



UK AIRPROX BOARD



Analysis of Airprox in UK Airspace

Report Number 2

January 1999 to June 1999

Report by the UK Airprox Board (UKAB),

'Analysis of Airprox in UK Airspace'

(January 1999 to June 1999)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

January 2000

This book is aimed at people who fly aircraft and those who control them, both civil and military. Its prime purpose is to promote safety in the air by sharing lessons learned from Airprox incidents that happened in UK airspace in the first six months of 1999.

There were 95 such cases during the period, all of which were reported by pilots or air traffic controllers. Each encounter was investigated fully before being presented to the UK Airprox Board (UKAB) for independent assessment. The Board's findings are set out here in full.

What is evident in the Airprox assessment process is the way that technology and training both contribute towards air safety. TCAS (Traffic Alert and Collision Avoidance System) deserves particular mention for its positive role in alerting pilots to danger when things begin to go wrong. Additionally, on the ground, Short Term Conflict Alert (STCA) systems for ATC also act as a further safety net to help prevent collision. Finally, good as these technical devices are, acknowledgement must go to the high professional performance standards demonstrated by aircrew and air traffic controllers alike; every day their actions ensure that thousands of flights are flown over the UK safely and without incident.

A statistical break down of the 95 cases where things did not go according to plan shows that 56 carried no risk of collision because of effective intervention by those involved, both in the air and on the ground. Their timely actions successfully prevented the development of more serious situations. Other incidents, however, were less clear cut. There were 26 encounters when events moved on to the point where the safety of aircraft had been compromised and a further 12 situations where a collision risk had existed. Occasionally, insufficient or conflicting information attaches to an incident, such that the Board is unable to determine with any assurance the risk level involved. This report contains 1 such case.

I encourage you to give this UKAB Report wide readership within your sphere of the aviation community, for two very practical reasons. One is to spread the flight safety message and the other is to raise awareness of the type of situations and causes that could lead to serious mishap. The more people reached in your sector of the community the better, but especially those who may be exposed to the sort of circumstances related here, that have already caught others out.

Future UKAB reports will be published twice each year to cover Airprox incidents progressively on a six month cycle. Analysis of each year's first-half results will be confined to comparisons with data for the same period in the previous year. No long-term conclusions should be drawn from these comparisons because the statistical sample is too small. A more meaningful appraisal of trends is likely to emerge by comparing results for each full year with similar data recorded over the preceding ten years; this is the model which UKAB reports intend to follow.

Gordon McRobbie
Director, UKAB

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INTRODUCTION

Background

For many years pilots reported Airprox to the Joint Airprox Working Group (JAWG) for assessment. By 1990 a second assessment panel had been formed, called the Joint Airprox Assessment Panel (JAAP), whose task it was to assess Airprox incidents raised by air traffic controllers. Both panels worked independently analysing incidents, deciding what caused them to happen and assessing the risk levels involved. Importantly, they put forward a series of successful recommendations that resulted in improved safety. Building on that success, the Civil Aviation Authority (CAA) and the Ministry of Defence (MOD) decided to rationalise the situation by combining both panels into one body, tasked with making an independent assessment of all Airprox incidents reported within UK airspace. The UK Airprox Board (UKAB) was formed as a result of these decisions and began its work in January 1999.

UKAB

The UKAB comprises a Director, plus a unique mix of civilian (8) and military (6) members, each of whom is an acknowledged expert within his or her field of aviation. These are hands-on practitioners providing a level of first hand 'know how' that covers:

- Terminal, Area and Airfield aspects of civil ATC [3 civilian ATCOs]
- Terminal and Area aspects of military ATC [1 x RN and 2 x RAF ATC officers]
- Commercial Air Transport [3 airline pilots]
- General Aviation flying, both fixed wing and rotary [2 civilian pilots]
- Military flying by the RN, Army and the RAF; plus UK-based USAF aircraft and aircraft regulated by the Defence Procurement Agency (DPA) [3 x military pilots]

The Director acts as Chairman at Board meetings and reports jointly and directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force. A small Secretariat supports the Board.

UKAB's Role

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

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

Safeguarding Anonymity

Names or operators' identities are not revealed during investigation or in published reports. Safeguarding anonymity is a deliberate policy to encourage an open and honest reporting environment. Of note, the UKAB has no legal powers and does not apportion blame or liability.

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 ac as well as their relative positions and speed have been such that the safety of the ac involved was or may have been compromised.

Airprox Causal Factors

For every Airprox incident assessed the Board determines one or more causal factors. These tell us why events started in each instance and signpost the lessons to emerge. It is self evident that attention paid to 'cause' is worthwhile because it is likely to deliver and promote better 'prevention'. UKAB database records code causal factors under 83 separate descriptions, but for simplicity, these have been grouped here under just five headings. The modified cause factors listed below are shown in order of numerical occurrence for this report period:

- Pilot errors (e.g. honest mistakes, poor airmanship, wrong procedures)
- Controller errors (e.g. honest mistakes, poor service, wrong procedures)
- Ineffective or poor 'Lookout'
- Conflicting flight paths in the open FIR (legitimate tracks that cross by chance)
- Inconsiderate flying (passing too close to another aircraft, that has been seen in good time)

Risk Categories

Risk level assessments are made on the basis of what actually took place and not on what may or may not have happened. There are four categories, agreed at international level, as follows:

A Risk of collision	An actual risk of collision existed
B Safety not assured	The safety of the ac 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

Relationship between Cause and Risk

There is rarely a straight-line connection between 'cause' and 'risk'. Other aspects invariably interpose to influence the outcome. As any 'Airprox situation' develops, reactions by people and/or equipment can render safe potentially dangerous events. Some examples might include the following:

- *Pilot sees the other aircraft late but avoids it safely (good weather – not in cloud – day time)*
- *Controller is alerted to a confliction by STCA and issues effective avoiding action instructions*
- *Confliction goes unnoticed until pilot follows a TCAS Resolution Advisory and resolves the conflict*

A wealth of evidence exists to suggest that examples such as these make a significant contribution towards maintaining and improving air safety standards.

UKAB RECOMMENDATIONS

Recommendations are made when the Board believes that attention needs to be drawn to particular safety matters, for example where risk-bearing incidents are repeated or where improved practices may prove beneficial. Subsequent 'acceptance' or 'non acceptance' is a matter for the organisation concerned to decide, based on its own professional judgement. The list that follows provides feedback.

109/98 Tornado ~ Cessna 26 Aug 98 Risk Category: B

RECOMMENDATION: The CAA considers printing military low flying system flow markings on CAA topographical Air Charts.

Status – Not Accepted – Closed Jul 99

CAA Action: The Maps and Charts Working Group rejected this recommendation for the following reasons:

- a. May cause obstruction and confliction between aeronautical and topographical symbols.
- b. Could be potentially dangerous as pilots operating in the vicinity of a published flow arrow may feel encouraged to concentrate in one direction only.
- c. Inclusion of flow information and choke points would clutter rather than enhance charts.

116/98 MD11 ~ MD11 ~ B767 11 Sep 98 Risk Category: C

RECOMMENDATION: That the CAA considers encouraging airline operators to provide instructions to aircrew, on actions to be taken on discovering an incorrect IRS alignment position.

Status – Accepted – Closed Sep 99

CAA Action: The Authority accepted this Recommendation and has produced AIC 106/1999 (Pink 201) dated 9 September 1999, which provides guidance to operators on the procedures to be followed by pilots upon discovering an incorrect IRS alignment position.

51c/98 B737 ~ B737 22 Sep 98 Risk Category: C

RECOMMENDATION: That the CAA considers the merit of controllers undergoing some form of recency check when returning to active controlling duties after an absence of one month or more, instead of 90 days.

Status – Not Accepted – Closed Jun 99

CAA Action: At units where a Local Competency Checking Scheme is in place, the responsibility for ensuring controller recency, following periods of leave, sickness, secondary training etc., rests with the unit management as determined by the Scheme. Where there is no such scheme the responsibility lies with the controller returning from an extended period of absence. Although the currency period of 90 days is always open to review by the Authority, we have no evidence to show that it currently requires to be amended.

39c/98 A320 ~ B757 13 Oct 98 Risk Category: C

RECOMMENDATION: That in light of the revision to the Heathrow RW 27R MIDHURST SID it may be timely for the CAA to consider the current one minute departure separation in order to establish that this is adequate in all relevant circumstances.

Status – Accepted – Closed Jul 99

CAA Action: A Procedural Safety Analysis has been conducted by the Heathrow ATC Operations Department of the reconfigured MIDHURST SID and its interaction with other Heathrow SIDs. The Analysis confirms that the current one-minute departure separation, when correctly applied, is adequate in all relevant circumstances.

146/98 Fokker 100 ~ Tornado 27 Nov 98 Risk Category: C

RECOMMENDATION (1): That the CAA considers drawing the attention of civil controllers to how urgently they should aim to achieve prescribed separation while providing a RAS in accordance with DAP's 8AP/51/08/01 dated 27 November 1997 and associated correspondence.

Status – Accepted – Open Sep 99

CAA Action: The whole area of collision avoidance is currently under consideration by the CAA. This work will be complete by March 2000 with any changes to documentation required by July of that year.

RECOMMENDATION (2): That the CAA considers drawing to the attention of airline pilots that when under RAS, a Controller's advisory avoiding action instructions should be treated as avoiding action.

Status – Not Accepted – Closed Sep 99

CAA Action: The Authority rejected this Recommendation, since the UK Aeronautical Information Publication clearly describes, for the benefit of all pilots, the level of service provided under a Radar Advisory Service.

17/99 F50 ~ Tornado F3 10 Feb 99 Risk Category: C

RECOMMENDATION: That the RAF reviews rules on 'interceptions' so that non-military or non-exercise traffic is not given any cause for concern on safety.

Status – Accepted – Closed Jun 99

RAF Action: HQ No 11/18 Gp has ordered units to adopt the following as Standard Operating Procedure (SOP). Under all exercise conditions aircraft are to be passed to their controller via a marshalling position, which has access to an unjammed radio frequency and radar picture. Additionally, the Fighter Marshal should highlight the existence of non exercise traffic entering the exercise area to the Fighter Allocator, who can determine what further action should be taken.

48/99 B737 ~ B737 12 Apr 99 Risk Category: C

RECOMMENDATION: That the CAA considers introducing a more formal approach to the dynamic process of face-to-face co-ordination between controllers so that an audit trail results.

Status – Open

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

58/99 PA38 ~ BAe 146 28 Apr 99 Risk Category: A

RECOMMENDATION: That the CAA reviews the way ATC instructions are given in sequence to aircraft prior to take-off so that post departure instructions are separated from take-off clearance.

Status – Open

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

RECOMMENDATION: That the CAA reviews the decision to exclude LFS 'flow arrows' from those civil charts commonly used by civilian pilots flying below 2,000 ft outside controlled airspace.

Status – Open

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

STATISTICS

JANUARY – JUNE 1998 and 1999

The graphs and tables set out in the next 5 pages aim to provide see-at-a-glance comparisons on Airprox recorded between the first six months of 1998 and the same period for 1999. The statistical sample is not large enough in either case to extract any meaningful trends, but some interesting profiles emerge from the data nonetheless. Identifying trends needs to be based on a more significant range of information, stretching over a number of years. This will be covered in the next UKAB full year report, when all assessed incidents for the whole of 1999 will be shown alongside like results for previous years going back to 1990.

As in UKAB Report Number 1, Airprox information is presented first to show the 'big picture', followed by separate sub-sections covering Commercial Air Transport (CAT), General Aviation (GA) and Military involvement. Note that the term 'Civil' used here includes both CAT (passenger carrying aircraft) and GA aircraft, while 'Military' covers aircraft flown by the RN, Army and RAF, as well as aircraft regulated by the Defence Procurement Agency (DPA), plus UK-based USAF and some foreign military ac.

THE TOTAL AIRPROX PICTURE INVOLVING CIVIL AND MILITARY AIRCRAFT

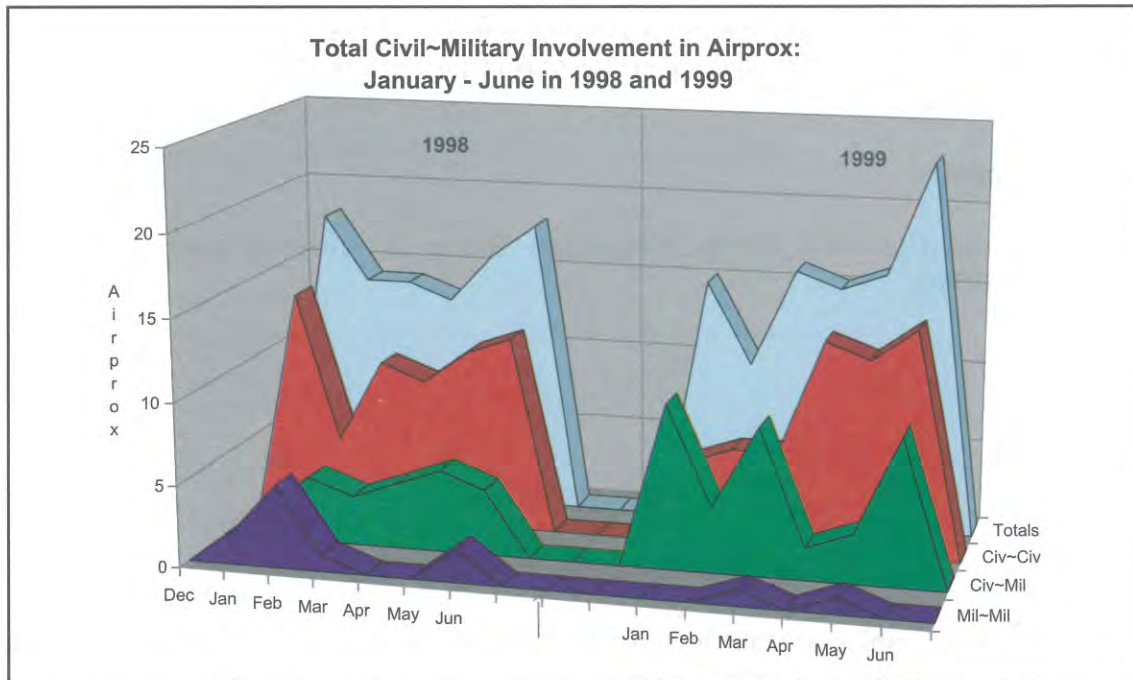


Figure 1: Airprox Incidents Involving Civil, Military and Civil~Military Encounters

The graph shows a direct comparison of all Airprox incidents during the first six months of 1998 and the corresponding period for 1999. More detailed information is tabulated below for both years.

A comparison of the 'Totals' for each period reveals that the overall numbers are similar but the distribution patterns vary, particularly in the early months. Lower total numbers show up in the early months of 1999. Both periods then share a more evenly balanced profile through springtime before rising numbers signal the start of summer.

Civ~Civ encounters show a reduction from 61 in 1998 to 56 in 1999, achieved primarily during the winter months. This is in contrast to the Civ~Mil incident pattern where the low and evenly spread figures recorded in 1998 were not repeated in 1999. Instead peaks and dips are evident in 1999 to produce an overall rise by 15 cases to 37, or some 39% of the period's total.

A more stable picture emerges from straight Mil~Mil comparisons however, with just 2 cases recorded in 1999 against 10 for the previous time scale.

While these observations give a broad overview, a more detailed picture of involvement by the three main components of the UK aviation community is shown in each of the Commercial Air Transport (CAT), General Aviation (GA) and Military sections, which follow.

Tables 1 & 2: Airprox Incidents by Classification January – June 1998 & 1999

1998	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil/Mil	2	5	1	0	0	2	10
Civ/Mil	2	4	3	4	5	4	22
Civ/Civ	14	5	10	9	11	12	61
Totals:	18	14	14	13	16	18	93

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

AIRPROX INVOLVING COMMERCIAL AIR TRANSPORT (CAT)

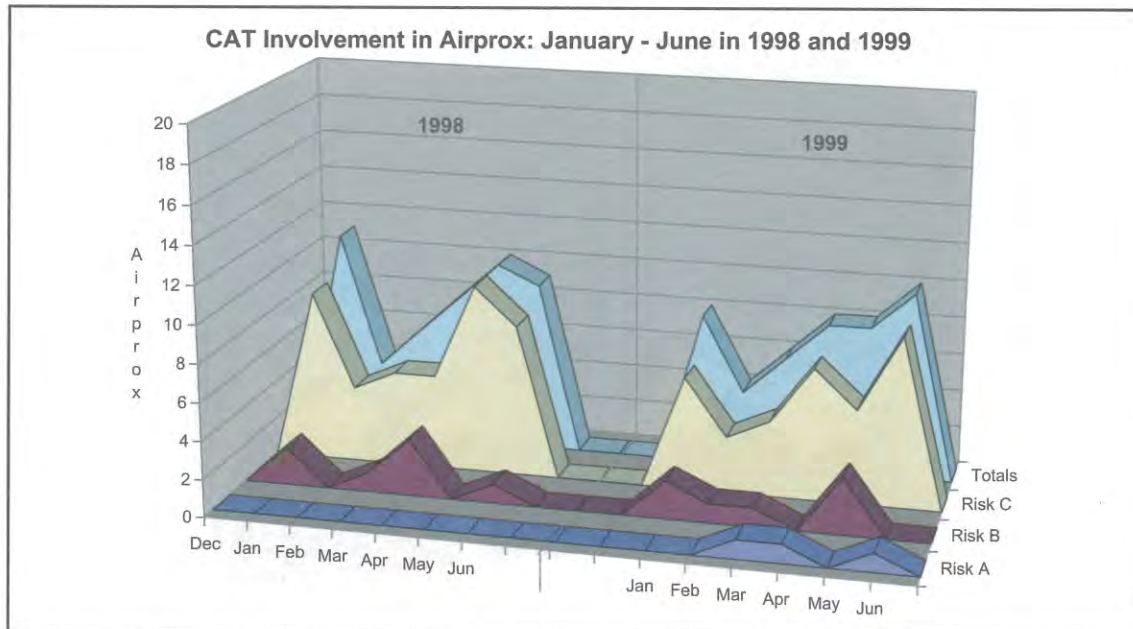


Figure 2: CAT Airprox Incidents Within UK Airspace – by Risk Category

In the first six months of 1998, a total of 93 Airprox incidents were recorded and of these 48 involved CAT aircraft. This equates to 51%. For the same period in 1999 the total number of Airprox across the board increased slightly to 95, but the involvement of CAT aircraft reduced to 44 cases, or 46%. It is worth observing that this reduction took place against a background of increased commercial flying hours; CAT flying hours went up from 585,330 hours in the first half of 1998 to 622,003 hours for the same period in 1999, an increase of 36,600 hours or 6% in round figures.

The graph at Fig 2 shows that Risk Category C incidents (no risk of collision) dominated both periods and accounted for over 75% of all CAT Airprox involvement. Moreover, incident numbers for Risk Category C cases reduced from 41 during the first half of 1998 to 34 for the same period in 1999. As an observation, February returned the lowest number of 'C' cases in both years but there seems to be no particular reason for this other than coincidence.

Turning to the risk bearing results, the incidence of Risk Category B encounters (safety had been compromised) remained the same in both years at 7. With such a small sample size any attempt to reach conclusions on distribution patterns would produce erroneous answers.

For the Risk Category A cases (an actual risk of collision existed) it was possible to equal but not improve upon the zero incidence rate recorded in the first six months of 1998. In the event there were 3 x 'A' risk assessments in the 1999 period, all of which involved CAT ~ GA aircraft encounters. One situation involved an unexpected meeting with a Microlight at 11,000 ft (Microlight pilot mistake), another happened at Birmingham Airport on take-off (CAT pilot mistake), while the third one took place near Bournemouth Airport (ATC mistake).

Tables 3 & 4: CAT Airprox Incidents by Risk Category January – June 1998 & 1999

1998	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	2	0	1	3	0	1	7
Risk C	9	4	5	5	10	8	41
Totals:	11	4	6	8	10	9	48

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

AIRPROX INVOLVING GENERAL AVIATION AIRCRAFT

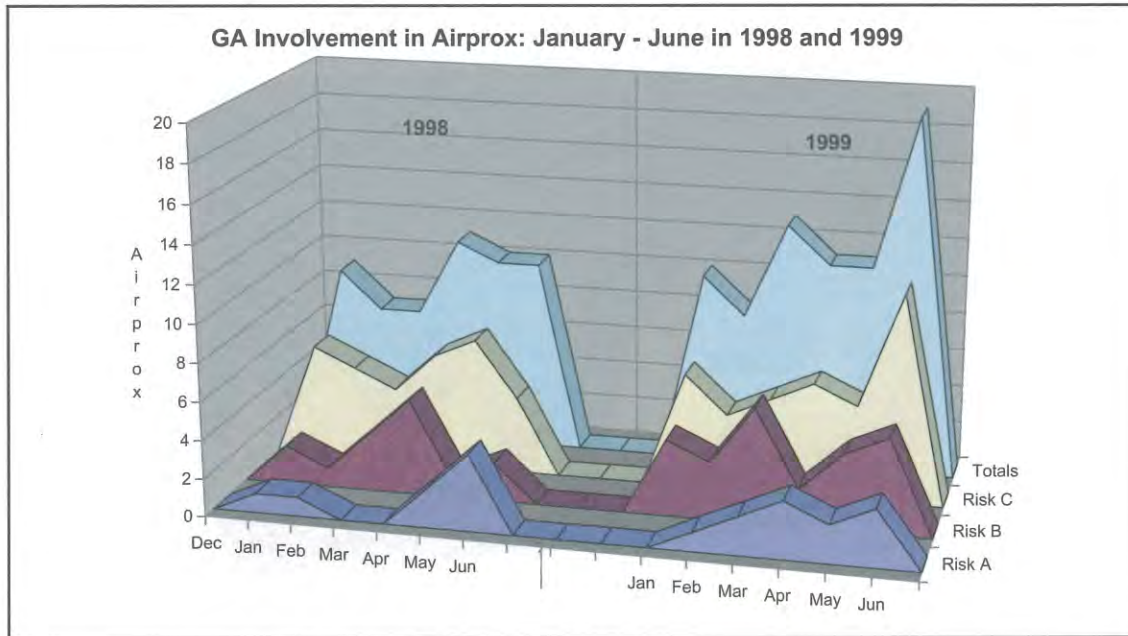


Figure 3: GA Airprox within UK Airspace – by Risk Category

In historical terms the majority of Airprox incidents recorded in UK airspace has involved GA aircraft and this continues to be the case. In the first six months of 1998, a total of 93 Airprox incidents were recorded and of these 54 involved GA aircraft. This equates to 58%. During the same period in 1999 the total number of Airprox across the board increased slightly to 95 and the involvement of GA aircraft rose to 72 cases, or 75%. In other words the incidence rate went up by one third.

From the graph it can be seen that Risk Category C cases (no risk of collision) continued to make up the largest elements in both years; they accounted for 59% of the GA total in 1998 and 51% in 1999. Moreover, the spread remained broadly similar over both time frames except for June where there was a marked difference; unlike 1998 when figures reduced, in 1999 they climbed steeply to 11 cases.

Next in quantity comes Risk Category B incidents (safety had been compromised) and here there was an increase between the two periods. In 1998, the 14 incidents assessed accounted for some 26% of the GA total, while in 1999 incident numbers moved up to 24, to form one third of the GA total.

There were 3 more Risk Category A encounters (an actual risk of collision existed) in 1999 than in the same months in 1998. However, because of this increase the percentage figure remained virtually constant at about 15%. Distribution profiles show that compared with the 1998 period, incidents in 1999 occurred more towards spring and early summer, much of which may be attributed to better weather conditions. Of note, 9 of the 11 cases in 1999 were caused by ineffective lookout.

Table 5 & 6: GA Airprox Incidents by Risk Category January – June 1998 & 1999

1998	Jan	Feb	Mar	Apr	May	Jun	Totals	1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	1	1	0	0	2	4	8	Risk A	0	1	2	3	2	3	11
Risk B	2	1	3	5	1	2	14	Risk B	4	3	6	2	4	5	24
Risk C	6	5	4	6	7	4	32	Risk C	6	4	5	6	5	11	37
Totals:	9	7	7	11	10	10	54	Totals:	10	8	13	11	11	19	72

AIRPROX INVOLVING MILITARY AIRCRAFT

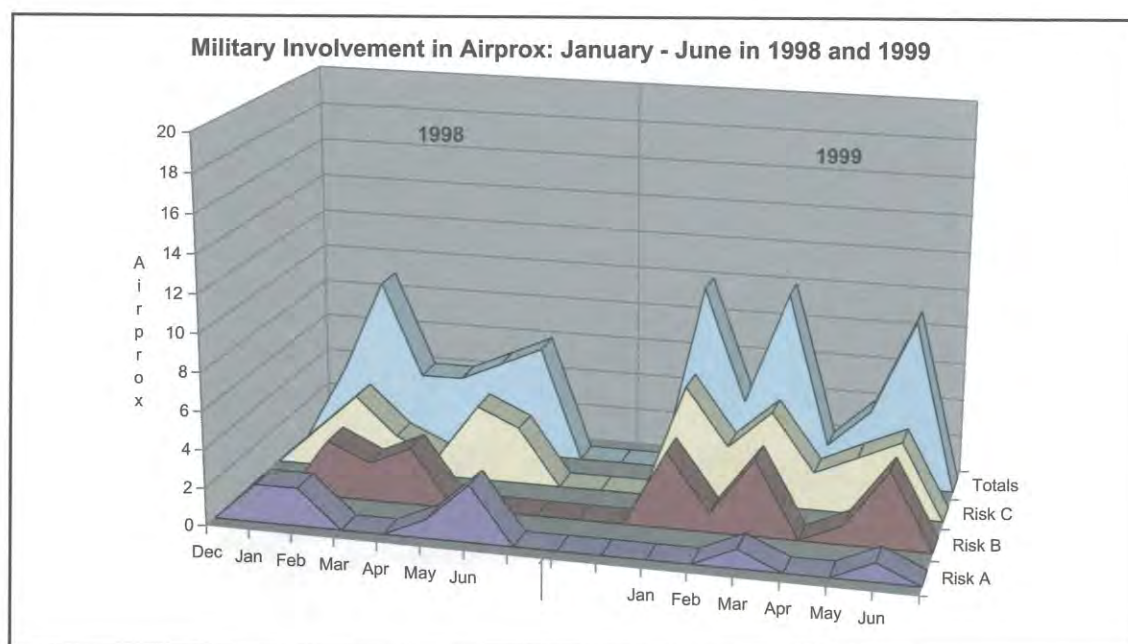


Figure 4: Military Airprox in UK Airspace – by Risk Category

Compared with CAT and GA aircraft involvement in Airprox, Military aircraft involvement has been in the minority over the years, measured against total numbers. All of the latest data shows that this situation sustains. In the first six months of 1998, Military aircraft were involved in 32 of the 93 Airprox total. This equates to 34%. For the same period in 1999 the total number of Airprox across the board increased slightly to 95 and Military figures moved up also to 39, or 41%.

Again, it would not be sensible to draw any clear conclusions from such a relatively small sample size, but the distribution patterns are worth looking at nonetheless. In common with CAT and GA findings most of the Military incidents turned out to be Risk Category C (no risk of collision) assessments. These accounted for some 50% of the Military total in 1998 and 60% in 1999, when overall numbers were also higher. Nothing startling emerges from the Risk Category C distribution pattern.

Risk Category B cases (safety had been compromised) numbered about half those of Risk Category C incidents in both years, but distribution patterns were quite different. In broad terms during the 1998 period (middle months), 'B' incident figures rose as 'C' numbers fell. However, during the same months in 1999, the pattern for 'B' encounters mimicked the shape of the 'C' profile and this can be seen clearly on the graph at Fig 4.

A scrutiny of Risk Category A figures (an actual risk of collision existed) for both periods exposes little more than an obvious reduction in cases during 1999. These fell to a quarter the total recorded during the same months of 1998.

Table 7 & 8: Military Airprox Incidents by Risk Category January – June 1998 & 1999

1998	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	2	2	0	0	1	3	8
Risk B	0	3	2	3	0	0	8
Risk C	2	4	2	1	4	3	16
Totals:	4	9	4	4	5	6	32

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

ENCOUNTERS IN THE UK LOW FLYING SYSTEM (LFS)

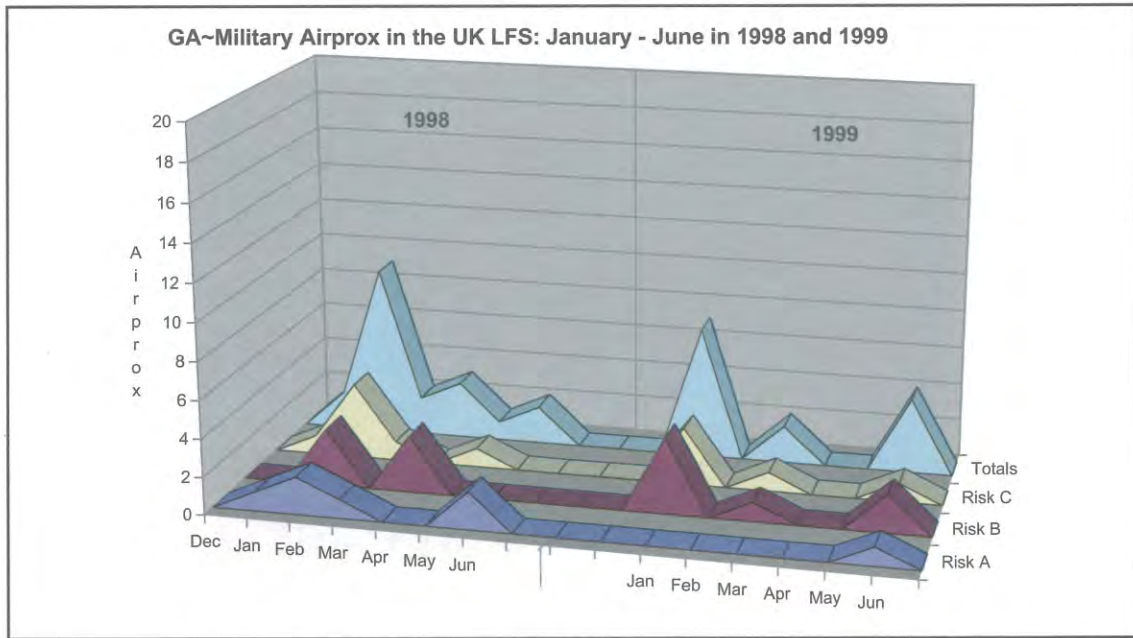


Figure 5: Airprox Incidents in the UK LFS Involving GA and Military Aircraft

The graph, supported by the tables below, give a break down of the incidence and risk categories for unplanned encounters between GA and Military aircraft in the UK Low Flying System. Like the scale used to show CAT, GA and Military data, a scale of 20 Airprox is also used here for direct comparisons.

Two points emerge from the UK LFS data. First, the numbers concerned are relatively small – perhaps surprisingly so - when measured against ‘big picture’ totals. Second, they reveal that a reduction has taken place. During the first half of 1998 the 19 incidents recorded amounted to 20% of the Airprox grand total, while corresponding figures for 1999 were 13 incidents or 13% of total Airprox numbers.

The various distribution shapes do not signal much that is consistent and ‘random scatter’ more closely describes what happened. There is little point in trying to extract anything meaningful from such returns. It has to be accepted that working with a small sample size means that information is likely to appear in a haphazard way rather than assume any clear form.

Tables 9 & 10: Airprox Incidents in the UK LFS Involving GA ~ Military Aircraft

1998	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	1	2	1	0	0	2	6
Risk B	0	3	0	3	0	0	6
Risk C	1	4	1	0	1	0	7
Totals:	2	9	2	3	1	2	19

1999	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	1	1
Risk B	4	0	1	0	0	2	7
Risk C	3	0	1	0	0	1	5
Totals:	7	0	2	0	0	4	13

GLOSSARY OF ABBREVIATIONS

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

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

AIRPROX REPORT No 1/99

Date/Time: 03 Jan 1748 (Sunday) NIGHT

Position: N5130 E0006 (5 NM E London City Airport)

Airspace: LTMA (Class: A)
First Aircraft Second Aircraft

Type: DHC8 (Dash 8) BAe 146

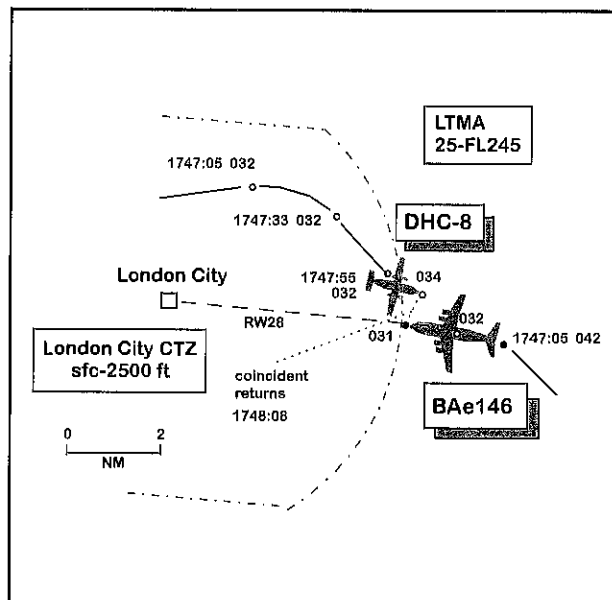
Operator: CAT CAT

Alt/FL: ↑3000 ft 3000 ft
(QNH 1006) (QNH 1006)

Reporter: Thames Radar controller

Reported separation: 0.75 NM

Recorded separation: 0.75NM/300 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE THAMES RADAR CONTROLLER reports that the Dash 8 had departed from London City on a DVR 3T SID and was turned onto a heading of 080° climbing to 3000 ft. The BAe146 had been vectored to the ILS for RW 28 at London City and was established on the localiser at 3000 ft. Owing to other inbound traffic, he turned the Dash 8 R onto a heading of 150° but then realised that this heading would take it into conflict with the BAe146, so he passed traffic information to the Dash 8 pilot, instructed him to turn L onto a northeasterly heading and to climb to 4000 ft to achieve a degree of vertical separation. The ac subsequently passed within 0.75 NM of each other.

THE DHC8 PILOT reports that following take off from RW 28 at London City airport he followed a DVR 3T SID. During the R turn out he called Thames radar and was instructed to turn onto a heading of 120° (the RT transcript shows this was actually 150°) and to maintain 3000 ft. Out of the clouds he then saw the lights of an ac established on finals for RW 28 at a similar altitude; although he realised that the separation between them was reducing he did not at that point consider the other ac to be a hazard. However, ATC then instructed him to turn L about 90° and climb at a good rate to 4000 ft. He was not aware until sometime later that he had been involved in an Airprox.

UKAB Note: The BAe146 pilot did not know at the time that he had been involved in an incident and could recall no relevant details of his flight; he was therefore unable to submit a report.

ATSI reports that all ATC equipment relative to the task was serviceable. The Thames radar controller (who is situated in the Control Tower Building at Heathrow) reported his workload as high and commented that he had requested the presence of another controller to act as a co-ordinator and this person was in position prior to the occurrence. He explained that there is an option for a second radar position to be opened (City Radar) but this, he added, is usually only employed when the RW in use at London City is 10, when radar vectoring is more restricted. In his opinion, the use of a co-ordinator is more beneficial when the RW in use is 28, as it was on this occasion.

The Thames Radar Controller, having placed the BAe146 on a closing heading for the ILS to RW 28 at London City at 3000 ft, requested its pilot to report established on the localiser (Note: this was the first ac in a sequence of inbounds). Shortly afterwards, at 1745, the Dash 8 pilot contacted Thames Radar after departure from London City on a DVR 3T SID, climbing to its initial altitude of 3000 ft. The Radar Controller instructed the flight to maintain 3000 ft and to

turn right heading 080°. Thames Radar is not permitted to issue instructions to climb above 3000 ft to ac on such departures until they are E of a line running NE/SW about 3 NM E of London City Airport.

Describing the inbound traffic situation pertaining at the time, the controller said that after the subject BAe146 there were 2 ac from the N, followed by one from the E and another from the SE. All of these, he added, would be at 4000 ft. To shorten the routeing of the 2 ac from the N he agreed with Terminal Control (TC) North to accept them routeing southbound from Lambourne (LAM) at 4000 ft, thereby constraining his area of operation. The Thames Radar Controller agreed that in hindsight it would have been preferable to have left the 2 northern arrivals on the standard routeing (via Barkway, Brain, Mayla, Spear and Alkin) although, he added, at the time the agreement was reached for the LAM routeing he did not envisage a problem. This procedure is stated in the Heathrow Airport MATS Part 2, Page 5-4-3, under the heading of "Traffic Released by TC North" which states: "In certain circumstances TC North will ask Thames Radar to accept traffic inbound from the N via LAM. The acceptance of traffic on this routeing is solely at the discretion of Thames Radar, who should take into account traffic expected via the standard routeings." He mentioned that although Thames Radar Controllers do have the final say as to whether ac can be accepted on this route, in his opinion there is often pressure to agree the procedure because it assists the TC North Sector Controllers by reducing their workload.

At 1747 the Thames Radar Controller instructed the Dash 8 to turn right heading 150°. This resulted in placing the ac on a conflicting track with the BAe 146, which was now established on the localiser and maintaining an altitude of 3000 ft. The Controller said that when he instructed the ac to turn R he overlooked the presence of the BAe146, probably because the latter's SSR label overlapped that of the second ac in the sequence, thus obscuring his picture. However, he added that the FPS for the BAe146 was still on his display and remained in

position even after its transfer to London City Tower frequency which, he said, should have acted as an aide memoir to its presence but, as he was operating mainly using his radar display, it went unnoticed. Thames Radar is not equipped with Short Term Conflict Alert.

After transferring the BAe146 to City Tower, and having passed the No 2 ac in the sequence a heading instruction, the Thames Radar Controller stated that he realised the developing confliction between the Dash 8 and the BAe146 and instructed the former, at 1747:30, to turn L heading 070° which was followed, in the next transmission, with a climb clearance to 4000 ft and information on traffic at his twelve o'clock, range two miles, L to R at a similar altitude; the pilot reported leaving 3000 ft with the traffic in sight. The controller said that he did not use the term avoiding action because he believed that the Dash 8 would take the turn early enough to ensure that the ac would pass at least 2 NM apart. However, radar photographs of the incident reveal that the Dash 8 did not commence its turn until about 1747:55 and, therefore, lateral separation reduced to a minimum of approximately 0.75 NM. The Radar Controller commented that he did not have time to warn the London City Aerodrome Controller about the situation and consequently the BAe146 pilot was not advised of the occurrence.

UKAB Note: A radar picture at 1747:05 shows the Dash 8 about 3 NM NE of London City airport indicating 3200 ft Mode C (equivalent to 3000 ft on the City QNH 1006) and beginning a R turn onto a southeasterly track. At the same time the BAe146 is passing 4000 ft and about to establish on the final approach track for RW 28 at 7 NM. At 1747:55, with the BAe146 at its 12 o'clock range 2 NM level at 3000 ft, the Dash 8 starts to turn L and shortly before 1748:08 passes 300 ft above and just under 1 NM N of the BAe146 in the opposite direction. The Mode Cs of the ac show 031 (BAe146) and 034 (Dash 8) at this point.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the pilot of the Dash 8, transcripts of the relevant RT frequencies, radar photographs, a video recording, and a report from the appropriate ATC authority.

ATCO members familiar with TC and Thames Radar operations said that although the Thames Radar controller always retained the right to refuse requests from TC for non-standard routings, in practice such requests were almost always agreed to; there was therefore nothing exceptional about the circumstances surrounding this incident. Had the Thames controller allowed the DHC 8 to follow its SID instead of choosing to vector it, the Airprox would not have occurred. When he did become aware that the radar heading he had issued was inappropriate and that avoiding

action was necessary, no sense of urgency was imparted to the Dash 8 pilot by including the words "avoiding action" and consequently the ac came closer than they need have done. The Board emphasised the need for adhering to the standard avoiding action phraseology.

The Board was advised that several factors, including a lack of recency due to OJTI commitments, a period of leave, and the Christmas and New Year holiday contributed to this experienced controller's uncharacteristic error.

The Board concluded that the Thames Radar Controller caused the Airprox by vectoring the DHC 8 into conflict with the BAe 146. Members were satisfied, however, that although standard separation was compromised, the ac were nevertheless sufficiently separated laterally to preclude any risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Thames Radar Controller vectored the DHC 8 into conflict with the BAe 146.

AIRPROX REPORT No 2/99

Date/Time: 03 Jan 1749 (Sunday) NIGHT

Position: N5131 E0016 (8.5 NM E London City Airport)

Airspace: LTMA (Class: A)
First Aircraft Second Aircraft

Type: DHC8 (Dash 8) BAe146

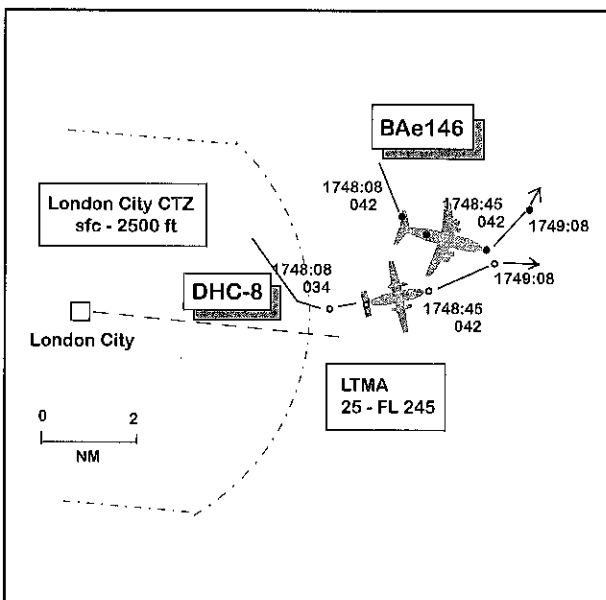
Operator: CAT CAT

Alt/FL: ↑ 4000 ft 4000 ft

Reporter: Thames Radar controller

Reported separation: 1.5 NM/zero ft

Recorded separation: 1.5 NM/zero ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE THAMES RADAR CONTROLLER reports that the Dash 8 had departed from London City Airport on a DVR 3T SID and was turned onto a heading of 080° climbing to 3000 ft. A BAe146 (the subject of a previous Airprox, No 1/99) had been vectored to the ILS for RW 28 and was established on the localiser at 3000 ft. To position the Dash 8 from further inbound ILS traffic, he turned it R onto a heading of 150° but then realised that this heading would take the ac into conflict with the BAe146; he therefore turned it L onto a north-easterly heading and climbed it to 4000 ft to achieve a degree of vertical separation. This brought the ac into conflict with a second BAe146 which was at 4000 ft southbound from LAM. Both the Dash 8 and the pilot of the BAe146 were given vectors to resolve the conflict but subsequently passed within 1.5 NM of each other.

THE DHC8 PILOT reports that, following departure from RW 28 at London City Airport on a DVR 3T SID, ATC instructed him to turn R onto 120° and to maintain 3000 ft. Out of the clouds he could then see the lights of another ac established on final approach at a similar altitude. Although he realised that separation between himself and the ac was reducing he did not at the time consider the other ac to be a hazard; however, ATC suddenly instructed him to turn L about 90° and climb at a good rate to 4000 ft to avoid this traffic. He then heard avoidance turn instructions also being given to another ac which he did not see and ATC made no mention at the time that he was involved in a conflict. It was not until sometime later that he discovered that his was the ac being avoided.

UKAB Note: Neither of the BAe146 pilots involved in these successive Airprox were aware at the time that they had been involved in an incident and could not submit any meaningful report.

ATSI reports that all ATC equipment relative to the task was serviceable. The Thames radar controller (who is situated in the Control Tower

Building at Heathrow) reported his workload as high during the period when the incident occurred. He commented that he had requested the presence of another controller to act as a co-ordinator and this person was in position prior to the occurrences. He explained that there is an option for a second radar position to be opened (City Radar) but this, he added, is usually only employed when the RW in use at London City is 10, when radar vectoring is more restricted. In his opinion, the use of a co-ordinator is more beneficial when the RW in use is 28, as it was on this occasion.

The Radar Controller, having placed the first BAe146 on a closing heading for the ILS to RW 28 at London City at 3000 ft, requested its pilot to report established on the localiser. Shortly afterwards, the Dash 8 contacted Thames Radar after departure from London City on a DVR 3T SID, climbing to its initial altitude of 3000 ft. The Thames Radar Controller instructed the flight to maintain 3000 ft and to turn right heading 080°. Thames Radar is not permitted to issue climb instructions to ac, on such departures, above 3000 ft until they are E of a line running NE/SW, about 3 NM E of London City Airport.

Describing the inbound traffic situation pertaining at the time the controller said that after the (first) BAe146, there were 2 ac from the N, followed by one from the E and another from the SE, all of which, would be at 4000 ft. To shorten the routing of the 2 ac from the N, he agreed with Terminal Control (TC) North to accept them routing southbound from Lambourne (LAM) at 4000 ft, thereby constraining his area of operation. The Radar Controller agreed that, in hindsight, it would have been preferable to have left the two northern arrivals on the standard routing (via Barkway, Brain, Mayla, Spear and Alkin) although, he added, at the time agreement was reached for the LAM routing, he did not envisage a problem. This procedure is stated in the Heathrow Airport MATS Part 2, Page 5-4-3, under the heading of "Traffic Released by TC North" which states: "In certain circumstances TC North will ask Thames Radar to accept traffic inbound from the N via LAM. The

acceptance of traffic on this routeing is solely at the discretion of Thames Radar, who should take into account traffic expected via the standard routeings." He mentioned that although Thames Radar Controllers do have the final say as to whether ac can be accepted on this route, in his opinion there is often pressure to agree the procedure because it assists the TC North Sector Controllers, by reducing their workload.

After the initial call was received from the Dash 8, the pilot of the second BAe146 (No 3 in the traffic sequence) contacted the Thames Radar frequency and was instructed to maintain 4000 ft and to turn R heading 170°. The controller's intention was to route this ac, like the one ahead of it, through the RW 28 extended centre-line and then vector it left-hand downwind.

At 1747, the Radar Controller instructed the Dash 8 to turn R heading 150°. This instruction resulted in placing the ac on a conflicting track with the first BAe146 which was then established on the final approach to RW 28 at 7 NM; both flights were at 3000 ft. After transferring the first BAe146 to City Tower, and having passed the next inbound ac a heading instruction, the Radar Controller said that he realised the developing conflict between the Dash 8 and the BAe146 and instructed the former, at 1747:30, to turn left heading 070°. This was followed, in the next transmission, with a climb clearance to 4000 ft and information on traffic at his twelve o'clock, range 2 NM, L to R, at a similar altitude. The Radar Controller said that at the time he gave the Dash 8 the L turn and climb instruction to 4000 ft he did not recognise the potential conflict with the 2nd BAe146, probably, he thought, because he was concentrating his attention on resolving the situation involving the first. However, realising the problem almost immediately, he issued the 2nd BAe146 with a L turn heading 100° which was followed by further L turns heading 060° and 020°. A radar photograph, timed at 1748:21, shows the BAe146 in a L turn with the Dash 8 about 2 NM SW of it and 500 ft below. Subsequently, after the co-ordinator had agreed further climb with TC for the ac, the Dash 8 was

instructed to climb to 5000 ft. Another radar photograph, timed at 1748:45, shows the closest point of approach between the Dash 8 and the 2nd BAe146; both are at the same altitude, 1.5 NM apart, with the BAe146 still in a L turn. Shortly before vertical separation is established between the ac at 1749:38, the Dash 8 is given a R turn heading 120°. No comment about the incident is made on the frequency by either pilot.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the pilot of the Dash 8, transcripts of the relevant RT frequencies, radar photographs, a video recording, and a report from the appropriate ATC authority.

This incident should be read in conjunction with the previous Airprox (No 1/99) as the two encounters are concurrent.

The Board concluded that the Thames Radar controller, while resolving the conflict with the first BAe 146 vectored the DHC 8 into conflict with the second BAe 146. Again, members were critical of the absence of standard avoiding action phraseology which might have prompted a more timely reaction from both pilots. Although standard separation was compromised, members were satisfied that lateral separation, as shown by the radar recording, was sufficient to preclude any risk of collision.

The Board was advised that a lack of recency due to OJTI commitments, a period of leave, and the Christmas/New Year holiday contributed to this experienced controller's uncharacteristic error.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: While resolving the conflict with the first BAe 146, the Thames Radar controller vectored the DHC 8 into conflict with the second BAe 146.

AIRPROX REPORT No 3/99

Date/Time: 6 Jan 1430

Position: N5157 W0118 (7 NM N of Kidlington - elev 270 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA28 Tornado GR

Operator: Civ Trg HQ STC

Alt/FL: 1500 ft 1000 ft ↑

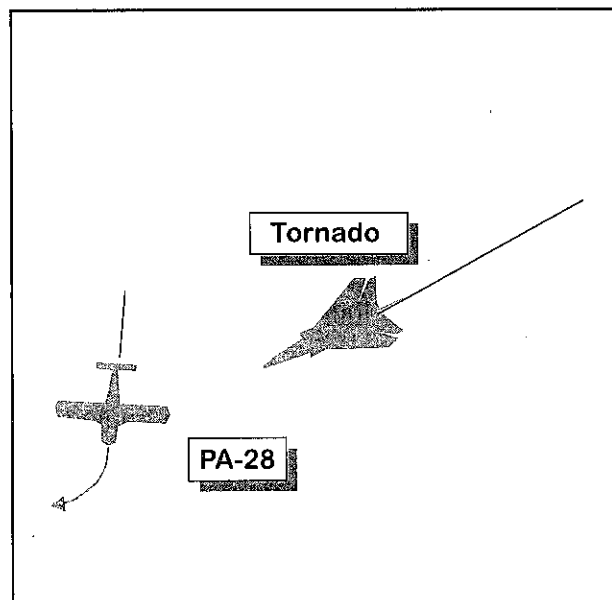
(1005 mb) (Rad Alt)

Weather VMC CLOC VMC CLBC

Visibility: 10 km+ 10 km+

Reported Separation: 75 ft/100 ft

Recorded Separation: 200 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports heading 210° at 105 kt established at 1500 ft on finals for RW 20 at Oxford when he spotted a Tornado closing from close in his 7:30 at the same level. He climbed, turning right, and the Tornado passed about 75 ft below him, tracking from his 7:30 to 1:30 with a high risk of collision. Later, he spoke with its pilot who said his on-board camera showed the Tornado had passed 100 ft directly beneath him, with a very late spot.

THE TORNADO PILOT reports heading 260° at 420 kt, climbing from low level, and while changing to a Brize Norton frequency he saw a light ac slightly right of the nose and tracking towards his 12 o'clock. He checked his climb as the light ac turned right and climbed; he passed under it by about 100 ft, at 900 ft agl. He considered there was a high risk of collision until he saw it, but the sighting was in time to take avoiding action.

Note: LATCC radar recordings show the PA 28 tracking 183° towards Kidlington and the Tornado pops up into radar cover 8 sec before passing the PA28 on a track of 243°. Mode C readings are 1600 ft for the PA28 and 1400 ft for the Tornado as the ac pass, and 1800 ft and 2200 ft respectively 8 sec later.

HQ STC comments that the Tornado, the lead ac of a pair, climbed out of low level into the instrument pattern of an active civilian airfield. Although the captain's parent unit has elected not to comment on the incident, it is possible that the crew may have relaxed to some degree following an intensive low level phase and underestimated their proximity to the Oxford approach. Immediately presented with conflicting traffic, it is fortuitous that there was sufficient time available to them, albeit barely, to take avoiding action.

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 while the PA28 was not strictly on finals, it was on a straight-in approach to join finals for RW 20 at the 4th busiest airfield in the UK. The Board discussed this and it was further pointed out that the approach path chevron on the LFC, which would warn LFS users of an approach lane, was applied to the Oxford RW 02 approach. This was because cartographers had drawn the chevrons for approaches to notified main instrument runways, which at Oxford was RW 02. However, RW 02's approach path is already protected by virtue of its passage through Brize Norton's Class D airspace and the Oxford ATZ. Furthermore, by agreement with Brize Norton,

RW 02 was only used in weather extremis because of its adverse effect on Brize Norton's operations; so, despite indications on charts, RW 20 was used as Oxford's main instrument runway on a daily basis. A GA member undertook to invite the Oxford ATS to liaise with military low flying staff at HQ MATO to see if the chevron on the LFC should be moved to reflect reality.

As to the incident itself, both pilots were VFR in VMC and responsible for seeing and avoiding each other; the Board agreed that the PA28 pilot had done well to spot the Tornado approaching from his rear quarter but his options thereafter for avoiding action were limited. The reason the ac came so close, members concluded, was that the Tornado pilot had spotted the PA28 late. Members considered that although both pilots had seen each other's ac just in time to avoid an actual collision, their safety had been compromised.

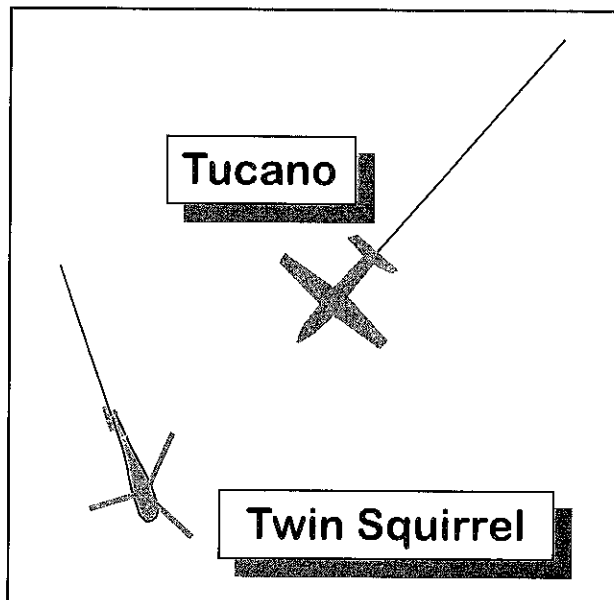
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Late sighting by Tornado pilot.

AIRPROX REPORT No 4/99

Date/Time: 6 Jan 1452
Position: N5552 W0250 (15 NM ESE of Edinburgh)
Airspace: FIR/LFS (Class: G)
Reporting Aircraft Reported Aircraft
Type: Tucano Twin Squirrel
Operator: HQ PTC Civ Comm
Alt/FL: 250 ft 800 ft
(agl) (Rad Alt)
Weather VMC CLBC VMC CLBC
Visibility: 10 km+ 30 NM+
Reported Separation: 100 m/5 NM?



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT reports heading 220° at 240 kt on a dual low level exercise, having deviated to the right of planned track to avoid weather. His student who was flying the ac pitched up sharply, banking to the right and he took control, seeing a white helicopter pass 100 m underneath on an easterly heading; he saw it bank right some 5-6 seconds later. The risk of collision would have been high without the avoiding action.

THE TWIN SQUIRREL PILOT reports heading 162° at 128 kt. Having cleared the Edinburgh Zone he was unable to contact Scottish Info so he climbed to improve communication and to clear the Lammermuir Hills. At this point he and his paramedic saw the reporting ac some 5 NM away approaching from the E, turning away to pass behind at a similar level. Presuming its pilot had him in sight he also turned to acknowledge it. There did not appear to him to have been more than a minor risk of collision.

HQ PTC comments that there is only a slight positional/temporal discontinuity between these 2 reports but a widely differing perception of the miss-distance. The Tucano's late sighting might account for both pilot's conviction of a fairly adjacent encounter. The Twin Squirrel, however saw another ac so far away that he did not recognise it to be a Tucano (whose colour

scheme is pretty distinctive in either case) and immediately dismissed it as a threat. Either their paths then converged unexpectedly while he was preoccupied elsewhere or the ac he saw was not the Tucano. There can be no certainty in this case but the student pilot's lookout and avoiding action were effective.

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 discussed the different perceptions of miss distance in this incident and were unable to resolve them. It was surmised that either the ac seen by the helicopter pilot was not the reporting Tucano, or, if it was, having seen it at some distance and discounted it, he was unaware that it had subsequently manoeuvred into close proximity before taking avoiding action. In either case, the Board concluded in this instance that it was the Tucano pilot's responsibility (under the converging or overtaking rules) to see and avoid the helicopter. This happened eventually, but the reason they came so close was that the Tucano pilot saw the helicopter somewhat late. Nonetheless, members agreed that the sighting was in time to enable the pilot to remove the risk of the ac actually colliding.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Late sighting by the Tucano pilot.

AIRPROX REPORT No 5/99

Date/Time: 7 Jan 1110

Position: N5226 E0118 (7 NM NE of Diss)

Airspace: LFS/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Tornado GR JetRanger

Operator: HQ STC Civ Comm

Alt/FL: 250 ft 100 ft

(Rad Alt) (agl)

Weather VMC HAZE VMC CLNC

Visibility: 6 km

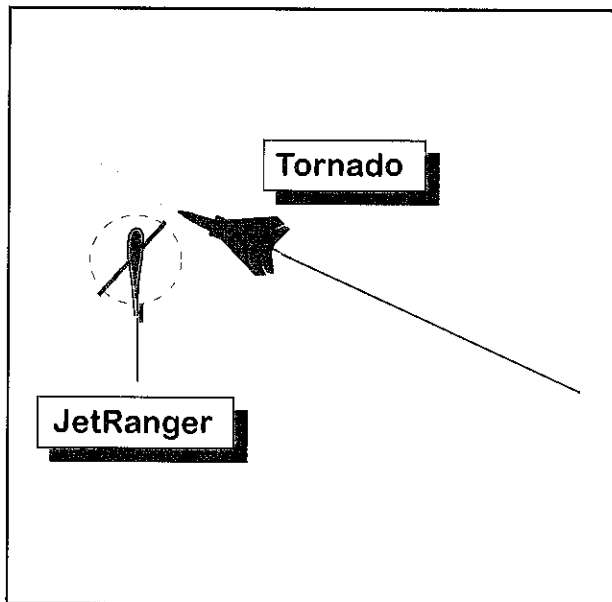
Reported Separation: 75m/200 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 303° at 480 kt on a simulated attack at 250 ft agl when he saw a white helicopter with blue stripes converging in his 10 o'clock on a collision course. He pulled hard right and up and then reversed his bank, assessing that he passed within 200 ft of the helicopter after the avoiding action. The helicopter did not appear to take any avoiding action.

THE JETRANGER PILOT reports heading N at 40 kt on a power line inspection at 100 ft. His helicopter was black and silver. The wires were to the left of the ac (his observer being in the LHS) and his lookout was concentrated to the left for the wires and ahead for obstacles. He saw the Tornado as it crossed 75 m ahead and 50 ft above from right to left, banking away steeply and presenting a view of its underside. It rolled left and right, giving the impression that his helicopter had been seen. Because of this and his own lack of avoiding action he decided not to file an Airprox. He expressed his concern about fast jet activity, having had 2 more close encounters with Harriers the same day, one of which was the subject of another Airprox report.

Note: LATCC radar recordings show the helicopter, identified by its 0036 squawk, manoeuvring for some minutes in the general area of the Airprox but it disappears as the Tornado coasts in near Southwold. The Tornado closes on the Airprox location at 500 ft



Mode C and climbs to 700 ft in a right turn just before reaching its simulated target. The local QNH was 1008 mb; taking local terrain elevation into account, 500 ft Mode C equates to 200 ± 100 ft agl.

HQ STC comments that unlike the protection afforded to helicopters by the Pipeline Inspection Notification System (PINS), those on power line inspections are potentially more vulnerable. The advice at para 3.1 of AIC 10/98 (Yellow 284) dated 27 Jan 98 recommends a height profile during transits between inspection areas of 500 – 700 ft agl. Moreover, in all but the Tactical Training Areas, helicopters operating below 250 ft agl are inherently less vulnerable to low-flying fast jets: strict adherence to an authorised MSD by military ac should minimise any potential for conflict. To that end, the Jetranger pilot's perception of the vertical separation may be somewhat conservative. The Tornado crew, committed to a highly demanding phase of their sortie profile, would have necessarily concentrated their attention on the final stages of target acquisition and it is encouraging that the pilot continued to regard lookout as a priority. The incident serves as a salutary reminder of the importance of a thorough and disciplined external scan at all stages of flight.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It appeared to some members that the JetRanger pilot's height with his estimation of vertical separation constituted an allegation that the Tornado was operating below its MSD. This was not supported by the recorded Mode C readings. It was also pointed out that RAF aircrew are aware that the RAF Police carry out random monitoring of the heights of low flying ac using SkyGuard radar, in addition to the continuous recording of ATC radars, and Sky Guard has shown no infringements in the last 12 months. Unlike most other operators at low level, fast jet pilots had accurate head-up display indications of radar height, which they flew to, rather than an altimeter pressure datum. Members were also aware that the sudden appearance of a fast jet in circumstances like these often made it look closer than it was.

Members went on to discuss the circumstances surrounding conflicts between helicopters carrying out this kind of work and military low

flying ac. There is some small built-in separation by virtue of the military MSD (usually 250 ft) and the height flown by a helicopter inspecting minor power lines (100 -150 ft) and if neither pilot sees the other they should still not collide. The pilots of the company with the most years of experience of this type of work accept that there will be close encounters but provided look out all round is exercised before climbing away from a stretch of cables, Airprox situations can be avoided. Even so, members accepted that occasions such as this will arise when a fast jet pilot will approach closer to a helicopter than is desirable for its comfort or safety, and will then do what he can to increase the separation, as in this case. The Board commented that the Tornado pilot had done well to spot the helicopter while on a target run and commended the helicopter's dark colour scheme, which promoted conspicuity.

In conclusion, the Board agreed that this incident was a conflict of flightpaths in Class G airspace which was resolved by the Tornado pilot. As to the risk, members assessed that although the Tornado had seen the helicopter in time to avoid it, the helicopter pilot had not seen the Tornado and might have pulled up into its flightpath, thus the safety of the ac had not been assured.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Conflict of flightpaths in Class G airspace resolved by the Tornado pilot.

AIRPROX REPORT No 6/99

Date/Time: 07 Jan 0945

Position: N5107 W0254 (12 NM NW

Yeovilton)

Airspace: AIAA/FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: Shorts 360 PA23 Aztec

Operator: CAT Civ Trg

Alt/FL: FL 60 FL 65

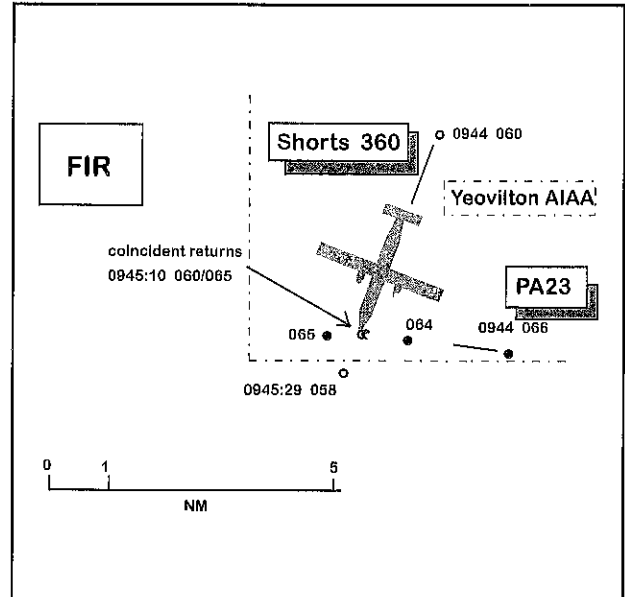
Weather VMC CLBC VMC CLBC

Visibility: 15 km 10 NM

Reported Lat zero/ Lat zero/

separation: Vert 300 ft Vert 500 ft

Recorded separation: Lat zero/vert 500 ft (Mode C)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHORTS 360 PILOT reports that he was heading about 220° at 180 kt and cruising at FL 60 en route from Birmingham to Exeter in the FIR. The visibility was over 15 km in VMC. He was receiving a RIS from Yeovilton LARS who advised him of traffic at his 9 o'clock position maintaining FL 65. The traffic was then signalled as a TA on his TCAS indicating 500 ft vertical separation. The pilot of the other ac was twice heard to request descent to FL 60 but was advised by Yeovilton to maintain FL 65 and subsequently the other pilot reported visual contact with the Shorts 360. The Shorts's TCAS showed reduced vertical separation and, though neither the Captain nor P2 could see the other ac at that point, the Captain instructed the P2 to descend. A TCAS RA followed instructing a descent which was carried out to 5750 ft, whereupon an Aztec was spotted above them about 500 - 600 ft away; they watched it fly overhead by an estimated 300 ft, confirmed by the TCAS reading. He asked Yeovilton if the other pilot was visual with him and they confirmed that he was.

The Shorts 360 pilot comments that had he not monitored the TCAS TA and initiated a descent when he did there would, in his opinion, have been a real risk of collision. Horizontal separation had reduced to nil and vertical separation showed 300 ft after his ac had

descended to 5750 ft. He believed the TCAS had been an invaluable aid to deconfliction. The other traffic was initially in his blind spot and unseen until it appeared in the LH eyebrow window.

THE PA23 PILOT reports that he was heading 280° at 160 kt and cruising at FL 65 on a training flight from Bournemouth to Bristol via Cardiff. The visibility was 10 NM in VMC. He was squawking 0231 and receiving a RIS from Yeovil Radar on 127.35 who advised him of traffic at his 1 o'clock at FL 60 which he then saw at a range of 4 - 6 NM. He did not consider there to be a collision risk owing to the existing vertical separation of 500 ft and he was surprised to learn that the TCAS in the other ac had activated after detecting a vertical separation distance of 300 ft. His Mode C was checked for accuracy both before and after the encounter and found to be satisfactory. The pilot questions the advisability of conducting a public transport flight in an area of the FIR known for its high level of GA activity while receiving a RIS and using quadrantal separation.

RNAS YEOVILTON ATC reports that the PA23 was handed over to Yeovilton LARS by Bournemouth Radar at about 0930 maintaining FL 65 under a RIS. The pilot was on his own navigation and requested a clearance to join

CAS at EXMOR at 0955 at FL 60. The Shorts 360 pilot called at about 0940 after leaving the Bristol CTZ at FL 60; he requested a RIS en route to Exeter which was provided following identification. The Modes A and C of both ac were verified.

It was observed that the acs' tracks would take them very close to each other and traffic information was passed to both pilots when they were about 10 NM apart. The PA23 pilot requested descent to FL 60 as this was the level required for entry into CAS. However, owing to the potential merging of the acs' radar contacts, the pilot was advised to remain at FL 65 and the acs' relative positions were passed to the pilots again when lateral separation reached 5 NM. At 0945, as neither pilot had reported visual, the Shorts 360 pilot was advised that the PA23 was now at his 11 o'clock position 1 NM, to which he replied...."*descending with TCAS alert*"....and asked if the other pilot was visual with him; the PA23 pilot confirmed that he was.

The Shorts 360 pilot reported that his TCAS had been triggered by an ac indicating 300 ft above him (the PA23's Mode C readout indicated 064 at this stage but within the tolerance limits for level flight). Once the ac were laterally separated, the PA23 was cleared to FL 60 for CAS entry, and the Shorts 360 descended into Exeter.

HQ FONA comments that the Airprox occurred despite the Yeovilton LARS controller giving more information than was required under the terms of the RIS being provided. Neither ac was observed on radar to deviate significantly from its respective quadrantal level until well after the encounter. There are no contributory military ATC factors associated with this Airprox.

UKAB Note: A replay of the LATCC radars at 0944 shows the 2 ac converging on a point 12 NM NW of Yeovilton, just inside the southern boundary of the Yeovilton AIAA. The Shorts 360, tracking SSW with the PA23 at its 10 o'clock/4 NM, is indicating FL 60, and the PA23, tracking W, is indicating FL 65. Between 0944:41 and 0944:50 the PA23's Mode C shows FL 64; however, by the time the contacts

merge 20 sec later, at 0945:10, their Mode Cs again indicate 060/065 respectively. No change in the Shorts 360's level is detected on radar until 0945:29, nineteen sec after the encounter, when its Mode C indicates FL 58 and then briefly FL 57 before climbing back to regain FL 60. The PA23 maintains FL 65 on a westerly track for several minutes after 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, a radar video recording, reports from the air traffic controllers involved, and a report from the appropriate ATC authority.

An increase in TCAS generated incidents is expected as more and diverse civil air transport ac are fitted with the equipment in anticipation of the new Rules for carriage which come into effect on 1 January 2000. Incidents involving CAT ac flying quadrantal levels in Class G airspace are particularly likely to increase because the equipment will be triggered by the 500 ft vertical separation provided under the Quadrantal Flight Rules. When TCAS and SSR equipment tolerances are taken into account, it is possible that less than 500 ft separation may result and therefore the perceived vertical distance may give pilots cause for concern. Members were advised that the next generation of TCAS equipment is designed to alleviate this problem. It was pointed out that while pilots were usually obliged by company rules to follow TCAS RA demands, in this case it appears that the Shorts 360 pilot pre-empted the RA and initiated a descent as a result of a TA. Members warned that any change in the vertical parameter within Class G airspace could be hazardous if a non Mode C-equipped ac is occupying the adjacent level.

ATC had given more information than was required under the RIS being provided to both pilots, and radar evidence showed that both ac, whose Mode Cs had been verified, maintained their respective quadrantal levels until after the

encounter. Some members questioned therefore whether this incident constituted an Airprox. However, while accepting that there may have been some erosion of the 500 ft vertical separation due to equipment tolerances, the Board concluded on balance

that the Shorts 360 pilot had a mistaken impression of loss of vertical separation from the PA23, and that there was no risk of collision.

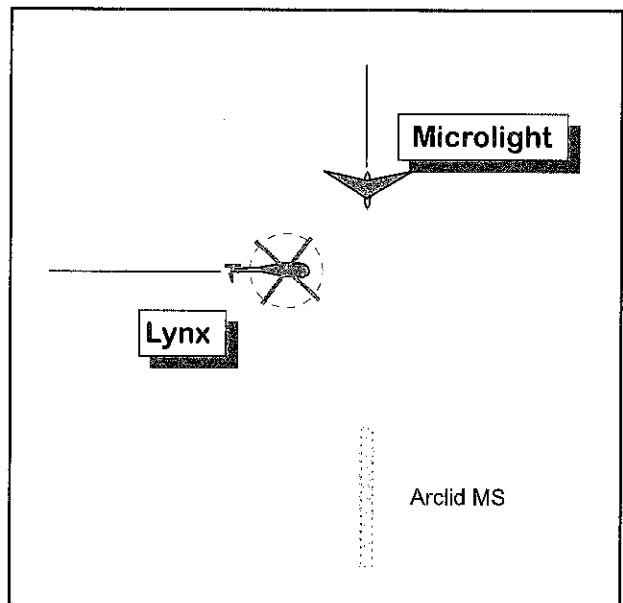
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Mistaken impression of vertical separation by the Shorts 360 pilot.

AIRPROX REPORT No 7/99

Date/Time: 11 Jan 1540
Position: N5309 W0220 (1 NM E of Sandbach)
Airspace: FIR (Class: G)
Type: Reporting Aircraft Reported Aircraft
 Microlight Lynx
Operator: Civ Pte HQ DAAvn
Alt/FL: 760 ft ↓ 500 ft (QFE)
Weather VMC CLNC VMC HAZE
Visibility: 10 km+
Reported Separation: 200 ft/ 500 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports heading 180° at 50 kt descending towards finals to his airstrip at Arclid. Passing 760 ft he saw a helicopter approaching in his 2 o'clock 500 m away crossing right to left so he discontinued his descent and the helicopter passed 200 ft directly beneath with a medium to high risk of collision.

THE LYNX PILOT reports heading 090° at 120 kt in transit at 500 ft agl when he saw a microlight high in his 10-11 o'clock area about 4-500 ft above and 0.5 NM away. There was no risk of collision. He was following the line of the A534, about 500 m S of it.

Note: The Lynx's track as described would have taken it about 8-900 m N of the runway the microlight was aiming at and well inside the 1 NM radius airfield avoidance area marked on the military low flying chart. On 11 Jan 99, relevant orders in the UK LFHB (Edition 85) were as follows:

Ch 1 Para 13. Aircraft are judged to be low flying when . . . helicopters are at less than 500 ft msd ... All military ac flying below 2000 ft msd in the UKLFS are to be flown in accordance with LFS restrictions, (including:)

Ch 1 Para 24o (1). Microlight Sites . . . listed are to be avoided by 1 NM and 2000 ft agl but these criteria do not apply to light fixed wing ac and helicopters flying at speeds below 140 kt which are to operate under the see and avoid principle.

While the microlight site was not included in the UKLFHB under MS in LFA8, it was shown on the LFC at least as early as Apr 98.

HQ DAAvn comments that the microlight's phase of flight (finals), location (within the LFS avoidance area), poor conspicuity and relatively poor mobility may all have enhanced its pilot's concern over the risk of collision and account for his closer estimate of proximity than the Lynx pilot's. In the event the microlight had been seen eliminating any risk of collision. However, although the Lynx pilot was entitled to be where he was, this Airprox would have been avoided altogether had a wider berth been given to the landing site. This would normally be expected as a matter of airmanship.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

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

recordings and reports from the appropriate operating authorities.

Members agreed that the helicopter pilot was not infringing any regulations and this prompted a query as to whether microlight pilots operating at a site known to have been given avoidance status by the MOD were aware that this did not apply to light ac and slow helicopters. It was suggested that a copy of the report into this incident should be forwarded to the BMAA as information for its members. Aside from the legality, the Board agreed with DAAvn that without an operational need to transit the site it was inconsiderate on the part of the Lynx crew to route as they did. Although there was clearly no risk of collision in this case because the microlight pilot saw the danger in good time, the Lynx crew did not see the microlight in time to turn to go behind it. (It was also pointed out that microlights were hard to see which was a further reason for avoiding known sites.) The microlight pilot was therefore forced to abandon his approach to avoid the Lynx's wake, an encounter with which could have been very dangerous. Members concluded that the cause of the Airprox report was that the Lynx flew close enough to the microlight to cause its pilot concern for the safety of his ac.

AIRPROX REPORT No 9/99

Date/Time: 14 Jan 1345

Position: N5220 E0055 (5 NM ESE of
Honington)

Airspace: FIR/LFS (Class: G)

Reporting Aircraft Reported Aircraft

Type: JetRanger Harrier

Operator: Civ Comm HQ STC

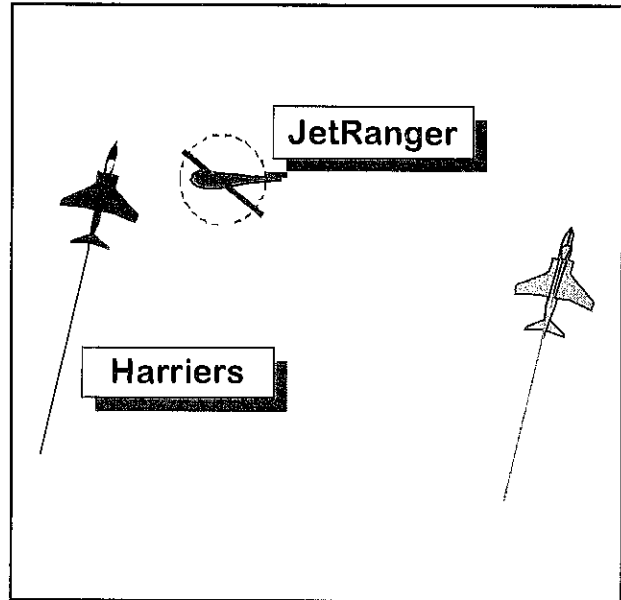
Alt/FL: 100 ft 250 ft
(agl) (msd)

Weather VMC CAVK VMC CLNC

Visibility: 10 KM+ 5 km+

Reported Separation: 75 m

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETRANGER PILOT reports heading W at 40 kt on a powerline inspection at 100 ft agl with the wires on his left, the same side as his observer. He was receiving a FIS from Norwich Approach on 119.35. He saw a Harrier 200 m away in his 10 o'clock crossing left to right slightly higher; he instinctively lowered the collective fully to initiate a rapid descent and the Harrier passed some 75 M ahead with a high risk of collision. He expressed the need for a system by which his activity could be notified to the military since neither the CANP nor the PINS was applicable.

THE HARRIER PILOT reports flying a low level sortie at 420-480 kt in the area of the Airprox but neither he nor his wingman saw the helicopter which was not visible on the 22° angle colour video recording of the sortie.

Note: Recordings of LATCC radars show the helicopter tracking NE to the E of the Airprox position some minutes before the incident and SE from the Airprox position some minutes afterwards, but not for the 4 minute period around the incident. During this period the Harriers can be seen tracking 016° through the area; the left one passing just W of the position at 600 ft Mode C which equates to 2-300 ft agl taking the local QNH (1006 mb) and the local terrain elevation into account. The RH one

passes 1.5 NM to the E of the position; this could explain why the helicopter pilot only saw one Harrier.

HQ STC comments that the difficulties associated with seeing a slow moving ac at low altitude are well documented. In this instance the Harrier pilots did not see the JetRanger which was slightly below their level, further exacerbating the task of visual acquisition. The JetRanger pilot is to be commended for maintaining his lookout scan and reacting appropriately.

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.

As with an earlier incident considered at the same meeting, it appeared to some members that from the JetRanger pilot's height, his estimation of vertical separation constituted an allegation that the Harrier was operating below its MSD. This was not supported by the recorded Mode C readings. It was also pointed out that RAF aircrew are aware that the RAF Police carry out random monitoring of the

heights of low flying ac using SkyGuard radar, in addition to the continuous recording of ATC radars, and Sky Guard has shown no infringements in the last 12 months. Fast jets had a good head-up display of radar height, and maintenance of a specified MSD is not difficult. Members were also aware that the sudden appearance of a fast jet in circumstances like these often made it look closer than it was.

Members then addressed the circumstances surrounding conflicts between helicopters carrying out this kind of work and low flying military ac. Some small built-in separation exists between the military MSD (usually 250 ft) and the height flown by a helicopter inspecting minor power lines (100-150 ft) and if neither pilot sees the other they should still not collide. However, members accepted that occasions

such as this will arise in which a fast jet pilot will find himself closer to a helicopter than is desirable for its comfort or safety and will do what he can to increase the separation if he sees it. In this case the Harrier pilot did not see the JetRanger and it did not appear on the Harrier's HUD recording; members wondered if it was in fact further off his track than suggested by the JetRanger pilot's report. If the pilots had seen the conflict earlier they would probably have manoeuvred to increase separation and the Board concluded that the cause of the Airprox was that the Harrier pilot had not seen the JetRanger. As to the risk level, the Board assessed that because the ac had passed fairly close without the Harrier pilot seeing the JetRanger, the safety of the ac had been compromised.

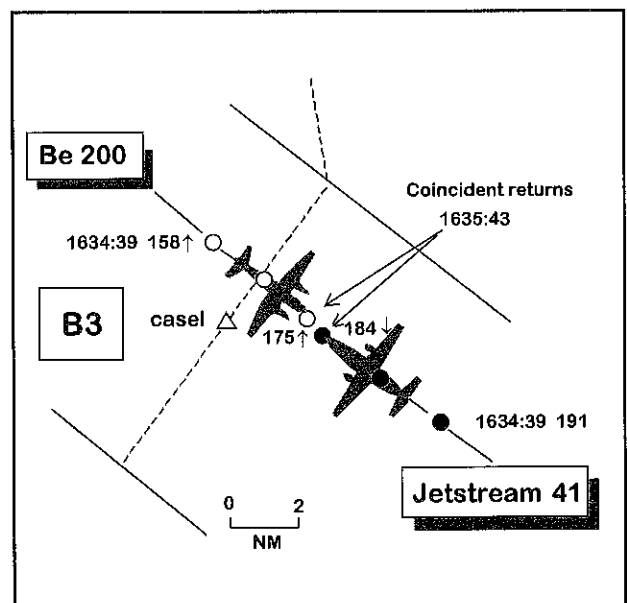
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Harrier pilot did not see the JetRanger.

AIRPROX REPORT No 10/99

Date/Time: 15 Jan 1636
Position: N5355 W0405 (24 NM SE IOM VOR)
Airspace: Airway B3 (Class: A)
Reporter: Manchester ACC
First Aircraft: Jetstream 41
Second Aircraft: Be 200
Type: CAT
Operator: Civ Pte
Alt/FL: ↓ FL 180 ↑ FL 190
Weather: VMC
Visibility: VMC
Reported Separation: 0.6 NM/600 ft
Recorded Separation: 0 NM/700-800 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

MACC reports that the Jetstream was tracking NW on airway B3 inbound to Belfast City. The ac had been cruising at LATCC assigned levels but requested a lower level and was accepted into W/IOM sector descending to FL 180. The Be 200 was climbing out from Ronaldsway on B3 to FL 170 in opposition to the Jetstream, and was given further climb clearance to FL 190 before the Jetstream reported on frequency in the descent. The Airprox occurred just as the Jetstream was levelling at FL 180 and being transferred to the Scottish Antrim sector. The Manchester Radar controller concerned did not recollect issuing the climb instruction to FL 190 to the Be 200 although he had annotated the FPS accordingly. Minimum separation was believed to be in the order of 0.6 NM and 600 ft.

Investigations revealed that the Jetstream was correctly accepted into the sector by the coordinator and pointed out to the radar controller. The radar controller, even immediately after the incident, was convinced that the Be 200 was climbed only to FL 170 because of the traffic at FL 180. He recognised the strip marking climb instruction to FL 190 had been annotated by himself, and accepted that he must have issued such an instruction but could not recollect doing so.

UKAB Note (1): As neither the Jetstream nor the Be 200 pilot was aware at the time that an incident had occurred they were unable to submit a report.

ATSI reports that at the time of the Airprox the MACC West Sector was manned by an 'R' (radar) Controller, plus a trainee 'C' (coordinator) Controller (an experienced controller whose Certificate of Competence had lapsed) who was being supervised by a suitably qualified mentor. The 'R' Controller assessed his workload as "average" while the 'C' mentor described his as "low". The relevant ATC equipment was serviceable and no factors likely to have adversely affected the performance of the controllers involved were identified during the course of the investigation.

After departure from Ronaldsway, the pilot of the Be 200 established communication with the MACC West Sector at 1630:00 and reported climbing to FL 70. The 'R' Controller instructed the flight to squawk 'ident' and issued clearance for further climb, initially to FL 130 and then 2 min later, to FL 170.

The Jetstream was cruising westbound along Airway B3 at FL 200, under the control of the LATCC Wirral Sector. (In the portion of B3 in question, FL 200 and above is under the jurisdiction of LATCC). At 1632:30, approximately 30 seconds after the Be 200 had been cleared to FL 170, the LATCC Wirral Sector, during the course of telephone co-ordination with the trainee 'C' Controller, requested permission for the Jetstream to descend to FL 180, into MACC West's airspace.

The trainee 'C' Controller approved the Jetstream's descent to FL 180 having correctly assessed that the only potentially conflicting MACC traffic was the Be 200, which had only been cleared to FL 170, although its requested cruising level was FL 190. The Sector was provided with a Ronaldsway departure FPS, displayed under the 'IOM' strip designator, and a Wallasey ('WAL') FPS on the Be 200 and both had been annotated appropriately to indicate the flight had been cleared to FL 170. The trainee 'C' Controller brought the 'R' Controller's attention to the fact that the Jetstream was descending to FL 180 and prepared a pink FPS, showing the callsign and the fact that the ac was cleared to FL 180, to act as an aide memoire. The 'R' Controller acknowledges that these actions were taken but he did not comply with the unit MATS Pt. 2 requirement to tick the level to confirm acceptance.

Despite having acknowledged that the Jetstream would be descending to FL 180, at 1633:30, less than one minute later when the subject ac were head-on at a range of approximately 18 NM, the 'R' Controller cleared the Be 200 to climb to FL 190. At that stage the Jetstream had not vacated FL 200 and the Be 200 was just approaching FL 140. The 'WAL' FPS on the Be 200 was annotated to indicate that the clearance to FL 190 had been issued.

The trainee 'C' Controller and her mentor remained under the impression that the Be 200 had only been cleared to FL 170. The relevant recording shows that the trainee had been engaged in an operational telephone conversation at the time the Be 200 was cleared to FL 190 by the 'R' Controller, which would explain this. Due to the nature of their task, 'C' controllers cannot be expected continuously to monitor the actions of their 'R' controller and, whilst it is unfortunate, errors can go undetected, as on this occasion.

Following the co-ordination with LATCC regarding the Jetstream, the MACC controllers assumed that the flight would remain with LATCC and be transferred straight to ScACC, despite the fact that it would be descending into MACC airspace. (The pink FPS was marked with a 'V' to indicate this.) No satisfactory justification for this assumption has been established because the subject of whether or not the Jetstream should be transferred to MACC was not discussed during the co-ordination with LATCC and neither was any decision reached as to who should pass the revised level to ScACC. However, the LATCC controller did undertake to amend the Jetstream's level in the Host Computer System (HCS), thereby ensuring that FPSs on the flight would be printed at MACC. At LATCC it was assumed that MACC would wish to work the flight and it was transferred, establishing communication with MACC at 1634:30. This was one minute after the Be 200 had been cleared to FL 190 and should have served as a prompt, albeit an unexpected one, that the climb clearance issued to the Be 200 was potentially unsafe, but it did not do so.

When the pilot of the Jetstream contacted MACC, his ac was descending through FL 190 with the Be 200 in its 12 o'clock position, at a range of about 9 NM climbing through FL 158. Thereafter, the subject ac continued to converge head-on with vertical separation reducing. At 1635:05, by which time the ac were about 5 NM apart, their SSR labels started to flash indicating the activation of the STCA. Again this did not draw the attention of the MACC controllers to the error which had been

made and, at 1635:20, while the SSR labels continued to flash, the MACC 'R' Controller transferred the Jetstream to ScACC. The radar returns from the subject ac merged at 1635:45, as the Jetstream passed virtually overhead the Be 200, with an estimated vertical separation of 900 ft. Neither crew were aware that an incident had occurred.

The Jetstream called the ScACC Antrim Sector at 1635:40. By the time the pilot had completed his transmission the ac had passed. Thus, it was too late for the Antrim Sector, being operated by a trainee controller under supervision, to intervene. No reference to the incident was made on RT but the mentor promptly rang MACC and spoke to the trainee 'C' Controller, enquiring what had happened because, in his opinion, the subject ac had been involved in an "airmiss". It is evident from the recording of the ensuing conversation that the MACC controllers remained unaware that the incident had occurred.

The ScACC Antrim Sector mentor and trainee do not warrant criticism for their role in the Airprox. The Jetstream was just passing overhead the Be 200 as it contacted them, so there was no time to issue avoiding action. They had observed the activation of the STCA but the ac concerned were in MACC's airspace and, not unreasonably, they had presumed that the Be 200 would level at FL 170 thus retaining standard vertical separation. One further consideration is that the Antrim controllers were confused by the fact that the Jetstream was not at FL 200, the level at which they were expecting it to be transferred. After initially receiving advice that the Jetstream would be at FL 200, contradictory and confusing information on the flight's cruising level, originating from both LATCC and MACC, had reached ScACC but the correct up-to-date information had not reached the Antrim Sector by the time the Jetstream called them. The 3 ACCs involved carried out an investigation into what went wrong and appropriate action has been taken to help prevent any repetition of what appears to have been an isolated breakdown in the correct co-ordination procedures. Fortunately, in the event, the fact that ScACC did not have the up-

to-date level information on the Jetstream had no direct bearing on the Airprox itself.

The interviews with the MACC controllers did not provide any satisfactory explanation for the MACC 'R' Controller's error. He did not dispute the fact that the trainee 'C' Controller had pointed out that the Jetstream would be descending to FL 180 and acknowledged that an appropriate pink 'blocking' FPS had been provided. At the time of the Airprox, it appears that the 'R' controller had forgotten he had climbed the Be 200 to FL 190, despite having annotated the 'WAL' FPS to indicate this. It emerged that another controller, walking behind the sector, had observed the STCA alert but he, like the 'C' controllers, believed that the Be 200 was only climbing to FL 170 and dismissed it as a 'nuisance' alert. At interview, the MACC controllers all confirmed that there had been no undue distractions during the period preceding the Airprox which might have accounted for the 'R' Controller forgetting that he had cleared the Jetstream to FL 190 and failing to recognise the developing conflict.

UKAB Note (2): Pictures of the LATCC radars show the subject ac tracking towards each other on airway B3 to the SE of Ronaldsway, the Be 200 is climbing and the Jetstream is descending. At 1634:39 the ac are head-on 8.5 NM apart with the Be 200 climbing through FL 158 Mode C and the Jetstream descending through FL 191 Mode C. At 1635:43 the distance has reduced to 0.25 NM with the Be 200 passing FL 175 underneath the Jetstream at FL 184. Seven seconds later, at 1635:50, the ac have crossed and the Be 200 is climbing through FL 177 0.5 NM behind the Jetstream which is descending through FL 183. By interpolation the Jetstream passed directly over the Be 200 by 700 – 800 ft at about 1635:45.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the pilot of the Be 200, transcripts of the relevant RT frequencies, radar photographs and a report from the appropriate ATC authority.

The Board thought this was a very serious incident since quite a number of 'signals' were present that should have prevented the encounter, but these seemed to have gone unnoticed.

One, it was clear that the Jetstream had been properly co-ordinated into the W/IOM sector and acknowledged as such by the 'R' controller. Two, all of the relevant FPS were in place and correctly annotated (but see Note 1) including the Be 200's clearance to climb to FL 190. Three, both the Jetstream and the Be 200 were visible on radar and the trainee controller had pointed out the Jetstream to the 'R' controller at the time of the co-ordination. Four, both ac had established RT contact with the 'R' controller and although it was not clear what prompted the action, he cleared the Be 200 to climb to FL 190 after the co-ordination of the Jetstream descending to FL 180. Finally, the STCA had triggered and was flashing when the 'R' controller transferred the Jetstream to SCACC.

ATSI advisers provided further amplification to Members who discussed this with the information presented. In the end they were at a loss to imagine why the 'R' controller had not maintained adequate checks of his radar and FPS displays and had not kept up his mental picture of sector traffic. Moreover, the Board was disturbed to note that the STCA had been overlooked and/or dismissed as a 'nuisance' warning without establishing what had triggered it. Such actions render safety nets ineffective.

In conclusion the Board assessed that the MACC W 'R' controller caused the Airprox by climbing the Be 200 into conflict with the Jetstream.

UKAB Note 1: There was no tick on the temporary pink strip to indicate the 'R' controller's awareness of the co-ordination.

Members were divided over the degree of risk involved. Some felt that sufficient vertical separation existed to preclude the possibility of collision. However, the majority thought that such separation was purely fortuitous; none of the controllers concerned was aware, even

after the encounter, that the ac had been flying into conflict and no steps had been taken to

remedy the situation. The Board concluded that the safety of both had been compromised.

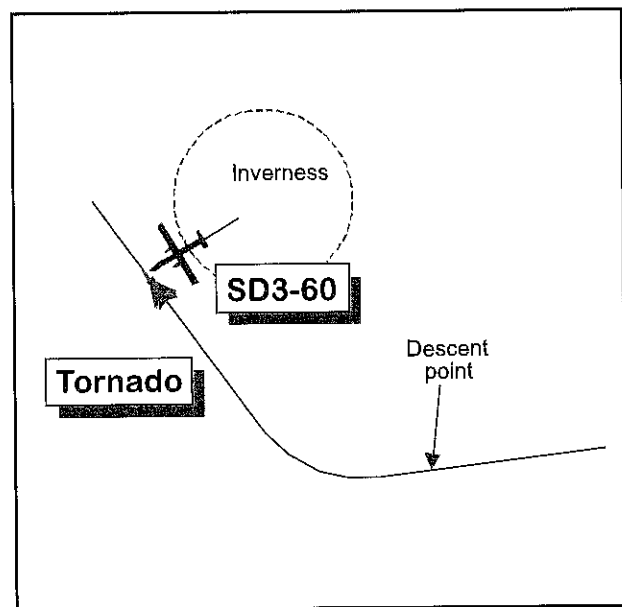
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The MACC W Radar Controller climbed the Be 200 into conflict with the Jetstream.

AIRPROX REPORT No 11/99

<u>Date/Time:</u>	19 Jan 1805	NIGHT
<u>Position:</u>	N5730 W0409 (4 NM SW of INS - elev 31 ft)	
<u>Airspace:</u>	FIR	(Class: G)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	SD3-60	Tornado GR
<u>Operator:</u>	CAT	HQ STC
<u>Alt/FL:</u>	1800 ft ↑ (QNH 987 mb)	2000 ft ↓ (Rad Alt)
<u>Weather</u>	VMC CLOC	VMC CLOC
<u>Visibility:</u>	10-15 km	
<u>Reported Separation:</u>	200 ft	
<u>Recorded Separation:</u>	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SD3-60 PILOT reports heading 240° at 150 kt in a climb after taking off from RW 24 at Inverness. He had been warned before take-off of a military jet routeing 5 NM S and then 2 NM W of Inverness and on departure had seen an ac at 9 o'clock whose relative bearing was changing slowly from L to R. He elected to continue climbing on runway heading and to delay a planned left turn onto the 194° radial. The military traffic which had been warned of his presence then turned right and descended; Inverness ATC transmitted a further warning of his position when the military ac continued its right turn and appeared to level off. Becoming increasingly concerned, he levelled at 1800 ft and maintained heading to watch the military ac pass directly overhead by about 200 ft. At the

time he had nav lights, red strobes top and bottom plus white wing tip and tail strobes. The landing lights were switched on to augment this but the military pilot reported his level as 2000 ft and that he had not seen the SD3-60.

