UK AIRPROX BOARD

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Analysis of Airprox in UK Airspace

Report Number 14
January 2005 – June 2005

Fourteenth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(January 2005 to June 2005)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

The primary purpose of this, the fourteenth Report from the UK Airprox Board (UKAB), is to promote air safety awareness and understanding of Airprox. "Book 14" covers the first six months of 2005 in detail, containing findings on 91 of the 92 Airprox which were reported as occurring within UK airspace in that period and which were fully investigated. Airprox 008/05 is subject to ongoing Air Accidents Investigation Branch action, as a Serious Incident, in addition to investigation by UKAB. Details of that incident and conclusions will be published in due course.

The count of 92 incidents during the first six months of 2005 is four less than the average of comparable figures in each of the previous five years. This Table shows the details:-

Risk Category	2000	2001	2002	2003	2004	2005
A	14	16	7	6	8	12
B	20	23	27	29	30	26
C	61	57	56	49	66	53
D	0	5	2	1	5	0
to be assessed	0	0	0	0	0	1
Totals:	95	101	92	85	109	92

Although this Report is primarily concerned with aircraft operations across a wide spectrum of aerial activities, it is understandable that people generally are interested in the safety of commercial air transport (CAT). Of the 12 Risk Category A events in the first half of 2005, none involved a CAT aircraft. Of the 26 Risk Category B events, four - a below-average figure - involved at least one CAT aircraft. Numbers of Airprox in Risk Categories A and B where at least one aircraft was military are in line with the respective five-year averages.

It is part of aviation folklore that there are three things which, without proper forethought, are of little use in safety terms to pilots. These are: fuel in the bowser; runway behind you; and airspace above you. On the basis of experience at UKAB, I would add "transponder on standby" to the list. During 2006, UKAB will be communicating this message.

Tribute is again paid to those who report their Airprox experiences honestly and openly. The Board and Secretariat respect people's feelings, disidentifying reports and focussing on the available facts of an incident to arrive at fair, impartial conclusions on cause and risk. If the collective effort of reporters, investigators and the Board helps to make flying safer then all involved will have felt their efforts worthwhile.

Peter Hunt

Director, UKAB

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INTRODUCTION

UK AIRPROX BOARD (UKAB) COMPOSITION

The UKAB is an independent organisation sponsored jointly by the CAA and the MOD to deal with all Airprox reported within UK airspace. The UKAB itself is comprised of two sections: a Board comprised of civil and military Members the work of which is supported by the second section, a small Secretariat. The Board is chaired and the Secretariat is led by the Director UKAB who reports directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force. Board Members together form a team of hands-on practitioners with first-hand civil and military 'know how' on:

- Air Traffic Area Control, Terminal Control and Airfield Control, military and civil;
- Commercial Air Transport (CAT) flying, both fixed and rotary wing;
- General Aviation (GA) flying, including gliders; and
- Military flying, both fixed and rotary wing, by the RN, Army and the RAF.

UKAB's ROLE

The UKAB undertakes the following tasks in promoting improved safety standards in the air:

- Act as the start point for an investigation process into each incident, generally carried out by the Safety Regulation Group (SRG) of the CAA and/or Military HQs;
- Determine what happened plus analyses of the main causal factors;
- Assess the risk levels involved;
- Make Safety Recommendations where appropriate to reduce the risk of incident recurrence; and
- Publish and distribute full reports so that lessons can be learned.

STATUS OF UKAB REPORTS

The sole objective of the UK Airprox Board is to assess reported Airprox in the interests of enhancing flight safety. It is not the purpose of the Board to apportion blame or liability. To encourage an open and honest reporting environment, names of companies and individuals are not published in UKAB's reports.

RISK CATEGORIES

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

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

AIRPROX DEFINITION

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

THE UKAB DATA SET

The UKAB Airprox database comprises a set of records each of which relates to a specific Airprox. As an investigation proceeds, from first report until the conclusion of the Board's deliberations, fields within the appropriate record are completed by the UKAB Secretariat. Analysis of the set of records is then possible to produce information such as is published in this Report.

Note:

In previous Reports, certain Tables included figures for 'Unknown' aircraft. In this Report, numbers of 'Unknown' aircraft are added to 'Untraced' aircraft and weather balloons to produce a new category, 'Other'. All figures in the relevant Tables have been adjusted accordingly, including those for prior years.

PUBLICATION OF REPORTS

A key UKAB objective is to communicate effectively the lessons identified from Airprox events. Bi-annual 'hardcopy' Reports have been the primary means of communication, supported by presentations at flight safety meetings, cd-roms and the internet. The UKAB internet website, enhanced and developed in late-2005, is updated at least every month. The latest statistics are added, for example, as are details of the most-recent set of Reports asessed by the Board. The website address is www.airproxboard.org.uk

THIS REPORT

On pages 6 to 11, this Report follows established practice by giving a broad overview on general trends and then examines in more detail some specific results for each of the three principal airspace user groups Commercial Air Transport (CAT); General Aviation (GA) and Military.

