diagram; the Cessna is steady at 2200 ft Mode C and the Jetstream maintains 1900 ft throughout. The Jetstream passes about 1 NM ahead of the Cessna on its outbound track, turns right and then the Cessna passes just ahead of the Jetstream and 300 ft (Mode C) above it.

HQ MATO reports that at 0829:22, the Cessna pilot freecalled Waddington Zone (Zone) on 127·35 stating, *"C/S is a 172, Leeds/Bradford to Cranfield...(clipped transmission)...victor mike on course for Gamston approximately 10 NM to run, request RIS"*. At 0829:55, and whilst still in the process of identifying the Cessna, Zone transmitted *"....I believe that you have traffic south east of you, one mile indicating about 2000 ft"*. The Cessna pilot replied that *"..we have him in sight"*. At 0830:14, the Cessna pilot reported to Zone that *"...he's gone beneath us"*.

Both pilots were flying in Class G airspace with 10 km visibility and a responsibility to 'see and avoid' other airspace users. By the time he called Zone for a RIS at 0829:22, the Cessna pilot was well aware of the proximity of the Jetstream and was prepared to initiate a right turn away from confliction if necessary. Even so, Zone reacted quickly to the situation and was able to pass timely and accurate TI despite the close proximity of the ac.

SHEFFIELD ATC reports that during the approach the Jetstream pilot reported a Cessna in the ILS and that he was filing an Airprox. The Cessna was unknown traffic.

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.

The Board took little time to conclude that the Jetstream pilots had turned into confliction with the Cessna, which they saw late, and this had caused the Airprox. Because the Cessna pilot had been watching the Jetstream for some time, and was always in a position to avoid it, members agreed that there had not been a risk of collision. They noted also that the Cessna had been in the Jetstream pilots' field of view, first to its left and latterly on the inside of its turn, for some time up to the Airprox.

This was another example of an Airprox near Sheffield Airport in Class G airspace (there have been 10 since Sheffield opened, including this and another assessed at the same meeting) involving CAT and GA ac. Members wondered what lay behind the trend which was not reflected at other airports outside controlled airspace that had many more daily movements. In 4 of the 'Sheffield' Airprox, cause had been attributed to a breakdown in lookout by the CAT crews (who were not receiving a radar service at the time) and in one of these to a breakdown in lookout by both parties. Because Sheffield is the only such airport without a radar a greater need existed for pilots operating into and out of this airport to look out; members wondered if there was anything the operators concerned could do by CRM, flight deck procedures or training to improve this. The Director undertook to find out from the companies concerned.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jetstream pilots turned into confliction with the Cessna, which they saw late.

Degree of Risk: C

AIRPROX REPORT No 94/00

Date/Time: 28 Jun 0917

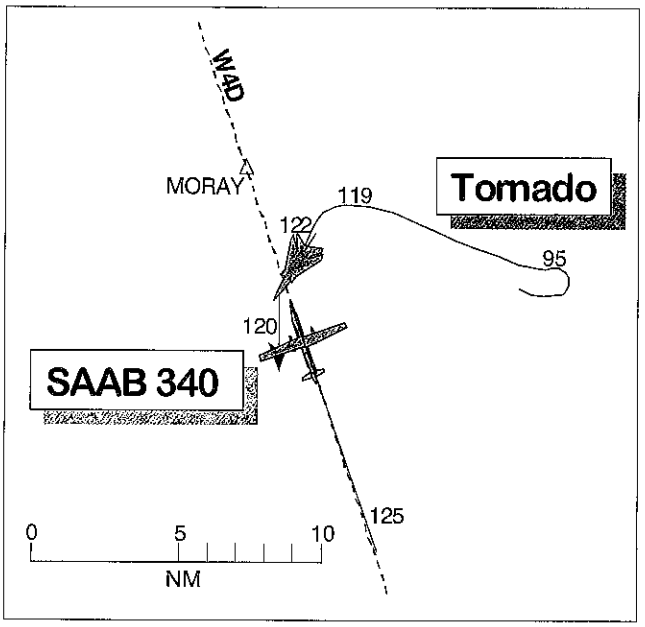
Position: 5801 N 0246 W (29 NM SSE of Wick)

Airspace: ADR W4D (*Class:* F)

	Reporting Aircraft	*Reported Aircraft*
Type:	SAAB 340	Tornado GR
Operator:	CAT	HQ STC
Alt/FL:	FL 125	FL 80
Weather Visibility:	VMC CLNC 80 km	VMC CLNC 60 km+

Reported Separation: 80-100 ft 500 ft V, 1000 ft H

Recorded Separation: 500 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT reports heading 345° at 220 kt and receiving a RAS from ScACC on ADR W4D at FL 125. With no warning from ATC a Tornado was seen in the right windscreen, banked in a descending left turn, passing R to L across the nose about 80 to 100 ft away. Both its crew members were looking at the SAAB as it passed, and it then entered a near vertical descent. There was no time for avoiding action. TCAS was not operational on the ac at the time.

THE TORNADO GR PILOT reports turning onto 240° at 360 kt during a pilot conversion sortie while repositioning to the S and W of Wick to clear the ADR before carrying out high-energy manoeuvres. He was not receiving an ATS. On rolling out he saw an ac passing about 1000 ft behind and above by 5-800 ft. In order to increase the separation he rolled and increased his rate of descent. He did not see the other ac take avoiding action and there was no risk of collision.

UKAB Note: ATC radar recordings show the SAAB on W4D steady at FL 125 throughout. The Tornado, E of ADR W4D, turns from an E'ly track onto 292° at 0915:20 in a climb through FL 95. It tracks initially to cross the ADR ahead of the SAAB but at 0916:50 it turns left onto 214°, climbing through FL 120. At 0917:15 the returns of the ac start occulting with STCA, as the Tornado tops at FL 122, 5 NM from the SAAB in its 1 o'clock. The Tornado then starts to descend, showing FL 120 at the CPA which occurs at 0917:35.