THE TORNADO PILOT reports having contacted Inverness to inform ATC that he would be following 2 other Tornados and would be turning NW (from W) to pass abeam their field in 3 minutes, and descending from 2700 ft to low level just short of the turn. Inverness advised him of the SD3-60 departing, with its route, and asked him to advise on changing his level. Approaching his turning point 7 NM SE of Inverness he advised descending and during the turn and roll out he was looking for the SD3-60 believed to be left of his track and turning

onto S in the climb. Inverness gave the impression that the traffic was left of him but did not give a height; both crew members were looking in that direction and monitoring the TF system. After crossing the runway centreline at 2000 ft Rad Alt, heading 308° at 420 kt, he heard the SD3-60 pilot file an Airprox. He had not seen it.

INVERNESS ATC reports, with RT transcript, that the SD3-60 pilot acknowledged his take-off clearance at 1801:30 and the Tornado pilot called on the same frequency just over 10 sec later, advising south abeam in about 4 minutes, following the track of 2 previous ac. The controller told him at 1803:20 "*There is a Shorts 360 just departing RW 24, be turning left onto approximately the 194 radial . . .*"; the Tornado pilot replied that he was 10 miles from S abeam, adding that he was at 2700 ft on 997 mb (RPS) but would be letting down to low level. The controller asked the pilot to advise on changing level and checked that the SD3-60 pilot had copied the exchange. At 1804:20 the controller asked the Tornado pilot to report on seeing the SD3-60 adding that it was just airborne off RW 24, but there was no reply to this. Thirty seconds later the controller again asked the pilot if he could see the SD3-60 but he had transmitted at the same time as the Tornado pilot whose transmission over-ran his, ending ". . . low level" at 1805. The controller again asked "*are you visual with the Shorts 360*" and when the pilot said "*negative*", he replied "*It should be just, er to your left I believe and confirm your altitude now*". The Tornado pilot replied "*passing 2000 ft on 977*". The controller told him he was past the SD3-60 and advised him of another one climbing towards BONBY, after which the SD3-60 pilot filed the Airprox.

Note: In a subsequent discussion, the Tornado pilot stated that the height he gave in his last transmission above would have been his radar height. It appeared that he had not heard the crucial transmission about the SD3-60 being just airborne off the runway and he was asked if he could remember what he was doing at that point which appeared to be shortly before he began his descent. This was a TF descent and he said that although the pre TF checks would

have been completed earlier there would have been commentary within the crew about the performance of the system as it took the ac down to low level. He added that the route was not ideal in this respect; he was appointed late to the mission when the route had already been planned and as a course student he had not felt it his place to voice his reservation. In discussions after the incident he had suggested that they might have been wiser to have modified the route by descending earlier or later, rather than through the Inverness climb-out path.

ATSI comments that the Inverness controller, operating at a non-radar equipped airfield in the open FIR, did all that could be reasonably expected to try and avoid the conflict. Whilst it is unfortunate that the controller did not pick up the fact that the Tornado and the SD3-60 were reporting their altitudes with reference to QNHs differing by 10 mb this is not considered to have had any direct bearing on the Airprox itself. The relevant ATC Inspector addressed this matter during the course of the Unit Inspection in February. (The Inverness QNH was 987, the Tornado pilot reported on QNH 977 (the previous Tornado had reported on 997).

HQ STC comments that the main learning point from this Airprox arises from the Tornado crew's decision to initiate a high workload Terrain Following descent to low level, through the Inverness departure lane. Although this is class G 'see and avoid' airspace, the maxims of sound airmanship would point to the inadvisability of such a manoeuvre. Since this Airprox was filed, RAF Lossiemouth has assumed responsibility for providing a radar service to Inverness and incidents such as this should not recur.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

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

Members agreed with the Tornado pilot's comment about his routing and the choice of descent point and were briefed that changes had been made at unit level. HQ STC's comments on the reduced likelihood of a recurrence were noted by the Board, who remained less convinced, however. Radar performance in that local area was known to have limitations. Radar could have assisted in this instance to keep the SD3-60 away from the Tornado, but without it the Inverness controller, (aware of the passing Tornado), could possibly have asked the SD3-60 pilot to hold for a few seconds until the Tornado was out of the way. Although he had already cleared the SD3-60 to take off, the ac probably had not begun its take-off roll. That said, he had ensured the SD3-60 pilot was aware of the Tornado and the pilot was himself in a position to delay taking off into conflict with the fast jet.

But these considerations all enjoyed the benefit of hindsight and the Board concluded the cause

of the Airprox was that the Tornado pilot had not seen the SD3-60. It was unfortunate that the Tornado pilot had missed the crucial piece of traffic information about the SD3-60 being just off the runway but since he was aware of its departure, members were concerned that he had not queried its position at any stage. Again, this came back to the choice of position for the TF descent point; the pilot was faced with the unwelcome twin tasks of locating a conflicting ac and monitoring the TF, and it was felt he gave insufficient attention to the former. As to the risk level, some members considered that there was no risk of collision because the SD3-60 pilot who was watching the Tornado was content to hold track and fly directly under it, confident in his ability to avoid a collision. But most felt that 2 other important factors also had to be weighed; first it was night and a change of the Tornado's flightpath would have been difficult to detect, and second the Tornado pilot had not seen the SD3-60. Therefore the Board assessed that the safety of the ac had not been assured.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Tornado pilot did not see the SD3-60.

AIRPROX -REPORT No 12/99

Date/Time: 27 Jan 1206

Position: N5220 W0141 (3 NM SSW HON
VOR)

Airspace: CTZ (Class: D)

Reporting Aircraft Reported Aircraft

Type: Canadair CRJ 600 C150

Operator: CAT Civ Club

Alt/FL: 2500 ft 2250 ft
(QNH 1011 mb) (RPS 1012 mb)

Weather VMC CLBC VMC CLOC

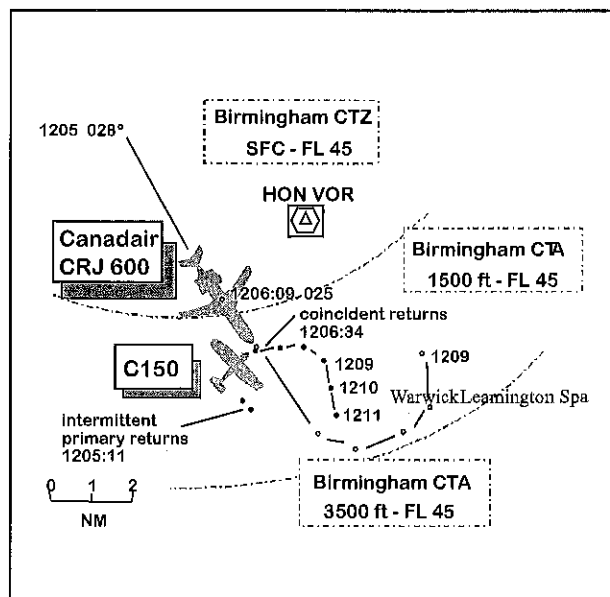
Visibility: 40 km 30 km

Reported separation:

Hor 200 m/Vert 100/200 ft

Recorded separation:

Hor nil Vert ?



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CRJ 600 PILOT reports heading 150° at 190 kt and level at 2500 ft (QNH 1011) while downwind in the radar pattern for RW 33 at Birmingham. He was receiving a radar control service from Birmingham APC on 118.05 and squawking 7433 with Mode C. The visibility was 40 km in VMC. Workload was slightly higher than normal due to pre-landing cockpit activities, with the Captain flying the ac and the FO operating the flight control panel and handling the RT. When about to turn L onto base leg about 6 NM SW of Birmingham airport, the Captain spotted a high wing Cessna-type ac at his 10 o'clock position range 200 - 300 m and about 200 ft below tracking away. As he would have flown directly over this ac by turning at that point, he delayed until it was well clear. It transpired that the FO had spotted the Cessna just before his Captain, in their 12 o'clock about 500 m away as it crossed from R to L.

The Captain thought there had been a high risk of collision and reported an Airprox to Birmingham ATC on 118.05.

THE C150 PILOT reports flying from Kemble to Coventry airport in VMC; the visibility was about 30 km. He was receiving a FIS from Brize Norton on 134.3. The transponder on his ac

was unserviceable. He had intended to contact Birmingham ATC and then Coventry; however, as he neared the M40 he became concerned about a weather front approaching from the W and, while considering whether or not he should turn back to Kemble, he held his position at the intersection of the railway line and M40 at 2250 ft (Cotswold RPS 1012) (but see UKAB Note). He then advised Brize that he was not proceeding to Coventry and that he was manoeuvring in the Leamington Spa area. Although he was aware that he was close to the Birmingham CTA, he believed from his map that he was flying under the sector where the CTA base was 3500 ft. He saw no other ac and turned S to route back to Kemble via Stratford-upon-Avon.

UKAB Note (1): In a subsequent telephone conversation, the C150 pilot said that his position while manoeuvring was at the junction of the railway line and the M40 about 4 NM S of Honiley. Although he was aware of his geographical location, for an inexplicable reason he thought at the time this put him in the 3500 ft sector of the CTA and therefore clear of CAS. Moreover, when asked his position by Brize he erroneously said that he was S of Leamington. He realised his errors in hindsight and could only explain them on the grounds of inexperience and inadequate map-reading; the incident had left him in a state of some shock

and he again expressed his apologies for the inconvenience caused.

The pilot subsequently sent a letter to the General Manager ATC at Birmingham airport freely admitting his error and apologising for his unauthorised penetration of the CTA. He regrets not calling Birmingham ATC for assistance as he intended to do, and believes this was the root cause of his problems.

BIRMINGHAM ATC reports that the CRJ 600 was being positioned downwind LH for RW 33 at an altitude of 2500 ft. As the ac turned towards base leg, the Captain reported a high wing ac in close proximity at a similar level and advised that he would be submitting an Airprox report. A primary radar return was seen at the position but because of its location was believed to be below CAS; the ac was not in contact with Birmingham. Brize was contacted and assisted in tracking and identified the ac as a C150 which was routing to Coventry from Kemble under a FIS from Brize. The pilot had decided not to proceed to Coventry and to return to Kemble; he subsequently telephoned Birmingham ATC to say that he had been at 2500 ft but had believed that he was S of Leamington-Spa at all times.

HQ MATO reports that the C150 pilot called Brize LARS at 1136:50 on 134.3 requesting a RIS at 1750 ft. Although this request can be heard quite clearly on the RT recording, the controller mistakenly believed the C150 pilot had requested a FIS (see Note below), possibly because several other ac during the session had requested the same service. The Cotswold RPS (1012) and a squawk were passed to the Cessna pilot who acknowledged, though shortly afterwards he advised LARS that his transponder was unserviceable.

At 1145, the LARS control position was handed over and the new controller asked the C150 pilot his final destination, which he said was Coventry. At 1203:50, LARS requested the C150 pilot to "*Report changing to Coventry*" which he acknowledged. At 1210:57 the C150's position was requested by LARS and the pilot replied "*.....just south of Leamington Spa and*

doing a few manoeuvres before proceeding to Coventry". The pilot was passed the Barnsley RPS (1007) at 1211:22. At 1216:08, the C150 pilot advised LARS that he had elected not to continue to Coventry after all, and was returning to Kemble via Stratford-on-Avon. At 1242, following a landline call from Birmingham and a period of track observation on radar, the LARS controller identified the C150 as the subject of an Airprox which had occurred within the Birmingham CTA.

Note: Considering the reported level of the ac (1750 ft), had a RIS been provided it is highly likely that the service would have been limited or even reverted to a FIS beyond 20 NM from Brize as the ac would then be close to, or below the base of, solid radar cover. In addition, the C150 would probably have been handed-over or freecalled to another unit at this stage as it approached its destination. The type of service provided is therefore not considered to have been a factor in the incident. The C150 pilot was clearly aware of his position when he reported it at 1210:57, and hence his vicinity to Coventry and the Birmingham CTA.

It is concluded that there are no military ATC factors involved in this Airprox.

UKAB Note (2): A replay of the Clee Hill radar at 1205 shows the CRJ 600 tracking downwind LH for RW 33 at 2800 ft Mode C about 5 NM NW of HON. At about the same time an intermittent primary radar return, believed to be the C150, can be seen manoeuvring about 5 NM SSW of HON. At 1206:34, the CRJ 600's contact, now indicating 2500 ft, merges with the primary return and then, having continued tracking 150° for a further 2-5 NM, turns L onto base leg for RW 33. Meanwhile, the primary return tracks E in a wide R turn and exits the 1500 ft sector of the CTA on a southerly heading to the S of HON at about 1213.

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.

Members felt that the C150 pilot's limited flying experience had led him into a series of positional errors which caused his unwitting entry into CAS. They were also concerned at his apparent lack of awareness on the weather situation which was likely to deteriorate en route and they questioned the effectiveness and source of his pre-flight preparation. Facilities for met briefing were not thought to be available at Kemble.

The Board concluded that a combination of erroneous map-reading and poor situational

awareness had led the C150 pilot inadvertently to penetrate the Birmingham CTA and cause the Airprox by flying into conflict with the CRJ 600, which he did not see. Opinions were divided on risk; some believed that the C150 was not, in effect, seen by the CRJ 600 crew until after it had passed through their 12 o'clock and therefore there had been a possible risk of collision. However, airline pilot members were satisfied that no collision risk existed as the C150 crossed some 500 m ahead and below the CRJ 600; there would have been time to spot and take avoiding action had the Cessna been higher. Most members accepted this and the majority conclusion was that there had been no risk of collision.

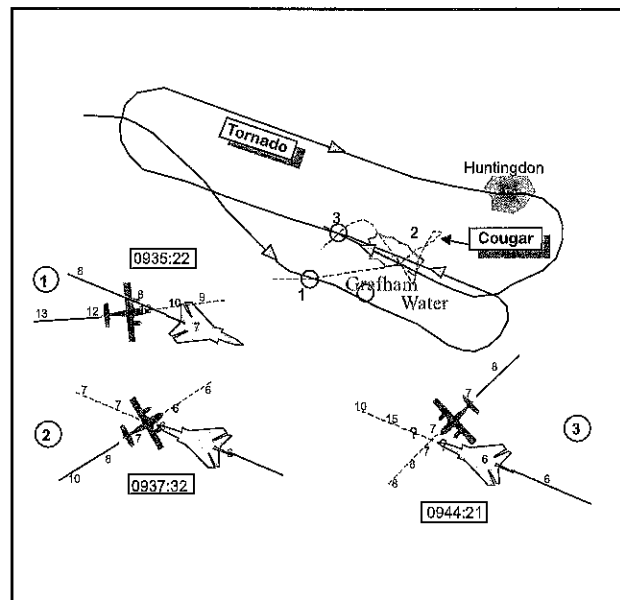
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Following an inadvertent penetration without clearance of the Birmingham CTA, the C150 pilot flew into conflict with the CRJ 600 which he did not see.

AIRPROX REPORT No 13/99

<u>Date/Time:</u>	27 Jan 0944	
<u>Position:</u>	N5219 W0022 (7 NM W of Huntingdon)	
<u>Airspace:</u>	LFS/FIR	(Class: G)
	<u>Reporting Ac</u>	<u>Reported Ac</u>
<u>Type:</u>	Tornado GR	GA7 Cougar
<u>Operator:</u>	HQ STC	Civ Trg
<u>Alt/FL:</u>	500 ft	
	(Rad Alt)	(QNH 1012 mb)
<u>Weather</u>	VMC CLNC	VMC HZNC
<u>Visibility:</u>	10 km+	5 km approx
<u>Reported Separation:</u>		300 ft
<u>Recorded Separation:</u>		N/K



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO CREW reports heading 291° at 420 kt on a LL exercise at 500 ft; while passing an IP the navigator spotted an ac 5 NM

in their 12:30-1:00 at the same level on a converging track. He called to the student pilot 3 times to pull up without effect so he pulled up using the rear control column, passing 300 ft

above and 30 ft from the other ac which was a low wing twin. Without the pull-up the ac might have collided.

THE GA7 PILOT reports flying various speeds, heights and headings in the area of Grafham Water while instructing asymmetric flight including simulated engine failures in low, slow high power situations. (He explained that he used the Grafham Water area to minimise the noise nuisance to the public.) He was in the area for about 30 minutes but did not see the Tornado – he suspected that its camouflage had been effective; a low sun in the morning haze did not help.

Note: LATCC radar recordings show the Tornado making 2 passes over its IP (the lake) and its target to the WNW. It first approaches the area from the NW and passes at 8-700 ft beneath the Cougar which is descending towards Grafham Water passing 1200 ft Mode C (① in the diagram). It then turns left and next crosses the Cougar's track over Grafham Water with no apparent plan separation at ②; the Tornado goes from 600 to 700 ft during this crossing while the Cougar goes from 700 to 600 ft. Finally, the Tornado turns right off its target and returns over Huntingdon for a re-attack; after the IP it converges at 600 ft on the Cougar which is closing in its 1 o'clock at 800-700 ft at ③ (the reported Airprox position). The Tornado's Mode C does not show on the returns immediately before or after the ac pass (possibly indicating a rapid change) and is next shown at 1500 ft, whence it returns to low level. The local QNH was 1014 mb and the terrain elevation in the area is in the order of 150 ft.

HQ STC comments that the factors evident in this Airprox appear in many of the incidents assessed by the UKAB. The following circumstances in this incident may have contributed to reduced lookout and increased the likelihood of an Airprox: operating at low level under high workload; crews engaged in flying instruction, manoeuvring within a relatively small amount of airspace and, significantly, operating over a significant VFR navigation point.

On the face of it the reported Airprox seems relatively benign, albeit fortuitous that the rear seat crewmember was able to assume control of the ac to initiate avoiding action. The second merging of flightpaths, as seen on radar, is perhaps more disturbing in view of the fact that neither of the crews saw the other ac. In the see and avoid environment, crews must recognise predisposing factors which will impinge on their ability to lookout, such as the factors listed above.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It seemed extraordinary to the Board that the ac involved in this incident could have come so close to each other on 3 occasions without the pilots seeing the other ac at all. It was surprising that the Tornado crew had not seen the GA7 as they underflew it in encounter ①, horrifying that neither crew saw or heard the other ac at encounter ②, and in encounter ③ very fortunate for all concerned that the Tornado crew flew this sortie in a 2-stick ac. The Board discussed which encounter to consider in this unusual incident and decided on the one reported; while the second one was clearly an A risk event, it was only disclosed as a result of investigating the third encounter which was the one reported. Members were advised that the nationality of the 2 Tornado crew members was not the same and that there may have been some language difficulty which resulted in the navigator having to take matters into his own hands. While regulations did not permit navigators to handle the ac in 2-stick versions, members agreed that judgement was required in circumstances not completely covered by regulations and that the navigator's actions in this instance were unchallengeable.

The GA members could understand why the GA pilot was doing this particular asymmetric exercise at low level in a non-supercharged ac

but considered that because of the attention it required to instrument indications, it was not safe to conduct it at low level in class G airspace where a constant lookout for fast-jets is required. It was very worrying that the GA7 pilot had not seen the Tornado, even while it was going away, in any of the encounters.

The Board concluded that the cause of the Airprox was a non-sighting of the other ac by

both pilots, fortunately resolved by the Tornado navigator. Members agreed that in the reported encounter (3) the Tornado navigator had seen the GA7 in good time and had intervened in a timely manner which removed the risk of the ac actually colliding. Despite this, the incident as a whole contained very sobering lessons for all concerned.

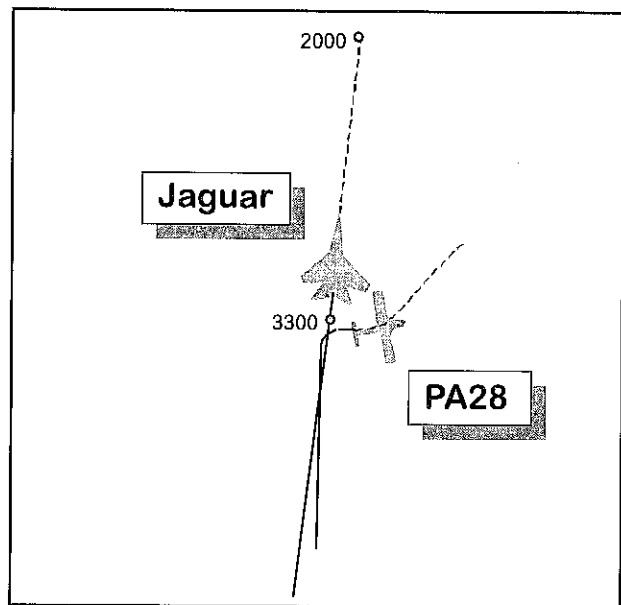
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Non-sighting of the other ac by both pilots, fortunately resolved by the Tornado navigator.

AIRPROX REPORT No 14/99

Date/Time: 28 Jan 1527
Position: N5155 W0132 (1 NM SE of Chipping Norton)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: PA28 Jaguar
Operator: Civ Trg HQ STC
Alt/FL: 2000 ft ↑ 2500 ft ↓
 (QNH 1015 mb) (Rad Alt)
Weather VMC CLBC VMC CLNC
Visibility: 10 km 15 km
Reported Separation: 300 ft/0.25 NM
Recorded Separation: 0.2 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports heading 340° at 75 kt in a climb on a general handling sortie. He was on the Oxford Approach frequency (125.32) but did not say what type of service he was receiving. He saw a Jaguar as it passed 200 ft below and 300 ft ahead, crossing from his 8 o'clock to his 1 o'clock in a descent. He continued his climb and assessed the risk of

collision as high. He reported the Airprox after landing.

THE JAGUAR PILOT reports heading 022° at 450 kt in a descent to low level. He had transited the Brize Norton overhead at FL 50 and left their frequency before starting his descent. He reported seeing a PA28 1 NM away and 2000 ft below and delayed his descent keeping it in sight to make sure it did

not turn left. He descended through its level when clear ahead on the left with it 0.25 NM away in his 4 o'clock. It was on a similar heading to him and there was no risk of collision at any stage.

HQ MATO reports that the Jaguar had left the Brize frequency at 1527:10 having stated he wished to descend VFR. The controller could see no traffic ahead of the Jaguar, although a PA28 in the Airprox position at 2000 ft would normally show on Brize radar. Had the PA28 made contact with Brize, traffic information could have been passed to both pilots.

Recordings of LATCC radars, not available at Brize, show that this Airprox occurred at about 1527:28. The Jaguar is shown passing 0.5 NM E Brize Norton, tracking 005° and squawking 3711 at 4900 ft Mode C (1013 mb). At 1526:46 the ac has just crossed the northern boundary of the Brize Norton CTZ (upper limit 3500 ft QNH) and is indicating 4700 ft Mode C as descent is commenced. The non-squawking PA28 can be seen in the Jaguar's 12:30 position, at 5 NM tracking about 008° for the 90 sec leading up to the Airprox. Subsequently the Jaguar turns right onto 012° and loses 2400 ft over the next minute, although the initial rate of descent appears quite low. At 1527:12, the Jaguar is passing 4100 ft Mode C, with its 3/A squawk in the process of changing, and the PA28 in its 12 o'clock at 2 NM on a similar heading. The closest point of approach is recorded at 1527:28 as the Jaguar passes about 0.2 NM W of the PA28, indicating 3300 ft Mode C, which equates to 3350 ft on the PA28's altimeter setting of 1015 mb, and squawking 7001. From the radar trail shown, the PA28 made a sharp right turn onto E about 15 seconds before the Jaguar passed behind it. The PA28's operator advises that the ac is fitted with transponder + Mode C and it was not logged as unserviceable on that day.

MOD (PE) comments that the Jaguar pilot saw the PA28 1 NM ahead when it was 2000 ft below, and delayed his descent, keeping it in sight to ensure there was no risk of collision. It is unfortunate that the PA28 did not show on the Brize radar and that its pilot had not contacted Brize for traffic information since this could have prevented 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 reports from the appropriate ATC and operating authorities.

The Board's task was complicated by the pilots' widely differing perceptions of the incident and the radar recording which differed to some extent with both of them. It seemed probable that the PA28 might have been in a right turn as the Jaguar passed and that the pilot mis-assessed the vertical separation, or the point at which it descended through his level. If the PA28 was at 2000 ft as he had said, the Jaguar passed some 1300 ft above it and was some 2 NM in his 10:30 when it descended through his level. The Board concluded that the incident was a conflict of flightpaths which was resolved by the Jaguar pilot.

The Board noted that the PA28 pilot could have made himself more conspicuous by squawking (which would have enabled Brize to give the Jaguar pilot more warning) and he could also have called Brize for a service.

In view of the timely sighting by the Jaguar pilot and his subsequent actions, the Board assessed that there had not been a risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Conflict of flightpaths resolved by the Jaguar pilot.

AIRPROX REPORT No 15/99

Date/Time: 29 Jan 1231

Position: N5244 E0005 (5 NM NW of
Wisbech)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: ATR42 KC135

Operator: CAT Foreign Mil

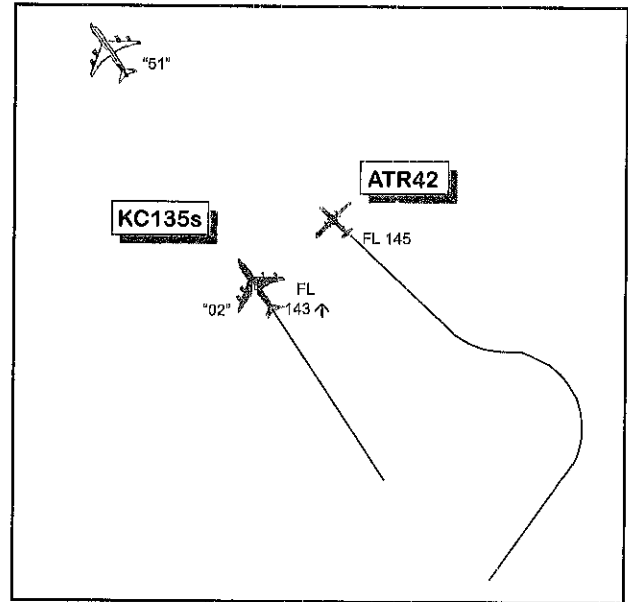
Alt/FL: FL 145 FL 145 ↑

Weather I/VMC CLAC IMC INCL

Visibility: 10 km 1000 ft

Reported Separation: 2 NM

Recorded Separation: 1.64 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR42 PILOT reports heading 330° at 260 kt, level at FL 145 under a RAS from London Radar. He had been vectored R to avoid traffic and then back on track. He heard the KC135s' c/s being cleared to climb through his level and the controller then told him to turn immediate R onto 360° with traffic in his 9 o'clock climbing through his level. Having just become VMC he asked for the range of the other traffic and was told it was 2 NM, but it looked closer. He thought there had been a moderate risk of collision.

THE KC135 PILOT reports heading 330° at 385 kt, climbing on a MLD 4 departure as leader of a pair with the same c/s name but with the numbers 51 and 02 instead of sequential numbers. The flight had been cleared to the block FL 210-230 and handed over to London Radar in about a 5 NM trail. London Radar amended their level clearance to FL 135 and FL 130 respectively due to traffic which was advised to them. Subsequently London Radar cleared c/s 51 to FL 200 and the leader called back immediately requesting a block altitude for both ac and was given one; both ac then resumed the climb. As c/s 02 was passing through about FL 160 London Radar called to ask why 02 was climbing as he was supposed to be at FL 130. At some point the ATR42 passed close to 02 but was not seen since both

ac were IMC at the time. It appeared that London Radar was addressing them as a flight on some occasions and not on others but none of the aircrew understood that they were being given separate clearances.

HQ MATO reports that the ATR42 was en-route from Stansted to Newcastle, level at FL 145 and receiving a RAS from London Radar (LRAD) Sector 12 (SEC 12) on 135.92. It was squawking 6126 with Mode C. The KC135 c/s 02, was the second of two KC135s and squawking 6152 with Mode C. The lead a/c, c/s 51, was about 5 NM ahead of his No.2, squawking 6151 with Mode C. The KC135s had departed Mildenhall and were climbing on a NW track in order to conduct AAR operations N of Flamborough Head. 02 was not yet visual with his leader, however the intention was for him to join 51 when VMC and operate as a flight between FL 210 – FL 230. Both KC135s were receiving a RIS from LRAD Sector 15 (SEC 15). Although they were identified as individual ac by the Lakenheath Departures controller, they were handed over together and checked in on frequency as a formation. Just before the handover SEC12 had contacted SEC15 by landline and they briefly discussed the options for separating their traffic. The plan was for SEC15 either to stop the climb of the KC135s beneath the ATR42 and/or turn them onto a northerly track, which would take them behind

it. Co-ordination was not agreed on the landline however, as this would be effected silently using the electronic data system, which is a normal operating method in the LRAD Ops Room, once the tankers were on frequency.

The KC135s established contact with SEC15 at 1226:50, with 51 taking the RT lead using the callsign 'c/s 51 flight'. The flight was identified, placed under RIS whilst climbing to FL 230 and instructed to turn R 360°. 51 however, requested to maintain the present hdg (330°), as the flight elements were not yet visual. This was approved, but a restriction of *"..not above FL 135"* was imposed by SEC 15, due to the silent co-ordination requirements with the ATR42. This was acknowledged by the lead a/c *"...we'll be levelling FL 135....c/s 51 flight"*. Shortly before 1228 02 was given traffic information for the join with his leader *"..right 1 o'clock 5 miles . . at FL 135"* to which 02 replied *"..levelling off 125"*. SEC 15 then passed traffic information *"c/s 51, traffic north-west 5 miles, tracking north-east, not below FL 145 under control of this unit"*. This traffic was the ATR42. 51 replied *"..(garbled) the traffic there, we're VMC at this time c/s 51 flight"*. In addition, the controller advised that the traffic had been co-ordinated. SEC 15 then gave 02 further positional information on his leader, during which 51 apologised to the controller and stated that c/s 51 flight were still IMC. As a result 02 agreed that he was happy to accept 500 ft separation from his lead whilst joining and SEC 15 transmitted *"c/s 02 roger, climb FL 130"*, which was read back correctly by 02. SEC 15 then advised *"c/s 51, I will be able to give you further climb shortly, once clear of traffic"*. During this period, SEC 12 had turned the ATR42 NE, across the track of the KC135s, in order to avoid other unknown traffic and shortly after doing so, the SEC 12 control position was handed over.

At about 1229:30, whilst in the process of conducting a radar handover of another track to Scottish Mil, the new SEC12 controller turned the ATR42 L hdg 290° in order to keep S of Holbeach Range (D207) and passed traffic information concerning the KC135s, *"co-ordinated traffic is south of you by a mile*

maintaining FL 135". (The separation was actually 3 NM.) At 1229:20, SEC 15 transmitted *"C/s 51 clear of traffic, continue climb FL 210"*, to which 51 replied *"....copied clear of traffic climbing to FL 210, wonder if we could get a block altitude of a thousand feet, 21-22, to let 02 catch up with us?"*. SEC 15 confirmed a larger block of FL 210 to FL 230, adding *"I'll be climbing c/s 02 1,000 ft below you"*. *"51 flight copies"* was the leader's response. SEC 12 completed the radar handover to Scottish Mil at 1230, shortly afterwards turning the ATR42 R hdg 320°. At 1231:10, SEC 12 transmitted *"c/s avoiding action, turn hard right hdg 360, traffic was SW 3 miles hdg N climbing through your level"*, which was acknowledged by the ATR42. At the same time SEC 15 queried 02 *"..just confirm, are you climbing?"* but there was no response to this, or to a further call seconds later. SEC 12 and SEC 15 briefly discussed the situation on the landline, with SEC 15 stating that only the lead a/c had been cleared to climb. Shortly afterwards 51 called 02 across to a different frequency *"2 – 51 go 340.7"* which was acknowledged. In the RT exchange that followed, SEC 15 explained to 51 that 02 had not been cleared to climb. By this time however, the confliction had passed and 02 was permitted to continue the climb and join his leader. At 1232, the ATR42 resumed its own navigation, having been informed by SEC 12 that the traffic was clear. The ATR42 pilot then discussed the incident on RT with SEC 12, specifically the separation distance on radar, stating that *"...it looked awfully close to me"* and he requested to telephone the controller after landing.

The LATCC Debden radar recording shows that this Airprox occurred about 18 NM NE Marham at 1231:13. The ATR42 is shown squawking 6126 and level at FL 145 Mode C throughout, whilst its track is seen changing from N, to NE across the path of the KC135s, and then back to NW, whilst following SEC 12's vectoring/avoiding instructions. The a/c that SEC 12 avoided, squawking 7000, with no Mode C is clearly shown tracking slowly E, as is another contact, without Mode C, which SEC 12 later co-ordinated with Marham ATC. 51 and 02, squawking 6151 and 6152, are shown having

departed Mildenhall, tracking NW and climbing to FLs 135 and 125 respectively. Initially faster than 51, 02's speed reduces to a slight overtake when the a/c are 3 NM in trail. Both tankers have a significant speed advantage over the ATR42, which, before vectoring, was 12 NM ahead of the lead a/c. The first indication of a climb is seen at 1230:16, when the Mode C's of both KC135s increase by 100 ft, with the first positive indication, based on the +/-200 ft level occupancy criteria, seen at 1230:29 as 51 passes FL 138 and 02 passes FL 134. At this point, the ATR42 is in a right turn onto 320°, with 51 3 NM W, and 02 3 NM SW of its position. The closest point of approach occurs between 1231 and 1231:17, where 02 is in the ATR42's left 9 o'clock, range 2 NM, passing FL 145 and on a 10° closing heading. By the time the ATR42 responds to the avoiding action turn, at 1231:36, 02 is already 500 ft above it and climbing.

Callsign confusion/misunderstanding features largely in this Airprox. The tankers checked in with SEC 15 as a "flight" and the controller's first transmission identified them as such. Subsequently, SEC 15 only used the specific c/s of the a/c being spoken to, however each time 51 responded, the c/s "C/s 51 flight" was used. This slight difference went unnoticed by the controller and both KC135 crews, presumably because they were each sure in their own minds of the situation. Whilst the SEC 15 controller was 'technically correct' in the phrasing of the RT transmission, considering the requirement for the KC135s to join visually, there would appear to be little benefit in climbing one a/c without the other following. Hence it was a rather naïve controlling technique to assume that 02 would not also climb. The lessons learned from this incident, highlighting the potential problems that exist when controlling this type of "flight", have been publicised widely within LRAD. It is unclear why 02 did not respond to SEC 15's calls once he had commenced the climb from FL 130, however by the time the a/c had been called, the closest point of approach had already 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 and reports from the appropriate ATC and operating authorities.

It appeared that the KC135 formation expected to be treated as a single speaking unit on arrival on the London Radar frequency and were not listening out for their individual callsigns which SEC15 used consistently (apart from correctly acknowledging their formation check-in). The advice given to the Board indicated that the crews may not have been aware that ac more than 1 NM apart and at the same level (or 3NM/1000 ft at the controllers discretion) will not be treated by a controller as a single unit. It would not be safe to do so in UK overland airspace in the lower levels; the airspace is too crowded. Controllers, however, are well aware that such a tanker formation aims to join up and will expedite this process when it is safe by issuing individual instructions to formation members. Furthermore, asking for a block altitude will not affect this situation as it only becomes effective when the ac arrive at their operating level.

Members noted the HQ MATO comment that SEC15 could have taken more note of the replies being received and deduced from them that the KC135s were assuming that instructions were addressed to them both, but this was clearer with hindsight than it may have been at the time. Members agreed, however, that with frequent crew rolements, it would have been wiser for the controller to expect some unfamiliarity with local procedures and be ready for the unusual. The KC135 operating authority advised that the rules regarding ATC for formations are copied into their own publications and the Board eventually agreed that the cause of the incident was that the KC135 02 pilot mistakenly climbed in response to an instruction given to his leader.

Members assessed that there was no risk of the ac actually colliding because of the existing

separation between the ac tracks and the timely avoiding action passed by SEC12 the ATR42 pilot.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The KC135 02 pilot mistakenly climbed in response to an instruction given to his leader.

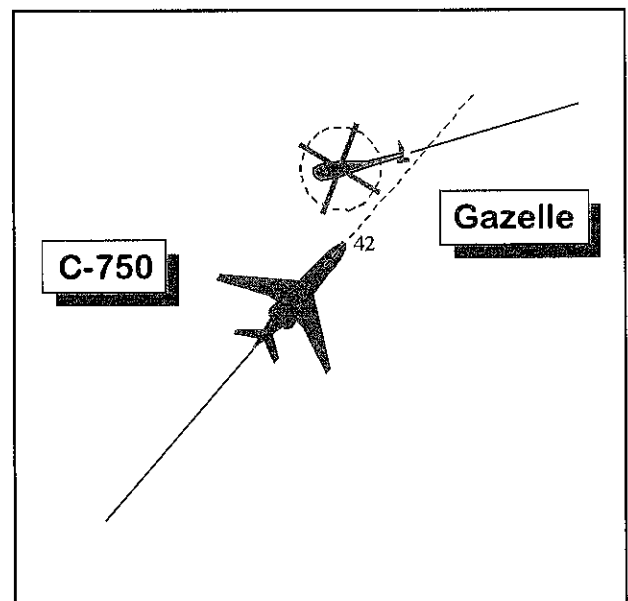
AIRPROX REPORT No 16/99

Date/Time: 4 Feb 1056
Position: N5111 W0115 (Popham)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Gazelle Cessna 750
Operator: HQ DAAvn Civ Comm
Alt/FL: FL 40 ↓ 3000 ft (QNH 1028 mb)
Weather VMC CLBL VMC
Visibility: 40 km+
Reported Separation: 100 ft/50-100 m
Recorded Separation: N/K

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports heading 265° at 100 kt and receiving a RIS from Wallop Radar at FL 40. At a very late stage he saw a low wing twin engined executive jet closing in his 10 o'clock. He made a descending right turn as it passed less than 100 ft above and 50-100 m to his left on a N easterly track with a high risk of collision. He reported the Airprox briefly to Wallop Radar. His workload had been high with his co-pilot under instruction and flying on instruments.

THE CESSNA PILOT reports heading NE and recovering to Farnborough while receiving a RIS from Boscombe Zone. This had been his 3rd similar flight from Farnborough in the week and he was aware of the extensive traffic at



lower levels and was using TCAS generated targets and altitudes to adjust his rates of descent and vectors. Although many ac were spotted he did not recall anything that would have constituted a near miss. As for the future, he would delay his descent below FL 100 until closer to Farnborough.

HQ MATO reports that the Gazelle free-called the Wallop Radar frequency (275.40) at 1012:35, requesting a radar pick up for operations within the Middle Wallop Instrument Flying Training Area (IFTA) between FL 35 and FL 55. Wallop Radar, a task undertaken by Boscombe Down (BDN) ATC, was bandboxed to the Boscombe LARS controller at the time and two other helicopters were on frequency.

With a third ac calling, LARS requested a separate Wallop Radar controller (WAL). A squawk was issued to the Gazelle; since it was not observed LARS transmitted at 1015:25, "*C/S, not yet identified, climb at your discretion, report established between FLs 35 and 55*", which was read back precisely by the Gazelle pilot. Following a face-to-face handover from LARS, WAL assumed control of the freq at 1016:20. Although the Gazelle was never formally identified or placed under a radar service by WAL, the Gazelle pilot received traffic information, throughout his sortie in accordance with a RIS, the usual service provided to ac in the IFTA, including details of ac in adjacent CAS.

At 1050:00, following a handover from London Mil, the C750 established RT contact with LARS, about 15 NM WNW of BDN, hdg 100°, level at FL 100 and was provided with a RAS. Having confirmed that he was VMC, the pilot accepted a downgrade to RIS for the return to Farnborough in order to avoid a substantial re-route. The C750 was subsequently descended to FL 55 and vectored clear of D127 and the Solent CTA before turning towards Farnborough. At 1055:10, the C750's descent was continued to 3000 ft, London QNH 1028 mb and at 1055:30, LARS gave traffic information "*C/S, traffic twelve o'clock, four miles manoeuvring, no height.*", which was the Gazelle. LARS then limited traffic information from all round as the C750 approached an area of high traffic density. At 1055:50, the C750 pilot transmitted "*Roger, we have a tally on that traffic, chopper*". The C750 pilot gave no indication of flying close to another ac.

At 1055:20, during the period that the C750 continued its descent, the Gazelle pilot reported hdg 270°, level at FL 40 and requested vectoring to BDN for a PAR. However, he was advised by WAL that BDN were too busy to accept him, and so he requested an SRA at Middle Wallop instead. Following two requests from WAL (at 1056:00 and :15), the Gazelle pilot again stated his heading and level (270°/FL 40) and at 1056:20 was instructed to descend to FL 30. The Gazelle pilot reported

the incident on RT at 1057:00 "*...for your information, I've just had a near miss with a fast mover on a north-easterly heading at four zero*".

The LATCC Pease Pottage radar recording shows that this Airprox occurred very shortly after 1055:56, albeit not reported by the Gazelle pilot until 1057:00. The C750 is shown squawking 3/A 2654, with the Mode C indicating a descent from FL 100 to FL 35, whilst it tracks SE, then NE as instructed by LARS. A radar return, believed to be the non-squawking Gazelle, can be seen manoeuvring within 3 NM of Popham, with 7 other ac, all squawking, within a 10 NM radius. Whilst there is no approved method available of identifying the Gazelle from the video alone, the traffic information calls given by WAL in the 5 min preceding the Airprox and the pilot's heading report, transmitted at 1055:20, correspond accurately with this contact. At 1055:03, when the C750 is 7 NM SW, but heading towards the Gazelle, the SSR label of the C750 overlaps with that of another ac, making the C750's Mode C almost impossible to see. The closest point of approach observed on radar occurs at 1055:56, when the C750 indicates FL 42 Mode C, with the Gazelle in its 12 o'clock, crossing from R to L. The edges of the displayed processed radar contacts are just touching, the horizontal separation being too small to measure. The subsequent radar sweep, timed at 1056:02, shows the C750 passing FL 40 Mode C, with the Gazelle emerging from an 8 o'clock position at about 0.75 NM. There is no indication of a track alteration by either ac. During this period, the Mode C of the C750 reduces at a steady 200 ft per sweep, which equates to a 2000 ft/min ROD.

The WAL controller did not formally identify or place the Gazelle under a service. However, the accuracy of the traffic information given to the Gazelle pilot in the minutes preceding the Airprox, which matches the video evidence, suggests it is reasonable to assume the controller had correctly established the identity of the ac. Thus, the Gazelle pilot received traffic information as if he had been provided with a RIS throughout his sortie. Although wholly responsible for maintaining separation from

other ac, he would also have been expecting timely traffic information on conflicts (as had been the case during the previous 40 min), and was probably surprised by the unannounced appearance of the C750. Within the fairly busy airspace adjacent to the Solent CTA and the London TCA, the WAL workload was assessed as medium, but complicated by the difficulty in maintaining track ident due to the Gazelle's lack of SSR. Within one minute of the Airprox, two events appear to have occurred simultaneously; a telephone call came in from another unit (requesting co-ordination from a different BDN controller) and the Gazelle's request for PAR with the subsequent refusal/change. Additionally, the overlapping of the C750's squawk, which also happened during this time, may have briefly disguised the ac's presence on the WAL radar display. Thus, the WAL controller became distracted by administrative tasks at a time when he could have reasonably been expected to have called the conflicting traffic.

The C750 received timely traffic information from LARS and reported visual with a helicopter some 10 sec prior to the Airprox.

HQ DAAvn comments that under a RIS traffic information on the C750 could reasonably have been expected by the Gazelle, and as such the lack of any warning is arguably the major contributory factor to this Airprox. Notwithstanding that there are a number of other factors which the aircrew can learn from: firstly no radar service was formally offered following the initial calls and it is fortunate that the assumption made by both the crew and controller as to the service being provided was as both expected.

Secondly, it is a little surprising that the Gazelle crew did not see the C750, and crew will be reminded of their responsibility to maintain separation and lookout under a RIS. Finally, this Airprox demonstrates the value of the SSR, and although the Gazelle was permitted to establish itself in the IFTA with no squawk, the subsequent increase in controller workload combined with a manoeuvring ac made it hard to track. A local review of the SSR

requirements for training ac to enter the IFTA is under way.

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.

HQ DAAvn advised that it was advisable to be squawking as well as under a radar service while working in the IFTA with a student. Moreover, discussion continued as to whether it should be made mandatory when flying with IF screens up. However, the Board noted that the WAL controller had identified the Gazelle, knew its level and was giving it a service which amounted to a RIS. It was unfortunate that the controller was distracted at the critical moment when traffic information on the Cessna should have been passed. Even so, under a RIS, it was still the pilot's responsibility to see and avoid and the Board hoped that this would be emphasised by HQ DAAvn. The Gazelle pilot saw the Cessna very late and members concluded that this, along with the lack of traffic information from WAL, were part of the cause of the Airprox.

The Cessna pilot provided the briefest of reports and consequently it was not known if he remembered seeing the Gazelle. It was clear from radar that he had passed very close to it. He had been warned about it and said he saw it about 10 seconds before he is seen passing it on the radar recording but these timings depend on the synchronisation of the RT and radar recordings which is not always that accurate. There is no other helicopter near the Cessna at that point so what he saw was the Gazelle. However, the Cessna pilot had said he did not consider he had flown close enough to another ac to consider it an Airprox situation. Members concluded that if he saw it and did not turn to give it a wider berth then part of the cause was that he had flown close enough to the Gazelle to cause its pilot concern for the safety of his ac.

The Board was concerned to hear the Cessna pilot was referring to his TCAS in Class G airspace, where many ac are not squawking (like the Gazelle) and against which it is non effective, and worse, it distracts from the task of keeping a diligent lookout.

Members accepted that the Cessna pilot saw the Gazelle in time to ensure that he did not actually collide with it and that there was therefore no risk of a collision in the incident, although the Gazelle pilot would not have known this at the time.

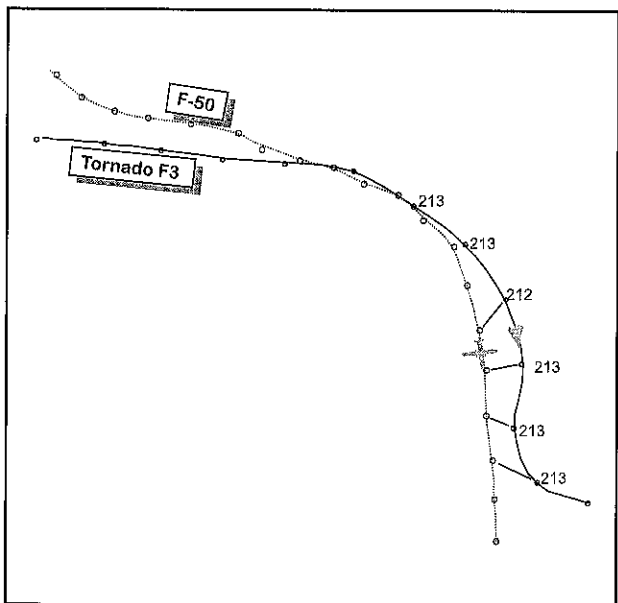
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Cessna pilot flew close enough to the Gazelle to cause its pilot concern for the safety of his ac, and a late sighting by the Gazelle pilot compounded by a lack of traffic information from WAL

AIRPROX REPORT No 17/99

Date/Time: 10 Feb 1839 NIGHT
Position: N5420 W0003 (13 NM N of Flamborough Head)
Airspace: FIR (Class: G)
Type: Reporting Aircraft Reported Aircraft
 Fokker F50 Tornado F3
Operator: CAT HQ STC
Alt/FL: FL 210 22000 ft (RPS 1008 mb)
Weather VMC CLNC VMC CLOC
Visibility:
Reported Separation: 0.5-1 NM/1150 ft
Recorded Separation: 0.62 NM / 300 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports heading 130° at 195 kt and receiving a RAS from Pennine Radar at FL 210, en route from Newcastle to Amsterdam. He was given an advisory avoiding action turn onto 100° for traffic closing from astern at the same level which then turned to follow him. Next he was turned R onto 180° and the traffic, having again turned to follow him, was seen in his 8 o'clock, level, about 0.5 to 1 NM away. It was then seen to turn towards him in his 9 o'clock before breaking away to the left; Pennine advised that there was no radar

separation at that point but his crew collectively estimated the other ac to have been 1000 to 1500 ft away. He thought the risk of collision might have been high.

THE TORNADO PILOT reports flying a night exercise which involved comms jamming. On handover to Neatishead he found that the frequency was being jammed heavily and although he was able to establish a FIS, the jamming may have interfered with a number of Neatishead's calls. Radar contact was made with an ac inside the exercise area close to the

pre-briefed position and height of his wingman who had taken off before him. He performed a radar locked intercept on this ac from 15 NM away; at 10 NM he was in his pre-briefed height block. At about 2 NM he could see that the ac was not his wingman but could have been one of the target ac. In the later stages it became clear that the ac was not one of the civil ac being used in the exercise (Falcon) so he disengaged, breaking away to the E. Throughout he had been vertically and visually separated from the F50 and there was no risk of collision.

PENNINE RADAR reports, with RT transcript, that the trainee controller saw a Neatishead squawk closing from the W on the F50 which he was providing with a RAS. He turned the F50 left onto 100° and called Neatishead to ask if the fighter could be given the identity of the F50 but voice connection was then lost. At that stage the 2453 squawk was in trail on the F50 and slowly catching it up at the same level. Although he turned the F50 R onto 180° the 2453 squawk followed, so he kept the F50 pilot informed until he saw the ac on his left wing; it broke away subsequently to the E. Further conversation with Neatishead disclosed that a jamming exercise had been in progress but he was unable to find out if the fighter could have identified the F50's squawk. The F50 pilot advised that the fighter had come alongside and turned towards him before banking away to the left.

Note: LATCC radar recordings show the F50 level at FL 210 and turning left and right in response to the Pennine radar controller's instructions, and the Tornado tracking E towards the point at which the F50 turns S. The F50 is at FL 210 throughout. The Tornado levels at FL 209 Mode C until it starts to turn right to follow the F50 and then flies between FLs 211 and 213 as shown in the diagram. Minimum separation as the Tornado comes abeam the F50 is 0.62 NM but the Tornado is in a gentle right turn which takes it slightly closer to the F50's track before it breaks away to the left.

RAF NEATISHEAD reports with RT transcript that at 1838:20 the Pennine controller called identifying the F50 by squawk, advising that the Tornado was at the same level and asking for

the Tornado to avoid the F50. The Intercept Controller (IC) replied that the Tornado was on a FIS. The Pennine controller replied "*I know he is but can you tell him that I'm sure he doesn't want to die so just tell him there's traffic in his 12 o'clock at the same level*". The IC transmitted to the Tornado "*C/s stranger 090/8 co-alt*", but jamming followed and no reply was recorded.

HQ STC comments that the fighter, operating in a demanding EW environment within the confines of an Air Defence (AD) training area, ADS6, effected a safe and expeditious radar join on an ac which he believed to be his wingman. The crew would have attempted to interrogate the Mode 1 and Mode 3 squawks of the target ac, based on pre-briefed discrete IFF codes, but a lack of response would not have constituted a positive non-friendly identification. With the information presented to the crew therefore, it was neither unsafe nor unreasonable for them to continue with the join. However, having received a stranger warning from the CRC and upon positive visual identification, the Tornado captain commenced a safe breakaway from the target and continued to his next objective. Had the ASACS (Air Surveillance and Control System) controller seriously believed that a flight safety incident was developing, he had the option of transmitting a stranger warning on Guard or calling for the jamming to be stopped. However, he rightly concluded that the Tornado had radar contact and would effect his own separation.

This incident highlights the potential danger of accepting a handover of ac from a non-ASACS agency onto a frequency which is being, or is likely to be, jammed. As a result, the following order has been issued (a) and recommendation (b) has been proposed:

a. All units are to ensure that under all exercise conditions, ac are passed to their controller via a marshalling position, which has access to an unjammed frequency and radar picture. This marshaller also acts as an assured point of contact for aircrew experiencing difficulties during the sortie and on recovery. Notwithstanding the limited time available for this marshalling phase when CAPs

are close to home bases, the information passed during this period is vital from both a tactical and a safety viewpoint.

b. That LATCC (Mil) or ScATCC (Mil) advise appropriate civil air traffic agencies when ASACS operations are subject to jamming. This, however, will only be effective if the civilian agencies react to the information and encourage traffic to use controlled airspace where available.

If civilian ac forgo the relative sanctuary of the UK airways system and operate within Class G airspace, incidents such as this are, to some degree, inevitable. Nevertheless, it is understandable that the F50 captain considered that the progress of his flight was impeded by the presence of the fighter and felt sufficiently concerned to file an Airprox. Although this exercise was notified and conducted in accordance with established procedures, further restrictions on the conduct of such minor exercises in the open FIR would be highly undesirable. Wider promulgation of such training events to civil ATC agencies may go some way, therefore, to increasing awareness of specialist AD activities. Once civil ATC agencies have been advised of such activity, they must make the judgement as to the most expeditious routing of their traffic, accepting that this will not always be a straight line.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear to the Board that there had been no risk of collision in the incident, although the F50 pilot would not have known that at the time. However, in providing a RAS, the Pennine controller had rightly tried to separate his traffic from the F3 which was in turn bent on negating his efforts. The result was a major and

unnecessary deviation of the F50 from its required routing and the Board considered that, even with comms jamming, in a peacetime environment it should be possible for the military to avoid causing such unwelcome action to an airliner. A member mentioned that similar deviations forced on airliners fitted with TCAS would produce even more extreme reactions with attendant passenger alarm.

Members considered that the HQ STC comment was overly defensive and rejected most of the final paragraph, pointing out that civil ATC agencies do not dictate routings. The Board felt that it would have been more useful to have been told what the military regulations and procedures were and to what extent they had been complied with. It seemed that the Neatishead IC was reluctant to call the F3 off, because the service provided was a FIS. When the IC did call, he advised the F3 pilot that his target was a 'stranger', but there was no information available to the Board to indicate how urgently, if at all, a pilot should react to such information or how. In particular members wanted to know whether it would indicate that an airliner might be involved. Comment was made that the IC did not repeat the 'stranger' call on Guard and there was no information to the Board on how feasible that would have been from his control position. Whatever the regulations, the Board felt that common sense had not prevailed and that since the IC knew, and his supervisor should have known, that the target was an airliner, the intercept should have been called off at an early stage. Without knowing what the SOPs were, however, the Board could only conclude that the cause of the Airprox report was that the F3 flew close enough to the F50 for its pilot to be concerned for the safety of his ac, although the Neatishead IC knew the F50 was an airliner.

There was unanimous agreement that regulations/procedures should be robust enough to prevent such unnecessary interference with civil passenger traffic. Accordingly the Board made a recommendation that HQ STC should review its procedures on interceptions to prevent recurrence of this type of incident.

PART C: ASSESSMENT OF RISK AND CAUSE

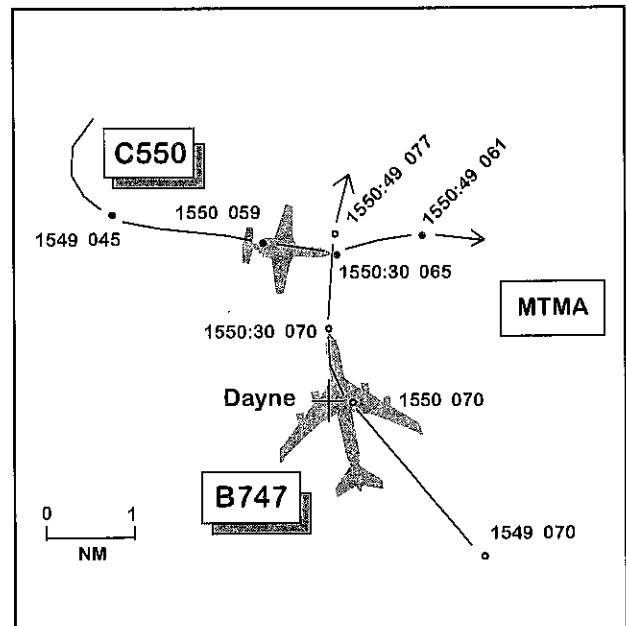
Degree of Risk: C

Cause: The F3 flew close enough to the F50 for its pilot to be concerned for the safety of his ac, although the Neatishead IC knew the F50 was an airliner.

Recommendation: That HQ STC reviews its rules on interception training so that the conduct of such activity does not give non-military or non-exercise traffic any cause for concern on safety.

AIRPROX REPORT No 18/99

Date/Time: 18 Feb 1551
Position: N5316 W0201 (10 NM SE Manchester airport)
Airspace: MTMA (Class: A)
Reporting Aircraft Reported Aircraft
Type: B747 - 436 C550
Operator: CAT Civ Pte
Alt/FL: FL 70 ↑ FL 60
Weather IMC IMC
Visibility:
Reported Separation: Not reported
Recorded Separation: 1 NM/500 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B747 PILOT reports that he was level at FL 70 in IMC, heading 330° and reducing speed through 250 kt. He was receiving a radar control service from Manchester Approach and squawking 5131 with Mode C.

When in the vicinity of Dayne, a TCAS TA indicated traffic at FL 60 climbing on a reciprocal track. An RA then followed demanding climb, which was initiated to FL 75 and, simultaneously, ATC alerted him to the traffic and instructed him to maintain FL 80. Shortly after this he was given descent clearance for Manchester. The other ac was not seen but ATC advised him that it had climbed through its cleared level and that vertical separation had reduced to less than 400

ft. He felt there had been a high risk of collision. (UKAB Note: The RT transcript reveals no mention of the observed vertical separation to the pilot of the B747).

THE C550 PILOT reports that he had departed from Woodford for Cambridge and was climbing to FL 60 on a heading of 110° at 200 kt in IMC. He was under the control of Manchester Radar on 119:40 and squawking 7427 with Mode C. As he approached his cleared FL the autopilot failed to capture and on passing FL 58 he took control manually; in the ensuing bunt and because of his high rate of climb, he was unable to prevent the ac topping at FL 65. The autopilot functioned correctly for the remainder of the flight both in climb and descent.

MANCHESTER ATC reports, with RT transcript, that the C550 was outbound from Woodford climbing to FL 60 and the B747 was inbound to Dayne heading 330° at FL 70. When the B747 was 2 NM S of Dayne, its pilot was advised that an outbound ac would be 1000 ft below his cleared level; the pilot replied that this traffic was indicated on his TCAS. When the C550 was then seen on radar to have climbed to FL 64, the B747 pilot was given an avoiding turn, whereupon he advised ATC that he was receiving a TCAS RA demanding a climb; he was instructed to climb to FL 80. When the C550 pilot was asked to confirm whether he was maintaining FL 60, he replied, "*standby, we have an autopilot problem*". (UKAB Note: The RT transcript shows that the controller gave avoiding action instructions to both pilots using the appropriate phraseology).

THE GENERAL AVIATION FLIGHT STANDARDS DEPARTMENT OF THE CAA

reports that the C550 had been involved in a similar level bust incident in Oct 1997. Appropriate written advice had been given to the Chief Pilot of the company concerned, in particular drawing attention to the need for robust procedures for ensuring that an ac does not pass through the height, altitude or flight level to which it has been cleared. Operators are warned that all autopilots can trip out occasionally or fail to capture, but in order to lead to a 'level bust' this has to be compounded by inadequate crew monitoring of the FMS.

UKAB Note : A video recording of the radar shows the B747 at 1549 tracking NW at FL 70 with about 2.5 NM to run to Dayne. At the same time the C550 is 3 NM NW of Dayne having just rolled out onto an easterly track and passing FL 045 following departure from Woodford. At

1550:30 the C550 passes 1 NM ahead of the B747 with its Mode C indicating FL 065, the latter having now passed Dayne and turned onto a northerly heading. Nineteen sec later the C550's Mode C shows FL 061. The minimum recorded separation is therefore in the order of 1 NM and 500 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

ATCO members commented that even when assigned a relatively low initial flight level, high-performance executive ac often adopted a high rate of climb; in this incident it was felt that even if the C550 had levelled off normally his high climb-rate would probably still have triggered the B747's TCAS equipment. As with all 'level busts' of this nature, the Board took the view that the responsibility for compliance with ATC level off instructions rests squarely with the flight crew through careful monitoring of the FMS. Pilots should be particularly vigilant when in a high climb rate because of the reduced reaction time available in the event of an autopilot malfunction. The Board concluded that the C550 pilot had caused the Airprox by exceeding his cleared level.

ATC instructions and the TCAS alert warning combined to enable a timely resolution of the conflict and members were satisfied that there had not been a risk of collision.

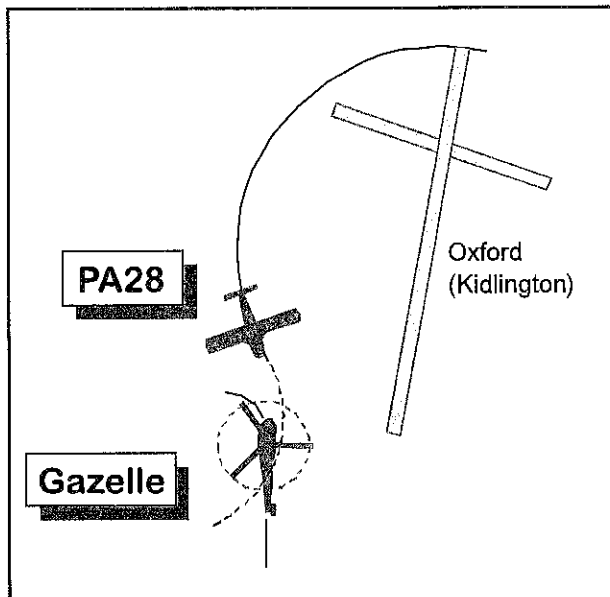
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The C550 pilot exceeded his cleared level

AIRPROX REPORT No 19/99

Date/Time: 16 Feb 1508
Position: N5150 W0119 (Kidlington - elev 270 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Gazelle PA28
Operator: HQ DAAvn Civ Trg
Alt/FL: 2100 ft 2100 ft ↓
(QNH) (QNH)
Weather VMC CLOC VMC CLNC
Visibility: 20 km 10 km+
Reported Separation: 60 ft/150 yd
Recorded Separation: N/K



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports heading 360° at 120 kt in transit at 2000 ft. He called Kidlington for clearance to transit their overhead; this was approved and he was given the QNH. He called when overhead and at the same time a non-flying pilot saw an ac approaching from the 11 o'clock and warned the handling pilot who took avoiding action, turning sharply left. The light ac passed 60 ft ahead, left to right with a very high risk of collision, and turned into their 6 o'clock. He informed Oxford ATC who said they were unaware of any other traffic in the area.

THE PA28 PILOT reports flying a standard overhead rejoin at Oxford from 2300 ft QNH and descending over the dead side to 1500 ft, at 95 kt. He had earlier heard something on Approach frequency about traffic transiting the overhead, but was then on tower frequency. He told his student to keep a good lookout for it and was doing so himself as they descended. They did not see the Gazelle approaching but were suddenly aware of it 250 yd away on a heading that would bring it very close so he took control for a break to the right before reversing, by which time it had passed 150 yd away and he continued into the circuit. He considered that he had not seen it earlier because it was camouflaged and below his level as it approached and the visibility into sun, whence it approached, was poor. He thought it would

have been more prudent to overfly at 2500 ft; the stream of joining traffic can be almost continuous.

HQ DAAvn comments that the aircraft commander involved in this Airprox has not been available to expand upon the requirement for his track to go overhead Kidlington rather than avoid the area. However, positive radio contact was made, clearly establishing the Gazelle's intention and should have been more than adequate to eliminate any conflict with local traffic, albeit not diminish the crews responsibility to lookout, which was poor in this instance.

It is surprising that Kidlington ATC seemed unaware of the PA28 when informed of the Airprox. Equally the PA28 pilot, having heard a message about traffic transiting the overhead (and into potential conflict) might have paid fuller attention to its import. It is of concern that this entirely avoidable Airprox took place and there are lessons both for aircrews and ATC.

Note: Unfortunately the Oxford ATC RT recording was not impounded. The controllers apparently did not recall an incident being reported so it is possible that the Gazelle pilot did not use the word Airprox in his report.

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 discussed whether or not the Gazelle pilot was wise to have routed overhead Oxford in the first place; it was pointed out that this is the 4th busiest airfield in the UK. The majority opinion was that he would have had to route close to Oxford to avoid other restrictions in the area such as the Brize Norton zone and D129, and so passing directly overhead would simplify navigation and give Oxford a more precise position for giving traffic information to other ac. In this respect, even though no ATC RT recording was available, it appeared that Oxford ATC, having cleared the Gazelle through at

2000 ft, should have collectively done more by informing both pilots about each other. Members considered that this was part of the cause. At the same time the Board agreed that the Gazelle crew should have been keeping a particularly sharp lookout and seen the PA28 earlier. Moreover, members were disappointed that having heard something about an ATZ crosser, the PA28 pilot had not pursued the matter to assess its relevance and seen the Gazelle earlier. As a consequence, members concluded that late sightings by both crews were also part of the cause.

Concerning the risk level, the ac had come fairly close and each pilot appeared to have perceived the other as late, crossing his nose and both had broken behind, ie towards each other. Because of this the Board concluded that the safety of the ac had been compromised.

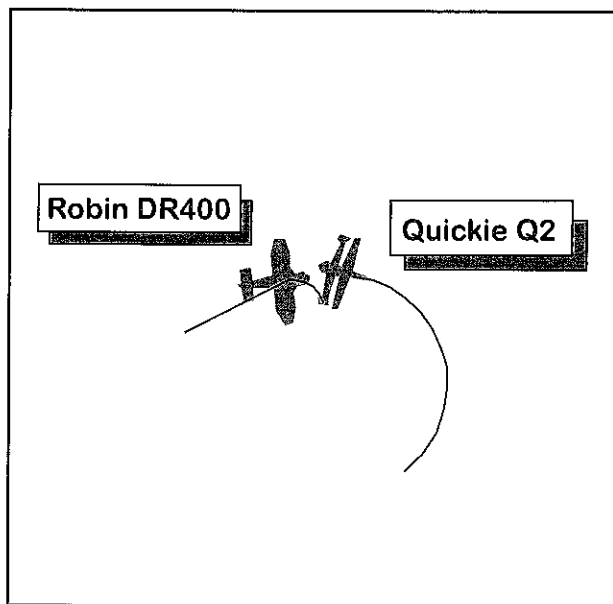
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Apparent lack of traffic information from Oxford ATC compounded by late sightings by the pilots of both ac.

AIRPROX REPORT No 20/99

Date/Time: 23 Feb 1440
Position: N5200 W0228 (6 NM SW Banbury)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Quickie Q2 kitplane Robin DR400
Operator: Civ Pte Civ Trg
Alt/FL: 2000 ft 2500 ft
(QFE) (QNH 1015 mb)
Weather VMC HAZE VMC
Visibility: 10 NM >10 km
Reported separation: Hor 50 ft/ Hor 10 m/
Vert zero Vert zero
Recorded separation: Unrecorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE QUICKIE PILOT reports that he was climbing out following departure from Enstone (elev 550 ft) for an airborne test of a newly fitted propeller. The visibility below cloud was a hazy 10 NM and a weather front to the SW gave a flat grey backdrop which reduced the conspicuity of ac oncoming from that direction. He had just levelled off at about 2000 ft (Enstone QFE 996) at 80 kt in a L turn through 300°, when a movement to his L caught his eye and he realised that an ac was heading straight at him 100 - 150 yd away at speed. He immediately dived in avoidance and the other ac passed about 50 - 100 ft behind his L shoulder with no visible signs of taking avoiding action. He felt there had been a very high risk of collision. Following the encounter he chased the ac and observed its registration from a range of about 100 m. The pilot comments that his white ac should have been visible to the other pilot against the sunlit ground and he was shocked that he had not been seen. He calculated that he had a maximum of 2 sec to react from first sighting the other ac, a Robin DR400, and his avoiding manoeuvre had little effect on enhancing separation.

THE ROBIN DR400 PILOT reports that she was heading 076° at 90 kt and cruising at 2500 ft (QNH 1015) having departed from Turweston on her first solo cross-country exercise. The visibility, below cloud, was over 10 km. The other ac, a low wing type, pale blue and white in colour, appeared suddenly at her 11 o'clock about 50 m away at the same level on a reciprocal track. She turned R in avoidance and the other ac dived, passing about 10 m to her L with a high risk of collision. She could only assume that she had not seen the other ac earlier because it had come up from below her.

The pilot says that she was just recovering her composure and regaining normal navigation when the other ac formed off her starboard wing. She comments that she objects to such actions even if carried out with the aim of noting her registration details.

UKAB Note: Both pilots' reports indicate that the incident occurred about 6 NM SW of Banbury in the vicinity of Hook Norton village. Neither ac carried SSR equipment and no primary returns relevant to the subject ac could be seen on the radar 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.

This serious encounter took place in Class G airspace in reasonable, albeit hazy, VMC and members discussed the relative abilities of the two pilots to 'see and be seen'. The DR 400 pilot was flying solo from the LHS and her view to the R and downwards, from whence the Quickie was climbing, was blanked by the Robin's starboard wing. Moreover, the time available to her for sighting the other ac following its recent departure from Enstone was limited. Consequently, members felt it unsurprising that she did not see the Quickie until it appeared late at her 11 o'clock at co-altitude. Turning to the Quickie pilot, members took the view that it was his responsibility to clear the airspace into which he was climbing and turning and, given the reduced visibility reported towards the direction of the turn, he should have been particularly wary of traffic approaching from that direction. Overall, the Board considered that of the two, the Quickie pilot had the better opportunity to spot the DR 400 and that his very late sighting was the cause of the Airprox. While understanding the Quickie pilot's desire to identify the Robin, general aviation members did not approve of his forming on the ac which was disconcerting for the Robin pilot and is also contrary to the Rules of the Air (Rule 17 (1) (c)).

Both pilots reported similar very close lateral distances with no vertical separation, and members felt that only their combined actions saved them from colliding. It was concluded, therefore, that there had been an actual risk of collision.

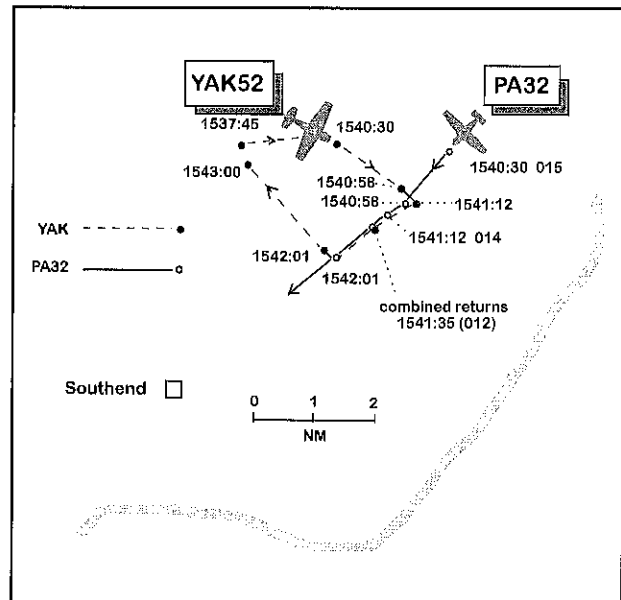
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Late sighting by the Quickie pilot.

AIRPROX REPORT No 21/99

Date/Time: 23 Feb 1542
Position: N5137 E0047 (4 NM NE Southend)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: PA32 YAK 52
Operator: Civ Pte Civ Pte
Alt/FL: 1050 ft ↓ 1500 ft ↑
(QNH 1015 mb) (QNH 1014 mb)
Weather VMC CAVOK VMC CAVOK
Visibility: 20 NM
Reported separation:
Horiz 100 m
Vert zero



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA32 PILOT reports that she was acting as safety pilot while the handling pilot was making a procedural ILS approach at 90 kt to RW 24 at Southend. The visibility was 20 NM in CAVOK. When fully established on the ILS and descending through 1000 ft (QNH 1015) about 3 NM from touchdown, a Yak appeared from behind their port wing tip and overtook them 50-100 ft away at co-altitude. Having drawn about 100 m in front, still level, the Yak rolled slightly R and L and then made a climbing turn to the R. No avoiding action was taken as the ac was much faster than they were and was passing them when first seen. However, she felt there had been a high risk of collision and immediately reported an Airprox to southend ATC.

UKAB Note (1): In a subsequent conversation with UKAB staff, the PA32 pilot was adamant that the Yak was not more than 10 ft above her level when it appeared on her port side. It then

pulled in front of them, at what seemed to be about eye level, before turning R and climbing away. The ac's sudden appearance took her by surprise and caused her and her colleague considerable alarm.

THE YAK 52 PILOT (PIC) reports that he was in the front seat while the ac was being flown from the rear by the P2 as part of a sortie to simulate flying a Yak 50 before converting to type. They were squawking 7000 with Mode C and listening out on Southend Approach (128.95), but did not call as the frequency was quite busy. Their speed was 120 kt. The P2 was briefed to follow the course of the river Crouch eastwards to a point 1 NM W of Burnham-on-Crouch and then turn R onto a reciprocal track. When 1.5 NM to run to this position, the PIC called traffic at 10 o'clock high flying from L to R, and the P2 acknowledged visual contact. In order to remain visual they stayed on heading until passing behind the other ac, believed to be a PA 23, and then

turned R, climbing to an extended echelon port position 200 - 300 m from it. As the other ac was seen to be on a steady heading and descending, and being aware of the proximity of the Southend ATZ and that there was further traffic (which they could not see) inbound to Southend, they continued to climb until clear of the PA 23 and then turned R onto a heading of about 300°.

Having watched the other ac throughout the encounter they did not feel there had been any risk of collision, and they believed their actions, which took them further E and S than intended, were the safest in the circumstances.

UKAB Note (2): In a subsequent telephone conversation with UKAB staff the Yak pilot said that having passed behind the other ac, their turn to the R put them some 100-200 m away on its port side and about 200 ft higher. They then climbed to clear the ac before making a R turn ahead of it. The ac was kept continuously in view and he did not believe that they posed any threat to its safety.

SOUTHEND ATC reports that the pilot of the PA32, which was established on the localiser for RW 24 at about 4 NM, reported that a Yak had just flown about 500 ft below her (Note: the PA32 pilot subsequently told UKAB staff that she could not recall saying this because at no time during the encounter was the other ac seen to be below her level). The Yak was not known to Southend ATC. The PA32 pilot declined to file a report on the RT but said that she would "like to have a word with the other pilot". The Yak was then seen from the VCR about 3 NM NE of the airfield at low altitude tracking N and climbing to about 1500 ft, and a corresponding radar return was observed tracking towards North Weald. The PA32 pilot carried out a radar vectored ILS and before leaving the frequency for Stapleford said she would telephone Southend after landing. She commented that she felt "lucky to be alive".

The pilot of the Yak later telephoned the SATCO at Southend and explained that he was flying in the vicinity of the river Crouch, near Burnham, and had not intended to come closer than 5 NM

from the airfield. He saw the PA32 and kept clear of both it and the instrument approach area. He was advised that Airprox reporting action might be taken by the pilot of the PA32.

UKAB Note: Analysis of the LATCC radar recording at 1537:45 shows a return believed to be the Yak squawking 7000 but with no Mode C, about 4 NM NNE of Southend tracking E. At the same time a 7000 return indicating 1500 ft Mode C, believed to be the PA32, is 6 NM NE of Southend apparently tracking the final approach to RW 24. At 1540:30 the Yak turns R and tracks 90° to the PA32, which is now at its 10:30 position range 2 NM. Having then passed just astern of the PA32, the Yak turns abruptly R at 1541:12 to shadow the ac on its port side. The two returns then become one and only the presence of a parallel set of trail dots indicates that more than one ac is present; the PA32's Mode C at this point shows 1200 ft. At 1542, with the PA32 passing 900 ft Mode C 3.5 NM from touchdown, the Yak's return separates, appearing just ahead and slightly R of the PA32 on a northwesterly heading.

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 commented that Southend's instrument approach area is clearly marked on the 1:500,000 topographical chart. Furthermore, activities at Southend should be well known to operators from local airfields such as North Weald. Despite the Yak crew's assertion to Southend ATC that they had not intended to encroach on the instrument pattern, or approach within 5 NM of the airfield, it is clear from the radar recording that they did both.

The Board could find little to commend in the Yak crew's airmanship throughout this incident. Had they turned L instead of R after passing behind the PA32 there would never have been a conflict. Having turned R, they then

overtook the ac on its port side contrary to the Rules of the Air; moreover, members disapproved of what they regarded as forming by the Yak without prior agreement, also contrary to the Rules of the Air. Finally, having overtaken the ac, the Yak turned R across its nose before clearing the area.

The Board concluded that the Yak crew caused the Airprox by flying close enough to the PA32

to cause concern to its pilot. While there is a considerable difference of opinion between the pilots as to the horizontal and vertical distances between them, radar evidence suggests that the encounter was unnecessarily close. However, members were content that the Yak crew kept the PA32 continuously in view and were always in a position to avoid it; they were satisfied, therefore, that there had not been a risk of collision.

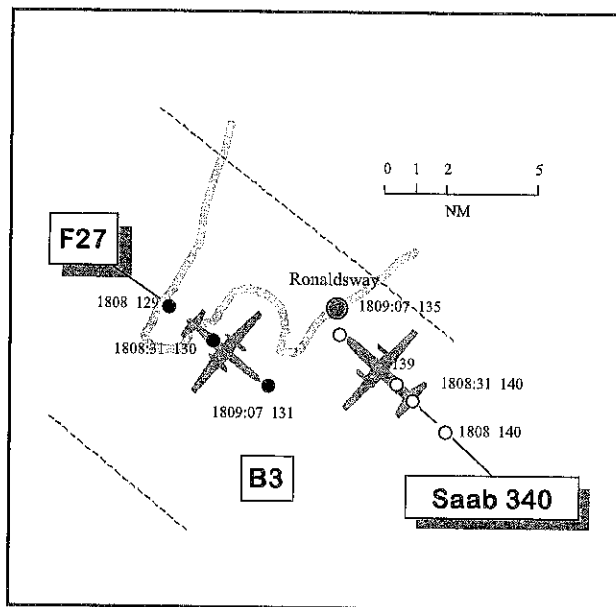
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Yak crew flew sufficiently close to the PA32 to cause concern to its pilot.

AIRPROX REPORT No 22/99

<u>Date/Time:</u>	24 Feb 1809	TWILIGHT
<u>Position:</u>	N5403 W0439 (2 NM SW Ronaldsway airport)	
<u>Airspace:</u>	AIRWAY B3	(Class: A)
<u>Reporter:</u>	ScACC	
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	Saab 340	F27
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	FL 40 ↓	FL 130
<u>Weather:</u>	VMC	
<u>Visibility:</u>	10 km	
<u>Reported Separation:</u>		5 NM/1000 ft
<u>Recorded Separation:</u>		2.6 NM/400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

ScACC reports that the Saab 340, routing from East Midlands to Aldergrove, was northbound on airway B3 at FL 140 on a radar heading. The F27, routing from Belfast City to Bristol, was southbound on B3 at FL 130. A third ac, a Shorts 360 from Glasgow to Belfast, was routing direct at FL 80 and receiving a RIS outside CAS. All ac were under the control of the Antrim and West Coast P & E controller. The pilot of the Shorts 360 requested descent

and a joining clearance was co-ordinated for him with Aldergrove radar. For an unaccountable reason the controller transmitted the clearance intended for the Shorts 360 to the pilot of the Saab 340; the latter read it back and the significance of this did not register with the controller. The controller then observed the Saab 340 descending and asked its pilot to climb back to FL 140. Traffic information was not given as by this time the 2 ac had already

passed each other; separation was estimated to be in the order of 5 NM and 1000 ft.

THE SAAB 340 PILOT reports that he was heading N on airway B3 at 220 kt and cruising at FL 140 under the control of Scottish on 123.77. The visibility was 10 km in VMC. After passing the Isle of Man (IOM), he was about to ask for descent clearance when ATC transmitted: *“c/s (his ac) join controlled airspace descend altitude 4000 ft QNH 1015”*. Because of the unusual “join controlled airspace” element of the clearance, the Captain (non-handling) read back the clearance verbatim and nothing further happened until the ac was passing 13,500 ft, when the controller asked him what he was doing and instructed him to climb back to FL 140. After levelling at FL 140, he was advised that the clearance he had responded to was for another ac.

A report was subsequently submitted by Scottish ATC on an Airprox between his ac and an F27. He was advised that the latter, which he did not see, was to the S of his track about 3 km away and 400 ft below. He was told that analysis of the RT tape confirmed his actions had been correct.

THE F27 PILOT reports that he was over the IOM VOR on airway B3 in VMC at FL 130, heading 131° at 240 kt. Scottish ATC advised him on 123.55 that another pilot had taken an ATC clearance to descend intended for someone else, and told him to look towards a position 3 NM to the N and 600 ft above for the conflicting traffic. Despite the good twilight visibility the other ac was not seen. However, as he was under radar control and no avoiding action was required, he thought there had been a very low risk of collision.

ATSI reports that the controller concerned described his workload as low. He was operating a combined Antrim and West Coast Sector, acting as both P and E Controller at the time of the incident. This, he explained, was not unusual for the time of day, with little or no traffic expected on the West Coast Sector. When he took over the position, about ten minutes before the incident occurred, the F27 was already on

frequency and had been cleared to climb to FL 130 on a radar heading of 135° within Airway B3. After he took over the sector, he cleared the ac to route direct to the IOM.

The Saab 340, also on Airway B3, established communication with the sector at 1803, reporting maintaining FL 140 and routing to the IOM VOR. The controller instructed the flight to turn right 5°, the new heading being confirmed by its pilot as 315°.

At 1801, the pilot of a Shorts 360 from Glasgow to Aldergrove contacted the sector maintaining FL 80 and routing direct to the Belfast (BEL) VOR. In view of this ac's routing outside CAS in Class G Airspace of the Scottish FIR, the P and E Controller confirmed with its pilot that he would provide a RIS. Although not involved in the subsequent loss of separation, this flight was relevant to the incident.

At 1806, the Shorts 360 pilot requested descent from FL 80. The controller telephoned Aldergrove ATC to co-ordinate its arrival and was given the option of either leaving it at FL 80 and transferring it to them for descent, or passing a joining clearance to the ac at 4000 ft. The controller said that because of unidentified traffic to the S of the ac, not seen by Aldergrove, he decided not to transfer the flight but to pass its joining clearance on his frequency. However, the controller inexplicably addressed this clearance to the Saab 340 instead of the Shorts 360 pilot, transmitting: *“C/S (the Saab 340) you're cleared to join controlled airspace in the descent to er four thousand ft on the Aldergrove QNH of One Zero One Five”*. The pilot replied: *“C/S clear to enter controlled airspace in the descent er to altitude four thousand ft One Zero One Five, C/S.”* The controller said he did not notice that it was the Saab 340 pilot and not the Shorts 360 pilot who replied to this clearance and, consequently, did not realise that he had issued the instructions to the wrong ac. He added that he could not explain why he had made the error. He confirmed that he had written the joining co-ordination on the correct FPS and had annotated the same FPS with the descent instruction when it was issued. The RT

recording of the incident reveals that the Saab 340 pilot did not query the clearance, either by word or intonation, even though his ac was flying in CAS when it received the joining clearance. The Air Safety Report filed by the Captain of the Saab 340 following the incident comments on the "slightly strange/unexpected wording" of the clearance he received.

The P and E Controller stated that while he was looking at the radar display to ascertain when the Saab 340 and the F27 passed each other, he noticed that the former's Mode C SSR return indicated that the ac was descending. Accordingly, he asked the pilot to confirm his level. When the pilot replied that he had been cleared to descend, the controller instructed him to climb back to FL 140. The controller said that it was not possible to take further action because by the time he issued the climb instruction the 2 ac had passed. STCA did not activate during the incident.

UKAB Note: A radar video recording shows the subject ac at 1808:31 tracking airway B3 in opposite directions just S of the Ronaldsway VOR, the F27 cruising southbound at FL 130 and the Saab 340 northbound at FL 140. At this point the ac are just over 6 NM apart in each other's 11 o'clock. A few seconds later the Saab indicates FL 139 Mode C and at 1809:07, as the ac pass 2.6 NM abeam each other, the Saab shows FL 135 and the F27 FL 131. Minimum separation distances are therefore measured at 2.6 NM/400 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Antrim and West Coast P and E Controller inadvertently issued a clearance to the wrong ac.

the relevant RT frequencies, a radar video recording, and a report from the appropriate ATC authority.

The Board quickly concurred that the Airprox was caused by the Antrim and West Coast P and E Controller inexplicably issuing a joining clearance intended for the Shorts 360 to the Saab 340. By his own admission, however, the Saab 340 pilot was not comfortable with the instructions passed to him and members were surprised that he did not query the clearance with the controller, particularly as he was already within CAS and a 'joining' clearance was therefore manifestly inappropriate. There was no obvious similarity between the callsigns of the two ac and, moreover, standard procedure for the Saab 340 would have entailed descent to a FL and not an altitude, as was given in this clearance. Surprise was also expressed that the Shorts 360 pilot did not notice the error as he would have been expecting to receive a joining clearance at about the same time. Members thought he might have been alerted to the transmission as its content was clearly more appropriate to his ac and in accordance with what he was expecting to hear. Had either pilot sought clarification of the clearance the controller may have been alerted to the situation and the Airprox might have been avoided. Fortuitously the ac were sufficiently separated laterally, as shown by the radar recording, and the Board was satisfied that there had not been a risk of collision.

AIRPROX REPORT No 23/99

Date/Time: 26 Feb 0830
Position: N5133 E0007 (6 NM SSW LAM)
Airspace: LTMA (Class: A)
Reporting Aircraft Reporting Aircraft
Type: B737-300 Gulfstream 4
Operator: CAT Civ Pte
Alt/FL: FL 120 ↓ FL 120

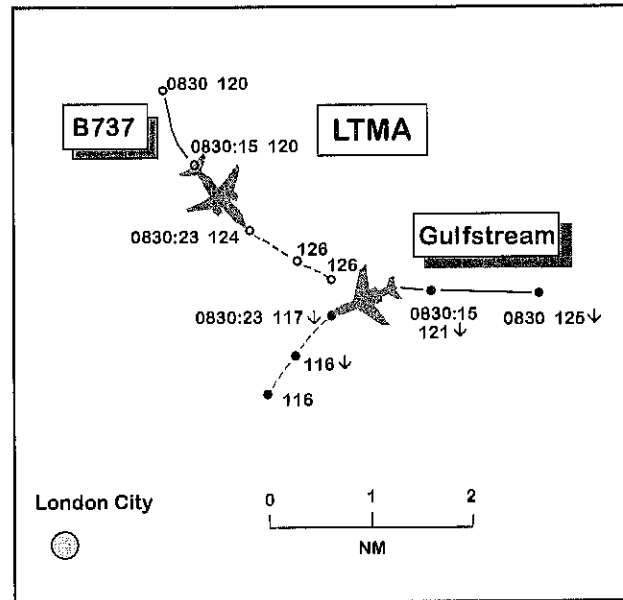
Weather: IMC IN CLOUD IMC IN CLOUD
Reported
Separation: 0 NM H/100 ft V 600 m H/0 ft V
Recorded
Separation: 1.16 NM H/700 ft V

BOTH PILOTS REPORTED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was established in the LAM holding pattern at FL 120 in IMC under a radar control service from LATCC (Heathrow INT N - 119-725). When about 1 NM S of the LAM VOR and turning L through a heading of about 120° at 210 kt, TCAS signalled traffic within 400 ft vertically which was followed by an RA demanding climb. The other ac was not seen but TCAS indicated minimum vertical separation at 100 ft with no lateral separation. He believed there had been a high risk of collision and reported an Airprox to the London supervisor by RT and later by telephone.

THE GULFSTREAM PILOT reports that he was in IMC approaching the LAM VOR at 250 kt and heading 270° under radar control from LATCC (TC LAM - 121-225) who had instructed him to descend to FL 120. TCAS then indicated that other traffic was closing from the R and seconds later he received an RA demanding descent, which was carried out to FL 115 and accompanied by a hard L turn. ATC also instructed an immediate L turn but he felt this was given far too late. The other ac was not seen but TCAS indications suggested that it passed about 600 m to his R at the same level. He believed there had been a very high risk of



collision and comments that in his opinion only the operation of the TCAS equipment enabled the ac to be deconflicted.

ATSI reports that both flights involved were operating on IFR flight plans; the Gulfstream 4 (GLF4) was inbound to Farnborough from Istanbul and the B737-300 inbound to Heathrow from Munich. At the time of the Airprox, the GLF4 was in receipt of an area control service from the TC LAM SC and the B737 an APR service from the TC Heathrow INT (N) controller. The B737 was established in the LAM Hold at FL 120. FL 110 was vacant but the flight had requested to remain at FL 120 for as long as possible in order to remain clear of cloud. The TC LAM SC was radar vectoring the GLF4 through the LAM holding area prior to transferring it to the TC NW Sector for onward routing via the Compton VOR to Farnborough. The ac was cleared to descend to FL 120 and, as it did so, it approached the B737, which was just turning onto the outbound leg of the holding pattern, almost head-on. The flight crews were alerted to the developing conflict by their TCAS equipment and the controllers by the activation of the STCA. Both crews and controllers responded to these alerts; nevertheless, lateral separation reduced to 2.4 NM as levels crossed, and continued to reduce, to 1.1 NM, before standard vertical separation was restored. Airprox reports were submitted by the

controllers involved and the commanders of both ac.

The 2 controllers concerned had felt fit and adequately rested and no factors likely to have adversely affected their performance were identified during the course of the investigation. The traffic loading on the TC LAM Sector was assessed, as light; however, due to delays at LAM, which were running at about 15 minutes, the workload was moderate. The traffic loading for the TC Heathrow INT (N) Director was typically high; nevertheless, his workload was assessed as moderate. Both controllers were operating as part of a 'dual' operation; the Heathrow Director with a Support (SPT) controller, and the LAM SC with a Co-ordinator.

The B737 established communication with TC Heathrow at 0822:10. In accordance with the earlier release message from TC LAM, the pilot reported approaching FL 120 and about to enter the LAM hold. One minute later, at 0823:10, the flight was cleared to descend to FL 110. This instruction received no response but when it was repeated, the pilot said: "... *would appreciate to maintain flight level one two zero as long as possible to stay clear of cloud*". There were no other Heathrow inbound via LAM closely following, so the request was approved and the B737 remained in the LAM hold at FL 120.

The GLF4 had been co-ordinated into the TC LAM Sector at FL 150 and established communication at 0824:00, reporting level at FL 150 on radar heading 270°. The TC LAM SC instructed the flight to make the radar heading 275°. There is no specific procedure for the handling of Farnborough inbounds via the Clacton Sector, so flights such as the GLF4 are co-ordinated through the various TMA Sectors individually. In line with what it is understood to be common practice, the plan was to route the GLF4 W through the Lambourne, LOREL and TC NW Sectors prior to turning S, via Compton VOR, and onward to Farnborough. The LAM SC intended to route the GLF4 through the LAM holding area and his plan was to ensure that a level was vacant in the hold to achieve this. The LAM SC is provided with a CCTV which

depicts the Heathrow INT/SPT Controller's strip display and enables him/her to monitor the progress of flights which have been released to Heathrow. The FPSs used by the Heathrow INT/SPT controllers are pre-printed with the levels available in the stack and when a flight is cleared to a particular level it is ringed on the strip. When the level is vacated it is crossed through with an 'X'. Thus, on this occasion, the Heathrow INT/SPT (N) controller's FPS on the B737 showed both FL 110 and FL 120 ringed but FL 120 was not crossed out. This was confirmed by the LAM SC and should have indicated to him that FL 120 was occupied in the LAM hold.

At 0825:30, the TC LAM Co-ordinator contacted Heathrow to release the next Heathrow inbound via LAM. This flight had some distance to run to LAM and was well behind the GLF4. Having noted from the CCTV that the B737 had been cleared to FL 110, it was anticipated that FL 120 would become available for the next inbound, but the Heathrow controller pointed out that the B737 had requested to stay at FL 120. Accordingly, it was agreed that the next Heathrow inbound would be released at '12A'. In this instance, this meant that, in recognition of the fact that the preceding flight had been released at FL 120 but had not yet vacated the level, the next inbound would be released at FL 120 but would only be cleared to that level once it had been established that the B737 had vacated it. This is a procedure which is promulgated in the unit MATS Pt.2 and was well understood by the controllers involved. It reflects the need for TC LAM controllers to retain the use of FL 130 for traffic transiting the sector and means that, in general, ac are not released to Heathrow at levels above FL120.

During the same period, co-ordination had been agreed with TC NW whereby the GLF4 would be transferred to them at FL 120. TC LOREL, being operated by the TC NE Dops SC, also agreed for the GLF4 to transit his airspace at FL 120. At 0828:20, the LAM SC cleared the GLF4 to FL 120, despite the B737 still occupying that level in the LAM hold. The LAM SC had not totally forgotten about the presence of the B737, however, because at 0829:00, he

correctly cleared the next Heathrow inbound (referred to earlier) to FL 130. The LAM SC said that he had made a mental note to delay descending the GLF4 to FL 120 because of the presence of the B737. He believed that this then slipped his mind when the arrival of about 8 FPS on further Heathrow inbounds caused him concern as to whether he would have sufficient levels available to be able to accommodate them. He confirmed that he had retained his FPS on the B737 under the LAM designator, which showed the flight had not vacated FL 120, so closer attention to the strip display might have reminded him of the flight's presence. The SSR label of the B737 may have been obscured by that of another ac, which was almost directly below it in the hold, and this could explain why the presence of the flight was not picked up during the SC's routine scan of the radar display.