To begin this review, Figure 1 overleaf shows the distribution of Airprox that were reported in the first six months of 2005 and which were subsequently opened for full investigation. Please note that some events reported as Airprox are subsequently withdrawn and are thus not subject to full investigation. Only the reporter can withdraw an Airprox.

AIRPROX RESULTS FOR JANUARY - JUNE 2005

Map 1: location of Airprox reported in the period January-June 2005 which were subsequently opened for full investigation.

Broad comparison with Map 1 in 'UKAB Book 12' indicates a reduction in the number of Airprox in the Hertfordshire/Essex area, a conclusion borne out by examining numbers inside an appropriately-centred circle radius 50nm. In 2004 there were 45 Airprox within the circle; 28 in 2005. Further analysis reveals that the number of Airprox within the 50nm circle which were reported as occurring in Class G is down by one third whilst the number in Class A, Terminal Control Areas (Rule 21) is down from 15 to four.

HALF-YEAR COMPARISONS 2004 AND 2005

A total of 92 Airprox were reported and opened for full investigation in the period 01 January to 30 June 2005. Tables 1 and 2 below give month-by-month data for the three airspace user groups. The figures in the columns headed 'Totals' are shown in pie-chart format in Figures 1 and 2 from which it can be seen that the proportion of Airprox where civil aircraft met civil aircraft (Civ~Civ) is roughly the same, year on year. The figure for military encounters with other military aircraft (Mil~Mil) has dropped to 7% against 11% in 2004 whereas for Civ~Mil the proportion is up from 36 to 43%. Care needs to be taken when drawing conclusions because the total number of Airprox is down from 109 to 92, a fall of over 15%.

Civil/Military Mix: January - June 2004

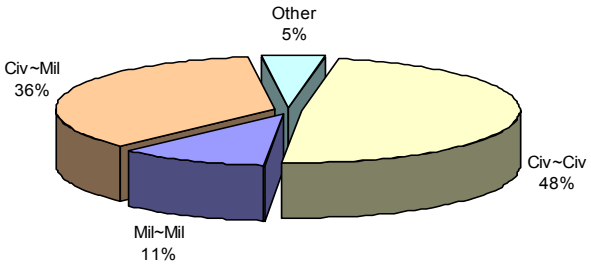


Figure 1

Civil/Military Mix: January - June 2005

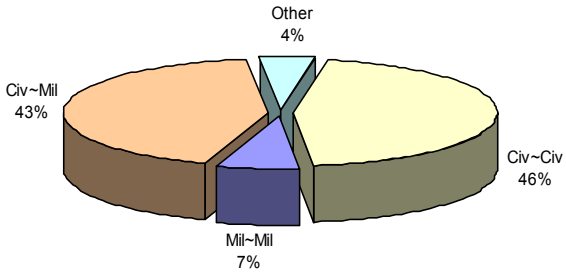


Figure 2

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	1	2	2	3	2	12
Civ~Mil	3	5	12	5	9	5	39
Civ~Civ	2	3	8	14	16	10	53
Other	0	0	0	1	3	1	5
Totals	7	9	22	22	31	18	109

Table 1

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	0	1	1	0	2	6
Civ~Mil	8	6	7	8	5	6	40
Civ~Civ	2	2	10	8	10	10	42
Other	0	0	0	0	2	2	4
Totals	12	8	18	17	17	20	92

Table 2

The totals in Tables 1 and 2 can be broken out as in Tables 3 and 4 below, these showing in more detail how the various user groups interacted during the first six months of 2005 (Table 4) with data for the same period in 2004 for comparison (Table 3). In a nutshell, all figures bar one are the same or less than the previous year, the exception being CAT~Military where Airprox numbers rose by four. Such a change - less than one extra Airprox per month on average - is considered to be within normal bounds of variability.

Mix details for 2004 (Jan - Jun):	
CAT~CAT	10
CAT~GA	16
GA~GA	27
CAT~Mil	16
GA~Mil	23
Mil~Mil	12
CAT~Unknown	1
GA~Unknown	1
Mil~Unknown	3
	109

Table 3

Mix details for 2005 (Jan - Jun):	
CAT~CAT	6
CAT~GA	13
GA~GA	23
CAT~Mil	20
GA~Mil	20
Mil~Mil	6
CAT~Unknown	1
GA~Unknown	1
Mil~Unknown	2
	92

Table 4

AIRSPACE IN WHICH THE CONFLICTS TOOK PLACE - JANUARY TO JUNE 2005

Figure 3 (below) shows the various classes of airspace in which Airprox events occurred in the first six months of 2005. It was noted last year, when comparing Jan-Jun 2004 with the same period in 2003, that there had been an increase in the number of incidents in Class G airspace, the 'Open FIR', in the altitude band from ground level to 3,000ft. The increase was from 25 to 40 Airprox, equating to an increase in percentage terms from 29 to 37% of all Airprox in the period. As Figure 3 shows, the number of such Airprox in Jan-Jun 2005 was 28, equating to 30% of the 92 Airprox. Notwithstanding this fall, the overall percentage of Airprox occurring in Classes F and G remains at approximately 75% of the total.