HQ STC comments that although there is considerable disparity between the estimated miss distances provided by the pilots of the 2 ac, this incident is nonetheless alarming especially given that one of the ac was receiving a RAS. The Tornado crew reported established in a right hand turn to clear the ADR; it is therefore highly likely that the crew were unsighted on the SAAB as they looked into the turn in order to clear their flightpath. On rolling out, the pilot took immediate avoiding action but it would appear that the CPA had already passed. The subsequent high energy manoeuvre, albeit well intended, was perhaps a little rash given that they were still on the ADR and potentially descending rapidly into confliction with further civilian traffic.

There is little that can be offered in defence of the Tornado crew, and this incident once again highlights the requirement for extra vigilance when operating in Class F airspace without a radar service. The fact that it is legal does not always imply that it is sensible; it is encouraging to note that the unit involved has briefed its crews accordingly, urging them to stay clear of ADRs or

obtain an appropriate radar service if compelled to operate close to or in them.

ATSI reports that the controller concerned in this incident was operating as Tactical and Support Controller on the combined Hebrides and Moray Sectors. Whilst operating these sectors combined, use is made of two radar displays, with the Hebrides Sector set up on one and the Moray Sector on the other. The controller described the traffic loading and workload level as light, with most of the aircraft being on the Hebrides Sector frequency. He commented that the two sectors were about to be split when his colleague, who had handed over the position to him about 40 minutes earlier, returned from a relief break. He added that another controller was available if it had been considered necessary to split the sectors earlier.

The ScACC MATS Part 2, Page MOR 1-2, states, with reference to the provision of a RAS in the Moray Sector, that it: "shall only be provided to aircraft operating within Advisory Airspace notified in the UK AIP, including published Advisory Routes (ADRs)".

The SAAB 340 pilot established communication on the Moray Sector frequency at 0903, reporting climbing to FL 65. The flight was identified and informed that a RAS would be provided. Further climb clearance was given, in stages, over the next three minutes, to its requested cruising level of FL 125. No further transmissions were made to, or received from, the SAAB 340, until after the Airprox.

The MATS Part 1, Page 1-36, states that a controller's responsibilities, whilst providing a RAS, with respect to non-participating traffic are that: "he shall pass to the pilot the bearing, distance and, if known, level of conflicting non-participating traffic, together with advice on action necessary to resolve the confliction". It also states, Page 1-37, that certain conditions apply, including: "Controllers shall pass avoiding action instructions to resolve a confliction with non-participating traffic and, wherever possible, shall seek to achieve separation which is not less than 5 NM or 5000 feet, 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 traffic make unpredictable changes in flight path, it is not always possible to achieve these minima".

The T and S controller said that he did not monitor the SAAB 340's progress along W4D, as he should have done, to be able to fulfil the terms of the provision of a RAS. He said that he had concentrated his attention on the traffic situation on the Hebrides Sector and did not notice the developing confliction between the SAAB 340 and the unknown military aircraft. The STCA activated when the subject aircraft were 5 NM apart, although this was not noticed by the controller, probably because he was looking at the Hebrides radar display. He stated that he only became aware of the occurrence when the SAAB 340 pilot reported that a Tornado had passed about eighty feet from him. The controller added that, by then, when he looked at the situation on his Moray Sector radar display, the aircraft had passed. Because the Tornado was showing a Lossiemouth code, he telephoned that unit to find out its details. It later transpired that the Tornado had contacted Lossiemouth after the incident had occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It appeared to members that there had been a late realisation in the Tornado's cockpit that they were about to cross the ADR which, as had been pointed out by their operating authority after a recent, similar incident, they would have been better advised to have crossed at a quadrantal level and under a radar service. The crew demonstrated to themselves the wisdom of these concepts when they saw the SAAB 340 effectively too late to do anything about it, and close enough for members to assess that there had been a risk of collision. This assessment took account of the fact that all the safeguards to prevent a collision had failed and that the safe outcome had been a matter of chance. Neither crew saw the other ac in time to affect the outcome and, although STCA had worked, the Moray SC had not seen the confliction before it occurred. While the Mode C showed there was 500 ft of vertical separation as the Tornado passed into the SAAB's 8:30 position, and 300 ft before they passed, there may have been very much less

between those returns as the Tornado crossed, very close laterally, in the SAAB's 10 o'clock. The Tornado pilot's non-sighting (effectively) of the SAAB was considered to be part of the cause of the Airprox. Additionally, members noted that the SAAB pilots' sighting of the Tornado was fairly late and observed that even under a RAS it was advisable to keep a lookout for other ac. It was a fact that the SAAB crew saw the Tornado too late to increase their separation from it and members considered that this was also part of the cause.

The Board noted that the SAAB pilots received no warning of the Tornado's approach and queried whether the SAAB was in fact receiving the RAS which he believed was in force. ATSI advised that the Hebrides and Moray Sectors, which, between them, cover a wide area, were combined when the incident occurred and they felt this was a major contributory factor to the Airprox. It was explained that the controller's attention had been largely taken up with providing a Radar Control Service in the Class B Airspace of the Hebrides Sector at the time of the incident. Consequently, it was very difficult for sufficient attention to be paid to the Moray Sector's Class F Airspace in which the SAAB 340 was being given a RAS. In these circumstances the SC's decision to advise the pilot of the SAAB 340 that he was receiving a RAS was inappropriate since he was not able to monitor adequately the progress of the flight. This meant, in effect, that the pilot was informed that he was receiving a service which was not actually being provided.

In view of this ATSI had recommended that the Safety Regulation Group consider providing controllers with guidance and instructions to ensure that prior to and during bandboxed operations, reasonable assurance exists that they will able to fulfil the obligations of the relevant ATC task.