The track of the GLF4 took it very close to the outbound leg of the LAM holding pattern and, consequently, it would be virtually head-on to any ac established on the outbound leg of the pattern. The GLF4 was about 10 NM SE of LAM as it vacated FL 150. At that time, the B737 was just turning L overhead the LAM VOR. Thereafter, the flights converged on the Airprox position, which was close to the beginning of the outbound leg of the holding pattern. The developing conflict remained undetected by the controllers concerned until the STCA activated at 0829:54, going straight to a 'high severity' alert with the SSR labels of both ac flashing red. At that stage, the GLF4 was descending through FL 127 with the B737, on a southerly heading, about 4.5 NM to the NE, level at FL 120. The LAM SC said that the STCA had activated just as he extended his displayed radar range to check on the progress of following traffic inbound to the sector. His first impression was that the ac involved were both in the hold and under the control of Heathrow but he quickly realised that one of them was the GLF4. The controller and the pilot of the GLF4 transmitted almost simultaneously and there were a number of crossed transmissions; however, at 0830:00 on the RT recording the latter can be heard saying: "... traffic warning right in front of us for C/S".

Without delay, the LAM SC instructed the flight to turn L immediately onto heading 180°. He then repeated the instruction and, on this occasion, used the words 'avoiding action'. The pilot replied: "Yes, we are in the left turn and climbing ...". At 0830:30, the pilot reported: "And we're maintaining level at er eleven point six right now and we're by the traffic." (The radar recording confirms that, in making a commendably expeditious L turn, the GLF4 did actually descend rather than climb. At the time of the pilot's report at 0830:30, the B737 was in his six o'clock position, in the climb at a range of 1 NM, with a vertical separation of approximately 1000 ft and increasing). Thereafter, the GLF4 climbed back to FL 120 and was turned back onto a westerly heading. A short time later the flight was transferred to TC NW and continued without further incident. The LAM SC explained that he had not realised at the time that the crew of the GLF4 had received a TCAS warning and thought that they had acquired the B737 visually. He had opted for a lateral resolution of the conflict as the best course of action but made clear that he was fully aware that ATC should not dissuade pilots from complying with any corrective RA from their TCAS equipment.

In the meantime, at 0829:50, just as the pilot of the GLF4 was reporting traffic in front of him, the pilot of the B737 announced: "... we have TCAS traffic er one o'clock descending". The Heathrow INT (N) Director responded: "... avoiding action descend immediately flight level one one zero traffic in your ten o'clock range three miles". The pilot replied: "We are executing a TCAS er manoeuvre climbing level one two five ... we have TCAS traffic still ahead sir". The INT (N) Director updated the earlier traffic information by advising the pilot that the traffic was now 800 ft below and, a short time later at 0830:40, confirmed that it was clear. At 0830:50, the B737 was cleared to FL 110 and the remainder of its approach to Heathrow was uneventful.

The avoiding action issued by the INT (N) controller to the B737 to descend was the opposite to that demanded by the TCAS RA received on the flight deck. However, given the

information available to the controller at the time (indicating that the conflicting traffic was still above the B737, the level below it in the hold – FL 110 - was vacant and the level above was likely to be occupied by the next inbound ac), this action was justified and does not leave the controller open to criticism. What is important is that no action was taken to countermand the TCAS “climb RA” once the pilot had advised that he was following it. When it became clear that the B737 was climbing to FL 125, the TC LAM SC was alerted and, as a precaution, the following flight (the next Heathrow inbound) was climbed back to FL 140.

If the developing conflict had not been detected by TCAS and STCA, this would have been a very close encounter. However, by projecting forward the ac positions on radar photographs, and assuming no avoiding action had been taken, it appears likely that the B737 was always going to pass slightly behind the GLF4. The avoidance manoeuvres carried out by the flights, very promptly in both cases, combined to provide a greater margin of safety and quickly re-established standard separation. The GLF4 passed L to R through the B737's 12 o'clock position at a range of 1.3 NM with 400 ft vertical separation. Thereafter, horizontal separation continued to reduce, to a minimum of 0.8 NM, but, as it did so, vertical separation was increasing all the time and standard vertical separation had been re-established by that stage. It is estimated that the minimum separation was approximately 1.1 NM and 700ft.

The **AAIB** also carried out an investigation into this incident and the ATC aspects of their report essentially mirror those of the ATSI document. However, the AAIB report makes additional observations including information obtained as a result of analysis of the Flight Data Recorders (FDR) and the TCAS and STCA warning systems.

The B737's FDR information had been overwritten because the ac had flown in excess of 25 hours since the incident. The GLF4's FDR showed the entire incident and revealed that the ac responded to the L turn instruction with an

initial roll rate of 10°/sec, reaching a maximum recorded bank angle of 63° and 1.8G. Some TCAS data was recorded but this was insufficient to determine what information had been provided to the crew. Analysis of the data suggested that if no action had been taken, the B737 would have passed just behind the GLF4.

Both ac received TCAS TAs, followed by RA demands, which occurred at about the same time as the STCA activated. However, the GLF4 pilots were unable to recall the TCAS instruction given in their RA because they were already following the avoiding instructions given by the controller. The time from the first alerts to the estimated point of minimum horizontal separation was around 25 sec. The STCA display gives two levels of alert and in this case went immediately to red, indicating a high severity conflict. The present STCA limits are set to give optimum warning while minimising the level of nuisance alerts, an excessive number of which would degrade the operational effectiveness of the system. Work is at present being undertaken to enhance the STCA system with a view to extending the alerting period it provides.

The Heathrow INT N controller was only alerted to the conflict when the STCA activated and his response was both rapid and logical as he attempted to increase the vertical separation between the ac. This gave rise to a situation whereby the TCAS instruction and the controller's instructions were in opposition. The B737 pilot responded correctly by following the TCAS instruction and reporting his action to ATC, and the controller responded correctly giving the B737 traffic information. Likewise the TC LAM SC issued prompt avoiding action instructions to the GLF4 on being alerted to the conflict by the STCA. The co-pilot responded immediately to the instruction to turn L. The Captain initially reported that the ac was climbing during the turn; however, it is likely that as the non handling pilot he was initially confused as to the situation of the ac because of the large bank angle and G forces being experienced whilst in IMC.

It is worth noting a difference between individuals operating as air traffic controllers and as pilots. An airline pilot operates in a multi-crew environment where his actions are continuously cross-checked by another person. In the present air traffic management system there can be fewer cross checks of the actions of a controller by a second person and in the event of an error the system safety net therefore depends on the STCA or TCAS alerts. The former, however, entails a delay while avoiding action instructions are given which could be further exacerbated if there are crossed or blocked transmissions. However, a pilot is able to respond directly to what he sees on his display in the event of a RA and for this reason TCAS is the primary means of avoidance once a conflict has occurred. In this incident both systems contributed to preventing a more serious situation.

The investigation examined the desirability of routing LTMA traffic through a holding area. Under the present system traffic is routed through such areas on a tactical basis. Experience has shown this to be the most effective way of handling such traffic as it offers ATC maximum flexibility and allows the optimum use of airspace. Any other procedure, short of the total exclusion of crossing traffic from such airspace, could present as many, if not more, potential conflicts.

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, a report from the appropriate ATC authority and a report from the AAIB.

An ATSI adviser expanded on the investigation results and told the Board that this Airprox occurred while the Gulfstream was being radar vectored through the LAM holding area; during the process the TC LAM SC cleared it to a level occupied by the other ac. Normally FL 110 would not have been left vacant in the holding

pattern and it was possible these unusual circumstances had contributed to the controller's error. Nonetheless, the fact that the B737 had not yet vacated FL 120 should have been evident had the SC made the appropriate checks prior to clearing the Gulfstream to descend; even if the B737's radar return had been obscured, the relevant information was available on the FPS display and CCTV.

On a positive note, the adviser added, both controllers had reacted promptly and decisively and used the correct phraseology once they became aware of the conflict. Moreover, neither attempted to countermand the TCAS RAs being carried out by the respective crews. In this incident, both the ground and airborne alerting systems functioned correctly and undoubtedly lessened the severity of the incident.

The Board concurred with the ATSI assessment, believed current procedures were perfectly sound and concluded that the TC LAM SC had caused the incident by clearing the Gulfstream to descend to a level already occupied by the B737. Members noted that the eventual separation distances, in the order of 1 NM and 700 ft, were achieved at a late stage of the conflict and then principally by the activation of the TCAS and STCA. Moreover, the swift robust avoiding manoeuvre by the Gulfstream was indicative of the urgency with which the event was viewed by the crew of that ac. With these points in mind the Board concluded that the safety of both ac had been compromised.

ATCO members commented that the B737 pilot's request to remain at FL 120 (so as to keep clear of cloud) had on this occasion introduced an unusual element which probably contributed to the controller's slip.

An airline member commented that messages from pilots to ATC following receipt of a TCAS RA should be concise, and to the point, in keeping with published phraseology. This enabled ATC to react quickly and appropriately to the TCAS action being taken.

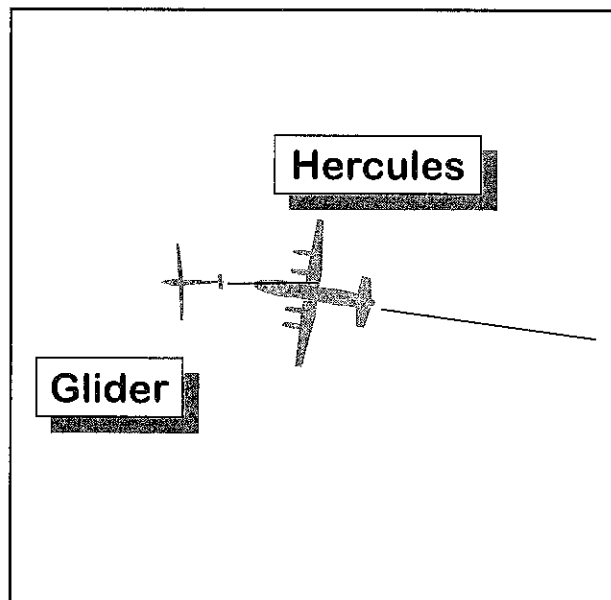
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The LATCC TC LAM SC descended the Gulfstream to a level occupied by the B737.

AIRPROX REPORT No 24/99

Date/Time: 27 Feb 1301 (Saturday)
Position: N5135 W0141 (1 NM W of Shrivvenham - elev 350 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Hercules K18 glider
Operator: HQ STC Civ Club
Alt/FL: 2000 ft 2700 ft ↓
(QFE 991 mb) (QFE)
Weather VMC CLBC VMC CLBC
Visibility: 40 km 30 km
Reported Separation: 200 ft/500 ft
Recorded Separation: 450 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HERCULES PILOT reports heading 250° at 250 kt while positioning for an instrument approach at Lyneham. While approaching the localiser he saw a glider in his 12 o'clock 200 ft above some 3-5 seconds before passing directly under it. He made a rapid descent of 200 ft and considered there had been a moderate risk of collision.

THE K18 PILOT reports heading 270° at 50 kt 2700 ft above the level of Sandhill Farm glider site when he heard the Hercules approaching. It was not in his field of view and before he could turn he detected from the Doppler effect that it had passed so he maintained his heading. He first saw it as it passed 500 ft directly beneath; at that stage there was no risk of collision.

HQ MATO reports that the C130 was self positioning for an ILS approach to RW 25 at

RAF Lyneham, squawking 4004 with Mode C and receiving a RIS from Lyneham Approach (APP). As the pilot was establishing the aircraft on the localiser at 13 NM finals and at 2000 ft (Lyneham elev 513 ft, QFE 991 mb), he saw the glider. He did not mention the Airprox on RT but informed Lyneham ATC by telephone after landing.

The Airprox occurred almost overhead the Sandhill Farm gliding site; however, the glider was not evident on the Watchman radar display at Lyneham; traffic information on the glider could not, therefore, be provided to the C130 pilot. SATCO reports that the radar's performance had been considered suspect and suffered some considerable time unserviceable in the weeks prior to the Airprox; nevertheless, the radar was within calibration limits. The glider pilot's heading and speed would have presented the Watchman radar with a near

head-on aspect of a slow moving glider which it may not have detected.

Note: LATCC radar recordings show the Hercules in a slow descent towards the Airprox position which it passes at 2700 ft Mode C where there is also an intermittent primary return. On the next radar sweep the Hercules is at 2400 ft where it levels. 2700 ft Mode C equates to 2100 ft above Lyneham's QFE and the glider at 2700 ft above Sandhill Farm would have been about 2550 ft above Lyneham.

HQ STC comments that the Hercules crew in this Airprox are to be commended for maintaining their lookout and visually acquiring the glider, albeit with minimal time to take avoiding action, whilst preparing for an instrument approach. Gliders are notoriously difficult to see and crews must be ready, as in this case, to react immediately on sighting them. This is especially true as the lower airspace becomes increasingly busy.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Confliction of flightpaths in Class G airspace, resolved by the Hercules pilot.

recordings and reports from the appropriate ATC and operating authorities.

It was suggested that Lyneham and the operators of Sandhill Farm glider site might be better enabled to integrate their operations if they were to devise a letter of agreement between themselves. However, the Board was advised that this site was but one of many around Lyneham and that it would not be feasible to co-ordinate such a complex situation without heavily compromising operations in the area. Members then asked if this incident was a confliction at all as the ac seemed to have approached with some 400+ ft of vertical separation which the Hercules pilot increased by 300 ft, mostly after the ac had passed. The Board concluded that avoiding action seemed necessary to the Hercules pilot at the time and that he had seen the tail-on glider about as early as could be expected; members therefore agreed that the incident was a confliction of flightpaths in Class G airspace which was resolved by the Hercules pilot. There did not appear to members that there had been any risk of the ac actually colliding.

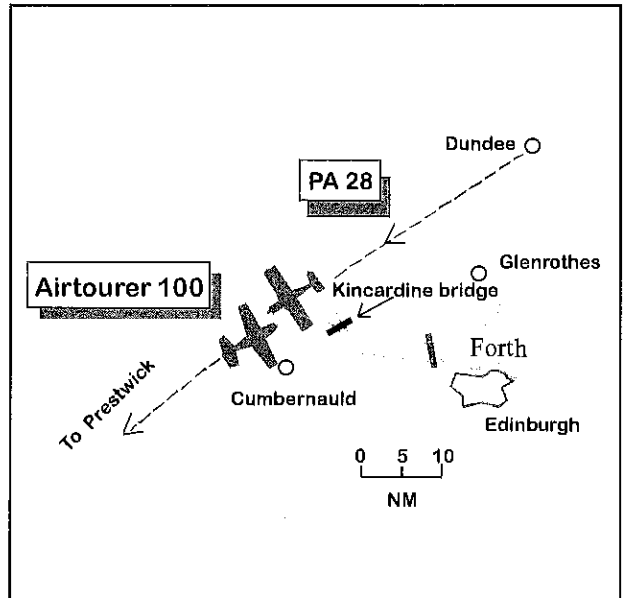
AIRPROX REPORT No 25/99

Date/Time: 23 Feb 1618
Position: N5604 W0344 (Kincardine bridge)
Airspace: SFIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Victa Airtourer PA28
Operator: Civ Pte Civ Pte
Alt/FL: 2000 ft 2500 ft
(RPS 1012 mb) (QNH)
Weather VMC CLBC VMC CLBC
Visibility: 40 km >10 km
Reported Separation: 100 yd H/50 ft V

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AIRTOURER PILOT reports heading 075° at 110 kt on a VFR flight from Cumbernauld to Glenrothes. The visibility, below cloud and out of sun, was in the order of 40 km. Cockpit workload was high as he carried out 'FREDA' checks and changed frequencies. When about 3 NM W of the Kincardine bridge, cruising at 2000 ft (RPS 1012) and in the process of changing frequency from Cumbernauld to Edinburgh, he saw a PA28 about 400 yd directly ahead of him on a reciprocal track. He immediately dived to the R in avoidance and the other ac passed within 100 yd to his L and 50 ft above with a high risk of collision. There had been no relative movement to attract his attention to the ac and it only became apparent as it grew rapidly in size. He believes the other pilot never saw him.

THE PA28 PILOT reports that he was flying from Dundee to Prestwick on a VFR navigational training flight with a student and a passenger; the latter was also a student who was aboard for local area experience. He was squawking 4522 with Mode C and receiving a FIS from Scottish on 119.875. The visibility was over 10 km in VMC. His cruising level was 2500 ft (QNH) until 4 NM S of Cumbernauld, when he descended to 2000 ft. Despite all three of them keeping a good lookout no one saw any ac in the vicinity of the reported Airprox.



UKAB Note: A video replay of the Lowther Hill radar shows the PA 28, identified by its 4522 squawk, heading SW from the Dundee area. The ac tracks slightly to the N of the Kincardine bridge at 2300 ft Mode C and at 1618 is about 4 NM W of it and about to merge with a faint intermittent opposite direction primary return believed to be the Airtourer. The actual encounter cannot be seen clearly on the radar because of label overlaps with adjacent squawking ac, but by 1618:20 the primary return appears about 0.5 NM in trail of the PA28.

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.

While this incident occurred in good visibility in Class G airspace where the 'See and Avoid' principle applies, the Board felt that the head-on geometry of the encounter mitigated to a large extent the difficulty experienced by both pilots in seeing the other ac. Additionally, the PA28's pilot might have been disadvantaged by the sun's position and his 2 crew were probably concentrating their lookout to port and starboard. The lack of relative motion in these

circumstances makes it almost impossible for the human eye to detect an oncoming object until very late when it becomes conspicuous only by a sudden and rapid increase in size. By the time the conflict reaches this stage there is usually little time left for reaction, especially at high closing speeds. In this instance the Airtourer pilot saw the PA28 just in time to take

avoiding action and the PA28 crew did not see the other ac at all; the Board concluded that this was the cause of the Airprox. Although the Airtourer pilot's action successfully deconflicted the ac, members felt that the encounter was uncomfortably close and that the safety of both ac had been compromised.

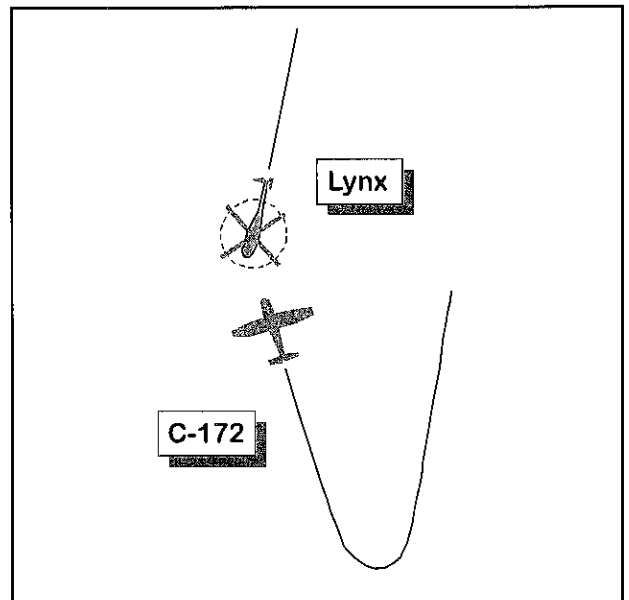
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: A late sighting by the Airtourer pilot and a non-sighting by the PA28 pilot.

AIRPROX REPORT No 26/99

Date/Time: 2 Mar 1222
Position: N5217 W0050 (2 NM SW of Sywell)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Lynx Cessna 172
Operator: HQ DAAvn Civ Trg
Alt/FL: FL 40 4200 ft
 (QNH 1003 mb)
Weather IMC INCL IMC CLBL
Visibility: 1-200 m 1 - 1.5 km
Reported Separation: 50-100 ft/1-200 ft
Recorded Separation: N/K



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX PILOT reports heading 215° at 90 kt, cruising at FL 40 in cloud and receiving a RIS from Cottesmore. While flying on instruments he saw out of the corner of his eye a Cessna type ac in his 11 o'clock about 15 seconds before it passed beneath by about 50 - 100 ft as he pulled up momentarily. It was tracking towards his 5 o'clock where it was then seen by other pilots on board to disappear back into cloud. He considered the risk of collision was very high and reported the Airprox to AIS (Mil) after landing.

THE CESSNA PILOT reports heading 310° at 100 kt while flying various QDMs from Sywell NDB and working Sywell Information. He was in a 200 ft clear gap between cloud layers. The helicopter was first seen 0.5 NM away in the 2 o'clock by his student but was obscured from him by the high wing and strut. He descended immediately and the helicopter passed 1-200 ft above; there was insufficient time to turn to avoid it. It maintained track as he watched it pass into his 8 o'clock. There would have been some risk of collision if they had not seen the helicopter and avoided it.

HQ MATO reports that the Lynx departed from Cottesmore for a transit to Benson and established RT contact with Cottesmore Departures (DEP) at 1205:45 on 376.575. The ac was identified, provided with a RIS and climbed to FL 40. During the climb, the service was upgraded to RAS, after the pilot reported IMC, before reverting to RIS shortly afterwards, at the pilot's request. At 1213:15, as the Lynx approached an area of poor radar performance, DEP limited the radar service from ahead. Traffic information was passed on an ac indicating 2800 ft in a 1 o'clock, 5 NM position before, at 1217:44, DEP advised the Lynx pilot *"...further traffic 12 o'clock five miles manoeuvring, no height"*, which was acknowledged by the Lynx pilot. An update was given at 1219:21 *"....clear of the right one o'clock traffic, the twelve o'clock traffic is now left eleven o'clock four miles manoeuvring, but presently on a similar heading"* and 11 seconds later, *"C/S you're slightly faster than him"*. The Lynx pilot acknowledged each call. Traffic information was again updated at 1221:06, *"C/S, previously reported traffic left eleven o'clock three miles, turning onto a reciprocal heading"*, however the pilot did not reply.

During the following 55 seconds, DEP made six radio check calls to the Lynx, including an instruction to squawk 'ident' if receiving his transmissions (with no response) and a further traffic update *"....12 o'clock, half a mile...."*. The Lynx pilot also made three radio checks to DEP in that period, however two-way communications were not re-established. At 1222:05, the Lynx pilot reported, *"C/S, we've just had a fixed wing pass within about two hundred metres, below us about fifty feet"*. DEP answered this call immediately, but received no response from the Lynx pilot. Over the next 4 min, 19 radio transmissions were made on the frequency, 10 of which were specifically addressed to the Lynx. These calls included a transmission from another Cottesmore controller using a different control position and 3 calls from another ac that had recently departed Cottesmore. The pilot of this ac informed DEP that he had also attempted to call the Lynx on another frequency, but with no joy. DEP contacted Brize Norton by landline, in case

the Lynx had free-called them, and requested that a message be passed to Benson. At about 1225, Cranfield informed Cottesmore ATC by telephone that the Lynx pilot had called them on RT to report an Airprox.

The LATCC Claxby radar recording shows that this Airprox occurred at about 1221:50. The Lynx is squawking 4624 without Mode C, tracking 198°T and heading directly towards WELIN. A contact is manoeuvring within 2-3 NM of the Airprox position throughout the recorded period, squawking 7000 with no mode C. There are no other primary, or unidentified secondary radar contacts displayed within 10 NM, hence it is most likely that this is the C172. The closest point of approach observed on radar occurs at 1221:49, when the C172 is very slightly left of the helicopter's track (contacts almost completely merged) and crossing from L to R, tracking 328° T. The horizontal separation is too small to measure. The subsequent radar sweep at 1221:56 shows the ac emerging from the 4 o'clock position of the Lynx, with the contacts still touching and the SSR labels unreadable. Neither contact appears to alter course.

The controller complied fully with the requirements of RIS by providing the Lynx pilot with traffic information on the manoeuvring C172 when they were separated by 5 NM, updating the details of the conflicting traffic 1½ min later when separated by 4 NM, and advising that it was a slower contact. To his credit, he further updated the information as the conflicting ac turned towards the Lynx and, once it became apparent that the pilot was not replying to his calls, used the SSR 'ident' feature in an attempt to establish whether the pilot could hear him, passing another traffic update just prior to the merge. The controlling workload was assessed as low at the time; thus DEP was able to pay greater attention to the Lynx. Whilst a call on UHF Guard may have been an option, there was probably less than 30 seconds between the earliest time DEP could have realised he had lost comms and the pilot reporting the Airprox. Given that the pilot had requested a RIS rather than RAS, it is unlikely that DEP would have considered the situation

urgent enough to warrant the use of Guard at the time. It is evident from the pilot's report however, that the Lynx was actually IMC at the time of the encounter.

Being only 25 NM away and at FL 40, the Lynx was well within UHF radio range and was not flying in a known area of poor radio performance. The serviceability of the ATC radio equipment was proved by the communications with the departing ac, which had been utilised as an airborne radio relay. It is therefore considered most likely that the Lynx either suffered a radio fault or, as it was heading directly away from Cottesmore, suffered from some form of aerial shielding, which resulted in the loss of UHF radio reception.

Considering the circumstances and the time available, the controller tried his best to update the Lynx pilot. The Lynx pilot had acknowledged two traffic information calls referring to the C172 before the apparent loss of RT reception.

HQ DAAvn comments that this Airprox is predominantly attributable to the breakdown in communication between the Lynx and Cottesmore. Having received a RAS until a flight level at an appropriate quadrantal was established it is perfectly reasonable to downgrade the service to a RIS, which without the break in communication would have been entirely adequate.

The loss of communication came at an unfortunate time with the last received call of "*you're slightly faster than him*" possibly leading the crew to believe the confliction was reducing thus not to expect further calls. Furthermore the loss of communication to one aircraft in IMC and flying a quadrantal should still provide adequate separation so long as all other aircraft

are following the appropriate rules and in receipt of an appropriate service.

The C172 seems to have been manoeuvring for QDMs in a 200 ft clear gap between cloud layers (IMC!) with only an information service.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was advised that the Lynx suffers an occasional UHF aerial screening problem which in this instance may have caused the loss of communications at the critical moment. Although members agreed that, because of the loss of comms, the type of ATS made no difference in this case, in IMC it was better airmanship to fly under a RAS, even when flying at the correct quadrantal. However the Board was of the unanimous view that the cause of this incident lay with the Cessna pilot. While he may have been content in what appeared to have been a small gap in the clouds to see and avoid other traffic, he only had time to avoid the Lynx because it was a relatively slow ac. Although in his report he did not say if he was IMC or VMC, the weather conditions he gave clearly placed him in IMC and in such conditions outside controlled airspace he should have been flying quadrantals or using a radar service.

In view of the proximity of the ac and the limited time available for avoiding action, the Board considered that the safety of the ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Cessna pilot did not comply with IFR.

AIRPROX REPORT No 27/99

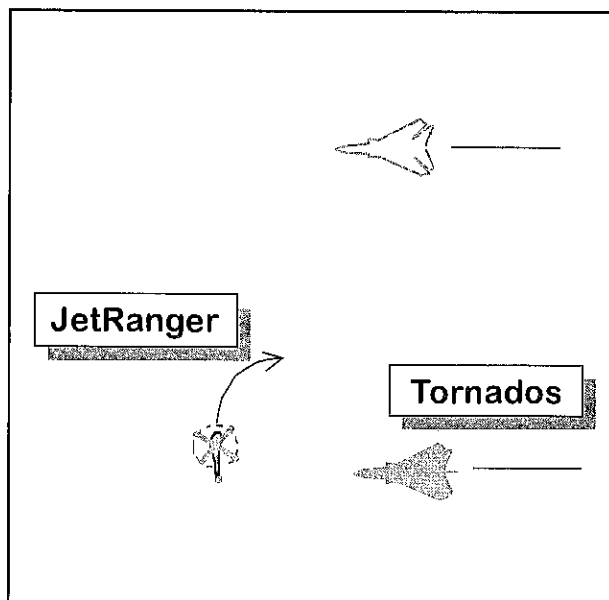
Date/Time: 3 Mar 1028
Position: N5634 W0256 (5 NM N of Dundee)
Airspace: FIR/LFS (Class: G)
Reporting Aircraft Reported Aircraft
Type: JetRanger Tornado GR
Operator: Civ Comm HQ STC
Alt/FL: 500 ft 350 ft
(agl) (Rad Alt)
Weather VMC CLOC VMC CLBC
Visibility: 10 km + 30 km
Reported
Separation: 50-100 ft level/400 ft V
Recorded Separation: N/K

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETRANGER PILOT reports heading N at 75 kt on a pipeline patrol and was at 500 ft agl when his observer called a fast jet ahead and to the right by 3 NM. He turned right to avoid it and began a descent; as he turned, his observer pointed out another Tornado passing close astern with a high risk of collision. The first ac indicated he had seen the helicopter but the second one passed without deviation.

THE TORNADO PILOT reports heading 270° at 450 kt as the LH ac of a pair at 350 ft Rad Alt when he saw a helicopter 1 NM away, low and to the left, heading N. He pulled up at 3 g to pass 400 ft above it, calling it to his No 2. There was no risk of collision but he thought the helicopter pilot might file so he reported the encounter to UKAB to facilitate tracing action.

HQ STC comments that the JetRanger pilot appears to have taken his initial avoiding action on the northerly Tornado and whilst focused on this manoeuvre his observer acquired a late sighting of the southerly Tornado passing close astern, apparently without deviation. Meanwhile, the crew of the southerly Tornado, which was on a conflicting flightpath, had visually acquired the JetRanger and taken appropriate avoiding action – including the transmission of a warning to his wingman. Although the Tornado crew assessed that no



risk of collision existed and took calm and controlled avoiding action, it is clear that the miss distance of only 400 ft when allied to the late sighting by the JetRanger crew, contributed to the helicopter crew's assessment of a high risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was unable to resolve the differences in the 2 pilots' perceptions of this incident. The Tornado pilot had seen the helicopter in reasonable time and in his view taken adequate avoiding action. This may have happened before the helicopter pilot saw him, but would not account for the latter's perception that the Tornado had passed by at the same level. It may have been that while the Tornado pilot was confident that he had done what was required to miss the helicopter, he was aware that it would have been close enough to cause its pilot to file an Airprox and so he reported the sighting on landing. The Board was aware that incidents frequently looked entirely different to 2 pilots and without a radar recording to corroborate reports there was no way to

discover exactly what did happen. Members concluded that the incident was a conflict of flightpaths which was resolved by the Tornado pilot but that the latter had nevertheless passed close enough to the JetRanger to cause its crew concern for the safety of their ac.

A BHAB member advised the Board that there was a perception that the military view of an incident always seemed to prevail in circumstances like these. UKAB Members noted this view and the Chairman restated the fundamental requirement for impartial assessments on all Airprox incidents. Where radar evidence was available this would be used to support the appropriate reported account of what took place. In the absence of any radar recording more weight would tend to be given to the pilot who saw the other ac first since he/she would have had more time to

assess distances and angles. Members also acknowledged the effect of 'the startle factor' This can affect the perception of events and in the air it will usually make another ac, seen unexpectedly, seem closer than it actually is. All of these aspects had to be taken into account regardless of the organisations that employed the pilots concerned.

The degree of risk in this incident proved equally difficult for the Board to assess; the view that there was none because the Tornado pilot had seen and avoided the helicopter was tempered by the feeling that the Tornado pilot flew much closer to the JetRanger than he would have wished and well inside the normal avoidance envelope used on helicopter affiliation sorties. By a small margin members favoured the view that the safety of the ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

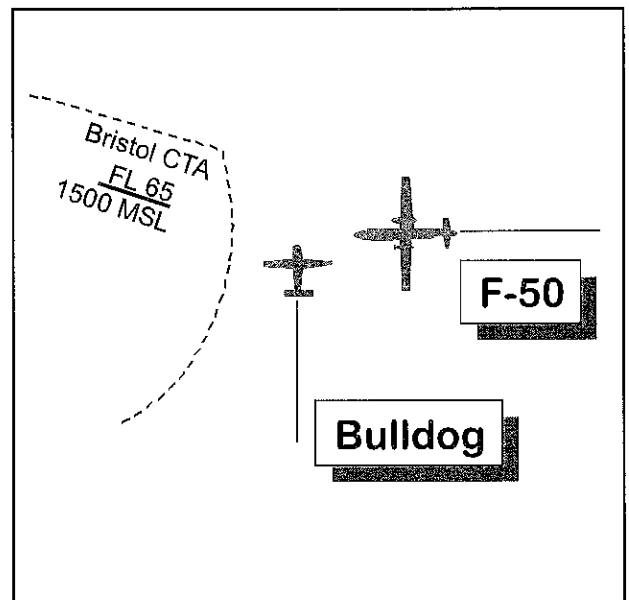
Degree of Risk: B

Cause: Conflict of flightpaths resolved by the Tornado pilot who passed close enough to the JetRanger to cause its crew concern for the safety of their ac.

AIRPROX REPORT No 28/99

Date/Time: 31 Jan 1027 (Sunday)
 Position: N5124 W0226 (1 NM NW of Bath)
 Airspace: FIR (Class: G)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
Type:	F50	Bulldog
Operator:	CAT	HQ PTC
Alt/FL:	3500 ft ↓ (QNH 1041 mb)	2500 ft (QNH)
Weather	VMC HZBC	VMC CLBC
Visibility:	1.5 - 2 NM	
Reported Separation:	300 ft V, 200 m H	
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F50 PILOT reports heading W at 220-250 kt established on the centreline for an approach to RW 27 at Bristol and in communication with Bristol Approach on 128.55. He was cleared to descend to 2500 ft and broke out of cloud at 4000 ft in poor visibility. At 3500 ft the F/O saw a single engined light ac crossing ahead and below at about 3000 ft; he immediately disconnected the autopilot and levelled off, estimating that the light ac passed 300 ft below and 200 m away. He advised the controller he would file a report and was told after landing that the area was a training area outside controlled airspace.

THE BULLDOG PILOT reports (on 20 May) heading N at 2500 ft QNH when he saw a civil ac passing above and behind, presumably on approach to Bristol airport. Visibility was good and there was no need for avoiding action. He had followed the briefed procedures for operating S of Colerne and had retained a squawk of 4577.

ATSI reports that all ATC equipment appropriate to the task was serviceable. The controller concerned described his workload as light to moderate at the time of the AIRPROX.

RAF Colerne, the Bulldog's base (about 16 NM ENE of Bristol Airport) has a LOA with Bristol ATC which states that they should "prenote Bristol ATC of any departure to the south of Colerne airfield". Bulldog ac have been allocated two transponder codes: 4576, for ac operating up to FL 100 for conspicuity purposes only, and 4577, used by Bristol ATC for identification and verification of Mode C as follows: "Bulldog ac operating to the south of Colerne are to depart the Airfield on Stud 2 with Code 4576 selected. On passing HT 1500 ft Colerne QFE, ac are to change to the RPS and contact BRS ATC on 128.55 Mhz for identification and Mode C verification. Once Mode C has been verified, Bulldog ac are to retain the 4577 squawk allocated for the duration of the sortie (BRS approach must be advised if this is not possible for any reason),

and may then either resume a listening watch on Colerne approach frequency or remain on 128.55 Mhz". "Bulldog ac are not to operate to the south of Colerne with an unserviceable transponder unless co-ordinated with BRS Approach". The UK AIP Part 2, En route (ENR) section, Page ENR 1-6-3-6, in a note following the listing of the UK SSR Allotment Plan, states that the squawk 4577 is restricted in its use up to FL 40. This restriction is not reflected in the LOA.

Colerne prenoted the Bulldog to Bristol ATC, who raised a FPS for it. The ac contacted Bristol Approach at 1011, reporting passing 1500 ft and confirming its routing to the south of Colerne. The Bulldog was asked to squawk 4577 but no squawk was seen. The controller told the pilot that the SSR code was not showing but he would advise him when it was visible, probably, he added, before the flight passed Bath. SSR information (from Clee Hill radar, about 60 NM away) is apparently often not visible in this area at 1500 ft. The pilot was told that there was no restriction to his climb.

At 1013, the controller, still not observing its squawk, asked the Bulldog its passing altitude. The pilot reported at 3000 ft to the S of Bath. Despite recycling, the squawk still did not show. Based on a primary radar return in its reported position which he believed to be the Bulldog, he passed it traffic information about another Bulldog in the area and said that the pilot could return to squawking 4576. The pilot replied: "...roger am I clear to return Colerne?" The controller approved this request.

The meaning of the 'return to Colerne' message and transponder failures were discussed at length. On the first issue the controller said that the call could be interpreted as either the ac was transferring back to the Colerne frequency, but would continue with its sortie, or it was returning to land at Colerne. The controller did not clarify this with the pilot. He said that despite the transponder failure procedures stated in the LOA, he would expect that Bulldog ac would probably continue with their full sorties, but transponder failures were rare and he had not experienced one.

The controller understood that SSR returns were validated and verified so that traffic information can be passed using SSR data, especially Mode C. However, because the Bulldogs are not usually tracked continuously, their identity is generally not maintained. On this occasion the controller did not have the benefit of any SSR information to locate the ac or monitor its altitude. He added that the Bulldog's FPS was left in the display, but it would not have been marked with its last reported altitude because there was no guarantee that it would stay at the same level. He commented that normally Bulldogs' FPSs are left in the display until the flight has landed.

Before the F50 contacted Bristol Approach, the controller co-ordinated descent clearance for it through Lyneham's area to FL 40. The F50 contacted Bristol at 1020, reporting descending (as cleared by LATCC) to FL 110, inbound to the Bristol (BRI) NDB. On contact, the pilot requested an NDB approach to RW 27, for training purposes. The controller was not aware until then that the flight required a training detail; he had been expecting to give the ac radar vectors to an ILS approach. He informed the pilot to expect direct routing for a locator approach and issued the flight with descent to FL 40, as agreed with Lyneham ATC. The controller believed that, because the flight was carrying out a procedural approach, this negated the requirement in the Bristol Airport MATS Part 2, Page 4-3a, for IFR arrivals leaving Controlled Airspace (CAS) inbound to Bristol whereby: "Pilots will be provided with a Radar Service outside CAS". While MATS Part 1, Page 1-36, states that outside CAS it is the responsibility of the pilot to request the radar service he requires, if the pilot fails to specify the type of service the controller must ask him which radar service he requires. Pilots must be advised if a radar service commences, terminates or changes when they are operating outside, or cross a boundary, of CAS. On this occasion the controller confirmed that the F50 was inside CAS when it contacted Bristol but he did not advise that it was leaving CAS. The controller said that, when talking later to the F50 pilot, the latter appeared to mistakenly believe that his ac had remained within CAS throughout

its flight; this is not possible because Bristol's CTA is not directly connected to the airways system.

The F50 was given descent to 3500 ft on the QNH 1041 mb at 1025, although the Transition Altitude at Bristol is 3000 ft. (The controller agreed that, with this high QNH, it would have been appropriate to have cleared the flight to FL 30.) Shortly afterwards he passed traffic information: "*And there's numerous light ac transiting from right to left in about the next three miles not above two thousand ft on the QNH 1041*". This traffic information was derived from information supplied by the Bulldogs, although none was on his frequency at the time. However, the LATCC radar recordings show (at 1026:03) one ac at FL 17 i.e. about 2500 ft above mean sea level when calculated against the QNH 1041 mb. Correlating the RT recording with the radar recordings, this ac is believed to be a flight instructed to operate not above 2000 ft until south of Bath, due to inbound IFR traffic. The controller commented that, when passing the traffic information, he did not take into account the Bulldog, which had left the frequency about 12 minutes previously, having last reported at 3000 ft.

At 1026 the F50 was given descent clearance to 2500 ft and was cleared for a "*locator DME Approach for RW 27*". Radar recordings show the F50 at FL 45 at 1026:39, with a primary return about 4 NM away in its 11 o'clock position, on a conflicting track. The recording subsequently shows the primary return still tracking northbound, in conflict with the F50. At 1027:34 the F50 is seen to pass just to the north of the primary return. It was at about this time that the F50's pilot enquired whether there was any traffic known to be operating at 3000 ft in his area and was told that "*they shouldn't be above two thousand*". The controller said that he could not recollect whether he had seen the primary return at the time. However, he agreed that an ac at 3000 ft should have been visible on the radar display. He confirmed that he did not realise that the ac concerned may have been the Bulldog until after he contacted Colerne ATC. (UKAB Note: Although the

Bulldog pilot believed he had been squawking 4577, he had been advised to return to 4576 at 1014. Just after the Airprox a primary return appears on the LATCC radar recording tracking N from the Airprox position; it briefly shows a 4576 squawk at 2400 ft Mode C (3200 ft on 1041 mb) for 2 returns before reverting to primary only.)

The LOA between Bristol and Colerne was not being complied with fully; apparently this occurred regularly. Although the Bulldog's transponder appeared to be unserviceable, its sortie continued as briefed, although the LOA states that Bulldog ac are not to operate south of Colerne with such an unserviceability. However, the ac contacted Bristol Approach and the controller was, therefore, aware that the transponder did not appear to work, but did not comment about curtailing its detail; this could be construed that co-ordination took place with Bristol Approach. Also, although the LOA states that Bulldog ac will retain the 4577 squawk until the end of their details, as soon as the ac's squawks were validated and verified, they were changed back to the 4576 squawk by Bristol Approach. It is considered, therefore, that both units involved in the LOA should review their procedures to ensure that they reflect accurately current practice and to resolve any ambiguities that may exist.

HQ PTC comments that it appears that Bristol ATC was not applying the LOA to best advantage. The Bulldog pilot was conforming with the LOA as interpreted by APC; the LOA is being examined in a co-operative spirit and we shall do all that is necessary to encourage this to continue. However, while the LOA should assist Bristol to separate their traffic from Colerne ac, this is free airspace and there is no such agreement with other ac which transit it.

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 hoped that the review of the letter of agreement would prompt all concerned to make better use of its provisions. One of those provisions was an issue in this incident to the extent that the BRS controller had acquiesced to the Bulldog remaining in the area but not on frequency with a u/s transponder; this made it an item of unknown traffic in Class G airspace such as referred to in HQ PTC's final sentence. The existence of such traffic underlines the importance of advising pilots receiving an ATS whenever they leave controlled airspace. Pilots can then start looking out for traffic the controller may not know about. It was not surprising to the Board that the F50 pilots were concerned about having to take avoiding action if they thought they were still in controlled airspace. Members could not follow the controller's reasoning on not needing to provide a radar service to the F50, when the reverse was true.

The traffic warning given by the controller concerning traffic "not above 2 thousand feet . ." was misleading, not only because of the Bulldog, which the controller did not know was above that level, but there may have been other unknown traffic apart from Bulldogs from Colerne transiting the area and not in contact with Bristol. However the F50 crew carried out an effective lookout on clearing cloud and took appropriate avoiding action on seeing the Bulldog. The Board concluded that the incident was a conflict of flightpaths in Class G airspace which was resolved by the F50 pilot.

On vertical separation, the Board assessed that 500 ft was perfectly safe for traffic in class G airspace whose pilots have seen each other's ac, and concluded that there was no risk of the ac actually colliding.

The Board also noted that the lateness and sketchiness of the Bulldog pilot's report was a hindrance to the investigation and rendered the Bulldog pilot's recollection of the incident less reliable due to the passage of time.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Confliction of flightpaths in Class G airspace, resolved by the F50 pilot.

AIRPROX REPORT No 29/99

Date/Time: 4 Mar 0951

Position: N5305 W0008 (1.5 NM E of
Coningsby - elev 25 ft)

Airspace: MATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: Jetstream PA31 Chieftain

Operator: HQ PTC Civ Comm

Alt/FL: 1000 ft 1000 ft ↓
(QFE 983 mb) (QFE 983 mb)

Weather VMC CLBC VMC CLBC

Visibility: 15 km+ 40 km

Reporting Separation: 200 m/300 m

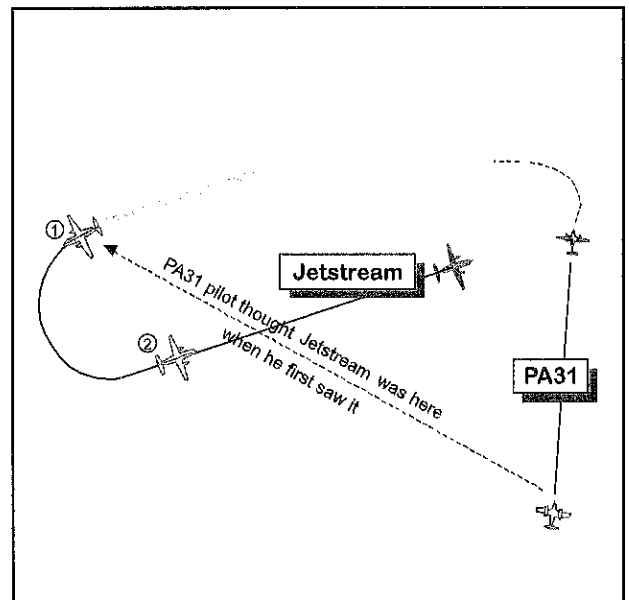
Recorded Separation: 0.75 NM

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 070° at 130 kt downwind in a LH circuit for RW 26 at Coningsby. Approaching the end of the downwind leg, and while carrying out the pre-landing checks, he was told by ATC that a PA31 was joining downwind. Before turning left onto finals he checked to the right and saw the PA31 700 m away joining on base leg and closing rapidly in his 1:30; it came across his nose 200 m away at the same level but the risk of collision was low because he had it in sight and could see it would not actually collide with him. It then turned left and descended with its gear down.

THE PA31 PILOT reports heading 345° at 170 kt having been cleared to join left base for RW 26. He had been advised that there was one other ac in the circuit which he saw starting a crosswind turn as he was approaching the airfield from the S but he was not told its type or



intentions; he was on VHF and did not hear the other ac's transmissions so he believed it was on UHF. He next saw the ac as he passed about 300 yd ahead of it as he started his base leg. It had no lights and did not stand out against the horizon. He believed the risk of collision was low assuming the other pilot could see him.

HQ MATO reports that there appears to be a discrepancy of about 1-1.25 min between timings on the RT transcript and those on LATCC radar recordings; the units concerned have been advised accordingly. The Jetstream was flying LH visual circuits to RW 26 at Coningsby and in contact with Coningsby Tower (TWR) on 275.875. The PA31 was inbound to land at Coningsby, joining from the south and in contact initially with APP and then TWR on 119.975. APP ascertained that the PA31 would be joining on a left base, asked the pilot to report field in sight and briefed him that there were 2 ac in the visual circuit and no radar

traffic. At 0948:40 the pilot replied that he was looking. At 0949:12 APP advised TWR that the PA31 was *"inbound, left base join, he's coming to you now"* at the same time as the pilot called *"Field in sight (6 syllable callsign)"*. TWR was listening on the same frequency, and the PA31's transmission may have distracted his full attention from what APP had said.

The TWR transmissions were broadcast simultaneously on both UHF and VHF frequencies throughout the period, so each pilot could have heard what TWR said to the other ac but not each other's transmissions. TWR established RT contact with the PA31 pilot at 0949:40 and advised *"....join RW 26, QFE 983, one in"*, which was acknowledged. 38 sec later, TWR transmitted *"(PA31 c/s), there is one in turning downwind now"*, to which the pilot replied *"Traffic in sight, tower C/S"*. (Note: The PA31 pilot indicated in his report that, when he saw it, he perceived that the other ac was on the extended runway c/l at position ① in the diagram. It was probably at position ② at the time.) Immediately after this, the Jetstream pilot transmitted *"(Jetstream C/S) downwind to roll"*. TWR acknowledged this call *"C/s roger surface wind 310/15"* and 15 sec later advised *".... there is a PA thirty one joining downwind"*, although the only information he had received regarding the position of the PA31 was via an earlier landline call from the Supervisor stating that it was joining *"..from the south"*. At some time during the following 28 sec, TWR sighted an ac joining on a left base leg for RW 26. He believed this was probably the PA31 and so transmitted *"(PA31 C/S), confirm on left base now?"* to which the PA31 pilot replied *"Roger, turning, C/S"*. Immediately following this, TWR transmitted *"(Jetstream C/S) are you visual with the PA thirty one ahead?"* to which the Jetstream pilot replied *"Affirm C/S"*. 13 sec later the Jetstream pilot transmitted *"C/S finals, gear down"*. TWR replied *"(Jetstream C/S) cleared to roll"*.

Subsequent RT calls included the Jetstream pilot questioning the PA31's intentions, the PA31 pilot calling 'finals' and being told to 'go around' by TWR, the PA31 pilot requesting the circuit direction and the Jetstream pilot finally

electing to 'go around' on the deadside. 1 min 26 sec after calling 'finals', the Jetstream pilot transmitted *"...I request you report an Airprox there"*. Shortly afterwards, the Jetstream pilot stated that he was *"..not happy"*, and returned to Cranwell.

The LATCC Claxby radar recording indicates that the Airprox occurred 2 NM E of Coningsby at about 0951:28. The PA31, identified from its 3730 squawk whilst working Coningsby Approach, is seen tracking NNE towards Coningsby. The last Mode C indication from the PA31 is passing FL 39 (equating to 3000 ft on QFE 983) at 0949:37, about 4 NM SSE of the aerodrome just before the ac squawks standby, presumably whilst changing to TWR. The non-squawking Jetstream can be seen flying left hand circuits to RW 26, although the final 0.5 NM (approx) of the approach occurs below the cover of the recorded radar and is therefore not seen. The Jetstream is steady downwind in the radar sweep timed at 0950:34, which would equate to the moment that its pilot reported 'downwind to roll'. At this point, the PA31, which had just reported in sight of the 'traffic', is in the Jetstream's 1:30, range 2.5 NM, tracking about 020°. The PA31 turns L onto a base leg hdg at 0950:58, which places it in the Jetstream's 1 o'clock, 1.5 NM with the relative bearing reducing; the PA31 appears to be very slightly faster than the Jetstream. The PA31 crosses 1.08 NM ahead of the Jetstream and the closest point of approach occurs at 0951:28 with the PA31 in the Jetstream's 11 o'clock, range 0.5 NM, turning finals. In the preceding two radar sweeps, the PA31 appears to have turned R 20°, followed by L 30°, whilst the Jetstream appears to deviate about 5° R. Subsequent radar sweeps show both ac intermittently, but not in the same frame until 0952:17, when they are each lined up on final approach, with just under 0.25 NM separation. Interpretation of the tracks during the subsequent 'go arounds' would indicate that the PA31 was in front of the Jetstream at that time.

The events leading up to and after this Airprox highlight both the problems associated with multiple frequency operations and the need closely to monitor visiting civilian ac operating at

military aerodromes. Whilst TWR controllers can receive and reply to transmissions on different frequencies, the current military aerodrome communications fit does not permit 'cross coupling' of frequencies (ie transmissions on one freq being simultaneously rebroadcast on another). Therefore it is incumbent on the controller to ensure that sufficient information is given to, and understood by, pilots of ac operating on differing frequencies on the actions/intentions of the other ac. Notwithstanding this, however, the visual circuit at military aerodromes is operated in accordance with VFR and it is the responsibility of pilots in, and specifically joining the circuit to see other circuit users and position themselves accordingly. Note: JSP 318A article 2502 (NATO Standard Visual Circuit procedures) para 5 states. *'It is the responsibility of the pilot to avoid 'bunching' in the circuit'.*

Having reported 'downwind', without being informed of any ac ahead of him, the Jetstream pilot could have reasonably assumed that he was No 1 in the landing sequence. This would have been subsequently reinforced by the (later discovered to be incorrect) information that there was a *"..PA31 joining downwind.."*. Similarly, the PA31 pilot, who was visual with the Jetstream, could have also reasonably assumed that he was the No 1 once TWR had asked if he was *"...on left base now?"* and then referring to the *"..PA31 ahead..."* whilst transmitting to the Jetstream, although this choice of words was not intended to indicate an order of recovery. Finally, having ascertained that the PA31 pilot was visual with the Jetstream and, although only shortly before the Airprox, that the Jetstream pilot was visual with the PA31, the TWR controller no doubt assumed that the pilots would not fly their ac into conflict. Thus the situation was allowed by all concerned to continue. The weather conditions reported by ATC were: Vis 40 km, Wx nil, Cloud 6/2500 ft, however the slant visibility to the south was much less due to the sun shining through the clouds. Therefore mid morning, whilst the Jetstream was tracking downwind (approx 080°), the PA31 was in a 1:30 position and thus roughly into the sun. The Control Tower at Coningsby is situated to the N of the runway;

thus, from the TWR controller's perspective; an ac on left base would also be positioned into the sun. Both of these points may have also precluded the earlier sighting of the PA31.

With two frequencies in use, the person best placed to clarify/control the situation was the TWR controller. By more accurately confirming the position of the joining ac and providing a better exchange of information between both frequencies, in a similar fashion to the well established means of integrating circuit and instrument traffic, the impending conflict might have been highlighted earlier. Thus the controller would have had a better opportunity to take charge of the situation by specifying the landing order, the simplest option probably being to have instructed the PA31, who was already visual with the Jetstream, to join as No 2 behind.

However, both pilots would have heard, and should have been paying attention to, the RT transmissions being made by TWR, although they would have been unable to hear calls or replies from the other ac. Thus TWR would have reasonably believed that any inaccuracies in his transmissions, such as *"..PA31 joining downwind"* would have been heard and corrected by the PA31 pilot, knowing that he was actually joining left base. The additional confusion, which arose during the subsequent overshoot/go around, regarding circuit directions and the intentions of the Jetstream, would also lead to a questioning of the PA31 pilot's awareness and planning. He saw the Jetstream flying a left-hand circuit and should also have heard the controller's *"(Jetstream C/S) cleared to roll"* transmission. This is in addition to the fact that he knowingly flew about 0.5 NM ahead of another ac without question.

HQ PTC comments that where the only 2 ac in the circuit arrive in the same bit of sky at the same time all the parties concerned have to some extent not exercised the requisite degree of common sense. The lack of clarity from ATC as to where the PA31 was joining was not helpful. Both ac should have been left in no doubt as to their relative positions and circuit priorities. This is particularly important in a mixed V/UHF environment where the ac cannot

hear each other. The PA31 may have initially mis-assessed the Jetstream's position in the circuit but he should then have continued to monitor his separation more closely as he continued to join. When separation was becoming eroded, the situation could have been resolved by more positive action by TWR. That the situation developed was the PA31 pilot's responsibility; that it remained unresolved was the controller's.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board discussed this incident at great length. Firstly, it was clear that the ac did not come particularly close and that the Jetstream pilot, having seen the PA31 cross ahead, could have adjusted his circuit to fit in behind it. Members agreed that there had been no risk of the ac actually colliding but there had been a confliction in the circuit and the Board sought to analyse its causes.

Members agreed that none of the cause lay with the Jetstream pilot who was told the PA31 was joining downwind and since he was already downwind, could justifiably assume he would not see it between himself and touchdown. The TWR controller made an unchecked assumption that the PA31 would join downwind, and, not having heard APP tell him that it was joining base leg, should have asked where it was coming from before passing traffic information to the Jetstream pilot; the incorrect traffic information was therefore a factor in the cause.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Coningsby ATC did not provide the degree of control necessary to integrate the joining civil ac into the circuit.

Members discussed the PA31 pilot's part in the cause. Military ATC opinion held that he was given sufficient information to allow him to integrate himself into the circuit pattern without disrupting those already in it, as per the requirements of military flying regulations, and that if he was unsure where other ac were in the circuit he should have asked. It was such a simple situation from a military ATC viewpoint that it would not have prompted any particular attention. However, it was pointed out that, as a civilian, he had no experience of these regulations or procedures, and that a civilian pilot will expect to be directed where to join and to be told where he is in the traffic sequence. In this instance he was asked by APP if he was joining on base leg and replied that he was. The absence of any instructions to the contrary would constitute clearance to a civilian pilot to do exactly this, the unspoken understanding being that ATC wanted him to do so to fit in with their plan for other traffic. Having seen the Jetstream initially, the PA 31 pilot had no specific requirement to watch it, perhaps assuming since the controller had cleared him to join on base, that the Jetstream was in a right hand circuit or was climbing out, or was a low performance ac (he had not recognised its type) that would not catch him up. On seeing it as he passed it, it must have seemed as if ATC's actions to separate traffic under their control had failed, as would have been the case under civil ATC procedures.

It was clear from the views expressed in the discussion that some military airfield controllers were not aware of fundamental differences between civil and military ATC at aerodromes, and that the PA31 was not given the degree of control required to integrate a civil pilot safely into a military ATC pattern. The Board concluded that this was the cause of the confliction.

AIRPROX REPORT No 30/99

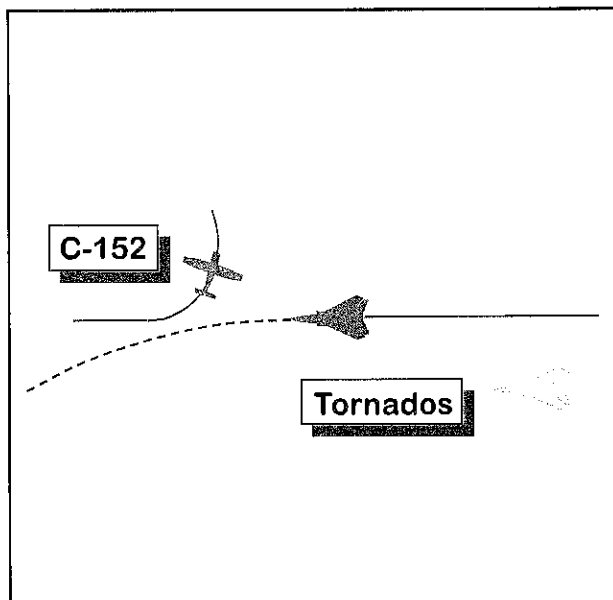
Date/Time: 9 Mar 1336
Position: N5620 W0323 (3 NM SSE of Perth)
Airspace: LFS/FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Tornado GR C152
Operator: HQ STC Civ Trg
Alt/FL: 350 ft ↓
(Rad Alt)
Weather VMC CLBC VMC HZBC
Visibility: 10 NM 5 km
Reported Separation: 0.75 NM/NK
Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 265° at 420 kt leading a pair in arrow formation at low level. He saw a light ac in his 12:30 about 0.75 NM ahead in what appeared to be a LH turn. He called it to his No 2 and flew a tight LH climbing turn to avoid it, without which a collision would have occurred. He was very concerned to find a light ac in the LFS below 500 ft.

THE C152 PILOT reports flying a GFT with a student pilot and at the time of the Airprox was in communication with Dundee approach who had earlier advised of Tornado traffic at low level which is not uncommon in this area. He flew a PFL at 70 kt during which the incident probably occurred but he did not see the Tornados.

HQ STC comments that it is particularly difficult to see small, slow moving ac at low altitude. In this instance the Tornado crew saw the Cessna with sufficient time to take appropriate avoiding action and to warn their wingman. In their subsequent comment the Tornado crew have expressed surprise at encountering the Cessna below 500 ft. Clearly, operators of light ac have a right to the lower airspace within the context of the rules governing their operations and accordingly all RAF crews will be reminded of this fact via the IFS (RAF) Feedback publication.



The Cessna crew had been advised of Tornado traffic and knew that they were operating in an area where military fast jet traffic is not uncommon. Under circumstances such as this, it behoves all light ac operators to maintain optimum lookout, especially when ac performance is poor during manoeuvres such as PFLs.

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 found little to discuss about this incident; both parties were going about their respective tasks in an environment where they needed to see and avoid each other. While concentrating on a selected PFL field to his left the Cessna instructor would still have been in a position to look to the right (outside the turn) while descending through military low flying levels. Whether he did or not was unknown, and the Board considered that his non sighting of the Tornados was part of the cause of the incident. The Tornado pilot fortunately did see the Cessna in time to avoid it but this late sighting was also considered to be part of the reason the ac came close to each other.

However, members accepted that the sighting was made in time for the Tornado pilot to remove any risk of the ac colliding.

Members suggested that it would be useful for military pilots to be advised that civilian ac

should not fly "closer than 500 ft to any person, vessel, vehicle or structure". In open countryside or water therefore, civil ac may be less restricted than military ac in how close to the surface they may fly.

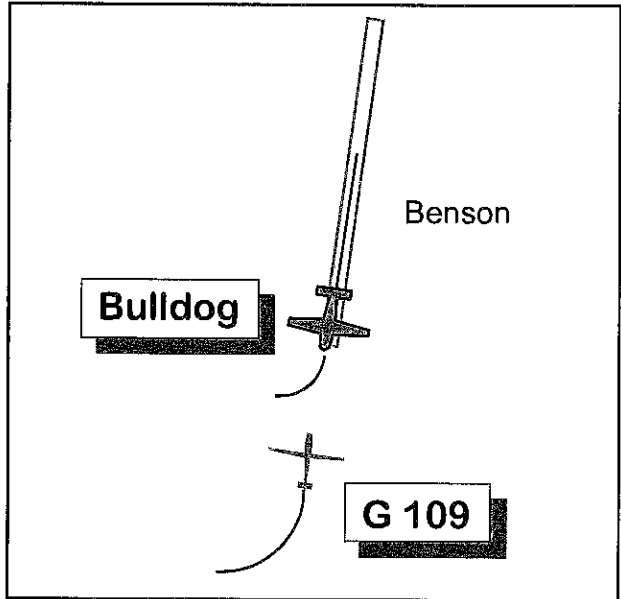
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Late sighting by the Tornado pilot and non-sighting by the C152 pilot.

AIRPROX REPORT No 31/99

Date/Time: 9 Mar 1622
Position: N5137 W0106 (Benson - elev 203ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Bulldog Grob 109
Operator: HQ PTC Civ Club
Alt/FL: 250-300 ft ↑ 100 ft ↓
 (QFE) (QFE 984 mb)
Weather VMC CLBC VMC CLBC
Visibility: Unltd 8 km+
Reported Separation: 50 ft V
 800 m H, 50 m V
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BULLDOG PILOT reports heading 190° at 80 kt in a climb after take-off from RW 19 at Benson. Passing 250-300 ft he saw a motor glider on a reciprocal track in his 11 o'clock 50 ft ahead and below. It passed 50 ft below with an extremely high risk of collision as he broke up and to the right; the other ac appeared to take no avoiding action and landed on RW 01.

THE GROB 109 PILOT reports being uncertain of his position and it was getting late when he saw the airfield so he decided to land to find out where he was. Not knowing the identity of the

airfield he did not have a frequency to call on and made no RT calls. He flew a downwind leg and normal approach to land having seen another ac taxiing down the runway and assumed he would be safe to land behind it. He was heading 010° at 65 kt on finals when he saw the Bulldog which turned away to its right and climbed, passing 800 m away and 50 m above as he continued for a landing. There was no risk of collision.

HQ MATO reports that the Bulldog was captained by a solo UAS student, who had been briefed to carry out a circuit consolidation

exercise at RAF Benson, whilst his instructor observed from the VCR. RW 19 was in use, with one other Bulldog in the visual circuit and one Puma helicopter conducting an instrument approach to land when the Bulldog pilot was cleared to take off at 1620:36. The Puma was cleared to land at 1621:44, once the Bulldog was seen to be airborne. At 1622:35, shortly before the landing Puma reached the RW threshold, a second Puma taxiing into dispersal transmitted to the Ground Controller (GND) "*Ground (C/S), is Tower visual with that motor glider coming in against the flow?*" On hearing this, GND observed a Grob motor glider landing on RW 01 and informed the Aerodrome Controller (ADC). The Puma pilot had seen the Grob during the final stages of his approach, whilst changing to the ADC's frequency and landed clear of the runway. The Grob turned into a subsidiary runway and then onto a grassed area, before being intercepted by an ATC vehicle and brought to a halt near to the helicopter dispersal. The Bulldog pilot flew two circuits before landing and unexpectedly returned to dispersal. After changing to the GND frequency, his instructor asked on RT if he had a problem, to which he replied "*Near miss with the glider sir, bit shaken up, decided to call it a day*".

ATC staff in the vehicle questioned the Grob pilot in order to determine the reason for his unannounced arrival. He stated that he did not have an emergency, nor was he short of fuel, but that he had become lost and had landed in order to find out where he was. A check of the Grob's VHF radio was conducted with Benson TWR on frequency 130.25 at 1624:57 and found to be serviceable. It was also noted that the a/c was equipped with an SSR transponder. ATC were later advised by telephone that the student pilot of the Bulldog had filed an Airprox with the Grob motor glider. Subsequent checks by the ATC supervisor revealed that the Grob pilot had not been in RT contact with Lyneham or Brize Norton, nor had he made use of the fixing services available from the LATCC (Mil) D&D cell.

Based on analysis of the Mode C readout from the Puma flying the instrument approach, the

base of LATCC radar cover overhead Benson is about 850 ft AAL. (Puma contact disappears at 1300 ft Mode C, QFE 998 mb). The Airprox is not recorded as it occurred below the base of the LATCC Heathrow radar recording, however the preceding events, including circuit traffic flying the downwind leg to RW 19, can be seen (the Bulldog circuit is flown at 1000 ft QFE). The Grob approaches Benson from the S and manoeuvres between 0.5 NM and 2 NM to the W and SW, for about 3 min before turning towards the airfield. The last radar return from the non-squawking Grob is seen at 1621:27, 1.25 NM SSW Benson as it turns L through east. 30 sec later, a contact believed to be the Bulldog appears for the first time about 0.25 NM E of the Grob's last observed position, turning L downwind for RW 19.

The Grob was first seen as it landed, despite there being 6 people (ADC, GND, 2 assistants and 2 Bulldog instructors) in the VCR. The VCR at Benson is positioned to the W of RW 01/19 and the visual circuit pattern is flown to the E, (ie 19L, 01R). At the time the Bulldog was cleared for departure (1620:36), the Grob was about 0.75 NM W of the airfield and thus directly behind the main area of interest to the VCR occupants, ie the visual circuit and final approach area to RW 19. Additionally, the a/c can be seen on the radar recording at this time, thus it would have been some 850 ft or more above the aerodrome and hence at a relatively high angle of elevation from the Control Tower. Considering this, the relatively small size and the light colour (white) of the Grob, and that the ac would have been 'into sun' from the Tower, it would have taken an extremely determined observer to have noticed it much earlier.

HQ PTC comments that it is difficult to understand how in modern times an ac with a serviceable radio and transponder can become lost and arrive completely unannounced at an active airfield unless its pilot is totally unaware of the services available to him on the VHF 'common' and emergency frequencies. That the pilot also did not follow accepted procedures for a non-radio arrival, misidentified the landing direction and flew into direct conflict with an ac on take-off is a matter of

grave concern, showing a marked lack of awareness on the part of the G109 pilot. His assessment of the minimum separation distance is at odds with that reported by the Bulldog pilot. This discrepancy could be explained if he saw the Bulldog in the circuit rather than the one involved in the Airprox. Whichever he saw, he should have been alerted to the fact that it was not conforming to his assessment of the circuit pattern. We are extremely fortunate that thanks to the alertness and prompt reactions of the Bulldog and Puma pilots this incident did not end in tragedy.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

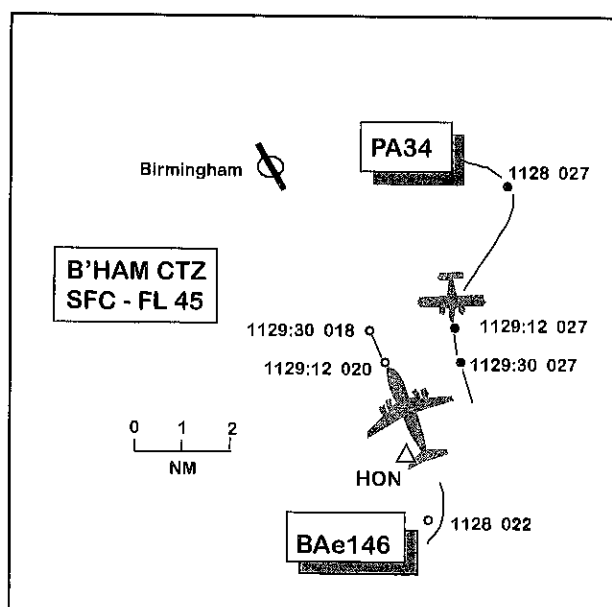
Cause: The Grob pilot flew without authorisation into the Benson ATZ contrary to Rule 39 and into conflict with the Bulldog.

AIRPROX REPORT No 32/99

Date/Time: 09 Mar 1129
Position: N5223 W0139 (5.6 NM SE Birmingham airport)
Airspace: CTZ (Class: D)
Reporter: Birmingham ATC
First Aircraft Second Aircraft
Type: BAe146 PA34
Operator: CAT Civ Trg
Alt/FL: 2000 ft 2500 ft
(QNH 1005 mb) (QNH 1005 mb)
Weather VMC VMC
Visibility:
Reported Separation: 1.6 NM/500 ft
Recorded Separation: 1.4 NM/700 ft

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

Members agreed with HQ PTC's opening comments about the Grob pilot's surprising lack of awareness of what the D & D cell at West Drayton would have been happy to provide to a pilot uncertain of his position. The result was very unprofessional conduct on his part and the Board concluded that the cause of the Airprox was that the Grob pilot had flown without authorisation into the Benson ATZ, contrary to Rule 39, and into conflict with the Bulldog. Members assessed that the safety of the ac had been compromised.



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

BIRMINGHAM ATC reports that traffic loading was medium. Following an ILS and missed approach to RW 33, the PA34 was flying a radar heading of 090° at 2500 ft (QNH) prior to setting course out of the CTZ to return to base. When at a point E of the airfield the pilot was instructed to resume his own navigation; at this time the BAe146, having been radar vectored for the ILS to RW 33, was on L base leg descending from 2500 ft to 2000 ft (QNH). The PA34 was then seen to be tracking directly towards Honiley; its pilot was instructed to turn L heading 110° to keep him clear of HON and the BAe146. However, the turn was slow, owing to the effect of an easterly wind prevailing, so the heading was amended to 090° together with an instruction to climb to 3500 ft. The ac passed with a separation of about 1.6 NM and 500 ft thereby triggering the SMF equipment.

UKAB Note (1): Neither of the pilots concerned in the Airprox was aware at the time that an incident had occurred. They were therefore unable to submit reports.

ATSI reports that the Airprox occurred during a period when the controller concerned assessed the workload and traffic loading as "medium". The relevant ATC equipment was serviceable and no factors likely to have adversely affected the controller's performance were identified during the course of the investigation. The manning in the approach room was considered adequate with an approach controller, operating on the same frequency but not equipped with a radar display, and an assistant to support the approach radar controller (APR).

After departure from Oxford the PA34 conducted an "airways" detail terminating at Birmingham, where it carried out an ILS and a missed approach to RW 33. Prior to returning to Oxford; the ac established on the ILS at 1116:00 and the pilot remained in communication with the APR while he carried out his approach and, with prior approval from the APR, conducted a simulated engine failure

while making a missed approach. The APR had instructed the pilot to make a R turn onto heading 090° and to climb to 2500 ft altitude following the go-around; the pilot reported turning onto this heading at 1124:10. At 1125:10, the pilot was instructed to turn further R onto heading 110° and remained on this heading, which was taking it away from the airfield, while the pilot of the other ac, the BAe146, was instructed to turn onto a L base leg and given further descent clearance to altitude 2500 ft.

The BAe146 pilot had established communication with Birmingham Approach at 1118, and the APR vectored the flight on a LH radar circuit for an ILS approach to RW 33. The ac was passing about 6 NM W abeam the airfield as the PA34 executed its go around, and was about to turn base-leg as the PA34 took up the heading of 110°.

The APR explained that she had recognised that a potential conflict would exist between the PA34 and any traffic on final approach to RW 33 if the ac turned directly on track for Oxford following the go around; hence the radar headings assigned to the PA34. However, at 1127, the APR advised the PA 34 pilot: *"...you can resume your own navigation position four miles east of Birmingham"*. The pilot acknowledged this and advised *"...we're departing to the south"*. He requested climb to 3500 ft but this was refused by the APR because her plan was to keep the flight underneath inbound traffic being vectored for ILS approaches. If the climb had been approved, the Airprox with the BAe146 would almost certainly have been avoided.

Once released on its own navigation, the PA34 took up a southwesterly heading (probably tracking towards the Honiley VOR) placing it virtually head-on to the BAe146 which by that time was on a closing heading for the ILS, descending to 2000 ft. The APR readily acknowledged that she should not have cleared the PA34 to resume its own navigation until there was no risk of a conflict with the BAe146. She had expected the PA34 to take up a track direct to Oxford which she had

assessed would keep the ac well E of the ILS. (On the direct track for Oxford, the PA34 would still have converged with the ILS localiser and the 3 NM minimum radar separation required might well have been infringed but, unless the BAe146 had gone through the localiser, it is unlikely that any risk of collision would have arisen).

When the BAe146 established on the ILS localiser at a range of about 7 NM, level at 2000 ft on the QNH, the PA34 was in its 2 o'clock position at a range of 3.3 NM and heading towards the Honiley VOR level at 2500 ft. If the 2 ac had remained on their respective tracks, although standard separation would have been seriously compromised, the PA34 would have passed behind the BAe146. At 1128:30, the BAe146 was transferred to ADC and the crew remained unaware of the Airprox. At about this time, the APR noticed the confliction and, at 1128:40, instructed the PA34 pilot to turn L onto radar heading 130°. The APR recalled that, at some stage, her approach controller had queried what the PA34 was doing but she was not certain whether this was before or after she had issued the turn instruction. The approach controller had been busy with operational telephone calls which would explain why the confliction was not picked up any earlier.

The APR did not use the words "avoiding action" and did not pass traffic information. When this was queried, she explained that she had not considered the use of the phrase because, knowing that 500 ft vertical separation existed, she had been confident that there was no risk of collision, however, she acknowledged that she should have at least provided traffic information. Subsequent enquiries indicate that the crew of the PA34 were unaware that the incident had occurred. At 1129:20, the APR instructed the PA34 to turn further L onto 090° and approved the requested climb to 3500 ft. Thereafter, its flight through Birmingham's airspace was uneventful. The encounter had activated the unit's SMF equipment and the APR filed an Airprox report. The minimum separation was 1.6 NM and 500 ft.

UKAB Note (2): A replay of the Clee Hill radar shows the BAe146, indicating 2200 ft Mode C, turning onto finals for RW 33 at about 1128. At the same time the PA34 is about 4.5 NM E of the airfield indicating 2700 ft and commencing a R turn towards HON. At about 1129 the PA34 is making a slow L turn away from the 33 approach path as the BAe146 comes into its 2 o'clock position at about 2 NM away at 2200 ft. At 1129:12, 1 NM N of HON, the ac pass starboard to starboard 1.4 NM apart with the BAe146 now descending through 2000 ft Mode C on the ILS. Vertical separation at this point, based on Mode C readings, is 700 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI adviser told the Board that the Birmingham APR had instructed the PA34 crew to resume their own navigation in the belief that they would set a course from their position direct for Oxford and therefore not conflict with the inbound BAe146. Given the circumstances it is unlikely that the prescribed lateral separation (3 NM) would have been achieved even if the crew had done so. The APR had recognised from the outset that a potential for confliction existed and it would have been prudent either to put the PA34 on a radar heading until the ac had passed, or to establish the requested routeing out of the CTA before allowing the ac to resume its own navigation. Members concurred with this appraisal and the Board concluded that the Airprox occurred because the Birmingham APR released the PA34 to follow its own navigation before ensuring that lateral separation from the BAe146 would not be compromised. The Board were satisfied, however, that the ac were sufficiently far apart both laterally and vertically to preclude any risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Birmingham APR released the PA34 on its own navigation before standard separation with the BAe146 was assured.

AIRPROX REPORT No 33/99

Date/Time: 10 Mar 1047

Position: N5329 W0250 (9 NM N Liverpool airport)

Airspace: MTMA (Class: A)
Reporting Aircraft Reported Aircraft

Type: B767 Microlight

Operator: CAT Civ Pte

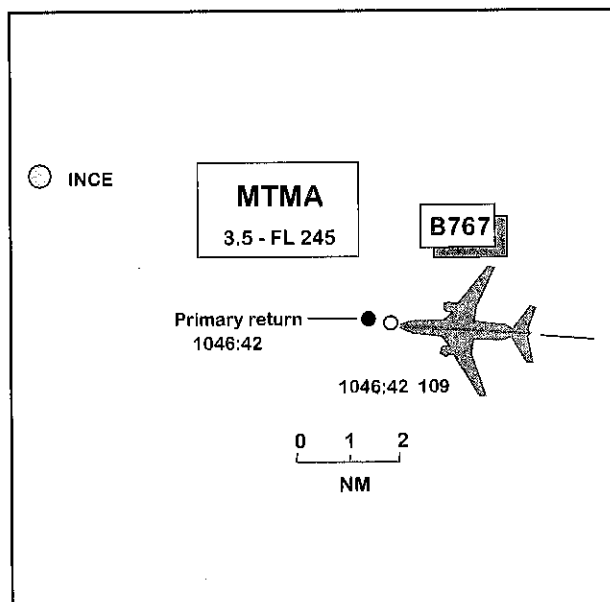
Alt/FL: ↑ FL 180

Weather VMC VMC

Visibility: good

Reported Separation: 0 ft lat/>100 ft vert

Recorded Separation: 0 ft lat



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports that he departed from Manchester at 1041. At 1049, while climbing through FL 110 at 500 ft per min on a westerly heading within CAS, an ultralight ac was seen directly ahead and below them. They had less than a second to react and by the time the co-pilot, who was flying the ac, had instinctively begun to raise the nose, the ac passed less than 100 ft directly below them. Their main concern was that the other ac might have encountered turbulence from the B767's wake.

THE MICROLIGHT PILOT reports that he had departed from Ince airfield in good VMC on a solo training flight. His brief was to head NE to the old airfield at Burscough, follow the railway line NE towards Preston and then turn R just before Leyland to pick up the M6 southbound to the M6/M58 junction. From there he would head W, following the M58, and then track the river Alt back to Ince.

All initially went according to plan until he began to follow the M6 southbound. At this point he decided to climb a little higher from the 1500 - 2000 ft he had hitherto been maintaining. On attempting to level out, however, he found that the throttle was jammed (it was subsequently found to have frozen). Being unsure of what to do, but thinking that 'height was safety', he allowed the ac to climb. Eventually, having selected the largest field he could see in the area, he gained sufficient courage to switch off the engine and glided down to a perfect engine-off landing.

Being preoccupied with his jammed throttle, he had not realised that his ac had drifted S in the prevailing northeasterly winds and into CAS. He did not see, hear or feel any effects from the B767 which reported the Airprox.

The microlight pilot's CFI comments that in future solo microlight student pilots on cross-

country flights will use radio-equipped ac only. Moreover, each student will receive a comprehensive brief on RT lost procedures.

MANCHESTER ACC reports that the B767 had been cleared to climb to FL 180 and to head 285° after

passing FL 70. At 1047, when 076°/12.5 NM from WAL and climbing through FL 110, the pilot reported passing overhead a microlight with less than 100 ft separation. A primary return was observed at the position and traced to the St Helens area.

UKAB Note: A video recording of the LATCC radars at 1046:42 shows the B767 tracking westerly and climbing through FL 109 Mode C as a pop-up primary return appears at its 12 o'clock less than 0.5 NM away. A few seconds later the acs' returns merge and, following the encounter, the primary paints for a couple of sweeps before disappearing. The Airprox occurs about 9 NM N of Liverpool airport (7 NM SE of the microlight's base at Ince).

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.

A GA member commented that the microlight's planned route was close to the base of the MTMA throughout and any climb above 3500 ft on the southbound leg would have inevitably taken the ac into CAS. He assumed that the microlight student pilot was of fairly limited experience, and perhaps unaware of the full significance of continuing a climb even when dealing with his engine emergency which he seemed ill prepared for. The Board concurred and felt that in the circumstances the microlight pilot should have had the benefit of a pre-flight briefing appropriate to his experience level.

Notwithstanding his preoccupation with the engine problem, members were amazed that the microlight pilot could have found himself in such a predicament without apparently being aware that he had climbed so high. It seemed incomprehensible that he was not conscious of the extent of his unusual ascent, both from a visual and a physiological point of view, during the 15+ minutes or so it must have taken him to reach 11000 ft. Moreover, it was equally mystifying how he could have passed within 100 ft of a large passenger jet without in any way being aware of its presence.

The Board concluded that the microlight pilot, while preoccupied with his engine problem, had allowed his ac to climb into Class A airspace and into conflict with the B757, which he did not see. Members conjectured that even if he had seen the jet his ability to manoeuvre to avoid it would have been extremely limited.

The B767 pilot would not have been expecting to encounter light traffic at such a level within the protected airspace of the TMA and members were not surprised that he did not see the microlight earlier; moreover, owing to its poor radar signature, the microlight would have been at best an intermittent return on radar, thus limiting the radar controller's ability to pass traffic information. In the event, the B767 pilot's eventual sighting of the microlight left him with insufficient time to take effective avoiding action and the ac passed uncomfortably close below him, exposing it to the possible effects of the B767's wake vortex. These factors led the Board to conclude that there had been an actual risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: While endeavouring to overcome engine difficulties the microlight pilot allowed his ac to fly into Class A Airspace and into conflict with the B767, which he did not see.

AIRPROX REPORT No 34/99

Date/Time: 11 Mar 1653

Position: N5212 E0011 (Cambridge - elev 50 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: Bulldog Beech 200

Operator: HQ PTC Civ Comm

Alt/FL: 800 ft 1000 ft

(QFE 1011 mb) (QFE)

Weather VMC CLBC VMC CAVK

Visibility: 10 km+ 10 km+

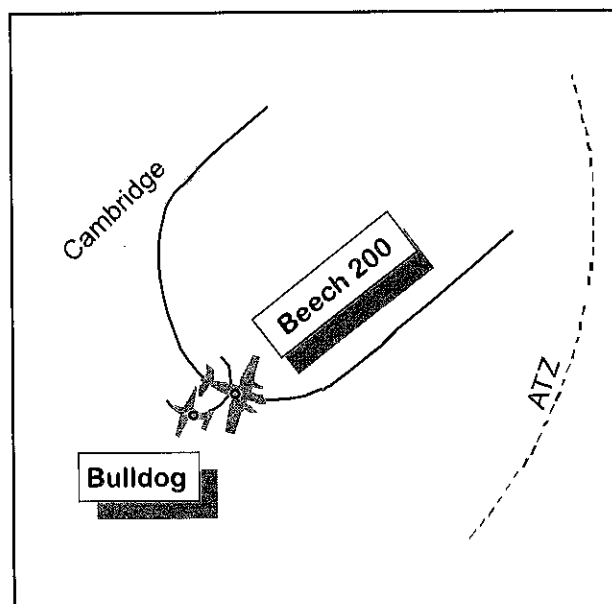
Reported Separation:

200 ft H

500 m H, 200 ft V

Recorded Separation:

< 0.25 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BULLDOG PILOT reports flying LH circuits for RW 23 at Cambridge at 800 ft. He was asked to orbit in the downwind position for an ILS calibration ac which was at 6 NM running in. Three quarters of the way round his second orbit, heading 320° at 80 kt, he suddenly saw a T-tailed twin-engined ac in a tight left hand turn at the same altitude about 200 ft away. There was no time for avoiding action as the speed of the twin took it rapidly past him with a high risk of collision. He said on RT that the Beech 200 had passed too close. He had not received any traffic information on it after the 6 mile call and reported the Airprox after landing.

THE BEECH PILOT reports heading 233° at 180 kt, level at 1000 ft on a centreline calibration run for the ILS on RW 23 at

Cambridge, at 180 kt. He followed this with a level 30° AOB turn left from the threshold to reposition downwind. He was told about the Bulldog orbiting and saw it at 2 NM; he passed 500 m from it and 200 ft above it in his left turn, with no risk of collision.

CAMBRIDGE ATC reports, with RT recording, that the Bulldog was orbiting downwind to avoid the final approach area for the calibrator. Approach advised the calibrator on 123.6 about the Bulldog; the Beech 200 pilot said he could see the Bulldog when he was asked at the start of his left turn inside the Bulldog which was orbiting to the right. The Tower controller had told the Bulldog pilot on 122.2 about the calibration ac when it was at 5 NM. 1½ minutes later the Bulldog pilot asked if the Beech 200 pilot had seen him, saying "*it passed bloody close*". There were no other ac in the circuit at the time.

Note: The Debden radar recording shows the 2 ac as shown in the diagram; the Bulldog is a primary-only return and the Beech 200 is steady at 1100 ft Mode C as it passes across the Bulldog's orbit, which equates to 1000 ft on the QFE 1010 mb. The separation is difficult to measure as the closest point is between returns but appears to be in the order of 200 yd.

HQ PTC comments that this comes somewhere between bad manners and bad airmanship on the part of the calibrator. Some of the Bulldog pilot's alarm might be due to the Kingair's sudden appearance from his blind-spot but it was undeniably close. Notwithstanding having seen the Bulldog since 2 NM finals and his clear wish to complete his task as economically as possible, it was wholly unnecessary for the Kingair to fly that close.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

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

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

In his orbit the Bulldog pilot was not able to keep a continuous eye on the Be200, if he ever saw it, having not been told where it was since the 5 NM call. ATC had been advised by the Kingair pilot that he had the Bulldog in sight which completed ATC's responsibility to VFR traffic. It was up to the Kingair pilot subsequently to avoid the Bulldog by a reasonable margin, which he thought he had done. However, the Bulldog pilot thought the Kingair pilot had flown close enough to cause concern for safety, an opinion shared by the Board who concluded this was the cause of the Airprox. The reported separation seemed unnecessarily close and members could not understand why this was since there was no operational need to fly that flightpath. Because the Kingair pilot kept the Bulldog in sight the Board concluded that he was always in a position to ensure he did not actually collide with it.

AIRPROX REPORT No 35/99

Date/Time: 10 Mar 1251

Position: N5242 W0145 (3 NM NE Lichfield
- elev 171 ft)

Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft

Type: Microlight JetRanger

Operator: Civ Trg Civ Comm

Alt/FL: 300 ft , 500 ft ,
(QFE) (RPS)

Weather VMC VMC CLBC

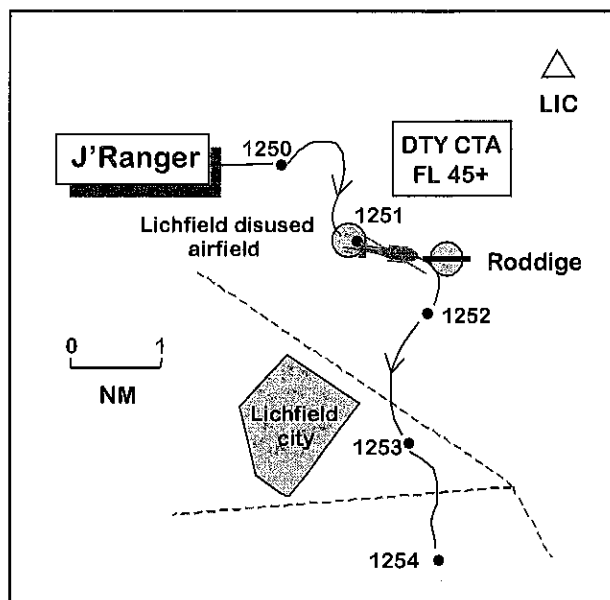
Visibility: 30 km 10 km

Reported Separation: zero H/50 ft V

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports that he was heading 360° at 50 kt and descending through 300 ft agl while engaged in a circuit training detail on RW 09 at Roddige. The visibility was 30 km in VMC. He was listening out on Birmingham's radar frequency (118.05) and heard a helicopter reporting over Lichfield disused airfield (1.5 NM to the W). On looking in that direction, he saw the helicopter flying towards him at high speed and immediately initiated a full power climb in avoidance; the helicopter passed about 50 ft directly below him with no apparent change of heading and was then observed to turn R towards Lichfield city. He believed that had he not taken avoiding action there would have been a collision.

THE JETRANGER PILOT reports that he was NW of Lichfield in the descent from 1000 ft to 500 ft at 90 kt on a pipeline inspection flight. He was squawking 0036 with no Mode C. The visibility was 10 km in VMC. While calling Birmingham for a FIS on 118.05 he noticed a shadow on the ground and a microlight was then seen in level flight about 0.5 NM ahead tracking towards him at about co-altitude: he thought it must have climbed from under his horizon having just taken-off from a local field. A rapid powered descent and turn to the R was initiated and the microlight passed down his port side 150 m away and 200 ft above. The pilot does not give an assessment of risk but



comments that his avoiding action followed a late sighting which had probably been due to the slow speed and lack of relative motion of the microlight as it approached from below, and its obscuration by the helicopter's door pillar.

UKAB Note: Throughout the Clee Hill radar recording there was no primary radar available and therefore the microlight cannot be seen. However, the helicopter, identified by its 0036 squawk, is seen at 1250 as it commences a meandering South to southeasterly track about 2 NM NW of Roddige. At 1251 the ac has turned onto E about 1 NM W of the airfield and about 30 seconds later skirts its SW boundary while in a R turn onto a southwesterly heading. This area equates with a base leg position for RW 09 at Roddige and the helicopter's observed flight path during this period accords with the microlight pilot's description.

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.

While this incident took place in the "see and avoid" environment, where the onus for deconfliction falls equally on both pilots, the

Board felt that in this case the helicopter pilot shouldered the greater responsibility by virtue of his choice of route and his manoeuvrability; moreover, the geometry of this encounter required him to give way to the microlight. Members thought the helicopter pilot could have planned his sortie with greater awareness of likely activities and hazards en route, such as the well known microlight site at Roddige; it was evident from the radar recording that the helicopter passed close enough to the airfield boundary to encroach on its circuit area. While the helicopter observer's attention was likely to have been concentrated towards the ground, overall responsibility for lookout rested on the pilot who, in the event, saw the microlight only just in time to take avoiding action. The Board

concluded that his late sighting, close to the active microlight site, was the cause of the Airprox.

The microlight pilot, having been prompted by RT transmissions to look in the direction of the Lichfield disused airfield, also saw the helicopter just in time to take avoiding action within the limits of his manoeuvring capabilities. Members felt that he had seen the other ac as early as could be expected, bearing in mind that his attention was focused on the circuit and his imminent landing. The Board concluded that the combined late actions of both pilots successfully avoided a collision but that ac safety had nevertheless been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

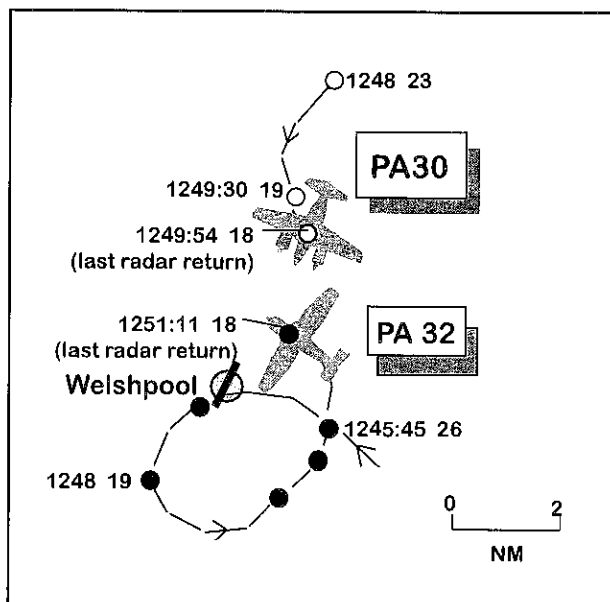
Cause: Late sighting by the helicopter pilot in close proximity to an active microlight site.

AIRPROX REPORT No 36/99

Date/Time: 13 Mar 1252 (Saturday)
Position: N5238 W0309 (Welshpool - elev 233 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: PA30 PA32R
Operator: Civ Pte Civ Pte
Alt/FL: 450 ft, 1000 ft,
(QFE) (QFE 1013 mb)
Weather VMC CLBC VMC
Visibility: >10 km >10 km
Reported Separation: 20 ft Vert/0 ft Hor

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA30 PILOT reports that he was inbound to Welshpool from Newcastle in VMC. The visibility, 2000 ft below cloud, was over 10 km. Approaching the airfield he changed from



Liverpool's frequency to Welshpool a/g and listened to the RT for a few minutes to ascertain the traffic situation. At Oswestry he called giving his details and requesting joining

instructions; these were to join RW 22 LH, circuit height 1500 ft, w/v 200° less than 5 kt. His nav instruments were tuned to Welshpool and as he progressed southbound down the valley towards the airfield at 85 kt he monitored his DME distance to run. At 6 DME he heard an ac call 'finals'; no other traffic was heard. At 5.6 NM he called RW in sight for a straight-in approach, which he believes was acknowledged but cannot be certain. Another ac was then heard to call overhead at 2000 ft descending dead side. At 3.5 NM he could see the landing ac ahead so he again called...*"c/s finals 22 one ahead, second to land"*, at the same time commenting to his passenger that the other ac had probably joined finals behind them and had them in sight. The ac ahead had now landed and was seen holding clear of the RW for landing traffic. At 1.4 NM and passing about 450 ft, his passenger suddenly shouted a warning that there was an ac above them and on looking up he saw the windscreen filling rapidly with the underside of an ac. He immediately lowered the nose, broke R and made a climbing turn to the L to avoid terrain. The other ac, a PA32 whose registration he noted after landing, was within 20 ft of him and descending when he first saw it and he believed there had been an imminent danger of collision. He then asked Welshpool if his transmissions had been received, to which the operator replied 'loud and clear'; on being told that he had been cut up on final, the operator replied she 'could do nothing about that'. He queried whether the other pilot had heard his calls to which the reply was...*"We heard you – we were in the circuit"*. Subsequently he made a tight circuit and landed without further incident.

THE PA32 PILOT report that he was inbound to Welshpool from Coventry and was flying the ac from the RHS while his co-pilot was navigating and making the RT calls. Having made his initial call, he advised that he would be making a standard overhead join, which was acknowledged. Approaching the overhead he saw another ac, believed to be a Tomahawk, making a 'touch and go'. He called...*"c/s overhead descending deadside contact ac in circuit"*. The Tomahawk seemed to be carrying out a wider than usual circuit and it was

necessary for him to do the same to maintain separation. He called "downwind - contact aircraft ahead" at 90 kt. When the Tomahawk called 'finals' he realised that he would have to extend further downwind to accommodate the ac's backtrack of the runway. After then turning in and calling 'finals' he heard another ac call '2 miles finals' (his DME read 2.2 NM at this time). His co-pilot immediately transmitted that they were on a 2 mile final. Neither of them could see the other ac but they then heard its pilot say...*"Don't people listen out – another ac has turned in front and above me"*.