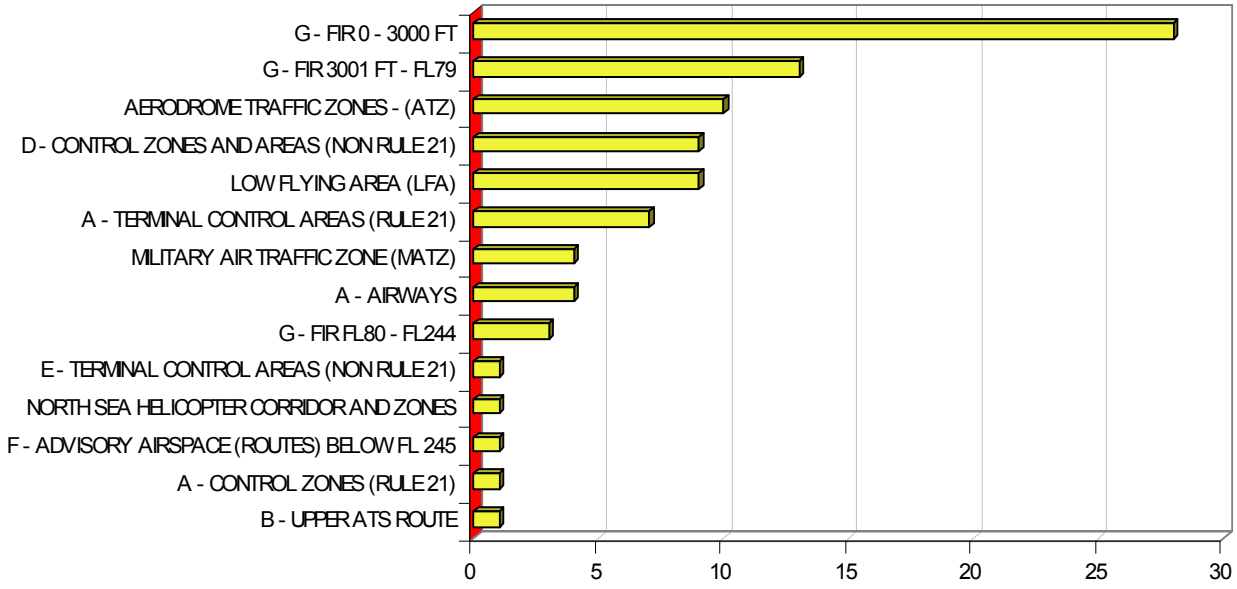


Figure 3

Again referring to the UKAB Report of a year ago, an increase from 10 to 17 events was noted in the number of Airprox inside Terminal Control Areas (Rule 21). The comparable figure in 2005 was seven. No one specific action or development can be identified for this decrease which must therefore be the outcome of a range of factors. This again serves to illustrate how much variability there can be in year-on-year figures (and, consequently, how careful one must be in any attempt to draw meaningful conclusions from those figures).

COMMERCIAL AIR TRANSPORT (CAT) SECTION

Risk results for Airprox involving at least one CAT aircraft are plotted by month in Figures 4 and 5 overleaf using the data in Tables 5 and 6 (below).

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	0	1	0	4	1	0	6
Risk C	0	3	14	6	8	4	35
Risk D	0	0	0	0	2	0	2
Totals	0	4	14	10	11	4	43

Table 5

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	1	0	2	0	1	0	4
Risk C	4	5	7	7	8	4	35
Risk D	0	0	0	0	0	0	0
tbc*	1	0	0	0	0	0	1
Totals	6	5	9	7	9	4	40