Members agreed that events had proved that it was inappropriate for the sectors to have been bandboxed, and that reliable judgement and firm supervision was needed on deciding when to bandbox or split sectors or limit an ATS. On these ground the ATSI recommendation was supported. A RAS in class G/F airspace involved watching for unpredictable manoeuvring by ac not under control which was a great deal more time consuming than was apparently appreciated. The Board concluded that the lack of traffic information/advisory avoiding action from the Moray SC was also part of the cause of the Airprox.

Members asked that the sound advice issued to Tornado crews at Lossiemouth as a result of Airprox 62/00 (to cross ADRs expeditiously, at the correct quadrantal, and under a radar service whenever possible) should be vigorously reinforced, if this had not already been done.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting of the SAAB 340 by the Tornado pilot and a late sighting of the Tornado by the SAAB 340 pilots, compounded by a lack of traffic information from the Moray/Hebrides SC.

Degree of Risk: A

Recommendation:

The UKAB recommends 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.

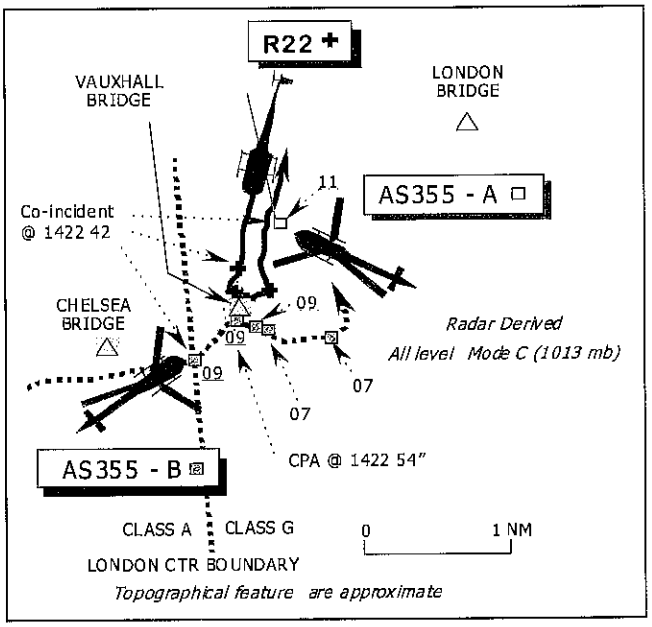
AIRPROX REPORT No 95/00

Date/Time: 24 Jun 1423 (Saturday)

Position: 51 29 N 00 07 W (Vauxhall Bridge)

Airspace: FIR – Specified Area (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	AS355N	R22
Operator:	Civ Comm	Civ Pte
Alt/FL:	1000 ft (QNH 1018 mb)	1500 ft (QNH 1018 mb)
Weather Visibility:	VMC CAVOK >10 Km	VMC CLOC <25 Km
Reported Separation:	<200 ft V,200 m H	300 m H (AS355-A)
Recorded Separation:	0·2 NM H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS355N TWIN SQUIRREL PILOT, Twin Squirrel (B), reports that he had been tasked to relieve another AS355, Twin Squirrel (A), which was in attendance at an incident in the vicinity of the Imperial War Museum (IWM). The helicopter was white with distinctive markings; HISLs and the 2 landing lights were on. He had launched from Fairoaks and joined H3 just W of SUNBURY LOCK and thence via WESTLAND HELIPORT onto H4, with the intention of leaving the route just past VAUXHALL BRIDGE to operate in the same area as Twin Squirrel (A). Thames RADAR informed him of two conflicting ac, one being Twin Squirrel (A) S of the River and the other, which was subsequently identified as the subject R22 helicopter, flying in the opposite direction to him, westbound on H4. He acquired both ac visually at BARNES reporting point, at least 6 NM away and advised Thames RADAR. Twin Squirrel (A) was in the hover 'on scene' at the IWM and the R22 westbound at LONDON BRIDGE. Thames RADAR informed the R22 pilot of the two Twin Squirrels and to remain on the N bank of the river. Whereas he was required to remain along the S bank. After passing LONDON WESTLAND HELIPORT he maintained 1000 ft London QNH (1018 mb) to provide a degree of vertical separation from both other ac, prior to arriving 'on scene', lateral separation having been imposed by ATC.

As he approached VAUXHALL BRIDGE heading 050° at 100 kt, the R22, which was at 11 o'clock about 900 m, turned L directly towards his ac, no radio calls were heard from its pilot as it left the N Bank of the river only slightly above his helicopter. He immediately entered a descending autorotative R turn and avoided the R22 by about 200 m as it overflew less than 200 ft above. If he had not taken avoiding action then the risk of a *"close quarters"* situation would have been high, as the R22 turned onto a reciprocal track and proceeded eastbound. The Airprox was immediately reported to Thames RADAR on RT. He believed that when asked by Thames RADAR, the R22 pilot said he was at 1500 ft and visual with the Twin Squirrel in the hover over the park.

The Twin Squirrel pilot surmised that the R22 never saw his ac despite the good VMC conditions prevailing at the time and had not absorbed the information passed by Thames RADAR about **two** helicopters. The crews of both Twin Squirrels reported the R22 as being level with Twin Squirrel (A) which was maintaining a hover height of 1200 ft QNH (1018 mb).

THE R22 HELICOPTER PILOT reports that he called Thames RADAR routeing H4 westbound to VAUXHALL BRIDGE and return via ISLE OF DOGS

and was "cleared" so to do at 1500 ft London QNH (1018 mb). At the ISLE OF DOGS, Thames RADAR informed him of Twin Squirrels operating S of VAUXHALL BRIDGE and asked him to report at LONDON BRIDGE. Whereupon, he reported that he had the traffic in sight, as did the pilot of the Twin Squirrel, so RADAR asked him to stay N of the Thames. The Twin Squirrel was hovering about 2-300 m S of the river. At Vauxhall he commenced a L turn starting N of the Thames, turning tightly through the turn and finishing mid-river to head eastbound at 70 kt, crossing back to the N side. He maintained visual contact with the Twin Squirrel during the turn whereupon its pilot reported to RADAR that his R22 had made a tight turn as it moved NW. Thereafter he stayed to the S side of the river to avoid conflict. He added that there was no danger of collision with the Twin Squirrel, which was in sight all the time, with at least 200-300 m of separation between the ac.