The PA32 pilot comments that he had flown a full circuit at the correct height of 1500 ft, following the Tomahawk ahead and making all relevant RT calls. After landing he confirmed this with the air/ground operator and her comment on the other pilot's call was...*'what does he expect me to do from down here?'* He and his co-pilot were convinced that the other pilot had not been listening out or was trying to 'beat them in' by making a straight-in approach down the valley. The pilot adds that once he had started his L turn towards finals his raised starboard wing would have obstructed his view in the direction of the PA30.

UKAB Note: The Welshpool air/ground operator concerned was later contacted by UKAB staff but could remember nothing of the incident.

A replay of the Clee Hill radar shows the PA32 approaching Welshpool from the SE and joining overhead the airfield at about 1247 at 2000 ft Mode C. At the same time the PA30 is about 7.5 NM to the NE at 2300 ft. At 1249:54 the PA32, now 2 NM SE of the airfield at 2100 ft, commences a slow L turn towards finals as the PA30 positions onto finals at about 3.5 NM (this is the last radar paint observed on the PA30). The PA32 continues towards final and is still on a base leg heading, indicating 1800 ft, at 1251:11 when it also fades from radar cover.

Welshpool has a notified ATZ radius 2 NM active 0900 – 1700 in winter.

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 incident occurred just within the ATZ of an airfield situated in difficult terrain and served only by an air/ground operating facility. In such an environment it is particularly important for pilots to approach the airfield in a conscientious and safe manner having assessed conditions through careful interpretation of the RT and the provision of essential information by the a/g operator. While there is no laid-down priority for inbound VFR traffic in these circumstances, it is incumbent on pilots to ensure that they integrate themselves safely into the circuit pattern. On this occasion it should have been apparent to the PA30 pilot that the circuit was already active as he had heard one pilot call "finals" when he himself was 6 miles from touchdown, and another call descending on the deadside shortly afterwards. A GA Board member said that in his opinion, the PA30 pilot should have carried out a standard overhead join rather than a straight-in approach, particularly given the difficult terrain within which Welshpool is situated. The PA30 pilot's attention appeared to be drawn primarily to the Tomahawk he could see landing ahead of him, and he had erroneously concluded that the other ac he had heard calling deadside could see him and would fit in behind him. Members concurred with this view and the Board concluded that the PA30 pilot's straight-in approach, which took his ac into conflict with the unseen PA32 despite the good visibility reported, was a part cause of the Airprox.

Turning to the other ac, it appeared to members that the PA32 pilot might not have heard the initial joining calls from the PA30 pilot because his report indicates that the first he apparently knew of the other ac was after he had turned onto finals at 2.2 NM. Had he heard the PA30 pilot call at 3.5 NM "finals.....one ahead second to land" he might have been alerted to a possible conflict if he turned towards the approach track at that point. Members pointed out that whether or not he was aware of another inbound ac, the PA32 pilot was responsible for clearing the approach path to his R before turning base leg, and before turning finals. Given the good visibility reported, members felt that he should have been able to see the approaching PA30 during his base leg (had he lowered his wing to look) because by that time the 2 ac were converging rapidly and could not have been very far apart at similar heights. Once he began his finals turn any further opportunity to see the PA30 would have been degraded by his ac's upraised starboard wing. The Board concluded, therefore, that the PA32 pilot's non-sighting of the PA30 contributed to the cause of the Airprox.

Members agreed this was a very serious Airprox. The PA32 pilot was unsighted from the PA30 as he descended above it, and the PA30 pilot's first view of the PA32 was when it appeared very close above him; neither pilot was therefore able to react to the rapidly deteriorating situation and it was purely fortuitous that they did not collide. The Board concluded that there had been an actual risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: The PA30 flew into conflict with the PA32, and the PA32 pilot did not see the PA30.

AIRPROX REPORT No 37/99

Date/Time: 17 Mar 1544

Position: N5144 W0015 (4 NM E Luton airport)

Airspace: CTZ (Class: D)

Reporting Aircraft Reported Aircraft

Type: B727 C152

Operator: CAT Civ Trg

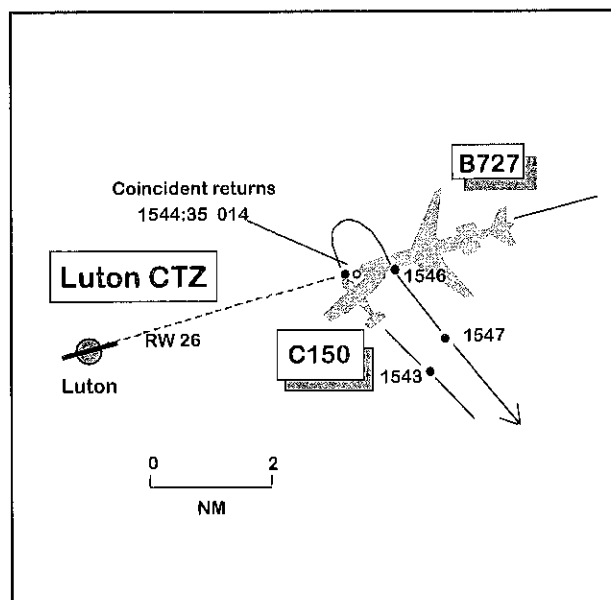
Alt/FL: 1800 ft ↓ 2000 ft
(QNH 1027)

Weather VMC HAZE/SUN VMC HAZE

Visibility: poor <5 km

Reported Separation: 300 ft V/0 m H

Recorded Separation: ? ft V/0 m H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B727 PILOT reports that he was established on final approach for an ILS to RW 26 at Luton airport at 150 kt. Visibility directly ahead was severely degraded by haze and a low bright sun. When about 4 NM from touchdown and descending through 1800 ft (QNH), he suddenly noticed a high wing Cessna type ac at his 11 o'clock 500 m away tracking from L to R. He thought it had been climbing but had levelled off when its pilot spotted him. As the ac was 300-400 ft below and they were able to keep it in sight, except for a few seconds when it passed directly under their nose, no avoiding action was considered necessary. He did not think there had been a danger of collision provided the other pilot had spotted them, but felt the risk would have been much greater if he had not. He reported the incident to the Luton Tower controller.

THE C152 STUDENT PILOT reports that he was unaware until advised by his instructor sometime later that he had been involved in an incident. Consequently he could remember few details of his flight. His planned route was Panshanger - Elstree - Stapleford - Panshanger, during which time he was in contact with Panshanger radio on 120.25 and squawking 7000. On the return leg from Stapleford he was unable to see Panshanger on his flight plan ETA and decided to pinpoint

his position with respect to a large town he could see; however, he quickly realised that this was in fact Stevenage and immediately turned S to clear the area. He saw no other ac in his vicinity. After the flight he discussed his navigational difficulties with his instructor and subsequently successfully undertook further dual navigational training. The pilot is profusely apologetic for his unintentional infringement of CAS and for any inconvenience this caused.

The Cessna pilot's CFI comments that the flight took place late in the day and the low bright sun did not make for ideal flying conditions. Since the flight he has conducted further dual navigational training exercises with the student emphasising the importance of accurate time keeping and, if unsure of position, the need to contact the nearest ATSU for assistance; in this case he should immediately have called Luton APC.

LUTON APR reports that at the time of the incident use of the Luton radar frequency (129.55) was subject to a NOTAM which limited the availability of ATC services to SAR, emergencies and essential zone transits only. During the period of the incident there were no calls from any ac for CAS entry clearance. Traffic loading was light.

The B727 had been radar-vectorred for the ILS to RW 26 and the pilot reported established at about 8 NM; he was transferred to the Tower frequency (132.55) at 7 NM. At 1545 the Tower controller advised APR that the B727 pilot had reported seeing a light Cessna-type ac passing under his nose from L to R in a climbing attitude. No corresponding primary or secondary radar returns were seen at any time during the B727's positioning onto the ILS but after the encounter a faint primary was observed just to the N of the approach at 4.5 NM tracking E and then SE. The return faded when about 2 NM S of the approach to the RW and was therefore impossible to track. Blind transmissions were made on 128.75 and 129.55 but no replies were received.

ATSI comments that it was unfortunate that the infringement was not observed on radar or visually by the controllers concerned. However, on the day in question the radar was reported to be affected by 'anaprop' (atmospheric interference) and was operating on only one channel, so the radar performance was unlikely to be at its optimum. Furthermore, without any specific information to alert them to the fact that there might be an ac in the CTZ without clearance, the controllers would not have been keeping a particular lookout for one.

UKAB Note: A replay of the LATCC radars at 1540:38 shows a primary only return, believed to be the C152, entering the Luton CTZ on a northwesterly heading about 2 NM NE of Panshanger. The B727 can be seen turning onto the RW 26 approach track from the N and at 1543 is established on the localiser at about 9 NM from touchdown. The primary return continues tracking NW and at 1544:22 passes just ahead of the B727 at the LUT NDB (4 NM from touchdown RW 26) with radar returns almost merging. The Mode C of the B727 at this point indicates 1600 ft, equivalent to 1978 ft altitude). A few seconds later the primary return then turns R onto a reciprocal track and re-crosses the final approach track at 5 NM, eventually leaving the CTZ at 1549:25 at exactly the same position it had entered.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording and reports from the air traffic controllers involved.

Members were disappointed to note the CFI's comment that the flying conditions were less than ideal for the C152 student. Bearing in mind not just the weather, but also the proximity of Panshanger to the Luton CTZ and the NOTAMed Luton frequency restrictions, members felt that a higher level of supervision should have been exercised before the student, of presumed limited flying experience, was permitted to undertake such a sortie. Specific briefing on the actions to take in the event of RT or navigational difficulties should have been covered particularly as any deviation from course to the N of Panshanger would almost certainly result in penetration of Luton's airspace. Whether or not he was aware of the Luton frequency limitations, the C152 pilot should have called Luton APC as soon as he became aware that he had penetrated the CTZ. Indeed, an immediate call should have been prompted when he identified Stevenage, a large town within 4 NM of the airport on the final approach path of Luton's main RW. However, the significance of this sighting does not appear to have registered. Following the encounter with the B727, which he did not see despite it having passed over him by less than 500 ft, he turned R and again flew through the approach track as he made his way out of the Zone.

The Board concluded that the student C152 pilot, having inadvertently entered the Luton CTZ, flew into conflict with the B727. Members noted that, despite a fairly late sighting of the Cessna by the B727 pilot, the latter was satisfied that the C152 was sufficiently far below him not to warrant any avoiding action on his part, and he was therefore content to continue approach while keeping the ac in sight. Although it eventually transpired that the student pilot had not in fact seen the B727 (contrary to the B727 pilot's

belief) and therefore this incident had the potential to be considerably more serious, the Board was satisfied that sufficient vertical

separation existed between the ac to preclude a risk of collision.

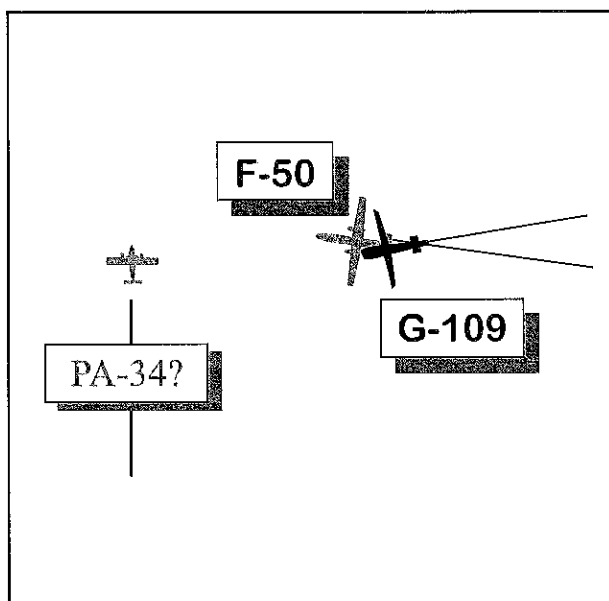
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Student of C152 pilot inadvertently entered the Luton CTZ and flew into conflict with the B727 which he did not see.

AIRPROX REPORT No 39/99

Date/Time: 18 Mar 1448
Position: N5323 W0112 (7 NM E of Sheffield - elev 231 ft)
Airspace: FIR (Class: G)
Reporting Ac: Fokker 50
Reported Ac: Grob 109
Type: CAT HQ PTC
Operator: 2500 ft 3000 ft
Alt/FL: (QNH) (QNH 1024 mb)
Weather: VMC CLBC VMC CLBC
Visibility: 10 km+ 20 km+
Reported Separation: <500 ft V 500-1000 ft V
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FOKKER PILOT reports heading 280° at 160 kt on the ILS centreline at 2500 ft for an approach to RW 28 at Sheffield with whom he was communicating on 128.52. He saw a glider about 0.25 NM ahead and above which was hard to see due to its slender line and the position of the sun. Within seconds he had passed less than 500 ft under it and slightly to its right; it was a motor glider on a similar heading. Just before passing under it he saw another ac akin to a Seneca at his 12 o'clock crossing S to N at high speed about 500 ft above and 0.5 NM ahead. He saw this ac late due to paying attention to the glider which he had passed before he could take any avoiding

action. He considered the ATC situation at Sheffield to be dangerous with no ATC facilities to provide safe separation from other traffic. Although the Grob pilot called Sheffield after the incident, there was no call from the other ac. He considered the risk of collision was moderate.

THE GROB PILOT reports heading 260° at 90 kt, level at 3000 ft. He saw a light twin crossing L to R on a northerly track about 0.5 - 0.75 NM ahead and almost immediately afterwards saw the Fokker as it appeared in his 1-2 o'clock having overtaken below and to his right, apparently in a descent towards Sheffield. It was 500-1000 ft below and several hundred yd to his right. There was no risk of collision and

no need for avoiding action. Shortly after this, Sheffield advised him about the F-50 and its pilot then reported the Airprox.

HQ MATO reports that the Grob pilot free-called Waddington Zone at 1417:47 whilst conducting a navex at 2500 ft. At 1445:46, having established the Grob's next turning point (Camp Hill airfield), the Zone controller transmitted, "...as you're approaching very close to Sheffield and they are active, suggest you free-call them 128 decimal 52....", which was acknowledged by the pilot "Roger, speak to Sheffield on 128 decimal 52". Waddington ATC were unaware of any incident until being informed by HQ MATO the following afternoon.

The LATCC Claxby radar recording shows the Airprox occurring at 1448:32, 6.5 NM E of Sheffield. The Grob, previously identified on a 3602 squawk, can be seen heading W and squawking 7000 without Mode C. At 1448:15 the reporting ac, a F-50 identified from its 0224 squawk, is shown steady on a westerly heading, having just completed a 180° R turn, with the Grob in its 12 o'clock at 1 NM. The F-50's groundspeed is about twice that of the Grob. The last (unverified) Mode C indication from the F-50 is shown at 1447:45, level 2200 ft (1013 mb) after which the level indication has been removed by AIS (Mil) in order to remove clutter. The contacts merge at 1448:32, with both ac heading W. An additional contact, squawking 3605 can be seen at this point, about 1 NM W of the Airprox position, heading N maintaining an indicated 2900 ft Mode C. This ac was originally also implicated in the Airprox.

ATSI reports that at 1440 the F-50 reported overhead the SMF and was cleared for an ILS/DME approach and to descend to 2500 ft on QNH 1024 mb for RW 28. At 1444 the ac reported "Beacon Outbound" on a track of 083°. At this point LATCC radars (not available at Sheffield) show there was a 3602 (Waddington) squawk heading W with no altitude to the E of the F-50. At about 1446 this squawk changed to 7000, again with no altitude, and a 3605 (Waddington) squawk, tracking N over Sheffield at 2900 ft indicated,

appeared to be a conflict to both of the other ac.

At 1447 the F-50 reported established on the localiser and was cleared for an ILS approach and to report at 3 DME. At this point the F-50 was descending to 2200 ft indicated and turning in behind the 7000 squawk which was much slower. At 1448 the F-50 pilot reported traffic believed to be a Tomahawk 500 ft above and same direction to ATC who stated that they had no knowledge of the traffic.

At 1449 the Grob pilot reported on frequency stating that it was a military motor glider on a cross country passing the M1 and that Waddington had suggested the call. The controller responded by instructing the glider to squawk 0224. At 1449:16 the F-50 and motor glider primary returns are coincident with the F-50 at 1500 ft indicated and the 3605 squawk about 2 NM to the N still at 2900 ft indicated.

After landing the F-50 pilot stated to Sheffield tower that he wished to file an Airprox with not only the motor glider but also with what was believed to be a Seneca crossing the airport from S to N.

HQ PTC comments that there is no ambiguity in these reports therefore the conclusion seems straightforward. Neither Waddington nor the Grob pilot himself should have allowed his ac to get this close to Sheffield before calling them. This seems to have been exacerbated by a delay in changing frequency. However, such encounters are an inevitable consequence of commercial operations without the protection of radar and therefore the onus is also on airliner pilots to "see and avoid" other traffic if necessary.

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 seemed to the Board that reasonable separation had existed between the F50 and the other ac, such as is acceptable under quadrants in Class G airspace, and members agreed there had not been a risk of collision and no need for any avoiding action. The Grob pilot and the pilot of the other (northbound) ac appeared to have flown at a level which fully took into account the approach path into

Sheffield. The Board felt that the F50 pilot may have been uncomfortable operating in Class G Airspace without a radar service, where pilots are wholly responsible for their separation from other ac. If so, this was a matter for him to take up with his company Flight Safety organisation, or for the company to address with the operators of Sheffield Airport; either way the issues involved were outside the remit of UKAB. The Board concluded that this incident was a sighting report.

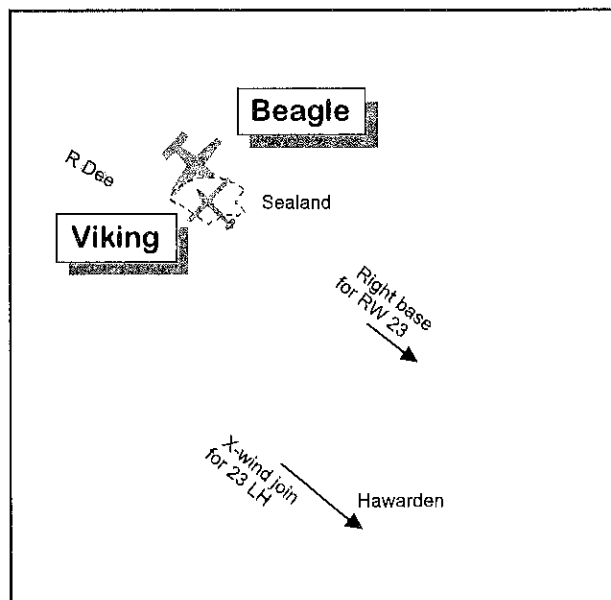
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Sighting report.

AIRPROX REPORT No 40/99

Date/Time: 20 Mar 1353 (Saturday)
Position: N5313 W0301 (RAF Sealand)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Viking glider Beagle B121
Operator: HQ PTC Civ Pte
Alt/FL: 800 ↑ 1000 ft ↓
 (agl) (QNH 1026 mb)
Weather VMC CLBC VMC CLBC
Visibility: 10 km+ 20 NM
Reported Separation:
 100 ft V, 200 ft H/NK
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING PILOT reports heading 300° at 62 kt on a winch launch from RAF Sealand when he was warned of an approaching ac and told by radio to release the cable; this he did at 750 ft. He levelled at 800 ft and saw a low wing single engined ac passing in the opposite direction 100 ft above and 150-200 ft to his right. The other ac took no avoiding action and

the risk of collision was very high. The light ac had been seen from the control caravan when it was about 0.5 NM upwind of the airfield and was watched as it made an approach to Hawarden, whose ATC identified it and who had been informed that gliding was taking place at Sealand.

THE BEAGLE PILOT reports heading 130° at 90 kt descending towards Hawarden for a landing. He was at 1000-1200 ft as he passed Sealand; he was following the S side of the Dee about 0.5 NM from Sealand and did not see the glider although he saw one on the ground. He was unaware of any Airprox until after shutdown.

HAWARDEN ATC reports with RT recording that at 1346 the Beagle pilot requested joining instructions from the 'bank of the Dee' and was advised "*QNH 1025 now and expect to join crosswind for RW 23 due Sealand active*". The pilot replied "*Sealand active and to join for 23 er crosswind*". Some minutes later the Beagle was seen joining right base for RW 23. The Air Pilot (AD2 EGNR-1-3 & 4 (Hawarden)) states that the circuit direction for RW 23 is LH, that pilots should avoid overflying local towns and villages below 1500 ft and that gliding takes place at Sealand 3 NM NNE of Hawarden up to 3000 ft at weekends.

Note: In a subsequent letter the Beagle pilot apologised for misunderstanding the Hawarden joining instructions and for not knowing the circuit direction, - this was his first landing at Hawarden. Although he believed he had tracked along the S side of the Dee from the Point of Ayr, the glider pilot, who was just off a cable attached to RAF Sealand, saw the Beagle pass on his right.

HQ PTC comments that because of their proximity, there is a LOA between the Viking Sqn at Sealand and Hawarden ATC. This has stood the test of time and must therefore be reasonably robust. However it cannot prevent infringements by aviators not fully briefed or not complying with the agreement. We are assured that local individual corrective action has been taken and therefore that this or a similar incident is unlikely to recur. It does however underscore the need, notwithstanding other safeguards in place, for an alert lookout from the ground while launches are in progress.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a recording of the relevant RT frequency, reports from the air traffic controllers involved and reports from the appropriate operating authorities.

It appeared from the Beagle pilot's submissions to the UKAB that he was a pilot who took his aviation seriously so it was all the more surprising that he did not appear to have briefed himself on Hawarden from the UK AIP, or discussed his arrival with Hawarden ATC before departure. It was more surprising that he had not adhered to specific ATC instructions on his rejoin; this contributed to his proximity to Sealand. Finally, having acknowledged that Sealand was active, he had not taken sufficient action to avoid it. As to the risk level, it was not possible to conclude what the miss distance was. The glider pilot, startled by the appearance of the Beagle, may have thought it was closer than it actually was. The Beagle pilot had thought he was at 1000-1200 ft in the area which would have meant a greater separation than the glider pilot's estimate, but since he appeared mistaken about his track members questioned his memory of his height in the area. Because he had not seen the glider, which had been climbing steeply, members concluded that the safety of the ac had not been assured.

The Board assessed that the cause of the Airprox was that the Beagle pilot had not conformed to his joining instructions, and had flown into conflict with the glider which he did not see.

The Board also noted and commended the prompt actions of those on the ground at Sealand who, on seeing the approaching Beagle, had got a message through to the launching pilot in time for him to take appropriate avoiding action. Lookout from the ground is vital during glider launches when the view ahead is denied to the pilot because of the steep climbing attitude.

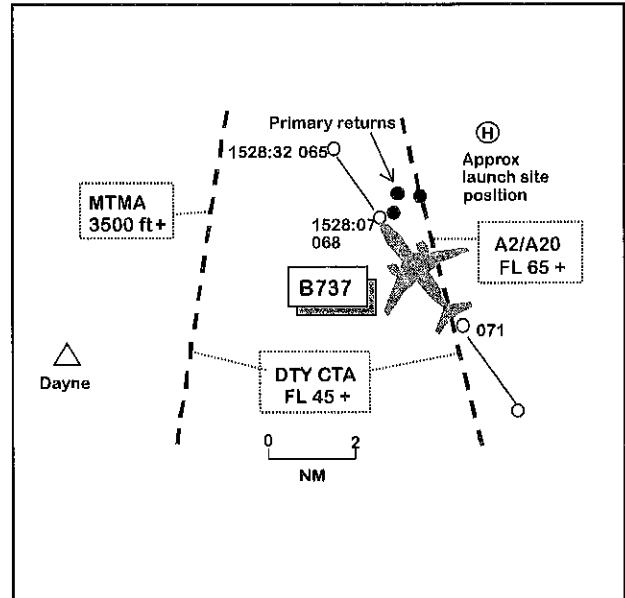
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: By not conforming to his joining instructions, the Beagle pilot flew into conflict with the glider which he did not see.

AIRPROX REPORT No 41/99

Date/Time: 19 Mar 1528
Position: N5318 W0149 (8 NM NE Dayne)
Airspace: CTA/FIR (Class: A/G)
Reporting Aircraft Reported Aircraft
Type: B737-200 2 Hang-gliders
Operator: CAT Civ Pte
Alt/FL: ↓ FL 60 FL 65
(QNH 1028)
Weather VMC VMC CLAC
Visibility: 10 km 10 KM +
Reported Separation
200 m H/0 ft V 500 ft H/0 ft V
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was heading 300° at 310 kt and descending to FL 60 inbound to Manchester. When passing FL 65, 16 NM/100°R from the MCT, he saw a hang glider with bright orange wings at co-altitude as it tracked away from him at his 2 o'clock position 200 m away. He thought there had been a high risk of collision and reported the encounter to Manchester APC.

THE HANG GLIDER PILOT reports that having foot-launched from Bradwell Edge (5319.25N 0143.75W) he was flying in company with another hang glider (see UKAB Note 1 below) at FL 65 in exceptional soaring conditions over Bradwell Moor. His craft's wing is white on top and orange underneath. The visibility was unlimited in VMC. Groundspeed was zero as he headed N into a 20 kt wind. When at a position 5318.5N 0146.5W (10 NM NE of Dayne) he noticed a white passenger jet

approaching fast in level flight from his 6 o'clock about 2 NM away and immediately turned onto E at 50 kt in avoidance. The jet passed 500 ft behind him at the same level. He thought there had been only a 'minor' risk of collision.

UKAB Note (1): The pilot of the second hang glider, whose craft has a white wing with a red leading edge and green under-surface, also submitted an Airprox report in which he describes that while heading N at 6600 ft amsl (equivalent to FL 62) he saw a B737 overtake 200 m to his R and 300 ft below on a northerly heading. No avoiding action was felt necessary and he thought there had been only a slight risk of collision. He states that his position at the time was 5318.7N 0146W. This pilot comments that there were several other hang gliders and also sailplanes in the area at the time. Both hang glider pilots report the same time for the sighting of the B737 – 1530.

ATSI comments that even if the controller had seen the hang gliders on radar he would have been entitled, in the absence of Mode C information to the contrary, to assume that they were below the base of CAS; there were, therefore, no perceived ATC causal factors in this incident.

UKAB Note (2): A video recording of the Claxby radar at 1527 shows the B737 10 NM E of DAYNE heading NW descending through FL 70. At 1528:32, when about 1.6 NM inside the section where the base of the DTY CTA is FL 45, the B737 passes FL 65, about 4 NM W of the hang glider launch site. Although the pilot of the second hang glider reports seeing the B737 to his R and below him as he tracks N, no corresponding primary radar returns can be seen to the W of the B737's track; a hang glider would not necessarily show on radar. The hang glider pilots and the B737 pilot agreed that the incident occurred at FL 65 and their estimates of miss distance are also in broad agreement. It therefore appears that the incident took place some 1.5 NM inside the DTY CTA area where the base is FL 45. However, the hang glider pilots are completely convinced that they were not inside controlled airspace because they maintain they were within sight of their launch point and have no difficulty in determining what is directly beneath them in order to fix their positions. The BHPA commented that the radar can be about a mile in error at the pertaining distance from the radar head. LATCC radar experts agreed with this as a possibility but considered it unlikely that a similar inaccuracy in range and bearing would occur at the same time on the Claxby, Clee Hill and Gt Dun Fell radars which were individually examined and which all showed exactly the same track for the B737. The radars are normally accurate to about 57 yards in range and azimuth at mid ranges, and there was no evidence to indicate that they were adrift on this occasion.

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 closely examined the investigation in view of the certainty expressed by the hang glider pilots as to the position of the Airprox. Individual replays of the Claxby, Gt Dun Fell and Clee Hill radars had shown the B737 following precisely the same track in each case and also the position where it showed FL 65 on each recording was exactly the same. This conclusively showed that when the B737 passed FL 65, it was over 1.5 NM inside controlled airspace. While there was a theoretical possibility of a radar being inaccurate, the Board accepted that a true picture was shown on this occasion. One member suggested that the radar video mapping of the airspace boundary between the FL 65 and FL 45 bases might be inaccurate, but it was pointed out that this was a boundary in Manchester's airspace, did not show at all on LATCC radars and was not used in plotting the B737's track. The track had been plotted on large scale maps with reference to airfields and navigation facilities whose positions were not in doubt on the ground or on the radar maps. Another member commented that it was perhaps unwise for FIR traffic to fly close to borders of CAS; while most members believed from the evidence that it was most likely that the hang glider pilots had been mistaken about their position, the Board concluded in the end that the Airprox was a conflict of flightpaths near the boundary of controlled airspace.

Because the B737 pilot had not seen the hang glider until he was passing it, and because of the limited ability of a hang glider to get out of the way of a jet flying at 300 kt, the Board assessed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Confliction of flightpaths near the boundary of controlled airspace.

AIRPROX REPORT No 42/99

Date/Time: 19 Mar 0955

Position: N5138 W00027 (152°/6 NM from BNN)

Airspace: LTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: HS125 B747-400

Operator: HQ STC CAT

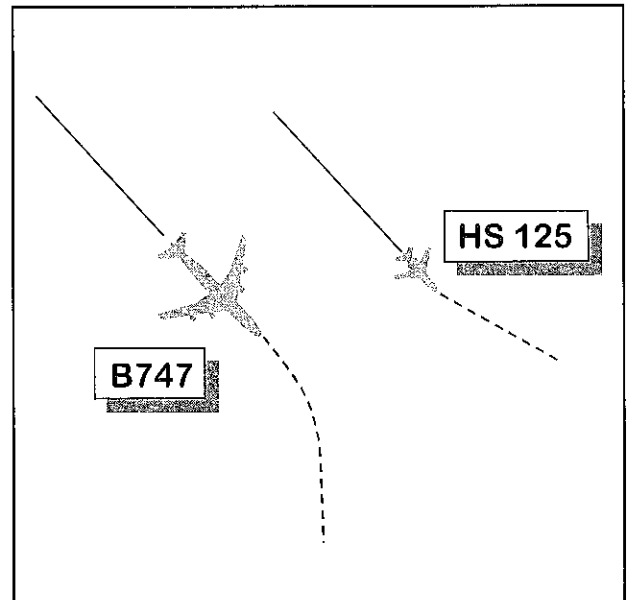
Alt/FL: FL 70 ↓ FL 70

Weather VMC CLAC VMC

Visibility: 3 NM

Reported Separation: 0.5 NM/600 ft

Recorded Separation: 0.6 NM/400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HS125 PILOT reports heading 140° at 210 kt, transiting the BNN hold at FL 70. He had seen the B747 earlier, in the hold about 1000 ft above. His co-pilot then saw the B747 paralleling their track about 0.5 NM to the right and somewhat behind and although it looked less than 1000 ft above he was content because it was not converging, and conditions were VMC. ATC asked the B747 pilot his passing level and the reply was FL 76; it was then given an immediate right turn onto S in avoidance and he was told to turn left. The risk was low but any further descent by the B747 could have produced a high risk.

THE B747 PILOT reports holding at BNN prior to a recovery to Heathrow with a main hydraulic failure; they had requested extra track miles to allow for flap and gear extension on standby systems. He did not see the HS125 but received a TCAS RA on traffic 400 ft below at the same time as the controller gave avoiding action. They did not hear any other ac being

cleared to the same level but may have been preoccupied with the hydraulic problem.

ATSI reports that the Heathrow INT DIR N at LATCC (TC) described his workload as medium in the 30 minutes up to the incident. He considered that, although a controller was readily available to assist him as the Support (SPT) Controller N, the workload did not necessitate manning the position. The LATCC MATS Part 2, Page HRW 1-2, states that one of his specific functions is: "The acceptance of releases and control of ac inbound to RAF Northolt from the release point, until control is transferred to either the Northolt Director or to Northolt ADC, as appropriate".

The B747 contacted the INT DIR N at 0950, reporting at "nine thousand". The flight was instructed to descend to FL 80 and it was informed of a five minute delay at BNN. The INT DIR N said that, although Minimum Stack Level (MSL) at BNN is allocated to TC NW, the

TC Sector Controller asked if he would accept the HS125 at MSL i.e. FL 70. This, he added, is normal operating procedure. The level was agreed and at 0951 the HS125 made its initial call on the frequency, reporting at FL 70 routeing direct to BNN. The pilot was instructed to maintain FL 70 and to leave BNN heading 140° for Northolt. The INT DIR N commented that this heading was about 20° further south than he would normally use, probably, he thought, because of outbound traffic. His next call was to instruct the B747, which was turning right inbound in the BNN hold to "*continue right turn all the way around heading one four zero speed two twenty knots*".

The Heathrow INT DIR N instructed the B747 to descend to FL 70 at 0954. The controller could offer no explanation why he overlooked the presence of the HS125 at FL 70 when he cleared the B747 to descend to the same level. The radar recording, at 0954:36 i.e. just after the descent instruction was passed, shows the subject ac on parallel tracks just over 0.5 NM apart. The HS125 is maintaining FL 70 to the east of the B747, which is level at FL 80. The INT DIR N confirmed that the FPS for the former ac was in his display, correctly annotated, showing it level at FL 70. He added that, as he cleared the B747 to descend to FL 70, he annotated its FPS, which was immediately above that of the HS125, with the cleared level. He said that he could not understand why he did not recognise the potential conflict from the FPS display. The radar recording shows that the SSR labels of the ac may have been overlapping together with another ac in the vicinity, thereby preventing the INT DIR N from being able to observe clearly their relative positions and levels on the radar display.

Shortly after clearing the B747 to descend to FL 70, the controller instructed the HS125 to turn left heading 100° to position it for Northolt. He said that, as soon as he passed the clearance to the latter ac, he noticed, on the radar display, that the B747's Mode C readout showed FL 77. Following confirmation from the B747 pilot that he was at FL 76, the controller gave the flight an avoiding action right turn heading 180° and

passed it information on traffic at FL 70, 11 o'clock, one mile. Receiving an acknowledgement from the pilot, he immediately instructed the HS125 to descend to an altitude of 4000 ft, with a "*good rate of descent*". The pilot of the HS125 read back the clearance and added that he was visual with the traffic. The radar recording, at 0955:22, shows the two ac about 0.6 NM apart. The HS125 is just commencing its left turn, 400 feet below the B747. The pilot of the latter later reported that he received a TCAS RA to "Reduce Rate of Descent" during the incident. The controller commented that STCA did activate, with a red alert, but only after he had realised the problem and whilst he was taking action to control the situation. He said that he thought, in hindsight, he should have instructed the B747 to stop its descent but nevertheless felt that the avoiding action turn was a more effective resolution.

It is open to conjecture whether the presence of a N SPT Controller would have assisted in detecting the error earlier, thereby possibly preventing or minimising the loss of separation.

HQ STC comments that notwithstanding the error made by the controller, the fact that the HS125 crew visually monitored the B747 during the moments leading to this Airprox nullified any actual risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board discussed whether or not the pilots could have heard each others' cleared levels and so prompt the controller when the B747 was cleared to FL 70. The clearance given to the HS125 would have given the impression to the B747 pilot that he was leaving the hold so his subsequent clearance to FL 70 could have seemed safe. However, the HS125 pilot was still in transit through the hold when the B747

was cleared to descend to his level and he did not appear to have been aware of the danger inherent in this transmission. It was pointed out that the controller was also working the Lambourne hold and with 2 stacks being controlled on the same frequency it was not always possible for pilots to determine if clearances to other ac were relevant to their stack or the other one. A previous recommendation that controllers should add the hold name to level change transmissions, to bring pilots into the checking loop, had been rejected.

Members also discussed the rôle played by the B747's TCAS; the pilot reported responding to an RA but the Board wondered what had happened before that. No information was given as to whether he had seen the HS125 as traffic on the TCAS, or if he had received a TA.

The Board agreed that the cause of the incident was that the INT DIR N had cleared the B747 to

descend to the level still occupied by the HS125. The nature of the error, with the 2 FPS adjacent in the display, showing the same level, provoked further discussion because of its potential for very serious consequences, especially in a holding pattern; indeed 2 such incidents were assessed at this meeting of the UKAB. Not enough was known to explain what led competent professionals to overlook apparently obvious basic clues in a display designed to make them stand out, and the Board was advised that a 'human factors' study into this type of error was under way. Members understood that the more automated displays planned for use in the new en-route centre should produce attention-getting effects in these circumstances.

Because the HS125 crew was always in a position to avoid the B747, the Board assessed that there had not been a risk of collision in the circumstances

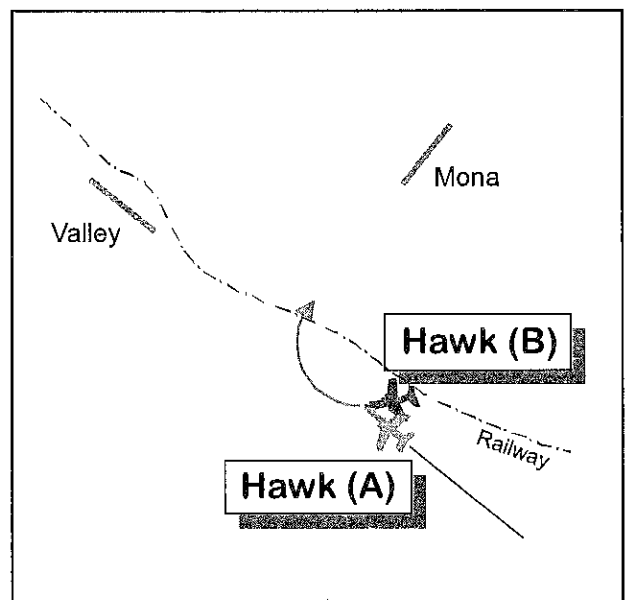
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The INT DIR N cleared the B747 to descend to the level occupied by the HS125.

AIRPROX REPORT No 43/99

Date/Time: 25 Mar 1418
Position: N5312 W0425 (5 NM SE of Valley - elev 37 ft)
Airspace: MATZ (Class: G)
 Reporting Aircraft Reported Aircraft
Type: Hawk (A) Hawk (B)
Operator: HQ PTC HQ PTC
Alt/FL: 1500 ft ↓ 1000 ft
 (QFE 987 mb) (QFE 991 mb)
Weather VMC CLBC VMC CLBC
Visibility: 10 km 10 km+
Reported Separation: 100 ft V
Recorded Separation:



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT (A) reports heading 319° at 150 kt leading a pairs GCA to RW 32 at Valley. As he came out of the cloudbase at 1500 ft he saw another Hawk pass about 100 ft below in a right turn which continued towards Mona to join for RW 04. There was no time for avoiding action when he saw the Hawk and the risk of collision was high.

THE HAWK PILOT (B), a solo student, reports heading 220° at 350 kt leaving the circuit at Mona to rejoin RW 04 RH from initials. He turned inbound at 1000 ft on the Mona QFE (elev 202 ft), 200 ft below cloud, but did not see the GCA pair.

HQ MATO reports that the pilot of Hawk B was in contact with Mona Tower (TWR) on frequency 358.75. During one circuit, the pilot informed TWR "(Hawk B C/S) wide downwind to initials". The pilot of Hawk A was in contact with Valley Talkdown (T/D) on frequency 358.675. When Hawk A was about 5 NM from touchdown, T/D observed a contact on the PAR display closing rapidly from the right, at about 90° to the track of Hawk A. A brief look at the Director's radar display, which was adjacent to his own, led T/D to believe that this contact was an A/C departing the Mona circuit. At 1418:29, T/D transmitted "*Aircraft departing Mona, right left in front, at half a mile*". The contact passed less than 0.5 NM ahead of Hawk A. T/D continued with the PAR and at 1418:53, Hawk A transmitted "*....I'd like to file an airmiss against that aircraft*". Shortly afterwards, Hawk B reported at the initial point (IP) and followed this with a standard break into the visual circuit. Hawk B made no reference to an Airprox and returned to Valley at 1432.

Mona is situated 6 NM E of Valley and is used almost exclusively by Valley based Hawks. The combination of RW 32 at Valley and RW 04 at Mona results in the extended runway centrelines crossing at 4 NM finals to each runway, with the IPs at 3 NM finals. Valley and Mona have operated simultaneously for many years and thus the potential conflicts arising

from RW 32/04 operations are well known and generally well accounted for in local orders. Pilots in transit to/from Mona are required to contact Valley Approach (APP) in order to receive pertinent traffic information on traffic inbound to Valley. In addition, pilots departing Mona for Valley are required to remain clear of the approach to RW 32, using the main railway line as a visual reference, until they are two-way with and have received information from APP.

On this occasion however, the pilot of Hawk B merely extended his circuit downwind, with the intention of practising a visual run in and break, through the IP, back into the Mona circuit. The ac was not actually departing from Mona and the thought of a conflict with Valley did not occur to the student pilot, or possibly to TWR. With the IP at 3 NM though, the pilot would need to extend about 4 NM downwind (about 5 NM finals RW 32), before turning inbound (right turn) for the IP. At the point of conflict in this Airprox, Hawk B would have been 'belly up' to Hawk A whilst turning and the pilot would have been unable see Hawk A, which had just broken cloud in descent. Although in close proximity to cloud, Hawk B's pilot was within the 1200 ft cloud base minima laid down for student pilots in local orders.

T/D would have had very little time (approx 1 NM) to assimilate and react to the situation when Hawk B appeared on the PAR display crossing from R to L. With the reported heights involved being very similar, the Airprox was virtually set up by the time he would have seen it. A R turn given to Hawk A would have put both ac head to head and a L turn may have put A directly ahead of the faster B, although with hindsight, it could be argued that an "Avoiding action, stop descent", or possibly a climb instruction may have been more technically correct. By passing traffic information however, (in the hope that the pilot would see the conflict and thus be best placed to deal with it) the controller did the best he could in the circumstances and successfully alerted the pilot to the imminent confliction. Similarly, Valley Director, who has a responsibility for 'looking out' for T/D, would have had little time to realise

that an ac, flying a perceived 'normal' circuit at Mona, had actually extended further downwind.

Prior to this Airprox, the local orders did not specifically deal with the, presumably very infrequent, occasions when ac extend out of the Mona circuit and practice re-joining. There are no records of such an incident happening before. As a result of this Airprox, local flying and ATC orders have been amended to ensure that pilots remaining at Mona do not cross a specific geographical line feature (the railway line), when conducting this manoeuvre. This compromise will keep the environment safe, but still allow the maximum use of both airfields.

HQ PTC comments that this was a simple case of tried and trusted procedures failing because inexperience will always find the remaining weak spot. The station has wisely decided that the exercise of airmanship cannot be assumed in the training process, and has taken appropriate action to close the gap. Although it seems inconceivable that this has lain in wait for so long, the station has rightly not sought to resolve this problem locally and privately. Without such openness and candour, others are denied the opportunity of learning from hard won experience.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Hawk B flew across the final approach path for RW 32 at Valley.

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.

The Board agreed that the circumstances gave the TD controller no opportunity to provide appropriate avoiding action to the Hawk formation who were in IMC and configured for landing. Neither party had the opportunity to see the other before the incident since the Hawk formation was in cloud until the incident was in progress. While factors leading to the encounter included the inexperience of the Hawk B pilot and the absence of a specific procedure to fit these circumstances, the Board concluded that the cause of the incident was that Hawk B flew across the final approach path for RW 32 at Valley. The Board acknowledged the introduction of a new procedure to prevent a recurrence and agreed that there had been a risk of collision because of the proximity of the ac and the lack of opportunity for avoiding action.

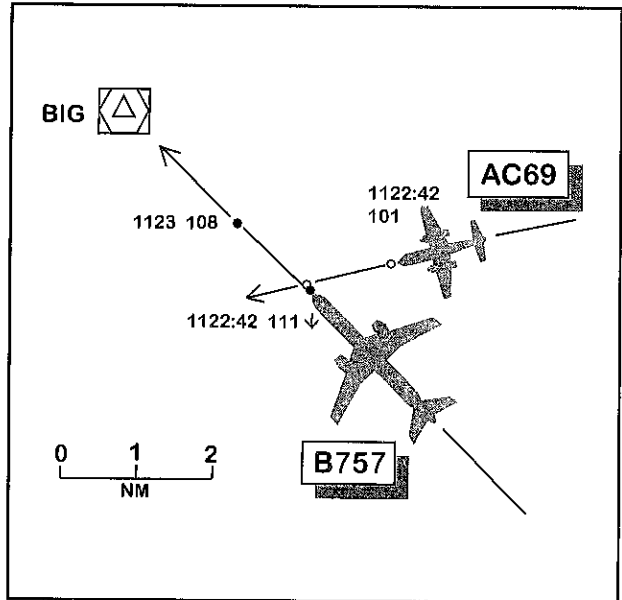
AIRPROX REPORT No 44/99

Date/Time: 1 Apr 1123
Position: N5118 E0006 (3 NM SE BIG)
Airspace: LTMA (Class: A)
First Aircraft Second Aircraft
Type: B757 Rockwell
Commander 69
Operator: CAT Civ Comm
Alt/FL: ↓ FL 110 FL 100
Reporter: LATCC TC
Weather: VMC VMC
Visibility:
Reported Separation: 1 NM/600 ft
Recorded Separation: 0.9 NM/1000 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

LATCC TC reports, with RT transcript, that the B757, inbound to Heathrow from Geneva, first called on the LATCC TC SE sector frequency at 1116 descending through FL 220 for FL 160; the ac was then further cleared to FL 140. The Rockwell Commander, conducting an aerial survey, was flying a radar heading of 260° at FL 100 to pass just S of BIG. At 1119:53 the B757 was instructed to descend to FL 110 which was clearly and correctly read back by the pilot who then asked if there was any speed restriction or holding delay. He was told "standard speeds" and "no delays expected". At 1121:29 the B757, now about 2 NM S of the survey ac and descending through FL 122, was instructed to leave BIG on a heading of 275° and at 1122:20 to contact the Heathrow Int S Director. The STCA triggered 'white' at 1122:46 as the B757, indicating FL 111 and descending, passed about 1 NM in front of the survey ac. After the ac paths crossed the alert almost immediately changed to red as lateral separation briefly reduced to 0.9 NM.

Meanwhile, having changed frequency, the B757 pilot called Heathrow Director at 1123:04 advising that he was descending to FL 100. Following an ATC instruction to fly a heading of 310° (UKAB Note: this was to optimise separation from the survey ac), the pilot asked if there was another ac in the BIG holding



pattern at FL 100. The Director confirmed the survey ac was at FL 100 and advised the B757 pilot that his clearance had been to descend to FL 110. When satisfied that standard separation had been restored, the Director put the B757 back on a heading of 275°. Meanwhile, the TC SE SC, having unsuccessfully tried to contact the B757 pilot (who had not at that point called Heathrow), instructed the survey ac to turn L immediately onto 220°. Once standard separation was assured, the westerly heading was resumed.

THE B757 PILOT reports that he was heading 275° at 250 kt. He understood the clearance from ATC on 120.52 was to.."Descend to FL100 after Biggin heading 275°". Following a frequency change to 134.97, the B757's TCAS indicated traffic in the hold at Biggin and this was followed by an RA to reduce descent. Descent was arrested at FL 108 but then resumed on instructions from Director on 134.97. The other ac was not seen but he deduced from his TCAS indications that there had not been a risk of collision.

THE ROCKWELL PILOT was unaware at the time that an incident had occurred and was unable to add anything meaningful to the investigation.

UKAB Note (1): The B757's company flight operations staff advised UKAB that the FO was flying, with autopilot engaged. The Captain was on RT and correctly acknowledged the descent instruction to FL 110. The FO heard FL 110 but set FL 100 on the altitude selector, but does not know why he did this. The FO would have indicated the selection to the Captain to obtain his concurrence in accordance with company procedure and would not have desisted until the Captain gave his OK. The Captain accepts that he looked but did not notice the error. He cited a high workload at the time - he believed he was given a concurrent heading, height, and frequency change, but the RT transcript shows the following:

LATCC *C/s descend flight level 110*
757 *Flight level 110 c/s, any speed control this morning?*

LATCC *Standard speeds please (1120:00)*
757 *Standard speeds; any delays expected Biggin?*

LATCC *Hopefully no delay*
757 *Thank you*

Nothing further until (1121:15):

LATCC *C/s contact Heathrow Director on*
757 *134.97, goodbye (Ack)*

The company flight operations staff acknowledged that the workload may have been of the Captain's making; although the frequency change was requested some time after the event, the Captain would have known that it was imminent and would probably have preset it on the second radio, having heard the frequency his predecessors were being sent to.

UKAB Note (2): The RT transcript for 120.525 shows that by the time the B757 pilot called Director descending to FL100, the confliction was over as the 2 ac had already passed; the controller therefore advised the pilot that the other traffic was now 3 NM to the S and clear of him and he could continue descent to FL 80. A short RT exchange then took place in which the B757 pilot commented that he thought he had

been cleared to FL 100, to which the Director replied that the descent instruction had been given by the previous controller and therefore he would have to check. The pilot stated that he had monitored the other ac on his TCAS.

UKAB Note (3): A replay of the LATCC radars at 1121:33 shows the B757 tracking NW towards BIG descending through FL 132 with the survey ac tracking R to L at its 1:30 position range 5 NM indicating FL 103. At 1122:42 the B757 flies through the survey ac's 12 o'clock at about 1 NM indicating FL 111 in a descent (the survey ac at this point shows FL 101). Minimum separation occurred at 1122:53 and lateral separation increased rapidly thereafter as the acs' tracks diverged. The B757 arrested its descent at FL 108.

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 air traffic controllers involved.

The Board was satisfied that the B757's cockpit procedures for cross-checking level changes were effective and, should have prevented this incident. However, it appeared that the Captain might have been preoccupied with other matters of less priority at a time when his attention should have been applied to cross-checking the FO's actions, in particular the level set on the altitude selector.

Previous experience has shown that there is usually a strong cognitive element in these kinds of errors which is often associated with tasks that are so routine they require little attention. In this context it would be appropriate to quote an extract of the comment made by the Principal Psychologist at DERA Farnborough in response to a previous similar incident:-

"Frequent repetition without errors reinforces the expectation that the setting will be correct. Human beings are simply not very good at

spotting infrequent errors in routine operations. However, it should be possible for all clearances to be positively monitored and checked by the other crew member(s); it is a question of priorities and timing".

The Board concluded that this Airprox constituted a straight forward "level bust", the

B757 pilot having allowed his ac to descend below its clearance level. Members noted that owing to the action of TCAS, erosion of vertical separation was limited to 200 ft and that this occurred only after the acs' paths had crossed. It was therefore concluded that there had not been a risk of collision.

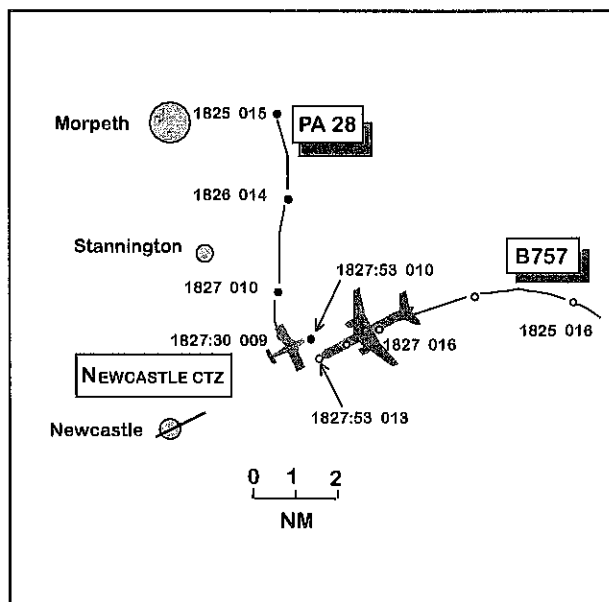
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The B757 descended below its cleared level.

AIRPROX REPORT No 45/99

Date/Time: 08 April 1827
Position: N5504 W0135 (4 NM NE Newcastle airport)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: B757 PA28 Cherokee
Operator: CAT Civ Pte
Alt/FL: 1200 ft ↓ 1100 ft
 (QNH 1022 mb) (QNH 1021 mb)
Weather IMC VMC CLBC
Visibility: 8 km
Reported Separation:
 0.5NM/200ft 1.5NM/500ft
Recorded Separation:
 0.5NM/300ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports that while heading 250° at 127 kt and descending through 1300 ft (QNH 1022) on final approach to RW 25 at Newcastle, a TCAS TA alerted him to traffic. At 1200 ft an RA demanded climb which was carried out to 2500 ft as per the published procedures. The other ac was not seen but was believed to have passed about 200 ft below and within 0.5 NM to their starboard side with a high

risk of collision. After landing he telephoned Newcastle ATC, on whose Tower frequency (119.7) he had been, and was advised that the traffic was a PA28 orbiting on a base leg for RW 25 at 1000 ft.

The pilot comments that although the other ac was SSR equipped, ATC apparently thought it was 2 NM N of the RW 25 centreline. He disputed this and pointed out that there was a strong northerly wind blowing. He further commented that while the other pilot may have

known of his presence, he was unaware of the PA28.

THE PA28 PILOT reports that he was returning to Newcastle following a VFR sortie to the N of the CTZ in good CAVOK conditions. He was in contact with Newcastle Tower on 119.7, who had given him clearance to enter the CTZ not above 2500 ft QNH, VFR, via Stannington, and was squawking 3777 with Mode C. Due to the lower cloudbase which extended S from the Morpeth area, he descended to about 1100 ft but, being aware that at this altitude he might infringe the low flying Rules, he routed 2 NM E of Morpeth in order to remain clear of the built-up area. He reported at the CTZ boundary as he passed E of Morpeth VRP and W of Ashington and was informed that he was No 2 in traffic. His track of about 190° was slightly to the E of the route he would normally have taken, partly due to his detour round Morpeth and also because he was aware from conditions on his outbound leg that the cloudbase, visibility and turbulence would not favour an approach from directly N of the airfield. He was then told to expect to be No 3 in traffic and was cleared to the end of the downwind leg for RW 25, where he anticipated it would be necessary to make an orbit. The visibility, about 200 ft below a layer of broken StCu, was about 8 km. As he was passing close to a congested industrial area immediately to the E of his track, which precluded a LH orbit at that point, he continued further until he felt he was in a correct position to take up an orbit, choosing to turn L rather than R so that his wing would not block his view of the final approach track. As he began the orbit he saw a B757 at a higher level and still above the layered cloud which had prevented an earlier sighting. The ac appeared to be joining or established on the final approach track but seemed to be on a more northerly heading than normal, probably due to the strong northerly wind. However, he felt his orbit would keep him sufficiently separated from the B757 and therefore continued as planned while maintaining visual contact. He estimated that the closest point of approach between the 2 ac occurred as he passed a SE to E heading, his ac being some 500 ft lower and about 1.5 NM to

the N of the B757. He briefly lost sight of the other ac as he carried out a short into-wind leg to avoid the possibility of drifting S, but was reluctant to go too far in case he conflicted with other traffic he believed to be inbound from the N. The pilot of the B757 then reported that he was going around following a TCAS alert and the ac was re-acquired as it climbed up through the cloud about 2 NM away and 800 ft above him. Newcastle ATC later confirmed that he had been positioned in what they considered a normal area for the downwind leg.

In a letter to UKAB the pilot states that he believes strongly that he positioned his ac according to ATC instructions, at a height and routeing compatible with VMC flight and in accordance with the Rules covering low flying. After considerable reflection in hindsight he believes that the incident was primarily TCAS related and did not constitute an Airprox. He was surprised that the B757 crew did not, to the best of his knowledge, report an Airprox either at the time or subsequently. The pilot goes on to comment at length about the lack of information generally available to GA pilots regarding TCAS and the ambiguity that exists about the use of SSR/Mode C and TCAS within an airfield 'traffic pattern' (a term for which he has been unable to find a definition). Given the increasing use of TCAS he believes that there would be a considerable safety benefit in publicising information on TCAS to the wider aviation community, and in clarifying the situation on the use of both Mode C and TCAS in the vicinity of airfields.

MANAGER ATC NEWCASTLE reports, with RT transcript, that the PA28 pilot requested a rejoin clearance from N of the airfield and was instructed to report passing Stannington, a position routinely used by controllers to indicate that an ac is about to establish on a R base for RW 25 at about 1.5 - 2 NM final (at this range it is relatively easy for the Tower controller to apply reduced separation in the vicinity of the aerodrome). Six minutes later the pilot reported passing the village of Ashington and the ADC, who was supervising a trainee, advised him to expect to hold at the end of the downwind leg as he would be following a B757 which was then 8

NM from touchdown; he instructed the PA28 pilot to report this ac in sight, which was acknowledged. Shortly after this the B757 pilot called the Tower at 5 NM and was cleared to land. At this point the PA28 pilot elected to hold and was given further traffic information on the B757. He was then advised that he was now No 3 in traffic and instructed to continue holding. About 30 sec later the B757 pilot reported that he had received a TCAS RA and was going around. The PA28 pilot was instructed to remain N of the centreline; he advised ADC that he had been about 2 NM N of the centreline and had the B757 in sight. ATC were unaware that the B757 pilot had filed an Airprox report until advised by DAP some time later.

The tape transcript indicates that it was the PA28 pilot's intention to enter CAS at Morpeth. However, he did not in the event route via either Morpeth or Stannington and therefore could not report passing the latter as instructed. His actual route direct from the NE resulted in his being some 3.5 NM from the airfield when on base leg, which is at least 4 NM from the VCR. This made him very difficult to see, particularly as his LH orbit then took him even further from the airfield. Had the PA28 followed his routing instructions, the resultant reduction in distance from the airfield would have made it more apparent to the Tower controller that the ac was too close to the approach path. Similarly, an RT check at Stannington would have given him the opportunity to reappraise the situation.

Use of the ATM was limited because of overlapping labels and therefore the controller placed the responsibility for separation on the PA28 pilot to whom he gave timely and accurate traffic information on the B757. Although a northerly wind at 2000 ft might have made it more difficult to remain N of the centreline, there were numerous built-up areas which could have provided the PA28 pilot with positional information. The pilot later said that at no time had he considered himself to have been too close to either the RW centreline or the B757.

The aerodrome controller accepted that he should have passed traffic information to the

B757 pilot as well as the PA28; while this may not have prevented the ac from coming into close proximity it might have prevented the go around. A memo has been distributed to all ATCOs highlighting the pitfalls of working in a TCAS environment and the extra care needed to ensure that traffic information is given when reduced separation in the vicinity of the airfield is being practised.

UKAB Note: A replay of the LATCC radars at 1825 shows the B757 in a L turn towards the localiser for RW 25 about 10 NM from touchdown, indicating 1800 ft Mode C. The PA28, meanwhile, shows at 8 NM to the NW of the B757, heading due S at 1500 ft Mode C, eventually passing E of Stannington at 1826:40. Twenty sec later the B757 is about 5 NM from touchdown at 1600 ft with the PA28 still tracking S at its 2 o'clock/2.5 NM indicating 1000 ft. By 1827:30 the PA28 is only 0.7 NM N of the 25 centreline and, at a range of 3 NM from touchdown, begins a LH orbit. The Airprox occurs at 1827:53 when the PA28 passes 0.5 NM to starboard of the B757 pointing in the opposite direction. Mode Cs on the PA28 and B757 at this point indicate 1000 ft and 1300 ft respectively.

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 air traffic controller involved.

Members noted that the inbound track flown by the PA28 pilot did not conform with the instructions given by ATC, which included a request to report overhead Stannington. The 'Stannington' check was specifically to enable the controller to acquire the PA28 visually at a position which would facilitate its integration onto the final approach track. In the event the PA28's considerably wider routing did not allow this plan to proceed and the pilot's subsequent visual positioning for his holding orbit did not ensure adequate lateral separation

from the B757. While the PA28 pilot explains in some detail in his report the reasons for his detour, such as keeping clear of cloud, built-up areas and conforming to the Rules regarding low flying, members agreed that he should have communicated his inability to adhere to ATC instructions; this would have allowed the controller to produce an alternative plan to integrate the PA28 into the circuit. The ATM was of limited assistance because of overlapping labels. Therefore, in the absence of visual contact with the PA28, the controller passed traffic information to its pilot and placed on him the responsibility to remain clear of the B757. While the PA28 pilot claims that he did keep clear of both the approach track and the B757, radar evidence shows that, contrary to his own estimate of 1.5 NM, the ac passed with only 0.5 NM lateral separation between them. This proximity triggered the TCAS equipment in the B757; however, members agreed that the encounter was sufficiently close to be considered an Airprox even without the TCAS alert. They did not therefore consider that this was a TCAS inspired event, but instead concluded that the PA28 pilot's non-compliance with ATC instructions was the cause of the Airprox. Members were satisfied, however, that there was no risk of collision as the PA28 pilot kept the B757 in sight during the encounter and the TCAS alert ensured the B757's manoeuvre away from the PA28.

The Board discussed the issues raised by the PA28 pilot regarding the use of SSR and TCAS in the airfield environment. While there are no specific rules regarding the former it is generally a requirement that within an aerodrome traffic pattern below 3000 ft 7000 conspicuity squawks will be switched off (AIP 1-6-2-1). There may, however, be occasions when a controller might require an ac to squawk for a specific purpose. In such circumstances it follows that alerts may be triggered in TCAS equipped ac. An airline pilot member said that it was general practice to keep TCAS switched on at all times, though in some situations its use may be restricted to TA only, as dictated by an individual company's operational policy requirements.

Turning to ATC aspects, an ATSI adviser said that in Class D airspace it was a requirement for ATC to pass traffic information to VFR pilots on IFR traffic (which was done) and also to pass IFR pilots information on VFR traffic, with avoiding action if requested. This latter requirement was not fulfilled. Had it been, the Airprox may still have occurred but the B757 pilot would have been alerted to the presence of the PA28 and the go-around might have been prevented. Some controller members expressed surprise that the ADC did not see the PA28 at the extended range to the E of Stannington, but the majority of ATCOs familiar with ADC operations disagreed.

UKAB Note: The following AICs are current and relate to TCAS in many different roles, including RVSM (Reduced Vertical Separation Monitoring), Operators role and legal aspects. Some of these may not be relevant to the GA pilot's observations.

124/98 (Yellow 308) – Introduction of ACAS 2 into UK airspace.

135/98 (Yellow 311) – ACAS, TCAS 2 – Operation in RVSM airspace.

29/99 (Yellow 324) – Introduction of ACAS 2 into UK airspace – further information

87/99 (Yellow 342) – Carriage and Operation of TCAS 1 equipment in UK airspace.

54/99 (Pink 194) – ACAS – legal aspects and interface with ATC.

Reference should also be made to CAA document CAA579 ("Airborne collision Avoidance Systems") which should be of interest to GA pilots.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The PA28 pilot did not follow ATC instructions.

AIRPROX REPORT No 46/99

Date/Time: 09 April 1306

Position: N5048 W0112 (Lee-on-solent - elev 33 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: KA 13 Glider AA5B

Operator: Civ Club Civ Trg

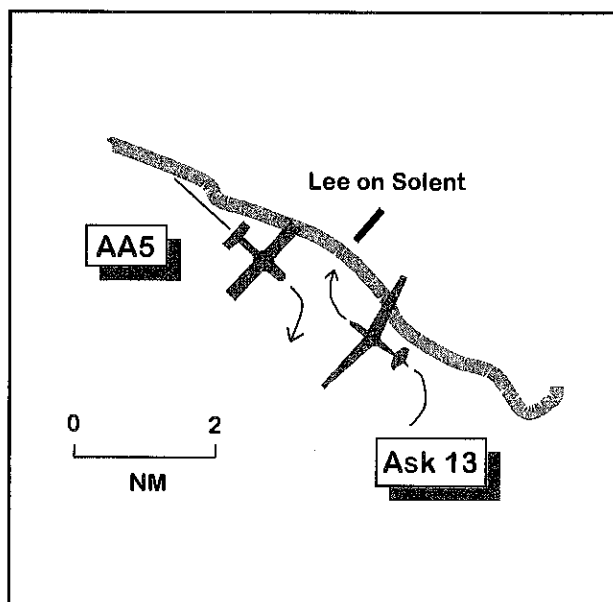
Alt/FL: 1200 - 1400 ft 1500 ft ↑
(QFE 1023 mb) (RPS)

Weather VMC CLBC VMC CLBC

Visibility: 7 NM >10 km

Reported Separation:

100 - 200 yd/0.25 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports that he was flying at 1200 - 1400 ft about 0.25 NM to the SW of Lee-on-Solent, from where he had launched earlier and with whom he was in contact on 135.7. The visibility was 5 - 10 NM in VMC. He had briefed his pupil to carry out clearing turns prior to spin training and they had just completed one of these to the L. On turning R at 45 - 50 kt, a low wing single engined ac, which had previously been obstructed by the glider's starboard wing during the L turn, was seen about 200 yd directly ahead of him flying on a reciprocal track at the same altitude. He thought the other pilot must have seen them first because his ac was already turning R, apparently in avoidance. He dived, continuing to turn R, and the other ac passed about 200 yd to his L. When subsequently asked by UKAB to assess the risk factor, the glider pilot said that he thought it had been medium to high.

THE AA5 PILOT reports that he was flying at 1500 ft (RPS) on a local training exercise from Southampton with whom he was listening out on 118.2. The visibility was over 10 km in VMC. When 2 - 3 NM SW of Lee-on-Solent, heading 120° at 120 kt, he saw a glider at his 10 o'clock 0.25 - 0.5 NM away and made a climbing R turn in order to remain clear of it. The ac passed about 0.25 NM down his port side 200 - 300 ft above, descending. He thought the other pilot had seen him, and as they had both avoided each other he did not feel there had been a significant risk of collision. The incident did not cause him any undue alarm; however, he was unsure what the risk might have been had they both continued on their respective headings and remained unsighted from each other.

The pilot comments that the Solent and Spithead area is often very congested with VFR GA traffic and observes that the Calshot VRP is the reporting point for all traffic inbound/outbound from/to the S and along the

coast E of Bournemouth. Being locally based, he is aware of the gliding activities at Lee-on-Solent and the powered hang-gliding activity at Hamble.

UKAB Note: Lee-on-Solent does not have an ATZ. In addition to the gliding activity, the airfield hosts a Hampshire police ASU and a helicopter air-sea rescue unit. The airfield frequency is 135.7 which is shared by Portsmouth/Fleetlands, a helicopter maintenance base some 2 NM to the NE which has a 2 NM radius ATZ.

Lee-on-Solent was the subject of an AIS bulletin and a civil NOTAM (J614/99), warning of intense gliding activity within a 2 NM radius of the airfield from Apr 2nd to Apr 11th between 0730 and 1830. This information would have been available on the Temporary Nav Warning Bulletin and the AIS website from at least the 2nd April. The AA5 pilot told UKAB staff that he was aware of this NOTAM.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

GA members of the Board wondered why the AA5 pilot was flying where he was in view of his knowledge of the gliding activity at Lee, and the 'honey-pot' effect of the Calshot VRP. It was suggested that the pilot might not have wished to fly further from the shore in a single engined ac, or closer to the VRP, but members then wondered if there was a need to fly in that area/height at all on a local sortie from Southampton. However, there was no legal reason to avoid the area and the Board agreed that in unrestricted Class G airspace the 2 pilots had the responsibility to see and avoid other traffic. Members concluded that the cause of the Airprox was that each pilot saw the other ac somewhat late. The level of risk prompted much discussion. Some members considered that the pilots had seen the confliction in time to remove all risk of collision, but the reported sighting ranges appeared only to have allowed about 5 seconds for action and the view eventually prevailed that the safety of the ac had been compromised.

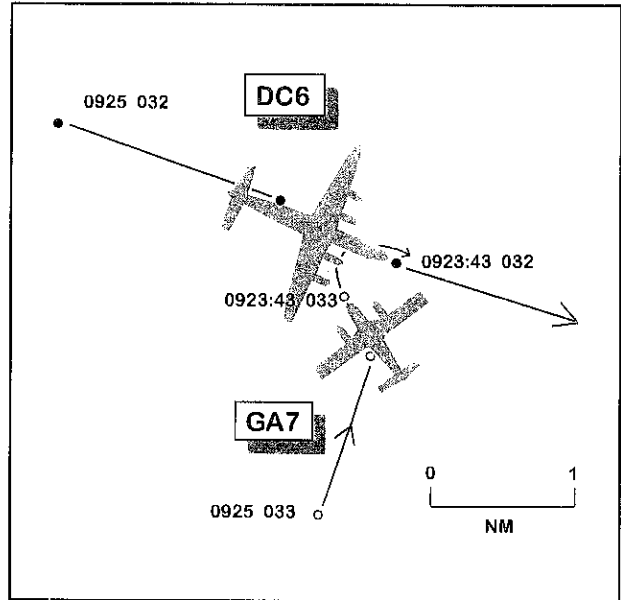
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Late sighting by both pilots in the vicinity of NOTAMed gliding activity.

AIRPROX REPORT No 47/99

Date/Time: 09 April 0924
Position: N5207 W0034 (3.5 NM NE Cranfield)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: GA7 Cougar DC6
Operator: Civ Trg Civ Comm
Alt/FL: 3500 ft 3500 ft
(QNH 1024 mb) (QNH 1024)
Weather VMC CLAC VMC CLAC
Visibility: 25 km 10 km+
Reported Separation:
0.5 NM H/0.5 NM H
Recorded Separation:
0.4 NM H/100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GA7 PILOT reports heading 025° at 135 kt while joining the CIT holding pattern at Cranfield at 3500 ft (QNH 1024). IF screens were in place. He was under an APC service from Cranfield on 122.85 and squawking 7000 with Mode C. The visibility, above cloud, was 25 km in VMC. As he approached the beacon, a DC6 appeared from behind the screen tracking L to R at his 10 o'clock, slightly above, about 1 NM away. He immediately turned hard L in avoidance and passed behind the other ac. In his opinion there had been a very high risk of collision and he reported an Airprox to Cranfield APC. He comments that this was yet another example of a pilot not calling on the Cranfield frequency despite apparently using the CIT NDB as a navigational beacon.

THE DC6 PILOT reports heading 115° at 240 kt while cruising at 3500 ft (QNH) on a flight from Coventry to Southend. The visibility was over 10 km in VMC. He was squawking 0201 with Mode C and receiving a RIS from Essex Radar (Stansted) on 120.62. Information was passed to him on traffic at 1 o'clock/4 NM which he saw at the same level and identified as a Grumman Cougar. A R turn through 30° was made to pass behind the ac which was then seen to turn to port; he therefore reversed his turn, maintaining

visual contact with the Cougar which passed in the opposite direction about 0.5 NM away on his R. In his opinion there was no risk of collision.

UKAB Note (1): In a subsequent telephone conversation the DC6 pilot said that his initial avoidance turn had not had time to take effect before the other ac altered course towards him. His manoeuvre, therefore, amounted to a roll to the R followed quickly by a roll to the L, which would have had little effect on altering the DC6's southeasterly track during the encounter.

CRANFIELD ATC reports that the GA7 was carrying out instrument training at the CIT NDB at 3500 ft. At 0926, the pilot reported taking avoiding action on a DC6 which had tracked about 120° through the holding area at the same altitude. Enquiries revealed that the DC6 was working Stansted. After subsequently discussing the incident with ATC, the GA7 pilot elected to file an Airprox report.

STANSTED ATC (ESSEX-RADAR) reports, with RT transcript, that the DC6 pilot called requesting a RIS and a transit of Stansted airspace routing Coventry-Barkway-Southend. The ac was given a squawk of 0201, instructed to remain outside CAS and identified about 7 NM W of Cardington. The pilot was advised that due to the density of traffic on his track and

expected IFR ac inbound to the Essex Sector, only a limited RIS would be available. As the ac was in the FIR and to the N of Luton the pilot was advised that a LARS may be available from Luton on 129.55. He replied that he had already tried them but they had declined to be of assistance. In view of the numerous returns in his area he asked for a RAS but this was declined because of the traffic levels. However, an SSR return with Mode C was then observed ahead of the DC6 at 3400 ft and this traffic was called to the DC6 pilot who replied that he was in good VMC and had the ac in sight. The other traffic was observed on radar to take avoiding action and the DC6 continued on track, clipping the Cardington D206 area, which was active. The pilot was advised that he was obliged to remain clear of the danger area but responded that he was good VMC.

ATSI comments that the DC6 was receiving a limited RIS from Essex Radar and had reported VMC on top. The GA7 was called to the DC6 crew, albeit somewhat later than was ideal but in mitigation the controller had his primary task of handling Stansted traffic to attend to as well as dealing with a number of other ac in the FIR requesting a service. Having received the traffic information on the GA7, the DC6 pilot reported visual about 20 sec before the ac passed. Since the GA7 had approached the CIT from the SW, squawking 7000, and went outbound straightaway for an NDB approach, it would not have been immediately obvious to the Essex controller that it was a Cranfield ac carrying out instrument training. Cranfield does not have radar so the Cranfield controller would not have been in a position to assist in preventing the confliction.

UKAB Note (2): A replay of the Heathrow radar at 0925 shows the GA7 as it tracks NNE at 3300 ft Mode C, with the DC6 at its 10 o'clock range 3 NM tracking ESE at 3200 ft Mode C. The ac continue to track at almost 90° until 0925:30 when separation has closed to about 1.3 NM and the GA7 makes a sharp L turn, passing about 0.4 NM S abeam the DC6 before turning R to track behind it on a southeasterly heading.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, a radar video recording and reports from the air traffic controllers involved.

GA Members commented that the direct track from Coventry to Barkway passes very close to the CIT and 3500 ft is an altitude at which training ac from Cranfield could be expected to be operating. Although the CIT holding pattern is in Class G Airspace, the GA7 pilot would nevertheless reasonably expect transiting pilots to exercise discretion when routeing through it since it is known for its high level of instrument training activity. GA Members were surprised that the DC6 pilot apparently made no effort to avoid the CIT but felt it was more likely that he was using the NDB as progress check en route to Barkway rather than as a direct navaid. Assuming the DC6 carried a second radio box, a call to Cranfield might at least have alerted the GA7 pilot to its presence. Members commended the GA7 pilot for maintaining an effective lookout and spotting the DC6 as early as he did. ATCO members suggested that a discrete SSR code for Cranfield training ac would at least allow local radar units to identify such traffic and enable them to pass appropriate traffic information.

It appeared that the DC6 pilot saw the GA7 first, following traffic information from Essex Radar, and had begun to take notional avoiding action when he was seen by the GA7 pilot. Although lateral separation was recorded at about 0.5 NM, both pilots had each other in sight and the Board was satisfied that there had not been a risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Conflict of flight paths in the FIR.

AIRPROX REPORT No 48/99

Date/Time: 12 Apr 1730

Position: N5121 E0045 (6 NM NE DET VOR)

Airspace: LTMA (Class: A)

Reporter: LATCC TC

First Aircraft (A) Second Aircraft (B)

Type: B737-400 B737-200

Operator: CAT CAT

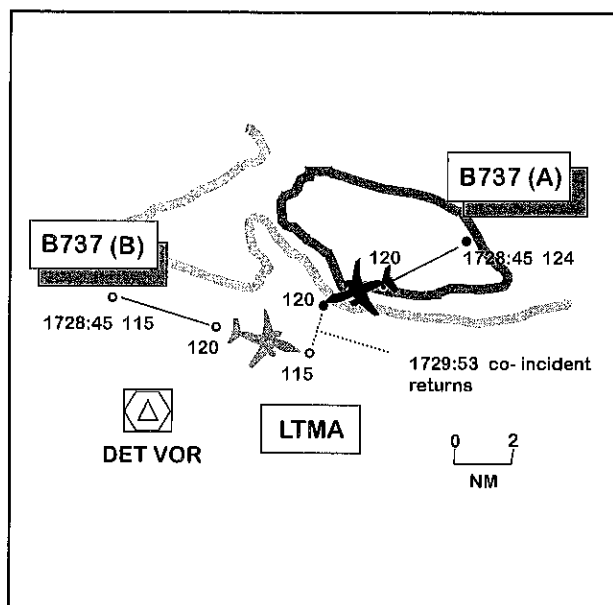
Alt/FL: ↓ FL 120 FL 120

Weather: IMC

Recorded Separation: 1.7 NM H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC TC SE (inbound) SC reports that B737 (A), inbound to Gatwick from Kiev, entered his sector at FL 130 in accordance with the standing agreement. The ac was streamed with speed control due to another Gatwick inbound close behind it. The TC SE (outbound) controller was working an outbound ac (B737 (B)) whose track crossed the inbound route at DET. In these situations standard procedure was to keep B737 (A) at FL 130 until S of the MAY-DVR track unless co-ordinated otherwise. When the two B737s were still about 20 NM apart, with B737 (B) still at FL 80, the outbound SC pointed at the DET area and said something like 'twelve'. He interpreted this as meaning that he could descend the first inbound ac to FL 120. The two inbound ac were close together and he believed the outbound SC had suggested this to help him, by keeping B737 (B) on a radar heading to take it well ahead of B737 (A). He therefore descended B737 (A) to FL 120 and then turned his attention towards the BIG area where he was controlling 4 other inbound ac. When he next looked back at DET he saw that B737 (B) was at DET turning



towards B737 (A) at FL 120. He instructed B737 (A) to make an immediate R turn and gave traffic information (though the words 'avoiding action' were not used). He estimated the ac passed with a lateral separation of 1 NM. Subsequently he noticed that the SE outbound SC had not written the co-ordinated descent to FL 120 on his DET FPS, and that therefore his interpretation of the word 'twelve' had been incorrect.

THE LATCC TC SE (outbound) SC reports that he cleared B737 (B), outbound to Pisa from Stansted, to climb to FL 120. At the time there was a stream of arrivals into Gatwick which he understood would be routeing direct to Larck, which was an accepted procedure in these circumstances. He put B737 (B) on a radar heading to position it N of Dover (also an accepted procedure in such a situation) to pass behind the first of the inbounds (B737 (A)) which was at the standard level of FL 130. While making a telephone call to TC NE, he

noticed that B737 (B) and B737 (A) were both at FL 120 and converging. He gave an avoiding action turn to the R with descent to B737 (B), and the TC SE TIMBA (inbounds) SC, who was working B737 (A), also instructed its pilot to turn R. B737 (B) then passed about 1 NM in front of B737 (A) at a similar level.

UKAB Note (1): In a subsequent telephone conversation the SE (outbound) SC told UKAB staff that 'nuisance' alerts were frequently generated by the STCA because of the opposing outbound/inbound profiles of the SIDS/STARS on this sector and the often high climb/descent rates involved. As a matter of courtesy, therefore, it had become common practice for the outbound SC to point out his ac to the inbound controller to reassure him that it was only going to FL 120. As far as he could remember this is what he did on this occasion; the gesture was not intended to approve descent for the inbound B737.

UKAB Note (2): Both LATCC controllers state that their reports were written without reference to RT or radar recordings.

THE B737 (A) PILOT reports that he was under the control of LATCC radar on 120.17 at FL 120. His speed was 250 kt. When about 5 NM NE of DET, ATC instructed an immediate R turn onto 280° and advised him that another ac would pass down his port side. Conditions were IMC and the other ac was not seen. ATC informed him that the incident would be investigated.

UKAB Note (3): The pilot of B737 (B) only recalls that he was given unusual heading changes. He later learned that there had been an incident which was attributable to ATC.

ATSI reports that B737 (B) was outbound from Stansted and in receipt of an area control service from the TC SE Outbound SC, and B737 (A) was inbound to Gatwick receiving a service from the TC SE Inbound (IN) SC. The two SCs were sitting at adjacent work stations and, therefore, most co-ordination was carried out directly, 'face to face', rather than by telephone. Crucially to this Airprox, this meant

that the co-ordination and discussion which took place between the two is unrecorded.

Both SCs considered their workload to have been moderate to high and the traffic situation complex at the time of the Airprox. They were from different watches, and had never worked together before, but did not think that there was much variation in the application of the relevant procedures between their two watches. However, the Inbound SC did point out that this was his first "spinning" day duty for at least a year. Given the option, he chooses to work night shifts rather than "spinning" day duties. There is no hard evidence to indicate that this was a factor in this incident but, although he would have been accustomed to working with controllers from other watches on his own morning and afternoon shifts, effectively working as a minority part of another watch would have been a significant change to his normal routine. Otherwise, the relevant ATC equipment was all serviceable and no other factors which could have adversely affected the SCs' performance were identified during the course of the investigation.

The traffic situation which preceded the Airprox is a common one. B737 (A) was on a STAR which routes via DET, and B737 (B) was on a SID, routing via the same point. Under normal circumstances, the potential confliction is resolved by published MATS Pt. 2 procedures (Page SEA 1-4, PARA 4.2.1, 4.2.2) which permit the Outbound SC to climb outbound traffic: "to the outbound agreed level (FL 170) without reference to TC South East IN, subject to any Gatwick inbounds routing from the Clacton Sector via TANET". The Inbound SC receives traffic inbound to Gatwick (such as B737 (A)) via the Clacton Sector from the TC SABER Sector under the terms of a Standing Agreement, which requires ac to be level at FL 130 by TANET. The MATS Pt. 2 states: "TC South East IN can not descend Gatwick inbounds routing from TC East via TANET below FL 130 until south of the MAY-WIZAD track without co-ordination with TC South East DEPS". The Outbound SC's FPS board has a "DET" designator, under which "DET" FPSs on both inbounds and outbounds are placed, and

he or she can thus check to see whether there are Gatwick inbound traffic likely to affect the climb of outbound traffic to FL 170. In practice, the Outbound SC normally climbs traffic to FL 120 initially and only climbs it to FL 170 having either checked that there are no conflicting Gatwick inbound traffic or agreed some form of co-ordination with the Inbound SC.

B737 (A) was the first of two closely spaced Gatwick inbound traffic; its pilot contacted the Inbound SC at 1726:40 and reported descending to FL 130 at a speed of "two nine zero knots or greater". This speed restriction had been imposed to maintain separation from the succeeding ac which would also be descending to FL 130 in accordance with the Standing Agreement. The Inbound SC instructed the flight to maintain the level and speed but his intention was to give it further descent when he could, in order to achieve vertical separation from the next inbound and enable it to reduce speed.

Meanwhile, at almost exactly the same time, the pilot of B737 (B) had established communication with the Outbound SC, reporting level at FL 80. The Outbound SC immediately issued further climb clearance to FL 120. If, in accordance with the published procedures, B737 (A) had remained at FL 130 until S of the MAY-WIZAD track, the Airprox would not have arisen; however, at 1728:00, the Inbound SC instructed the flight to descend to FL 120 and to reduce speed to 250 kt on reaching that level. He took this action on the basis of a verbal exchange which had taken place with the Outbound SC but neither controller could recall exactly what was said and the conversation is not recorded. However, whatever was said, the Inbound SC wrongly gained the impression that his colleague was offering him the use of FL 120 for B737 (A). His recollection was that the Outbound SC had pointed to the DET area on the radar and said something including the word "twelve". The Outbound SC could not recall the conversation at all but thought that if he had said anything it would have been as a matter of courtesy to remind the Inbound SC that he had traffic climbing to FL 120.

As B737 (A) vacated FL 130 B737 (B) was in its 1 o'clock position at a range of about 16 NM, climbing through FL 110. If B737 (B) had continued on its SSE heading it would have passed well in front of B737 (A). However, just as the Inbound SC cleared the latter to descend to FL 120, the outbound SC instructed B737 (B) to turn L onto heading 105°. This had the effect of putting the ac on converging tracks such that B737 (B) would eventually pass through B737 (A)'s 12 o'clock position at a range of 2.9 NM. The flights levelled at FL 120 when they were about 9 NM apart. A few seconds later, shortly before the STCA activated, both SCs noticed the conflict (prior to this their attention had been focussed on other sector traffic). Both pilots were instructed to turn R and passed traffic information. The Outbound SC prefixed his instruction with the words 'avoiding action' and, in addition, instructed B737 (B) to descend to FL 110. The crews of both ac reacted promptly to their instructions. The Inbound SC did not use the words 'avoiding action' but B737 (A) was instructed to turn "immediately". When asked why he had not used the phrase, the Inbound SC said that he had not immediately appreciated the severity of the conflict; he could not recall ever having used the phrase.

The 'DET' FPS on B737 (A), under the strip designator in front of the Outbound SC, was not annotated to indicate that the flight had been cleared to FL 120 (or that co-ordination had been agreed for the flight to descend to FL 120) so the potential conflict would not have been readily identifiable from the strip display. If the Outbound SC had agreed for B737 (A) to descend to FL 120, he would have been expected to annotate the FPS accordingly. The Inbound SC acknowledged that he should have checked to make sure that his colleague had written FL 120 on the appropriate FPS or have done it himself. Either of these actions should have brought the misunderstanding to light.

The problem of direct 'face to face' co-ordinations being misunderstood or misinterpreted is not new. An Airprox in December 1998 (159/98) was also caused by a breakdown in co-ordination between the TC SE Inbound and Outbound SCs. Following that

Airprox the Inbound SC expressed the view that : "... the process of co-ordinating crossing inbound and outbound aircraft was not as watertight as it could be and that a more standard form of words should be used which specified the level and an agreement, for example - "FL 120 - agreed." This Airprox suggests that this is a problem which remains to be addressed.

UKAB Note (4): LATCC radar pictures show the ac as they converge on a point about 6 NM NE of DET, B737 (A) heading SW and B737 (B) ESE. At 1728:45 the ac are at FL 124 and FL 120 respectively about 12 NM apart and on tracks which converged by about 50° from opposite directions. By 1729:20 both ac are level at FL 120 and just under 4 NM apart; neither at this point has altered heading. At 1729:53 B737 (B)'s Mode C indicates FL 115 as it passes 0.5 NM S of DET with B737 (A), now just beginning a R turn, passing 1.7 NM away on its port side at FL 120.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

An ATSI adviser told the Board that the Airprox occurred after the TC SE inbound SC descended B737 (A) to a level being used, in accordance with standard procedures, by B737 (B). Members concurred, and quickly concluded that this was the cause of the Airprox. Moreover, they were satisfied that the respective tracks of the ac were separated laterally sufficiently to preclude any possibility of collision, albeit they noted that the avoiding turns given by ATC had little significant effect until after the ac had passed.

In the absence of any record of the co-ordination it was not possible to determine what gave rise to the inbound SC's belief that his

colleague, the outbound SC, had sanctioned the descent. The latter had not intended to infer that the inbound ac could descend to FL120 and he had not annotated that level on the appropriate FPS. Had the inbound SC checked and observed that the outbound SC had not so marked the strip, it might have prompted him to query the transaction; alternatively, if he had written the level on the strip himself his outbound colleague might have been alerted to the misunderstanding. Members were disappointed to note that the inbound SC did not consider using the correct avoiding action phraseology. Such phraseology is essential to alert pilots to the need for immediate action.

The Board noted that this was not the first occasion on which inadequate 'face-to-face' co-ordination had resulted in an Airprox. In the opinion of ATCO members it was operationally impracticable to record co-ordination in these circumstances. Nonetheless, they thought a degree of formality should be introduced into the process, for example by combining the ac call sign and level with each co-ordination. One member wondered if it might be better to opt for procedural methods to separate inbound from outbound ac, thereby reducing the need for co-ordination. ATCO members rejected the notion, however, and pointed out that it was essential to retain flexibility to maintain an expeditious and efficient flow of traffic. Indeed, the radar techniques used to achieve this were fundamental to the day-to-day activity of any ATC operations room, and 'face-to-face' co-ordination was often an integral part of this process.

This Airprox was the second occasion within a year involving inadequate co-ordination between adjacent LATCC TC inbound and outbound controllers and the Board agreed that action was needed to improve the way in which unrecorded transactions were carried out. Members therefore asked the Director to recommend to the appropriate CAA/NATS authority that consideration be given to investigating the feasibility of introducing a more formalised approach to the process of face-to-face co-ordination.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The LATCC TC SE INBOUND SC descended B737 (A) into conflict with B737 (B) following a breakdown in co-ordination.

Recommendation: That the CAA considers introducing a more formal approach to the dynamic process of face-to-face co-ordination between controllers so that an audit trail results.

AIRPROX REPORT No 50/99

Date/Time: 14 Apr 0901

Position: N5152 W0123 (3 NM NW

Kidlington)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA28 RT-201 PA31

Operator: Civ Trg Civ Pte

Alt/FL: ↓ 2000 ft 2500 ft

(QNH 997 mb) (QNH 998 mb)

Weather IMC int in cloud VMC clear below cloud

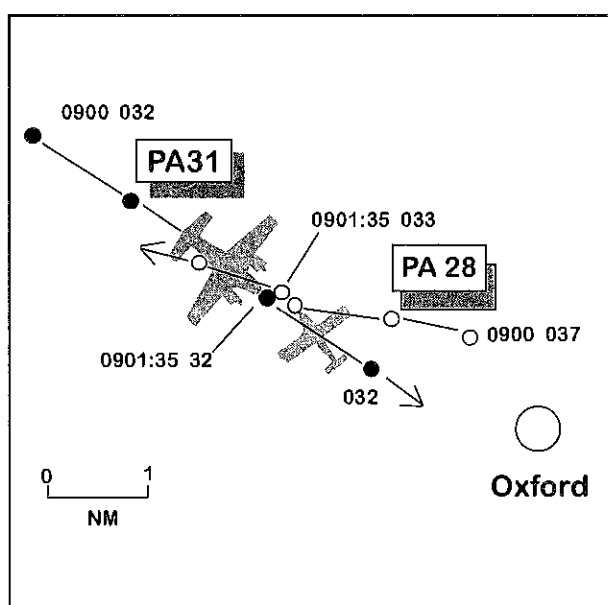
Visibility: 50 NM

Reported Separation:

500 ft V/not seen

Recorded Separation:

0.25 NM H/100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was conducting a simulated IMC training flight in the instrument procedure at Oxford with a student instructor. Although the visibility was greater than 10 km when clear of cloud, much of the flight was in IMC in or between layered cloud. Shortly after leaving 3500 ft (QNH 997) for 2000 ft, he heard the pilot of another ac call Oxford APC reporting routeing via the Oxford overhead to Chalgrove at 2500 ft; its pilot was given traffic information on all known Oxford traffic, including the PA28, and was instructed to "Maintain VFR". Just prior to entering cloud at 3000 ft the PA28 pilot saw the other ac, a PA31

whose c/s he recognised from its registration, as it emerged from the side of a (building) cumulus cloud 0.5 – 1.0 NM directly ahead and about 500 ft below him. He took control from the student, stopped descending and turned R in avoidance. By the time he managed to reverse the turn the other ac had re-entered cloud and so he was unable to assess its closest point of approach laterally. As he had seen the PA31 in time to take avoiding action there was no risk of collision; however, his sighting had been purely fortuitous because a few seconds later he would have been in cloud.

The pilot comments that had the other pilot climbed 1000 ft or descended 500 ft he would have been able to maintain VMC and thus

comply with the VFR clearance given by Oxford APC.

THE PA31 PILOT reports that he was cruising at 2500 ft Oxford (QNH 997) on a flight from Blackpool to Chalgrove at 180 kt; the visibility 1000 ft below cloud was 50 NM in VMC. When 7 NM from Oxford he obtained a crossing clearance from Oxford APC on 125-32 who advised him that there was no conflicting traffic and instructed him to report overhead the airfield. He spoke to Oxford APC several times between the ranges of 7 and 2 NM and did not see any other ac.

UKAB Note (1): In a subsequent telephone conversation with UKAB staff, the PA31 pilot confirmed that the visibility was excellent and that at no time during the Airprox period did he enter cloud. He could recall being given traffic information on one ac out to the W of Oxford but not on the one in the Oxford instrument procedure.

OXFORD ATC reports, with RT transcript, that the PA31 freecalled Oxford APC VFR requesting a transit of the Oxford overhead at 2500 ft from NW to SE. A VFR transit was approved, traffic information passed with respect to one other fixed wing ac out to the NW VFR and a PA28 outbound in the RW 09 procedure descending from 3500 ft to the W, and the pilot was instructed to report overhead. The outbound PA28 then reported taking avoiding action on the PA31 which, in his opinion, was not maintaining VFR; he stated that he would be filing an Airprox and described the cloudbase as broken at 2000 ft.

UKAB Note (1): Analysis of the Oxford APC RT transcript (125.325) shows that the PA28 pilot called beacon outbound at 0859. About a minute later the PA31 pilot called reporting 5 NM to run to the airfield overhead and requesting VFR transit clearance. He was passed traffic information on one ac listening out to the NW of the airfield, position unknown, and on the subject PA28 descending from 3500 ft in the 09 procedure to the W. The pilot confirmed that he would maintain 2500 ft until clear of the overhead and was then cleared to

transit VFR to report overhead. At about 0901:30 the PA31 pilot reported "overhead" followed almost immediately by the PA28 pilot transmitting....*"c/s just taking avoiding action on that PA31 who is not maintaining VFR"*. Shortly afterwards the PA28 pilot stated his intention to file an Airprox report.

UKAB Note (2): A replay of the LATCC radar at 0900 shows a 7000 squawk, believed to be the PA28, about 1 NM NW of Kidlington tracking WNW and descending through 3700 ft Mode C. At the same time another 7000 squawk, believed to be the PA31, is on an almost reciprocal track 6 NM NW of Kidlington maintaining 3200 ft Mode C. At 0901, with the ac almost head-on at a range of 0.5 NM the PA28, now level at 3300 ft Mode C (equivalent to 2870 ft QNH), makes a sharp R turn and passes about 0.25 NM down the port side of the PA31 at 0901:05. The Airprox occurs about 3 NM NW of the airport; Mode Cs indicate 3200 ft for the PA31 and 3300 ft for the PA28. Immediately after passing the PA31 the PA28 resumes its WNW heading and the PA31 flies over Kidlington with no observed track deviation.