Table 6 *("tbc*" - to be classified)*

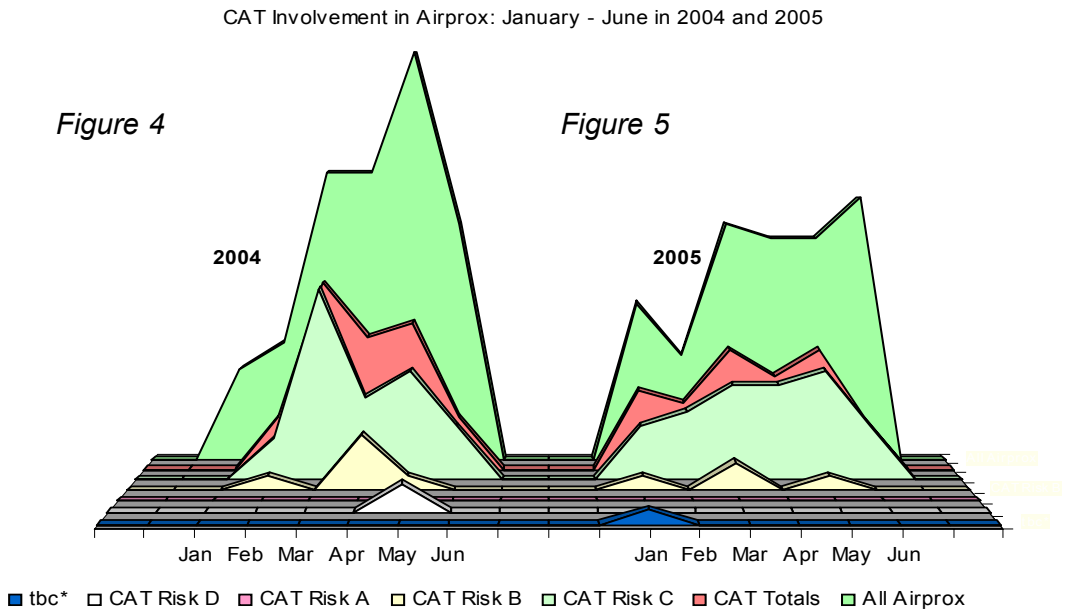


Figure 4 *Figure 5*

At first glance it seems that there were significantly fewer Airprox in 2005 compared with 2004: in fact the difference is just three events, the distribution being more even across the months of 2005.

In terms of **causal factors**, 78 were assigned to the 40 Airprox with those that feature most prominently being listed in Table 7 below. There is little to comment upon, the result being similar to the previous year.

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	14	CONTROLLER
2	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	7	PILOT
3	INADEQUATE AVOIDING ACTION/LACK OF POSITIVE CONTROL	3	CONTROLLER
4	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	3	PILOT
5	DID NOT SEE CONFLICTING TRAFFIC	3	PILOT
6	SIGHTING REPORT	3	CONTROLLER
7	CONFLICT ON BOUNDARY OF ATZ/CTR/CTA/SRZ/AAA	3	OTHER

Table 7

As mentioned in the Foreword, it is understandable that there is general interest in Airprox involving CAT aircraft. In recent years one aspect has received considerable focus in the industry, Airprox involving CAT aircraft flying outside controlled airspace *viz* in Class F or G. Analysis of data for the five-year period 2000-2004 shows that on average there are 13 Airprox in the first six months of the year, each occurring in Class F or G airspace and involving at least one CAT aircraft. On average, three of the 13 are risk bearing. Examination of the data for January-June 2005 shows that there were two risk bearing events in Class F or G, each involving at least one CAT aircraft. One of these two Airprox involved a military aircraft and a CAT aircraft. Both events occurred in Class G airspace and were assessed by the Board as risk category B. The work which is being done further to improve safety for all who operate outside controlled airspace is supported by the Airprox Board, in particular because civilian traffic levels are forecast to continue rising. Implementation of safety enhancements to maintain - and ideally reduce - the rate of Airprox events outside controlled airspace are therefore welcomed.

GENERAL AVIATION (GA) SECTION

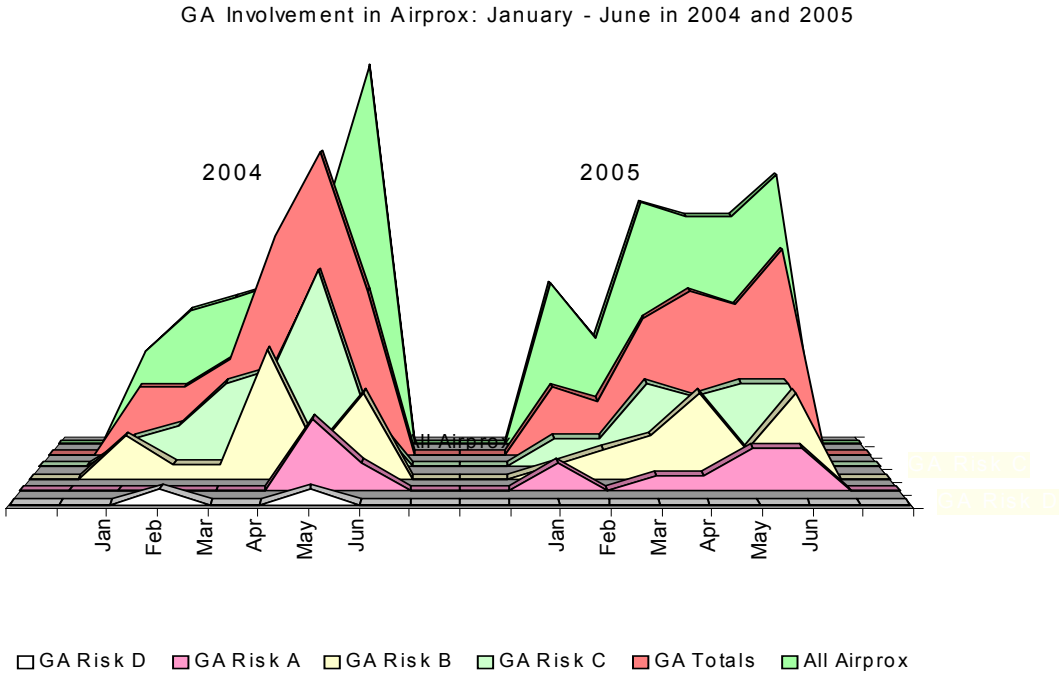
Risk data for General Aviation Airprox are given below: Tables 8 and 9 show the 'raw data' from which the charts in Figures 6 and 7 are constructed. The proportion of risk bearing events is up but the absolute numbers are within one, 29 in 2004; 30 in 2005.