UKAB Note (1) The two Twin Squirrels were using RT callsign suffixes comprising identical root numbers and an individual letter. Hence, the individual callsigns differed by only one letter – Alpha or Bravo, which if not readily apparent, could potentially mislead pilots to conclude that only one helicopter existed.

UKAB Note (2) This Airprox occurred in the airspace defined as the "Specified Area", wherein flight by single engined helicopters is normally prohibited except along the River Thames between the high water marks on each of its banks, thereby enabling a single engined helicopter, such as the R22, to 'alight' clear of the "Specified Area" in the event of an engine failure. The sector of H4 between ISLE of DOGS and VAUXHALL BRIDGE is established and notified in accordance with *Low Flying* Rule 5(2)(a) of the Rules of the Air Regulations. This generally exempts pilots from the requirement to fly at a minimum height of not less than 1500 ft above the highest fixed object within 600 m of the helicopter.

UKAB Note (3): The Twin Squirrels' pilots were generally exempt from certain sections of Rule 5 in their twin-engined helicopters, thereby enabling flight over the "Specified Area" and below or within 500 ft.

ATSI reports that the R22 called Thames Radar at 1410 and requested a VFR flight along H4 to VAUXHALL BRIDGE, which was approved. Because London City was closed the airspace E of VAUXHALL BRIDGE had reverted to Class G status. The R22 pilot was instructed to report passing the ISLE OF DOGS and LONDON BRIDGE; traffic information was passed to both the R22 pilot and the pilot of Twin Squirrel (A). Shortly afterwards the second Twin Squirrel - (B), flown by the reporting pilot, called and was instructed by RADAR to remain on the S side of the river and given traffic information about both Twin Squirrel (A) and the R22. Further traffic information was also passed about both Twin Squirrels to the R22 pilot. At 1421, the pilot of Twin Squirrel (B) reported passing BARNES, visual with both other ac. The R22 pilot then reported visual with *"the helicopter"*, followed at 1423 by an Airprox report from the pilot of Twin Squirrel (B). The R22 pilot reported that he was at 1500 ft QNH in the VAUXHALL BRIDGE area and had turned within the confines of the river.

UKAB Note (4): The LATCC radar recording shows Twin Squirrel (A) hovering to the S of the river indicating 1100 ft Mode C (1013 mb) – about 1250 ft QNH (1018 mb) - whilst (B) approached from the SW indicating 900 ft Mode C (1013 mb) – about 1150 ft QNH. The R22 is shown tracking along the river until just past Twin Squirrel (A) whereupon it turned L and reversed direction onto a reciprocal course. Twin Squirrel (B), is shown turning R just after the CPA of 0·2NM, which occurred at 1422:54 before it descended by 200 ft down to 700 ft Mode C – about 950 ft QNH and tracked eastbound S of Twin Squirrel (A). No Mode C is shown by the R22 throughout and its position is difficult to determine just after the Airprox because subsequent to 1423:03, the ac return is masked by SSR datablocks.

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 was evident to the Board that the Thames RADAR controller had provided appropriate traffic information to enable all 3 pilots to sight each other. However, the R22 pilot had only reported sighting

and taking action to remain clear of Twin Squirrel A and made no mention in his report whatsoever of sighting Twin Squirrel B. The Board was briefed that the R22 pilot had been asked subsequently if he had been aware of Twin Squirrel B, which he was not. This accounted for his close attention to Twin Squirrel A in the hover by the IWM, as he turned the R22 through 180° crossing from one side of the river to the other in the process. Consequently, the horizontal separation of 300 m reported by him was against Twin Squirrel A. It was observed that the extreme similarity of the two Twin Squirrels' callsigns did little to promote awareness that there were indeed two Twin Squirrels operating in the vicinity. Although traffic information had been issued, unbeknown to the R22 pilot he had turned in front of Twin Squirrel B without spotting it coming the other way. This was surprising to some members who thought that the R22 pilot should have cleared his flight path prior to the turn. Nevertheless, for whatever reason, the R22 pilot appeared to have fixated on Twin Squirrel A and members concurred unanimously that in so doing he turned into conflict with Twin Squirrel B, which he did not see.

Fortuitously, the alert crew of Twin Squirrel B, aided by the traffic information from ATC, spotted the R22 about 6 NM away when they passed BARNES reporting point and kept the R22 continuously in sight approaching VAUXHALL BRIDGE. This enabled the pilot of Twin Squirrel B to take prompt but robust avoiding action to turn away from the R22, albeit with only about 400 yd between them. Given the non-sighting by the R22 pilot and the final horizontal separation evinced by the radar recording, members agreed that the safety of the R22 and Twin Squirrel B had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R22 pilot turned into conflict with Twin Squirrel B, which he did not see.

Degree of Risk: B.