UKAB Note (3): Met Office archive material gives the 0900 weather at Oxford as - 25 km, cloud few at 018 broken at 035.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The prevailing weather conditions played a major part in this Airprox and much of the Board's discussion centred on interpretative aspects of VFR flight. The PA28 pilot, flying in and out of cloud in IMC, was convinced that the PA31 had emerged from cloud and therefore could not have been adhering to VFR criteria as instructed. The latter, on the other hand, was adamant that he was clear of cloud and in sight

of the surface; below 3000 ft at his speed of 180 kt this satisfied the VFR requirements. The PA28 pilot later confirmed to the UKAB that when he first saw the PA31 it was against a background of cloud, rather than the ground, and therefore his immediate impression was that the ac must have come out of cloud; however, he agreed that he could be mistaken in this respect. Furthermore, as his avoiding turn unsighted him from the PA31, he could not be sure that it had re-entered cloud after the encounter.

The radar recording shows the PA31 indicating 3200 ft Mode C as the ac passed, which equates to about 2800 ft (QNH 998) and suggests that the ac was flying a little above its declared altitude of 2500ft. With the cloud base reportedly in the region of 1800 -2000 ft, some members questioned the PA31 pilot's airmanship in choosing to fly in somewhat 'marginal' VFR conditions that allowed little time to react to an ac emerging from cloud – as happened. The PA31 pilot had been informed of the PA28's presence, albeit his report indicates that he did not remember this, and members felt that he should have seen it. They

wondered whether the PA31 pilot had in fact fully assimilated the information he had been given on the PA28 as his response to ATC instructions was merely that he would continue to the overhead at 2500 ft. The RT transcript shows that the PA28 pilot's report of the Airprox was very quickly followed by the PA31 pilot's overhead call, suggesting that the latter's position report was some 2 – 3 NM early and casting some doubt on the pilot's positional awareness.

Some members were surprised that Oxford ATC did not restrict the PA28's descent from 3500 ft as soon as the PA31 called requesting transit clearance at 2500 ft. ATCO members however, pointed out that in Class G airspace ATC had no responsibility to separate IFR traffic from VFR and neither were they under any remit to pass traffic information on VFR traffic to the IFR ac. In the event, the PA28 pilot astutely assessed the situation by listening to the RT and anticipated the appearance of the PA31. The Board concluded that his action effectively resolved the conflict, which arose from a conflict of flight paths in Class G airspace, and removed any risk of collision.

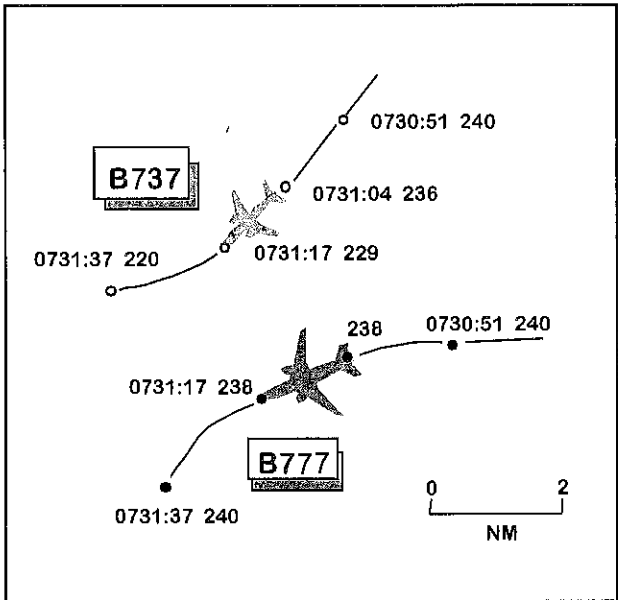
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: A confliction of flight paths in Class G airspace resolved by the PA28 pilot.

AIRPROX REPORT No 51/99

Date/Time: 15 Apr 0731
Position: N5147 E0201 (10 NM NW BLUSY)
Airspace: UAR UM604/R1 (Class: A)
Reporting Ac Reported Ac
Type: B737 B777
Operator: CAT CAT
Alt/FL: ↓ FL 240 FL 240
Weather VMC VMC
Visibility: 10 km
Reported Separation:
 1 - 2 NM H/ 0 ft V
Recorded Separation:
 2.3 NM H/ 900 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was under radar control from LATCC and heading 215° at FL 240 inbound to Gatwick from Gothenburg. His speed was 280 kt. The visibility was over 10 km in VMC. Following urgent instructions by ATC to turn R onto 290° and to descend to FL 200, the ac was turned and a descent initiated with the autopilot disengaged. At about FL 230, a TCAS RA signalled "climb", contrary to the ATC descent instruction. However, as both he and the FO could see the other ac, a B777, the RA demand was disregarded and the ATC instructions obeyed. The other ac passed down their port side at the same level about 1-2 NM away. He felt there had been a high risk of collision.

THE B777's FIRST OFFICER (See UKAB Note 1) reports that he was routeing westbound on UAR UR1 at FL 240 inbound to Heathrow from Amsterdam. At about 0730 a TCAS TA was received on traffic at their 2-30 position converging at FL 240. The signalled ac was then acquired visually and evasive action prepared in the event that a TCAS RA followed. Simultaneously, ATC was heard to instruct another ac, believed to be the conflicting traffic, to turn R and descend immediately. About 5 sec later a TCAS RA was received demanding descent and at the same time ATC instructed an immediate 60° L turn. On receiving the TCAS

RA the FO disengaged the autopilot and descended, at the same time turning onto the assigned heading. ATC was advised of the RA descent and the controller immediately instructed them to maintain FL 240. The crew retained visual contact with the other ac, a B737, and had heard ATC direct it to descend; it was therefore considered appropriate to return to FL 240. Maximum deviation below FL 240 was in the order of 300 ft. About 15 sec after the TCAS RA was received the confliction was resolved and normal navigation approved.

The pilot comments that there was some confusion in both cockpits caused by the conflicting requirements of the ATC instructions and the TCAS demands; the former requiring the B777 to remain at its assigned level, while the latter demanded descent. The pilot of the other ac was heard to advise ATC that he had received a RA requiring climb, which was contrary to the ATC instruction to descend. It was fortunate that they had been able to keep the other ac continuously in view.

UKAB Note (1): The B777's company advised UKAB that the Captain retired shortly after the incident and was not available to contribute a report.

UKAB Note (2): A replay of the LATCC radars at 0730:51 shows the B737 heading SW at FL

240 with the B777 at its 10 o'clock position range 3.75 NM tracking W, also indicating FL 240. At 0731:04 the B737 commences a R turn and the B777 a L turn. At this point the ac are 2.72 NM apart indicating FL 236 and FL 238 respectively. The tracks continue to converge slightly until 0731:17, when the ac are passing through parallel headings laterally separated by 2.3 NM; however by this time vertical separation has increased to 900 ft as the B777 remains at FL 238 and the B737 descends through FL 229. By 0731:37 vertical separation is 2000 ft and lateral separation increases rapidly as tracks diverge.

ATSI reports that the Airprox took place at 0731, NW of BLUSY in class A airspace and close to the intersection of two main inbound routes to the London TMA. At the time of the incident the two flights involved, a B777 en route to Heathrow from Amsterdam and a B737 inbound to Gatwick from Gothenburg, were being provided with an Area Control service by the LATCC Clacton Suite Sector 14 SC. The 2 flights were on converging tracks with the B777 at FL 240 westbound and the B737 tracking SW at FL 260. It was the SC's intention to descend the B737 to FL 200 when other traffic permitted. In the meantime, however, and to accommodate an adjacent sector, the SC descended the B737 to FL 240, but without taking into account the B777 at the same level. The conflict was not recognised by the SC until after the STCA triggered an alarm. The B737 was descended to FL 200 and both flights were issued turn instructions to resolve the conflict. Both pilots acquired each other visually.

The SC reported that in the period leading up to the incident she had felt fit and adequately rested. Both the traffic loading and the workload level were assessed as light to medium, and all ATC equipment appropriate to the task was reported serviceable. The Clacton suite had a normal complement of staff which, in addition to the Sector 14 SC, included controllers operating Sectors 12 and 13, and a Chief Sector Controller (CSC).

The B777 pilot made his first call to the S14 SC at 0722:30 and reported levelling at FL 240. The flight was on its own navigation to the LAM VOR via REFSO and LOGAN reporting points on airway R1. The controller acknowledged the call and issued the flight a Lambourne 3A STAR for London Heathrow. In order to meet the Standing Agreement for transfer to the next sector in TC, the flight would normally have to be descended to FL 200 by LOGAN prior to transfer. On this occasion however, to facilitate level management in TC the flight was co-ordinated into the TC Saber Sector at FL 240 by the Clacton CSC; only minutes earlier, another flight had been similarly co-ordinated with TC. The B777's FPS was marked to reflect this co-ordination and the SC acknowledges that she had noted this agreement. About two minutes later, at 0724:30, the B737 pilot called the SC. The flight, which had just entered the northern part of the sector, had levelled at FL 260 and the pilot reported turning on to a heading of 215°. Although the track adopted was a little E of the standard inbound route for Gatwick, it was acceptable to the controller and the pilot was instructed to remain on the heading. At this point, the 2 ac were about 37 NM apart on tracks converging by about 70°.

Meanwhile, the adjacent Sector 12 had under its control eastbound traffic above the B737, which needed to descend for Amsterdam. To provide Sector 12 with available levels for this traffic, the Sector 14 SC issued the B737 pilot with a descent clearance to FL 240, a level which had recently been vacated by other eastbound traffic below him. However, this clearance did not take into account the B777, already at FL 240. The two flights were now in potential conflict about 25 NM apart and converging. The SC could not account for this oversight. She reported that although the B777's FPS was correctly displayed and marked, she appeared to have mentally "blocked out" the flight's presence, possibly because the flight required no further action during its transit of the sector. Also, she believed that the B777's SSR label on the radar display may have "garbled" or overlapped with that of another ac at a lower level. (Examination of the radar recording reveals that

another ac, an AT43 8 NM ahead of the B777 on a similar track, was being rapidly overhauled by the B777. At the time the descent clearance was given the acs' labels were unobstructed).

Over the next 3 min the SC was involved with other flights and continued to be unaware of the developing conflict. At 0730:20, shortly after the B737 had reached FL 240, the STCA activated on the radar display. The controller reports that while her attention was immediately drawn to the B737 by its flashing SSR label, she could not readily determine the location of the second flashing label. A study of the radar recording shows that at the time the STCA activated the B777 was overflying the AT43 and their respective labels were partly overlapped. Thus, it is thought that the flashing element of the B777's SSR label may have been temporarily less effective. Prompted by colleagues, the SC identified the 2 ac in conflict, now a little under 6 NM apart and at the same level, and instructed the B737 to *".....descend now to FL 200 expedite your descent please turn right heading three two niner zero"*. The term "avoiding action" was not used and although the heading was read back the pilot asked for the level to be clarified. This was repeated, together with the instruction to expedite descent. Turning then to the B777, and once more without using avoiding action phraseology, the controller instructed this flight to *"turn left now heading one nine zero"*. The pilot asked if the call was for him and the controller transmitted again, this time saying *"... (c/s) emergency turn left heading one niner zero avoiding action"*. The pilot responded by reporting the traffic in sight and acknowledging the turn instruction. It is regrettable that at this critical point the controller had to repeat instructions to both flights before eliciting the correct readback. Experience has shown the effectiveness of using avoiding action phraseology in such circumstances to capture the crews' attention immediately and to convey the sense of urgency required to implement the instructions. The SC then passed traffic information to each flight, quoting a distance of 3 NM; and both crews confirmed they were visual. The B777 pilot then announced a *"TCAS descent"* implying he was descending in

accordance with a TCAS RA. Immediately responding, the controller said *".....negative maintain flight level two four zero traffic is descending"*, the pilot replied *"we're going back to two four oh"*. Under the circumstances, the response by the controller was perhaps understandable as she had already initiated a resolution plan (which ultimately was successful). However, the countermanding of a TCAS RA by ATC is contrary to the instructions provided to controllers in the MATS Part 1, Supplementary Instruction 2/99, para 5, which states...*"On being informed that an ac is manoeuvring in accordance with a TCAS Resolution Advisory (RA), a controller must not issue control instructions to that ac which are contrary to the RA communicated by the flight crew. Once an ac departs from an ATC clearance in response to an RA, the controller ceases to be responsible for providing standard separation between that ac and other ac affected as a direct consequence of that RA manoeuvre. However, controllers should continue to provide traffic advice to ac affected by the manoeuvre."*

The UK CAA guidance material to operators is contained in document CAP579, Airborne Collision Avoidance Systems, which states in para 6.2.4:

" Manoeuvres should never be made in a direction opposite to that given in an RA: this is because the sense may have been determined following an exchange of data with the established threat. For this reason:-

(a) RAs may be disregarded only when pilots visually identify the potentially conflicting traffic and decide that no deviation from the current flight path is needed.

(b) If pilots receive simultaneously an instruction to manoeuvre from ATC and an RA, and both conflict, the advice given by ACAS should be followed."

Following the incident both flights were returned to their original tracks, with neither crew making further comment about the incident until a few minutes later just before transfer to the next

sector. This was after the controller concerned had been relieved. The pilot of the B737 reported that during the manual descent he had received a TCAS climb rather than a descent, but that he had been visual with the other traffic at the time. The B777's pilot then confirmed that he had experienced a TCAS descent rather than a climb.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was advised by ATSI that the Clacton sector 14 Sector Controller did not recognise in sufficient time that the descent clearance issued to the B737 took it to a level already occupied by the B777, which was on a conflicting track. Members agreed that this error caused the Airprox. Although the controller eventually successfully resolved the conflict, valuable time was lost because avoiding action phraseology was not used in the initial stages of the conflict. Radar evidence shows that although label overlapping was not a problem at the time the controller issued the descent clearance, it might later have hindered the identification of the conflicting traffic when the STCA activated.

The Board examined the conflicting TCAS/ATC aspects of the incident. In the normal course of events with two ac at co-altitude, the TCAS will co-ordinate the RAs and one ac will be required to descend and the other to climb. (On the version of TCAS fitted to the subject ac – TCAS 6.04A - TCAS demands cannot subsequently be countermanded in the event of an adverse change of geometry; however, the next version of TCAS – TCAS 7 - will allow for a reversal of action). While in this incident the B737 received an RA to climb and the B777 one to descend, it is quite possible that the reverse could also have been advised, which would have been in accordance with the controller's instructions.

ATCO members reminded the Board that pilots were expected to follow and report RAs and ATC were under instructions not to countermand such action (albeit in this case the controller was unaware that at the time she gave the descent instruction to the B737 the latter had received an RA to climb). In a co-ordinated encounter the result of one pilot ignoring an RA is likely to send both ac in the same direction. The Board felt strongly that pilots should follow RAs, unless there were exceptional reasons not to, and that controllers should follow current instructions and not contradict an ac's response to an RA demand. Although some company procedures do permit pilots to disregard an RA if visual contact with the other ac is achieved, it is nevertheless generally recommended that RA demands are followed because there is always the possibility that the traffic sighted may not necessarily be the one involved in the encounter. In this incident, because the pilot of the B737 did not advise ATC of his RA climb demand and continued to descend, both ac descended together initially until the B777 resumed FL 240 on ATC instructions. Had both pilots followed their RAs, TCAS would probably have resolved the conflict in the absence of any ATC input; in the event resolution was eventually achieved by a combination of ATC turn instructions and visual acquisition by the pilots.

Members agreed that, despite the B737 pilot not informing ATC of his RA until after the incident and a lack of timely avoiding action phraseology by ATC, the controller's actions eventually resolved the conflict and the Board concluded that there had not been a risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Clacton Sector 14 SC descended the B737 to a level already occupied by the B777.

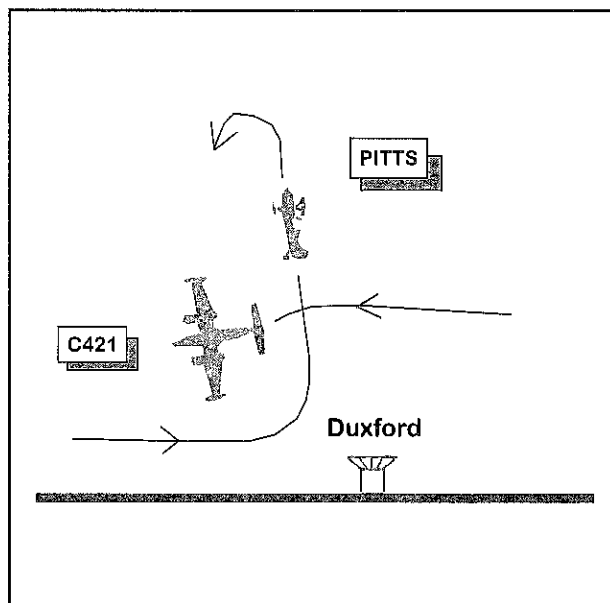
AIRPROX REPORT No 52/99

Date/Time: 14 Apr 1501
Position: N5206 E0008 (Duxford - elev 124 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Pitts C421
Operator: Civ Pte Civ Comm
Alt/FL: 1800 ft 2000 ft
(QFE 993 mb) (QNH 996 mb)
Weather VMC VMC
Visibility: >20 km >10 km
Reporting Separation: 50 ft H/100 ft V
Recorded Separation: not recorded

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PITTS PILOT reports that having been authorised to carry out a practice aerobatic display at Duxford aerodrome, he briefed the FISO on the routine and took off from RW 06, climbing to 1500 ft (QFE 993). Pre-aerobatic checks were carried out, including a visual check for other ac approaching the area, and he received approval from the FISO to commence the detail at his discretion. He dived towards the aerodrome reference point, accelerating to 210 mph while emitting dense white smoke and then, having checked "sky clear around and above", pulled up into a vertical position, making 1.5 vertical rolls to the L to align the wings along RW 06/24. At this point he was some 50 m S of the RW 06/24 centreline with speed decreasing rapidly through 70 mph. He looked L and R, checking the airspace around and below, and was about to commence a stall turn L when he saw a twin engined ac about 50



ft below and 400 m away heading straight towards him on a southerly heading at speed. It was immediately apparent that a stall turn at this point would result in a collision; moreover, any attempt to pull or push to level flight, or 45° down line, would have resulted in loss of control due to the low airspeed and high propeller torque and might have led to a collision. He therefore increased to full power and "hung" on the propeller to maintain attitude in the vertical plane until the other had passed clear (he was now at about 1800 ft with no significant rate of climb). When about 150 m away, the other ac made a L turn and passed about 50 ft to the SE of him and 100 ft below; at its closest point it was banked at about 20° and he was able to see its tail registration and identify it as a C421. Once the ac was clear, he entered a stall turn and regained airspeed, passing through the C421's wake whilst descending. He felt there had been a very high risk of collision and reported the incident on the RT to Duxford; the

AFISO later told him that he had not seen the C421 due to preoccupation with other duties.

The Pitts pilot calculated that the C421 would have been some 4 km away at the time he cleared the area for his run-in and at such a distance the ac would have been extremely difficult to spot. At the time he commenced his pull-up he estimated the ac would have been 1 km or 12 sec away from the confliction point but, despite a visual scan, he did not see the ac and believes that at that distance with his high work load situation it was extremely unlikely that he could have spotted it. He was surprised that the other pilot had, apparently, not seen a fast moving ac trailing dense white smoke.

The pilot comments that many ac practise regularly at Duxford, some of them jets flying at speeds around 450 kt and whose looping manoeuvres can involve heights in excess of 4000 ft. He suggests that airfields such as Duxford might benefit from having a chart symbol to warn pilots unfamiliar with the activities taking place there that the overhead should be avoided unless 2-way communication with the ground controller or operator has been established.

THE C421 PILOT reports that he was routeing solo from Cambridge to Stansted in VFR; the visibility was in excess of 10 km. Following departure from RW 05 at Cambridge, ATC cleared him to route direct to Barkway at 2000 ft, as he had requested on booking out. On transferring to Stansted Radar there was a short delay while he was radar identified after which he was cleared to route direct to Stansted at 2000 ft (QNH 996) under a FIS. Shortly afterwards he saw a Pitts in a vertical climb 200 ft away at his 1230 position; the cockpit was aligned towards him. He immediately banked L in avoidance and the Pitts continued its climb as he passed about 100 ft below it at a distance of about 50 ft. He felt there had been a high risk of collision.

Somewhat shaken by the encounter, he continued on route and asked Stansted to confirm that he was identified. With hindsight, he accepted that he was not sufficiently aware

of his position relative to the airfield and at 2000 ft was about 100 ft into the top of the Duxford ATZ. Workload was heavy as he tried to familiarise himself with a new ac and its navigation equipment on this short flight. The pilot comments that in his opinion it would have been impossible for him to have seen the Pitts any earlier than he did because the C421's long nose obstructed his view downwards from whence the Pitts had climbed at speed into a vertical attitude.

ATSI comments, with RT recording from Stansted for 126.95, that the C421 pilot called at 1500 and was allocated a local squawk of 0201. Following a change of controller, the pilot was informed, at 1502, that the ac was identified 1 NM S of Duxford and confirmation was given that it could route from there direct to Stansted for a VFR join to RW 05. The incident had therefore already occurred when the routing instructions were passed by Stansted ATC.

UKAB Note: A replay of LATCC radars at 1500 shows the Pitts on a southerly heading shortly after departure from Duxford. At the same time a contact believed to be the C421 is heading SSW towards Duxford at 2500 ft Mode C (equivalent to 2041 ft QNH 996, or 1917 ft above Duxford's airfield elevation). Having headed S for a short distance, the Pitts makes a R turn and flies directly back to Duxford where the returns of the 2 ac merge at 1501:50.

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 report from the FISO involved.

There was little discussion on this incident as the Board quickly concluded that the C421 pilot, by his own admission, had infringed the Duxford ATZ and thereby caused the Airprox. Several members commented on the short journey flown by the C421. They felt it was perhaps an inappropriate time to be familiarising with a new ac when the pilot should have been

concentrating on maintaining his positional awareness and avoiding en-route hazards; reference to the Air Pilot would quickly have revealed the diverse activity to be expected at Duxford.

There was agreement that it would have been difficult for the Pitts pilot to spot the approaching high speed C421 any earlier than he did; furthermore, he was well inside the ATZ and could therefore have reasonably assumed a degree of protection. The Board wondered why the C421 pilot did not see the Pitts, which had made a 'circuit' at 1500 ft to the S of the airfield before heading N and descending for its display routine; they thought the ac should have been conspicuous by its white smoke, depending on when the smoke trail was initiated – of course if this was after the Pitts was at low level the ac would probably have been below the C421's

line of sight. Moreover, the Pitts had only been airborne for about 2 min prior to its pull up and for much of the latter part of that time would have been head-on to the C421 and below its nose.

Despite the C421's late avoiding action members noted that the ac still passed almost directly beneath the Pitts with very little lateral separation, therefore the manoeuvre appeared to have had little effect on deconflicting the ac. The Pitts pilot had virtually no directional control over his ac and was forced to rely on engine power alone to maintain his vertical attitude for a moment while the other ac passed underneath. Under these circumstances the Board concluded that neither pilot had been able to influence effective separation and that a collision was only avoided by chance.

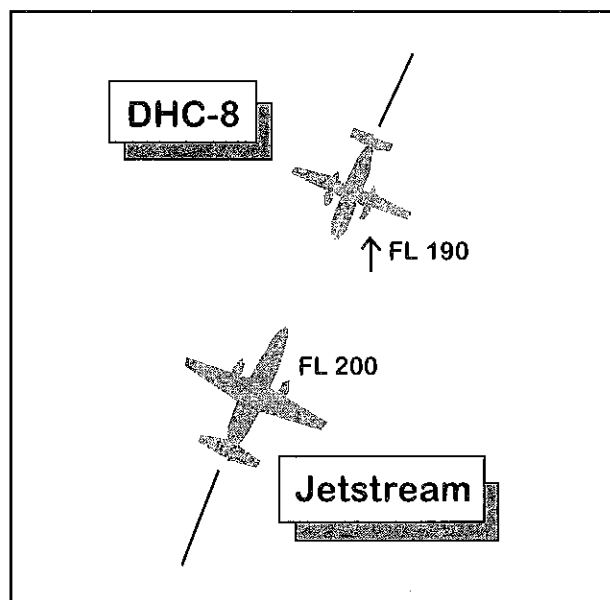
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: The C421 pilot infringed the Duxford ATZ.

AIRPROX REPORT No 53/99

<u>Date/Time:</u>	20 April 0630	
<u>Position:</u>	N5558 W0317 (Edinburgh)	
<u>Airspace:</u>	STMA	(Class: D)
<u>Reporter:</u>	ScOACC	
	<u>First Aircraft</u>	<u>Second Aircraft</u>
<u>Type:</u>	DHC-8	Jetstream 41
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	↑ FL 190	FL 200
<u>Weather</u>	VMC	VMC
<u>Reported Separation:</u>	1000 ft	
<u>Recorded Separation:</u>	2 83NM/700 ft (SMF/radar)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

ScOACC reports, with RT transcript, that the ac concerned were under the control of the TALLA P and E Sector controllers on 126.3; controller workload was moderate. The Dash 8 pilot requested a climb from FL 170 to FL 190, which was approved. Shortly afterwards the Dash 8 was observed on radar to be indicating FL 193; the pilot was asked to confirm he was maintaining FL 190 as there was opposite direction traffic, the Jetstream, at FL 200. The pilot responded "affirm" and the next radar return appeared to confirm the ac to be at FL 190. There had been insufficient time to give lateral avoiding action but the problem was resolved immediately as a result of querying the level. Neither controller concerned recalls seeing the STCA activate at any stage.

THE DASH 8 PILOT reports that he had climbed to his planned cruising level of FL 170 en route from Aberdeen to Manchester under the control of Scottish. Light turbulence was encountered in the Grice area and he requested permission to climb to FL 190, which was approved. FL 190 was set in the altitude selector and "Alt Sel" checked; the captain then attended to some secondary tasks. When the "thousand feet to go" warning sounded he looked up to check the "Alt Sel" and noticed that the ac had pitched up to about 9-10° nose up and was climbing at a very high rate. The FO also noticed this and reduced the pitch angle using the pitch wheel; this probably caused the "Alt Sel" to drop out, although this was not realised at the time. When the ac failed to level at FL 190 the autopilot was immediately disconnected and the ac descended back to FL 190. Just as the ac was levelling Scottish asked him to confirm his cleared level, to which he replied that he had just regained FL 190. "Alt Sel" was re-selected and the autopilot re-engaged, whereupon the ac started to climb again. The autopilot was disconnected a second time and the ac re-levelled at FL 190. It was then noticed that "Alt" was displayed on the Mode Selector. Altitude hold was then disengaged and re-engaged with the ac level at FL 190.

The Captain comments that at the time the FO made the adjustment in pitch to commence the climb, he was busy with the secondary duties and was unaware of any sudden attitude change, probably because the ac was experiencing turbulence at the time. The FO said that he selected only a 5° climb attitude but the ac had responded slowly to the pitch wheel, causing him to rotate it further than necessary. The Captain recalls that the maximum initial level attained was about 19280 ft. The cause of the second climb was that the "Alt Hold" had been engaged at some level above FL 190 and the ac was attempting to return to this level; he estimated the second excursion was about 100 ft and again recovery was effected immediately. Having discussed the incident with the FO, the Captain decided that as the altitude excursion had been less than 300 ft, and they were both satisfied that the event had been satisfactorily resolved, no reporting action would be taken. In future he intends to monitor the initiation of level changes more closely.

THE DHC-8's Company comments that the level bust was probably caused by the handling pilot adjusting the flight guidance pitch trim wheel as the ac approached the altitude capture envelope. This is a known trap and the crew is now the wiser for it. The incident also highlights the importance of the non-handling pilot adequately monitoring the ac flight path at all times, particularly at critical times of flight. The Company is conducting a "Level Bust" awareness campaign within the airline with particular emphasis on the importance of adherence to the check lists and SOPs in recent Flight Operations Department Communications.

UKAB Note (1): The Jetstream pilot had no knowledge at the time that an incident had occurred, though he did hear ATC query another ac's level and subsequently saw a DHC-8 pass about 1000 ft below him.

UKAB Note (2) : The SMF recording shows that vertical separation reduced to 600 ft when the ac were 2.83 NM apart. This is confirmed by a radar picture at 0630:20 which gives identical separation distances. Both controllers remain

adamant that they did not see the STCA activate. (The SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, a transcript of the relevant RT frequency, and reports from the air traffic controllers involved.

There was little discussion on this incident as it was clear from the DHC 8 pilot's report and his Company's comments that the cause of the error had been recognised and addressed. The issue was essentially one of CRM and the Board concluded that inadequate monitoring and crew co-operation on the flight deck lay behind the ac climbing through its assigned level, so causing the Airprox. However, both radar and SMF data indicated that minimum separation was in the order of 3 NM and 600 ft and the Board was satisfied that there had not been a risk of collision.

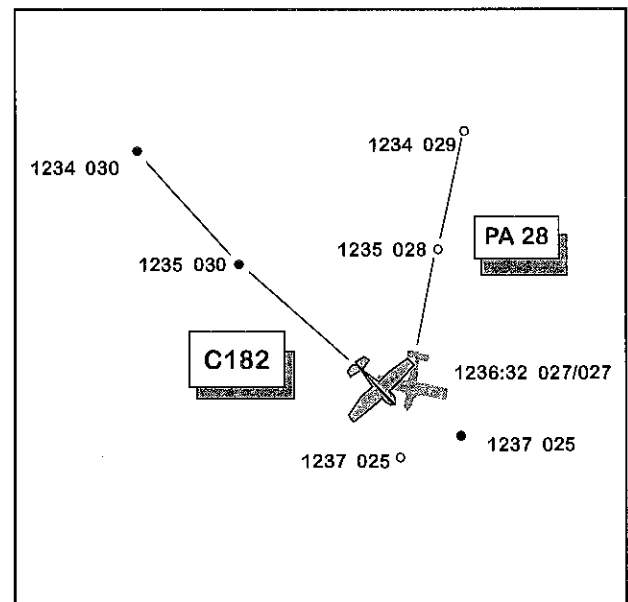
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The DHC 8 pilot climbed above his cleared level.

AIRPROX REPORT No 54/99

Date/Time: 24 Apr 1236
Position: N5147 W0243 (1 NM S Monmouth)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: PA28 C182
Operator: Civ Pte Civ Pte
Alt/FL: 2600 ft 2500 ft
(QNH 1011) (QNH 1011)
Weather CLBC
Visibility: >20 km >50 km
Reported Separation: zero H/50 ft V
Recorded Separation: zero H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was returning to Bristol at 2600 ft (QNH 1011) following a flight to Halfpenny Green. After initially receiving a FIS from London Information on 124.75, he called Bristol Approach on 128.55 when near the town of Coleford on a heading of 202° at 110 kt, squawking 7000 with Mode C. The

visibility was over 20 km in VMC. Before the Bristol controller could provide him with a service, he was over-flown from his 4 o'clock position by a blue and white high wing Cessna which passed less than 50 ft above him. There was no opportunity to take avoiding action and he considered the risk of collision was very

high. He reported an Airprox to Bristol on 128.55 and later by telephone to the ATC supervisor.

THE C182 PILOT reports that he had departed from a private airstrip near Tetbury in excellent flying conditions and was receiving a FIS from Bristol Filton on 122.72. He was squawking 7000 with Mode C. While heading 150° at 130 kt en route to Badminton at 2500 ft (QNH 1011), he saw a single engined Piper ac about 100 ft away and 50 ft below as it crossed his track from L to R at right angles. There was no time to take avoiding action as he had seen the ac late in his peripheral vision; he considered there had been a high risk of collision. He comments that he could not understand why the PA28 pilot appeared to take no avoiding action despite, in his opinion, having had unrestricted vision to his R in the direction of the approaching C182.

UKAB Note: A replay of the LATCC radars at 1234 shows two returns, squawking 7000 with Mode C and believed to be the subject ac, as they converge at a track angle of about 60°. The C182 is tracking 135° indicating 3000 ft with the PA28 at its 1030 position range 5 NM tracking 195° at 2900 ft. At 1235 the ac are still on the same relative bearing to each other 3 NM apart with the PA28 showing 2800 ft. The returns of the 2 ac merge at 1236:32 1 NM S of Monmouth, with both Mode Cs indicating 2700 ft. At 1237 Mode C readings show both ac at 2500 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA pilot commented that both pilots should have been in a position to see the other ac as each was always slightly ahead of the other's beam and neither ac was disadvantaged by its wing configuration. However, owing to the 'constant bearing' geometry of the situation there was very little relative motion between the ac and it is recognised that the human eye is poor at detecting objects early in these circumstances. This can mean that awareness of another ac's presence is delayed until it blooms suddenly in size, by which time the ac are often very close together.

While theoretically the C182 pilot had right of way under the Rules of the Air, members noted that he was overtaking the PA28 and they felt that he therefore bore equal responsibility for giving way. There was agreement that both pilots were jointly responsible for seeing and avoiding each other in Class G airspace and, notwithstanding the geometrical aspects, they should have done so earlier in the excellent flying conditions reported. The Board concluded that the late sightings by both pilots caused the Airprox. Moreover, given the minimal miss distances estimated by both pilots, which were supported by the radar video recording, the Board concluded that there had been an actual risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Late sighting by both pilots.

AIRPROX REPORT No 55/99

Date/Time: 26 Apr 1346

Position: N5258 W0100 (1 NM W of
Newton - elev 182 ft)

Airspace: ATZ (Class: G)

Reporting Aircraft Reported Aircraft

Type: Firefly Twin Squirrel

Operator: HQ PTC Civ Comm

Alt/FL: 1500 ft, 1000 ft

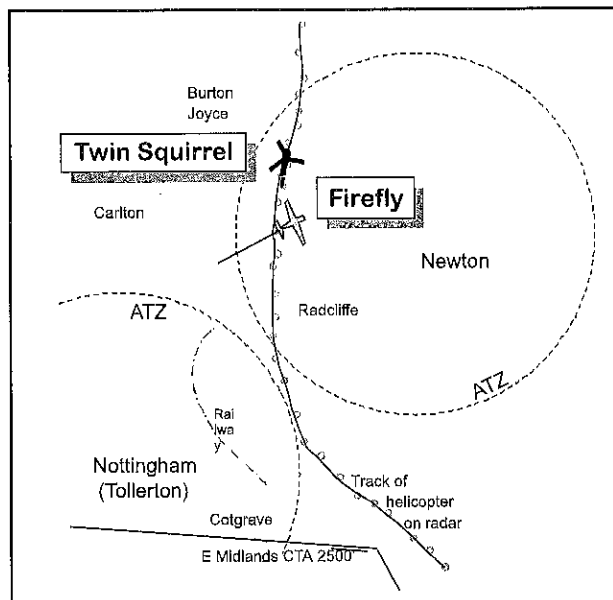
(QFE 1011 mb) (QNH)

Weather VMC HAZE VMC HZBC

Visibility: 6 km 4km

Reported Separation: 300 ft V 1 km H

Recorded Separation:



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIREFLY PILOT reports heading 070° at 100 kt carrying out a descending deadside join for RW 07 at Newton when he saw a Twin Squirrel crossing the ATZ from S to N at 1600 ft. He saw it 1500 m away and converted his descent into a climb to pass 1000 m behind it and 300 ft above it. While the risk of collision had been low it could have been high if a solo student had been joining.

THE TWIN SQUIRREL PILOT reports heading 340° at 120 kt en route to Leeds Bradford at 1000 ft, 500 ft below cloud. He was aware that Newton was active and had spoken to Nottingham, seeking clearance through their airspace to avoid Newton. He did not see the Firefly.

HQ MATO reports that the Firefly pilot called Newton Tower (TWR) on frequency 375.425 at 1344:53 requesting an overhead join, having previously conducted a visual recovery with Newton Approach (non radar). The pilot was passed the RW and QFE details (07 R/1011 mb) and informed that the circuit was clear. At 1345:32, the Firefly pilot transmitted "C/S, is the helicopter talking to you?" to which TWR replied "...negative". The controller did a rapid scan all round and saw the helicopter to the SW apparently about 0.75 NM away, tracking N and passing about 1 km in front of the Firefly. The

Firefly pilot added "He just came through your circuit at 1600 ft" at 1345:33. At 1346:26, having briefly called Nottingham in search of the helicopter's callsign, he informed TWR "...I'd like to file an Airprox on that helicopter."

The Twin Squirrel pilot had been in contact with Waddington Zone (ZONE) on frequency 127.35 and in receipt of a FIS at 1500 ft, Barnsley RPS 1013 mb, squawking 3/A 3601. At 1343:57, ZONE transmitted "...Newton are active to the north at er, range of about 3 miles, they've got about 5 or 6 aircraft airborne" and the Twin Squirrel pilot replied "...roger, that will be er, passing west of Newton." No other transmissions were made between the helicopter and ZONE until 1359, when the pilot changed frequency to Leeds Bradford. Radar contact had been lost as the helicopter approached Newton and briefly regained about 1 NM N of Newton. (Note: Newton is 21 NM SW of Waddington.) Waddington Approach received a telephone call from RAF Newton at 1359:07, requesting information about a helicopter that had infringed the Newton ATZ.

The Airprox occurred at the lower limits of the Claxby and Clee Hill radars and is not recorded, although the ATZ infringement can be clearly seen on both. (The events on the Waddington RT recording appear to be timed about 40 sec later than the time the corresponding events are

observed on radar.) The Firefly pilot reports that he passed above and behind the helicopter however, except for a short period, the Firefly cannot be seen. A possible explanation for this is that the Twin Squirrel presented a better radar aspect than the largely plastic Firefly. At 1344:40, the Twin Squirrel, identified by its 3601 (Waddington) squawk, without Mode C, is shown 2.5 NM SW of Newton tracking NW as a primary contact (thought to be the Firefly) appears in its 12 o'clock at 2 NM, heading N. The frame timed at 1345:08 shows the helicopter turning right onto a track of approximately 350°, with the primary contact in its 11 o'clock at 1.5 NM. The primary contact then fades. The helicopter continues to track 350° and passes 1.5 NM W of Newton.

There do not appear to be any military ATC related factors in this incident. ZONE fulfilled the requirements of the requested FIS and provided information on the position of Newton aerodrome and its activity. With the benefit of hindsight, as the helicopter was flying at the base of ZONE's radar cover and tracking close to Newton, a suggestion to call Newton may have guided the Twin Squirrel pilot in the right direction. The inference from the pilot's transmission however, was that he intended to keep clear. The observed weather at Newton was 7 km visibility in haze with some rain, cloud 4/1200, 7/5000. Therefore, it would have been difficult for TWR to have visually acquired the helicopter before the incident. The Twin Squirrel pilot reports that he was aware (from Waddington) that Newton was active and had then called Nottingham (Tollerton) for clearance through their airspace in order to avoid Newton. Both ATZs are marked on civilian aeronautical charts.

Note: The helicopter pilot has told the CAA Flight Ops Inspectorate that he did not infringe the Newton ATZ, advising that he flew to the railway line N of Cotgrave, following it to W of Radcliffe then over the country park and between Carlton and Burton Joyce.

HQ PTC comments that while this may not be an Airprox at all it appears to be a careless ATZ penetration which would carry with it a high

probability of an Airprox at any time; Newton is a busy training airfield. Waddington might have been more positive in instructing the Twin Squirrel to call Newton but they gave him a very positive prompt and he undertook to remain clear.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that there was no reason to doubt the accuracy of the radar recording for two reasons. First, tracks of other East Midlands and Newton traffic were as expected. Second, if the helicopter pilot had tracked as suggested to FOI, it would not have been seen by Newton ADC and would have passed behind the Firefly, not in front of it. (Part of the helicopter operator's argument was that the helicopter had not been seen by Newton ATC but in fact it had been.) Although the Board agreed that the cause of the incident was that the Twin Squirrel pilot had flown through the Newton ATZ without calling on RT, members considered the encounter with the Firefly was hardly an Airprox; clearly there had been no risk of the ac actually colliding.

Members accepted that the helicopter pilot and company had made arrangements to avoid Newton in the future but suggested that if he needed to transit Newton's ATZ for weather or traffic reasons, a call on 119.125 was the best solution.

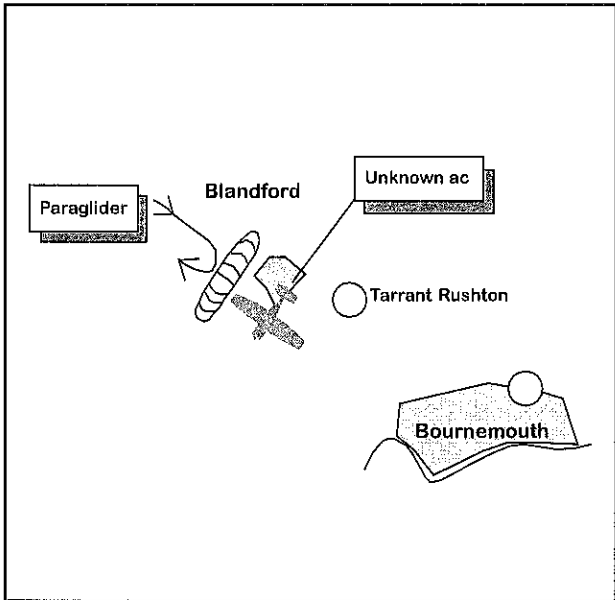
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Twin Squirrel infringed the Newton ATZ.

AIRPROX REPORT No 56/99

Date/Time: 24 Apr Approx 1105 (Saturday)
Position: N5050 W0212 (2 NM SW Blandford)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Paraglider Untraced light ac
Operator: Civ Pte
Alt/FL: 2600 ft (QNH)
Weather VMC CLBC VMC
Visibility: 30 km
Reported Separation: 40m H/20m V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PARAGLIDER PILOT reports that he was at 2600 ft (QNH) and heading about 130° at 20 kt 2 NM to the W of Blandford when he saw a high-wing single engined ac (see UKAB Note (1)) approaching from his L about 500 m away and slightly above. When it became apparent that the other ac was not altering course, he made a R turn through 180° in order to maximise separation from its wake. The pilot comments that it is difficult to achieve effective avoiding action with a paraglider because of its low speed and in this situation he felt that there was considerable danger to his safety from the effects of wake turbulence which could have collapsed his wing. He estimated that the other ac passed about 40 m behind him and 20 m above.

UKAB Note (1): In a subsequent conversation with UKAB staff the paraglider pilot said that he could be mistaken about the other ac's wing configuration as he had only a brief sighting of it. However, he felt fairly certain that the

registration markings on the side of the ac were in blue. He commented that had he not turned when he did the other ac would probably have passed over him by about 50 ft with the likely effect of deflating his canopy.

UKAB Note (2): Despite extensive enquires AIS (MIL) could not positively trace the other ac involved. Much time was taken analysing LATCC radar recordings using 5 different radar heads but no returns, which could be attributed to the encounter, could be observed. The pilots of several ac known to be airborne in the area were questioned but only one, flying a PA28 on a local flight from Hurn, could be considered a possibility. His ac is white with blue registration markings. This pilot agreed to submit a report to UKAB although he did not see any paragliders during his flight and could not remember specific details of his route or altitudes, nor could he recall the prevailing weather conditions. However, he believes that on his return leg to Hurn he would have routed

via the Rushton VRP and could have been in the Airprox vicinity at about the reported time of the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted of a report from the paraglider.

There was little discussion on this incident as the success of the investigation was hampered by the lack of a report from the pilot of the untraced light ac. However, the Board recognised the paraglider pilot had been sufficiently concerned about his safety to submit an Airprox report. Although there was no other

evidence to corroborate the paraglider's estimate of minimum distances, members nevertheless believed his account and concluded that his action, limited though it was owing to lack of speed and manoeuvrability, reduced the severity of the encounter and removed the risk of collision. Members noted that the paraglider pilot had time to assess the absence of avoiding action by the other pilot before he took action himself, indicating that the manoeuvre was a considered act rather than an instinctive reaction. Although this reduced the risk factor, members accepted the possible serious effects of downwash on the paraglider's canopy and concluded that the other ac passed sufficiently close to the paraglider to compromise its safety.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

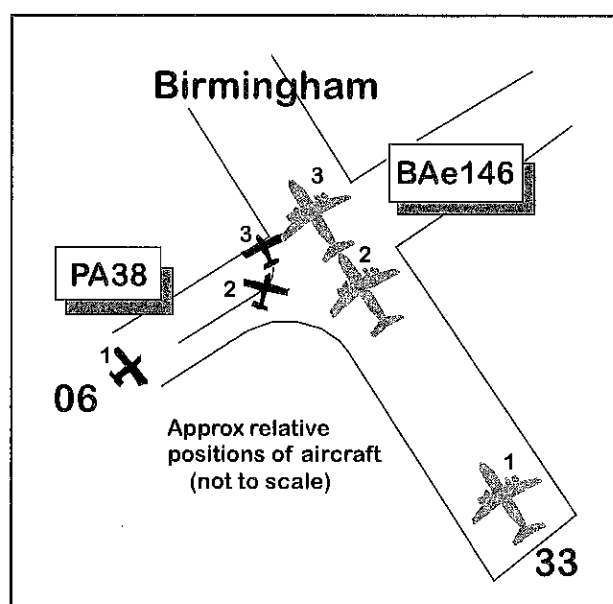
Cause: A confliction in Class G airspace resolved by the paraglider.

AIRPROX REPORT No 58/99

Date/Time: 28 Apr 1602
Position: N5223 W0145 (Birmingham airport - elev 325 ft)
Airspace: CTZ (Class: D)
Reporting Ac Reported Ac
Type: PA38 BAe 146
Operator: Civ Trg CAT
Alt/FL: Ground level Ground level
Weather VMC VMC
Visibility: 10 km

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

UKAB Note (1): Although this incident occurred at ground level it has been investigated as an Airprox because both ac were considered to be in a phase of flight – the BAe 146 taking-off on RW 33 and the PA38 landing on RW 06.



THE PA38 PILOT reports that he was instructing a PPL student carrying out a touch and go on RW 06 at Birmingham on the ADC

frequency, 118.3. Just as they were about to land, slightly beyond the touchdown zone markings, he heard ATC say in an urgent voice to another ac - "C/S hold position". Looking R he saw that a BAe 146 was rolling on RW 33, so he took control from the student and carried out an emergency stop, veering to the L in the process to avoid colliding with the BAe 146. As his ac came to a halt (now pointing to the north) at the RW intersection the port wing of the BAe 146 passed over his own starboard wing.

THE BAe 146 PILOT reports he was the Captain, accompanied in the RHS by a pilot on his fourth day of training, and a FO acting as safety pilot. As he taxied towards RW 33 he was instructed to 'line up and wait' since there was another ac taking-off from the intersecting RW. After a short conversation between the crew about strobes, the take-off check list was completed and a further discussion on the setting of the Thrust Management System (TMS) followed. At this point – lining up on RW 33 - he received an instruction from ATC that on passing 2000 ft he was to call radar on 118.05; he incorrectly believed this instruction included clearance for take-off. As he read back the clearance the safety officer tapped him on the shoulder and said that he could not hear the transmission and thought it was going out on the ac PA system. However, a re-check of radio selections confirmed that he was on RT and that the safety officer's radio was giving intermittent reception. The problem was cleared by recycling selectors but it meant the safety pilot had not heard either the ATC clearance or his Captain's reply. Moreover, the training pilot had been momentarily distracted by checking the TMS and he too had not heard what the ADC had transmitted to them.

All checks having been completed he commenced rolling in the belief that he had been cleared for take-off. Shortly after the '80 kt' call and handover of control to the training pilot (who was flying the ac) he faintly heard what he believed to be his callsign from ATC but the transmission was difficult to hear because of cockpit noise (he subsequently learned the call was 'C/S hold position'). Assuming there was a

problem he rejected take off, at which point he saw the light ac on the other RW, realised the situation and endeavoured to stop before the intersection. However, he was unable to avoid rolling through and on coming to a halt asked ATC to confirm that he had not hit the other ac. He informed them he would be filing an incident report.

ATSI reports that all ATC equipment appropriate to the task was serviceable. The controller described his workload as low at the time of the AIRPROX.

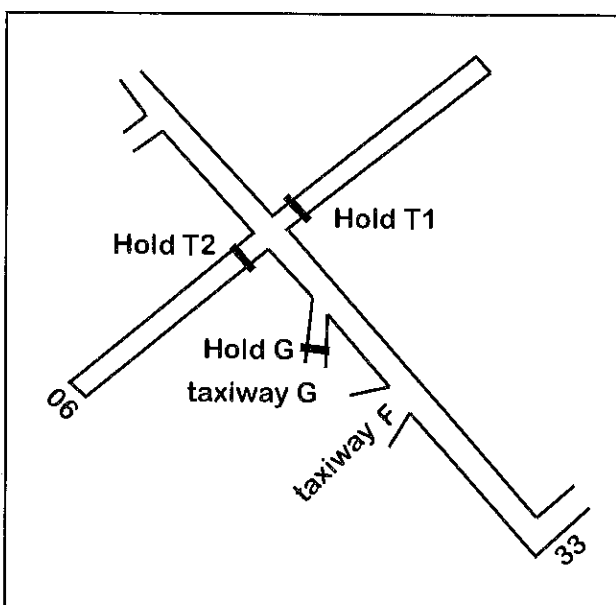
The PA38, operated by a locally based flying club, was cleared for take-off for a LH circuit on RW 06 at 1554. The pilot called downwind at 1558 and was instructed to report final number one. The ADC recollected that the BAe 146 was between holding points D3 and D4 when it contacted his frequency at 1600. He said that he could see the PA38 on base leg and judged that it would be able to complete a touch and go on RW 06 without significantly delaying the BAe 146's departure from RW 33. Accordingly, having no other traffic to affect the BAe 146, the controller cleared its pilot to: "*..... line up RW three three there'll be landing traffic zero six*". The pilot replied: "*Roger line up and wait three three*". The controller's next transmission was to clear the PA38, which was now on final approach, for a touch and go on RW 06.

(UKAB Note (2) A transmission then followed to another ac taxiing behind the BAe 146 after which ADC transmitted to the BAe 146"*c/s on passing altitude 2000 ft contact Birmingham Radar one one eight decimal zero five*").

Birmingham ATC had been carrying out a trial for about three months prior to 23 March 1999, at the request of local operators, testing a procedure on 'automatic frequency change' for departing IFR ac. This procedure was published in the Birmingham ATC Supplementary Instruction (ATCSI) 12/99 – attached at Annex - but was not issued to aircrew. One section states, in italics, that "*The instruction will be broadcast on ATIS and all IFR ac shall be given the instruction to contact Birmingham Radar on passing 2000 ft*

with the take off clearance". However, on this occasion the controller passed the 'automatic frequency change' instruction to the BAe 146 without any accompanying take-off clearance as the ac was lining up on RW 33 and whilst the PA38 was about 200 ft on final approach to RW 06. He explained that he had not complied with the procedure as stated in the ATCSI because of a misunderstanding on his part. With hindsight, he agreed that the frequency change should have been passed with the take-off clearance, as stated in the ATCSI, but at the time he had interpreted the Supplementary Instruction another way, adding "I read what I thought it meant". He believed the way the ATCSI was laid out promoted some confusion between one procedure for passing the standard instruction and another when there was a necessity for it to be changed. In the latter case ac were to be advised prior to a take-off clearance being issued. In the event, having received the following readback from the pilot of the BAe 146: "Out of two thousand one one eight oh five", the ADC replied, "affirm standby".

The controller then complied with standard ATC practice by turning his attention to the PA38 to monitor its touch and go. He commented that once an ac the size of a BAe 146 lined up at the RW 33 threshold, it was no longer visible from the ADC's position in the VCR because of a hangar which blocked the line of sight. However, two cameras had been installed to



capture the view from the E or W of the RW across the 33 threshold and the associated holding point, although only one camera could be selected at a time. A Closed Circuit Television (CCTV) screen, previously positioned close to the ADC's desk, had been replaced by a Surface Monitoring Radar (SMR) screen; the CCTV screen had been moved to the SE corner of the VCR. In normal operating conditions the ADC said he did not routinely look at the SMR, preferring instead to look out of the window or, when necessary, at the CCTV display. Consequently, he did not notice the BAe 146 commencing its take-off run because his attention was focused on RW 06. Whether he would have seen this occurring if the CCTV had still been in its original position is open to conjecture; it took about 25 seconds for the BAe 146 to reach the RW intersection. The ADC first became aware of the situation when he heard high engine noise and looked round to see the BAe 146 approaching the RW intersection just as the PA38 was about to do the same. His immediate reaction was to try and stop the BAe 146 and he transmitted: "C/S hold position". Without waiting for an acknowledgement he instructed the PA38 to "turn left now". The controller agreed that he did not use the correct phraseology for cancelling take-off of an ac which had commenced its take-off. The MATS Part 1, Page E (Attach)-5, states the appropriate phraseology as: "(a/c identity) stop immediately - I say again (a/c identity) stop immediately - acknowledge". However, not only did the BAe 146 pilot react to the ADC's transmission, the PA38's pilot did likewise, alerted by the controller's urgent tone. The PA38 was brought to an emergency stop, halting on the left hand hard shoulder of RW 33, facing N. Meanwhile, the BAe 146 was unable to stop before passing the PA38 and the airliner's port wing passed over the starboard wing of the smaller ac.

UKAB Note (3) Birmingham's SMR is equipped with a RW Incursion Monitoring and Conflict Alert Subsystem, but conflicts are not detected at the intersection until one ac crosses through the conflict alert area of the other RW . This is because the equipment monitors each RW independently.

The departure frequency change procedure, as originally published in ATCSI 12/99, was subject to a local Safety Assessment and was classed as “No Effect on Safety”. Although the scenario of this incident was not addressed as part of the assessment process, this type of problem is recognised in the MATS Part 1, Page 2-7, under the heading of “Awaiting Take-off”, which states that: “When, after an ac has been instructed to hold, a clearance message is passed which might be misinterpreted as permission to take-off, the instruction to hold should be repeated as part of the message”. Also, Page 2-8, under the heading of “Take-off Clearance, IFR Flight” states that: “To avoid pilots taking-off without take-off clearance the phrase ‘After departure’ shall be used in airways or route clearances, when appropriate”. As a result of this AIRPROX the ATSCI has been reissued.

The **AAIB** also conducted an investigation into this incident and their main findings on ATC aspects of the Airprox are covered by the ATSI report. However, the AAIB had some additional observations which expand on these and other aspects and these are included below for further information:

The controller said that he felt he had misinterpreted the procedure in so far as he believed that the transmission of the frequency change and the take off clearance could be legitimately separated. Furthermore, his misunderstanding was fostered by the wording of the second paragraph of the ATCSI‘the aircraft shall be advised *prior* (AAIB italics) to being issued with a take off clearance’.

The initial instruction to an aircraft awaiting departure is the frequency change; this is acknowledged and read back by the pilot, followed by the controller issuing take off clearance. Although the ATCSI contained the words“all IFR aircraft shall be given the instruction to contact Birmingham Radar on passing 2000 ft with the take off clearance”, there was no written example. This was amended in the ATCSI issued following the incident which contained a clear example of the manner in which the transmission was to be made.

With regard to the safety analysis carried out by the Birmingham air traffic management team prior to the issue of ATCSI 12/99, the AAIB made the following comment:

Potential hazards relating to the procedure were identified, categorised as to their severity from 1 to 4 (4 being the most severe) and an assessment made of how identified hazards would be mitigated and, where possible, eliminated. As a result of this analysis the conclusion was reached that the procedure would have no effect on safety. Unfortunately, the hazard analysis concentrated on problems arising from inability to contact an aircraft after departure and did not include a consideration of the circumstances which led to this incident – (that a pilot might respond to a partial instruction and then take off without clearance). While such methods of analysis can be useful, they depend on the analysis including all the relevant potential hazards. Such a list is not always easy to achieve and may focus on one set of potential problems at the expense of others. In this case a reasonable assumption had been made that the normal mandatory readback of a take off clearance would inevitably occur.

The AAIB report then addressed pilot-related aspects of the incident and noted:

The desire to reduce pilot workload led to the initiation of the procedure. It was an attempt to comply with a request from pilots using the airport to effect a reduction in workload immediately after take off. One means of achieving this was seen as a reduction in the number of executive instructions passed by ATC. The decision was taken to place the frequency change instruction with the take off clearance rather than to include it in the very busy post-departure phase of flight. No consideration was apparently given to the possibility of a pilot taking off prematurely on the assumption that frequency change information was always followed by the take off clearance. Also, the possibility of placing the frequency change with the airways clearance was not considered. This would have satisfied the prime requirement of reducing post-departure

workload while the frequency change could not have become associated in the pilot's mind with the take off clearance, thus removing the risk of an incident of this type.

The Bae146 pilot had departed from Birmingham at least six times since the procedure had been introduced. After reading back the instruction relating to the frequency change, he was apparently aware of another transmission from the controller but did not register its content. On the assumption that the frequency change is always followed by the take off clearance, he assumed the missed transmission was the clearance and acted accordingly without attempting a readback or check with the controller that the ac had indeed been cleared. Having a regular procedure (giving the frequency change with the take off clearance) is efficient in that pilots are primed to expect it and know what they are meant to do. It is still possible that assumptions may be made without prudent confirmation.

The AAIB concluded by commenting:

As with the majority of incidents, this occurrence was the result of cumulative factors. These included the controller's misinterpretation of the ATCSI, the assumption made by the BAe 146 pilot that information on the frequency change would inevitably be followed by a take off clearance and, most importantly, his perception that a take off clearance had actually been given – albeit not included in his readback of the departure instruction. This alone denied the controller an opportunity to correct the error. The controller's subsequent transmissions to both aircraft were timely in averting a more serious incident.

Annex A to AIRPROX REPORT No 58/99

The following is the text of Birmingham ATC Supplementary Instruction (ATCSI) 12/99 – commencing date 24 Mar 1999.

AUTOMATIC FREQUENCY CHANGE

Following a recent trial whereby departing IFR ac were instructed to make an automatic frequency change to Birmingham Radar after passing 2000 ft, it has been decided to establish this on a permanent basis. This instruction will be published on the SID charts and the Flight Procedures section of the Birmingham AIP entry. However this will not be done until 17 June 1999. In order to allow for this transition period and to ensure Aircraft Operators have been given sufficient time to obtain correct documentation, the following will be applied until 30th June 1999:

Transition Procedure

1. Unless otherwise instructed, departing IFR aircraft are to contact Birmingham Radar on 118.05 MHz as soon as practicable after passing 2000 ft QNH.
2. Should ATC wish to change this instruction the ac shall be advised prior to being issued with a take off clearance.

"This instruction will be broadcast on ATIS and all IFR ac shall be given the instruction to contact Birmingham Radar on passing 2000' with the take off clearance."

Following the 30 June the following permanent procedure will apply:

Permanent Procedure

1. Unless otherwise instructed, departing IFR aircraft are to contact Birmingham Radar on 118.05 MHz as soon as practicable after passing 2000 ft QNH.
2. Should ATC wish to change this instruction the ac shall be advised prior to being issued with a take off clearance.

Note:- IFR aircraft not departing on a SID shall be instructed to contact Birmingham Radar on passing 2000' with the take off clearance.

As a result of this Airprox the following amendment was issued – commencing 29 April:

ATCSI 12/99 ISSUE 2

Following a recent incident it has been considered necessary to re-issue this ATCSI to emphasise to controllers the absolute importance of ensuring that the frequency message is always given as an integral part of the take off clearance. Further, any changes to this instruction must also be given as an integral part of the take off clearance. (see examples below).

Transition Procedure

1. Unless otherwise instructed, departing IFR aircraft are to contact Birmingham Radar on 118.05 MHz as soon as practicable after passing 2000 ft QNH.
2. Although the instruction will be broadcast on ATIS, ALL IFR aircraft must be given the instruction to contact Birmingham Radar on passing 2000' with the take off clearance.
3. Should it be necessary to change this instruction, the new instruction must also be given with the take off clearance.

To ensure that there is no doubt as to when an ac is cleared for take off, it is essential that this instruction or amended instruction is only given with the take off clearance. Examples of the phraseology to be used are as follows:

(Callsign) After passing 2000 ft contact Birmingham Radar on 118.05. You are cleared for take off (surface wind).

(Callsign) After passing 2000 ft contact Manchester Radar on 124.2. You are cleared for take off (surface wind).

(Callsign) After departure remain on this frequency. You are cleared for take off (surface wind).

After the 30 June the following permanent procedure will apply.

Permanent Procedure

1. Unless otherwise instructed, departing IFR aircraft are to contact Birmingham Radar on 118.05 MHz as soon as practicable after passing 2000 ft QNH.
2. Should it be necessary to change this procedure for a departing aircraft, the new instruction must be given with the take off clearance. (phraseology as above)
3. IFR ac not departing on a SID must be individually instructed to contact Birmingham Radar on passing 2000' with the take off clearance.

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, and reports from the AAIB and the appropriate ATC authority.

The Board quickly concluded that the crew of the BAe 146 caused this very serious Airprox by commencing their take-off run without ATC take-off clearance. Members were in no doubt that the ac had come very close indeed to a collision.

The Board considered aspects of the BAe 146 crew's action which gave cause for concern. The pilot had been warned of landing traffic on the crossing RW while he was being given instructions to line up on RW 33. He should therefore have heard the PA38 pilot being given touch and go clearance on RW 06 by the ADC controller immediately following his own acknowledgement of the departure frequency change instruction. Yet, despite having knowledge that there was traffic to conflict with their departure, there was no attempt by the BAe 146 crew to determine the position of the other ac, either by requesting information from

the controller or by looking for it. However, when the PA 38 was on short finals for RW 06 it may have been hidden from the crew's view by an adjacent hangar to their L or the control tower building beyond. Members found it surprising that the BAe 146's radio problem had not come to light sooner; had the crew resolved the RT difficulties prior to entering the RW the ensuing confusion over missed calls would not have arisen and the Airprox would probably not have occurred. In the event, the problem arose at a critical phase of departure while important ATC instructions were being issued; this should have prompted the Safety pilot to ensure verification of the missed calls by requesting re-transmission. The training pilot also missed the significance of the RT exchanges between ADC and the Captain because his attention was diverted elsewhere. While accepting the need to monitor the ac's systems and engine performance, members pointed out that such activities should not interfere with the prime task of monitoring radio transmissions from ATC. It was noted that the RHS pilot was at a very early stage of training and members wondered whether his comparative inexperience might have led him to defer to his considerably more experienced colleagues. Whatever the case, both crew members missed the crucial transmissions between ATC and the Captain, and the latter compounded the error by not including the perceived take off clearance in his readback of the departure instruction. While the pilot wisely rejected take-off when he recognised his call sign, members expressed concern that engine noise in the cockpit had apparently significantly affected his capacity to hear ATC transmissions at this critical stage of flight.

Discussion then turned to ATC aspects of the Airprox. Although there was little criticism of the controller's part in the incident, ATCO members commented that having received the readback of the frequency change instruction from the BAe 146 pilot, the controller's reply of "affirm, standby" was insufficiently robust. It is well known that the passing of post take-off information to an ac already lined-up on the runway can occasionally be construed by a pilot as take-off clearance. It is essential in these

circumstances that the controller phrases his messages in a way which will leave the pilot in no doubt on clearance status. In this case the phrase "Hold position" would have been appropriate, and a read-back obtained. These aspects of aerodrome control are detailed in the MATS Pt 1, as referred to in Part A of this report, as is the standard phraseology for cancelling take-off. Although the latter was not observed by the controller, members acknowledged that he had very little time in which to retrieve the situation and it was unsurprising in the circumstances that his reaction was non-standard; they commended him for the speed with which he responded once he became aware of the situation. The Board was in no doubt that had the PA38 pilot not been alerted to the developing conflict by the urgent tone of the controller's instruction to the BAe 146, he may not have reacted so quickly to the situation and the consequences might have been much more serious. It is possible that had the CCTV showing the RW 33 holding area been in front of the controller, as it was prior to the introduction of the SMR, he might have spotted the BAe 146 moving in time to pass more timely instructions to its pilot. Alternatively, being mindful of the possibility that sometimes ac do roll without take off clearance, the controller could have asked a tower assistant to keep an eye on the CCTV for him while he was turning his attention to the PA38.

The Board then considered the ATCSIs produced by Birmingham ATC staff. Members felt that there was some justification in the controller's contention that a degree of ambiguity in the wording of the instruction had led to his misinterpretation. They also questioned the wisdom of combining the post take-off frequency change with the take-off clearance and they wondered why consideration had not been given to including the change with the airways clearance. This would reduce the post departure workload and also remove any possibility of a pilot associating the frequency change with the take-off clearance, as appears to have happened on this occasion. Some members were strongly of the opinion that once an ac had been cleared to line up on a runway the only instruction which

should follow thereafter would be the take-off clearance. However, ATCO members disagreed, pointing out that there were often occasions when it was necessary to impart last minute ATC instructions or messages to ac – such as Runway Visual Range (RVR) readings, post departure heading changes or late revisions to post departure routeings. The Board understood the necessity for this; however, members agreed unanimously that notwithstanding what other messages might be passed, the take-off clearance itself should

contain no form of words other than e.g. “C/S you are cleared for take-off, the surface wind is...” If such phraseology was standardised it would, in their opinion, contribute greatly to the elimination of ambiguity or misunderstandings. The Board therefore asked the Chairman to recommend to the appropriate CAA authority that take-off clearances issued by licenced UK Air Traffic Controllers should not be combined with any other message or post departure instruction.

PART C: ASSESSMENT OF RISK AND CAUSE

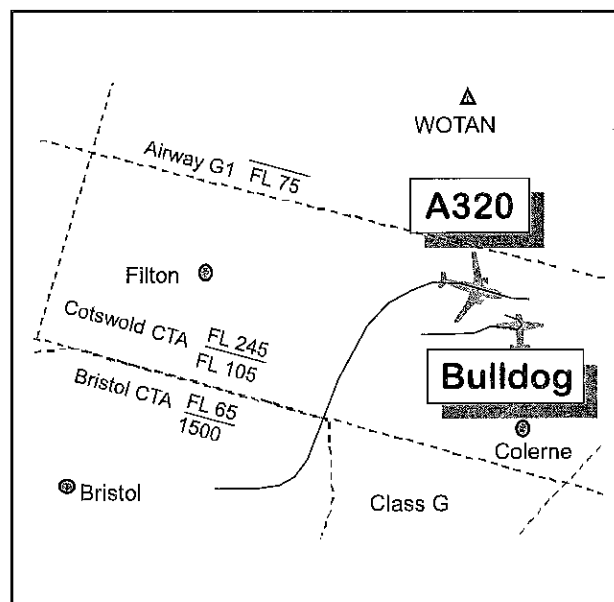
Degree of Risk: A

Cause: The BAe 146 crew commenced take-off without clearance.

Recommendation That the CAA reviews the way ATC instructions are given in sequence to aircraft prior to take off so that post departure instructions are separated from the take off clearance.

AIRPROX REPORT No 59/99

Date/Time: 28 Apr 1035
Position: N5130 W0217 (4 NM N of Colerne)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: A320 Bulldog
Operator: CAT HQ PTC
Alt/FL: FL 100 ↑ FL 100
Weather VMC VMC CLNC
Visibility: 7-10 km 50 km
Reported Separation:
 1 NM, 2-300 ft/0.75 NM
Recorded Separation:
 0.7 NM H, 300 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports heading for WOTAN in a climb at 300 kt and being transferred from Bristol approach to LATCC who cleared him to

FL 110 on a radar heading of 105°. On rolling out on heading, passing FL 100, he received a TCAS TA and several seconds later an RA to descend. He disengaged the autopilot and complied, advising LATCC ‘TCAS descent’.

The controller immediately issued an avoiding left turn and descent to FL 90. In the descent, TCAS announced 'clear of traffic' at FL 95. He did not see the other ac which LATCC later identified to him as a Bulldog, saying they were uncertain under whose control the ac was. The TCAS indicated the other ac passed less than 1 NM away and 2-300 ft above.

THE BULLDOG PILOT reports passing NE at 100 kt in a left turn while positioning for a spinning exercise when he saw the Airbus approaching from his 9 o'clock on an easterly heading. It crossed his 12 o'clock very slightly below about 0.75 NM away as he continued his turn. There was no risk of collision and no need for avoiding action as he was already turning.

ATSI reports that the Bulldog unit is allocated the transponder code 4576 to be used by ac operating between surface level and FL 100 for conspicuity purposes only. Ac operating to the north of Colerne do not have to be pre-noted to Bristol ATC. Although Bristol Airport is situated within Class D Airspace i.e. the Bristol CTZ from surface to FL 65 and the Bristol CTA from 1500 ft altitude to FL 65, it is not directly connected to the airways system. The southern edge of Airway G1 is situated about 7 NM N of the CTA with a base of FL 75. Between the two is the Cotswold CTA, its base being FL 105. An abbreviated clearance procedure exists between Bristol ATC and the LATCC BRS Sector, whereby ac joining Airway G1 are to be level FL 80 at WOTAN, necessitating ac being outside CAS for about 7 NM.

The A320 contacted Bristol Approach at 1032, reporting climbing to FL 50 on a radar heading of 090°. The flight was informed that it was receiving a Radar Control Service and was cleared to climb to FL 70. Shortly afterwards it was instructed to resume its own navigation for WOTAN. The A320 reported reaching FL 70 and, in accordance with the procedure with the BRS Sector, it was cleared to FL 80. Although reporting at FL 70 and, therefore, outside CAS, the pilot was not informed of any change of service as is required by MATS Part 1. It is understood that high workload precluded the Bristol APR Controller from routinely co-

ordinating a higher level for the A320 with the BRS Sector. However, estimating that the ac's track to WOTAN would keep it well clear of the 4576 squawk operating to its north east and assuming that the BRS SC would be able to see this ac, she transferred the A320 to the Bristol Sector.

At 1034, the A320 established contact with the BRS Sector reporting reaching FL 80 on course to WOTAN. The SC, who described the workload as medium/heavy at the time of the AIRPROX, instructed the flight to fly a radar heading of 105° and to climb to FL 110. The SC explained that this heading, which resulted in the flight remaining outside CAS for a longer period, was to position the ac on the S side of Airway G1, so as to comply with the standing agreement for exiting the sector. The SC admitted that, in hindsight, she should have informed the pilot of the service being provided, which she considered was a RAS. The change of heading resulted in the A320 turning into conflict with an ac (the Bulldog) squawking 4576 operating south of Airway G1 and showing, on Mode C, between FL 95 and FL 100. The SC commented that she had not observed this squawk, and radar recordings reveal that it only showed intermittently on the Clee Hill Radar and was in an area of high traffic density. She added that, although she had been valid on the sector for about three years, she was not aware of the Bulldog operation and its conspicuity code. To ensure that BRS Suite Controllers are aware of this operation from Colerne, an Operational Notice (OPNOT), number 46/99, was published on 10 May 1999. This included relevant details about the Bulldog unit procedures and a warning that, although Bristol ATC always endeavour to coordinate with the BRS Sector to resolve conflict outside CAS, their workload may preclude them from doing so. "In such instances, Bristol ATC, as with any other radar unit, will transfer joining ac to the sector when they judge that the joining traffic is clear of conflicts assuming that the ac continues as per the airways' joining clearance".

The A320 reported "*TCAS descent*" at 1035:28. At the time the ac was 1.7 NM NW of the

Bulldog and 500 ft below it. The SC said that she did not hear the pilot say TCAS and the RT recording reveals that it was not easy to decipher what was said. STCA activated at about the same time alerting her to the situation. She said she could see the 4576 squawk at FL 100 and, not having heard the TCAS action taken by the pilot, instructed the A320 to turn left for avoiding action and to descend immediately to FL 90 and passed traffic information. Radar recordings show that the A320 passed 0.7 NM N of the Bulldog and 300 ft below.

MATS Part 1, Page 1-36, states that: "Outside controlled airspace it is the responsibility of the pilot to request the radar service he requires. However, if the pilot fails to specify the type of service the controller must ask the pilot which radar service he requires. Pilots must be advised if a radar service commences, terminates or changes when:

- a) they are operating outside or,
- b) they cross the boundary of controlled airspace".

On the same page MATS Part 1 defines the relevant part of a RAS as an air traffic radar service in which the controller will 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 conflict.

HQ PTC comments that the Bulldog pilot appears to have been operating under VFR in Class G airspace and in accordance with the LOA between his unit and Bristol ATC. He saw and remained clear of the Airbus.

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 discussed the lack of information passed either by Bristol APP or the LATCC BRS SC to the A320 pilot that he was crossing into or operating in Class G airspace. This was one of 3 Airprox in 1999 in this airspace in which the lack of such a warning was a factor. Members agreed that it was important for pilots to be aware when they entered controlled airspace (when controllers would be responsible for their separation) and when they entered Class G airspace (when they themselves were primarily responsible for their separation from other traffic and would need to look out for it). A view was expressed that it was unprofessional for airline pilots not to be aware of the classification of the airspace they were operating in, which would indicate inadequate route briefing procedures. Being a safety-critical issue, controllers' orders dictate that controllers must clarify the airspace/control status with pilots whenever this status changes. However, a number of Airprox investigations disclose that controllers sometimes omit to do this. A view was expressed that in the circumstances of this Airprox, involving a short transit of Class G airspace before a change of frequency and in a busy ATC situation, it was not always possible to carry out the relatively lengthy RT exchanges involved. However, members agreed that it was unsatisfactory to omit the procedure and suggested that the Chairman should discuss with relevant departments to see if orders and/or regulations remained practicable in the traffic levels now experienced, or if another way of achieving the aim should be devised.

Whether or not the A320 pilot was aware of it, the LATCC BRS SC understood that she was providing a Radar Advisory Service. Radar recordings of the Clee Hill and Heathrow radars both showed the Bulldog consistently for some time before the A320 left the Bristol CTA and the Board considered it more likely that the SC had not seen it; this was due perhaps to the radar scale selected or label clutter from other ac, rather than its absence from the screen. Members agreed that the Bristol controller had not handed the A320 over while it was in conflict and that the cause of the Airprox was that the BRS SC had vectored it into conflict with the Bulldog which was outside controlled

airspace. Furthermore, they agreed that the A320's TCAS and the Bulldog pilot's lookout had combined to remove any risk of the ac colliding.

The Board considered that it would be advisable for the A320 pilot's company to

review their route brief for the sector in question and confirm that details of the Class G airspace between Bristol and the airways structure, and the relevant Air Traffic Services outside controlled airspace were included.

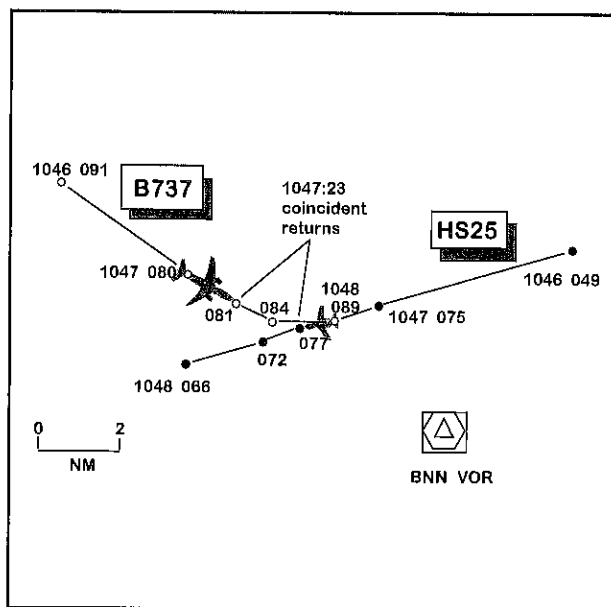
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The BRS SC vectored the A320 into conflict with the Bulldog outside controlled airspace.

AIRPROX REPORT No 60/99

Date/Time: 30 Apr 1047
Position: N5146 W0040 (5 NM NW BNN)
Airspace: LTMA (Class: A)
Reporting Aircraft Reported Aircraft
Type: B737 - 500 HS125
Operator: CAT Civ Exec
Alt/FL: FL 80 ↑ FL 70
Weather VMC VMC
Visibility: >10 km 50 NM
Reported Separation:
 >1 NM H/1.5NM 500 ft
Recorded Separation:
 1.5 NM/400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports that he was heading 120° at FL 80 under the control of LATCC on 119.72 while inbound to Heathrow from Manchester. The visibility was over 10 km in VMC. When about 3 NM from BNN, ATC instructed him to climb to FL 90 and to turn L heading 090° for avoiding action. He disconnected the autopilot and followed the instructions, whereupon a business jet was seen passing below and to the R about 1 NM away. The pilot does not estimate the vertical separation nor give an assessment of risk.

Following the incident he regained FL 80 and entered the holding pattern at BNN.

THE HS125 PILOT reports that he was flying the ac as Captain, climbing out from Luton for Cannes under the control of LATCC. Cockpit workload was high. The visibility was 50 km in VMC. Unknown to him the FO had received and acknowledged ATC instructions to level at FL 70 and had entered FL 70 in the altitude alerter window. The Captain, meanwhile, had mistakenly taken another ac's clearance to FL 150 as his own and continued the climb through

FL 70. The altitude alerter audio warning was operating very faintly and was not heard by either pilot (this defect has since been rectified). (UKAB Note 1: Analysis of the RT transcript for LATCC TC NW Deps (119.775) reveals no indication of any other ac on frequency at the time being passed a clearance to climb to FL 150. There is also no evidence of a readback by the Captain of the HS125 of any ATC instruction to climb to FL 150).

Prior to passing FL 70 the Captain saw the other ac, a B737, about 5 NM away and remarked to the FO that he thought it would pass close behind on their present flight paths. Simultaneously, ATC advised him of the "level bust" and instructed an immediate descent to FL 70, with which he complied. His altimeter had read FL 75 at the flight path apogee and he estimated that the other ac passed about 1.5 NM behind them and about 500 ft above with a medium risk of collision.

The pilot acknowledges that CRM on this flight had been less than adequate. Factors contributing to this, in his opinion, were the excellent weather, which facilitated external scanning of the area for other ac, including the B737, and the unfortunate failure of the altitude alerter audio system to provide an adequate warning.

The HS125 pilot's company advises that a procedural requirement has been re-instituted for the co-pilot to note in writing every Altitude and/or Flight Level change mandated by ATC. Furthermore, prior to or during flight the co-pilot is to confirm with the Pilot Flying every required change of Altitude or Flight Level before adjustment of the Altitude pre-select.

LATCC TC reports, with RT transcripts, that the B737 was released and transferred from NW Deps to the Heathrow Director maintaining FL 80. The HS125 pilot first called NW Deps at 5000 ft, having departed from Luton on a CPT 3C SID, and a few moments later the pilot was cleared to climb to FL 70. This instruction was correctly acknowledged. Shortly afterwards the ac was observed on radar to be climbing through FL 72 and the pilot was instructed to

descend immediately to FL 70; traffic information was passed to him on the B737. The HS125 pilot was asked to confirm his cleared level, to which he replied FL 70 and explained that there had been a "mix-up" in the cockpit.

The B737 called the Heathrow INT S Director when about to enter the holding pattern at BNN at FL 80. The STCA then activated against the HS125 which was indicating FL 74 climbing. The Director immediately instructed the B737 pilot to climb and passed an avoiding heading; there was no readback to this instruction which was repeated and an acknowledgement obtained. When the confliction was over the B737 was given descent clearance into the BNN stack.

UKAB Note (2): The RT transcript for the Heathrow INT S Director shows that the correct avoiding action phraseology was used when addressing the B737. The TC NW SC explained that he did not use the phrase "avoiding action" because he felt that there was plenty of time for the HS125 to level off; he was subsequently surprised when the ac in fact continued to climb, but by then the pilot had reported having the other ac in sight.

UKAB Note (3): A replay of the LATCC radar at 1046 shows the B737 tracking SE and descending through FL 91 for FL 80 11 NM NW of BNN. At the same time the HS125 is tracking WSW and climbing through FL 49 having just departed from Luton. At 1047 the ac are 4.6 NM apart on converging headings with the B737 level at FL 80 and the HS125 climbing through FL 75. The latter reaches FL 77 Mode C at 1047:23 with the B737 at its 1.30 position range 1.5 NM now indicating FL 81 having climbed in response to the ATC avoiding instructions. The B737 begins a L turn onto E and at 1047:35 the ac pass starboard to starboard 0.6 NM apart; however, by this time standard vertical separation has been achieved as the B737 climbs through FL 84 and the HS125 descends through FL 72. (Minimum separation distances are therefore in the order of 1.5 NM and 400 ft).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that the NW Deps controller had been remarkably alert to spot so promptly the HS125 climbing through its cleared level and to take appropriate action. There was no

explanation available as to why the HS125 pilot thought he was cleared to FL 150. If he had heard such a clearance for another ac on another radio, an acknowledgement did not appear on the transcript for the NW Deps frequency, unlike the acknowledgement to climb to FL 70 which did. The Board agreed there were no other complications to consider and that the cause of the Airprox was that the HS125 pilot climbed above his cleared level. Members assessed that all involved on the ground and in the air had reacted in time to remove any risk of the ac actually colliding.

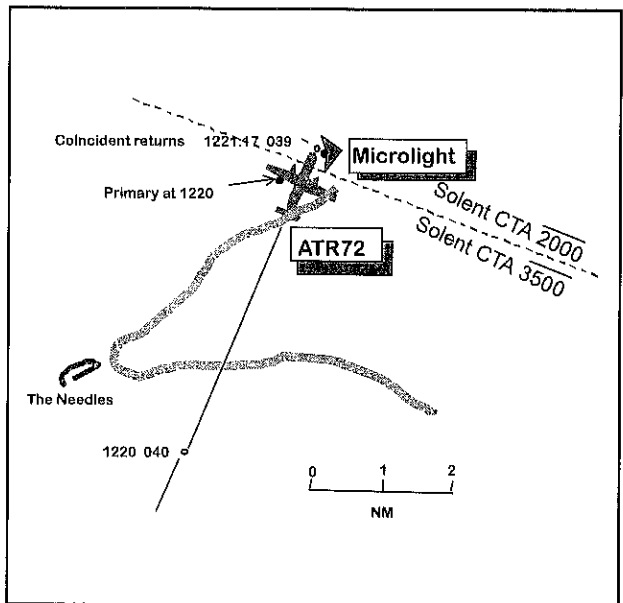
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The HS125 pilot climbed above his cleared level.

AIRPROX REPORT No 61/99

<u>Date/Time:</u>	3 May 1221	
<u>Position:</u>	N5043 W0130 (5 NM NE Needles)	
<u>Airspace:</u>	CTA	(Class: D)
	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
<u>Type:</u>	ATR 72	Microlight
<u>Operator:</u>	CAT	Civ Pte
<u>Alt/FL:</u>	FL 40	3500 - 1900 ft (QNH)
<u>Weather</u>	VMC	VMC HAZE
<u>Visibility:</u>	5 km	15 km
<u>Reported Separation:</u>	30 m H/ zero V	
<u>Recorded Separation:</u>	<200 m H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR 72 PILOT reports that he was routing from Jersey to Southampton at 4000 ft (QNH) under the control of Solent Radar on 120:22; he was heading 035° at 210 kt. The visibility was 5 km in VMC. When at position 5042N 0134W a microlight ac was seen at his 1230 0.5 NM away at co-altitude. There was no time to take avoiding action and the ac passed

to their starboard side on an easterly heading; it was seen and remarked on by several passengers.

THE MICROLIGHT PILOT reports that he departed from Sandown at 1145 and made a clockwise circumnavigation of the Isle of Wight at about 55 kt, landing back at Sandown at

1255. The visibility was 15 km in hazy VMC. At no time during the entire flight did he see another ac. His cruising altitude was 3500 ft.

(UKAB Note (1): the pilot states that at some point he descended to 1900 ft but does not specify where this was).

UKAB Note (2): A replay of the Pease Pottage radar shows a strong primary return leaving the Sandown area at 1155 on a southerly heading and subsequently following the coastline around the island in a clockwise direction. At 1221:17 the ac is about 5 NM NE of the Needles heading E at which point it is overflown by the ATR 72, identified by its 1211 squawk, which is tracking NNE towards Southampton at FL 39 Mode C (equivalent to 4035 ft QNH). This occurs just inside the part of the solent CTA where the base is 2000 ft. Lateral separation is difficult to judge because the closest point between the ac occurs between radar sweeps; after the second sweep the return has moved from just W to just E of the ATR 72. The returns are not seen actually to merge but the lateral distance is estimated to be less than 200 m.

SOLENT RADAR reports, with RT transcript, that LATCC Hurn Sector released the ATR 72 pilot descending to FL 50. The ac was subsequently descended to 4000 ft on the Southampton QNH (1019) when 30 NM from Southampton, and then to 3000 ft at 17 NM range; no traffic other than the ATR 72 was known to be in the area. On receiving the latter clearance the ATR 72 pilot reported passing within 100 ft of a microlight ac. An intermittent primary return was then seen on radar about 3 NM W of Thorness Bay on the Isle of Wight.

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 air traffic controller involved.

The Board felt it reasonable to assume that the microlight pilot was based on the Isle of Wight and therefore should have been aware of the extent of CAS dimensions in the area. A GA member commented that if the microlight maintained 3500 ft it would inevitably have infringed the Solent CTA during the latter part of its flight. It was not known at what point the microlight descended to the 1900 ft claimed by its pilot, presumably in order to remain clear of CAS, but since the pilots and passengers of the ATR 72 perceived it to be at a similar level to themselves (Mode C 039 - equivalent to 4035 ft QNH) it follows that the microlight had not yet descended when it passed in front of the ATR 72. Indeed, the microlight had exceeded its declared cruising altitude by some 500 ft and therefore would have been within CAS vertical limits whichever part of the Solent CTA it was flying in. The Board concluded that the Microlight's infringement of the Solent CTA caused the Airprox. Members were surprised that the microlight pilot did not hear or see the ATR 72 as it approached at close range from his R and then passed behind him.

With regard to risk, members noted that the microlight was not seen by the ATR 72 pilot until it had passed his 12 o'clock half a mile ahead precluding any opportunity to take earlier avoiding action. This, together with the microlight pilot's non-sighting of the ATR 72, led the Board to conclude that the safety of both ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The microlight pilot infringed the Solent CTA and did not see the ATR 72.

AIRPROX REPORT No 62/99

Date/Time: 03 May 0946

Position: N5123 W0121 (1.5 NM SW

Newbury)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: PA 28 (A) PA 28 (B)

Operator: Civ Trg Civ Trg

Alt/FL: 2900 ft 3000 ft
(QNH 1021 mb) (RPS 1020 mb)

Weather VMC CLOC VMC

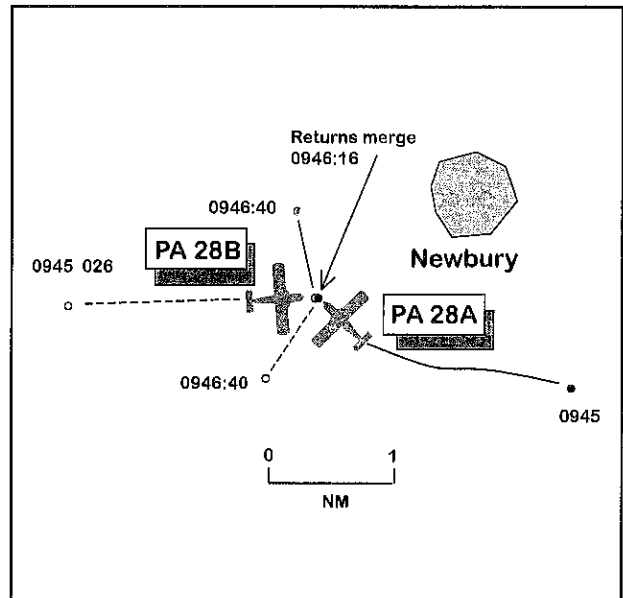
Visibility: 5 NM 7 km

Reported Separation:

50 ft, 30 m H/zero ft V

Recorded Separation:

zero H



BOTH PILOTS FILED

ART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 (A) PILOT, an instructor, reports that he was conducting a type conversion and introduction to UK airspace with a student who was a newly qualified UK PPL holder. Having departed from Blackbushe, he contacted Farnborough on 125.25 stating that he would be operating in the local area between 1000 and 3000 ft. Visibility was adequate for the exercise but careful attention to landmarks was required to maintain visual navigation. He was given the Farnborough QNH, allocated an SSR Code and provided with a FIS.

Well into the detail, he decided to climb to 4500 ft to the W of Newbury to demonstrate the ac's stall characteristics. However, before he could notify his intentions the Farnborough controller requested his current altitude, which he reported as 2900 ft. The controller then instructed him to remain below 3000 ft to enable him to co-ordinate jet traffic inbound to Farnborough. He therefore continued in a generally WNW direction, maintaining his altitude and pointing out prominent ground features to his student who was flying the ac.

When slightly W of Newbury, he suddenly saw a white PA28 almost head-on to him in a steeply banked attitude at his 11 o'clock high position 150 – 200 m away, apparently descending on a collision course; it was close enough for both cooling intakes on either side of the propeller to be clearly visible. He immediately took control, rolling to the R and pulling, but he doubted whether a significant change of track took place in the short time it took the ac to pass down his port side. Some minutes later, having regained his composure, he informed the controller of an Airprox. He presumed from his student's demeanour that he had not seen the other ac.

The other PA28 had appeared in a position and altitude, which suggested that it had previously been above, and to port of him on converging course. It was hidden from his view by the metal cabin roof of his ac. Assuming that the other ac was being flown from the LHS, its pilot's view may also have been similarly obstructed.

The pilot makes special mention in his report that under such circumstances a FIS provides no protection from traffic at similar levels. Moreover, the necessity to monitor the frequency added to the already high workload being experienced in operating the ac, navigating in reduced visibility, instructing the student and monitoring his performance, and

keeping a lookout. Furthermore, in his opinion, constraining FIS ac to the lower levels so that other ac receiving a RAS can benefit from specified information tends to increase the density of the FIS traffic and thus increases the likelihood of conflict.

THE PA28 (B) PILOT reports that he was carrying out a navigation exercise from Old Sarum with a student, using Petersfield and Newbury as turning points. He realised from the NOTAM and weather information prior to departure that the area would be extremely busy owing to an event at Popham and this, together with the usual Lasham traffic and extra activity on the bank holiday, would make good lookout essential - particularly as the visibility was only about 7 km.

Having departed from Old Sarum he was promptly cleared by Southampton to transit their airspace at 3000 ft VFR. Despite having been given traffic information by Solent Radar on another ac it was not seen until it was within 2 NM, which reinforced the need for good lookout. When over Petersfield, the student set course for Newbury at 110 kt and 3000 ft (QNH 1020), and changed to Farnborough LARS for a FIS and MATZ penetration. Arriving over the S side of Newbury at about 0945, he began pointing out significant landmarks in the area when the student suddenly banked sharply to the R. He then saw a white Cherokee about 300 m ahead on a reciprocal track at the same level. Their turn was sufficient to allow the other ac, which did not appear to take any avoiding action, to pass about 30 m to their port side. He believed that without the turn there would have been a collision. The pilot comments that at the time of the incident Farnborough LARS was very busy and as he was only receiving a FIS it was incumbent on him to see and avoid other ac. He reported an Airprox to Farnborough on 125.25.

FARNBOROUGH ATC reports that PA28 (A) was operating to the W of Blackbushe between 1000 ft and 3000 ft under a FIS. The ac was subsequently restricted to fly not above 3000 ft owing to an IFR ac leaving the airway system to the NW of Farnborough. This limitation was

intended as a precaution rather than a restriction as the PA28's instructor had previously declared his intention to operate between 1000 and 3000 ft.

The PA28 (B) was on a training detail from Old Sarum at 3000 ft and receiving a FIS. At about 0940 the pilot of PA28 (A) reported an Airprox over Newbury but was undecided whether he should file a report. Shortly afterwards the pilot of PA28 (B) also reported taking avoiding action at a similar location but did not file an Airprox. The LARS frequency was extremely busy with up to 15 ac as well as many others in the area not working the frequency.

The Manager ATS Farnborough comments that the LARS Controller had justifiably limited the FIS because of the number of ac operating in the area. He did not observe the conflict because his attention was being applied to other situations on his radar screen.

ATSI comments that it was May Bank Holiday and the Farnborough LARS was so busy with transit VFR traffic that the extent of the service was limited to a FIS. The pilot of PA28 (B) had not spoken to ATC for sometime, having been on the frequency before PA28 (A) called in the area at about 0945. It is considered that no ATC factors contributed to this incident.

UKAB Note: A replay of the Heathrow radar at 0945 shows the subject ac as they converge on a point about 1.5 NM SW of Newbury, PA28 (A) tracking West (no Mode C) and PA28 (B) East indicating 2600 ft Mode C. Initially the tracks are displaced laterally by about 0.75 NM but shortly before the Airprox PA28 (A) begins turning slowly R onto a northwesterly heading towards PA28 (B)'s track and at 0946:16 the ac returns merge. Following the encounter, PA28 (B) appears on a southwesterly track having turned very sharply R through about 120°, and the other ac emerges on a northerly track.

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 considered this a very serious Airprox and commended the student pilot of PA28(B) whose action almost certainly prevented a collision.

The Board addressed the points raised by the pilot of PA28 (A) concerning the limitations of a FIS in Class G airspace and the restriction placed on his operating altitude. It seemed unlikely that the Airprox would have occurred had PA28 (A) climbed above 3000 ft, as the pilot wished. Moreover, under a FIS in open airspace there was no obligation to adhere to the ATC 'request' to limit his altitude. However, such requests were not unusual, forming a routine exchange of information between pilots and ATC to promote flight safety in the FIR by using all available information, including radar. Occasionally these might entail temporary restrictions to operating parameters, such as maximum altitudes, and while in this instance the request resulted in a conflict at 3000 ft it might also have prevented one against the radar traffic working Farnborough; thus, though not a catch-all process, the system is one which generally works to the advantage of all FIR airspace users. As the pilot of PA28 (A) had initially declared that he would be operating in the 1000 ft – 3000 ft band it was felt that the request on this occasion was not unreasonable. However, members agreed the point being made on increased traffic density within an

airspace layer, which is likely to increase the chance of a conflict. Nonetheless, the bottom line when operating under the 'see and avoid' principle was to maintain an effective lookout throughout.