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	5	2	7
Risk B	3	1	1	9	2	6	22
Risk C	2	3	6	7	14	4	36
Risk D	0	1	0	0	1	0	2
Totals	5	5	7	16	22	12	**67**

Table 8

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	2	0	1	1	3	3	10
Risk B	1	2	3	6	2	6	20
Risk C	2	2	6	5	6	6	27
Risk D	0	0	0	0	0	0	0
Totals	5	4	10	12	11	15	**57**

Table 9



The 57 'GA' Airprox events in 2005 gave rise to 96 **causal factors** (any one Airprox event can have more than one causal factor), the most frequently assigned being as in Table 10 below. Sighting issues usually head the list, given that most GA Airprox occur in 'see and avoid' airspace. Attention is drawn to the sixth item in the list in Table 10: reports of GA aircraft flying too close to a glider site occur on a regular basis. As the Airprox Inspector wrote in his report into one such Airprox: *The reason that winch launch glider sites are given special mention in the UK AIP is they require protection since winch cables can be lethal to any ac striking them as well as to the crew of the glider - winch wire strikes are not survivable accidents.* The Board's sister publication "Selected Extracts from UKAB Reports for use by GA Pilots" regularly emphasises this important point.

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	28
2	LATE SIGHTING OF CONFLICTING TRAFFIC	16
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	9
4	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	6
5	DID NOT TO SEPARATE/POOR JUDGEMENT	4
6	FLYING CLOSE TO/OVER GLIDER OR PARADROP SITE	3

Table 10

MILITARY SECTION

Risk data for those Airprox involving at least one military aircraft and which occurred in the first six months of 2004 and 2005 respectively are plotted in Figures 8 and 9. The underlying figures are given in Tables 11 and 12. The (single) Airprox annotated 'to be classified' is Airprox 008/05 to which reference was made in the Foreword.

Figure 8

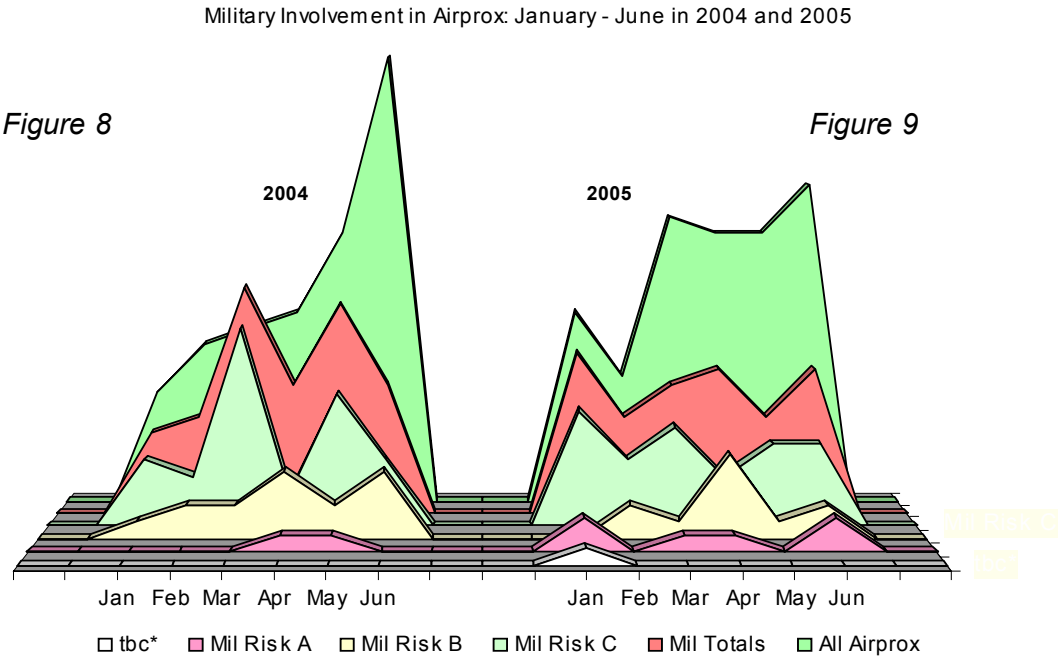


Figure 9

There is little to say regarding these data: the proportion of **risk bearing** events is similar; the distribution across the months is flatter than for GA (see Fig 7 opposite) which is probably explained more by lower GA activitiy levels in the Winter months rather than by anything connected with military flying. As regards the main **causal factors** in 'military' Airprox, shown in Table 13, sighting issues continue to predominate. It is pleasing to note that much attention is being given to the fitment of collision warning systems to military aircraft, the Tucano being the latest to benefit.