AIRPROX REPORT No 96/00

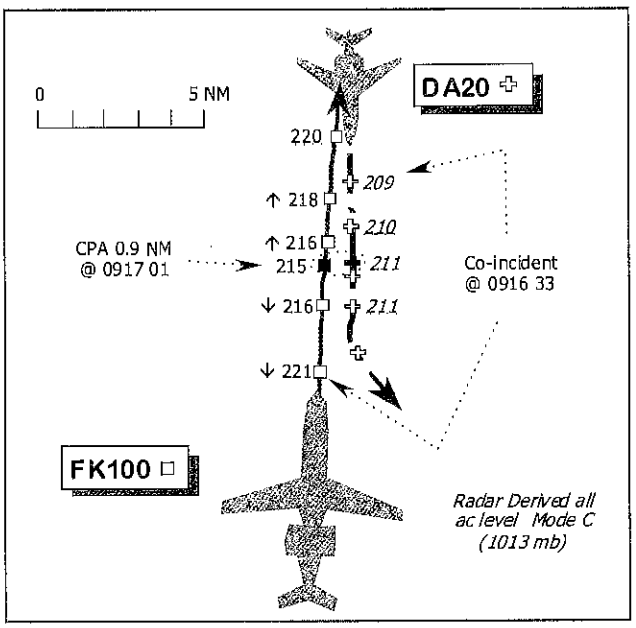
Date/Time: 29 Jun 0917

Position: 5012 N 0119 W (15 NM S of KATHY)

Airspace: AWY B11 (*Class:* A)

Reporter: LATCC HURN SECTOR

	First Aircraft	*Second Aircraft*
Type:	FK100	DA20 Falcon
Operator:	CAT	Civ Comm
Alt/FL:	FL 215	21000 ft (1014 mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	Not Reported	30 km
Reported Separation:	ATC – 500 ft V	
Recorded Separation:	0·9 NM H, 400 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC HURN SECTOR CONTROLLER reports that Danger Area EGD 036 within the Portsmouth Danger Area complex was notified active up to 21000 ft, and that the minimum FL available for use on B11 was agreed at FL 220. The FK100 was inbound to Gatwick, heading N on B11 and the crew had been instructed by him to descend to FL 220 when ready. He observed the FK100 Mode C approaching FL 220 and transmitted traffic information on an ac squawking A0021, which was operating in the Danger Area. At that point he

reiterated that the FK100 crew should maintain FL 220, whereupon the crew reported they were climbing back up to FL 220. Further traffic information was passed to the FK100 crew about the DA20 and the cleared level of FL 220 reaffirmed. The FK100 crew subsequently levelled their ac at the assigned level.

UKAB Note (1): The A0021 Squawk is a conspicuity code displayed by fixed-wing ac in receipt of a radar service from a ship, but the Mode A should generally be considered unvalidated and the Mode C unverified.

THE FK100 PILOT reports routeing B11 northbound to Gatwick, under a RCS from LATCC. Both he and the First Officer believed that they had been cleared by the SC to descend to FL 200 and did so. When ATC queried their action he replied that they were passing FL 215 for FL 200, but immediately climbed back to FL 220 when advised of the misunderstanding. He did not sight the DA20 at all.

After discussion with his First Officer, he suggested that there had been an incorrect acknowledgement of an incorrectly comprehended transmission by one of the crew, who then set the FMS to what they thought they heard. He requested his sincere apologies be passed on to the SC and the DA20 crew.

UKAB Note (2): The FK100 pilot, whose first language is not English, reports that he was not aware of the Airprox until 28 Aug. UKAB staff were unable to make contact with the company until 10 Jul, and further enquires elicited no response until 23 Aug. No information was held by the company about the Airprox and no report had been obtained from the pilot, whom finally contacted UKAB staff by telephone on 31 Aug. After two months elapsed time, his recollection of events was hazy, but he submitted a report the following day.

UKAB Note (3): A review of the HURN Sector RT transcript reveals that at 0912:30 the SC instructed the FK100 to *"...fly heading zero zero five"*, which was acknowledged 10 sec later. Thereafter at 0912:50, the SC instructed the FK100 crew to *"...when ready descend flight level two two zero"*. This clearance was immediately acknowledged and read back *"...when ready descending flight level two two zero"*.

THE FALCON DA20 PILOT reports that he was flying on an aerial towed target radar-tracking sortie within EGD 036. He was flying at 21000 ft ship's QNH (1014 mb) in good VMC, 15000 ft above the cloud tops with 30 km visibility, whilst in receipt of a RIS from a fighter controller (FC) afloat. The FC had reported a number of contacts during the sortie, most of which were high level airways tracks and some were not seen. He was unaware that an Airprox had been filed until he landed, but neither he nor any of the crew saw any conflict with an FK100 during the sortie. He was, therefore, unable to assess the minimum separation or the risk.

COMNA reports that this Airprox occurred within a notified Danger Area, which was NOTAM'd active sfc to 21000 ft amsl Portland RPS (1017 mb) for a ship radar-tracking serial against an aerial towed target. The target towing ac established communications with the ship's FC, who identified the ac and instructed the crew to squawk 3A 0021 before placing them under a RIS. The ac subsequently streamed its Rushton target and flew a series of racetrack profiles as directed by the ship, at 21000 ft, on the ship's actual QNH (1014 mb). Visibility was good throughout the serial and the ship's radar performance was also considered good. The ship's controller, a qualified FC, correctly applied a RIS throughout the sortie and without access to SSR data, passed traffic information on all ac tracks which were observed in the vicinity; several of these tracks were acquired visually by the crew. At no time during the sortie did the pilot indicate that he was concerned at the proximity of any other ac. The sortie was uneventful and on completion, neither the ship nor the DA20 crew was aware of an Airprox until notified some time later by Plymouth Military (the controlling authority for the Danger Areas).

It is normal procedure when operating in the Portsmouth Danger Areas above FL 50 for ac to receive an ATS from London (Mil) Special Tasks, in addition to the ship. Although not mandatory below FL 240, this enables expeditious routeing to/from the Danger Areas through CAS as well as other benefits. However, on this occasion the DA20 crew was unable to establish 2-way comms with LATCC (Mil).