A GA member added that the various tasks listed by the PA28 (A) instructor were part and parcel of any flight instructor's daily routine. Undoubtedly cockpit workload in the training environment can be very high and the 'heads in' nature of some instructional activities could inhibit an effective lookout if allowed to. Members felt that in this instance both crews might to some extent have been preoccupied with navigation in less than ideal visibility, perhaps allowing their concentration on identifying surface features unwittingly to degrade their lookout. Notwithstanding all these considerations, however, it remained the pilots' prime responsibility to exercise an effective lookout and members felt that in this instance the pilots should have been able to see each other early enough to ensure that their ac did not conflict; the Board concluded that their late sightings were the cause of the Airprox.

While one member thought that PA28 (B)'s late turn effectively resolved the conflict, though still compromising the safety of the ac, the majority of the Board were convinced that there was an actual risk of collision despite this action. This was supported by the graphic accounts of the pilots, both of whom gave minimal miss distances and high risk assessments, and the radar recording which showed no lateral separation at the point of conflict.

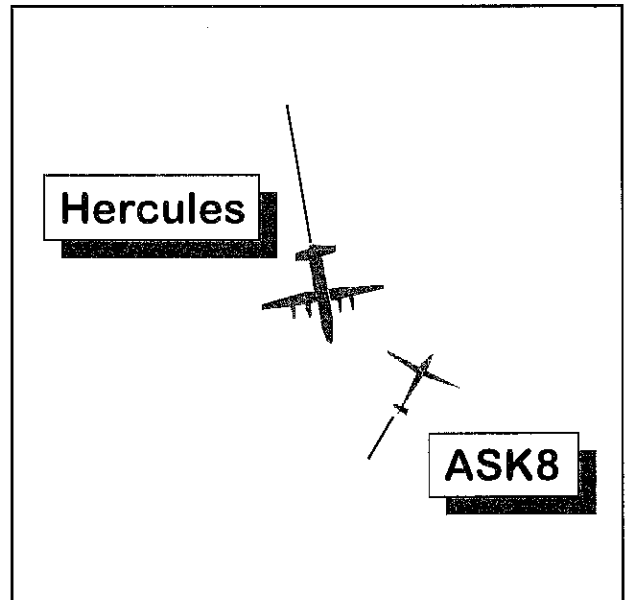
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: Late sighting by both pilots.

AIRPROX REPORT No 63/99

Date/Time: 5 May 1100
Position: N5142 W0207 (Aston Down - elev 600 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: ASK 8 Glider Hercules
Operator: Civ Club HQ STC
Alt/FL: 1700 ft 2000 ft
(agl) (QFE 990 mb)
Weather VMC CLNC VMC CLOC
Visibility: 15 NM 10 km+
Reported Separation:
300 m H, 150 ft V/0.5 NM, 500 ft
Recorded Separation:
400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 8 PILOT reports heading 030° at 55 kt on a reverse autotow launch from Aston Down. Approaching the top of the launch, he saw a Hercules closing from his 10 o'clock. He released the cable at about the same time as the Hercules made a small track correction to its right; he was then about 1700 ft above the airfield. The Hercules passed about 300 m away and about 200 ft higher; there had been a medium to high risk of collision.

His CFI added that the Cotswold gliding club is licensed to launch by cable up to 3000 ft above airfield level (3600 ft amsl) as shown on the CAA topographical charts. The track of the Hercules was directly over the airfield, and cables are not always visible, hence the club's concern.

THE HERCULES PILOT reports heading 180° at 230 kt, recovering to Lyneham. He had levelled at 2000 ft on instruction from Lyneham ATC and being familiar with the 2 glider sites on the ridge ahead, he warned his crew accordingly. As he finished speaking he saw the Aston Down launch point to the right, then turning to look ahead he saw the glider climbing on the launch cable. Although it must have been disconcerting for the glider pilot, still being

on the cable, he did not think there had been any danger of collision. They passed 0.5 NM behind and 500 ft above the glider.

HQ MATO reports that the C130 was inbound to Lyneham from the N for a visual recovery, descending from FL 60 to 2000 ft (Lyneham QFE 990 mb) and receiving a RIS from Lyneham Approach (APP) on frequency 359.5. As the C130 pilot reported level at 2000 ft, he added that Aston Down gliding site was active adding "...they look to be winching up to about 1500 ft". APP and the ATC Supervisor both independently checked the radar picture, but saw no contacts in the vicinity of the site. Shortly afterwards, the C130 pilot changed to the Lyneham Tower frequency. Later that day, Lyneham ATC was advised by AIS (Mil) that an Airprox had been filed by the glider pilot.

The LATCC Clee Hill radar recording clearly shows the transit of the C130 (squawking 4501) tracking about 170° directly overhead Aston Down. At 1100:05, its Mode C levels at an indicated FL 28, which equates to 2700 ft QNH. A primary contact appears in the C130's 12 o'clock, range 1 NM, but fades in the subsequent radar sweep. In the following frame, timed at 1100:22, the C130 passes just under 0.25 NM W of the primary contact's previous position. A primary contact reappears

0.25 NM NW of the previous position at 1101:04, but fades again in the next sweep.

The glider was not evident on the Watchman radar display at Lyneham, therefore traffic information could not be provided to the C130 pilot. Contacts such as gliders often do not show on radar, due to their size, speed and material of construction, and particularly when launching from a cable, as this glider was, when they climb rapidly but at a relatively low groundspeed, resulting in the contact being removed by in-built radar filters. In addition, the Aston Down area is within a small but significant area of known poor radar cover and, for this reason, ac recovering visually to Lyneham are normally restricted to not below 2000 ft until within 10 NM, as in this case.

There are a large number of gliding, hang gliding, microlight and parachute dropping areas in the vicinity of Lyneham, but it would be impracticable to mark all these on the radar displays. It has however, been noted that Aston Down is advertised within the UK LF documentation and on aeronautical charts as being active with cables up to 3000 ft agl. Although it lies almost directly in the natural gap between Kemble and Babdown parachuting areas (both active up to FL 150), consideration is being given to specifically marking this site on the radar.

HQ STC comments that the Hercules crew were aware of their proximity to Aston Down and had adjusted their lookout pattern accordingly. Having seen a glider on the launch cable the crew made a small track correction to increase separation. The learning point for users of 'see and avoid' airspace is well

rehearsed; effective lookout requires a proactive search pattern and an awareness of specific threats to each stage of flight.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was advised that Lyneham had decided not to include a marking of the Aston Down site on their radar picture because it was already very cluttered and controllers were well aware of its location and operating altitude anyway. Members then suggested that if this was so, then it appeared to be a questionable decision to direct the Hercules along the track it took below 3000 ft. They also thought it odd for the pilot to fly there since he had personal knowledge of the gliding operation. The HQ MATO adviser said that the former view would be conveyed to Lyneham ATC. Members understood that the sky involved was free airspace and the Hercules had every right to fly where he did but that in view of the known hazard they thought it was not particularly sensible, if it was not essential, to fly through at that height. The Board concluded that the cause of the Airprox was that the Hercules pilot flew over the known glider site and sufficiently close to the glider to cause its pilot to abandon his launch. Concerning the level of risk, members agreed that both pilots had seen and avoided each other in time to avoid any risk of them actually colliding.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Hercules pilot flew sufficiently close to the glider, over a known glider site, to cause its pilot concern for his safety.

AIRPROX REPORT No 64/99

Date/Time: 03 May 1052

Position: N5128 W0135 (5 NM NW

Airspace: FIR (Class: G) Hungerford)

Type: PA28 (Reporting Aircraft) B200 (Reported Aircraft)

Operator: Civ Pte (Reporting Aircraft) Civ Comm (Reported Aircraft)

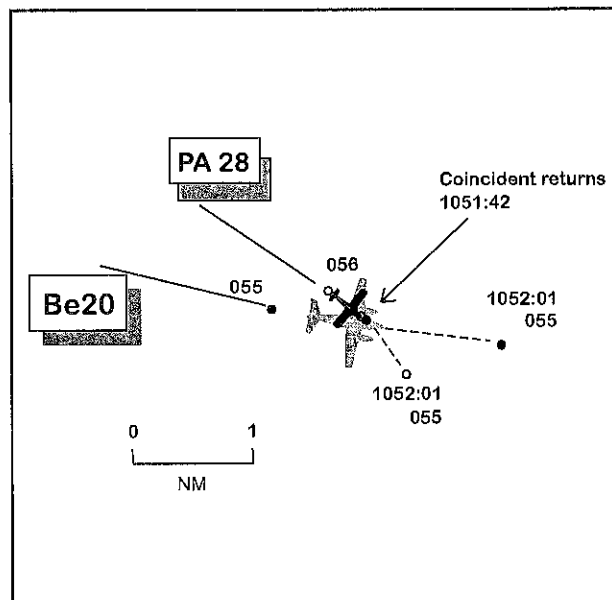
Alt/FL: 5300 ft (Reporting Aircraft) FL 55 (Reported Aircraft)
(RPS 1021 mb)

Weather: VMC CLAC (Reporting Aircraft) VMC (Reported Aircraft)

Visibility: 20 km (Reporting Aircraft) > 10 km (Reported Aircraft)

Reported Separation:
<200 ft V 200 - 300 ft V

Recorded Separation:
100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was heading 130° at 100 kt and cruising at 5300 ft (RPS 1021) en route from Gloucester to Deauville in VMC. He was squawking with Mode C and receiving a FIS from Brize Norton on 134.3. The visibility, above a haze layer below, was 20 km.

When about 2.5 NM NW of Hungerford, he and his rear seat passenger heard the sound of engines; less than 1 sec later a low wing white twin engined ac appeared directly ahead on a similar track having approached from his rear and passed less than 200 ft directly beneath his ac. After passing him it appeared to climb slightly and he thought its pilot had probably seen him late and dived to avoid him. He considered that there had been a major risk of collision and reported an Airprox to Brize Norton by RT. No transmissions from the other ac were heard on the Brize frequency.

THE B200 PILOT reports that he was en route from Dublin to Fairoaks at FL 55, squawking with Mode C and receiving a RIS from Lyneham on 123.4. The visibility was over 10 km in VMC. When on a southeasterly heading at 220 kt in the vicinity of Hungerford, he was given traffic information on several ac, one of which he

identified as a PA28 some 0.5 NM away. Although he saw this ac rather late, he assessed that there was no risk of collision and no avoiding action was taken as he felt this could be detrimental to safety if the other ac also changed course. He passed about 0.5 NM from the PA28 with 200-300 ft of vertical separation.

HQ MATO reports that the pilot of the PA28 freecalled Brize Norton LARS (BZN) at 1032:32 requesting a FIS having just departed Gloucestershire Airport. BZN provided the FIS, issued a squawk of 3711 and suggested an initial climb to FL 60, rather than the 6500 ft that the pilot had stated in his first call, in order to keep the ac below CAS; the controller could not recollect observing a Mode C readout from the ac. The remainder of the transit was uneventful with no RT exchanges between BZN and the PA28 pilot until 1051:38, when BZN informed the PA28 pilot "C/S your position to the west of Membury Mast by one mile, squawk 7000". This was acknowledged by the PA28 pilot, who then added at 1052:03 "...for information we've just had an ac pass underneath us, I estimate at less than 200 ft below us on a heading of approximately 100". BZN asked the PA28 pilot to confirm the position of the other ac and added that he saw "...nothing on radar". At 1052:42 BZN transmitted "C/S there's no contacts in your.....in fact there's a pop up

contact in your 12 o'clock now, one mile manoeuvring no height – could be weather though". The ATC workload was assessed to be light to moderate at the time, with 5 ac on frequency and all equipment reported as serviceable. Two days later, the BZN Supervisor was contacted by telephone by a person who stated that he wished to file an Airprox; it later transpired that this call was made by one of the passengers in the PA28. Tracing action subsequently revealed that the other ac, a B200, had been working Lyneham ATC.

Following a prenote from Cardiff, the pilot of the Be200 established communication with Lyneham Zone (LYE) at 1044:31 whilst still within AWY G1 (base FL 65), routeing from Dublin to Fairoaks and descending to FL 70. The ac was cleared to FL 50, which took it into the Lyneham CTA. The provision of Radar Control is implicit with clearances into the Lyneham CTA and, in accordance with JSP318A, does not need to be stated on RT. LYE was extremely busy, both with RT and landline calls, and there were at least ten other ac on frequency during this period. At 1046:37, the Be200's descent was stopped at FL 55 due to northbound traffic within the CTA at FL 50. At 1049:32 LYE transmitted to the Be200 *"C/S traffic left 11 o'clock 5 miles crossing left to right is indicating at FL 60"*, which referred to the PA28. By this time the Be200 had left the CTA but LYE had not yet ascertained the type of service required outside CAS. Following this an almost continuous period of RT exchanges with other ac took place until 1051:07, when LYE transmitted *"(Be200 C/S) traffic called before is passing through your 12 o'clock 2 miles, left to right, indicating slightly above at FL 57"*, to which the Be200 pilot replied, *"I think we have contact with that traffic, C/S"*. The remainder of the transit continued uneventfully and the Be200 left the frequency at 1053:52, the pilot having made no reference to an incident. Lyneham ATC were informed of the Airprox by HQ MATO Staff once tracing action had confirmed their involvement, however this was 8 days after the event.

The LATCC Pease Pottage radar recording shows that this Airprox occurred just before 1051:42 at a position 240°/5.5 NM from the reporting point KENET. The PA28 is tracking SE, squawking 3711 and indicating FL 59 Mode C. The Be200 is shown squawking 1444 and following the track of G1 about 1 NM N of the airway's southern edge, maintaining FL 55 throughout; the Be200's groundspeed is approximately twice that of the PA28. The first indication of a descent by the PA28 is shown at 1049:51, in the Be200's 11:30 position at 4 NM, as the Mode C indicates FL 58 and then, 35 sec later, FL 57. The closest point of approach observed on radar is shown in the radar sweeps timed at 1051:36 and 1051:42. The first of these frames shows the PA28 indicating FL 56 with the Be200 in its R 4 o'clock, indicating FL 55 and with the radar contacts about to overlap. The next frame shows the Be200 emerging from the PA28's 12 o'clock with 100 ft vertical separation still indicated; neither ac appears to alter course. As the ac separate, the PA28's Mode C indicates FL 55, and then FL 54 at 1052:19, where it appears to level off. The PA28's squawk changes to 7000 in the frame timed at 1052:07.

BZN provided a FIS to the PA28 pilot as requested and thus, although a squawk was allocated, the controller had no responsibility for monitoring the flight or for providing separation from other ac. As an Airprox was not filed at the time, the radar settings and SSR source used were not noted, therefore the reason why the Be200 was not seen by the BZN controller remains unknown. Although the controller remembered specifically looking, the only contacts seen were perceived to be weather returns. It is not known why the PA28 pilot descended from FL 60, although under a FIS he was not required to inform the controller.

The LYE controller involved was on leave when Lyneham ATC were informed of the Airprox and 3 weeks elapsed before he was able to provide a statement. He therefore had little recollection of events other than the sheer volume of traffic during the morning, receiving the Be200 off airways, an event which occurred infrequently, and changing the ac's SSR code to a Lyneham

squawk very late. It is normal practice to establish the type of service a pilot requires as the ac leaves the Lyneham CTA, however due to the number of RT exchanges, LYE had no chance to do this and it would have been impractical to have automatically provided the Be200 pilot with a RAS. The traffic information calls at 5 NM and 2 NM, in the style of a RIS, were accurate and resulted in the Be200 pilot stating that he believed he had visual contact. The controller was in a busy situation and, given the circumstances, it is considered that an appropriate level of service was provided.

This Airprox has highlighted the need to report flight safety occurrences promptly in order to ensure that the appropriate evidence is collated quickly whilst events are fresh in the mind, rather than having to recall apparently uneventful periods at a later date.

THE CAA FLIGHT OPERATIONS INSPECTORATE comments that the Be200 maintained a steady heading throughout the encounter; its pilot was informed twice by Lyneham of the position of the PA28 but did not spot it until it was 0.5 NM away and too late to take avoiding action. The PA28 had unexpectedly descended from its cruising level of FL 60. Recorded radar evidence shows that the ac converged with 100 ft vertical separation and it is considered fortuitous that they did not collide.

UKAB Note: The incident occurred on 3 May but an Airprox report was not completed by the reporting PA28 pilot until 10 May and this was not received by UKAB staff until 17 May.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A MATO adviser said that it was not known why the Be200 was not apparent on the Brize radar.

One possible explanation might be that the track flown by the Be200 was at right angles to the Brize radar head making it subject to a radar phenomenon known as 'tangential fade'. However, this was not a problem usually associated with the Watchman radar. Members commended the Lyneham controller for passing timely traffic information to the Be200 pilot despite the very busy conditions.

The Board then carefully considered the information provided by the Be200 pilot, who reported seeing the PA28 some 0.5 NM away and that he had felt it unwise to take avoiding action. GA pilot members thought that the distance should have been enough to allow him to overtake safely in accordance with the Rules of the Air (R17). In the event, analysis of the radar recording showed that separation between the ac as the Be200 passed directly under the PA28 was 100 ft Mode C. Given the ± 100 ft accuracy of serviceable Mode C equipment, actual separation could therefore have been between 0 and 300 ft. This broadly accords with the vertical estimates quoted by the pilots. However, the recording does not support the Be200 pilot's claim that he passed within 0.5 NM laterally. Members were puzzled that a pilot would consciously choose to fly so close beneath another ac from behind and some wondered if the Be200 pilot had seen the PA28 at all (the RT transcript shows that he only "thought" he saw it), or that he saw it too late to take avoiding action. But that was conjecture and so members agreed that if he had indeed seen the PA28 some 800 - 900 m away he caused the Airprox by not complying with the Rules of the Air for overtaking and flew close enough to the PA28 to cause concern to its pilot.

Members were divided over the degree of risk. Those who believed that the Be200 pilot had not seen the PA28, or seen it late, thought there had been an actual risk of collision. However, notwithstanding the apparent absence of any lateral separation, the majority felt that vertical separation lay somewhere between the 2 pilots' estimates and this, in their opinion, precluded an actual risk of collision. As a result, the Board

concluded that the encounter was close enough to compromise the safety of both ac.

Some members commented on the descent from FL 60 by the PA28 which brought it down towards the level of the Be200 (FL 55 was the correct quadrantal level for both ac). As the PA28 was receiving a FIS from Brize and

operating in Class G Airspace, there was no requirement for him to advise ATC of any change of FL. However, ATCO members pointed out that it was in everyone's interest to pass relevant information on changes to levels or headings if pilots wished to obtain maximum benefit from an ATC service.

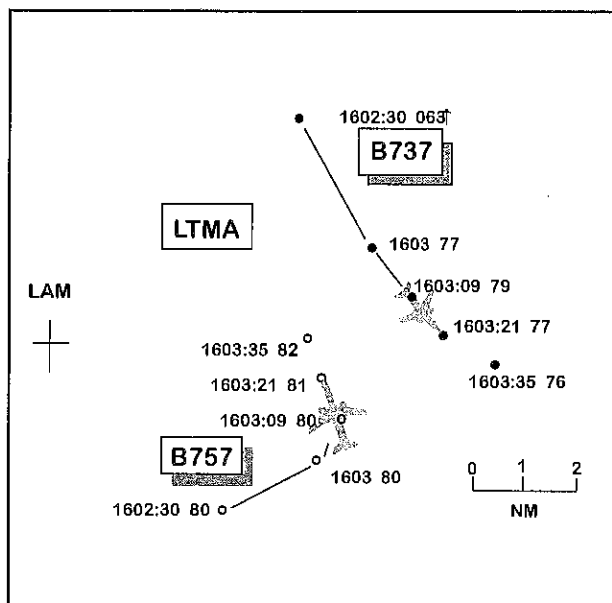
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Be200 pilot did not comply with R17 of the Rules of the Air and flew sufficiently close to the PA28 to cause concern to its pilot.

AIRPROX REPORT No 65/99

Date/Time: 06 May 1603
Position: N5138 E0020 (6.5 NM E LAM)
Airspace: LTMA (Class: A)
Reporting Aircraft Reported Aircraft
Type: B757 B737 - 300
Operator: CAT CAT
Alt/FL: FL 80 ↑ FL 80
Weather VMC VMC
Visibility: 10 km
Reported Separation:
 0 ft V/ 1 NM H/100 ft/ 3 NM
Recorded Separation:
 2.4 NM/400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports that he was in the LAM holding pattern at FL 80 under radar control from LATCC on 119·77. His speed was 210 kt. When in a L turn through a northerly heading, ATC advised him of traffic at his 12 o'clock at the same level and instructed him to tighten his turn. The other ac was then seen and a TCAS RA followed demanding climb, which was carried out to FL 83. He estimated the other ac, a B737, passed about 1 NM to his starboard side at co-altitude and he thought

there had been a high risk of collision. He reported an Airprox to LATCC who advised him that they would also be taking reporting action.

THE B737-300 PILOT reports that he was heading 150° at 280 kt and squawking 0552 while under the control of LATCC on 118·82, climbing to FL 80 on a DVR 6R SID from Stansted. The visibility was over 10 km in VMC. Approaching FL 80 he received a TCAS TA and at the same time ATC instructed "C/S turn L 090 without delay – conflicting traffic." The other ac

was then seen at a similar level 2 – 3 NM to their starboard side turning away; he thought there had been a medium to high risk of collision. Normal navigation was resumed following the encounter and no further information was received from ATC.

ATSI reports that at the time of the Airprox the controller concerned had only been in position for about three minutes. He was carrying out both the TC NE DEPS and LOREL functions but the workload was light with only two ac on the frequency. He had felt fit and adequately rested and no other factors likely to have adversely affected his performance were identified during the course of the investigation.

The B737 was outbound from Stansted on a DVR 6R SID. This routeing takes ac through the Lambourne (LAM) holding area. The Standing Agreement for the transfer of such traffic to TC SE is that it should be out of 6000 ft climbing to the Minimum Stack Level (MSL). MSL is “..the lowest whole flight level giving a minimum of 1000 ft separation above the transition altitude”. At the time, the Heathrow QNH was 1013 mb which meant that the MSL was FL 70. (If the QNH drops below 1013 mb the MSL becomes FL 80). The TC MATS Pt.2 (NEA 3-4) states the following: -

“To facilitate departures from Stansted, Luton and Northolt routeing via DET, MSL is allocated to TC NE for use by all traffic routeing east of the LAM VOR.”

Thus, on this occasion the lowest holding level at LAM was FL 80 and the TC NE DEPS SC was entitled to climb the B737 to FL 70.

The pilot of the B737 established communication with the TC NE DEPS SC at 1600:40. The flight was climbing to 5000 ft in accordance with its SID. Although well aware of the relevant procedures, the TC NE DEPS SC instructed the B737 to climb to FL 80 in the mistaken belief that it was the MSL. At that time, the B757 was just turning outbound in the LAM hold having left FL 90 descending to FL 80. However, the TC NE DEPS SC did not notice this and, not perceiving any requirement

closely to monitor the situation, he then directed his attention to three ac inbound to the LOREL Sector. He was about to discuss these ac with his colleague on TC East, from whom he would receive them, when the TC LAM SC, sitting alongside, alerted him to the developing conflict. This was just before the STCA activated.

Without hesitation, at 1602:50, the TC NE DEPS SC instructed the B737 pilot to turn L onto heading 90°, using the appropriate ‘avoiding action’ phraseology, and passed traffic information. The pilot responded by indicating that he was visual with the traffic and turning L in accordance with the controller’s instructions. The B737 was TCAS equipped and, in his written report, the captain states that he had received a Traffic Advisory (TA) while being passed avoiding action instructions by ATC.

Meanwhile, the mentor supervising the trainee TC Heathrow INT Director controller in communication with the B757, noticed the B737 climbing above FL 70 and converging with the B757, which was now level at FL 80 and commencing its inbound turn in the hold. The mentor took control of the RT and, at 1602:50, instructed the B757 pilot to tighten his turn, directly back to LAM (the TC NE DEPS SC issued his avoiding actions to the B737 at the same time), and explained that there was traffic in his 12 o’clock at a range of 3 NM which had apparently “bust” its level. The phrase “avoiding action” was not used; nevertheless, the B757 pilot reported the traffic in sight and confirmed that he was making an immediate L turn for LAM. Later the pilot advised the Heathrow controller that he had received a TCAS RA.

The TC NE DEPS SC had been under the impression that the MSL was FL 80. The Heathrow QNH, which determines the MSL, had been fluctuating but, at interview, the SC said that when he took over he had had “low pressure” in mind (i.e. the Heathrow QNH was below 1013 mb). He recalled that the Heathrow QNH had indeed been below 1013 during most of his recent duties, although it had been 1013 mb when he had operated as TC NW earlier in

the day. He was "fairly sure" that the MSL and/or QNH had not been included amongst the items covered during the handover, when he took over TC NE, adding that, in his experience, this was not unusual. In the context of this Airprox, this would have been a significant omission and in contravention of the TC MATS Pt. 2 (GEN 2-17/18 Para.17) which states the following: -

"HANDING OVER/TAKING OVER AN OPERATIONAL POSITION":

The responsibility for the accuracy of a handover lies with the controller vacating an operational position. This does not remove all responsibility from the controller taking over, who should be alert to the possibility of omissions and errors in the information passed to him.

It is essential that the controller taking over the position is fully aware of all relevant information before he is ready to accept responsibility for the operational position. With the introduction of many new systems, some of which can be configured in accordance with individual preference, it is necessary that configuration details are also included in any handover. TC Controllers are to ensure that when taking over an operational position they are fully briefed before taking over responsibility for that position".

(UKAB Note: The MATS Pt 2 then gives a comprehensive list of items of information that are relevant to a controller taking over an operational position; included in this list are the London QNH and the Minimum Stack Level).

The Heathrow QNH is displayed on the radar display and flashes when there is a change; however, the controller concerned felt that the character size was small and the information was not easy to read. The Heathrow QNH is also amongst the items provided on the "CCF Display Information System" (CDIS). The TC NE DEPS SC thought that there was a need for a reminder, in the FPS display, of the MSL and levels available, as there had been prior to the

opening of TC. Heathrow INT controllers do have such a strip in their 'stack' displays, which can be viewed by TC area controllers on CCTV screens, but, according to the controller concerned, these are not easy to see.

The UK Confidential Human Factors Incident Reporting Programme (CHIRP) published a report which describes an almost identical set of circumstances to those which preceded this Airprox. The reporter strongly advocates the reintroduction of strips showing MSL etc. but points out that this proposal was rejected. Since the beginning of 1999, there have been at least two occasions, excluding this Airprox, on which controllers have climbed departures to the wrong level having confused the MSL.

Following the Unit investigation into this Airprox, the author of the unit report made three recommendations to the LATCC Deputy General Manager TC. These are recorded below, together with responses:-

1) "It is recommended that best practice guidelines for handovers be developed for TC sectors where levels may vary with pressure, including a check list of essential items according to the sector".

Response: "DGM TC has accepted and implemented this recommendation".

2) "It is recommended that where controllers are climbing or descending aircraft to a level that varies according to external factors e.g. QNH, that level is prominently displayed on the sector".

Response: "This recommendation has not been accepted. It is the view of DGM TC that enough information is already available on the sector".

3) "It is recommended that a study be conducted into the feasibility of moving further to the east those departure routes which currently pass under the LAM stack".

Response: "This recommendation has been accepted but the study has concluded that moving the routes is not feasible".

ATSI recommend that further consideration be given to displaying the MSL and 'variable' outbound levels more prominently on applicable sectors, for example, by providing specialist engraved strips for the purpose.

UKAB Note: A replay of the LATCC radar at 1602:30 shows the B757, maintaining FL 80, 4.5 NM SE of LAM and about to commence a L turn from an ENE heading. At the same time the B737 is 6.5 NM NE of LAM tracking 155° and climbing through FL 63. At 1603:21 the B757 is indicating FL 81 and tracking through N in a L turn with the B737, having peaked at FL 79 12 sec earlier, now indicating FL 77 at its 2.30 position range 2.4 NM. A few sec later the ac have passed starboard to starboard with the B737 just beginning to register a port turn. At 1603:35 the B757 indicates FL 82 and the B737 FL 76. By this time the ac are some 4.5 NM apart with lateral separation increasing rapidly.

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 explained that this Airprox occurred when the TC NE DEPS SC mistakenly climbed the B737 to FL 80 in the belief that this was the MSL when in fact the MSL was FL 70. The Board noted, however, that once he became aware of the confliction, the SC responded quickly and correctly, using the appropriate avoiding action phraseology. Although correct phraseology was not used by the Heathrow Director, he did issue timely avoiding instructions to the B757 whose crew reacted promptly. As a result of these actions, the ac passed over 2 NM and 400 ft apart, which the Board concluded was sufficient to preclude any risk of collision.

The Board then discussed the data display arrangements which the DEPs controller had claimed might have contributed to his not noticing the current status of the MSL. Some ATCO members said that in their opinion the present arrangements on both radar and FPS displays were satisfactory and no changes were necessary. For example, it was explained that FPS holders had already been reduced in size, in order to accommodate more of them on the display board, and the information on them had been condensed; an extra 'blocking strip' for the MSL would therefore be at the expense of this information. ATCO members added that data on the current QNH and the MSL was readily available to the controller (the former being displayed on the radar screen and the latter on CCTVs, provided at radar positions, showing level availability at the Heathrow, Gatwick and Stansted stacks). The QNH flashes when its value changes and has to be cancelled by the controller, thereby acting as a prompt. Furthermore, both the QNH and the MSL should have been noted prior to taking over the position, as is required in the MATS Pt 2 handover procedures.

While noting the ATCO members' comments, the Board as a whole felt that this type of mistake could potentially be very serious, and pointed out this was the third incident this year in which a controller had confused the MSL and had climbed departing ac to the wrong level. There appeared to be a strong feeling amongst a number of operational controllers that the 'level availability' within the sector should be more prominently displayed and many members considered the matter was worth looking into once more.

Accordingly, the Board supported ATSI's response following the Unit recommendations, including those relating to guidelines for handovers; it was understood that the ATSI's supporting recommendation had been forwarded to LATCC management and a response was awaited. Since there appeared to be sufficient grounds to re-examine the MSL display arrangements, members asked the Director UKAB also formally to endorse a recommendation that the LATCC management

review the current arrangements to prevent a recurrence of this type of error.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Following a misunderstanding of the MSL the LATCC TC NE DEPS controller cleared the B737 to the level occupied by the B757.

Comment: The UKAB endorses the ATSI view that LATCC should give further consideration to displaying the MSL and 'variable' outbound levels more prominently on applicable sectors.

AIRPROX REPORT No 66/99

Date/Time: 07 May 1103

Position: N5217 W0124
(10 NM SE HON VOR)

Reporter: Birmingham ATC

Airspace: CTA (Class: A)

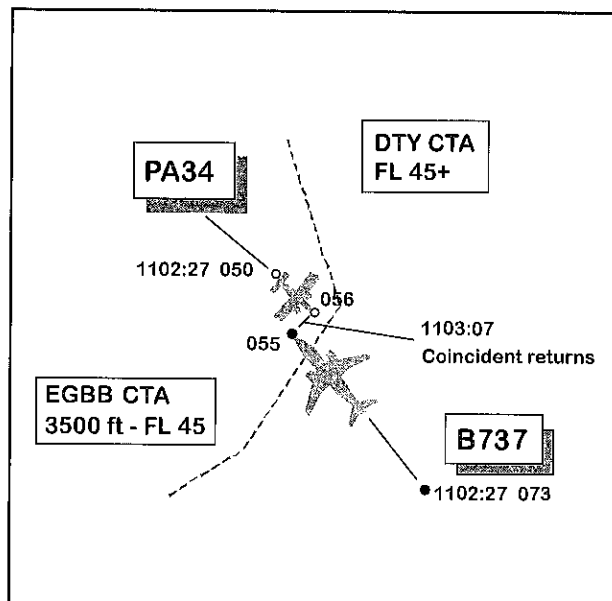
First Aircraft Second Aircraft

Type: B737 PA 34

Operator: CAT Civ Trg

Alt/FL: ↓ FL 50 ↑ FL 60

Recorded Separation: 0.6 NM H/100 ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UK

BIRMINGHAM ATC reports, with RT transcript, that the APR was carrying out the Joint function of APR/APC in a quiet traffic environment. A PA 34, outbound towards DTY from RW 23 at Coventry, was given climb clearance from its initial cleared altitude of 3000 ft to FL 60, while a B737, inbound to Birmingham from Paris, was being vectored for a LH circuit to RW 15 at Birmingham. The APR then descended the B737 to FL 50 having forgotten that he had previously climbed the Coventry outbound above 3000 ft. Information on other conflicting traffic was passed several times to the PA 34 pilot during his climb-out and the APR believes his pre-occupation with this might have contributed to his error. As soon as he became

aware of the potential confliction he instructed the B737 pilot to turn L onto 290° in an attempt to maximise lateral separation. The ac passed within about 0.8 NM of each other with no vertical separation.

UKAB Note (1): Neither of the pilots involved submitted a report as they were unaware that an incident had occurred.

ATSI reports that the Birmingham APR Controller was operating a combined APP/APR function at the time of the AIRPROX. An extra controller was available if required.

The Birmingham MATS Part 2, Page 4-33, states that the co-ordination procedures for Coventry outbounds are: "Coventry will request through Birmingham Approach all Airways clearances. Birmingham Approach is responsible for obtaining the clearance from the appropriate Airways sector and passing it to Coventry ATC together with any other restriction or qualifications. Standard routes are published for Coventry southbound airways departures which will be issued together with an initial level of FL60".

In accordance with the local procedures, the PA 34 was released by the Birmingham APR controller but restricted to an altitude of 3000 ft. He said that this restriction was imposed because of the expected arrival of the B737 which he planned to descend early and position for a LH visual circuit for RW 15. However, when the PA 34 contacted Birmingham Approach at 1059, after departure from RW 23 at Coventry, it was cleared to climb to FL 60 and the controller confirmed that he annotated the ac's FPS with the correct cleared level. He explained that the main reason for issuing further climb clearance was to get the flight into the protection of CAS above unknown ac which he could see on his radar display operating in the FIR close to the ac's projected track.

The B737 pilot contacted Birmingham Approach at 1059:50 reporting passing FL 108 in the descent to FL 70. The flight was cleared to continue to Honiley with no ATC speed restriction. The controller confirmed that the B737's FPS, correctly annotated, was on his display board and positioned above that of the PA 34. The next transmission received on the frequency was from a Birmingham outbound ac to the N, which was climbing to FL 60.

The PA 34 was identified and informed that a RIS, and then a Radar Control Service, was being provided to the flight. This was followed by traffic information on an unknown ac 4 NM away. Having transferred the Birmingham northbound departure, the APR adjusted the B737's heading to 305° preparatory to vectoring it on a downwind track. Updated traffic information on the previously reported ac was passed to the PA 34 at 1101:48.

A radar photograph, timed at 1101:54, shows the subject ac about 9 NM apart, the B737 passing FL 79 (in the descent) with the PA 34 at its one o'clock position passing FL 44 (in the climb). At this time the APR instructed the B737 to descend further to FL 50 and to turn R heading 320°, annotating its FPS accordingly. These instructions resulted in the 2 ac being placed on conflicting tracks with no vertical separation assured. The controller stated that, at the time, he believed the PA 34 was still only cleared to 3000 ft and, therefore, the 2 ac would be separated vertically. He said that he could offer no explanation why he made the error, especially as the FPS display would have shown the confliction; moreover, a scan of the radar display would have shown that the PA 34 was already above 3000 ft. His only possible explanation was of a fixation with his original plan, whereby the PA 34 would maintain 3000 ft while the B737 descended to FL 50 prior to carrying out a visual approach. He also explained that by clearing the B737 to descend to FL 50 any confliction between it and the northbound departure would be resolved more quickly.

The APR Controller said that he did not realise the confliction between the subject ac until 1103:00, when he instructed the B737 to turn L heading 290°. He mentioned that, although he is accustomed to using the term avoiding action, he did not do so on this occasion because the ac were about to pass each other. For the same reason he did not pass traffic information to either flight. In hindsight, he agreed he should have used the appropriate phraseology.

UKAB Note (2): A radar photograph at 1102:59 shows the B737 at FL 59 descending, with the PA34 1.5 NM to its N climbing through FL 55. Eight sec later, at 1103:07, the ac pass starboard to starboard about 0.6 NM apart with the B737 indicating FL 55 and the PA34 FL 56.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a transcript of the relevant RT frequency, radar

photographs, a report from the air traffic controller involved and a report from the appropriate ATC authority.

An ATCO member commented on the lack of information from either pilot. Although it was subsequently established that neither was aware at the time that he had been involved in a loss of separation, the member felt that the pilots should have been told as soon as possible after the incident so that they could be prepared to provide a report if asked. He thought it would have been useful on this occasion to have had weather information and ac speeds.

An ATSI adviser elaborated on the Airprox by saying it occurred when the Birmingham APR Controller descended the B737 believing that the outbound PA34 was still maintaining 3000 ft (although he had previously cleared it to climb

to FL 60). This was an inexplicable error on the APR controller's part which should have been avoided by a routine scan of the radar and strip display. Having climbed the PA34, the controller's descent and subsequent turn instructions to the B737 put the ac on conflicting courses both laterally and vertically; the Board therefore concluded that he had caused the Airprox by not ensuring standard separation between the ac. Members commented that it was fortuitous the resultant flight paths of the ac were separated, albeit marginally. Although the correct phraseology was not used the point was academic because the ac were already passing before the controller became aware of the situation. As neither pilot knew anything about the developing confliction and the controller spotted it too late to issue avoiding actions, the Board concluded that the safety of both ac had been compromised.

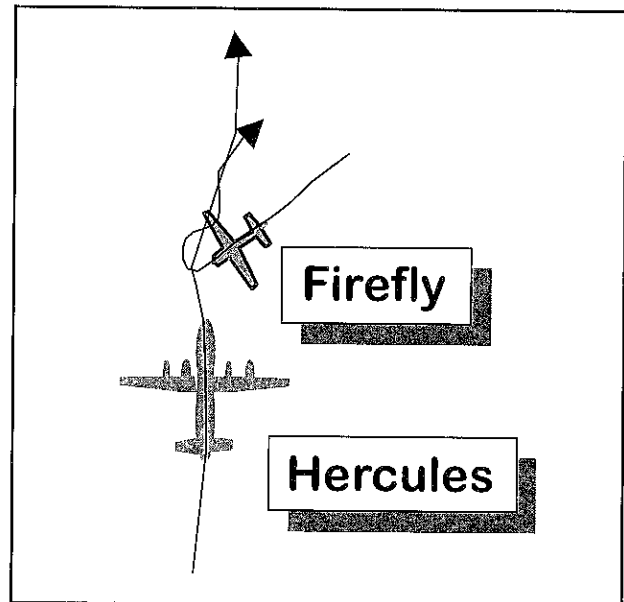
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Birmingham APR controller did not ensure separation between the B737 and the PA 34.

AIRPROX REPORT No 67/99

Date/Time: 13 May 1337
Position: N5256 W0041 (1 NM NW of Grantham)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Hercules Firefly
Operator: HQ STC HQ PTC
Alt/FL : FL 50 ↑ FL 50
Weather VMC CLAC VMC CLAC
Visibility: 5 km 4 – 6 km
Reported Separation:
 0.5 NM /0.75 NM, 3-500 ft
Recorded Separation:
 NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HERCULES PILOT reports heading 345° at 270 kt when he saw a Firefly 1 NM in his 12:30 crossing right to left at 90°. It then turned right which reduced the crossing component so he turned hard right and descended to avoid it. Just before the incident, Cottesmore, from whom he was receiving a LARS, called a contact in his 11 o'clock which made him look that way, but the call was intended for another ac. (Note: The RT transcript confirms neither part of the latter comment.)

THE FIREFLY PILOT reports heading 270° at 100 kt in a climb between clouds. When clear above, he saw a Hercules 1 NM away approaching in his 10 o'clock tracking N; it was slightly below. He turned right through 135° to avoid passing through its 12 o'clock; on rolling out he looked right to see it turning right in his 5 o'clock. He reversed his turn to his original heading to increase separation; while there was no risk of collision, the final separation was reduced by the Hercules turning right.

Note: LATCC radar recordings show the Hercules approaching the incident in a very gentle left turn which may have given the Firefly pilot the impression that his best course of action was to turn away to the right, but nevertheless he crossed the Hercules' 12 o'clock in the process. The Firefly was initially tracking SW. Its subsequent left turn took effect well after the event, with the Hercules over a mile away to the N. The vertical separation of Mode Cs as the ac pass cannot be deciphered due to garbling; both ac show FL 50 just before they pass at considerably less than 0.5 NM.

HQ MATO reports that the C130 was receiving a RIS from Cottesmore Zone (ZONE) on 130.2 in the descent to FL 50, en-route to RAF Waddington. There were 3 other ac on the frequency. Having ascertained the type of approach required, ZONE made landline contact with Waddington at 1336:20 to begin the radar handover. At 1336:31, ZONE transmitted "(C130 C/S), approaching Barkston Heath, positioning, turn left heading 350" which

was acknowledged. Six sec later, as Waddington Director (DIR) answered the landline, ZONE passed traffic information (TI) to the C130, "*C/S, as you turn, traffic 3 miles NNE of you, southbound, indicating 4400 ft*", which was the Firefly. Eight sec after this, at 1336:45, the C130 pilot transmitted "*C/S (unreadable word) five zero*". The handover sequence continued and at 1337:06, ZONE transmitted "*C/S, previously reported traffic now 12 o'clock, range 2 miles, crossing R L, indicating 5000 ft in the climb*". Activity at Waddington delayed further progress with the handover until, at 1337:20, the C130 pilot transmitted "*C/S is avoiding, wait please*". The next transmissions from the C130 were at 1337:45, "*C/S in a manoeuvre, we're down at 4300, climbing back to 5*", followed by "*And C/S, if you'd just note that...calling an Airprox*" at 1337:53.

The LATCC Claxby radar recording shows the C130 transponding SSR Mode code 4637, turning L from 020° to 350° and descending to FL 50. The Firefly is shown tracking SSW, then turning SW in a gentle climb with its squawk changing from 2641 to 2642 as it passes 4400 ft Mode C. The C130's groundspeed is significantly greater than the Firefly's. At 1336:37, the time of the first TI call, the Firefly is in the C130's 020°/3.5 NM, having just completed a L turn to track about 200° and climbing through an indicated FL 44 as the squawk changes; the C130 is passing an indicated FL 54 in descent. At the time of the second TI call, 1337:07, the Firefly is N of the C130 by 1.75 NM, having just turned SW and indicating FL 48. At this point, the C130 is passing FL 52 and appears to be tracking 355°, having just completed its turn. The closest point of approach occurs between 1337:19 and 1337:27. The C130 is indicating FL 50 with the Firefly in its 12 o'clock, range 0.3 NM, crossing from R to L and indicating FL 51. In the subsequent sweep, both ac appear to have turned hard right, the C130 now indicating FL 46 with the Firefly about 0.1 NM NW at FL 49.

The C130 pilot's report states that the TI call made by ZONE was incorrect in that "*the call made the crew look in the 11 o'clock position and the Firefly was approaching from the 1230*".

From the RT recording however, the TI passed to the C130 crew on both occasions appears to have been reasonably accurate, using the correct callsign and intended for the C130. The second call ("12 o'clock, 2 NM, crossing R to L"), was in error by 0.25 NM and about 10°, although both values would be difficult to estimate more accurately on a 40 NM range display such as the one ZONE was using. There was only one other RT transmission during this period, "Cottesmore (civilian C/S)", which was unanswered by ZONE whilst he spoke to Waddington. The reason why the C130's crew was drawn towards the 11 o'clock direction therefore, cannot be explained. It is quite possible that the C130 crew did not hear ZONE's first TI call; the response, which is 8 sec after the TI call, is inconclusive but has the hallmarks of a pilot reporting at a level rather than an acknowledgement of TI. Following several playbacks of the transmission, the unreadable portion is thought to be a single word, possibly "levelling".

ZONE gave the C130 pilot a positioning turn which was well intentioned and reasonable, to keep the C130 clear of the Barkston Heath and Cranwell overheads/climb-outs whilst the radar handover was performed. It was unfortunate that this turn ultimately contributed to a confliction. Both ac however, were on apparently reciprocal tracks and the turn was towards clearer airspace; it is only after the C130 has started its turn that the tighter R turn of the Firefly becomes evident on radar. The initial TI call by ZONE, assuming the C130 crew received it, was accurate and in accordance with a RIS. Having considered that the situation warranted an update, the second call was made. ZONE's workload was assessed as medium, with 4 ac under RIS.

HQ STC comments that it is unclear why the attention of the Hercules crew was drawn to the 11 o'clock position. That aside, the crew established a late visual contact with the Firefly and the captain correctly called a hard starboard turn in an attempt to increase separation and to prevent the flight paths from crossing. The co-pilot responded and also initiated a slight descent to maintain visual.

These actions were negated to some degree by the Firefly pilot's avoiding turn, which unfortunately, left him unsighted as the separation reduced. In sum, however, it would appear that prompt actions by the pilots of both ac resolved this confliction.

HQ PTC comments that both ac seem to have been going about their lawful occasions and satisfactorily resolved an encounter in unregulated airspace. With the benefit of hindsight, the Firefly might have achieved better separation by turning initially towards the Hercules, thereby avoiding the risk of losing sight of it. There seems no explanation as to why the Hercules crew were looking the wrong side of the nose but it is gratifying that the Firefly paint scheme caught their attention ultimately.

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 RIS from Cottesmore was effective and that the traffic information was timely, and repeated at just the right moment. It was clear that the Hercules pilot had been looking 'left' for some reason before hearing traffic information about the Firefly, but it was not a transmission from Cottesmore that caused it, unless it was a consequence of him being asked to turn left. This presumably would have caused him to check to his left before making that turn. In any case the Board considered that the Hercules crew had seen the Firefly about as early as could be expected and had taken appropriate action to resolve the confliction. The Board came to no conclusion about the avoiding action taken by the Firefly; in hindsight it appeared that if he had turned left initially he might have achieved greater separation, or at least have been able to keep the Hercules in sight, but it was never possible from a desk to

know exactly how the geometry looked to a pilot at the time. Members agreed that the incident was a conflict of flightpaths in the FIR which was resolved by both pilots. While members

could understand the concern of the Hercules pilot at the time, they concluded that the pilots of both ac had seen the confliction early enough to ensure that they would not collide.

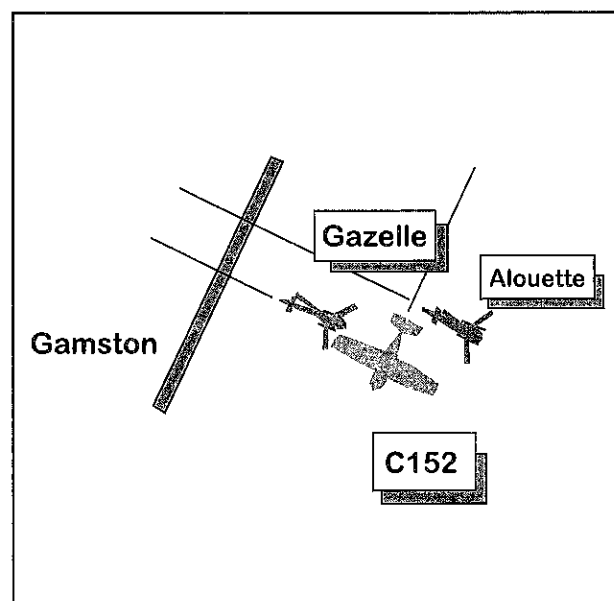
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Confliction of flightpaths in the FIR resolved by both pilots.

AIRPROX REPORT No 68/99

Date/Time: 16 May 1640 (Sunday)
Position: N5317 W0057 (Gamston - elev 87 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: C152 Gazelle
Operator: Civ Trg Civ Pte
Alt/FL: 1000 ft ↑ 1200 ft
(QFE) (1015 mb)
Weather VMC CLBC VMC CLBC
Visibility: >10 km >10 NM
Reported Separation:
50 yd H 0V 200 ft V
Recorded Separation:
N/A



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports that he was heading 210° at 90 kt while level at 1000 ft (QFE) downwind in a RH circuit for RW 03 at Gamston. The visibility, 3000 ft below cloud, was over 10 km in VMC and he was in contact with Gamston air/ground on 130.47. While abeam the RW he noticed a helicopter on a relative bearing of about 070° converging towards him several hundred ft below and maintained visual contact with it until it passed below him a few seconds later. Just as he was about to pass comment on separation to his student, he saw a second helicopter about 60 yd away also on a conflicting course from R to L. There was no time to take avoiding action

before this second ac passed about 50 yd behind him at the same level and he felt there had been a high risk of collision. Some time later he learned from the air/ground operator that the second helicopter was not able to select Gamston's RT frequency.

UKAB Note (1): The two helicopters involved in this incident were an Alouette 2 and a Gazelle with the former (in the lead) passing under the C152 and the latter being the subject of the encounter. Unfortunately, the Gazelle pilot left the UK shortly after the incident and it has proved impossible either to make contact with him or to extract a report from him.

A telephone conversation with the Alouette pilot, however, established that both helicopters were operating together. Having landed at Gamston, they discovered subsequently that the Gazelle had to return to their original departure airfield to pick up an item of equipment. On the Gazelle's return they planned that it would not land but the Alouette would join up with it so that both could set course together to their next destination SE of Gamston. Armed with this plan the pilots visited the airport manager together to explain their intentions and why the Gazelle was unable to call Gamston on 130.47; it appeared the radio fitted did not allow for the selection of Gamston's frequency.

As briefed, the Alouette pilot stated that on the Gazelle's return he took off and flew an easterly heading at 80 kt to rendezvous with it at around 1500 ft. The visibility was 10 – 15 NM and Gamston air/ground advised that there was no other traffic to affect him, and no other ac were heard on the frequency. While climbing he saw a high wing single engined ac ahead and so descended about 200 ft to pass beneath it. He did not know how close the Gazelle had come to it but he did not himself consider there had been any risk of collision; he was in communication with the Gazelle and confirmed that its pilot also had the fixed wing ac in sight. Having listened-out on Gamston's frequency for a while for other calls, he transferred eventually to Waddington on 127.35. Later the Alouette pilot said that he saw the fixed wing ac on a northerly heading and that it was 'sandwiched' between himself and the Gazelle, which was to the E of him. It was pointed out that since the C152 was on a RH circuit and downwind for RW 03 when its pilot saw the helicopters it must have been on a south westerly heading; however, the Alouette pilot would not change his mind and the matter was not satisfactorily resolved.

UKAB Note (2): In a subsequent telephone conversation the C152 pilot said that he had been airborne for about 25 min prior to the incident and was flying about his third circuit. His main concern was that the a/g operator had not informed him about the radio 'silent' Gazelle returning to the airfield and did not advise him that a helicopter was taking off. He did not hear

any transmissions from the Alouette pilot and was therefore completely unaware of any helicopter activity to affect him. This made for a very dangerous situation in his opinion, especially since it was unlikely that the Alouette would have heard any transmissions from him; his last call in the circuit had been made some time before the helicopter lifted off and he had been unable to make his downwind call at the correct point because of RT congestion.

UKAB Note (3): Discussion with the air/ground operator (also the airfield manager) at Gamston confirmed that both helicopter pilots had explained their intentions to him fully, including the Gazelle's 'silent' return. He agreed that the ac could re-enter the ATZ without RT, although no time for this re-entry was specified. Consequently when the ac did return he said he was unaware of its presence and could not therefore pass any information to the C152 pilot. The manager pointed out that his functions as an air/ground operator were strictly limited and airfield information was provided subject to his workload; there were indeed occasions when an RT service was not available due to other demands on his time. In his opinion it was essentially the responsibility of pilots to listen out on the frequency and arrange their flights not to conflict with other traffic.

UKAB Note (4): A primary return can be seen approaching Gamston at a range of about 2 NM from the N at 1638, and another seen heading SE from the Gamston area at about the Airprox time. These returns are very intermittent and soon fade from radar. The circuiting C152 is not in evidence and the Airprox is not recorded. There are no other primary returns which could relate to the geometry of the encounter as perceived by the Alouette pilot.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of the C152 and the Alouette and a radar video recording.

Owing to the absence of a report from the Gazelle pilot there were many aspects of this

incident which the Board was unable to resolve. The Alouette pilot's perception of the geometry of the encounter remained at odds with the information available but his recollection of events was the only account the Board had to go on from the helicopters' viewpoint. One helicopter member commented that visibility from the cockpit of both types of ac is excellent and in the good flying conditions reported both helicopter pilots should have had no difficulty in spotting other ac in their vicinity despite any lack of traffic information. The C152 had been airborne for some time prior to the incident and its pilot ought to have heard the Alouette's departing call, but did not. However, there was conflicting information as to how busy the radio conditions were at the time; the C152 pilot contended that he was unable to make his downwind call at the correct point because of RT congestion, in stark contrast to the Alouette pilot who said that he had heard no other ac calls. Turning to the level of service expected from an a/g station, there appeared to be a widespread misunderstanding among the GA community. In this case the C152 pilot seemed to have been under the erroneous impression that information on the helicopters ought to have been passed to him. It may be that experience of operating at Gamston led him to believe this. There is no obligation on the operator in an air/ground radio environment to pass any information if his attention is directed elsewhere by other pressures. Indeed, as one member pointed out, there could well be occasions when the radio may not be manned at all if a suitably licensed individual was not available. The onus for maintaining separation from other ac in these circumstances remained with pilots, by maintaining a listening watch on the RT, by ensuring that all necessary position reports and relevant RT calls were made in the correct place, and by keeping a good lookout.

Members noted that notwithstanding the minimal provisions of an a/g service, Gamston has an ATZ in which flight is subject to conditions laid down under the Rules of the Air (R39 and R17). The former requires pilots flying, taking off, or landing within the zone, to obtain information from the aerodrome operator to enable the flight to be conducted safely. In this incident the airport manager had given approval for the Gazelle to re-enter the ATZ without radio; however, members felt that it would have been wise to have included a specified time for this rejoin so that other ac might be warned of the impending arrival. Rule 17 requires pilots to conform to the pattern of traffic formed by other ac intending to land at an aerodrome, or keep clear of the airspace in which the pattern is formed. Board members considered that the Gazelle pilot did not conform to this Rule and concluded he caused the Airprox by flying close enough to the circuiting C152 to cause concern to its pilot. They went on to comment that the Airprox could have been avoided had the Gazelle pilot either flown above 2000 ft agl over the airfield (above the ATZ) or remained outside the 2 NM radius. Alternatively, the Alouette pilot, who was presumably aware of the returning Gazelle because he was able to communicate with its pilot, could have relayed an appropriate message to the a/g controller or even broadcast a message himself to warn other pilots.

Members had no positive information on whether, or at what point, the Gazelle pilot had seen the C152, albeit the Alouette pilot reported that they both had kept it in sight. While some members thought that there had been a possible risk of collision, the majority felt that insufficient reliable information was available to make an assessment with any assurance.

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

Degree of Risk: D

Cause: The Gazelle pilot did not conform to the airfield circuit pattern in accordance with R17(5)(a) of the Rules of the Air, and flew close enough to the C152 to cause concern to its pilot.

AIRPROX REPORT No 69/99

Date/Time: 17 May 0927

Position: N5059 W0011 (Willo holding pattern)

Airspace: LTMA (Class: A)

Reporter: LATCC (TC)

First Aircraft Second Aircraft

Type: B737 F100

Operator: CAT CAT

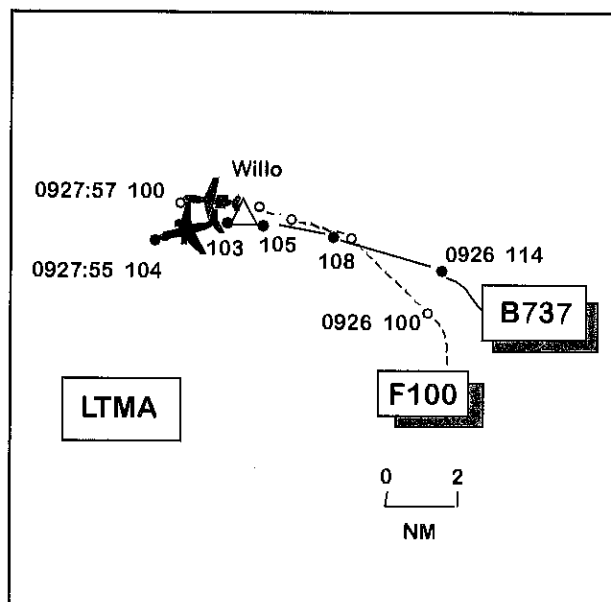
Alt/FL: ↓ FL 100 FL 100

Weather VMC CLAC VMC

Visibility: >10 km

Reported Separation:
400 ft V/ 0.5 NM H

Recorded Separation:
300 ft V/ 0.75 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GATWICK INTERMEDIATE DIRECTOR (LATCC TC) reports that FL 80 to FL 120 were in use in the WILLO holding pattern, with the B737 at FL 120 and the F100 holding one level below at FL 110. The F100 was descended to FL 100 and, when FL 110 was vacant, the B737 was cleared to descend to FL 110. The STCA then flashed red. The pilot of the B737 was asked to check his cleared level to which he replied that he was descending to FL 100. An immediate avoiding action turn onto 180° was given to the B737 with an instruction to maintain FL 110. The F100 pilot was instructed to maintain his present heading until standard separation was re-established. Minimum separation distances were believed to be in the order of 400 ft and 0.5 NM. The controller states that his report was compiled without reference to the appropriate RT recording (126-82).

THE B737 PILOT reports that he was maintaining FL 120 in the WILLO holding pattern at 220 kt. ATC cleared him to descend to FL 100. On passing FL 105 ATC queried his level and then gave an immediate turn onto 180° advising him that his cleared level had been FL 110.

THE F100 PILOT reports that he was in the WILLO holding pattern at FL 100 when he saw a B737 descending ahead of him, though it did not reach his level. ATC asked him whether he had seen the ac and he then heard them give the B737 a heading alteration. He asked ATC whether he should remain at FL 100 and they replied he should. There was no further instruction from ATC.

ATSI reports that the Gatwick INT Director described her workload as moderate at the time of the AIRPROX. She took over the position, which was operating in a combined Support (SPT) / APR configuration, about six minutes prior to the incident occurring. She explained that she had considered whether there was a need for a SPT controller but in view of the traffic situation and a projected decrease in arriving ac, she decided that it was not necessary to open that position.

The F100 pilot contacted Gatwick Approach at 0921, reporting heading to Holly at FL 110. The ac was instructed to enter the hold at Willo via Holly. Shortly afterwards, the B737 made its initial call on the frequency, reporting at FL 120 to hold at Holly and was informed of a five to ten minute delay.

At 0924 the F100 was cleared to descend to FL 100 to report leaving FL 110. The pilot replied

"leaving now one one zero". The INT Director said that, in her experience, pilots do not always leave the level the moment they report vacating it. Therefore, as the F100's SSR Mode C readout was not decipherable because of label overlap, and in view of the ac's close proximity laterally to the B737, she decided against clearing the latter flight to descend to the vacated level straight away. Consequently, at 0925, the INT Director asked the F100 pilot to report his level. He answered: "*Er level steady level er one zero zero*". The controller's next transmission was to instruct B737 to: "*Descend flight level one hundred report leaving flight level one two zero*". The pilot correctly read back the instruction using the phraseology "*one hundred*". The controller could give no definitive reason why she had cleared the B737 to FL 100, the same level as the F100. Her intention was to clear the ac to descend to FL 110 and this is what she believed she had done, to the extent that she annotated its FPS with a cleared level of FL 110. She added that the pilot's readback did not alert her to the error. The B737 reported leaving FL 120 about thirty sec later.

The Director stated that she became aware of the situation when the STCA activated at 0927:00, showing a high severity alert. Although not recollecting the circumstances clearly, she believed that F100's label was probably overlapping, especially as she queried its level. This was followed by a request to the B737 to confirm it was maintaining FL 110. Realising that the latter ac had descended below what she believed was its cleared level, she passed it an avoiding action L turn heading 180°, using the appropriate phraseology. She commented that she could see that the ac had already commenced its left turn when she gave this instruction and recollected observing its Mode C readout indicating FL 104. The F100, which was still on its inbound heading in the holding pattern, was instructed to continue on its present heading. The pilot acknowledged the instruction reporting that he was "*well under the seven three seven*". A radar photograph at 0927:10 shows the B737 at FL 105 about 1 NM ahead of the F100, which is maintaining FL 100. The controller said that she did not instruct the

B737 to stop its descent or climb back to FL 110 because she assumed that, once the pilot realised he had "bust" his level, he would climb back on his own accord. In any case she considered that the turn instruction passed to the B737 resolved the conflict. Traffic information was not passed to either flight, mainly because the B737 would not have been in a position to have seen the F100 and the latter reported having the other ac in sight.

UKAB Note: Pictures of the LATCC radar show the subject ac in the holding pattern at WILLO. At 0926 both ac are in a L turn to the E of WILLO at a range of 6 NM just over 1 NM apart, the F100 maintaining FL 100 with the B737 at its 1 o'clock descending through FL 114 (the F100 indicates FL 100 throughout the encounter). At 0926:45 the B737 has moved to the 11 o'clock of the F100 at a range of 0.75 NM and is now indicating FL 108 descending. By 0927:24 the B737 indicates FL 103, the lowest extent of its descent, with the F100 in a very slightly wider turn at its 5 o'clock at about 0.75 NM. At 0927:57 the tracks of the ac diverge as the B737 turns through a SW heading, indicating FL 104, with the F100 1.5 NM to its NE. By 0928:14 lateral separation is increasing rapidly through 4.3 NM as the B737 tracks S, now indicating FL 106. Minimum separations indicated by radar are 300 ft vertically and about 0.75 NM laterally. This occurred overhead WILLO at 0927:24.

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.

The Board quickly concluded that this incident resulted from the Gatwick INT Director's error in clearing the B737 to descend to the same level as the F100. Members assessed that the avoiding action instructions given by the Director, together with the visual acquisition by the F100 pilot, removed any risk of collision.

This was an error for which there does not appear to be an easy remedy. The controller, having cleared the B737 to FL 100, annotated its strip with the intended level of FL 110, yet was not alerted to her mistake by the pilot's correct read back of FL 100. Errors of this type can be explained only through analysis of the psychological processes involved, which are outside the scope of this forum. However, members thought it was possible that the controller's mind had in some way fastened to the last level she had heard, which was the F100 pilot's confirmatory readback of "one hundred" (FL 100). Unfortunately the significance of this readback did not trigger the controller's attention; moreover, the B737 pilot who, only moments before, had heard the F100 pilot confirm his level as "one hundred" did not query the fact that he also had been cleared to the same level. Members wondered if the B737 pilot assumed the other ac was in a second Gatwick holding pattern and therefore safely separated. After the F100's initial call, which the B737 pilot may not have heard, the holding designator (Holly) was not mentioned again in any transmission to either ac in the ensuing 5 min leading to the Airprox. It was clear, however, that the F100 pilot, having called on the frequency before the B737, was in a position to hear all the relevant transmissions to both ac and members wondered why he had

not recognised that the B737 had been cleared to the same level as himself. Three possible opportunities to expose the error, therefore, were missed.

An ATSI adviser reminded the Board that there had been 4 recent incidents involving loss of separation between ac in the same holding pattern. An Airprox (136/96) resulting from one of these prompted the Joint Airprox (P) Working Group to make the following recommendation: "that the appropriate authorities should examine the feasibility of amending current ATC clearance procedures as applied to multiple holds controlled by one controller on the same frequency so that controllers are required to append the HOLD name when issuing clearance related to that hold". Whether this procedure would have assisted in preventing this incident (which involved only one holding pattern) is open to conjecture. The Board was advised that this recommendation remained open.

With respect to the STCA, a NATS adviser told the Board that when activated the display now highlighted on a separate area of the screen not only the callsigns of the conflicting ac but also their levels, thereby enabling immediate identification of the transgressing ac to be made.

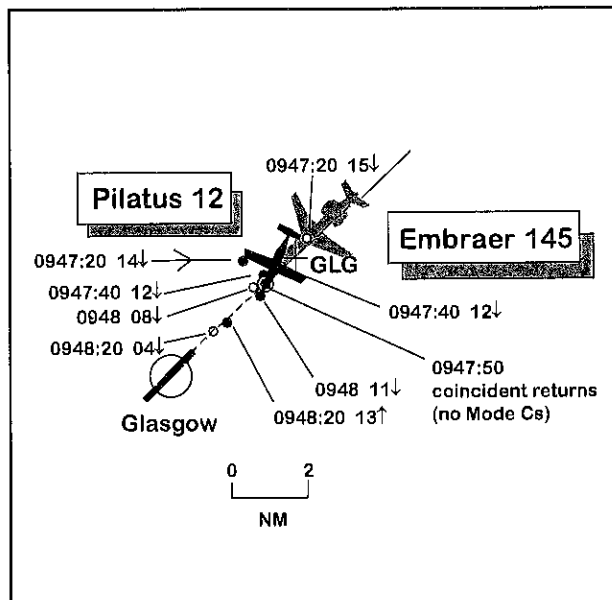
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Gatwick INT Director descended the B737 to the level occupied by the F100.

AIRPROX REPORT No 70/99

Date/Time: 15 May 0948 (Saturday)
Position: N5555 W0421 (3.5 NM NE
Glasgow airport - elev 26 ft)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: Embraer 145 Pilatus 12
Operator: CAT Civ Pte
Alt/FL: 1200 ft ↓ 1500 ft ↓
(QNH 1021 mb) (QNH)
Weather VMC VMC HAZE
Visibility: 21 km >10 NM
Reported Separation:
300 ft V/1 NM H/N/K
Recorded Separation:
0 ft H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER PILOT reports that he was in contact with Glasgow ADC heading 230° at 150 kt and descending through 1200 ft (QNH 1021) while on final approach to RW 23. The crew had previously heard Glasgow APR instructing VFR traffic to report at various VFR points towards RW 23. At range 5.5 NM ADC instructed him to continue approach. At about 4.5 NM from touchdown TCAS indicated traffic. A Pilatus was then immediately seen at his 11 o'clock and slightly above about 1 NM away. He began taking avoiding action while at the same time asking ADC whether the other ac was also positioning for RW 23. ADC responded by instructing the Pilatus to break L. The TCAS TA then changed rapidly to an RA but he was unable to be certain of the RA instruction because the glideslope warning was also active owing to his avoiding manoeuvre. He kept the Pilatus in sight and overtook it to its R. Landing clearance was issued when he was less than 1 NM from touchdown. He thought the other ac had been transferred to the ADC frequency slightly before them; however, although he was aware that it was in the vicinity, he was very surprised to see it appear ahead of them on final approach. He felt there had been a medium risk of collision.

UKAB Note (1): In a subsequent telephone conversation with UKAB staff, the Embraer pilot said that on first sighting the Pilatus at about 1 NM he reacted immediately by increasing his rate of descent. The ac ahead had apparently flown through the final approach centre line from the R; he kept it in sight throughout and passed abeam R and below it by not more than 0.5 NM and about 200 ft. Despite being somewhat surprised by the appearance of the Pilatus, he did not feel there had been a significant risk of collision. After landing the incident was discussed in detail with ATC who explained that the error arose as a result of the withdrawal of the ADC radar monitor for training purposes; he fully accepted and understood the reasons for this and was impressed by the positive attitude adopted by ATC on their aspects of the encounter.

THE PILATUS PILOT reports that he was inbound to Glasgow from Islay on a VFR flight plan. The visibility was over 10 NM in slightly hazy VMC. Approaching the VFR entry route to the airport he called Glasgow APC on 119.1 and was cleared VFR (he believes not above 1500 ft) to Erskine Bridge to report the airfield in sight. He was squawking and his TCAS (MK1) was operating.

On arrival at Erskine Bridge, where he reported the airfield in sight, he was transferred to ADC

on 118.1 who advised him that he was No 1 to land on RW 23. He tracked E at about 1500 ft (QNH) to intercept the localiser and glidescope and began descending. At that point, heading 230° at 130 kt, his TCAS signalled "traffic". He heard another ac call "finals", upon which he immediately broke L and asked the tower controller for instructions; he was told to orbit the L (which he was already doing). He did not see the other ac, believed to be an Embraer 145, but was told it had been behind and below him. In a later conversation the Embraer pilot told him that he would be submitting an Airprox report.

ATC subsequently advised him that a new controller was under instruction and the radar had been turned off for training purposes.

ATSI reports that at the time of the incident the Glasgow ADC Air position was being operated by a trainee supervised by a mentor. Both the traffic loading and the workload level were assessed as low. The 0950 met report for Glasgow Airport included light and variable winds up to 2000 ft with no significant cloud below 2600 ft.

The Air position is equipped with an Aerodrome Traffic Monitor (ATM) which displays SSR label information on flights that are within 20 NM of the airport. It allows the Air controller to identify and monitor the progress of inbound flights on final approach. At the time of the incident, however, the ATM was switched off at the mentor's initiative to encourage the trainee to improve his lookout and gain more practice in visual controlling. The traffic level was considered sufficiently light for this exercise and the trainee had been fully briefed prior to taking over the position. In addition, the withdrawal of the ATM placed a local requirement upon the APR to provide 10 NM range checks on inbound flights to the Air controller.

At 0937, the Embraer, inbound from Birmingham under IFR, made its first call to Glasgow APC and reported descending to FL 70. The APR told the flight to expect radar vectoring to an ILS approach on to RW 23. Having confirmed the latest ATIS broadcast, the

pilot was advised that there was no ATC speed restriction.

Two minutes later, at 0939, the Pilatus pilot made his first call to the APR, inbound from Ilay under VFR; he reported at 1500 ft squawking 7000 and with the latest Glasgow arrival information. Clearance to enter the Glasgow CTZ was given by the APR, VFR not above 2000 ft routeing via 'Ardmore point', a VRP about 10 NM to the NW of the airport.

Returning to the Embraer, which was inbound from the S, the APR cleared the flight down to 3000 ft and told it to fly a radar heading of 335°, positioning for L base on RW 23. The APR then advised the Air controller that the Pilatus was routeing via Ardmore point, adding that the flight would stay on the approach frequency until the pilot had reported visual with the airport. At 0945:20, the Pilatus pilot reported visual with the field and was transferred to the Air frequency for onward clearance.

At this stage no other inbound flights had been notified to the Air position. Consequently, when the Pilatus pilot reported approaching Erskine Bridge (a VRP 3 NM N of the airfield) and visual, the Air trainee cleared him to "...report final for runway 23 you're number one". Moments later, the APR advised the Air trainee that the Embraer was inbound range 9.5 NM. Both mentor and trainee could now see the Pilatus and assessed that it was tracking southeasterly, consistent with a RH base-leg for RW 23. Neither controller was familiar with this ac type, and they remarked how large and fast it had appeared by comparison to other types (Bulldogs and C152s) that commonly route inbound VFR through Erskine Bridge. (The Pilatus is an unusually large single engined turbo-prop ac, in size between a Jetstream and an Islander and not a routine visitor to Glasgow). On this occasion, however, the ac's performance appeared to assure its place ahead of the Embraer.

Meanwhile, the Embraer had been vectored to establish itself on the ILS localiser for RW 23. Once established, descent on the ILS was approved and the flight transferred to the Air

frequency. Responding to the Embraer's first call on his frequency, the Air trainee instructed the flight to continue approach, but failed to advise that it was number two in traffic. The controller did, however, request the flight's DME range and, at 0947:20, the pilot reported his range as 5.4 NM (note: the 9.5 NM range check had occurred only 70 sec earlier, so the ac had averaged more than 200 kt ground speed). This meant that the Embraer was now considerably closer to the airport than either controller had expected and prompted the mentor to check visually the position of the Pilatus. This revealed that the ac had widened its circuit and was extending downwind (23 RH) towards the E, a course of action the pilot was entitled to adopt in the absence of instructions to the contrary. The 2 ac were now on converging tracks, though this was not immediately apparent to either controller as the Pilatus still appeared to be relatively close to the field - an impression created, perhaps, by the ac's size. Nevertheless, the mentor recognised that the situation required attention and was waiting for intervention by the trainee. The trainee had reached a critical point in his training and the mentor was keen to allow him every opportunity to take his own decisions. Despite strong hints by the mentor that it would be timely to take action, none was forthcoming and the trainee allowed events to continue unchecked.

At this stage neither ac had been issued with traffic information and the Embraer pilot was unaware of the Pilatus ahead of him closing on the RW centre line from the R. From this point situational awareness by both crews played a part in both the recognition and the resolution of the subsequent conflict. At 0947:25 the Pilatus pilot asked if he was to "...turn in or hold". The trainee responded by clearing him to land, but took no further action. Twenty sec later the Embraer pilot reported visual with traffic coming into his one o'clock position and was told to continue approach. Unhappy with this the pilot asked (at 0948:00) for confirmation that traffic he could see "...high in our one o'clock" was not turning in for RW 23. Before the trainee could answer, the Pilatus pilot intervened and stated that it was his flight that had been

cleared to land and then forcibly asking ATC to "...sort it out will you". At this point the mentor stepped in, took control of the frequency and instructed the Pilatus pilot to "...break left please and orbit on er lefthand downwind for two three"; the pilot complied immediately. The Embraer pilot was then instructed to continue his approach and, somewhat confusingly, was told that he had been number two to land to a light ac ahead, but should now expect a landing clearance soon. No traffic information on the Pilatus had been passed. A short while later the Embraer was cleared to land on RW 23. The Pilatus, meanwhile, was held on a L base leg and landed safely a few minutes later.

ScACC radar recordings of the Lowther Hill radar show the Pilatus approaching Erskine Bridge at 0945:00 on a southeasterly track indicating 1500 feet Mode C. By 0946:30, the ac is on a track towards the GLG NDB (4 NM final for RW 23) while the Embraer is just turning onto a long final approach. The 2 ac are about 7 NM apart at this point. By 0947:20, when the Embraer pilot reports at 5.4 DME, the ac are about 1.5 NM apart, both converging on the GLG, with the Embraer's height readout indicating 1500 ft, descending, and the Pilatus 100 ft below, also descending. Moments later, when the Pilatus pilot asks if he should turn in or hold, his ac is (starting to go belly-up) in the Embraer's 1:30 position less than a mile ahead and just commencing a R turn towards final, but with no height information displayed. Thereafter, the Pilatus continues the turn in front of the Embraer, passing the latter's 1 o'clock at a range of about 0.5 NM, while both ac are descending through 1200 ft. The radar returns then merge, the Embraer having caught up the Pilatus; the former is passing 900 ft descending while the latter's Mode C is not showing. At 0948:00, as the radar returns start to separate, it shows that the tracks have crossed following a turn to the R by the Embraer, which is now appearing, on the Pilatus's starboard side and 300 ft below. The Embraer remains to the R and below the other ac and slowly pulls ahead. By 0948:25, the Embraer is about one mile final descending through 400 ft while the Pilatus is just commencing a L turn and passing 1300 ft in a climb.

The Unit investigation report, completed shortly after the incident, made a recommendation that controllers be reminded of the need to be extra vigilant when they are operating without the ATM for training purposes. Reflecting on the incident, the mentor has acknowledged that it was injudicious of him to allow the trainee to continue unchecked and that he should have intervened earlier to resolve the developing conflict.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members appreciated that it was necessary for the Tower mentor to give his trainee every opportunity to make his own decisions. This was a critical point in the trainee's progress and members understood the reasons for withdrawing the availability of the ATM. It was pointed out, however, that by denying the use of the ATM to the trainee, the mentor also denied it to himself and this was perhaps not wise. An ATC Safety adviser said that units had now been advised to turn the ATM down rather than off in such training circumstances. It appears that both the mentor and the trainee were then misled by the size of the Pilatus, which gave it the illusion of being closer to the airfield than it actually was. Moreover, its pilot made a somewhat larger than expected circuit, exacerbating the already rapidly decreasing separation between the ac. The critical point at which the mentor should have intervened to resolve the impending conflict had already passed by the time he took over the RT from his trainee; it was then virtually impossible to retrieve the situation. Members concluded that

the Airprox occurred because the ADC mentor had permitted his trainee to position the 2 ac into conflict on final approach for RW 23.

The Board agreed also that a key contributory factor in the incident was that neither pilot had been given traffic information. Had the Embraer pilot been aware of the Pilatus ahead of him, it might have prompted him to adjust his approach accordingly, particularly with regard to speed, and to request clarification on the landing order. Likewise, had the Pilatus pilot known about the Embraer he might have flown a tighter circuit. Several members expressed surprise that the APR controller had transferred the Embraer to the Tower controller with no speed restriction whilst aware that the Pilatus was turning onto base leg ahead of it; moreover, until the 9.5 NM check call by APR on the Embraer, the ADC controller was unaware of its presence. An airline member said that he had recently experienced an increasing number of incidents in the vicinity of major airfields where he felt an unrestricted high-speed approach had been a contributing factor – this case, he said, was another example. In his opinion there was a good case for imposing an automatic speed reduction within 10 NM of an airfield to reduce the possibility of this type of conflict.

Turning to risk, members were satisfied that the Embraer pilot, though sighting the Pilatus only 1 NM ahead, was content to continue his approach while keeping it in sight. The Pilatus pilot made a sensible assessment of the situation. Having been alerted to the conflict by his TCAS, he broke off his approach almost coincidentally with ATC instructions, though he did not spot the Embraer which by then had overtaken him. With these points in mind the Board concluded that there had not been a risk of collision.

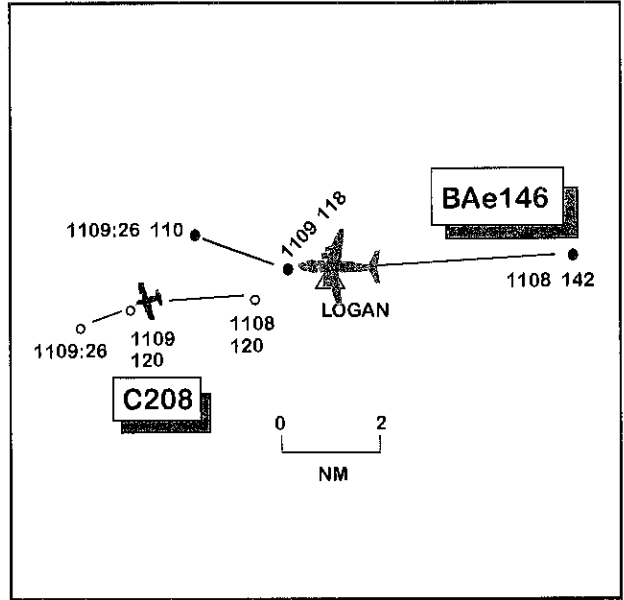
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The ADC mentor allowed his trainee to position the two ac into conflict on RW 23 compounded by a lack of traffic information to either ac.

AIRPROX REPORT No 71/99

Date/Time: 21 May 1109
Position: N5145 E0134 (2 NM W LOGAN)
Airspace: Airway R1 (Class: A)
Reporter: LATCC (AC)
First Aircraft Second Aircraft
Type: C208 BAe 146
Operator: Civ Comm CAT
Alt/FL: FL 120 ↓ FL 70
Reported Separation:
400 ft V/2.33 NM
Recorded Separation:
300-400 ft V/ 2 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC AC CLACTON S14 SC reports that he had been mentor to a trainee on S14 during a very busy and complex situation, but the trainee had transferred to another sector before the incident. Some time later he descended the BAe 146 to FL 180 above other traffic at FL 170; the BAe 146 was then given further clearance to descend to FL 70 and transferred to TC LOW. However, owing to its large catch-up speed the BAe 146 came into conflict with a C208 ahead of it at FL 120. He telephoned the LOW controller who instructed the BAe 146 to expedite its descent through FL 120.

The CLACTON CSC reports that the S14 SC warned that the BAe 146 had been transferred to the next frequency 'unclean' (without assured separation) against a C208 ahead of it. At that time the former ac was 3 NM E of LOGAN descending through FL 135 for FL 70 in contact with TC SE Low on 120.7, while the latter was 4 NM W of LOGAN cruising at FL 120 with TC DAGGA on 124.92. He immediately telephoned the TC SE co-ordinator, giving him an ident on the BAe 146 and explaining the urgency of the situation. A similar call was made to the TC E co-ordinator. Avoiding action appeared to have been taken by TCs E and SE to resolve the confliction.

The TIMBA radar (TC Low) controller reports that the BAe 146 called him descending as per the standing agreement to FL 70. Shortly afterwards the C208 called maintaining FL 120, at which point the CLN CSC telephoned the S co-ordinator saying that the BAe 146 had been transferred 'unclean' against the C208. Whilst this conversation was in progress he instructed the BAe 146 to turn R, and the C208 to turn L onto 180°. The latter's pilot queried the instruction but by then the BAe 146 had vacated FL 120 and so the C208 was instructed to continue on its original heading.

UKAB Note (1): Neither the BAe 146 pilot nor the C208 pilot could remember any details of the incident (but the C208 had queried the turn instruction with ATC at the time). No reports from the pilots are therefore available.

ATSI reports that the CLN S14 SC described the sector's traffic loading as moderate, with a complex traffic situation, in the period leading up to the incident. Although he had been in position for about one hour and twenty five minutes, he had been monitoring a trainee until approximately eighteen minutes before the Airprox occurred.

The C208 pilot contacted the CLN S14 Sector at 1041, reporting level at FL 160 on course to SASKI; he requested descent to FL 120 after

SASKI. This revised level was co-ordinated, subsequently, with TC by the CLN CSC. At 1050, after one more call had been made on the frequency by the C208 to request its routing, the SC took over the RT from his trainee. He commented that he did not realise, at the time, the relatively slow speed of the C208 (170 kt) compared with the BAe 146 (416 kt). He added that if he had not been operating with a trainee he would have probably high-lighted the C208's airspeed on its FPS on its initial call, in order to retain it in his memory. It is understood that although it is not possible at present to display ac speeds in the ACR, its feasibility is under consideration by the AC Technical Committee. The SC's first transmission to the C208 was to clear it, in accordance with the agreed co-ordination, to descend to FL 120 to be level by LOGAN. Shortly afterwards he confirmed its routing as Logan, Lambourne, Woodley and Compton.

The BAe 146 established communication with the CLN Sector at 1058, descending to the Standing Agreed Level of FL 270. The flight was instructed initially to maintain FL 270 but subsequent descent clearances to FL 250 and FL 180 were passed, together with headings of 305° and 315°. The SC said that the traffic situation at the time was complex. This included an ac crossing at FL 170, which affected the BAe 146's descent below FL 180 and its positioning by Maastricht on the "wrong" side of a Stansted inbound. At 1105, having instructed the BAe 146 to turn L heading 280°, the SC cleared it to descend to FL 70 to be level at TRIPO. This is in accordance with the Standing Agreement with the TC SE Low Sector. However, this descent clearance did not take into account the presence of the C208 ahead of it at FL 120. The SC commented that he probably overlooked the C208 because he was concentrating his attention on the traffic situation in an area well to the E of it. He explained that the FPS for both ac would have been displayed in the same display bay but, because of the nature of the sector, they would have been placed according to their relative geographical position and, therefore, not necessarily close to each other. Even when the BAe 146 was given a routing direct to TRIPO

the SC said that he still did not realise the potential conflict between the two ac.

The BAe 146 was transferred to the TC TIMBA frequency at 1107 and shortly afterwards the C208 was instructed to contact the same frequency. At this time the BAe 146 was about 6 NM behind the C208. The SC stated that only when he had transferred the latter did he realise the conflict between the two ac. He immediately informed the CSC so that he could warn the appropriate TC sector, and called the BAe 146, without success, in the hope that it was still on frequency.

The BAe 146 contacted the TC TIMBA frequency reporting descending to FL 70 to TRIPO. Shortly afterwards the C208 reported on frequency at FL 120, having just passed LOGAN on a heading of 260°. The TIMBA SC explained that he had no information on the C208, as he was not expecting it on his frequency. However, he realised the potential conflict and at 1108:40 instructed the BAe 146 to turn R heading 295°. He added that at about the same time he was warned of the problem by the co-ordinator and the activation of the STCA. Having received an acknowledgement of the turn instruction from the BAe 146, the SC instructed the C208 to turn L heading 180°. However, by the time the pilot queried this instruction, the BAe 146 had descended through its level; consequently, the L turn was considered unnecessary and cancelled.

UKAB Note (2): A replay of the LATCC radar at 1108 shows the BAe 146 heading W and descending through FL 142 about 5 NM E of LOGAN; the C208 at this point is some 6 NM ahead maintaining FL 120. At 1109 the lateral separation has closed to 3.3 NM with the BAe 146 passing FL 118 and commencing a R turn; the C208 starts a L turn at the same time. The closest point of conflict occurs a few seconds later as the BAe 146 passes about 2 NM N of the C208 with vertical separation in the order of 300 - 400 ft. SMF data indicates minimum separation figures of 2.73 NM/400 ft at 1109:09.

(LATCC TC is authorised to use a minimum of 3 NM lateral radar separation in the circumstances of this incident).

SMF recorded separation may differ slightly from the true separation and radar recordings because it is based on processed and predictive radar data.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

An ATCO member commented that the SC concerned had been in position for some time, much of which was spent monitoring a trainee in a complex and busy traffic situation; although within the time limit specified for continuous operational duty (normally two hours but often less depending on the nature of the position), he thought it was possible that tiredness was

beginning to affect his performance. This may have contributed both to the speed differential between the ac going unnoticed and to putting the C208 over to the wrong frequency. The latter, however, turned out to be a fortuitous error because both ac were then on the same frequency which enabled the issue of timely avoiding instructions by the Timba controller; members commended him for his astute recognition and speedy resolution of the unexpected situation. One ATCO member commented that the L turn given to the C208 involved a large heading change which, in the absence of any avoiding action phraseology, probably prompted the pilot to query the instruction instead of obeying it at once.

The Board concluded that the Airprox occurred because the LATCC Clacton S14 controller did not notice the large speed difference between the 2 ac and descended the BAe 146 into conflict with the slower C208 ahead of it. However, the Timba controller's timely turn instruction to the BAe 146 had an almost immediate effect and ensured that it tracked far enough N of the C208 to preclude any possibility of a collision.

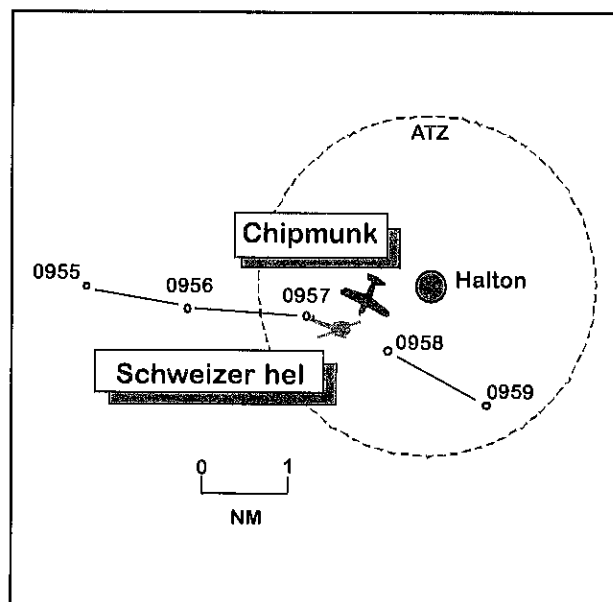
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The LATCC CLACTON S14 SC did not take the slower C208 into account when descending the BAe 146.

AIRPROX REPORT No 72/99

Date/Time: 20 May 0957
Position: N5147 W0045 (Halton - elev 370 ft)
Airspace: ATZ (Class: G)
Reporting Aircraft Reported Aircraft
Type: Chipmunk Schweizer helicopter
Operator: Civ Trg Civ Pte
Alt/FL: 1000 ft ↓ 1500 ft
(QFE 999 mb) (RPS)
Weather VMC VMC HAZE
Visibility: 7 km 4 NM
Reported Separation: zero V/ 300 m H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHIPMUNK PILOT, an instructor with a student in the front seat, reports they were heading 200° at 90 kt and maintaining 1000 ft (QFE 999) in a LH circuit for RW 02 at Halton. He was in contact with Halton radio on 130.425. The visibility was 7 km in VMC. About half way along the downwind leg he saw a Schweizer helicopter 300-500m away at his 1 o'clock position on a conflicting course at co-altitude. He immediately took control and made a steep R turn. The helicopter passed about 300 m to his port side without any apparent avoiding action by its pilot, from whom there had been no radio call. He considered there had been a high risk of collision. Two other ac were operating in the circuit at the time of the incident. The instructor comments that forward vision from the rear seat of a Chipmunk is poor.

THE SCHWEIZER PILOT reports that he was heading 100° at 70 kt in hazy VMC during a transit flight from Oxford to North Weald at 2500 ft. Owing to deteriorating visibility (4 NM) he descended to 1500 ft (RPS) and called Luton when passing about 1 NM S of Halton Airfield. The only traffic he saw was a fixed wing ac about 100 ft below to his L on finals for RW 02 at Halton.

UKAB Note (1): Halton has an ATZ radius of 2 NM notified in the AIP (ENR 2-2-3-3) active 0700 – 1900 (0600 – 1800 in summer).

UKAB Note (2): A replay of the LATCC radar at 0955 shows a return squawking 7000 tracking E about 4 NM W of Halton. At 0957 the response turns about 20° to Starboard and at 0958 passes 0.8 NM SW abeam Halton. The Chipmunk is not seen on the radar 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.

By his own admission the Schweizer pilot passed 1 NM S of Halton airfield at 1500 ft without calling Halton radio. He had therefore entered the Halton ATZ without the necessary notification and the Board concluded that his unauthorised penetration of the ATZ caused the Airprox. Members commented that the Chipmunk pilot could reasonably have expected a degree of protection by virtue of the ATZ and they commended his vigilance. The Board was divided over the degree of risk and some thought that the lateral separation achieved by the Chipmunk pilot following his very positive avoidance manoeuvre suggested there had been a possible risk of collision. However, the majority felt that he saw the

helicopter in time to take action which removed any risk of collision.

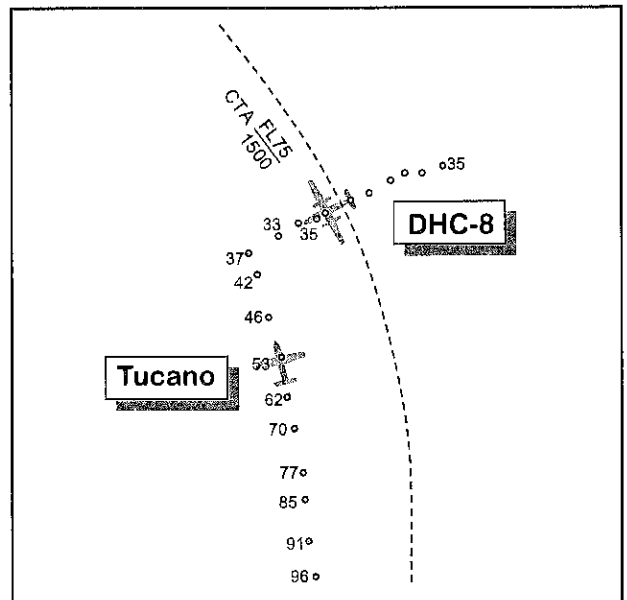
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Unauthorised penetration of the Halton ATZ by the Schweizer.

AIRPROX REPORT No 74/99

Date/Time: 25 May 1355
Position: N5506 W0127 (9 NM ENE of Newcastle)
Airspace: CTA (Class: D)
Reporting Aircraft Reported Aircraft
Type: DHC-8 Tucano
Operator: CAT HQ PTC
Alt/FL: 2300 ft ↓ 2500 ft
 (QNH) (QNH 1015 mb)
Weather VMC CLBC VMC CLBC
Visibility: 10 km 40 km
Reported Separation: 200 ft V/NK
Recorded Separation: 0.5 NM/400 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-8 PILOT reports heading 250° at 160 kt on ILS finals to RW 25 at Newcastle. In the descent, passing 2600 ft at 8 NM he received a TCAS TA followed by an RA to increase vertical speed. He did so and the conflicting ac, blue, low wing single engined, passed about 200 ft overhead, crossing left to right. The other ac was on a different Newcastle frequency and was unknown to his controller; he thought there had been a medium risk of collision.

THE TUCANO PILOT reports heading 352° parallel to the coast, descending to low level while receiving a radar service from Newcastle to VMC below. He was cleared initially to 3700 ft where he levelled before continuing when cleared to 2500 ft. During this, he saw no other

traffic and could not remember being given any traffic information on the DHC-8.

ATSI reports that the Airprox occurred during a period of high workload with a Radar 1 (R1) and Radar 2 (R2) controller operating. The Tucano was the second of two Tucanos northbound along the coast cruising at FL 105 prior to descending low-level once north of Newcastle. The pilot initially contacted Newcastle on the R1 frequency, at 1347, but was immediately requested to change to the R2 frequency. The DHC-8 was inbound from Bristol under the control of the R1 controller.

The crew of the DHC-8 established communication with the Newcastle R1 controller at 1344:00. They were vectored for a left hand radar circuit to the RW 25 ILS and

reported established on the ILS localiser, maintaining 3500 ft QNH, at 1354:45. At that stage, the Tucano was in the DHC-8's 10 o'clock position at a range of about 5 NM, descending through FL 85. Once established, the DHC-8 was cleared to descend to 2000 ft QFE (1006 mb) and further with the ILS glidepath. A minute later, at 1355:45, the DHC-8 pilot reported: "...we've just had a TCAS er warning on er single engine aircraft flying up the coast and he's just missed us by about two hundred feet." The R1 controller responded: "Okay sorry about that it was erm with the Rad Two on a VFR descent sorry."