2004	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	1	1	0	2
Risk B	1	2	2	4	2	4	15
Risk C	4	3	12	2	8	4	33
Risk C	0	1	0	1	2	0	4
Totals	5	6	14	8	13	8	54

Table 11

2005	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	2	0	1	1	0	2	6
Risk B	0	2	1	5	1	2	11
Risk C	7	4	6	3	5	5	30
Risk D	1	0	0	0	0	0	1
tbc*	1	0	0	0	0	0	1
Totals	11	6	8	9	6	9	**49**

Table 12 *("tbc*" - to be classified)*

Ser.	Cause	Totals:
1	DID NOT SEE CONFLICTING TRAFFIC	20
2	LATE SIGHTING OF CONFLICTING TRAFFIC	8
3	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	7
4	DID NOT SEPARATE/POOR JUDGEMENT	5
5	NOT OBEYING RDERS/FOLLOWING ADVICE FROM ATC	3
6	MISINTERPRETATION OF MESSAGE	3

Table 13

UKAB SAFETY RECOMMENDATIONS

UKAB Safety Recommendations are made when, following its consideration of any given Airprox, the Board believes that action needs to be taken to address a particular safety matter. It is for the organisation(s) concerned to decide how to respond to a UKAB Safety Recommendation. The information that follows updates actions being taken in response to those Safety Recommendations published in Report Number 13. Also listed are Safety Recommendations made more recently together with Responses where available. Updates will continue to be published until action is complete, indicated by 'CLOSED' in the 'STATUS' sections below.

156/03 29 Aug 03 involving an A320 and a SHAR Risk B

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

UPDATE: The CAA and MOD initial review was completed on schedule. At present, the MOD continues to work towards a mutually acceptable solution while retaining compatibility with operational training requirements.

STATUS – ACCEPTED – OPEN

004/04 21 Jan 04 involving a PA31 and a PA28 Risk C

RECOMMENDATION: The MOD, MOD (DPA) and CAA should jointly review the applicable Boscombe Down, Thruxton and Middle Wallop aerodrome/approach procedures to ensure that these conform to the requirements of Rule 39 of the Rules of the Air so as to ensure the safe integration of air traffic at these closely located aerodromes.

UPDATE: It has not been possible to issue a general exemption to Rule 39 of the Rules of the Air as quickly as had been planned due to legal considerations although work is continuing in this area. All other action, including a revised LOA between Boscombe and Thruxton, is complete.

STATUS – ACCEPTED - CLOSED

018/04 4 Mar 04 involving a Gulfstream 41 and an F16 Risk C

RECOMMENDATION: The MOD should review the safety arrangements in respect of major air exercises with a view to establishing an Air Safety Cell for each such exercise in order to minimise the risk of participating aircraft infringing Controlled Airspace.

ACTION: The MOD accepts this Recommendation. The MOD has established the need to conduct a Safety Review on the potential requirement for air safety cells for major exercises. Initial work has identified that there were nine Airprox and 18 Mandatory Occurrence Reports submitted during the period 2000-2004 that appear to have involved exercise aircraft. However, three incidents were reported under both schemes which means that there were twenty-four incidents reported within a five-year period.

STATUS – ACCEPTED - OPEN

059/04 28 Apr 04 involving an Embraer 145 and a Tornado F3 Risk B

RECOMMENDATION: The MOD and CAA should jointly review the terminology used by Air Defence and Air Traffic controllers when effecting co-ordination with other military and/or civilian ATSUs, the aim being usage of a standardised form of phraseology which minimises the potential for any misunderstanding.

UPDATE: The work planned for 2005 has been progressed. CAA and MOD representatives continue to discuss issues within the Working Group where any new issues are considered; consequently, enhanced civil-military co-ordination procedures will be evaluated within the Scottish Centre later this year.

STATUS – ACCEPTED – OPEN

097/04 25 May 04 involving an MD80 and a CRJ Risk C

RECOMMENDATION: The CAA revise the UK AIP clearly to promulgate the requirement for flight crews to report inter alia their cleared level and, if appropriate, passing level, on initial contact with a controller subsequent to an RT frequency change.

UPDATE: The revised requirements have been promulgated in the UK AIP, AIC 96/2005, a FODCOM and a R/T Discipline Pamphlet. The CAP 413 amendment is complete and will be issued before the end of February 2006

STATUS – ACCEPTED – CLOSED

023/05-01 02 Mar 05 involving an AS332L and an AS332L Risk B

RECOMMENDATION: That the CAA should require NATS to devise and implement a standard procedure for use in the North Sea Area, under conditions agreed with the helicopter operators, such that in circumstances when helicopters would otherwise be obliged to fly at the same altitude on conflicting tracks, an acceptable form of separation is assured from the outset.