UKAB Note (4): As EG D036 was notified active up to 21000 ft on the Portland RPS (1017 mb), the

DA20 flying at 21000 ft (1014 mb) was about 90 ft above the upper limit and thereby technically outside the Danger Area. As the RPS (the lowest forecast QNH) was 1017 mb it seems unlikely that the actual QNH used by the ship's FC was 1014 mb as reported. It must have been higher. Met Office archive data gives an actual QNH of 1020 mb at the position of the Airprox. Nevertheless, it is evident from the LATCC radar recording that the DA20 pilot flew within 100 ft of FL 210 Mode C, as shown on the diagram. This would have afforded standard vertical separation below FL 220. The apparent QNH/RPS anomaly in this case is being reviewed by COMNA, but it is not considered to have affected the outcome.

UKAB Note (5): Fleet Operating Orders, FLOO's 21125, requires ships' controllers to utilise the RPS when controlling ac within EGD036, specifically to ensure that the upper level of the danger area is not exceeded and the activity is contained wholly within the promulgated area. In this instance the FC was in error when instructing the DA20 pilot to fly with reference to ships QNH.

LATCC reports that this Airprox occurred 15 NM S of KATHY on Airway B11 at 0917. The HURN SC's traffic loading was moderate. EGD 036 had been notified as active up to 21000 ft at the time of the occurrence and, as the Portland RPS was 1017 mb, the lowest level available on B11, that ensured vertical separation from the Danger Area was FL 220. The SC was complying with this procedure and information had been passed to Brest ACC and Jersey ATSU.

The FK100 was cruising at FL 280 when the crew first called the HURN SC and at 0913 was cleared to descend when ready to FL 220. This instruction was clearly and correctly read back. At 0916:33, as the FK100 approached FL 220 in descent northbound, it was almost head on to and about 5 NM away from the DA20 indicating FL 210 which was southbound in the Danger Area. The HURN SC deemed it prudent to pass traffic information to the FK100 crew and as he did so the STCA activated on his display. The SC was satisfied that the descent clearance given was safe but was concerned when the FK100 pilot reported that he was climbing back to FL 220. Having established that the FK100 had descended to FL 215 the SC reiterated the traffic information stating that the DA20 was now underneath the FK100. Since corrective action was by then already underway he did not consider further measures necessary. Both ac subsequently passed starboard to starboard with a horizontal separation of 0·9 NM at the CPA and a minimum vertical separation of 400 ft as the FK100 bottomed out at FL 215, before climbing above the DA20 which indicated FL 211 Mode C. The SC did not state his intention to file an AIRPROX on RT.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although the Board noted that the DA20 crew had been incorrectly instructed to fly with reference to the ship's 'actual' QNH instead of the RPS, it was agreed that this was not intrinsic to the cause of this Airprox. Instead members assessed quickly that this Airprox stemmed from a misunderstanding by the FK100 crew of their cleared level. Why both pilots had not detected the error, however, remained unclear and may have been the result of a breakdown in CRM on the flightdeck. Although the FK100 crew had read back correctly their assigned level, it was suggested that they may have muddled in part the radar heading instruction of 005°, which was immediately followed by the instruction to descend to FL 220. However, an ATC member familiar with the operation of the HURN Sector postulated another theory. When the danger area was not active it was normal practice to descend B11 Gatwick inbounds to FL 200. The FK100 crew might have flown this route regularly and could have been predisposed to descending to this level routinely. If so, familiarity might have misled them to descend to the wrong level. This seemed to the majority of members to be a very plausible hypothesis. Whatever the reason, members agreed unanimously that this Airprox was caused by the FK100 crew descending below their cleared level.

The LATCC HURN SC had detected the misunderstanding promptly when the FK100 crew reported climbing back to FL 220. Actions by the controller undoubtedly prevented a closer encounter than the 0·9 NM horizontal and 400 ft

vertical separation evinced by the radar recording at the CPA. Some members thought it surprising that neither of the ac crews saw each other at this range in CAVOK, but as the HURN SC had acted quickly to restore standard separation there was unanimous agreement that there had not been a risk of a collision.

Members were briefed that the Meteorological Office had been given a copy of the Part A summary and indicated they would check the calibration of the barometer used by the ship to establish the ship's QNH.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FK100 crew descended below their cleared level.

Degree of Risk: C.

AIRPROX REPORT No 97/00

Date/Time: 28 Jun 1356

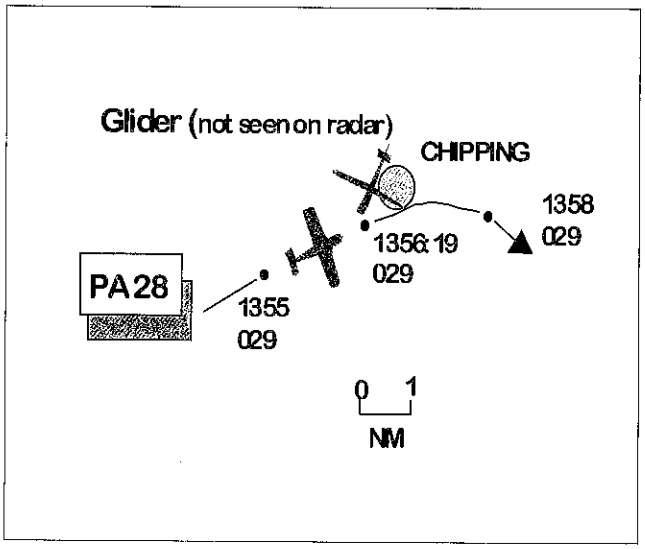
Position: 5353N 0237 W (Chipping airfield - elev 600 ft)

Airspace: FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Pilatus B4Glider	PA28
Operator:	Civ Club	Civ Pte
Alt/FL:	2600 ft (QFE)	3000 ft (RPS)
Weather Visibility:	VMC CLBC 5 NM	VMC CLBC 8 km

Reported Separation: 10 ft V / 75 yd H Not seen

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports that he was circling LH in a weak thermal at 2600 ft (Chipping QFE) about 0·5 NM SW of Chipping airfield in VMC. The visibility was 5 NM. After 3 or 4 orbits, at a speed of around 40 kt, he was turning through a SSW heading when he saw another ac 100 yd away approaching from the opposite direction at a similar height and on a heading which he estimated would take it through the centre of his turning circle; he immediately turned hard R to avoid what he believed would have been an imminent collision. He noted the registration of the ac, a PA28, as it passed some 50 - 75 yd to his L at the same level with no observable avoiding action. He felt there had been a very high risk of collision.