The Tucano had established communication with the Newcastle R2 controller at 1348:00 and the flight was placed under a RIS. At 1351:15, the pilot advised that he would be requesting descent in 3 minutes to become VMC below cloud. He made the request at 1353:45 and the R2 controller approved the descent with an instruction to report passing 3500 ft on the Regional QNH 1008 mb. At that stage the DHC-8 was in the Tucano's 1 o'clock position at a range of about 7.5 NM, just levelling at 3500 ft (Newcastle QNH 1015 mb), on a similar heading. By permitting the Tucano to descend where it did, the R2 controller effectively approved the flight's entry into the Newcastle CTA (Class D). Consequently, on passing FL 75, the top of the CTA, the Tucano should have been advised that it was entering CAS, placed under a radar control service and provided with standard separation from other IFR traffic. (MATS Pt 1, Page 1-36 refers).

Despite having undertaken to provide the Tucano with a RIS, the R2 controller did not pick up the developing conflict between the subject ac and no further communication took place until, at 1355:45, the pilot of the Tucano reported level at 3500 ft, VMC and happy to continue with a FIS. At that time, the Tucano had just passed about 0.5 NM in front of, and 400 ft above the DHC-8. The R2 controller changed the service being provided to a FIS but no mention of the incident was made. In his report, the R2 controller states that he had been aware that the Tucano had commenced its descent and had noted its Mode C passing FL

90. He had also been aware that there was traffic being vectored for the ILS but it appears he did not appreciate or anticipate the Tucano's relatively high rate of descent (5000 ft/min+) and did not foresee the potential conflict between the subject ac. For his part, the R1 controller states in his report that he had been aware of the presence of the Tucano at FL 105 but had not noticed it commence descent and come into conflict with the DHC-8.

HQ PTC comments that the Tucano pilot recalls only having received a RIS from Newcastle until VMC below, changing to FIS then clearing their frequency once below the CTA. His descent through the CTA was approved by the Newcastle radar controller. He neither saw the Dash 8 nor can he recall having been given any traffic information on it, despite having worked 2 of the Newcastle frequencies.

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.

There was no doubt that the cause of the Airprox stemmed from the R2 controller clearing the Tucano to descend through the level of the DHC-8. It was not clear, however, why he had done so. He had asked the pilot to call passing safety altitude, but not to call passing FL 75 where he would be entering the CTA and would need to be given a radar service and separated from other traffic while on an IMC descent to VMC. Because the controller had retired since the incident there was no explanation of why he had apparently discounted the Tucano entirely, even though it was under a RIS for an IMC descent. Ultimately the conflict was resolved by TCAS. Although the ac had passed some 0.4 NM apart and with some 400 ft of vertical separation, members agreed that the safety of the ac had been compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Newcastle R2 controller cleared the Tucano to descend through the level of the DHC-8.

AIRPROX REPORT No 75/99

Date/Time: 25 May 1040

Position: N5056 W0232 (5 NM ESE Yeovil -
elev 207 ft)

Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft

Type: PA23 Jodel

Operator: Civ Trg Civ Pte

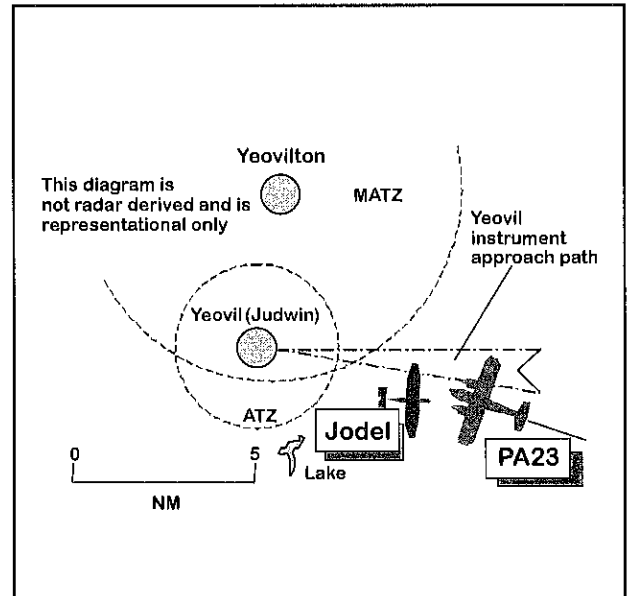
Alt/FL: 2000 ft 2000 ft
(QNH 1023 mb) (RPS)

Weather VMC CLBC VMC CLBC -
HAZE

Visibility: 30 km 10 NM

Reported Separation: 50-100 ft V

Recorded Separation: Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA23 PILOT reports heading 290° at 120 kt and level at 2000 ft (QNH 1023) having just completed the base leg turn of an NDB/DME approach procedure at Yeovil, from whom he was receiving a FIS on 130.8. He was positioned 4.8 NM DME on the 100°R from Yeovil. On looking up after pointing out a drift error to the student, he saw a fixed undercarriage low wing ac with up-turned wing tips (similar to a Robin) about 100 yd away at his 11 o'clock not quite head-on passing from L to R. There was no time to take avoiding action and the ac passed 50 to 100 ft above him with a high risk of collision; he had seen it for about 2 seconds in all. The pilot comments that he was conducting a simulated instrument exercise and IF screens were in position. He reported the incident to Judwin (Yeovil) Approach on 130.8. They were unaware of the presence of the other ac.

THE JODEL PILOT, flying solo, reports heading 090° at 90 kt and maintaining 2000 ft (QNH) in VMC while receiving a FIS from Yeovilton on 127.35. His ac was not transponder equipped. The pilot comments that the RT frequency was very busy at the time. The visibility was a hazy 10 NM. When due S of Yeovilton, he saw a low-wing twin engined ac with white and orange markings only after it had passed under him from R to L in level flight. He was not able to estimate the vertical separation but he thought the risk of collision had been low.

HQ FONA reports that RNAS Yeovilton was first asked to provide information about this Airprox over a month after the event, by which time the RT tapes had been recycled and the controller concerned could remember no details other than that an Airprox had not been declared on the frequency.

UKAB Note (1): AIS(Mil) had contacted Yeovilton ATC on 2 Jun during their routine tracing enquiries and were advised that no radar service had been provided by Yeovilton to any fixed wing ac between 1015 and 1115 on the day in question. Subsequently, FONA provided UKAB with a facsimile of the FPS raised by Yeovilton ATC on the Jodel which indicates that the ac was provided with a FIS while it transited the area at 2000 ft on a pressure setting of 1015 (the Portland RPS) - this figure was later confirmed by the Met office. The ac was not able to transpond.

UKAB Note (2): Following AIS(Mil) tracing action, the Jodel pilot completed a 1094 report form on 6 June but this did not arrive with UKAB until 16 Jun.

UKAB Note (3): UKAB staff spoke to Yeovil/Judwin ATC on 28 May and were advised that, while the PA23 pilot was believed to have made reference to a close-encounter situation, he had not indicated his intention to file an Airprox report and therefore no ATC reporting action was taken. Later a telephone conversation between UKAB and Yeovil ATC established that the PA23 was engaged in NDB training at Yeovil at the time of the incident and had been issued with a squawk (0261). It was explained that although Yeovil have radar they do not have SSR capability; however, there is a standing agreement with Yeovilton that any ac operating with Yeovil will be given a squawk by Yeovil ATC to enable such flights to be identified by the Yeovilton controller, and also to facilitate handovers between the 2 units.

UKAB Note (4): A replay of the Burrington radar shows the PA23, identified by its 0261 squawk, apparently holding in the Yeovil NDB procedure at 2700 ft Mode C (equivalent to 2970 ft QNH). No primary returns are seen in the area, probably because at that range ac are below primary radar cover. At 1038 the PA23 turns L over Yeovil onto a SE heading and at 1039:23, about 6 NM S of Yeovilton, its SSR data, last seen indicating 2300 ft Mode C, disappears and the ac is not seen again on the replay. On the assumption that the ac's track after it faded from secondary radar cover took it outbound and

descending into the procedure for an approach to RW 28, it is calculated by DR that the Airprox would have occurred at about 1042 following completion of the base leg turn. In a subsequent telephone conversation the PA23 pilot confirmed that the incident occurred on his first approach to Yeovil following a period in the holding pattern at 3000 ft. He reiterated that in his opinion the other ac was very close, he thought less than 100 ft.

UKAB Note (5): In a subsequent telephone conversation, the Jodel pilot said that the Yeovilton frequency was extremely busy; he was not passed any information regarding the PA23. His planned route took him over a lake 2.5 NM to the SSE of Yeovil. He was quite certain that he had tracked over the lake and well clear of the Yeovil ATZ. When asked about his risk assessment, the pilot said that it was difficult to judge distances accurately because the other ac had already passed below him when he first saw it. He thought it had crossed from R to L at a fairly large angle and not on a reciprocal heading.

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.

Members quickly concluded that this Airprox occurred because neither pilot saw the other in time to take avoiding action. If both ac were flying at 2000 ft on their respective pressure settings, the Jodel should theoretically have been about 200 ft above the PA23. However, the PA23 instructor clearly felt the distance was considerably less than this and was sufficiently concerned to file an Airprox report. He had been unable to react owing to the late sighting and the Jodel pilot was not in a position to avoid him, or estimate the risk, because he had already passed the other ac when he first saw it. Taking these factors into account the Board concluded there had been an actual risk of collision.

Maintaining positional accuracy during an NDB procedure can be difficult owing to drift assessment and members thought it possible that the PA23 might have been a little S of the inbound track. This notion was supported by the PA23 instructor's comment that he was pointing out a drift error to his student just before the incident. A GA member pointed out that the instrument approach to Yeovil's RW is marked on the 1:500 000 chart and good

airmanship dictated that pilots should route clear of such areas. It was noted, however, that the Jodel pilot had planned to route via the distinctively T-shaped lake to the S of the Yeovil ATZ and he was adamant that he had tracked in an easterly direction directly over this feature. If so, this would have taken him clear of the published instrument approach area at Yeovil, albeit by not a great margin.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

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

AIRPROX REPORT No 76/99

Date/Time: 26 May 0944

Position: N5247 W0103 (10 NM ESE East Midlands airport)

Airspace: CTA (Class: D)

	<u>Reporting Aircraft</u>	<u>Reported Aircraft</u>
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<u>Type:</u>	PA34 - 200T	PA28
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<u>Operator:</u>	Civ Pte	Civ Pte
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<u>Alt/FL:</u>	FL 50	5000 ft
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<u>Weather</u>	VMC CLAC	VMC CLAC
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<u>Visibility:</u>	10 km	>10 km
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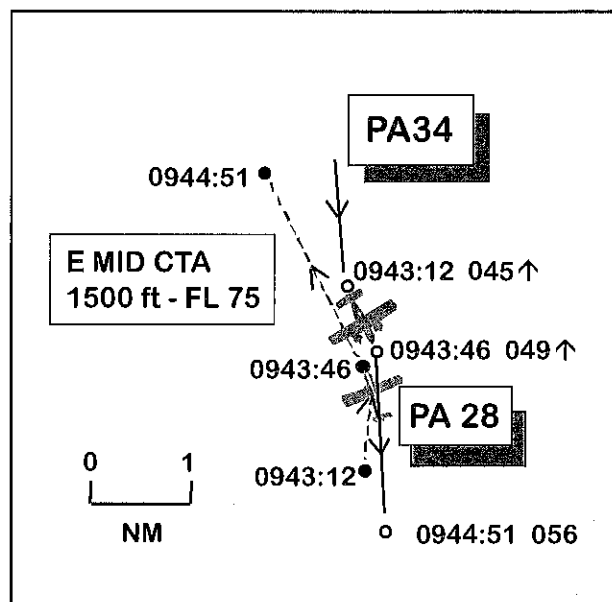
Reported Separation:

50 ft V/150 ft H/

300 ft V/500 m H

Recorded Separation:

<0.25 NM H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA34 PILOT reports that he was heading 180° at 160 kt and cruising at FL 50 having recently departed from Nottingham (Tollerton) for Jersey. The visibility, 1500 ft above cloud, was over 10 km. He was squawking with Mode C selected. On leaving Tollerton he had switched to the East Midlands APC frequency (119.65) to request clearance to enter their

CTA. The frequency was busy, so he initially remained VFR and below 2000 ft until contact was established about 20 sec later. ATC then cleared him to enter East Midlands airspace to fly IFR at 5000 ft direct to the DTY VOR. To his surprise he was told that he had already entered the CTA when his call was made; the controller accepted his apologies for the error.

When level at FL 50 he was advised of conflicting traffic on a northbound track about

which ATC had no height information; he was advised that it had entered the CTA without permission. Looking ahead for the ac he saw a PA28 at very close range and watched it pass in the opposite direction about 150 ft off his starboard wing and 50 ft above. No avoiding action was possible due to the late sighting but he reported the incident to E Midlands APC and advised them of the miss distances. He then heard the controller make contact with the other pilot who, when asked, said that he thought lateral separation had been about 600 yd. APC asked him if he agreed with this figure and he replied that he did not, believing the other ac had been much closer than its pilot would admit. He declared his intention to submit an Airprox report.

THE PA28 PILOT reports that he had filed an IFR flight plan to Leeds Bradford and took off from Biggin Hill at 0829. Shortly afterwards, while climbing to 3000 ft towards BPK on a BPK2 standard departure with Thames Radar, it became clear that his SSR transponder was not working (despite the fact that it was blinking normally). Attempts to recycle it were unsuccessful and Thames instructed him to leave CAS by continuing towards DET at 3000 ft as LATCC would not accept him in the TMA. After leaving CAS he descended to 2400 ft and worked his way NW, negotiating the Luton zone and flying under airway B4. Much of the time he was on the London Information frequency 124.6. As the bottom level of the airway system rose, he climbed to 5000 ft while checking the base of CAS in his area with London Information and keeping them advised of his progress.

Eventually he called E Midlands APC and then realised that he had in fact already entered their airspace. While the controller was expressing his displeasure, and he was apologising for his mistake, he saw what he thought was a military jet (see UKAB Note 2) climbing through his level in the opposite direction about 0.5 NM away. No avoiding action was considered necessary and the other ac passed 0.5 NM down his starboard side with an estimated vertical separation distance of around 300 ft.

The pilot concedes that he had misjudged his position and entered controlled airspace without clearance (he has subsequently been sent a letter of guidance by the GA department of the CAA).

EAST MIDLANDS ATC reports, with RT transcript, that the PA34 pilot made a late call on 119.65 requesting transit clearance of the CTZ/CTA on a southerly heading climbing to 6000 ft. The ac was given a squawk (4560) and subsequently identified as it passed through RW 27's approach path at a range of 8 NM indicating 3600 ft. At this point the pilot had still not been given clearance to transit the CTA; he was advised of the necessity either to call earlier or remain clear of CAS pending receipt of a clearance. The pilot acknowledged his error, apologised and was then cleared to continue on track climbing to FL 60. At that point the APC mentor handed the radio over to a trainee who quickly noticed an unknown primary-only return on a northerly track conflicting with the PA34. She called this traffic to the PA34 pilot who acknowledged. Shortly afterwards a free-call was received from an ac giving his position as 5 NM N of Leicester at 5000 ft northbound. The D/F was out of service but it was immediately apparent that the free-calling ac was likely to be the observed unknown return which had entered the CTA without clearance. The mentor re-took control of the radio and called the traffic. The two radar responses merged and both pilots subsequently reported that they had sighted each other; the PA 34 pilot estimated the miss distance at 100 ft horizontal at the same level while the other pilot said 500 yd and 300 ft. The unknown ac, a PA28, was subsequently identified within the CTA.

UKAB Note (1): **ATSI** examined this incident and concluded that there were no contributory ATC factors.

UKAB Note (2): In a subsequent telephone conversation the PA28 pilot accepted that the ac he had seen was not a military jet (no returns other than those of the subject ac are apparent on radar in the area during the period of the Airprox) and attributed his misperception to a

high closure rate between the ac. He remained adamant that the other ac had passed well clear of him with no risk of collision.

UKAB Note (3): A replay of the LATCC radar shows the PA34 climbing out after departure from Tollerton. At 0943 the ac is about 10 NM E of East Midlands airport and heading S, squawking 4560 with Mode C. Twelve sec later a primary only return pops up on a northerly heading about 1.5 NM directly ahead of the PA34. At 0943:46 the ac are at each other's 2 o'clock at about 0.25 NM with the PA34 indicating FL 49. At this point the returns become difficult to follow as the PA34's SSR return disappears for several sweeps of the radar, as does the primary response of the PA28. The PA34 tracks S as a primary return and then leaves the CTA at about 0944:51 when the Mode C reappears indicating FL 56. The primary return of the PA28 shows again about 1 NM N of the Airprox position and proceeds in a northwesterly direction. It is not possible to judge the lateral separation with any degree of accuracy; however, based on the projected tracks as the ac passed the distance would likely have been less than 300 m.

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.

A GA member thought that the PA28 pilot might have been unsettled by the unexpected need to re-plan his flight to Leeds Bradford while airborne, following failure of his ac's SSR equipment. Indeed the Board member wondered to what extent he was prepared for such an eventuality, which would have required the availability of relevant charts and topographical maps; absence of the latter might explain why the PA28 pilot found it necessary continuously to confirm his position in relation to CAS with London Flight Information. While not having any specific knowledge of the PA28

pilot's experience, members assumed that having filed an IFR plan to enter CAS, he ought to have had the necessary qualifications for such flight. That said, GA members thought the use of the FIS frequency (124.6) was inappropriate in the circumstances and the PA28 pilot would have been better served by a LARS service which could have been obtained variously from Luton, Cottesmore and Waddington.

With regard to the incident itself, members noted that although both ac had entered the East Midlands CTA without authorisation, the PA34 had already been identified and provided with a service before the PA28 appeared as a pop-up return moments before the encounter. They considered, therefore, that while the PA34 pilot's unauthorised penetration of the CTA had no relevance to the Airprox, the PA28's unannounced entry was the direct cause of it.

Members found it difficult to understand how the PA28 pilot could have misidentified the PA34 for a military ac; a GA member thought that in order to gain such an impression the other ac must have appeared to be quite large and probably in the PA28 pilot's field of view for only a very short time. This might suggest that the other ac had been considerably closer than the PA28 pilot had thought. Moreover, although inconclusive, the radar replay supported the probability that lateral separation was somewhat less than the 0.5 NM reported by the PA28 pilot. The PA34 pilot, on the other hand, despite seeing the PA28 late following traffic information from East Midlands ATC, was able to identify the ac correctly and members felt that his recollection of the encounter was the more credible. Members acknowledged that this had been a most uncomfortable experience for the PA34 pilot and there was considerable debate as to the risk that had been involved. Some thought that there had been an actual risk of collision, but others reserved feelings of doubt on this. Eventually the view prevailed that the information available was sufficiently inconclusive to say with assurance that there had been a positive risk of collision. Instead, the Board agreed that the safety of both ac had been severely compromised.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Unauthorised penetration of the East Midlands CTA by the PA28 which then flew into conflict with the PA34.

AIRPROX REPORT No 77/99

Date/Time: 28 May 1257

Position: N5202 W0027 (7 NM SE of Cranfield)

Airspace: Airway B4 (Class: A)

Reported by: LATCC DTY CSC

First Aircraft Second Aircraft

Type: DC10 C12

Operator: CAT Foreign Mil

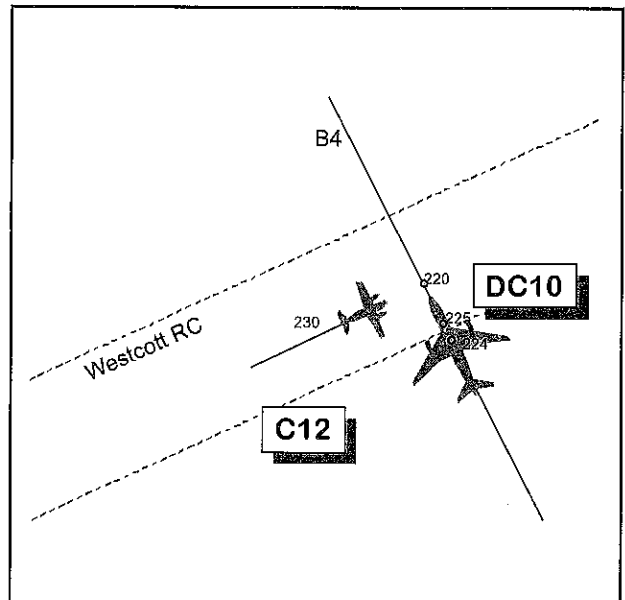
Alt/FL: ↑ FL 240 FL 230

Weather VMC CLNC VMC

Visibility:

Reported Separation: NK/NK

Recorded Separation: 0.96 NM, 1000 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC DAVENTRY SC reports that the DC10 was on a radar heading of 340°, cleared to climb to FL 220 to remain clear of traffic crossing the Westcott RC at FL 230. He noticed its Mode C reading FL 224 at the same time as the pilot asked about traffic on his TCAS. The SC asked the pilot what level he was climbing to as he had only been cleared to FL 220. By then the confliction had passed (the pilot was descending in response to a TCAS RA) and so no avoiding action was passed. The pilot responded that he was climbing to FL 240 and had acknowledged that level.

THE DC10 PILOT reports heading NW at 320 kt in an en route climb. The FO (handling) believed he had been cleared to FL 240 and set this on the height selector and believed he had acknowledged FL 240. The Captain and Second Officer were obtaining and confirming their oceanic clearance with Shanwick at the

time. At FL 225 he received a TCAS RA to descend; he complied with this, advising ATC who seemed unaware of the conflict and replied that they had only been cleared to FL 220. He was unaware where the breakdown occurred.

THE C12 PILOT was heading 055° at FL 230 and declined to submit a report. It is believed that he was unaware of the incident.

HQ MATO reports that the C12 was routeing through the Westcott (WCO) RC inbound to Mildenhall at FL 230 and under Radar Control from the LJAO Central (CEN) Sector Controller on frequency 275.35. The WCO RC had been correctly activated. Whilst CEN was coordinating the descent of another track with the Daventry CSC, the Daventry SC pointed out the DC10 amongst a group of tracks, informing CEN that its climb would be stopped at FL 220 in order to remain clear of the traffic within the WCO RC. CEN advised the C12, "C/S traffic

right two o'clock, ten miles crossing right left, co-ordinated in the climb to stop one thousand feet below" at 1256:15, before continuing the previous co-ordination with the CSC. Whilst still co-ordinating, CEN observed the STCA activate on the DC10's track, although CEN assumed that this had triggered because of its rate of climb. The Daventry SC confirmed that the ac was only cleared to FL 220. Shortly afterwards, CEN was advised that the DC10 had climbed through its cleared level, but the crew had received and reacted to a TCAS RA. The Civil Supervisor subsequently classified the incident as an Airprox.

The incident is shown on LATCC radar recordings. The C12, squawking 6401, is tracking NE through the WCO RC, just south of the centreline, and indicating a Mode C of FL 230 throughout. The DC10 can be seen squawking 5444, tracking NNW at 90° to the C12's track. At its highest point, at 1257:26, the DC10's Mode C indicates FL 225 with the C12 in its 10 o'clock position at 3 NM. The DC10 passes 0.9 NM ahead of the C12 at 1257:46, at which point the ac are separated vertically by 1000 ft. A subsequent playback of the RT exchange between the Daventry SC and the DC10 crew revealed that the ac had been cleared to climb to FL 220 and this had been clearly acknowledged.

THE DC10 PILOT'S COMPANY reports that having checked the RT recording it appears that the FO inadvertently set FL 240 on the altitude selector. His ATC instruction to turn onto 340° and climb to FL 220 may have led him to transpose heading and flight level figures. In accordance with company procedures for 3-pilot crews, the PNF and the second officer both go off frequency to pick up and check their oceanic clearance. The company is continually reviewing possible solutions for obtaining oceanic clearance immediately after departure to prevent a recurrence of an incident like this. One possible solution may be to request and receive the clearance through the ACARS computer; another is to obtain the clearance before take-off. The incident will be reviewed in the company flight operations safety publication.

ScOACC advises that there is no possibility of extending the issue of pre-take-off oceanic clearances beyond the few airfields adjacent to the oceanic areas where it is essential. In these cases a slot in the form of a 'take off not before/clearance expiry time' is applied which could not be complied with by traffic from the London airports. Precise estimates for oceanic entry are vital to avoid expensive buffer requirements which would be necessary to allow for take-off delays. The problems outlined by the DC10's company are well known; part of the problem is a time consuming wait for a gap in the RT traffic to request clearance. The way ahead is seen to lie in data linking requests and clearances to and from ac on-board computers, and trials are under way with selected airlines.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the DC10 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

The Board had no doubt about the cause of the Airprox; the DC10 crew climbed above their cleared flight level because the FO set the wrong level in the altitude selector and the crew's checking procedures either broke down or were not adhered to. The initial error was of a type which is common enough in aviation. It emphasised the importance of pilots cross-checking each other's selections, especially in the London TMA and Daventry CTA which were so busy that any uncleared altitude/level deviation is almost certain to lead to a conflict with another ac. Members were familiar with the problems associated with two-man checking of vital RT messages, particularly when there were routine instructions to be listened to at the same time, such as obtaining ATIS weather or oceanic clearances on another frequency. However, airline members who operated in 2-man crews thought that it was inappropriate for the DC10 crew, on climb-out through a busy TMA, to have been

concentrating on anything other than the job in hand at that stage of flight. With over an hour to go to the ocean, the place to obtain oceanic clearance was in the cruise. Although such clearances were issued on a first come, first served basis, members thought safety considerations outweighed any slight advantage that might be obtained by calling 15 minutes earlier. It was surmised that a company procedure which required 2 pilots to check an incoming oceanic clearance may have been the result of an earlier incident caused by

a mistake in copying such a clearance. The Board concluded that this made it even more important to obtain the clearance at a less critical stage of flight.

Members also noted that this conflict was resolved by TCAS and the DC10 crew's prompt response to the RA which had removed any risk of the ac actually colliding; indeed standard separation was re-established as the DC10 crossed ahead of the C12.

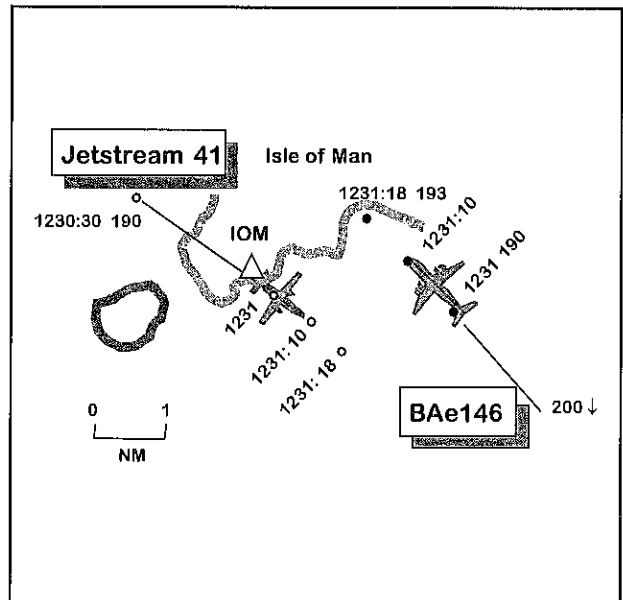
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The DC10 crew climbed through their cleared level.

AIRPROX REPORT No 79/99

Date/Time: 01 Jun 1231
Position: N5403 W0443 (1.5 NM SE IOM VOR)
Airspace: Airway B3 (Class: A)
Reporter: SCACC
First Aircraft: Jetstream 41
Second Aircraft: BAe146
Type: Jetstream 41 BAe146
Operator: CAT CAT
Alt/FL: FL 190 ↓ FL 120
Weather: VMC VMC
Visibility: 30 km 30 km
Reported Separation: 1 - 2 NM H
Recorded Separation: 1.5 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC ANTRIM SC reports that the Jetstream was tracking airway B3 from Belfast towards the IOM VOR at FL 190 on its own navigation under the control of the Antrim Sector on 123.77. The BAe 146 was transferred to the frequency from London tracking airway B3 in the opposite direction at FL 220. Its pilot requested a route to centre fix

for RW 22 at Belfast City but this was refused and instead the ac was instructed to head 315° and descend to FL 200. As the BAe 146 passed FL 210 the STCA triggered, but, since the ac had been cleared to FL 200, it was assumed this was a false warning and therefore no action was taken. At this point the BAe 146's label garbled with that of another ac below it at FL 120; however, a number 7 was noticed

amongst the garbled label data and the BAe 146 pilot was asked to confirm that he was maintaining FL 200. He replied that he was descending to FL 120 as cleared. Avoiding action was then given to the BAe 146 but not the Jetstream, as by this time the ac had passed. He advised the Jetstream pilot that an incident had occurred and that the appropriate reporting action would be taken.

THE JETSTREAM PILOT reports that he was heading 130° at 210 kt and cruising at FL 190 under the control of Scottish Radar on 123.77. The visibility was 30 km in VMC. He heard ATC passing avoiding action instructions to another ac and a BAe146 was then seen to pass down his port side at co-altitude about 1-2 NM away. ATC advised him that the appropriate reporting action would be taken.

THE BAe 146 PILOT reports that he was en-route from Birmingham to Belfast City under the control of Scottish Radar on 123.77. The visibility was 30 km. When near the Isle of Man he was given descent clearance (he believed to FL 120). On passing FL 197 ATC asked him to confirm he was level at FL 200 to which he replied that he had been cleared to FL 120. He was then instructed to turn R heading 360° and complied, at the same time readjusting his level to FL 200. A short time later ATC instructed him to resume a heading of 315° and to descend to FL 120.

UKAB Note (1): The BAe146 pilot's manager advised that the pilot accepted that he had selected the wrong descent level, having heard and acknowledged the correct one. Appropriate company action had been taken on this aspect. Moreover, they had also investigated what the FO had been doing at the time and determined that he had been getting destination weather on another radio while the captain was resetting the height selector; this meant the normal check by the non-handling pilot had been missed. The Fleet Manager went on to say it was disappointing that this incident had occurred since company altitude change procedures had recently been revised. He agreed that a 'height bust' in UK airspace, with much climbing and descending traffic, was a major problem,

particularly for his airline which flew short sectors involving many level changes. Nevertheless, routine cockpit activities, such as obtaining weather checks and listening to ATIS transmissions, must always be held subordinate to ATC instructions on changes to an ac's height or FL. Whenever one pilot is unable to hear such instructions fully, he/she should be encouraged to ask for the instruction to be repeated.

UKAB Note (2): Examination of the RT transcript for 123.775 shows that at 1229 the BAe 146 pilot was instructed to descend to FL 200 which he acknowledged and read back correctly. Two min later ATC asked him to confirm he was levelling at FL 200 to which he replied...*"C'S we're clear to one two zero"*. After advising him that he was cleared only to FL 200, ATC instructed an avoiding action turn R onto 360°.

UKAB Note (3): A replay of the Scottish Radar shows the subject ac tracking airway B3 on reciprocal headings towards the I0M VOR with the Jetstream maintaining FL 190 Mode C throughout the encounter. At 1230:30 the BAe 146 is about 6 NM SE of the VOR descending through FL 200, with the Jetstream at its 11 o'clock range 8 NM. At 1231 the BAe 146 indicates FL 190 with the Jetstream now at its 10 o'clock 2 NM; about 10 sec later the ac pass port to port some 1.5 NM apart. There are no Mode C readings on the BAe 146 at this point but the next indication, at 1231:18, shows FL 193. The BAe 146 was therefore at a similar level, or perhaps very slightly above, 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, transcripts of the relevant RT frequencies, a radar video recording, and a report from the air traffic controller involved.

An ATCO member familiar with the SCACC environment said that FL 120 was the standard

inbound level to Belfast and as the BAe 146 pilot would have flown this route many times before he would have been expecting descent clearance to that level; it was perhaps a case of his 'hearing what he wanted to hear'. Noting that the pilot's error was not detected by the FO, whose attention was engaged elsewhere, members made the point that it was a crew's joint responsibility to hear and verify all ATC executive instructions. Several Airprox recently assessed by the Board had shown that in many cases cross-checking of ATC instructions had been neglected, often because the non-handling pilot had chosen an inappropriate time to pursue non-essential activities, such as obtaining weather information as was the case here. An airline member said that it was insufficient for the checking pilot merely to acquiesce to the other pilot's pointing finger if he had not heard the ATC instruction himself, as this would simply verify a possibly erroneous setting.

Members commended the SCACC SC for astutely spotting the figure 7 amongst the garbled label information which enabled him to expose the conflict and give timely avoiding instructions to the BAe 146. An ATCO member, however, commented that it would have been even better had he given the avoiding action turn before entering into a conversation with the pilot about what his cleared level was.

The Board concluded that the BAe 146 pilot had caused the Airprox by descending below his cleared level. Fortunately the tracks of the two ac were laterally separated by over 1 NM and this was slightly improved by the SC's avoiding turn instructions; therefore, although the ac passed at similar levels, the Board was satisfied that there had not been a risk of collision.

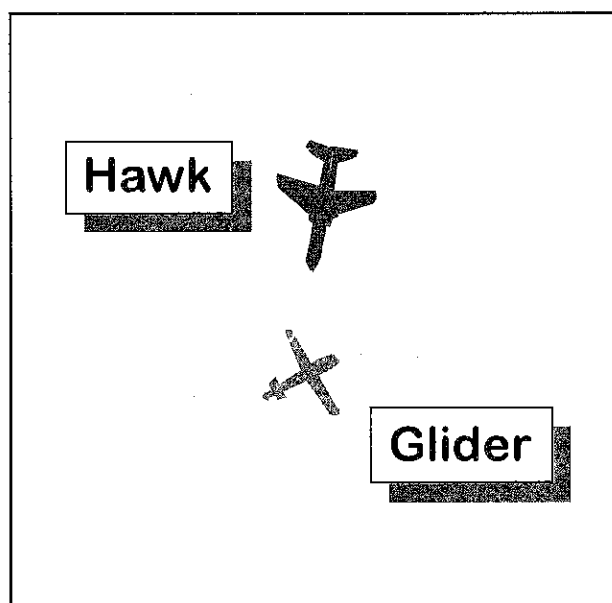
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The BAe 146 pilot descended below his cleared level.

AIRPROX REPORT No 80/99

Date/Time: 1 Jun 1537
Position: N5223 W0048 (2 NM W of Kettering)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Hawk Untraced glider
Operator: HQ STC
Alt/FL: FL 30
Weather VMC HZBC VMC
Visibility: 15-20 km
Reported Separation: 150 m, 1-200 ft
Recorded Separation:



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports heading 193° at 360 kt in a transit at FL 30. Having called Cottesmore for a FIS but without making two-way RT contact, he then called Benson who asked him to change squawk. While doing so he looked up to see an ac just right of the nose, crossing right to left at the same level, about 0.5 NM away. He turned hard right, noticing that the glider did the same before he lost sight of it. On rolling out he saw the glider in his 8 o'clock about 100 ft below, rolling wings level. He estimated he had missed it by about 150 m and considered the risk of collision would have been high if avoiding action had not been taken.

Note: Both ac can be seen on LATCC radar recordings, both as primary-only returns with no squawks. The other ac, probably a motorised glider, is tracking about 080° and continues on track after the Airprox. An intermittent track which may be the glider disappears in the area of Lyveden but the club there were unable to find a pilot who may have been involved. A glider pilot from the London Gliding Club who was airborne at the time said he had heard someone on the glider common frequency saying "Did you see that, that was close", but the glider pilot remains untraced.

HQ MATO reports that the Hawk was not receiving an ATS at the time of the Airprox, was below Benson's radar cover and did not report the incident to Benson on RT.

HQ STC comments that the difficulty of seeing gliders is well known to pilots and the UKAB. In this instance, in-cockpit activity may have compounded the difficulty, resulting in a relatively late sighting by the Hawk pilot. However, appropriate avoiding action was taken and the risk of collision negated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the Hawk pilot, radar video

recordings and reports from the appropriate ATC and operating authorities.

Members agreed that this incident was a prime example of the importance of maintaining a lookout scan while coping with cockpit tasks. They praised the Hawk pilot's technique – punctuating his head-down task after a few seconds with head-up scans outside which had helped him spot the conflict just in time. Members went on to discuss whether or not this constituted a late sighting but concluded that it was not always possible to spot a white glider at any greater range. Similarly, the glider pilot appeared to have seen the Hawk somewhat late, if his manoeuvring had been in avoidance, but a fast moving Hawk head-on is usually easier to spot because of its nose light. The Board concluded that on the limited information available, the incident appeared to be a conflict of flightpaths which was resolved by the Hawk pilot. Opinion as to the risk fell into 2 camps; some members considered that the Hawk pilot appeared to have manoeuvred relatively moderately to avoid the other ac, with enough time to remove any risk of collision. However, the view prevailed that because the Hawk pilot had filed, and had come fairly close to the 'glider', the safety of the ac had not been assured.

The gliding representative on the Board pointed out that the remark heard on the glider common frequency was not necessarily to do with this incident, but that the glider pilot concerned appeared to have been in a situation which should have caused him to file a report anyway. The BGA encourages glider pilots to file such reports when appropriate but there still appears to be a disappointing reluctance among glider pilots to participate in Airprox reporting procedures.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Confliction of flightpaths resolved by the Hawk pilot.

AIRPROX REPORT No 81/99

Date/Time: 3 Jun 0947

Position: N5124 W0226 (3 NM SW of
Coleme)

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

Reporting Aircraft Reported Aircraft

Type: Jetstream 41 Hercules

Operator: CAT HQ STC

Alt/FL: FL 120 ↓ FL 125 ↓

Weather VMC VMC CLBL

Visibility: 10 km 10 km

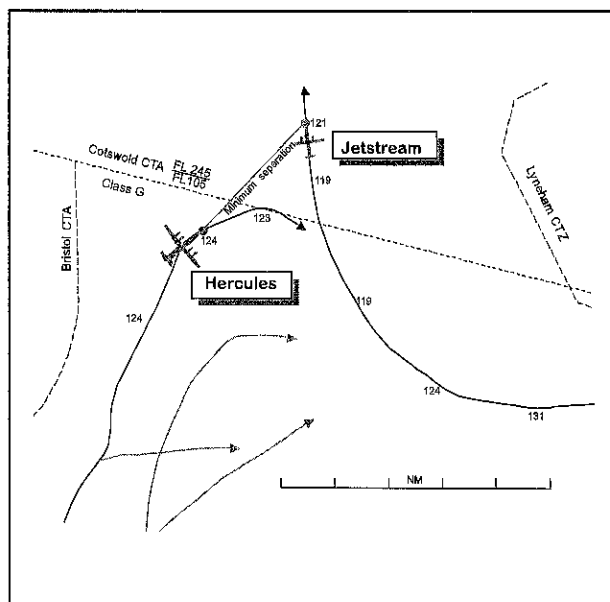
Reported Separation: 3 NM/NK

Recorded Separation: 3.2 NM

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 255° at 240 kt in a descent for Cardiff and receiving an ATS from Bristol ATC to whom he had given his preference for RW 30. Passing FL 123 he was told to maintain his present level; he levelled the ac at FL 120 and was then told to turn right onto 320°. In the turn he was advised to turn further onto 350° to avoid 4 Hercules in his 11 o'clock at the same level. On rolling out he saw 3 Hercules below heading NE and then saw one appear from behind a cloud at the same level on a closing heading. It then turned right to pass about 3 NM astern. He was in controlled airspace throughout (he believed) and acting on all ATC instructions; it appeared to him that the Hercules had entered controlled airspace (CAS) without permission.

THE HERCULES PILOT reports heading 026° at 220 kt leading a 4-ac formation recovery to Lyneham and receiving a RIS from Lyneham director. The formation had split for recovery and although he did not see the Jetstream he



understood the incident occurred while he was in a descending turn away from CAS.

HQ MATO reports that the C130 established communications with Lyneham Director (DIR) at 0942:08 on 300.475 and was squawking 4514 with Mode C. The ac was the lead element of a formation of 4 C130s, operating VMC between layers in the block FL 110 to FL 130 and receiving a FIS. Prior to individual radar recoveries to Lyneham, DIR (manned by a trainee and mentor) established that the C130 leader intended to split the formation without ATC assistance for recovery in the order 4, 3, 2, 1. He told the formation to "...report split and ready for individual recovery" and the split commenced at 0944:34. At that point the other 3 ac all began transponding at the same time, which had the effect of obscuring the radar picture. From 0944:51, there followed an almost constant stream of RT exchanges whilst DIR identified and vectored Nos. 4, 3 and 2 C130s in turn. Unknown to ATC the C130s had

also split themselves vertically, from FL 110 upwards, at 500 ft intervals on a north-easterly heading. During these exchanges, DIR passed traffic information on the Jetstream to the No 4. At 0946:55 DIR started vectoring the lead C130 whose pilot advised he was at FL 125, heading 030°. Ten sec later (No.1 c/s) was told to turn right heading 180°, which was acknowledged. Within moments this was amended to "(No.1 c/s) expedite your turn onto 180° to avoid the airway". This call however, was acknowledged by No.4, who had just called level at FL 80. Forced to repeat the instruction to No.1, DIR went on immediately to transmit, "(No.1 c/s) expedite descent...flight level ...one...one zero now"; this was acknowledged by the pilot at 0947:33.

When the split began, the Lyneham Supervisor (SUP), realised that there were a number of tracks in the Bristol area that would probably require co-ordination. Included in these was the Jetstream inbound to Cardiff which was 10 NM SW of Lyneham, heading towards the formation. SUP contacted Bristol Approach (BR APR) by landline at 0945.00, requesting co-ordination for the "gaggle of squawks" on which additional FL information was passed. The BR APR acknowledged, spoke about the Jetstream and sought clarification on the various Hercules' hdgs. It took the 2 controllers the next 20 sec or so to sort things out, culminating in the BR APR issuing an avoidance turn R to the Jetstream, onto 320°. As the dynamics of the situation progressed the BR APR and SUP continued to discuss and co-ordinate 2 other relevant Bristol tracks until 0945.50. At 0947.00, BR APR told SUP she had turned the Jetstream further right onto 350° maintaining FL 120. SUP replied "Thanks, we'll just get the other one out of the airway." Shortly afterwards, the LATCC BRS sector CSC telephoned SUP to discuss the situation, following an STCA activation at LATCC, confirming later that a report would be raised.

LATCC radar recordings show the C130 formation, identified by a single 4514 squawk, 6.5 NM SW Radstock at 0944:00, tracking about 015° and indicating level at FL 110. The Jetstream is 6.5 NM S Lyneham, tracking

towards the southern point of the Bristol CTZ (about 255°), indicating FL 155 in descent; the C130 formation is 15° L of the Jetstream's track, range 23.5 NM, crossing from R to L. One min later, the formation is split over a 3 NM distance, the lead ac tracking N with the remaining ac equally spaced to the ESE, the most easterly ac tracking 025°. Three of the 4 C130s are squawking. The Jetstream is now 9 NM SW Lyneham, having just crossed the Cotswold CTA boundary, descending through FL 145 with the closest of the C130 group on a steady bearing (15° L) at 13.5 NM. The first indication of the Jetstream turning R is at 0945:44 as it passes an indicated FL 132 with the C130s now between its 11 and 12 o'clock, at 8.5 NM and 10 NM, still crossing L to R. The C130s' SSR labels are overlapped, but it is possible to identify the closest ac (11 o'clock 8.5 NM) as the No.2, which is indicating FL 120 and tracking 020°. The Jetstream's further R turn to 350° shows at 0946:48, about 0.5 NM before re-entering CAS, with the ac levelling at an indicated FL 119. At this point, the C130s' positions relative to the Jetstream are:

No.4 205/4 NM tracking 090, Mode C obscured

No.3 220/5 NM tracking 100, Mode C obscured

No.2 235/4 NM tracking 020, FL 120 Mode C

No.1 255/4 NM tracking 030, FL 124 Mode C

The closest point of approach recorded on radar occurs at 0947:23. The Jetstream is 2.5 NM inside CAS, tracking 350° and indicating FL 121, with the No.1 C130 in its 7 o'clock position, range 2.75 NM, tracking 060° and indicating FL 124. The C130's radar contact bisects the displayed edge of CAS at FL 123 at 0947:35, and the much tighter turn takes effect in the next frame as the ac turns S.

A number of events linked together to cause this loss of separation. On the initial call, BR APR placed the Jetstream on a radar heading towards Bristol and cleared it for descent without co-ordinating with Lyneham; this action

put the Jetstream into conflict with the Hercules formation which was about 13 NM SE of Bristol tracking NNE at FL 110, and wearing a Lyneham squawk. One minute later, as the Jetstream left CAS, the formation began the split. The increased No. of SSR returns about to cross the track of the Jetstream should have made them readily apparent.

Having ascertained that the formation would split itself and, knowing that the pilots were VFR, DIR left the C130 crews to their own devices. The formation split themselves vertically, on headings and levels that would shortly infringe CAS without passing any details to DIR who was slow subsequently in extracting the information from the ac. DIR would have reasonably expected the Lyneham based C130 crews to be fully aware of the local airspace, and their proximity to CAS. However, it was known that radar recoveries were required and therefore, more positive action was needed to control the split. An instruction to split around a suitable base heading, eg. east or north-easterly (the ac were much further S at this time), would have made the risk of CAS entry and the developing conflict easier to contain. Indeed, had the split-up plan been clarified beforehand, either by the formation leader or by DIR, the risk of a CAS infringement would have been obvious and, regardless of the fact that their tracks were obscured by the SSR labels, the need to turn all 4 ac quickly would have been given more urgent attention.

Following the activation of the whole formation's transponders, DIR and SUP had difficulty monitoring the progress of the split and this distracted the controllers from properly controlling the developing situation. It would however, have been a simple action to instruct all ac to squawk standby and issue individual squawks as required, rather than try to fight through the clutter.

SUP was the first person to notice and react to the conflict by calling BR APR. APR stated that she had the Jetstream, and asked about the C130s' routing. The Jetstream was descending through FL 145 at this point. The SUP concerned however, could only recall

vertically co-ordinating 2 other Bristol tracks and believed that, as the intentions of the formation were unclear, it was only traffic information that had been passed regarding the C130 formation. The R turn was never really a viable option; had the Jetstream and all 4 C130s instantly taken up new headings (for the C130s, only E was mentioned on the landline), achieving the prescribed 5 NM separation would have still been difficult without the Jetstream re-entering CAS. However, having ascertained that the Jetstream was turning right, Lyneham ATC were slow in ensuring their 4 ac were vectored as individual speaking units, as DIR elected to identify and deal with each ac in turn.

The No 4 C130 was given traffic information on the Jetstream, which was indicating FL 125, but nothing was said to, or by, the other ac. At this point, all 4 C130s were still within 2-3 NM of each other. A more general call to the whole formation however, may have been more effective. Additionally, the Jetstream's level was passed in the transmission; the other C130 crews were flying at FL 115 (No.3), FL 120 (No.2) and the leader at the same level as the Jetstream, and should have had sufficient situational awareness to realise that the Jetstream could also be close to them. The lead C130 crew, having been instructed to turn S, was initially slow to turn and appeared not to realise their proximity to CAS.

ATSI reports that the Bristol APR was working the Jetstream which was still well inside CAS when it contacted Bristol at 0943:40. Co-ordination was initiated by Lyneham at 0944:50, as the Jetstream was about to leave CAS, with the C130 formation converging from the south, and the conversation terminated at 0945:30 when the Bristol APR gave the Jetstream an avoiding action right turn in accordance with the agreement reached. This took it back into CAS. Following the co-ordination with Lyneham, BR APR would have assumed that the C130s were IFR and that Lyneham would also have been endeavouring to provide standard separation. 3 of the C130s turned right onto an easterly heading to pass behind the Jetstream but the fourth continued north, following the Jetstream

as it returned into CAS. The C130's track was tangential to the boundary of the Cotswold CTA as it turned away to the SE. The APR used appropriate 'avoiding action' phraseology when turning the Jetstream and provided traffic information; although the Jetstream pilot should have been advised that he was leaving CAS & told what type of service was being provided, in reality there was very little time to do this.

HQ STC comments that the Hercules crews elected to conduct a 4 ac formation split close to controlled airspace and without having informed ATC of their precise intentions. This action complicated the task of the controllers who, in turn, were slow to react to the situation. The result was not only the Airprox but also a great deal of confusion, and, no doubt, frustration for all concerned. Formation splits require proper planning and co-ordination and this incident should serve to highlight the impact of a failure in either of these areas. Thankfully, this scenario was not further complicated by traffic in the Cotswold CTA. Turning to the activation of transponders after the formation split, JSP 318 Para 05312 states that 'pilots are to operate transponders and select modes/codes only as directed by an Air Traffic Service Unit'.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that the primary cause of the untidy handling of this event was poor planning. Had the formation leader conveyed his vertical and horizontal split intentions to ATC beforehand, the Lyneham and Bristol controllers would probably have been able to co-ordinate a trouble-free passage for all concerned. The Board accepted that the Lyneham controller, starting from a FIS, could not have been expected to pick up any more quickly the threads of a situation which was

dumped on him without warning, although it was easy to say with hindsight that he could have eased his problem with more prompt SSR instructions.

Members accepted also that Bristol ATC was no more required to initiate the required co-ordination than Lyneham and that APR had correctly and promptly applied avoiding action in response to the agreed co-ordination. However, the Board was critical of the omission to tell the Jetstream pilot that he was leaving controlled airspace; a mandatory requirement in MATS Part 1 that appeared from several Airprox reports to be honoured more in the breach than the observance by Bristol ATC. Members agreed that it was very important for pilots to be aware of when they left controlled airspace; a mistaken belief, as in this case, of being in CAS could lead to a pilot not looking out at all in an environment full of traffic unknown to the controller and which a pilot had the prime responsibility for seeing and avoiding, as indeed applied (in VMC) to the Jetstream pilot with regard to the C130s in this incident.

It was further agreed that pilots had a primary responsibility for knowing the type of airspace they were operating in and that if the type of chart normally used did not show this information, it was up to airlines to ensure that route briefs contained information on the type of airspace to be encountered on various portions of a route. Airspace awareness was a factor in several Airprox assessed at this and earlier meetings and the Chairman agreed to discuss with the CAA means of improving matters. This did not absolve controllers from their separate duties in this respect, not least because of overseas airlines operating outwith the bailiwick of the CAA.

Members agreed that the separation achieved between the ac was satisfactory for Class G airspace and that there had been no risk of the ac colliding; the avoiding action given to the Jetstream had prevented the ac coming into conflict with the C130s which had (just) not entered CAS. While it had undoubtedly been a messy situation, the Board concluded that it only amounted to a sighting report.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Sighting Report.

AIRPROX REPORT No 82/99

Date/Time: 7 Jun 0546

Position: N5137 E0006 (1.5 NM SW of LAM)

Airspace: LTMA (Class: A)

Reporting Aircraft Reported Aircraft

Type: Fokker 50 B747-400

Operator: CAT CAT

Alt/FL: FL 90 ↓ FL 95 ↑

Weather IMC IICL IMC NK

Visibility: 10 km+ nk

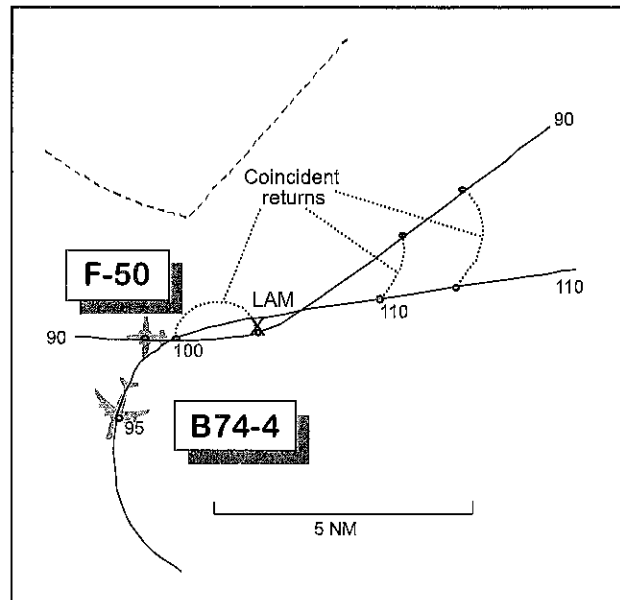
Reported Separation: 500 ft/NK

Recorded Separation: 1.7 NM, 500 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE F-50 PILOT reports heading 240° at 220 kt inbound to LAM at FL 90 when he was overtaken by a B747 above in the hold. As they turned left outbound the B747 which should have been at FL 100 descended, approaching to within 500 ft of his level; he was unsure of how far away it was. It then turned away to his left.

THE B747 PILOT reports approaching Lambourne at 230 kt, level at FL 100. The controller told him to make one left orbit at LAM and then roll out heading 270. The Captain (PNF) acknowledged while working on the FMS-CDU so he did not notice that his FO had set the autopilot altitude selector to FL 70 and the ac had begun to descend. The controller enquired and alerted him at FL 95 and he noticed and apologised for the unauthorised descent. Fortunately there was no conflicting traffic indicated on his Nav Display or TCAS; the controller told him to maintain FL 90 and continued to vector him. He was unaware at



the time of the presence of the F-50. He expressed his appreciation of the controller's performance and alertness and said that the reason for the deviation was that his FO misinterpreted the ATC heading instruction and thought they had been cleared to FL 70, and he did not notice his FO's actions in a busy environment; he was re-programming the FMS to fly a complete orbit at LAM rather than following the full holding pattern.

LATCC reports, with RT transcript, that during a very quiet period (3 ac on frequency) the Heathrow Intermediate Director (N) was explaining a radar display problem to a systems engineer when another controller pointed out a conflict alert near Lambourne. The B747, whose cleared level was FL 100, was descending through FL 95. As it was already heading away from the F-50 at FL 90 he gave no traffic information or avoiding action.

The B747 called the INT Dir (N) at FL 125 descending to FL 110 and was told to continue to LAM. The slower F-50 was preceding the B747 into the hold and was then cleared to descend from FL 100 to FL 90. 2 minutes later the controller advised the F-50 pilot *"Cancel the hold, leave Lambourne heading 270"*. After his acknowledgement the controller cleared the B747 pilot to *"Descend to FL one hundred"* which was correctly acknowledged; thirty seconds later the controller told the pilot *"When you get to Lambourne just make a full left hand orbit, after the orbit head 270"*. The pilot replied *"C/s over Lambourne left orbit roll out heading two seven zero"*. 45 seconds later the controller called the B747 pilot: *"C/s you're supposed to be maintaining FL one hundred. You can er maintain 90 now, confirm"*. The pilot apologised profusely for leaving FL 100 and acknowledged the clearance to FL 90.

LATCC radar recordings show the ac converging on LAM; the F50 is steady at FL 90 throughout as the B747 overtakes some 2 NM to its left and 2000 ft above. The B747 then starts to descend and passes FL 100 when it is 1.7 NM ahead of the F50 as the latter passes LAM. The B747 continues to descend entering its left orbit and passing FL 95 the conflict alert activates. It continues descending and diverging from the F50 and its range, which has remained virtually constant at 1.7 NM, begins to increase.

THE B747 PILOT'S COMPANY comments that the Flight Ops Manual instructs pilots that: "The PNF shall normally set the altitude preselect switch settings. When the autopilot is engaged, the settings shall be performed by the PF". Under crew co-ordination, the manual states: "The pilot making altitude entries in AFS shall point a finger at the altitude readout until the other pilot has confirmed and acknowledged the setting as depicted in AOM."

UKAB Note: The company was asked if the error lay with the FO for actioning the perceived level change without obtaining the Captain's concurrence, or if something the Captain said gave him the impression that he had agreed the change. The company was unable to provide

this detail but advised that the FO was a very experienced captain on other ac types who had recently transferred to the B747 and was on a UK route introduction flight. The company also stated that their FOM is in the process of revision to stress the importance of confirmation of ATC clearances, and this incident will be used as a case study by their human factors team during pilot CRM 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, reports from the air traffic controllers involved and reports from the appropriate operating authorities.

It was clear that the cause of the incident was that the B747 descended below its cleared level. Airline members of the Board considered that the incident resulted from poor crew co-ordination. It was suggested that since both pilots were very experienced and probably trusted each other a great deal, the process of one pilot flying the ac and the other checking what he was doing appeared to have broken down. Pilot members considered that the B747 pilots had got their priorities wrong; the flying task appeared to have become split with the pilots working separately and not as a team. The PF was attending to the level flown and the PNF was making the heading change, while neither was checking what the other was doing. Board members with B74-4 experience advised that according to the procedures recommended by Boeing (autopilot engaged), the PF should have carried out both FMS functions (heading and level) with the PNF working the RT and monitoring the PF. Had they been working this way the PF's erroneous belief that they had been cleared to descend would almost certainly have been picked up by the Captain before they left FL 100. A pilot flying Airbus products advised that his company policy, during climb and descent was to have the PNF make changes on the MCDU keyboard, at the PF's direction, but he should not request such

activity at the same time as making a level change or other activity requiring a check by the PNF. Finally, pilot members agreed that it would have been much simpler to have flown the B747's turn by rotating the heading selector, rather than re-programming the FMS CDU, and the PF could have done this without distracting the PNF from his monitoring task.

It was recognised that all this took place towards the end of a long spell of duty for the pilots and the controller. The RT transcript

showed that pilots in other ac were making errors, taking instructions clearly addressed to other ac and so on. This demonstrated the need for aircrew, after a long flight, to make an extra effort to "sharpen up" for the descent and landing phases.

The Board agreed that the B747's orbit fortunately took the ac away from the F50 and that it descended into clear airspace without any risk of colliding with another ac.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

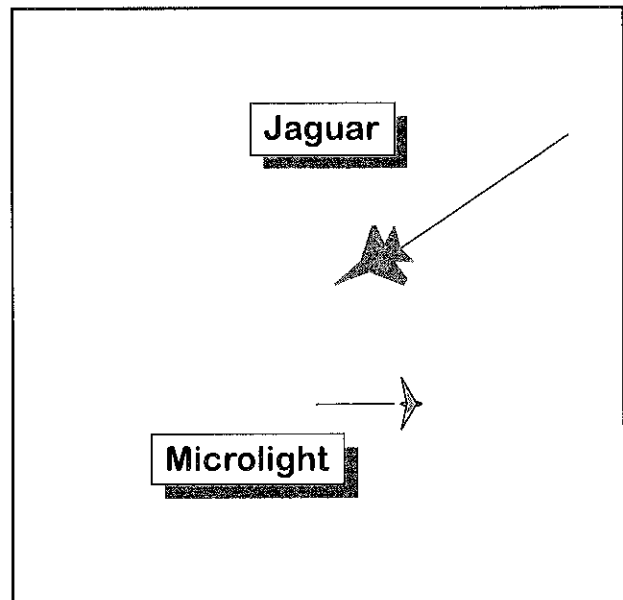
Cause: The B747 descended below its cleared level.

AIRPROX REPORT No 83/99

Date/Time: 11 Jun 1624
Position: N5255 W0258 (Chirk)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Microlight Jaguar
Operator: Civ Trg HQ STC
Alt/FL: 1200 ft (QFE) 1500 ft (Rad Alt)
Weather VMC CLBC VMC CLBC
Visibility: 10 km+ 25 km
Reported Separation: 3-400 m, 100 ft/NK
Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports that having completed his first solo, he took off again to fly around the airfield area. He was heading 100° at 45 kt, cruising at 1200 ft, when he saw a military jet approaching from left of his nose 10 seconds before it passed 3-400 m to his left, banking sharply to its right. He saw its afterburner light as the ac turned sharply through about 150° and then noticed a strong smell of kerosene. He thought the risk of



collision had been high. His instructor on the ground at Chirk airfield saw the jet turn through the circuit at about 300 ft.

THE JAGUAR PILOT reports heading 240° at 360 kt, flying a hold at 1500 ft before recovering to Woodford and performed a level right turn in the area. He did not see a microlight ac.

UKAB Note: LATCC radar recordings show the Jaguar, identified from its Manchester squawk, making a right turn from SW to NE about 0.5 NM to the NE of Chirk airfield at 1300 ft Mode C. There is an intermittent return which might be the microlight which the Jaguar passes by about 0.5 NM just before it turns. 1300 ft Mode C equates to 1200 ft agl taking the local QNH (1025 mb) and terrain elevation (450 ft) into account.

HQ STC comments that the Jaguar was holding prior to recovery to Woodford. Aware of the need to minimise noise nuisance to the many built up areas in the vicinity, the pilot adjusted his ground track on a number of occasions. He was aware of his proximity to the airfield at Chirk and was holding at about 1500 ft. He did not see the microlight. The eyewitness report of an airfield overflight at 300 ft is not consistent with either of the pilots' reports or with the radar recording.

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 discounted the estimation of the Jaguar's height made by the ground witness as this was contrary to all the other information. If the Microlight pilot had smelled its exhaust, the Jaguar must have been at or near the microlight's level. Members wondered whether or not there had been an incident to discuss. It appeared that the ac had not been on a collision course and the Jaguar's turn away had not been taken as avoiding action. The microlight had subsequently flown close to its wake. However, it was concluded that the Jaguar pilot would probably not have flown that close to a microlight if he had seen it and therefore that the cause of the incident was a non-sighting of the microlight by the Jaguar pilot. The Board agreed that there had not been a risk of the ac actually colliding.

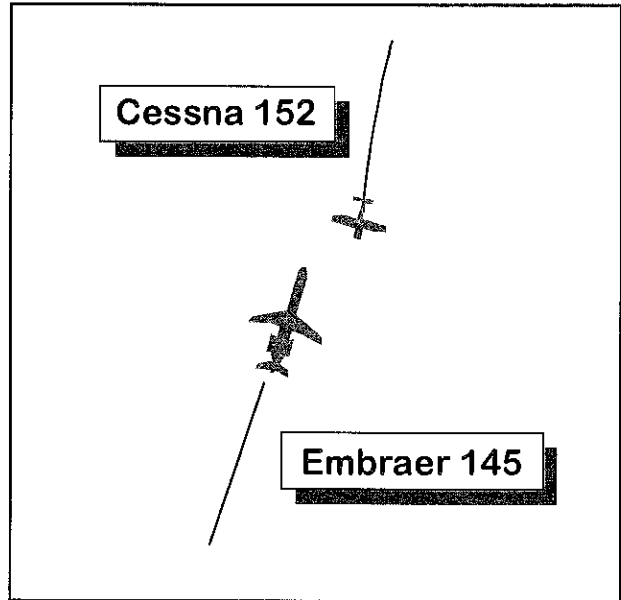
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Jaguar pilot did not see the microlight.

AIRPROX REPORT No 84/99

Date/Time: 11 Jun 0944
Position: N5101 W0119 (4 NM NNE of Southampton - elev 44 ft)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: Embraer 145 Cessna 152
Operator: CAT Civ Pte
Alt/FL: ↑ 2000 ft 2500 ft
(QNH 1026 mb) (QNH 1026 mb)
Weather VMC CLBC VMC CLOC
Visibility: 20 km 5 km+
Reported Separation:
H 500 m, V 300 ft H 200 m, V 500 ft
Recorded Separation: 500 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER PILOT reports heading 020° at 240 kt after take-off from RW 02 at Southampton. He had been cleared to 2000 ft and told to expect VFR traffic in the same sector at 2500 ft and was in communication with Solent Radar on 120.22. While levelling at 2000 ft he received a TCAS TA with traffic 300 ft above, immediately followed by an RA to descend. He descended by 200 ft and while levelling saw the Cessna in his 12:30 turning left, seemingly unaware of his presence. It passed 300 ft above and 500 m to his right. The cloud was reported as scattered at 3000 ft but he estimated from his previous approach that it was 'SC 2500' with reduced visibility beneath. It appeared subsequently that the encounter was a result of an acceptable local SOP.

THE CESSNA PILOT reports heading 200° at 95 kt, cleared to transit the Southampton zone via the SAM at 2500 ft by the Approach controller on 120.22 and to report if he could not maintain VMC. There were fairly well spaced Cu, base 2000 ft so he could remain clear of cloud and in sight of the surface but he had to adjust track to maintain 5 km visibility. He was warned of ac departing from RW 02 and climbing through his level but given no traffic information on it. His height keeping was reasonably accurate but varied between 2350

and 2550 due to slight turbulence. He first saw the twin jet at about 3 km, below and to the right; it passed well below (about 500 ft) and 200 m to the right and he reported seeing it. He would have appreciated timely traffic information on it but the controller was quite busy with a lot of zone transits. In retrospect he felt it would have been better to have accepted an IFR clearance on a track clear of the climb-out, which is what he did when offered it on his return flight.

UKAB Note: LATCC radar recordings show the incident as described by the pilots. The ac, identified by their Southampton squawks, are head-on to each other; the Embraer climbs to 2000 ft QNH (corrected from Mode C) and immediately descends to 1800 ft to pass the Cessna which is steady at 2350 ft.

SOUTHAMPTON ATC reports, with RT transcripts, that the Embraer was cleared before take-off to 2000 ft and told by ADC about the Cessna 8 NM N transiting southbound at 2500 ft. The Cessna pilot had asked APR for a transit via the SAM en route to Cherbourg while at 1800 ft and was asked if he could accept 2500 ft. He replied "Er 2500 ft IFR over" to which the controller replied "Roger that, VFR" He said he would try and reported climbing and was cleared "To transit the Solent Control area at 2500 ft VFR report at any time you're unable

to maintain VMC at that level". He was then warned of the Embraer about to depart from RW 02 "climbing northbound through your level IFR". The Cessna pilot reported seeing the Embraer but this went unacknowledged; the Embraer pilot said that he had a TCAS RA to descend and the traffic was 300 ft above. The controller did not see it take avoiding action and the pilot had not asked for any before take-off.

ATSI comments that whilst having 2 ac approach each other head-on was not ideal, the controllers complied with the level of service required in Class D airspace; indeed they exceeded the minimum requirement by 'building in' 500 ft of vertical separation between the IFR departure and the transiting VFR ac. The Embraer pilot had the options of remaining on the ground until the Cessna was clear or requesting positive separation from it (which may have meant being held on the ground.)

SDD comments that the catalyst for filing this Airprox and another like it was the Embraer's TCAS which reacted to the Cessna. Clearly TCAS fitted to commercial air transport ac is beginning to play an increasingly active role especially in Class D airspace against VFR ac squawking Mode C. There have been other Airprox occurrences concerning GAT operations under RAS in Class G airspace; RAs were indicated against known VFR traffic where 500 ft separation was being applied, because TCAS is designed to give an RA under such conditions. Perhaps a need now exists to remind commercial pilots about VFR traffic and the concomitant separation criteria. Similar reminders could be aimed at controllers to advantage.

CAA FOI consulted the Embraer pilot's Ops Director who has made an arrangement with Southampton ATC to route VFR traffic clear of departing/arriving traffic; a request always to give traffic information is also being considered. FOI comments that many Captains are not as aware as they should be of the rules regarding the type of airspace in which they are operating and expect that they are always going to get 1000 ft of vertical separation. The company will issue a Notice to their Aircrew aimed at bridging

any such gap in knowledge. However, the matter applies industry-wide and numbers of similar incidents are likely to rise with the progressive introduction of 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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This was one of 2 essentially similar incidents which occurred 4 minutes apart at Southampton each involving a (separate) departing EMB145 and a transiting GA ac; the similarities and differences between them were relevant to both incidents; this summary therefore covers both Airprox (84 & 85/99).

Members agreed with ATSI that to have VFR and IFR traffic approaching head-on was not ideal; indeed if the GA ac in both cases had been asked to pass 3-4 NM W of the SAM, the clearly contentious altitude clearances could have been avoided and the incidents would not have occurred. In both incidents, more so in the second, the GA ac appeared to have difficulty in maintaining VMC at 2500 ft and members agreed that both GA pilots should have told the controller, as required by their clearance, of their difficulty maintaining VMC at 2500 ft. The Cessna pilot appeared from Mode C to be flying some 150 ft below his cleared level but the Board agreed that this was just within the tolerances of the accuracy of Mode C and height keeping at an assigned level. However, the Board agreed that the controller applied the requirements in class D airspace regarding VFR and IFR flights, (as per MATS Part 1, not just an 'acceptable local SOP' as suggested by the EMB145 pilot's operator).

Members agreed with the CAA FOI that the EMB145 pilots did not appear to be fully aware of the lack of specific separation criteria between IFR and VFR traffic in class D

airspace. In both Airprox members considered that having been warned about the GA ac and accepted their take-off clearances, the EMB145 pilots should not subsequently have been surprised to encounter traffic. They had the option of declining the take off until the GA ac was clear but the controller also appeared unmindful of this possibility since the traffic information was issued after the line-up clearance. In conclusion, the Board agreed that the clearances issued and the standard of

adherence to them were sufficient to remove any risk of the ac actually colliding, and that the incident was a conflict of flightpaths in class D airspace.

The Board considered that commercial pilots' awareness of the provisions of the various classes of airspace was a matter that needed addressing, and the Chairman agreed to take it up with SDD and FOI.

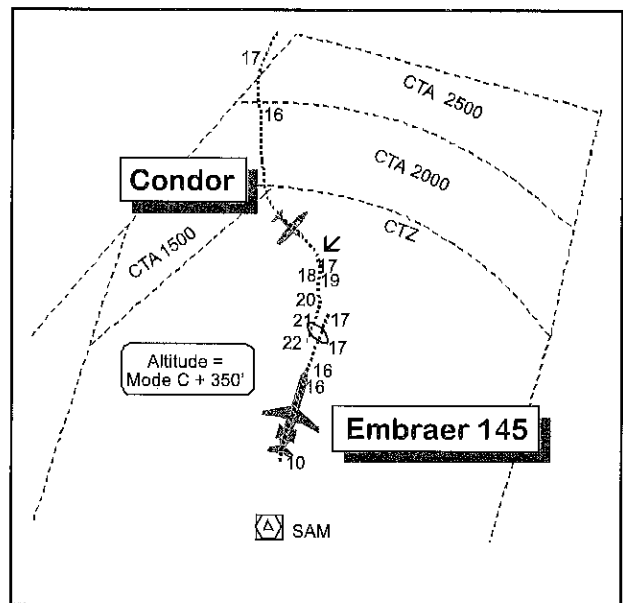
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Conflict of flightpaths in class D airspace.

AIRPROX REPORT No 85/99

Date/Time: 11 Jun 0948
Position: N5102 W0119 (4.5 NM NNE of Southampton - elev 44 ft)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: Embraer 145 D62 Condor
Operator: CAT Civ Pte
Alt/FL: 2000 ft 2300 ft
 (QNH 1026 mb) (QNH 1026 mb)
Weather VMC CLBC VMC CLBC
Visibility: 20 km 5 km+
Reported Separation:
 H 1 NM, V 3-500 H 300 ft, V 300 ft
Recorded Separation: 400 ft, 0.31 NM



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports heading 020° at 240 kt after take-off from RW 02 at Southampton. He had been cleared to 2000 ft and advised of 2 VFR ac N of the airfield, tracking S at 2500 ft and was in communication with Solent Radar on 120.22. His level out at 2000 ft took him between these ac; he noted from TCAS that the first was at 2300 ft and

reduced his climb rate to avoid an RA on the second which was at 2500 ft. Shortly before level off a TCAS TA was issued with the traffic 300 ft above and then when level at 2000 ft an RA, 'monitor VS' (climb prohibited) was actuated with the traffic seen at 11 o'clock 2 NM. It passed 1 NM to his left and 3-500 ft above. The ATIS cloudbase was 3000 ft; actual was 27-2800 ft with 5 km visibility close to the base.

THE CONDOR PILOT reports heading 185° at 90 kt, cleared to transit the Southampton zone en route to Alderney and was asked to climb to 2500 ft by the Approach controller on 120.22. He heard the controller tell the other ac about him and while climbing he saw a twin jet below and to the left of him pass in the opposite direction 300 ft below and 300 ft to his left. He told the controller he had spotted the jet and immediately afterwards heard the other pilot say he would file an Airprox. There was broken cloud between 2000 and 3000 ft.

UKAB Note: LATCC radar recordings show the incident as described by the pilots. The ac, identified by their Southampton squawks, pass on opposite tracks; the Embraer has climbed to 2000 ft QNH (corrected from Mode C) to pass 0.31 NM E of the Condor which is passing 2450 ft in a climb.

SOUTHAMPTON ATC reports, with RT transcripts, that the Embraer was cleared before take-off to 2000 ft and told by ADC about a Cessna 152 2 NM N transiting southbound at 2500 ft VFR, and the Condor also at 2500 ft VFR approaching from the N at about 7 NM. The pilot replied "Understood" and was cleared for take-off.

The Condor pilot had asked APR for a transit via SAM en route to Cherbourg while 10 NM N of the zone at 2000 ft and was asked if he could accept a transit at 2500 ft. He replied "I'll try 2500" to which APR replied "Roger and if you transit at 2500 ft VFR, report at any time if you're unable to maintain VMC at that level". The pilot acknowledged and was told to remain outside of controlled airspace until reaching 2500 ft as there was an Embraer shortly departing RW 02, "climbing through your level IFR". The Condor pilot acknowledged this requirement and APR advised him to climb immediately or turn right onto N (Point \angle on the diagram). The pilot said he was climbing immediately and was told the Embraer was now airborne and asked to report his altitude (2200 ft) as the Embraer 145 came on frequency and was given traffic information on the Condor (12 o'clock, 3 NM). The Embraer pilot said that he had a TCAS RA because of the traffic and

would "be filing that". The controller did not see it take avoiding action; the pilot had not asked for any before take-off.

ATSI comments that whilst to have the 2 ac approaching head-on was not ideal, the controllers complied with the level of service required in Class D airspace; in fact the controller exceeded the minimum requirement by 'building in' 500 ft of vertical separation between the IFR departure and the transiting VFR ac. The Embraer pilot had the options of remaining on the ground until the Condor was clear or requesting positive separation from it (which may have meant being held on the ground.)

SDD comments that the catalyst for the filing of this Airprox and another like it was the Embraer's TCAS which reacted to the Condor. Clearly TCAS fitted to commercial air transport ac is beginning to play an increasingly active role especially in Class D airspace against VFR ac squawking Mode C. There have been other Airprox occurrences concerning GAT operations under RAS in Class G airspace; RAs were indicated against known VFR traffic where 500 ft separation was being applied, because TCAS is designed to give an RA under such conditions. Perhaps a need now exists to remind commercial pilots about VFR traffic and the concomitant separation criteria. Similar reminders could be aimed at controllers to advantage.

CAA FOI consulted the Embraer pilot's Ops Director who has made an arrangement with Southampton ATC to route VFR traffic clear of departing/arriving traffic; a request always to give traffic information is also being considered. FOI comments that many Captains are not as aware as they should be of the rules regarding the type of airspace in which they are operating and expect that they are always going to get 1000 ft of vertical separation. The company will issue a Notice to their Aircrew aimed at bridging any such gap in knowledge. However, the matter applies industry-wide and numbers of similar incidents are likely to rise with the progressive introduction of 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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

This was the second of 2 essentially similar incidents which occurred 4 minutes apart at Southampton each involving a (separate) departing EMB145 and a transiting GA ac; the similarities and differences between them were relevant to both incidents; this summary therefore covers both Airprox (84 & 85/99).

Members agreed with ATSI that to have VFR and IFR traffic approaching head-on was not ideal; indeed if the GA ac in both cases had been asked to pass 3-4 NM W of the SAM, the clearly contentious altitude clearances could have been avoided and the incidents would not have occurred. In both incidents, more so in the second, the GA ac appeared to have difficulty in maintaining VMC at 2500 ft. The controller persisted in the VFR clearance at 2500 ft despite being told by the Cessna pilot (84/99) that it would be IFR at 2500 ft. However, members agreed that both GA pilots should have told the controller, as required by their clearance, of their difficulty maintaining VMC at 2500 ft. The Condor pilot was clearly in breach of his clearance to remain clear of the Zone until he was at 2500 ft or to say if he was unable to maintain VMC at that level, and did not climb until ordered to directly by the controller, which was not acceptable behaviour. The Board agreed that part of the cause of the incident was that the Condor pilot did not comply with his clearance. The Board agreed that the controller applied the requirements in class D airspace regarding VFR and IFR flights, as per MATS Part 1.

Members then examined the clearance issued to the EMB145 pilot, which included traffic information on the Condor and the preceding Cessna, giving their levels as 2500 ft. Having made crossing at 2500 ft a condition of the GA ac clearances (which he did not need to do under the rules regarding VFR and IFR ac in class D airspace) the APR should have made sure the Condor was at that level before submitting it as traffic information for ADC to pass to the EMB145. Rather, members considered that having seen that it was not flying as cleared, APR should have passed a warning to ADC for departing ac. Had the EMB145 pilot known the Condor was not at 2500 ft, he might well have declined the take-off clearance. The inaccurate traffic information was therefore also considered to be part of the cause.

Members agreed with the CAA FOI that the EMB145 pilots did not appear to be fully aware of the lack of specific separation criteria between IFR and VFR traffic in class D airspace. In both Airprox members considered that having been warned about the GA ac and accepted the take-off clearance, the EMB145 pilots should not subsequently have been surprised to encounter it. By the time the Condor was encountered it had reached its cleared level; this, with the TCAS RA, led the Board to conclude that there had not been a risk of the ac actually colliding. The Embraer pilots also had the option of declining the take off until the traffic was clear but the controller also appeared unmindful of this possibility since the traffic information was issued after the line-up clearance.

The Board considered that commercial pilots' awareness of the provisions of the various classes of airspace was a matter that needed addressing, and the Chairman agreed to take it up with SDD and FOI.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Condor pilot did not comply with his clearance, compounded by inaccurate traffic information to the Embraer 145 pilot.

AIRPROX REPORT No 86/99

Date/Time: 16 Jun 0639

Position: N5212 W0130 (11 NM SE Hon VOR)

Airspace: DTY CTA (Class: A)

Reporter: Birmingham ATC

First Aircraft Second Aircraft

Type: Jetstream 31 C650

Operator: CAT Civ Pte

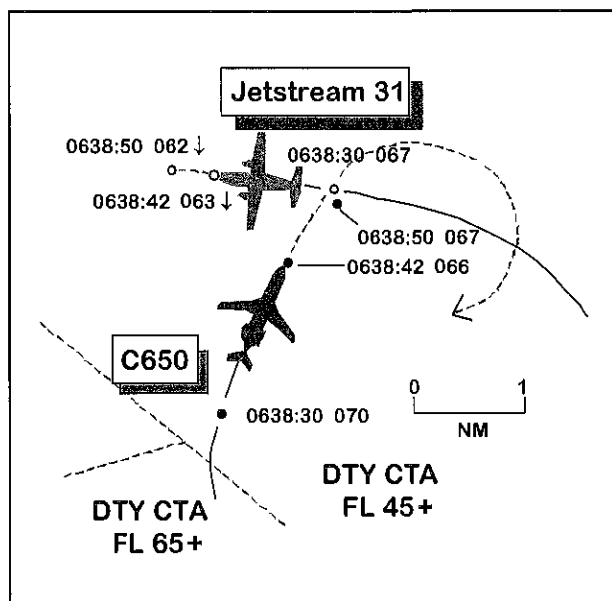
Alt/FL: FL 60 ↓ FL 70

Weather: VMC HAZE VMC No cloud

Visibility: 10 km >10 km

Reported Separation: 0.8NM H/200 ft V

Recorded Separation: 0.9 NM/300 ft



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

BIRMINGHAM ATC reports that the Jetstream had been released to Birmingham by TC COW/WEL. On first contact, descent clearance was given, initially to FL 80 and then, shortly afterwards, to FL 60 together with a radar vector of 280° for positioning to RW 33. At about the time the latter instructions were passed to the Jetstream, the C650 (seen to be wearing an airways squawk) was observed just outside CAS to the W but appeared to be closing towards the Jetstream and still climbing. TC was asked what the intentions of the C650 were; they advised that the ac was under a FIS and had been instructed to remain outside CAS. By this time the C650 had entered CAS and separation with the Jetstream was reducing rapidly. An avoiding action R turn onto 340° was given to the Jetstream and the C650 passed about 0.8 NM behind the Jetstream with 200 ft vertical clearance. TC was advised that Airprox reporting action would be taken.

THE JETSTREAM PILOT reports that he was maintaining FL 60 and receiving radar vectors from Birmingham APC for an ILS approach to RW 33. The visibility was about 10 km in early morning haze. He was advised of unknown traffic at a similar level in his 11 o'clock position at 1 NM and given an immediate instruction to turn R heading 340° to avoid. He complied at once and his FO briefly saw the other ac passing down their port side about 1 NM away and 300 ft above. The avoiding action given had prevented any risk of collision.

THE C650 PILOT reports that he was not required to keep either radio or clearance logs, so his recollection of events was from memory, a week after the incident. He had taken off from Oxford early in the morning (before ATC had opened) and had called London Information direct on 124.6 requesting instructions to join airways. While waiting for such approval he held clear of CAS about 8 NM NW Oxford

airport at FL 80. Clearance was then received to join CAS at Daventry maintaining FL 70; he therefore turned and headed about 050 towards DTY and descended to FL 70. On calling the assigned airways frequency, he was told to climb and to turn R heading 170°. Previous to this, whilst still some 15 NM from DTY on a NE heading, he had seen a Jetstream ac in his 4 o'clock position about 6 NM away heading NW at a similar level and had kept track of it. Subsequently, during his turn towards Daventry, he watched this ac as it flew from R to L across his track and considered that there was absolutely no risk of a collision. Had there been any question of a serious conflict he would have taken the appropriate reporting action himself. He estimated minimum separation distances were in the region of 0.5 NM and 1000 ft.

ATSI reports that the C650 departed from Oxford before the ATC hours of watch. At 0632:30 its pilot called the FIR frequency requesting an airways joining clearance at Daventry, giving brief details of the flight. The FISO (A) responded correctly with a time check, the standard warning to remain outside controlled airspace, and brief amplification of parts of the flight plan. At 0635:00, whilst waiting for a clearance from TC Midlands, the FISO (A) put the C650 on its airways squawk (which would be obtained by activating the flight plan in the ATC computer and which would assist the TC Midland controllers in identifying the ac). At 0637:00, the TC Midland co-ordinator looked at all the relevant information assembled and issued a joining clearance to the FISO (A) for onward transmission to the ac. Instructions were made with reference to the converted data block of the C650 (which at this

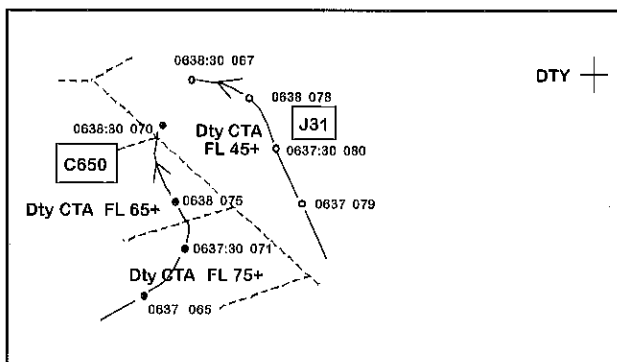
stage would be unvalidated and unverified). Moreover, the clearance, which was to join CAS on track Daventry level at FL 70, included an instruction to make one RH orbit, and gave the contact frequency.

UKAB Note (1): What the TC Midland co-ordinator had in mind was to make the C650 do one RH orbit outside CAS to provide separation before it flew towards DTY. This intention, however, was never stated clearly and what the C650 pilot received second-hand from London Information was ".... You are clear to join on track Daventry level at FL 70 ... er ... do one right hand orbit before setting course for Daventry". This was read back correctly.

The TC Midland Co-ordinator agreed afterwards that the clearance he issued was not strictly correct procedurally for a number of combined reasons; one, the Jetstream had been released to Birmingham, two it was at FL 80 in the vicinity of Daventry and three, he would not know when Birmingham would descend the ac. However, as the TC MID radar controller was very busy and the Co-ordinator was radar qualified, he had made the decision to issue a radar-based clearance on his behalf. He felt this was reasonable given the relative positions of the ac as viewed on the radar.

Following the clearance from London Information (at 0638.00 hrs), radar photographs show the C650 turning L onto a North Westerly heading and starting to converge with the Jetstream, which was tracking NW ahead of it inside CAS. Watching this unfold with some concern, the Birmingham APC became sufficiently worried 25 sec later to transmit to the Jetstream under his control "c/s turn R heading 340 avoiding action there's unknown traffic inside the airway (unreadable) ... correction closing left hand side seven o'clock range is one mile". As the turn instruction issued to the Jetstream started to take effect, the C650 commenced its RH orbit placing it in direct conflict with the Jetstream.

While all this was going on, at 0638:20 the FISO (A), working in a non-radar position, had instructed the C650 to contact TC Midlands -



shortly before the Birmingham APC issued the avoiding action turn to the Jetstream. The C650 pilot made two attempts to establish contact with the TC Cowly Sector controller between 0638:40 and 0639:10 but, owing to frequency congestion, was not successful until 0640.00 when he was vectored and climbed into the airways system. No mention was made at the time of sighting another ac.

UKAB Note (2): A replay of the LATCC radars at 0638:30 shows the C650 in a R turn through a northerly heading indicating FL 70 Mode C; it has just entered the stepped portion of the DTY CTA 2 NM S of Gaydon where the base of CAS is FL 45. Simultaneously, the Jetstream has rolled out onto a westerly heading from a L turn and is descending through FL 67 Mode C in the C650's 1 o'clock position, range 2 NM. Twelve sec later the ac are at their closest (0.9 NM and 300 ft) as the C650 makes a gentle R turn through a heading of about 030° indicating FL 66, with the Jetstream out to its left at 0930, range 0.9 NM indicating FL 63. The C650 passed 1.7 NM behind and 500 ft above the Jetstream at about 0638:50, at which time the latter is seen to begin a R turn. In his report the C650 pilot stated that the visibility had been perfect and that he had seen the other ac from 6 NM away.

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.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The LATCC TC Midlands Co-ordinator did not issue a safe joining clearance to the C650.

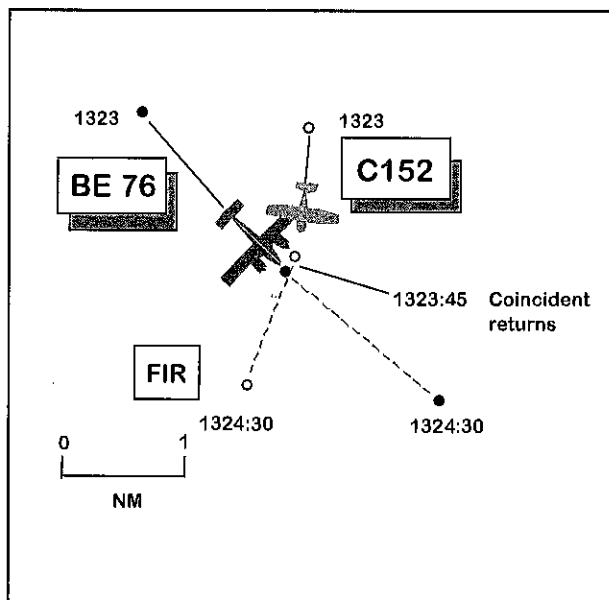
An ATSI adviser said that the Midland Co-ordinator had two choices - either to instruct the C650 to remain clear of CAS and obtain a joining clearance from his radar colleague or to issue a procedurally safe joining clearance.

When the Co-ordinator issued the airways joining clearance through the FISO, the C650 was on a northeasterly track and apparently set to pass behind the northbound Jetstream. However, by the time the clearance had been passed on to the C650 pilot, some 1 min 20 sec later, the ac had commenced a L turn to satisfy the instruction to remain clear of CAS, and was now heading north into potential conflict with the Jetstream. Thus, what initially had seemed to be a safe clearance based on radar information became unsafe because the Jetstream had been released to Birmingham APC at FL 80 some 3 - 4 min earlier. Members concluded, therefore, that the TC MID Co-ordinator caused the Airprox because he did not issue a safe joining clearance to the C650. ATCO members commented that the incident could have been avoided if the C650 pilot had been instructed to remain clear of CAS and contact the Midlands radar controller direct for his clearance.

Having seen the Jetstream some time earlier, and kept it in sight throughout, the C650 pilot clearly did not consider there had been any risk attached to the encounter. Radar evidence showed that he subsequently passed well behind the Jetstream, albeit without the requisite standard separation and the Board concluded that there had not been a risk of collision. Members commended the Birmingham controller for his vigilance.

AIRPROX REPORT No 87/99

Date/Time: 15 Jun 1324
Position: N5141 W0054 (5 NM NW Wycombe Airpark)
Airspace: FIR (Class: G)
Reporting Aircraft **Reported Aircraft**
Type: C152 BE76
Operator: Civ Club Civ Trg
Alt/FL: 2200 ft 2000 ft
(QNH 1027 mb) (QNH)
Weather VMC CLBC VMC
Visibility: >10 km 10 km
Reported Separation:
100 m H/50 ft V 600 m H/200 ft V
Recorded Separation: 200 - 300 m H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports that he had departed from Duxford for Blackbushe in VMC and was cruising at 2200 ft (QNH 1027) at 85 kt on a southwesterly heading. The visibility was over 10 km. Knowing how busy it could be at Wycombe Airpark he called them on 126.55 and obtained a FIS. He was also given clearance to transit the ATZ although subsequently this was not necessary as his track took him some 1.5 NM to the W of it. There was glider activity in the vicinity of Stokenchurch, which he had been told about. He was pointing out a glider to his passenger when a shadow appeared on his L windscreen followed immediately by an ac crossing from R to L about 100 m away and 50 ft above; he could part-read its registration and recognised it as a Beech Duchess. He thought there had been a high risk of collision.

The pilot comments that he had been trying to maintain a good lookout but the other ac's approach had been obscured by the high wing of the C152; moreover, at the time his attention had been drawn to the glider, which he was watching closely in case it turned towards him. The warm weather was creating thermals, which made for a bumpy ride and difficult height keeping. He did not report an Airprox to Wycombe ATC, as they were very busy. Furthermore, he was trying to keep his

passenger at ease as she had not only witnessed the close encounter but was feeling unwell because of the turbulence.

THE BE76 PILOT reports that he was returning to Wycombe at 2000 ft (QNH) with a student in the LH seat after a simulated IF sortie. The visibility was 10 km in VMC. He was in contact with Wycombe Tower on 126:55 and squawking 7000 with Mode C. When about 1 NM S of Princes Risborough heading 180° at 140 kt, and in the process of removing the IF screens from in front of the student, his rear seat lookout spotted a C152 about 800 m away to their L at a similar altitude crossing from L to R. He did not consider avoiding action necessary and the Cessna passed about 600 m behind them. He thought there had only been a slight risk of collision.

UKAB Note: A replay of the LATCC radar at 1323 shows a return squawking 7000 without Mode C, believed to be the BE76, tracking about 140° 6.5 NM NW of Wycombe Airpark. At the same time a primary return believed to be the C152 can be seen tracking S at the BE76's 10 o'clock position range 1.5 NM. The 2 ac continue to converge and at 1323:45 the BE76 passes in front of the C152 at a range not exceeding 200 - 300 m. The C152 turns about 10° R after the encounter and the BE76 continues on an unaltered track towards the SE.

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 noted this was an encounter in the FIR in good reported visibility conditions. Although the C152 pilot was required to give way to ac from his R, on their respective tracks the BE 76 was considerably faster than the C152 and its pilot was responsible under the Rules of the Air to ensure that he overtook safely. Moreover, good airmanship dictated that a pilot should always overtake in a manner that would not unduly alarm the other pilot, who might be unaware of his presence. It was noted the BE 76 pilot reported first seeing the Cessna some 800 m away and did not feel it necessary to adjust his track. However, the radar recording showed that he flew considerably closer to the Cessna than the 600 m he estimated. Members felt that under the

circumstances he had time to give the C152 a wider berth. Weighing these points, the Board concluded that the BE 76 pilot overtook the C152 close enough to cause concern to its pilot. Members wondered whether the C152 pilot could have seen the BE 76 earlier than he did; a GA member thought that given the relative bearings of the ac as they converged, and the slightly higher level of the BE 76, it was possible that it was obscured by the Cessna's high wing. The C152 pilot's late sighting of the other ac might have caused him to underestimate its distance from him but, although the BE 76 was evidently close enough to cast a shadow over his windscreen, members argued this did not necessarily mean a collision was imminent. It was felt that the true separation distance probably lay somewhere between the pilots' estimates. In the end the Board was satisfied that the BE 76 pilot was always in a position to take avoiding action had it become necessary and for this reason concluded that there had not been a risk of collision.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The overtaking BE 76 flew close enough to the C152 to cause concern to its pilot.

AIRPROX REPORT No 88/99

Date/Time: 16 Jun 1346

Position: N5049 W0021 (2.5 NM WSW
Shoreham airport - elev 7 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: C152 PA28

Operator: Civ Pte Civ Pte

Alt/FL: 1000 ft N/K
(QFE 1023 mb)

Weather VMC HAZE VMC

Visibility: 10 km N/K

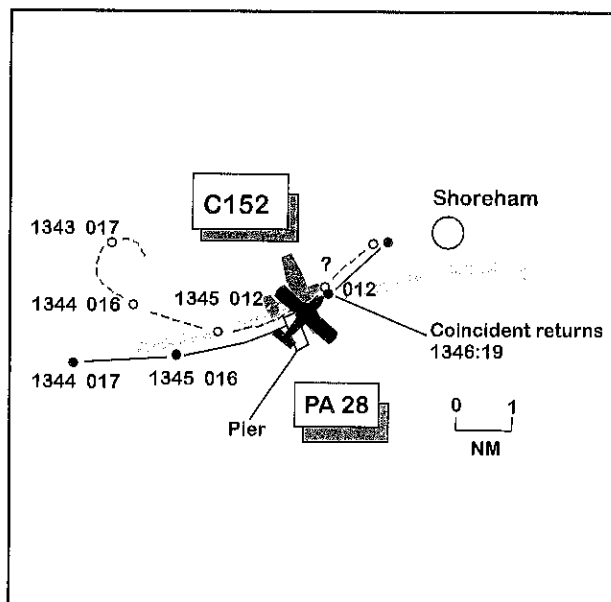
Reported Separation: 100 - 150 m / 200 m

Recorded Separation: <300 m H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying at 90 kt and joining crosswind at Shoreham for RW 21 LH when he was overtaken 100 - 150 m to his R by a Cherokee, which then cut in front of him. Later he learned that the other pilot had been doing 140 kt and had seen him throughout. He thought this made matters worse; the other pilot had approached from his blind spot and then cut in front in a reckless and dangerous manner.