UPDATE: All work on this Recommendation is complete. NATS have introduced new procedures that avoid the need to utilise opposite direction, same level, tracks.

STATUS – ACCEPTED – CLOSED

023/05-02 02 Mar 05 involving an AS332L and an AS332L Risk B

RECOMMENDATION: That the AS332L operator should proceed with its plans to fit a CWS to its North Sea helicopter fleet with all speed.

ACTION: The AS332L operator accepts this Recommendation. The operator has now successfully fitted the first CWS to its AS332L2 aircraft and intends to continue with this programme. The operator expects to attend the presentation of the Eurocontrol-sponsored study into CWS in helicopters in 2006. A decision as to the further roll-out of CWS will be taken afterwards, the intention being to lobby all helicopter operators in order to promote this as an industry wide initiative.

STATUS – ACCEPTED – CLOSED

061/05 06 MAY 05 involving an ASK 13 Glider and a Cessna 172 Risk A

RECOMMENDATION: In the light of this Airprox, the chart production company should review its policy with respect to the depiction on its VFR GPS charts of aerodromes where glider winch launching takes place.

UPDATE: The chart production company has decided on a number of general specification changes which will be applied to all its VFR+GPS and Glider charts on an "as revised" basis. These changes include several new symbols such as one for glider airfields where winch launching takes place. In future, the launch height will be indicated (provided that this information is officially published by the responsible State authority). VFR customers will be informed about the latest specification changes through a briefing bulletin and through respective information on the company's VFR website.

STATUS – ACCEPTED - CLOSED

072/05 18 MAY 05 involving a SAAB 340 and a Tornado F3 Risk C

RECOMMENDATION: The MoD should review VID procedures taking into account their influence on ACAS equipment.

STATUS – ACCEPTED - OPEN

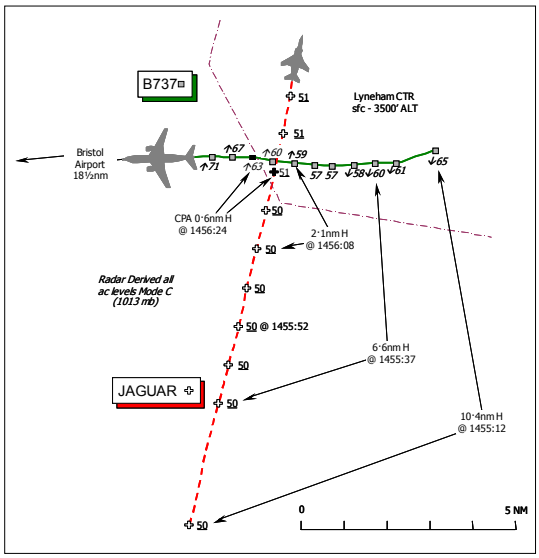
List of Abbreviations

AAI	Angle of Approach Indicator
aal	Above aerodrome level
ac	Aircraft
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACN	Airspace Co-ordination Notice
ACR	Aerodrome Control Radar
A/D	Aerodrome
ADC	Aerodrome Control(ler)
ADF	Automatic Direction Finding Equipment
ADR	Advisory Route
AEF	Air Experience Flight
AEW	Airborne Early Warning
AFIS(O)	Aerodrome Flight Information Service (Officer)
agl	Above Ground Level
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
alt	Altitude
amsl	Above mean sea level
AOB	Angle of Bank
A/P	Autopilot
APP	Approach Control(ler)
APR	Approach Radar Control(ler)
ARP	Aerodrome Reference Point
ASACS SSU	Air Surveillance and Control System Standards and Safety Unit
ASR	Airfield Surveillance Radar
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Control Officer
ATCRU	Air Traffic Control Radar Unit
ATIS	Automatic Terminal Information Service
ATM	Aerodrome Traffic Monitor
ATS (U)	Air Traffic Service (Unit)
ATSA	Air Traffic Service Assistant
ATSOCAS	ATSs Outside Controlled Airspace
ATSI	Air Traffic Services Investigations
ATZ	Aerodrome Traffic Zone
AWACS	Airborne Warning and Control System
AWR	Air Weapons Range
BGA	British Gliding Association
BHAB	British Helicopter Advisory Board
BHPA	British Hang Gliding and Paragliding Association
BINA ERS	British Isles/N Atlantic En Route Supplement
BMAA	British Microlight Aircraft Association
c	circa
CAA	Civil Aviation Authority
CALF	Chart Amendment - Low Flying
CANP	Civil Air Notification Procedure
CAS	Controlled Airspace
CAT	Clear Air Turbulence
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions
Cct	Circuit
CFI	Chief Flying Instructor
CinC Fleet	Commander in Chief Fleet, Royal Navy
CLAC	Clear Above Cloud
CLAH	Clear Above Haze
CLBC	Clear Below Cloud
CLBL	Clear Between Layers
CLOC	Clear of Cloud
CMATZ	Combined MATZ
CPA	Closest Point of Approach
C/S	Callsign
CTA	Control Area
CTR/CTZ	Control Zone
CWS	Collision Warning System
DA	Decision Altitude
DAAvn	Director Army Aviation
D & D	Distress & Diversion Cell
DF	Direction Finding (Finder)
DFTI	Distance from Touchdown Indicator
DH	Decision Height
DME	Distance Measuring Equipment
DUA	Dedicated User Area
E	East
EAT	Expected Approach Time
elev	Elevation
ERS	En Route Supplement
est	estimated
FAT	Final Approach Track
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Service
FISO	Flight Information Service Officer
FMS	Flight Management System
FO	First Officer
fpm	Feet Per Minute
fps	Flight Progress Strip
GAT	General Air Traffic
GCA	Ground Controlled Approach
GCI	Ground Controlled Interception
GMC	Ground Movement Controller
GP	Glide Path
GS	Groundspeed
H	Horizontal
HISL	High Intensity Strobe Light
HLS	Helicopter Landing Site
HMR	Helicopter Main Route
HPZ	Helicopter Protected Zone
HTZ	Helicopter Traffic Zone
HUD	Head Up Display
IAS	Indicated Air Speed
iaw	In accordance with
ICF	Initial Contact Frequency
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
JOI	Joint Operating Instruction
JSP	Joint Services Publication
KHz	Kilohertz
kt	Knots
km	Kilometres
L	Left
LACC	London Area Control Centre (Swanwick)
LARS	Lower Airspace Radar Service
LATCC(Mil)	London Air Traffic Control Centre (Military) (West Drayton)
LFA	Low Flying Area
LFC	Low Flying Chart
LH	Left Hand