THE PA28 PILOT reports that he was conducting a navigational exercise from Blackpool in VMC at 3000 ft (RPS). He was accompanied by one passenger. The visibility, 200 ft below cloud, was generally about 8 km; however, the latter stages of flight (after the incident) were conducted in IMC because of increasing cloud. Owing to the deteriorating weather, the ac's navigational aids, KNS 80 (a combination of NDB/VOR/DME/ILS) and GPS, were in operation. Blackpool ATC were providing a FIS on 119·95 and he was squawking 7000 with Mode C. Given the slight headwind and a TAS of 90 kt, he estimated that he would have been S abeam Chipping airfield at around 1400. Although he had no recollection of passing in close proximity to any gliders, he remembered remarking to his passenger, while passing the airfield, that he could see glider activity to their L.

UKAB Note (1): Chipping airfield is notified in the UK AIP for glider winching up to 3000 ft during daylight hours. The site is also marked on the 1:500 000 topographical chart with a warning of cables to 3000 ft.

UKAB Note (2): A recording of the Great Dun Fell radar shows a return, believed to be the PA28, squawking 7000 and tracking NE from the Blackpool area at 2900 ft Mode C. At 1356:19 the ac is about 0·5 NM to the SW of Chipping; after passing abeam the airfield about a min later it begins a R turn and leaves the area to the SE. No primary returns are to be seen to the S of the airfield throughout the period of the Airprox and therefore the encounter is not recorded.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA member said that although the PA 28 pilot had avoided flying within the area where he might have encountered the glider's launch cable, it was not good airmanship to fly so close to an airfield, which was notified for cable releases up to 3000 ft agl, at an altitude where launching gliders might expect to be encountered. In this instance, although the PA 28 pilot reported being aware of glider activity, he did not see the thermalling glider. The Board concluded that the Airprox resulted from the choice of route and the non-sighting of the glider by the PA28 pilot. Members noted that the glider pilot saw the PA 28 late but, despite his robust avoiding action, was unable to effect much separation. Some felt, however, that the glider pilot had done enough to remove the risk of collision to a level where safety had been compromised. Most disagreed with this and in the end the majority view was that there had been a very real collision risk because of the limited ability of the glider to get away from the unsighted PA28's flight path.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In close proximity to a notified winch launch glider site, the PA 28 pilot flew close to a glider which he did not see.

Degree of Risk: A

AIRPROX REPORT No 102/00

Date/Time: 25 Jun 1848 (Sunday)

Position: 5326 N 0112 W (6 NM ENE of Sheffield Airport - elev 231 ft)

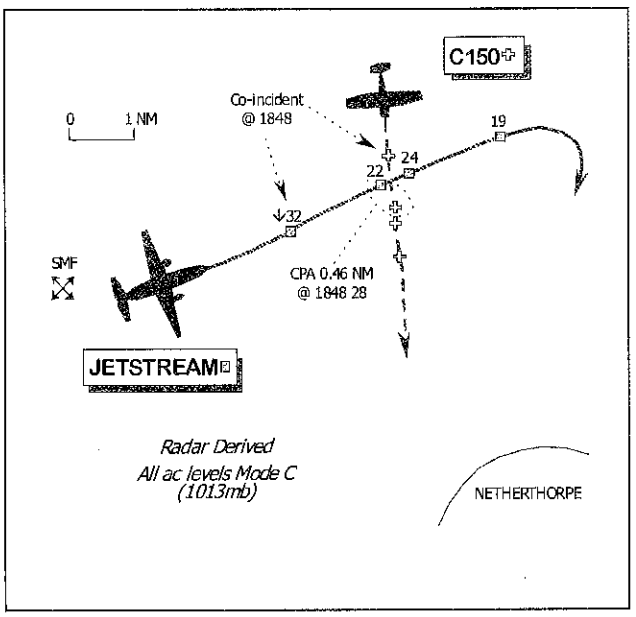
Airspace: London FIR (*Class:* G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Jetstream 41	Cessna 150
Operator:	CAT	Civ Club
Alt/FL:	2000 ft (QNH 1023 mb)	2300 ft (RPS 1018 mb)
Weather Visibility:	VMC CLOC >10 Km	VMC CLBC >10 Km

Reported Separation:

500 ft V, 400 m H Not reported

Recorded Separation: 0·46 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports he was conducting an instrument approach to RW 28 at Sheffield City Aerodrome, tracking 083° at 170 kt with autopilot engaged, outbound from the SMF NDB at about 6 NM flying at 2000 ft QNH (1023 mb). Simultaneously, both pilots saw a Cessna type ac at 1 o'clock about 400 m away southbound on a diverging track, 500 ft below their ac. No avoiding action was taken and TCAS did not enunciate an alert. A report was made by RT to

Sheffield City ATC, who advised that the other ac was not in contact with Sheffield. The risk was assessed as *"low"* and the pilot added that 'good airmanship' dictated that the other pilot should have called Sheffield ATC.