THE PA28 PILOT said before joining for RW 21 he reported at Worthing Pier, as instructed, adding that he was visual with traffic in his 10 o'clock. ATC then passed information on traffic descending deadside, which he knew must be another ac and not the Cessna he could see out to his L. He considered flying one orbit to let the Cessna ahead make contact with Shoreham but then decided instead to continue, because he had considerable overtake - he was doing 160 mph. Keeping the C152 in sight throughout he flew past it to the R with no risk of any air miss let alone a collision; he saw the Cessna waggle its wings, felt sure its pilot had seen him approaching and cleared the ac with more than 200 m horizontal separation. The Cessna pilot's subsequent 'air miss' radio call astounded him.



THE SHOREHAM CONTROLLER said the PA28 had been the first to call for joining instructions, but 2 min later the C152 did the same. Both were told to report abeam Worthing Pier and to expect a crosswind join for RW 21. At 1344 the Cherokee pilot called approaching Worthing Pier and that he was visual with a Cessna. The only Cessna known to the controller was descending deadside, so he passed traffic on that ac and at the same time cleared the Cherokee to join crosswind and report downwind LH. Next, the C152 pilot reported "Worthing Pier" at 1345. He was given traffic information on the PA28 and told to join crosswind. A minute later the Cessna pilot reported the Airprox.

ATSI comments that the Shoreham ADC did all that could be expected of him for the subject flights joining in VFR; there are therefore no ATC causal aspects in this incident.

UKAB Note: A replay of the Pease Pottage radar at 1343 shows the PA28, squawking 7000 and indicating 2500 ft Mode C, tracking eastbound along the S coast 9 NM W of Shoreham airport. At the same time, the C152 is in a L turn 6 NM due W of the airfield, indicating 1700 ft. The PA28 continues following the coast while the C152 also turns towards the airfield on a gently curving track, converging on the PA28 from its port side. At

1345 the the PA28 is at 1600 ft just over 5 NM from the airport with the C152, which it is gradually catching up, at its 11 o'clock 0.8 NM indicating 1200 ft. At 1346:19, 2.4 NM WSW of the airfield, the PA28 overtakes the C152 on its starboard side while indicating 1200 ft; the C152's Mode C cannot be seen at this point because of label overlap. Lateral separation is difficult to measure but is likely to have been less than 300 m because the returns of the ac are touching.

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.

PART C: ASSESSMENT OF RISK AND CAUSE

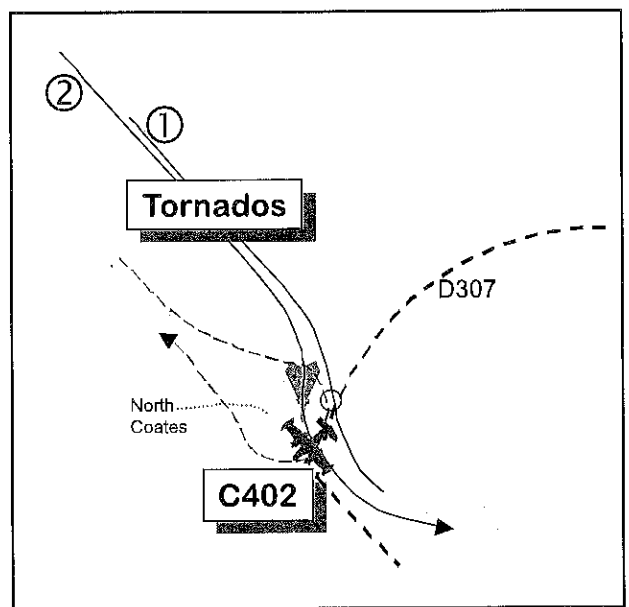
Degree of Risk: C

Cause: The PA28 pilot flew close enough to the C152 to cause concern to its pilot.

There was little discussion about this incident. While the Rule regarding overtaking (R17 (4) (a)) does not specify a minimum avoiding distance, members agreed that as a matter of good airmanship pilots who overtake should do so in a considerate manner, taking into account the possibility that the other pilot may be unsighted. Contrary to the PA28 pilot's belief, the C152 pilot had not seen him as he approached the Cessna's from its rear quarter. It was quickly concluded that, whatever interpretation the PA28 pilot put on the position of the ac he saw to his L, he subsequently overtook it at considerable speed and close enough to cause alarm to its pilot. However, members were satisfied that the PA28 pilot was always in a position to avoid the Cessna if necessary and concluded that there had not been a risk of collision.

AIRPROX REPORT No 89/99

Date/Time: 16 Jun 1516
 Position: N5330 W0005 (4 NM ESE of Cleethorpes)
 Airspace: FIR (Class: G)
 Reporting Aircraft Reported Aircraft
 Type: Tornado GR Cessna 402
 Operator: HQ STC Civ Comm
 Alt/FL : ↑ 2000 ft ↓ 2600 ft
 (Rad Alt) (QNH 1021 mb)
 Weather VMC CLAH VMC
 Visibility: 20 km
 Reported Separation: 200 ft V
 Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports heading 173° at 500 kt on a run-in for a 10° first-run dive attack at Donna Nook range as No 2 of a pair. On rolling into the dive, at 2000 ft and 500 kt, a civilian low wing twin engined ac was seen to pass 200 ft directly underneath, heading SW. On seeing it he rolled off the bank and climbed. The risk of collision was high but the confliction was resolved by his avoiding action. The formation leader had not seen the civilian ac.

THE C402 PILOT reports flying a 5 hour survey of the coast between Grimsby and North Coates in connection with a study of coastal erosion. He was receiving a RIS from Humberside and had called Donna Nook to advise of his presence. He flew about 20 tracks along the coast, initially advising Donna each time as he approached; he was then asked to keep a listening watch. As far as he could remember he was flying at about 140 kt and was at 2600 ft QNH. He did not see the Tornados.

Note: LATCC radar recordings show the pair of Tornados in 30 sec trail crossing the peninsular between Withernsea and Easington at low level and pulling up close to the boundary of D307 for their FRA. The Cessna, identified from its Humberside squawk, is tracking SE along the coast at 2400 ft Mode C, which it maintains while the 2nd Tornado passes it. The first Tornado had passed close to it on its left on a similar heading as the Cessna started its right turn, but about 1000 ft below it. The second Tornado follows the leader's track exactly until just before the roll in point, where it diverges slightly to the right; it pulls up earlier than the leader and this takes it directly over the Cessna which is passing SW in the turn that eventually takes it back up the coast towards Grimsby. The second Tornado's Mode C does not show as it passes the Cessna but shows 2300 ft just afterwards.

HQ MATO reports that the C402 pilot initially freecalled Donna Nook Range at 1220:40 on VHF, saying he was "on an aerial survey in the

Grimsby area, our lines will take us eh approximately just to the edge of your zone but em, we'll be needing to turn in your zone if possible, 2600 ft on the Humberside QNH and we are in contact with Humberside box 1". The secondary controller (SEC) acknowledged this call, advising that there was no range traffic at the moment and ascertained the axis of the survey line. SEC then asked the pilot "...can you monitor this frequency so I can give you a call?" and the pilot agreed. The RT exchange ended at 1221:35. The next transmission from the C402 pilot was over 2 hrs later, at 1444:30, advising "c/s understand you may have contacts in your range.....we are currently tracking SE along the coast, we'll be approx in your range in 5 minutes time if that's not a problem." The controller advised the pilot that traffic had just departed the range and that there was also one ac in the circuit at North Coates. At 1445:00, the C402 pilot transmitted "Roger c/s, we're maintaining 2600 on 1022 thanks and we're going back to Humberside and maintaining a listening watch on this frequency." No further transmissions were made by, or to, the C402 pilot. SEC later handed over control of the frequencies he was manning (VHF 122.75 and UHF 342.175), which were both quiet, to the Primary Controller (PRI). By this time however, it was considered that the C402 had departed the area.

The Tornado section established communication with the primary controller (PRI), at 1511:47 on UHF. They passed their intended attack details and received a weather update, and were told a number of land vehicles operating on the beach, ahead of the target, were in the process of vacating the area. At 1516:51, after receiving clearance to attack, the second Tornado crew reported "And Donna Nook be advised we've just come very close to a civilian.....green and white civilian going across our attack track." PRI knew of no other ac in the area at the time and thought that the pilot was referring to one of the vehicles, assuming that it had been slow to clear the area. No mention of an Airprox was made on the frequency.

In a later telephone conversation with UKAB staff the C402 pilot said that he had called Donna Nook at the start of his sortie and passed his flight details, adding that he had called prior to the start of each run until he was advised to keep a listening watch. However, the only recorded RT exchanges are as detailed above.

Range control at Donna Nook is provided from 2 adjacent control positions, PRI and SEC, neither of which is radar equipped. SEC normally operates the UHF ICF, 342.175, whilst PRI operates 387.675 within the range. Both controllers monitor the VHF frequency 122.75, with SEC normally being the main user, although PRI will respond to calls if SEC is busy on UHF. Transmissions between frequencies cannot be cross-coupled. During quiet periods, all frequencies are bandboxed to the PRI position, although SEC is always available. Controllers are also routinely involved in co-ordinating airfield movements at the nearby North Coates airfield with the range activities.

A number of assumptions made during the events leading up to this Airprox contributed to the incident itself. The C402 pilot's initial call was over 2 hours before his next transmission and made no reference to the duration of the flight. It is highly likely that SEC had assumed that the C402 had left the area and had forgotten about it. At the time of the C402 pilot's second call, the range had just become cold, with no activity expected for at least another 25 min. This RT call, purely stating the C402's track and ETA at the range (5 min), and asking if there was any problem, seemed rather vague to the controller who did not connect it with the Cessna's call some 2:25 hrs earlier. This style of call is quite commonplace from less experienced aviators when requesting permission to transit a Danger Area; because at that time there was no traffic, and the pilot said "...we're going back to Humberside..." in the next call, the controller did not further question the pilot's intentions. With hindsight it is clear the pilot was referring to his use of RT and the unit providing his ATS, rather than the ac physically moving away from Donna Nook. Having received no objection, the Cessna pilot

(knowing the duration and profile of his sortie) assumed that he was clear to operate in the range if required; he may have assumed that the Donna Nook controller would be aware that aerial survey flights can be several hours in duration. Having stated that he would be "*maintaining a listening watch*", he probably believed that the controller would update him when range activity was due to commence. (Note: Range controllers do not use FPS but use a plastic tally with the c/s marked in chinagraph as used by RAF tower controllers. Presumably the Cessna's tally had been dispensed with without checking if the ac was still on frequency.)

The C402 pilot reported that he called Donna prior to each run but this is not reflected in the relevant RT transcript. It is possible therefore, that the pilot made these transmissions on the Humberside frequency, possibly in the belief that he had the Donna Nook frequency selected. His report also states that he called Donna again, after Humberside gave him a warning of approaching jets. This is most likely to have been the call at 1444:30, whilst the previous sortie was clearing the range.

Had the C402 pilot provided more information initially, or had the range controller extracted more, SEC may have been alerted to the possibility of a later conflict and thus given the C402's flight more attention. The radar replay shows that the C402 was at 2300 ft, about 3 NM N of Grimsby and was commencing a SE track along the coast towards the range when the Tornado section first called Donna Nook. This information alone, had it been relayed on UHF, may have been sufficient to alert the Tornado crews to the existence of another ac along their track and close to the highest point of their attack profile. FJ crews entering a Danger Area expect Range Controllers to inform them of any known local aerial activity.

Having initiated a climb from almost directly beneath, it is also apparent that the crew of the lead Tornado did not see the C402 or vice versa. However, the Tornados approached the C402 from its 7-8 o'clock position and 2000 ft

below, giving the C402 pilot little chance of sighting, or avoiding them as they climbed rapidly. The manoeuvre was conducted at the edge of the Danger Area boundary, beyond which ac are free to operate VFR without making contact with Range Control. Therefore, both crews still had a requirement to maintain an adequate lookout prior to climbing.

HQ STC comments that during the execution of the dive manoeuvre the Tornado crews would undoubtedly have had a number of in-cockpit duties to perform. Notwithstanding such tasks, this Airprox further highlights the requirement for crews to maintain an appropriate lookout scan throughout all phases of flight and whatever the in-cockpit workload. The likelihood of this Airprox occurring could have been greatly reduced by a warning of aerial activity to the Tornado crews. However, this would only have been possible had the level of communication and understanding between the Range Controller and the C402 pilot been better. In any event, the Tornado pilot reacted appropriately following a late sighting of the C402.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that more information should have been passed to Donna Nook about the Cessna's operation, either by the pilot in his initial call but preferably by him or his company by telephone beforehand. Any lengthy

operation adjacent to a danger area or CTZ should be preceded by a discussion with its operators to reduce the chance of incidents such as this. Members also agreed that the Donna Nook controllers should not have dispensed with the Cessna's tally without calling to see if it was still on frequency; if they had not seen the need to raise one in the first place, this incident would demonstrate the need to do so. It seemed clear that the controllers had forgotten about the Cessna by the time the reporting Tornados joined and the Board discussed whether or not this was part of the cause of the Airprox. It was agreed eventually that, because crews using the range were required to look out for other ac whether they had contacted the range or not, the cause was the late sighting of the Cessna by the Tornado pilot. This was not necessarily a criticism (the mainly white Cessna would have been hard to see tail-on) but more a statement of fact. Members agreed that the Tornados, approaching from behind and below, would not have been in the Cessna pilot's view before the event.

The risk level generated considerable debate. Neither pilot saw the other ac before the incident was in progress, the radar recording indicated that the ac had come very close and the Tornado pilot had described the risk level as high, indicating that he only saw the Cessna as he was passing 200 ft from it. However, the Tornado pilot had also described his avoiding action as timely and he had not had to abort his attack, obtaining a reasonable score with his bomb. Some members considered therefore that there had been no risk of the ac actually colliding. The Board eventually concluded that the expression 'timely' here meant 'just in time' and that the safety of the ac had not been assured.

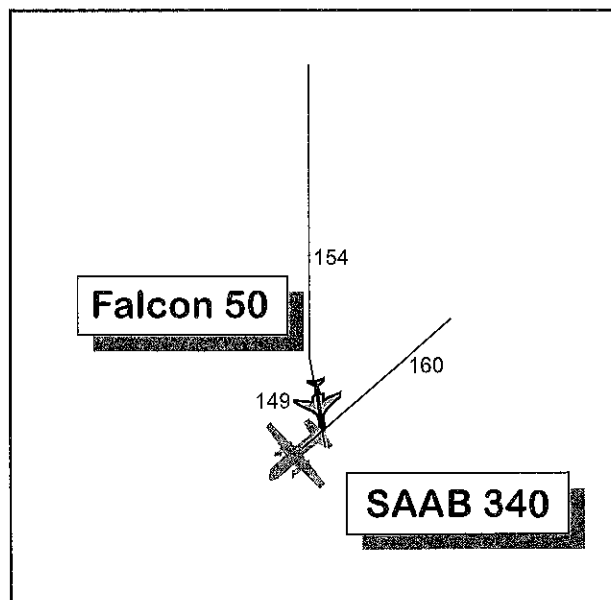
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Late sighting of the Cessna by the Tornado pilot.

AIRPROX REPORT No 90/99

Date/Time: 17 Jun 1314
Position: N5115 W0114 (5 NM W of Basingstoke)
Airspace: Airway R41 (Class: A)
Reporter: LATCC
Type: Falcon 50 SAAB 340
Operator: Civ Pte CAT
Alt/FL: FL 150 FL 160
Weather: VMC CLNC VMC
Visibility: 50 km
Reported Separation: 2 NM/700 ft
Recorded Separation:



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LATCC HURN SC reports acting as OJTI for a student controller with the SAAB 340 coordinated into her sector level at FL 160 on a heading of 235° but not in communication with the sector. When the Falcon 50, outbound from Luton, was transferred from TMA (Outbound) climbing to FL 150, the student acknowledged the pilot's first call and told him "*Roger, further climb shortly*"; the pilot replied with the last letter of his c/s. 20 seconds later the controller told him to turn left 10° and report his new heading, which was 185°. The Chief SC had asked the LATCC LMS Chief to turn the SAAB right onto 235° to achieve a crossover. At 1314:15 the student acknowledged an inbound ac, allocating it an Ockham 2B arrival for Heathrow and asking for its ac type. Before it replied, the OJTI, who had noticed the STCA on the 2 ac and seen the Falcon's Mode C read FL 151, had pointed this out to the student and told him to give it avoiding action and descent. The student transmitted "*C/s turn right avoiding action head 260 maintain two one five zero*" and then "*C/s maintain flight level 150*", to which the pilot replied "*Roger 150*". The arriving ac then replied; the student asked him to stand by and confirmed with the Falcon pilot that he was maintaining FL 150. The pilot replied, "*Affirmative sir we have traffic in sight*". The SAAB then came on frequency and was told to

maintain its radar heading. Subsequently the Falcon pilot advised "*C/s is turning to 260*" and was told by the controller to fly a heading of 200°. Once lateral separation between the ac had been achieved, the Falcon was cleared for further climb.

THE FALCON PILOT reports heading 185° at 320 kt under radar control from LATCC and cleared to climb to FL 150. The altitude selector did not capture the level so he manually levelled the ac, overshooting by 300 ft; during the process he received a RA from his TCAS and instructions from ATC to turn right onto 260° and maintain FL 150. While taking the avoiding action he saw the traffic about 2 NM away and 700 ft above. He considered the risk of collision was low.

THE SAAB PILOT was unaware of the incident and had nothing to report.

LATCC radar recordings show the SAAB tracking 225° at FL 160, crossing the axis of R41, and the Falcon climbing in its 4 o'clock, tracking S and converging. The conflict alert appears as the Falcon passes FL 144, 4.4 NM from the SAAB, and turns red as it reaches FL 154, 2.1 NM from the SAAB. The Falcon then begins a descent and turns slightly left to pass 0.3 NM behind the SAAB at FL 149.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board concluded that the cause of this incident lay with the Falcon pilot for not paying sufficient attention to his autopilot to prevent him exceeding his cleared level when it malfunctioned. The airline pilots on the Board pointed out that autopilots often malfunctioned in this way but that such a malfunction should not lead to a 'level bust'; it was the job of the pilot to be alert to the possibility and to take over

in time to prevent the ac passing through a cleared level.

Members pointed out that traffic density in the London TMA was such that any level bust would almost always result in a conflict with another ac. The need to avoid level busts is becoming ever more important as traffic levels continue to increase and members wanted this important safety message to be emphasised to the Falcon crew.

Concerning the level of risk, it was clear to the Board that the controller's prompt message and the Falcon's TCAS and sighting of the SAAB340 had fortunately combined to produce a timely resolution of the conflict and that there had consequently been no risk of the ac actually colliding.

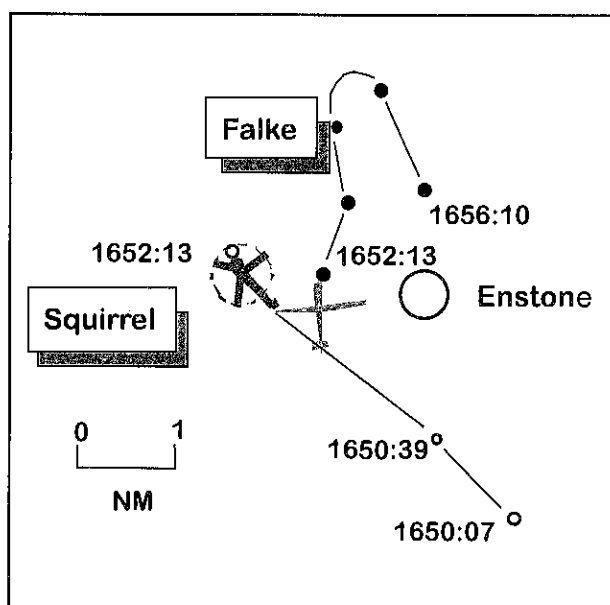
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Falcon pilot allowed his ac to exceed the level he had been cleared to.

AIRPROX REPORT No 91/99

Date/Time: 17 Jun 1652
Position: N5155 W0127 (1 NM WSW Enstone - elev 550 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Motorfalke Squirrel A350B
Operator: Civ Trg Civ Pte
Alt/FL: 400 ft 1200 ft
 (QFE 1004 mb)
Weather VMC sky clear VMC sky clear
Visibility: >20 NM >10 km
Reported Separation: 0 ft H/ 25 ft V not seen
Recorded Separation: N/K



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MOTORFALKE INSTRUCTOR reports that he had just departed from RW 26 at Enstone under a clear sky and visibility over 20 NM. His student pilot made all necessary RT calls on 129.875 (Enstone air/ground) including "rolling on 26" and, despite a thorough search for other traffic, none was seen during take off or initial climbout. A R turn was made onto the crosswind leg at 400 ft (QFE 1004) and 48 kt and the wings levelled. Suddenly, there was a tremendous noise and both he and the student saw rotor blades above the canopy. The cockpit went dark and the fuselage of a helicopter passed within 25 ft directly above them on a NW heading, nose-down and travelling fast. He had not been able to take avoiding action as the helicopter had approached from behind him. Attempts to call its pilot on the a/g frequency received no reply. He felt they had been only a split-second from collision and immediately reported an Airprox to Brize Norton ATC by RT on 119.0 and also later by telephone.

THE SQUIRREL PILOT reports that he was routeing NW from Oxford Kidlington to his base. The visibility in clear skies was 10 km. His speed was 110 kt, and he believes he would have been climbing through about 1200 ft when in the vicinity of Enstone but could not recall the pressure setting. Although also unsure of the frequency he had been operating on, he thought he had probably been receiving a FIS from Brize Norton on 134.3. He recollected being busy in the cockpit, setting way points on the GPS and selecting en-route frequencies, but at no time did he recall being close to another ac. In view of the relative headings of the 2 ac, he thought it was possible that the glider might have been out of his line of sight under his nose.

HQ MATO reports that the pilot of the Falke freecalled the Brize Norton Approach/Zone (ZONE) controller on frequency 119.0 at approximately 1656. His radio transmissions were unreadable and repeated calls were made over the following 3 to 4 min; these were also

virtually unreadable, although ZONE managed to ascertain that the pilot wished to report an Airprox at Enstone aerodrome. Owing to the poor RT reception, the Falke pilot was advised to pass the details by telephone after landing. ZONE attempted to contact Enstone but received no reply and it was later discovered that the telephone lines at Enstone were unserviceable. At approximately 2040 the Enstone airfield Director telephoned the Brize Norton ATCO I/C to report the Airprox on behalf of the Falke pilot, stating that it occurred within the Enstone circuit at 400 ft agl. The other ac involved was reported to be a Jetranger helicopter, heading approximately 330°, which passed about 50 ft above the Falke. The Falke pilot reported that there was no time to take avoiding action as the helicopter appeared to have approached from behind him. The reported ac was subsequently traced by AIS (Mil) as a Squirrel which had been receiving a service from Brize Norton LARS (LARS). Confirmation of the identity however, was not received until 5 Aug.

The Squirrel pilot freecalled LARS at 1648:42 requesting a FIS at 1000 ft while routeing from Oxford to Deans Cross via Halfpenny Green. The pilot did not give a position report. LARS provided a FIS, informing the pilot that the Cotswold RPS was 1019. A squawk was not given and the ac was not identified on radar (it is not known if it was transponder equipped). The pilot was asked to report changing frequency, and subsequently freecalled Birmingham at 1657:02. There were no other RT exchanges between LARS and the Squirrel pilot and the controller concerned could not recollect any further details of the transit. Following a review of the RT recording, the LARS controller's workload was estimated to have been of medium intensity.

LARS fulfilled the requirements of the requested FIS and was not required to identify the ac. The elevation of Enstone is 550 ft; assuming that the Squirrel pilot had maintained his reported altitude of 1000 ft RPS, the helicopter's height was 450 ft above Enstone's level. There is no ATZ established around Enstone and the pilot of the Squirrel did not give

any indication that he had encountered another ac during the transit.

UKAB Note: A replay of the LATCC Cleve Hill radar shows a primary return, believed to be the Squirrel, appearing on a northwesterly track about 2.5 NM SSE of Enstone. The return tracks about 1 NM W abeam Enstone at 1652 and at 1652:13 is 1.75 NM WNW of the airfield. At this point a primary return pops up at its 4 o'clock tracking NNE. This return, which routes towards a position 2 NM N of Enstone before turning R and heading S towards the airfield, is believed to be the Motorfalke. Based on the probability that the Motorfalke's track prior to 1652:13 was similar to its observed track afterwards, it is likely that the Airprox occurred when the tracks of the ac crossed abeam the airfield at about 1652.

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.

PART C: ASSESSMENT OF RISK AND CAUSE

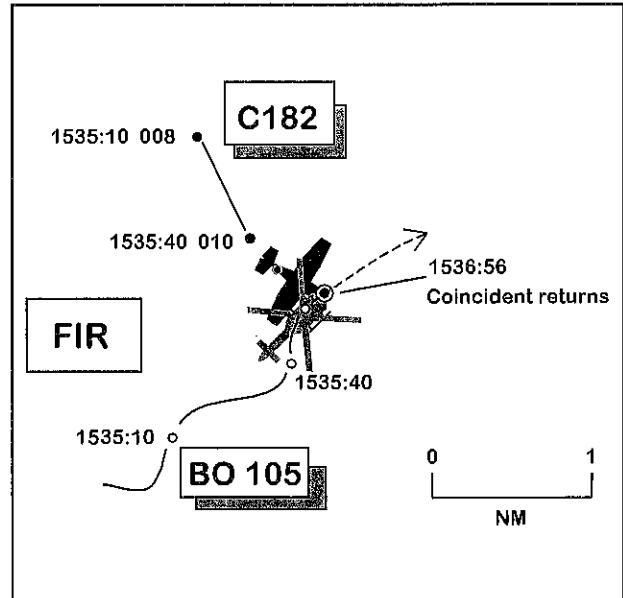
Degree of Risk: A

Cause: In the vicinity of Enstone the Squirrel pilot flew into conflict with the Motorfalke, which he did not see.

A GA pilot member commented that the Squirrel pilot had only been airborne for a few minutes and appeared to be busy in the cockpit with activities, such as setting way points, which should have been attended to prior to departure. Moreover, as Enstone is clearly marked on the 1:500 000 topographical chart, the Squirrel pilot should have taken into account the glider activity there when planning his route. In the event, he flew within a mile of the airfield at speed, climbing through an altitude at which he might have expected to encounter launching gliders, yet saw nothing. It seemed to members that everything about the helicopter's flight pointed to a hastily planned sortie. Consequently, the pilot's attention immediately after takeoff was directed into the cockpit dealing with belated route planning matters instead of looking out for other ac. Although not illegal, members felt that the choice of route flown was poor and inconsiderately close to the known glider site at Enstone. At the critical moment the Squirrel pilot did not see the motorglider and this, together with the very graphic description of the close encounter by the Motorfalke pilot, led the Board to conclude that there had been an actual risk of collision.

AIRPROX REPORT No 93/99

Date/Time: 19 Jun 1536 (Saturday)
Position: N5259 W0103 (3 NM NW
Newton - elev 182 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Bo105 C182
Operator: Civ Exec Civ Pte
Alt/FL: 1000 ft (RPS) 800 ft (QFE)
Weather VMC CLBC VMC
Visibility: 40 NM >10 km
Reported 50 ft V 0.25 NM H/
Separation: 200 ft V
Recorded Separation: 0 ft H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo105 PILOT was on an air ambulance detail and reports that he was heading 045° at 110 kt and level at 1000 ft (QNH) (1500 ft below cloud) but with Mode C off. At that stage he and his crew were returning to base at Waddington after attending an incident at Nottingham. The visibility, below cloud, was 40 NM. On previous flights Waddington Zone had informed him of high density traffic in the Newark, Syerston and Newton areas and so his medical aircrew had been briefed on the need for a good lookout. While he was transferring frequencies from Nottingham (122.8) to Waddington (127.35) a paramedic occupying the co-pilot's seat shouted, "aircraft left, oh bloody hell". He turned and briefly saw the other ac, a high wing single engine type, as it passed from L to R about 50 ft directly below him. The ac reappeared to his R descending, first banking to starboard then hard to port passing beneath them again, slightly astern, and then departing towards the NW at low level; he could read its registration. He thought there had been a high risk of collision and reported an Airprox to Waddington Zone on 127.35, backing it up later by a telephone call.

THE C182 PILOT reports that during climbout from Lambley airfield, where he was conducting a circuit detail, he saw a black and white helicopter tracking in a northwesterly direction

about 2 NM E of him. Having turned into the circuit, he found he was slightly faster than the helicopter and when abeam it by about 0.25 NM and 200 ft below, he overtook on its port side, at the same time turning L onto base leg. He had kept the ac in sight throughout the encounter and did not consider there had been any risk of collision.

HQ MATO reports, with RT transcript for Waddington Zone, that the Bo105 pilot first called Waddington Zone at 1537 about 3 NM NE of Newton at 1000 ft (RPS 1009). At 1537:09 the pilot advised that he wished to report an Airprox. Describing the incident he said, "it was a single seater.....came from my rear, passed underneath me, estimated minimum separation was 50 ft er then pulled to my starboard side then banked steeply towards me before disappearing to the west"

THE CAA FLIGHT OPERATIONS INSPECTORATE comments that from his report it appears that the C182 pilot did not consider there was a problem. He had initially spotted the helicopter at 2 NM and then kept it visual at all times, albeit subsequently flying to within 0.25 NM and 200 ft of it. This clearly startled the helicopter's crew who saw the C182 late. Perhaps one could question the wisdom of the C182 pilot's actions in flying so close to the

helicopter without appreciating its crew might be unaware of his presence.

UKAB Note (1): A replay of the Clee Hill radar at 1535:10 shows the Bo105 on a meandering northeasterly course about 3.5 NM to the W of Newton; a 7000 return indicating 800 ft Mode C, believed to be the C182, is 1.75 NM N of it heading SSE. At 1535:40 the Bo105 turns briefly onto a more northerly heading which puts the ac on almost reciprocal tracks just under a mile apart. The C182 is indicating 1000 ft at this point. At 1535:49 separation is about 0.3 NM, and at 1536:56, just under 3 NM NW of Newton, the returns merge. Following the encounter the C182 is not seen again on radar and the BO105 continues tracking NE.

UKAB Note (2): Lambley is a grass airfield operating in an air/ground RT environment; it is situated in the FIR 3.5 NM NW of Newton and is marked on the ICAO 1:500 000 topographical chart.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The C182 pilot flew sufficiently close to the BO 105 to cause its crew concern.

the relevant RT frequencies, a radar video recording, and a report from the appropriate ATC authority.

It was evident that the C182 pilot had seen the helicopter from some considerable distance away. It was therefore the Cessna pilot's responsibility to ensure he maintained safe separation from the helicopter. The crew of the BO 105 were unaware of the C182 and members thought that it might have been difficult for them to spot the ac in the short time it took to climb out beneath them from the Lambley circuit. Consequently, they were taken by surprise at the sudden appearance of the C182 and were not to know that its pilot had seen them. The Board wondered why the C182 pilot had converged on the Bolkow having spotted it in plenty of time. In the end they concluded that the C182 pilot flew inconsiderately close to the helicopter and caused its crew concern. However, members were satisfied that the C182 pilot was always in a position to avoid the helicopter and concluded that there had not been a risk of collision.

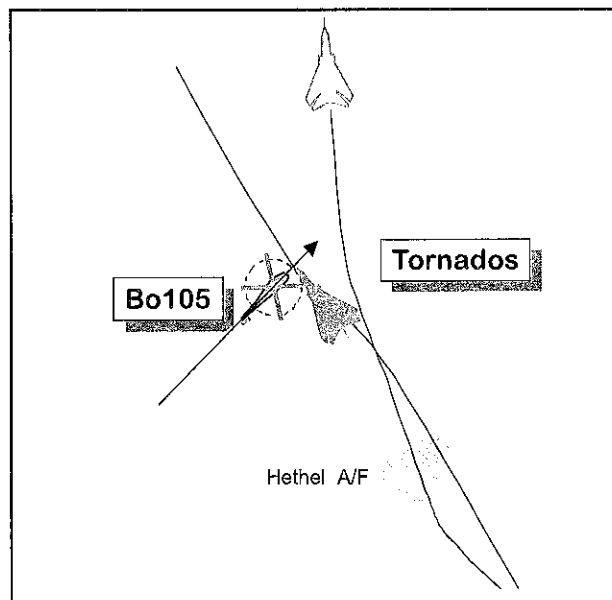
AIRPROX REPORT No 95/99

Date/Time: 15 Jun 1436
Position: N5236 E0109 (7 NM SW of Norwich Apt)
Airspace: FIR/LFS (Class: G)
Reporting Aircraft Reported Aircraft
Type: Bo105 Tornado GR
Operator: Civ Comm HQ STC
Alt/FL: 800 ft 250 ft
(RPS 1023 mb) (Rad Alt)
Weather VMC CLOC VMC HAZE
Visibility: 8-10 km 10 km
Reported Separation: 400 ft V/NK
Recorded Separation: 450 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BO105 PILOT reports heading 050° at 95 kt in transit at 800 ft RPS. Norwich ATC, from whom he was receiving a FIS, alerted him to a fast low level contact to the SE, tracking N. He saw it at 3 NM and it passed well clear ahead. Just after confirming with ATC that he could see it, he noticed a second Tornado in his 2 o'clock tracking directly towards him. It was less than 1 NM away and passed below by 400 ft with no alteration of track or indication that he had been seen. He pointed out that it is not good airmanship to fly directly under a helicopter by such a close margin and that a wing rock to indicate a sighting makes all the difference to a helicopter pilot's assessment of risk. He was particularly concerned that the lack of a wing rock might indicate that his black, skylined helicopter had not been seen.

THE TORNADO PILOT reports flying a low level exercise as No 2 in a pair. Having completed a loft attack on a coastal target near Southwold the pair tracked 310° to a split point at Hethel for a further attack on a target near Sheringham, accelerating to 480 kt at 250 ft msd. At the split point his leader turned N and he continued towards East Dereham before turning right for his IP. He did not see a helicopter during this part of the sortie.



Note: The Cromer radar recording shows a primary return following the reporting pilot's track (his transponder was u/s). A primary/secondary return (7001) followed by an intermittent primary-only are seen on the Tornados' planned track; the first turns N at Hethel, passing 11/3 NM ahead of the helicopter, and the second continues NW, passing directly under the helicopter.

HQ STC comments that the sortie was correctly briefed and authorised, and the weather was more than adequate for safe low-level operations. The crew were at a busy time in their sortie having recently completed a loft attack and preparing for a formation split for a further co-ordinated target run. Nevertheless, the crew regarded look-out as a priority, particularly in the area to the south of Norwich, and they continued to conduct their flying in the safest manner possible. It is regrettable that, in spite of a disciplined visual search pattern, at no time did they see the Bo105.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

controllers involved and reports from the appropriate operating authorities.

The Board assessed that with the ac on their pertaining flightpaths there had not been a risk of the ac actually colliding, but agreed that where possible fast jet pilots should not fly under a helicopter in case it had to enter autorotation. In this case however, the Tornado pilot did not see the helicopter so the point was peripheral to the incident. The Board agreed that the cause of the incident was that the Tornado pilot did not see the helicopter which was far enough above him for it to have been

obscured perhaps by the windscreen arch. This emphasised again the need to keep the head moving to see round parts of the windscreen/canopy structure. The BHAB member pointed out that the helicopter was in transit, not on task, and asked if there was any reason for it not flying higher; the pilot had not indicated any cloud above him. Information on this point was not available; members suggested that it might be a point for the helicopter pilot to consider. Finally, they agreed with the latter's comment on a wing rock to signal a sighting following a successful spot.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

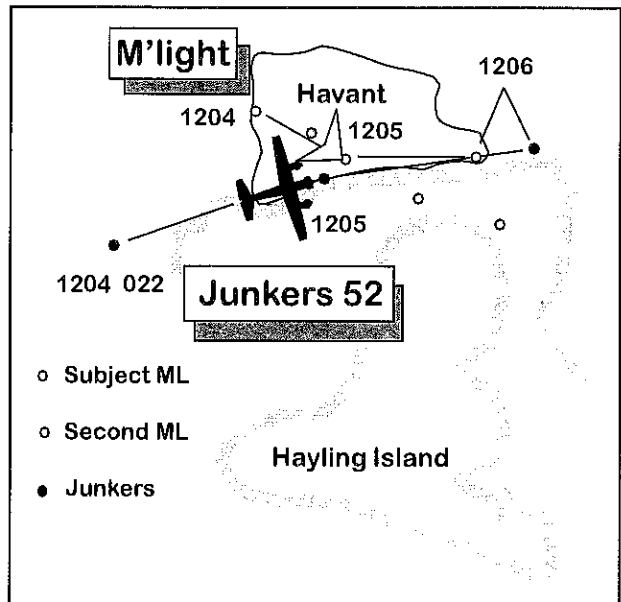
Cause: The Tornado pilot did not see the helicopter.

AIRPROX REPORT No 96/99

Date/Time: 20 Jun 1205 (Sunday)
Position: N5051 W0059 (Havant)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Microlight Junkers 52
Operator: Civ Pte Civ Comm
Alt/FL: 1800 ft (QNH)
Weather VMC VMC
Visibility: >30 NM
Reported Separation: 50 yd H/0 ft V
Recorded Separation: <200 m

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports he and his passenger were returning to Thorney Island from Devon, flying at 60 kt and 1800 ft on the QNH, heading 095°. They were flying in company with 3 other brightly coloured microlights of the same make, all on the same sortie. Weather conditions were very good. One of the stream ahead began its descent



towards their destination and called him on the radio, asking if they had seen Concorde in their 11 o'clock position. While replying to this transmission, he received a hefty nudge on the shoulder from his passenger. She too had heard the transmitted question, but had mistaken the direction to look in and had turned

her head instead to their 5 o'clock. There she saw a Junkers some 300 - 400 yd away, bearing down on them. Alerted to the danger, the microlight pilot turned his ac L through 60° before levelling the wings again to see the German machine pass down his starboard side at co-altitude, about 50 yd away. The Junkers showed no sign of changing direction and the microlight pilot thought there would have been a collision if he had not moved aside. He went on to express surprise that the Junkers crew had apparently not seen his very brightly coloured craft.

THE JUNKERS 52 PILOT declined to submit a report, but did speak to UKAB staff by telephone from Germany. He confirmed that he had flown 4 flights from Goodwood on the day in question and that the flying conditions throughout had been excellent. There had been no cloud below 3000 ft and the visibility was more than 50 km. However, despite such good weather he could not remember seeing any microlights.

UKAB Note: A replay of the LATCC radar at 1204 shows 2 slow moving primary returns heading SE in tandem on the E side of Havant town; the trail one of these is believed to be the microlight which is the subject of this report. At the same time, a 7000 squawk indicating 2200 ft Mode C, believed to be the Junkers, is tracking ENE along the coast to the NW of Hayling Island; its SSR data disappears from

radar at 1204:45 leaving a primary return only. At 1205 the Junkers is on the southern edge of Havant with the microlight at its 11 o'clock range about 0.25 NM. About 20 sec later the tracks of the 2 ac cross, but it is difficult to judge the lateral separation because the cross takes place in between sweeps of the radar. However, indications are that the ac passed less than 200 m apart.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included a report from the pilot of the microlight ac and a radar video recording.

The Board quickly agreed that the Airprox occurred because the Junkers pilot did not see the microlight, which he was overtaking, despite the excellent weather conditions. Members were divided over the degree of risk, however. Some felt that the microlight was particularly vulnerable owing to its slow speed and limited manoeuvring ability and that there had, therefore, been an actual risk of collision. Others countered this view, pointing out that the microlight pilot said that he felt his turn had effectively prevented this. By a small majority, the Board concluded in the end that, although the risk of collision may have been removed by the microlight's action, the safety of both ac had nevertheless been compromised.

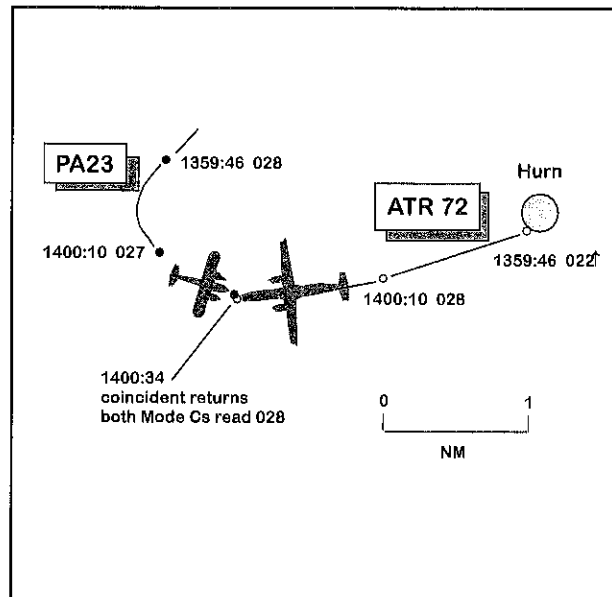
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The overtaking Junkers pilot did not see the microlight.

AIRPROX REPORT No 97/99

Date/Time: 22 Jun 1400
Position: N5046 W0154 (2.3 NM WSW Hurn - elev 36 ft)
Airspace: CTZ (Class: D)
Reporting Aircraft Reported Aircraft
Type: ATR 72 PA23 Aztec
Operator: CAT Civ Trg
Alt/FL: 2800 ft ↑ 3000 ft
(QNH 1023 mb) (QNH)
Weather VMC SCAT Cu VMC CLBC
Visibility: >10 NM >5 km
Reported Separation: <400 yd H/o ft V not seen
Recorded Separation: <200 m H/O ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR 72 PILOT reports that he was heading 260° at 180 kt and climbing through 1800 ft (QNH 1023) following a missed approach to RW 26 at Hurn. Cockpit workload was high owing to the go-around (which had been initiated because of a blocked RW). The visibility was over 10 km in VMC, with scattered fair weather Cu at various levels. Shortly after changing from the ADC frequency to radar (119.62), he was told to look out for another ac tracking towards the BIA NDB at 3000 ft; no avoiding action was given. As this information was being passed, the other ac, a low-wing twin engined type, was seen less than 400 yd away at their 2 o'clock position at the same level. There was no time to take avoiding action and it passed down their starboard side. He thought there had been a high risk of collision and reported an Airprox to Hurn ATC by telephone after landing. The pilot comments that the distances estimated could well have been considerably less than the 400 yd he gives.

THE AZTEC PILOT reports that he was holding in the Hurn (BIA) pattern at 3000 ft QNH under radar control from Bournemouth APC on 119.62 and squawking 1731. The visibility was over 5 km. ATC advised him that an ATR was climbing out from Bournemouth but this ac was not seen; he thought it might have been obscured by the Aztec's nose. The pilot comments that he was

unaware until some days afterwards that an Airprox had occurred; his recollection of the flight is therefore given to the best of his memory.

ATSI reports that just prior to the Airprox an ac was involved in an accident on RW 26. The ADC controller said that his workload rose from moderate to intense following the accident, although his traffic loading reduced. The APR controller described her workload as light to moderate, both before and after the Airprox.

The ATR 72 pilot contacted Bournemouth Tower frequency at 1356 reporting fully established on the ILS for RW 26 at 6.5 NM. The pilot was requested to report at 3 NM DME. Shortly afterwards an AA5 was involved in a landing accident, causing RW 26 to be blocked. The ADC controller stated that he immediately operated the crash alarm and passed the relevant emergency message to the airfield Rescue and Fire Fighting Service; he estimated that the ATR 72 was about 3.5 - 4 NM from touchdown when he activated the alarm. Following receipt of a readback of the information by the ADC Controller, the GMC controller elected to assist him in alerting the outside agencies, the former explained that he continued to concentrate his attention on the ac on the RW, rather than the situation with the inbound ac. Subsequently, at 1358, when the

ATR 72 was on a 1 NM final, he instructed the flight to go around. No instructions concerning routing or altitude restriction were passed to the pilot. The ADC Controller commented that usually ac carrying out a go-around, other than for training purposes, would join the visual circuit but because the RW was blocked he considered that this was unlikely to happen on this occasion. The Standard Missed Approach Procedure for ILS DME RW 26 is to: "Climb straight ahead to I-BH DME 4, then turn left to return to NDB (L) BIA at 3000 ft or as directed." The ADC Controller said that he saw the ATR 72 climbing quickly to what he assumed was 3000 ft and considered the best course of action was to transfer the flight to APR, which he did at 1400. At the same time he warned the APR controller, via intercom, about the ac. The Bournemouth MATS Part 2, Page 3-6, states that co-ordination is to be carried out by ADC with APC: "When any aircraft goes around from an instrument approach." The ADC controller agreed that he should have carried out the relevant co-ordination with APC, but could only conclude that he had not done so because his attention remained focused on the emergency situation. He added that he was not aware of any traffic which might have conflicted with the go-around.

At 1400, while still climbing straight ahead, the ATR 72 pilot checked-in on the APR's frequency saying he was on a go-around, passing 3000 ft. Virtually simultaneously the APR controller said she received a warning from the ADC controller. She realised immediately the confliction between the ATR 72 and the Aztec, which was on an IFR training detail and at the time maintaining 3000 ft eastbound to the BIA. She passed traffic information to the pilot of the ATR 72 and at 1400:10 instructed him to turn R heading 360° which was acknowledged. The term avoiding action was not used. A radar photograph at 1400:13 shows the Aztec approximately 1.8 NM to the W of the ATR 72, the latter being 100 ft higher. The pilot of the ATR 72 subsequently reported sighting the other traffic when it was in his two o'clock position, less than 400 yd away. The radar recording of the incident, together with the pilot reporting his heading as 260° at the time of the

Airprox, appear to indicate that the ATR 72 did not take the R turn. In hindsight, the heading instruction given by the APR would have resulted in the ac turning towards the Aztec. However, it is realised that the APR controller responded quickly to the unexpected situation and she acted on the information presented to her. Traffic information was passed to the Aztec but no acknowledgement was received from its pilot. He stated subsequently that he had not seen the other ac.

The wisdom of APC holding ac at the BIA at 3000 ft, when the Standard Missed Approach results in ac routing to the beacon at the same altitude, was discussed. The APR controller said that it was standard operating practice to use 3000 ft at the beacon, reliance being placed on the ADC to co-ordinate unexpected go-arounds with APC in order to resolve any conflicts. It is understood that the unit is considering the feasibility of adopting other procedures, including the provision of a go-around button, to assist in preventing the possibility of a similar incident occurring in the future.

UKAB Note: A replay of the LATCC radar at 1359:46 shows the Aztec in a L turn at 2800 ft Mode C 2(5 NM to the W of Hurn. At the same time a contact with the ATR 72's Mode C (5017) appears over the BIA NDB at 2200 ft. The ATR 72 then tracks 260° and at 1400:10 is at 2800 ft, 1.7 NM from the AZTEC, which is at its 1 o'clock turning L into opposition. At 1400:34 the contacts merge 2.3 NM WSW of Hurn with both Mode Cs showing 2800 ft, and the ATR 72 commences a R turn 10 sec later. Lateral separation cannot be measured because of the merged radar returns; however, it is likely the distance was less than 200 m as the Aztec passed on the starboard side of the ATR 72.

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 considered this was a very serious incident. The Aztec pilot did not see the ATR72 and the latter's pilot saw the PA23 only as it was passing close down his starboard side. The avoiding action instructions given by Bournemouth APR to the ATR72 were issued 24 sec before the ac passed and members thought it highly probable that had they been followed immediately an even closer encounter would have resulted. The radar recording, which shows the ac returns merging, supports the ATR72 pilot's view that lateral separation was probably less than the 400 m he initially reported. Members concluded that there had been an actual risk of collision.

After a lengthy discussion, the Board eventually took the view that the prime cause of the occurrence was a lack of co-ordination by ADC with the radar controller in respect of the ATR's missed approach. That said, there were other features of this incident which gave the Board much cause for concern. It was felt that the Airprox had been precipitated by arrangements that were inherently fail-dangerous, i.e relying on co-ordination alone to resolve a potential conflict between an ac going-around from an instrument approach and traffic holding at the minimum holding altitude. In this Airprox, the uncoordinated late transfer of the ATR 72 presented the radar controller with an immediate problem which she had no time to resolve. Military members particularly were astonished to see that it was apparently possible for an ac flying the missed approach procedure to end up at the same level as another ac flying a holding pattern overhead the airfield, as happened in this case. In their opinion the Missed Approach Procedure could

only be valid when there was no traffic in the holding pattern or commencing an approach at the promulgated missed approach altitude. The standard missed approach procedure in this instance required the ATR 72 to climb (via the I-BH DME 4) to 3000 ft, the same level as the PA23 in the hold. However, an ATSI adviser pointed out that it was the responsibility of the APR to allocate holding altitudes appropriately so that the missed approach procedures were not compromised in the event of an unplanned or unexpected go-around. In this context, the adviser felt the APR had not taken sufficient account of the possibility that the ATR might go-around. Subsequently, because of the late notification and transfer by ADC, she did not have time to give effective avoiding action against the Aztec which she had previously cleared to hold overhead at 3000 ft. On these grounds the APR's choice of holding altitude and lack of contingency planning had contributed to the Airprox.

Having discussed the implications of this incident in some detail, members wondered if similar situations could arise at other airfields throughout the UK, which prompted a suggestion that it might be prudent for the CAA to ask other units, in the light of this Airprox, to review their go-around arrangements. Director UKAB agreed to approach the appropriate CAA department on this matter. The Board also felt that ATC management at Bournemouth should examine their current ATC practices to ensure that missed approaches did not conflict with other inbound or holding traffic. At the request of members Director UKAB undertook to make a recommendation to this effect to the CAA.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: A

Cause: ADC did not co-ordinate the missed approach by the ATR 72 with the approach radar controller.

Recommendation: That the CAA considers a review of current ATC practice at Bournemouth International Airport to ensure that aircraft conducting the standard missed approach procedure are deconflicted from other IFR inbound/holding aircraft.

AIRPROX REPORT No 98/99

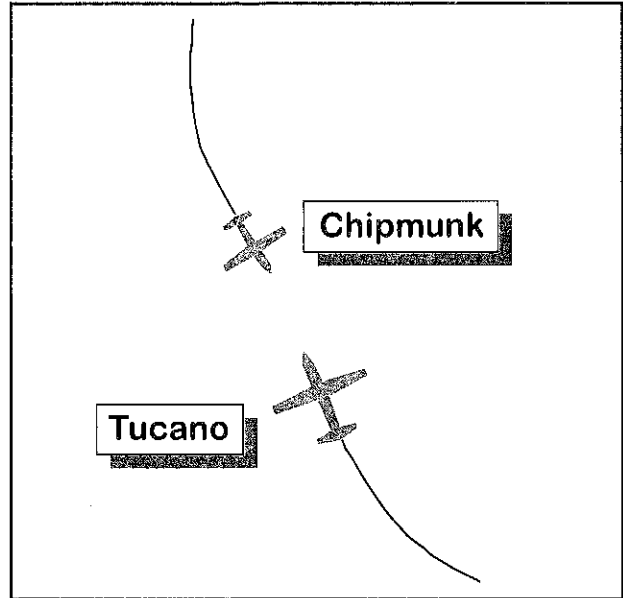
Date/Time: 24 Jun 1204
Position: N5652 W0415 (40 NM NW of Perth)
Airspace: LFS/FIR (Class: G)
Reporting Aircraft Reporting Aircraft
Type: Chipmunk Tucano
Operator: Civ Pte HQ PTC
Alt/FL: 500 ft (agl) 250 ft (msd)
Weather VMC CAVK VMC CLOC
Visibility: 20 NM 10 km+
Reporting Separation: 20 m/NK
Recorded Separation: NK

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHIPMUNK PILOT reports heading SE at 100 kt on a solo low level leg of a navex from and to Perth. He had advised Scottish Info that he would be at low level from Rannoch onwards. He was keeping the A9 and railway to his left and saw the conflicting ac when it rounded the hill to the E of the pass at the same level as him, 250 m ahead. He broke left and it appeared to him that the other ac, he thought it was a Tucano, did the same, passing 20 m away; he considered there had been a high risk of collision. The visibility ahead had been restricted by the bend in the valley.

THE TUCANO PILOT reports heading 340° at 240 kt on a low level exercise following the LFS flow direction through the A9 pass, at 250 ft. The crew consisted of 2 QFIs. After checking behind for faster ac, the front seat pilot looked ahead to see another ac head-on at the same level 200 m away. He pulled 8.2 g into the vertical, losing sight of the other ac which he estimated would have passed directly beneath; he thought there had been a high risk of collision. A level break was precluded by the lack of time and high ground to the right. The other ac was red and white and looked like a Chipmunk; after his pull up he saw it continuing along the pass. Its small frontal area, head-on aspect and lack of lights contributed to the late sighting.



HQ PTC comments that the Tucano was flying a properly authorised and conducted flight IAW the UKLFHB. He was properly concentrating his lookout where that document would lead him to expect traffic. He was extremely lucky to catch last-second sight of an ac exactly where he might not expect it.

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.

It was clear that the cause of the Airprox was a very late sighting of the other ac by both crews due partly to the terrain and partly to the Tucano crew not expecting oncoming traffic. Much of the discussion centred on the LFS flow arrows marked on the military low flying charts and, at 1:1000 000 scale, in ENR 6-5-2-1. The incident highlighted apparent unawareness by military pilots on 2 points; first that LFS flow arrows were not marked on civil topo charts, (unless the pilot had undertaken the task of transposing them from the AIP chart) and second that civil ac were not restricted to any minimum level when flying over unoccupied terrain. The GA members suggested that it would be remiss of a pilot who intended to fly a low level leg not to

have transposed the information (included in the ENR for his benefit) onto his flight chart; they also commented that while many GA pilots did not have ready access to the AIP, this should not apply to a pilot operating out of Perth.

The Board concluded that there had been a very real risk of collision in the incident and were advised that their recent recommendation to have the LFS flow arrows marked on the civil

low level 1:500 000 or 1:250 000 charts had been turned down. A Board member who was also on the MCWG advised that there had been military objections to the idea, but the Chairman who had discussed the matter recently with MOD said there were no military objections. The Board felt strongly that the flow directions should feature on the relevant charts and therefore recommended that the matter be reconsidered.

PART C: ASSESSMENT OF RISK AND CAUSE

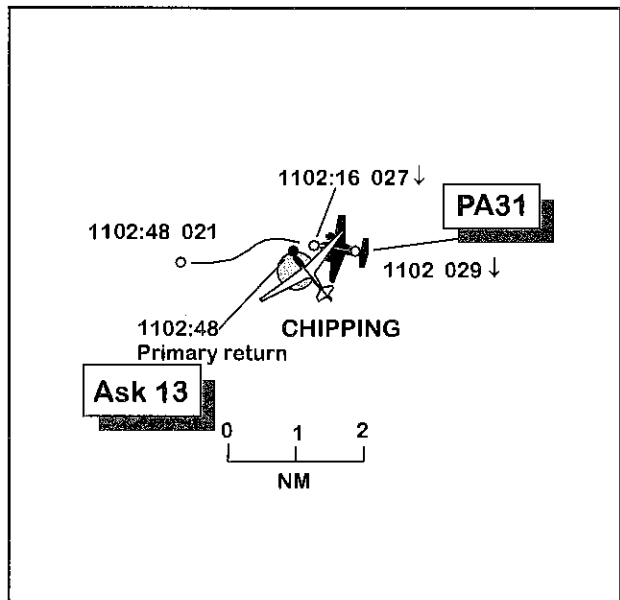
Degree of Risk: A

Cause: Very late sighting by both pilots.

Recommendation: That the CAA should reconsider the decision to exclude LFS 'flow arrows' from those civil charts commonly used by civilian pilots flying below 2000 ft outside controlled airspace.

AIRPROX REPORT No 99/99

Date/Time: 25 Jun 1102
Position: N5354 W0236 (0.5 NM NE Chipping airfield - elev 600 ft)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Ask 13 glider PA31
Operator: Civ Club Civ Comm
Alt/FL: 1800 ft (QFE) 1800 ft ↓ (QNH)
Weather VMC CLBC VMC
Visibility: 2 - 3 NM >10 km
Reported Separation: 50 m H/0 ft V 0.5 NM/100 ft
Recorded Separation: N/K



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports that he was flying at 50 kt, turning L in a thermal at 1800 ft (QFE), just outside the airfield boundary. Because of reduced visibility (2 - 3 NM in haze), he and his passenger employed an active lookout pattern, encouraged by the knowledge that other gliders

were flying in the area. Additionally, they were keeping a close eye on a number of paragliders that were also flying within a mile of their position. Despite their efforts, however, neither glider occupant saw the PA31 until it appeared some 50 m off their starboard wing; it was at the

same height, passing them from behind and banking away to the R. There had been no time for any avoiding action and the glider pilot thought the risk of collision had been high. After landing he filed an Airprox with Blackpool ATC and commented in his report that the Chipping glider site is marked on the ICAO Northern 1:500,000 topographical chart showing cable releases up to 3000 ft agl.

THE PA31 pilot reports flying with Mode C on towards Blackpool on a westerly heading at 1800 ft on the Warton QNH. On board with him was a systems operator. They were receiving a RIS from Warton Radar, who advised pop-up traffic ahead, range 5 NM. This traffic was seen by the crew at about 4 NM, pointing towards them so the PA31 pilot turned R aiming to clear the contact by an estimated 1.5 NM; he also switched on all his front hemisphere lights. However, as the range reduced the glider turned L, so closing the lateral separation being set up. This prompted the PA31 pilot to turn further R using 30° AOB - "to be on the safe side" - and eventually he passed the glider on its starboard side with about 0.5 NM lateral separation and some 100 ft vertically. Having kept the glider in view throughout, he believed no risk had been involved - even if he had stuck to his first 'avoidance' track. He saw no evasive manoeuvres from the glider and once he had passed it he resumed his heading for Blackpool.

UKAB Note (1): A replay of the LATCC radars shows the PA31 heading W towards Blackpool on a track which would take it slightly N of the glider site at Chipping. At 1102:06 the ac is about 1 NM NE of the site descending through 2900 ft Mode C; no primary returns are seen nearby at the time. At 1116:16 the ac is 0.4 NM to the N of the airfield passing 2700 ft and appears to be making a slight adjustment to the R. By 1102:48 the ac is well clear to the W of the airfield and passing 2100 ft having made a further adjustment to its heading, this time to the L. At this time a solitary primary return, which is probably the glider, appears about 0.3 NM due N of the airfield just S of the PA31's

track. On this assumption the Airprox would have occurred at 1102:16 or thereabouts as the PA31 passed abeam the airfield.

UKAB Note (2): Chipping is notified in the UK AIP (ENR 5-5-1-2) for glider launching during daylight hours up to 3000 ft. The site is also marked on the ICAO 1:500 000 topo with a warning of cables up to 3000 ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members felt that the PA31 pilot had made reasonable plans to avoid the glider when he was thwarted by its unexpected turn towards him. As the Piper had approached unseen from the glider's rear quarter, it was understandable that the latter's pilot was surprised and alarmed when he saw it apparently avoiding him in a banked attitude. As is often the case where there is a 'fright' element, the glider pilot may have perceived the other ac to be closer than it actually was. While it was not possible to verify the lateral separation with any degree of accuracy by radar, members were satisfied that the PA31 pilot, having watched the glider manoeuvring for some time, was fully in control of the situation and always in a position to avoid it.

Although the PA31 routed to the N of the airfield, and therefore clear of the path of the cable, members cautioned pilots against planning a flight quite so close to a known gliding site when a short detour would have ensured a greater degree of separation from gliders operating close to the airfield boundary. The Board concluded that the Airprox resulted from a conflict of flight paths in Class G airspace near Chipping airfield, which was resolved by the actions of the PA31 pilot.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: A conflict near Chipping airfield resolved by the PA31 pilot.

AIRPROX REPORT No 100/99

Date/Time: 30 Jun 1038

Position: N5142 W0207 (1 NM NW of Aston Down - elev 600 ft)

Airspace: FIR (Class: G)

Reporting Aircraft Reported Aircraft

Type: ASK 13 Glider Tornado GR

Operator: Civ Club HQ STC

Alt/FL: 400 ft (QFE) 500 ft (agl)

Weather VMC CLNC VMC CLBC

Visibility: Unltd 20 km

Reported Separation: 400 yd, 50 ft/NK

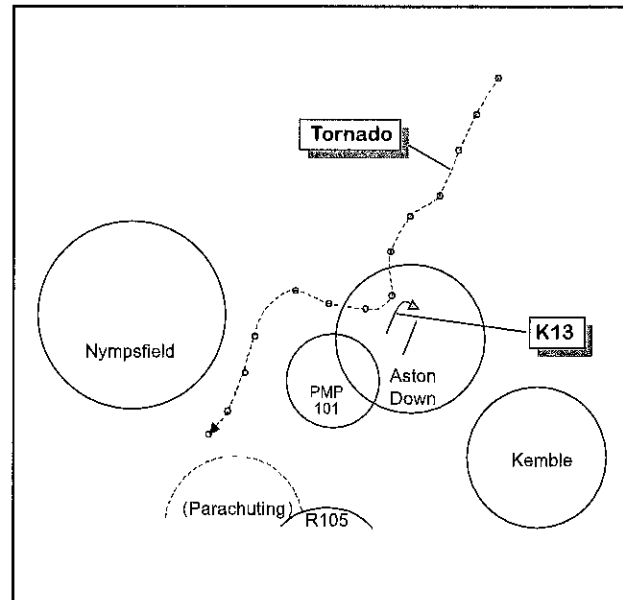
Recorded Separation: NK

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 13 PILOT was flying a dual sortie and reports heading NE at 55 kt about to turn base in a RH circuit to RW 21 at Aston Down; he was at 400 ft above touchdown. He saw a Tornado approaching from his 10:30 about 0.5 NM away. Taking control from his student, he turned hard right in a dive with full airbrakes and at the same moment the Tornado stood on its wingtip and turned sharply right, passing 400 yd away and about 50 ft below. Considerably shaken by the experience, he considered the risk of collision was very high, adding that Aston Down is active 7 days a week and has a cable clearance up to 3000 ft.

THE TORNADO PILOT reports heading SW at 420 kt on a navex at 500 ft and made a right turn in the area of Aston Down; he believed he had remained more than 1.5 NM from the airfield. He did not see the glider.

Note: LATCC radar recordings show the Tornado tracking SSW towards Aston Down;



the recording is transcribed in the diagram. Its track starts to turn away to the W but then reverses into the airfield avoidance area (AAA). It then reverses its turn again, sharply, and exits the AAA to the W before turning S to avoid Nympsfield.

HQ STC comments that operating in busy areas with complex airspace requires close attention to navigation and good lookout discipline. The radar recording indicates that the Tornado crew, who believed that they had maintained lateral separation from Aston Down, were in the AAA at the time of the Airprox. Accordingly, crews have been reminded of the need for vigilance when routing close to airspace restrictions.

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 found little to discuss regarding this incident which, they agreed, was caused by the Tornado crew infringing the Aston Down AAA and not seeing the glider. Although both ac

turned away from the conflict, the time available for avoiding action was limited and the Tornado crew did not have the glider in sight. For these reasons the Board assessed that the safety of the ac had not been assured. Members could well understand how frightening this incident was for the glider pilot.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: The Tornado crew infringed the Aston Down AAA and did not see the glider.

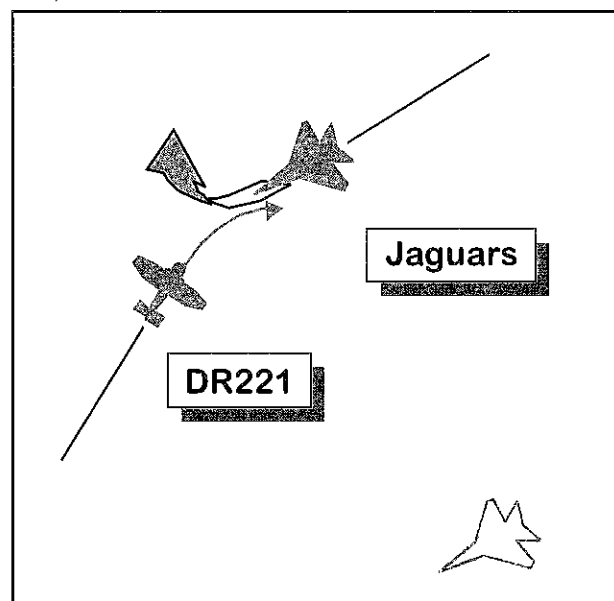
AIRPROX REPORT No 101/99

Date/Time: 30 Jun 1009
Position: N5106 W0259 (2 NM S of Bridgewater)
Airspace: LFS/FIR (Class: G)
Reporting Aircraft Reporting Aircraft
Type: Jaguar Robin DR221
Operator: HQ STC Civ Pte
Alt/FL: 1650 ft (Rad Alt) 1500 ft (NK mb)
Weather VMC CLBC VMC CLBC
Visibility: 30 km 10 km+
Reporting Separation: 50-100 ft/150-200 ft
Recorded Separation: NK

BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JAGUAR PILOT reports heading 240° at 360 kt as No 2 on the right of a pair of ac descending to low level. At 1650 ft, just before a turning point he saw a light ac in his 11 o'clock 1000 ft away at the same level and growing larger in his windscreen. He immediately pulled up and as he did so he saw the other ac pull and bank towards him. He estimated he passed 50-100 ft above it and the risk of collision had been high. On his HUD video the ac is first seen about 7 seconds before avoiding action was taken.



THE ROBIN PILOT reports heading 025° at 90 kt on a navex at 1500 ft in communication with Yeovilton Radar on 127.35, squawking 7000. A fast jet passed in the opposite direction above him by 150-200 ft, pulling up, as he turned right and dived. He had seen it when it was 500 ft away, and the risk of collision was high. He discussed the incident with Yeovilton the following day; they said they were probably not working the other ac.

HQ MATO reports that RNAS Yeovilton's involvement in this Airprox was not known until the Robin pilot's report arrived by which time the

RT recording was not available. The only records available are the (unidentified) LARS and Approach controller's FPSs. The word 'Airprox' was not said to the LARS controller on RT at the time. There is no record nor recollection by ATC staff, of the following day's telephone conversation with the Yeovilton Duty Officer (assumed to be the Duty Air Traffic Control Officer [DATCO]); again, it is possible that the word Airprox was not used. A brief analysis of the available data however, is given below. All timings are UTC.

The Robin was receiving a FIS from Yeovil Radar (LARS) on frequency 127.35 having departed from Bristol Lulsgate. The ac had been allocated a squawk of 0232, but it is not known if the ac was actually transponding this code; nor is it not known whether Mode C was available. The ac had initially reported operating at 1500 ft and was on a pressure setting of 1016 mb, which is most likely to have been the Portland RPS. At some point in the sortie, the ac reported being at 1000 ft. Finally, it would appear that the ac was free-called to Bristol Approach on frequency 128.55, as there is no indication of a prenote or a handover taking place. The Robin left the frequency at an unknown time shortly prior to 1016, the time that the FPS was logged by the Radar Assistant. This type of track, operating in the Bridgwater area, is similar to many flown by Bristol based light ac in communication with LARS. It is likely that the Airprox occurred just before the Robin left the LARS frequency.

The Jaguars had been receiving a service from Yeovil Approach (APP), squawking Mode 0211 with Mode C, whilst in transit to the SW and in descent to low level. It is not possible however, to tell from the FPS whether the service provided was RIS or FIS. Their squawks change to 7001 at 1008:15, at which time they are about 5 NM NE of the reported Airprox position and passing an indicated 2100 ft Mode C (about 2000 ft on 1016 mb). This position would correspond with the time that the Jaguars left APP's frequency.

The Airprox is not shown on radar. The LATCC Burrington radar replay shows the track of both

Jaguars throughout, however their transit through the reported position of the Airprox, from the point at which they both squawk 7001, is displayed as a SSR data only (ie. they were below primary radar cover). The Robin is not seen on the radar recording although the Airprox was reported as having very little vertical separation; it therefore appears that either the Robin was not squawking or that its transponder had failed. The workload of LARS and APP cannot be estimated, although both controllers are each seen to have had at least 2 other tracks under their control at the time. It is not known if APP passed traffic information to the Jaguars about the Robin before they changed frequency, although without SSR information, the Robin may not have been visible on APP's radar. It is unlikely however, that the controller would have knowingly sent the pair en-route 'in confliction', without some form of warning.

Note: The Burrington radar recording shows the Jaguars in a gentle descent with the No 2 about 2 NM to the right of his leader. At the reported Airprox position the Mode C rises from 1400 ft to 2700 ft in 16 seconds (4700 ft/min). There is no return on the intermediate sweep, indicating a possible rapid change of height. The Mode C then decreases again as the formation enters its right turn.

HQ STC comments that small ac, when flying co-altitude on a constant relative bearing, are very difficult to see. This may account for the relatively late sighting by both pilots. Notwithstanding the late sighting, the Jaguar pilot manoeuvred sufficiently to increase the miss distance.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board found little to comment on in this incident and concluded that the cause was a late sighting of the other ac by each pilot. There was no explanation as to the direction of the Robin's avoiding turn; a supposition was that it may have seemed to the pilot when he first saw the Jaguar that he needed to turn left but that while initiating a left turn it may have become

clearer that he needed to turn the other way and may have done so after going out of the climbing Jaguar pilot's field of view. While some members considered that there had been a risk of collision in the encounter, the view prevailed that both pilots had seen the other ac in time to avoid it but their safety had been compromised.

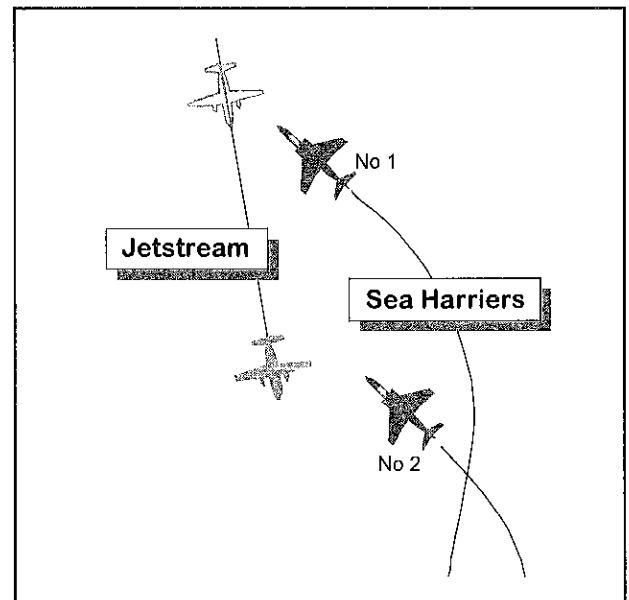
PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: B

Cause: Late sighting by both pilots.

AIRPROX REPORT No 103/99

Date/Time: 30 Jun 1323
Position: N5626 W0140 (40 NM E of Leuchars)
Airspace: FIR (Class: G)
Reporting Aircraft Reported Aircraft
Type: Jetstream 31 Sea Harrier
Operator: CAT HQ FONA
Alt/FL: FL: 195 20000 ft ↑ (RPS)
Weather VMC CLAC VMC CLAC
Visibility: 30 NM+ 20 km
Reported Separation: 500 ft/500 ft
Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM PILOT reports heading 180° at 240 kt en route to Humberside, cruising at FL 195 and receiving a RIS from ScACC on 124.5. Passing the Firth of Forth he saw a Harrier as it passed 500 ft directly beneath him at very high speed as he was turning from 180 to 240° in response to avoiding action passed by Scottish. He considered there was a high risk of collision.

THE HARRIER PILOT reports heading 010° at 480 kt leading a pair on a sortie involving many ac of different types; the use of D608 had been NOTAMED for the exercise. His No 2 was in 3

NM trail. He saw the Jetstream about 0.25 NM ahead and 500 ft below. He called it to his wingman but his microphone had failed; he heard his wingman call him to pull up so he knew his No 2 had seen it; although it was a late spot he could see there was no danger of collision. However, he pulled up to let his wingman know he had heard the transmission. He was receiving a RIS from Neatishead but because of comms jamming he did not know if traffic information had been passed. His wingman flew below the Jetstream by 500 ft and somewhat behind it.

Note: The Harrier Sqn confirmed that a NOTAM had been submitted for the exercise which was large enough to mandate such a request. Enquiries to see if a NOTAM had been issued which the Jetstream operators might have known about revealed that no such NOTAM had been published for that day. AUS advised that the exercise was not significant enough to warrant a NOTAM but an ACN had been issued; addressees included Aberdeen, Newcastle, ScACC and Pennine Radar. D608 had been 'booked' to prevent other military exercises from taking place there concurrently.

	Lead Harrier	Jetstream
Just before the ac pass	182	181
As the ac pass	185	182
Just after the ac pass	191	183

Note 2: LATCC and ScACC radar recordings were searched for the Airprox. The Jetstream, identified from its ScACC squawk, is seen passing the Firth of Forth (through D608) without event, and through the position 16 NM N of NTP given by the Sea Harrier pilot. A longer replay showed that the Airprox occurred earlier, abeam Leuchars, some 6 NM N of D608. The Jetstream is tracking 167° and climbing through FL 173 as the Harriers, tracking 012°, cross his nose R to L some 14 NM ahead in a gentle descent from FL 200. (The No 2 Harrier is an intermittent primary only return.) When some 6.7 NM from the Jetstream, the Harriers start a left turn still descending towards it. The Mode C returns of the ac are then as follows:

The Sea Harrier continues up to FL 196 and the Jetstream continues its gentle climb, having altered course slightly to the right. The No 2 Harrier is not visible at this stage. The radar recording confirms the pilots' reports of lack of horizontal separation. The diagram with the Harrier pilots' report showed that the No 2 Harrier was on his leader's left.

ScACC reports with RT transcript that the Jetstream was in a climb to FL 195 on a direct track to Humberside under a RIS from the Tay

P & E controller. There was intense military activity in its general area for much of its transit in Scottish airspace. Between 1316:50 and 1319 the controller was giving near continuous traffic information on a range of formations manoeuvring round it. At 1321:05 the controller warned the Jetstream that there was "opposite direction traffic coming into your half past 12 at a range of er 15 miles, 190 climbing, unverified, at least 2 tracks" to which the pilot replied that he was looking. The controller said at 1321:20 he would "keep you advised, there's quite a bit of activity in your vicinity at the moment." During the next 2 minutes the controller advised another ac to change heading and a minute later put it on its own navigation for Newcastle and spent 10 sec co-ordinating with another sector. At 1323:20 the controller noticed that the previously mentioned traffic had made a hard turn towards the Jetstream and advised the pilot "c/s Scottish avoiding action turn right heading 240 traffic coming into your one o'clock in a left hand turn passing 185 descending." The returns had practically merged by the time the Jetstream took the turn and the pilot replied "Visual with the traffic just er pa- now to our right". He confirmed that he wished to file an Airprox and identified the ac as a Harrier, saying he had seen only one.

HQ FONA comments that although similar incidents have occurred recently involving an ADRS service, comms jamming, and the presence of non-exercise ac, this is the first involving RN ac. As HQ STC is already investigating this problem, HQ FONA will be content to adopt any revised SOP.

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.

Problems associated with conducting military exercises involving comms jamming of the air

defence frequencies, in areas where civil air transports might be encountered, were being staffed by HQ STC after an incident earlier in the year (17/99) with some similarities. However, with or without a radar service, in class G airspace all the pilots involved had a duty to see other ac in time to take any necessary avoiding action. It was clear that the No 2 Harrier had seen the Jetstream in time to avoid it by 500 ft which members agreed was an entirely satisfactory margin for the FIR. The lead Harrier pilot's workload was high leading his section in a comms jammed environment, and although he saw the Jetstream later he still had time to avoid it; the Jetstream pilot was unaware that another Harrier had passed overhead. The Board concluded that the sightings had been in time to avoid a risk of the ac colliding.

It was noted that the ScACC P & E controller was providing a continuous service to the Jetstream in a busy military exercise area and had called the Harriers to him as they crossed his nose some 15 NM ahead. The Jetstream pilot did not subsequently ask for an update,

possibly because the controller had said he would keep the pilot advised, and the controller then said no more until the incident was in progress. This may have been because the Harriers only started to turn towards the Jetstream about 40 seconds before passing it.

As to the NOTAM, the Board was advised that the military pilots involved were not under any misapprehensions about the status of the airspace. ScACC was aware of the activity from the ACN and from the traffic on their screens, while the Jetstream pilot was made aware by the controller that he was in busy airspace, but there was no other practicable route that he could have taken between Aberdeen and Humberside.

The Board looked forward to learning HQ STC's findings on safety matters attaching to air defence comms jamming exercises. Meanwhile, members concluded that this incident was a confliction of flightpaths in the FIR which was resolved by the Harrier pilots.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: Confliction of flightpaths in the FIR resolved by the Harrier pilots.

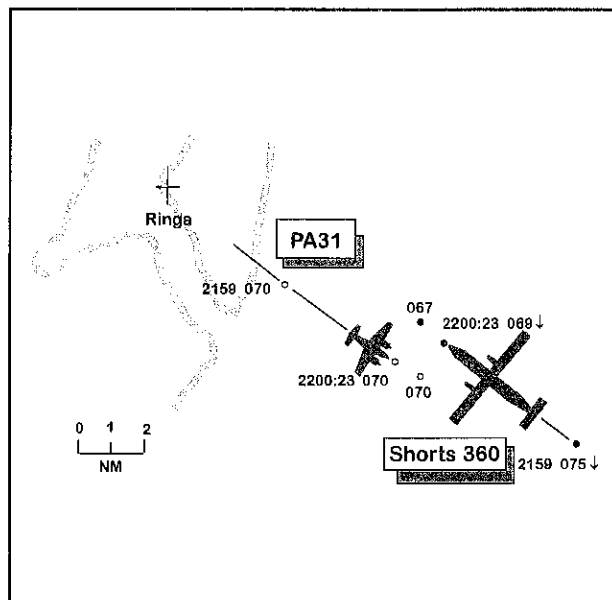
AIRPROX REPORT No 105/99

Date/Time: 30 Jun 2200 TWILIGHT
Position: N5418 W0521 (9(5 NM SE RINGA)
Airspace: Airway (Class: A)
Reporter: ScOACC
First Aircraft PA31
Second Aircraft Shorts 360
Type: PA31 Shorts 360
Operator: Civ Comm CAT
Alt/FL: FL 70 ↓ FL60
Weather VMC CLAC VMC
Visibility: 10 NM
Reported Separation: 1.5 NM
Recorded Separation: 1.4 NM/200 ft

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

UKAB Note (1): The loss of separation was not detected at the time by the controllers concerned (Belfast APR/ScOACC TMA and Antrim SC). ScOACC submitted an Airprox the next day (1 July) when the incident came to light following routine examination of SMF data. The Airprox occurred when the Belfast APR descended an inbound Shorts 360 (SH 36), which was on airway B3 and had just been transferred from Scottish, through the level of an opposite direction PA31 which Belfast ADR had transferred to Scottish some minutes before.

THE PA31 PILOT reports heading 135° at 170 kt while maintaining FL 70 on airway B3, 5 - 10 NM SE of RINGA. He was under radar control from Scottish on 126.3 and squawking 6227 with Mode C; cockpit workload was low. The visibility was 10 NM in VMC; however, until about 1 min before the incident he had been in IMC during which time his anti-collision lights had been switched off and, therefore, would not have been observable by the pilot of the other ac, which was a white high-wing twin engined type seen at his 10:30 position about 4 NM away. It subsequently passed about 1.5 NM down his port side descending through his level in the opposite direction. No avoiding action was felt necessary, as the relative bearing from the ac was decreasing rapidly and it was clear



that it would pass well clear of him. He did not consider there had been any risk of collision.

UKAB Note (2): The Shorts 360 pilot did not see the other ac and was unaware until some time later that he had been involved in a loss of separation.

ATSI reports that the Airprox occurred SE of the RINGA intersection on Airway B3 in Class 'A' controlled airspace shortly after the ac had been transferred between the units - the SH36 from ScACC to Aldergrove and the PA31 from Aldergrove to ScACC. The SH36 was westbound on the airway, cruising at FL 80 to Aldergrove from Stansted, and the PA31 eastbound, having levelled at FL 70 after departure from Aldergrove to Liverpool. Both flights were operating on IFR flight plans. The frequency transfer took place some time before the ac passed each other and, while they were still approximately 20 NM apart, the Aldergrove APR had cleared the SH36 to descend to 6000ft.

The controllers concerned had felt fit and adequately rested and no factors likely to have adversely affected their performance on the date of the Airprox were identified during the course of the investigation. Both assessed their workload to have been light. The ScACC controller was occupying the Galloway Position

and monitoring a trainee. As well as fulfilling the TMA 'P' and 'E' controller tasks, in accordance with what is understood to be common practice on night shifts, the mentor and trainee were also responsible for the Antrim and Tay sectors. In the light traffic conditions pertaining, this is not considered to have had any bearing on the Airprox from the workload perspective but did mean that a large area of airspace had to be monitored. Being a Wednesday night, the National Airspace System (NAS) equipment was not available at ScACC (due to routine maintenance) and the radar system was operating in 'BYPASS' mode. This meant that a number of facilities, including STCA and the SSR Code/Callsign Conversion facility, were not available.

At Aldergrove, during the period preceding the Airprox, it had been determined that the forecast traffic situation did not warrant the use of radar and the Aldergrove APR had gone to the VCR, where the aerodrome controller would provide a combined aerodrome/procedural approach control service. At that time there were no estimates on inbound traffic and only two departures (one of which was the PA31) were pending. The first ac departed at 2145, followed by the PA31 a min later. While passing the airborne times to ScACC, the Aldergrove aerodrome controller accepted estimates on two inbound ac, the first estimating RINGA at 2201 and the second, the subject SH36, at 2207. A short time later, at 2152, ScACC passed a further inbound estimate on a military ac joining from the FIR and estimating the field at 2209. At that stage the APR returned to the radar room in order to accept a radar handover on the military ac. In the meantime, the aerodrome controller had transferred the PA31 and the pilot called ScACC at 2151, by which time the flight was at its cruising level of FL 70. Unfortunately, when resuming the Aldergrove radar service, no formal handover took place between the aerodrome controller and the APR and the presence of the PA31 was not apparent to the latter controller; he was adamant that the ac was not showing on his radar (Aldergrove only has primary radar) and he did not have a 'live' FPS for the flight. The APR indicated that the Aldergrove primary radar coverage can be

unpredictable. On this occasion, although the PA31 was not showing, the military ac at FL 60, referred to earlier, was visible despite being further from the radar head, and the SH36 was visible continuously from the time it passed SLYDA.

At 2157, ScACC telephoned the APR to pass revisions to the earlier estimates and, during the course of the conversation, the trainee Antrim controller pointed out that the SH36 was just passing overhead SLYDA. This was purely for information and the supervising controller was surprised when the APR said that he could see the ac on radar because he thought it would be outside Aldergrove's radar coverage. The trainee confirmed that the flight was on its own navigation at FL 80 and, having received confirmation from the Aldergrove APR that the flight was identified, transferred it. At that stage, the SH36 was approximately 20 NM SE of the PA31. The Antrim Sector mentor readily acknowledged that it is not good technique to transfer an ac to another agency while it is in potential conflict with other traffic no longer in communication with that agency when this can be avoided. He emphasised that he, or his trainee, would normally have delayed transfer until the ac had passed. In this case, he had not expected Aldergrove to be able to see the SH36 at SLYDA but when the APR said that he could, the ScACC controllers, perhaps not unreasonably, assumed that he would also be aware of the PA31 and still be able to see it on radar. Therefore they elected to transfer the SH36 before the ac had passed each other.

No formal release message, either procedural or radar, was passed between the ScACC controllers and the Aldergrove APR, prior to the transfer of the SH36. The ScACC (Antrim Sector) and Aldergrove MATS Pt. 2s have sections describing the interface procedures in some detail. The initial unit investigations into this Airprox quickly established that the two sets of procedures did not match in all respects and steps were immediately taken to rectify this problem. During the course of the investigation, the two sets of procedures were scrutinised closely. The differences in the written procedures, at the time of the Airprox, are not

considered to have contributed directly to the Airprox; however, certain aspects of the procedures are ambiguous and open to misinterpretation. Both controllers considered themselves conversant with the relevant procedures, but their views on how the subject ac should have been handled differed significantly. In particular, the Aldergrove APR thought that the SH36 was 'released on contact', whereas the ScACC mentor thought that the eastern edge of Airway B2 (ScACC MATS Pt. 2, Page ANT 5-4, para. 1.6 refers) was the "Transfer of Control' point.

The pilot of the SH36 established communication with Aldergrove at 2157:30. The APR locked the aircraft on its heading (310()) and, when acknowledging this instruction, the pilot requested " descent when possible". The APR immediately cleared the flight to 6000 ft on QNH 1012. Fortunately, the radar heading assigned to the SH36 meant that its track was displaced slightly from that of the PA31; the flights subsequently passed port to port and the controllers concerned did not observe the conflict. The ScACC mentor said that he had not noticed the SH36 vacate FL 80. He pointed out that another of the features lost when the radar is operating in 'BYPASS' mode, is the presentation of climb and descent arrows to indicate that a flight is not in level flight. He thought that the presence of a descent arrow might have drawn his attention to the fact that the SH36 had left FL 80.

As far as is known, the SH36's crew were unaware that an Airprox had occurred. When the SMF equipment brought the Airprox to light, the Aldergrove APR and ScACC mentor and trainee submitted Airprox reports. In his written report, the PA31 pilot states that he sighted the other ac in his 10:30 position at a range of 4 NM and assessed that it passed him at a range of 1(5 NM at the same level; he did not notify an Airprox and only submitted a report after being contacted by the UKAB.

UKAB Note (3): The ATSI report then details and discusses the various anomalous aspects of the ScACC and Aldergrove MATS Pt 2 written procedures. These are set out at Annex.

The evidence available indicates that the controllers at both units were applying at least some elements of the 'Free Flow Procedures'. Unfortunately, neither adopted the normal vectoring requirement, which would have placed the SH36 on the N side of the airway and the PA31 on the S. The ScACC trainee controller did advise Aldergrove that the SH36 was on its own navigation, but there is no evidence to indicate that Aldergrove sought agreement to route the PA31 direct to the Isle of Man VOR.

During the visit to Aldergrove, evidence was produced of dissatisfaction with the working of the interface procedures, and two "Problem Reports" were produced. One indicated the author was unhappy with the requirement for Aldergrove controllers, when descending traffic below the agreed level, to remember and retain an ident on traffic already transferred to ScACC. The other expressed the view that revisions on inaccurate forward estimates on inbound traffic were not always forthcoming from ScACC.

The CAA Safety Regulation Group's ATS Standards Department conducted an audit of the ScACC Antrim Sector/Belfast International Airport interface between 31 August and 3 September 1999. This Airprox and the deficiencies in the written procedures identified during the course of the investigation were brought to the attention of the audit team. An interim audit report was sent to the units concerned on 8 September; it is understood that the report's recommendations have been accepted. The interface procedures have been reviewed by the units involved and revised procedures were brought into operation on 27 September. Aldergrove have advised that they anticipate the introduction of their SSR equipment at the end of November 1999.

UKAB Note (4): A replay of the Great Dun Fell radar at 2200:23 shows the subject ac passing 1.4 NM abeam each other on reciprocal tracks 9.5 NM SE of RINGA. Their Mode C readouts indicate a vertical separation distance of about 200 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 briefed the Board that the Airprox occurred after the Aldergrove APR had cleared the SH36 to descend through the level of the PA31. Notwithstanding Aldergrove's lack of SSR and its poor primary radar coverage, the APR should have been aware of the presence of the PA31 which had departed from the airfield only 9 min earlier. The incident occurred when workload was low enough to permit the APR to leave the radar position and go to the VCR. Board members thought this was perfectly acceptable but was dependant upon proper co-ordination and handover procedures being applied when radar control was resumed. In this case, although a pending outbound FPS for the PA31 was present on the display board in the APC room, members noted that the APR did not confirm its current status with ADR, despite being present in the VCR when the ac was given its taxi, airways and take-off clearances. The Board concluded therefore that the Aldergrove APR descended the SH36 into conflict with the PA31, of which he was unaware, following the absence of correct procedures when re-opening the radar position.

ATSI advisers drew attention to the inadequacy of the units' respective MATS Pt 2 instructions, which had undoubtedly influenced the actions of the controllers concerned. Several anomalies had been promptly addressed by both units in the light of this incident and these, together with SRG's audit of the procedures, should help to eliminate similar events in the future.

A Board member expressed concern that the radio frequency transfer of the SH36 to Aldergrove had been made before the ac had passed. ATCO members and advisers said that this was neither an unusual nor unsafe practice provided all relevant factors were taken into account; unfortunately, in this case, the Aldergrove APR was not aware of the PA31 when he descended the SH36. Some mention of the PA31 from the Scottish controller to the Aldergrove APR prior to transferring the SH36, or delaying its transfer until after the ac had passed, would have prevented the Airprox, but that was hind sight. With regard to risk, members noted that the recorded lateral separation was in the order of 1(5 NM; while this occurred fortuitously, the Board was satisfied that it was nevertheless sufficient to preclude any risk of collision.

The Board was advised that the introduction of SSR at Aldergrove is now expected take place in February 2000.

PART C: ASSESSMENT OF RISK AND CAUSE

Degree of Risk: C

Cause: The Aldergrove APR descended the SH36 into conflict with the PA31, of which he was unaware, following incorrect procedures in opening the Aldergrove Radar position.

ANNEX TO AIRPROX 105/99

Much time during the interviews was spent discussing the relevant written procedures. The impression gained was that the controllers concerned were rationalising their actions by referring to a mixture of basic MATS Pt. 1 procedures, MATS Pt. 2 "Free Flow Procedures", and MATS Pt. 2 "non-Free Flow Procedures". At the time of the Airprox, the distinction between the various related procedures was

blurred. The 'Free Flow Procedures' are long established and designed to facilitate the flow of traffic in and out of the Belfast TMA by reducing the co-ordination burden. The procedures associated with Airway B3 specify Agreed Levels, FL 110 for departures and FL 120 for inbounds, and state that traffic will be radar vectored onto the N or S side of the airway, according to the RW in use at Aldergrove. The procedures appear to work well most of the time with the majority of traffic cruising at or above the Agreed Levels. At the time of the Airprox, one of the conditions for the use of the 'Free Flow Procedures' (ScACC MATS Pt. 2, page ANT 5-1, para. 1.1 (b)) was: Departing and arriving aircraft will adhere to the agreed levels...". Both of the subject ac were cruising below the Agreed Levels so, by the strict application of the written procedures extant at the time, should not have been handled in accordance with the 'Free Flow Procedures'. In the absence of the specific procedures designed to cater for ac operating below the Agreed Levels, basic MATS Pt. 1 procedures should have been adopted, i.e. an individual clearance should have been obtained for the departure ac and the inbound ac should have been the subject of a 'full' inbound release; however, parts of the 'Free Flow Procedures' do make reference to ac cruising below the relevant Agreed Level. When discussing arrivals, the ScACC MATS Pt. 2 (Page ANT 5-2, para. 1.2.1) states :

"For aircraft cruising **below** the appropriate agreed inbound level, this message (the transfer of control message) shall be passed before the aircraft has passed the following geographical locations (SLYDA in this case) or specified time, and the cruising level will form part of the transfer of control message".

This requirement was complied with. The same paragraph goes on to say :

"Transfer of control will be effected by a radar handover at or prior to the transfer of control point... (in this case the eastern edge of Airway B2).

When descending arrivals below the agreed level, it is the responsibility of Aldergrove APC to provide separation against outbound traffic already transferred to Antrim Sector".

The relevant procedures written in the ScACC MATS Pt. 2 are not mirrored in the Aldergrove MATS Pt. 2. They do equate to a large extent but there are differences. The Aldergrove MATS Pt. 2 makes a number of references to flights inbound below the agreed levels. In the section on "Radar Control Procedures - Control of Inbound Aircraft" (Page 4-17), it states:

"Arriving aircraft at levels below the agreed levels must be the subject of individual co-ordination".

It is not clear exactly what this means. It was evident that Aldergrove expected something more than a 'transfer of control' message, which is required for all flights, irrespective of their level. Later, in the same section referred to above, it states: "Aldergrove radar accepts the released aircraft RSYD (Released Subject Your Discretion) any departing aircraft". Crucially to this Airprox, unlike the ScACC MATS Pt. 2 this does not make clear whether it applies to departing ac already transferred to ScACC but which may not have passed the inbound ac. In addition, it is not clear whether it applies to any inbound ac transferred to Aldergrove or just to ac which are the subject of a formal release. In another section of the Aldergrove MATS Pt. 2, "Operating Procedures - Arriving Traffic", there is a paragraph titled "Below Agreed Levels" (Page 4-22, para 3.1), which states the following:

"Arriving aircraft at levels below the agreed levels, must be subject to a standard release message. This release may be Procedural or Radar as appropriate".

Once again this is not consistent with what was written elsewhere. There are also inconsistencies in the "standard" 'Free Flow Procedures' themselves.

Following the Airprox, the units involved embarked on a joint initiative to review their interface procedures in order to rectify deficiencies. As an interim measure, ScACC issued a TOI (TOI 30/99) on 9 July 1999 with a view to preventing any repetition of this Airprox. The TOI stated:

“When conducting the Radar Handover on traffic below the Agreed Inbound Level, the Antrim ‘E’ controller shall remind the Aldergrove Radar controller of any outbound traffic from the Belfast TMA climbing to, or cruising at, a level below such inbound traffic which may still be in conflict”

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