THE CESSNA 150 PILOT reports he was returning from Sherburn-in-Elmet to Hucknall VFR at 2300 ft Barnsley RPS (UKAB Note (1): From Met Office Archive data the Barnsley RPS was 1019 mb for the period not 1018 mb as reported) and tracking 187° as they passed E abeam Sheffield. A 3/A 7000 squawk was selected but the ac is not fitted with Mode C. Neither the pilot nor his passenger, who was the pilot on the flight to Sherburn-in-Elmet, saw the Jetstream at all. The outward flight had been made earlier that day, when he was navigating the ac and it was apparent from the RT that there was a lot of traffic in the vicinity of Netherthorpe aerodrome, which was very busy. Consequently, as their return track passed through Netherthorpe ATZ, he elected to call Netherthorpe A/G Station 5 NM to the N of their ATZ boundary, instead of Sheffield.

SHEFFIELD ATC report that the Jetstream was released by Manchester ACC (MACC) to Sheffield City, passing FL 80 descending to FL 40 and the crew advised to expect a procedural ILS approach to RW28. Further descent to 3000 ft QNH was then issued under the procedural Approach Service within 10 NM DME from the 'SMF' NDB. As the ac homed towards the airfield, the crew reported that MACC had advised them of an unknown contact, NE of the aerodrome tracking southbound that would pass E abeam the aerodrome. The Jetstream crew was advised that there was no traffic known to the controller in that area and the only known traffic was SW of the aerodrome. The Jetstream crew was cleared for the procedure 'Beacon Outbound' at 1846 and instructed to descend with the procedure. About 2 - 5 min later, the Jetstream crew reported sighting an unknown ac possibly a C150, 7 NM E of the aerodrome, heading S, at an altitude of 2500 ft. The controller reiterated that he had no knowledge of any ac in that area and the Jetstream landed at 1853.

ATSI reports that during the descent from FL 165 to FL 70 MACC kept the Jetstream crew fully informed of traffic indications outside of CAS. Traffic information was passed on gliding activity up to FL 65 at Camp Hill, together with advice to stay at FL 70 until overhead Sheffield City Aerodrome. Just prior to transfer, the MACC SC also passed traffic information on a 3/A 7000 squawk with no Mode C, 8 NM NE of Sheffield and heading S. This subsequently turned out to be the subject C150.

UKAB Note (2): The Claxby radar recording clearly illustrates this occurrence about 6 NM ENE of Sheffield City Airport. The Jetstream, identified from its assigned squawk, is shown outbound on the procedure descending through 3200 ft Mode C (1013 mb, equating to about 3500 ft QNH) at 1848:00. The C150 is shown squawking 3/A 7000, NMC, southbound, in the Jetstream pilot's 1130 – 2 NM, crossing L – R. The ac close and at 1848:28, the CPA is about 0·46 NM as the Jetstream indicates 2200 ft Mode C (about 2500 ft QNH), just before passing astern of the C150. The C150's altitude at this point would have equated to about 2420 ft QNH, compared to the C150 pilot's reported altitude of 2300 ft actual Barnsley RPS (1019 mb). The Jetstream then climbed momentarily to 2400 ft Mode C before continuing with the procedure; it passed astern of the C150 again whilst steady inbound for RW28.

UKAB Note (3): The UK AIP at AD 2-EGSY –1-5, promulgates Sheffield City ATZ as a circle radius 2 NM, centred on RW10/28, from the surface to 2000 ft above the aerodrome elevation of 231 ft and active on Sundays in Summer from 1300 – 1930.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was apparent that Sheffield City ATC was unaware of the C150 as it crossed through the approach to RW28, therefore, they were unable to forestall this Airprox. Furthermore, the Jetstream crew did not see the C150 until after it had crossed their nose ahead of their ac from L – R and into their 1 o'clock – 400 m opening to the S. The members agreed that the sighting was too late to have any effect on the outcome. Pilots were also surprised at the non sighting considering the accurate traffic information which had been issued by MACC as the Jetstream

homed to overhead Sheffield City. Others pointed out that the C150 was a small ac and may have been difficult to spot, but some aircrew members thought that the Jetstream's speed of 170 kt was a bit fast for the procedure. It was apparent to members that the C150 pilot, who was required to 'give way' under the 'Rules of the Air' in this encounter, did not see the Jetstream at all. This led to the conclusion that this Airprox resulted because the C150 pilot did not see the Jetstream and effectively a non-sighting of the C150 by the Jetstream crew. The majority of members agreed with the Jetstream pilot's comment, that it was unwise to cross through the final approach of RW28 without first contacting Sheffield ATC. The RW approach sector is clearly marked on CAA topographical charts and whilst this encounter took place outwith the ATZ and wholly within Class G airspace the warning on CAA charts encourages pilots to call the associated ATSU when passing within 10 NM of the aerodrome. Whilst the C150 pilot might have thought it preferable to call Netherthorpe as they approached its ATZ, and for entirely understandable reasons, members thought that he should have called briefly to Sheffield City ATC first before crossing the centreline of RW28 and then called Netherthorpe once clear. This would have kept Sheffield City ATC appraised of their presence and intentions, and triggered traffic information to the Jetstream crew. The lesson here was a point of airmanship and pilots should always take Instrument Approach Procedure 'feathered arrows' into account during their pre-flight planning.

Turning to risk, the reporting pilot assessed that the C150 was 500 ft below his Jetstream when seen and the risk *"low"*. The C150 pilot reported transiting at 2300 ft (1018 mb), whereas, the Jetstream was shown from the radar recording to have been at 2200 ft (1013 mb), which would equate to about 2350 ft (1018 mb). This would suggest the C150 may have been only 50 ft below the Jetstream. Unfortunately, the C150 was not fitted with Mode C and hence, it was not possible to determine the actual vertical separation that pertained. Nevertheless, the Board thought it was unlikely that the Jetstream crew could have erred to such a large degree in their estimation of the vertical separation. In spite of the poor lookout from both ac, neither had passed particularly close to the other in the end and on this basis members agreed that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non sighting by the C150 pilot and, effectively a non-sighting by the Jetstream crew.

Degree of Risk: C.

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