LLZ	Localizer
LJAO	London Joint Area Organisation (Swanwick (Mil))
LoA	Letter of Agreement
LTMA	London TMA
MACC	Manchester Area Control Centre
MATS	Manual of Air Traffic Services
MATZ	Military Aerodrome Traffic Zone
mb	Millibars
MHz	Megahertz
MoD	Ministry of Defence
MRSA	Mandatory Radar Service Area
MSD	Minimum Separation Distance
MTRA	Military Temporary Reserved Airspace
N	North
NATS	National Air Traffic Services
NDB	Non-Directional Beacon
nm	Nautical Miles
NMC	No Mode C
NK	Not Known
NR	Not Recorded
NVG	Night Vision Goggles
OAC	Oceanic Area Control
OACC	Oceanic Area Control Centre
OAT	Operational Air Traffic
OJTI	On-the-Job Training Instructor
OLDI	On-Line Data Interchange
PAR	Precision Approach Radar
PFL	Practice Forced Landing
PF	Pilot Flying
PI	Practice Interception
PINS	Pipeline Inspection Notification System
PNF	Pilot Non-flying
PTC	Personnel & Training Command
QDM	Magnetic heading (zero wind)
QFE	Atmospheric pressure at aerodrome airport elevation (or at runway threshold)
QFI	Qualified Flying Instructor
QHI	Qualified Helicopter Instructor
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
R	Right
RA	Resolution Advisory (TCAS)
RAS	Radar Advisory Service
RCO	Range Control Officer
RH	Right Hand
RIS	Radar Information Service
ROC	Rate of Climb
ROD	Rate of Descent
RPS	Regional Pressure Setting
RT	Radio Telephony
RTB	Return to base
RVSM	Reduced Vertical Separation Minimum
R/W	Runway
RVR	Runway Visual Range
S	South
SAP	Simulated Attack Profile
SAS	Standard Altimeter Setting
SC	Sector Controller
ScATCC(Mil)	Scottish Air Traffic Control Centre (Military) (Prestwick)
ScOACC	Scottish and Oceanic Area Control Centre
SID	Standard Instrument Departure
SMF	Separation Monitoring Function
SOP	Standard Operating Procedures
SRA	Surveillance Radar Approach
SRA	Special Rules Area
SRE	Surveillance Radar Element of precision approach radar system
SSR	Secondary Surveillance Radar
STAR	Standard Instrument Arrival Route
STC	Strike Command
STCA	Short Term Conflict Alert
SVFR	Special VFR
TA	Traffic Advisory (TCAS)
TAS	True Air Speed
TBC	Tactical Booking Cell
TC	Terminal Control
TCAS	Traffic Alert & Collision Avoidance System
TDA/TRA	Temporary Danger or Restricted Area
TFR	Terrain Following Radar
TI	Traffic Information
TMA	Terminal Control Area
TRUCE	Training in Unusual Circumstances and Emergencies
UAR	Upper Air Route
UHF	Ultra High Frequency
UIR	Upper Flight Information Region
UKDLFS	United Kingdom Day Low Flying System
UKNLFS	United Kingdom Night Low Flying System
UNL	Unlimited
USAF(E)	United States Air Force (Europe)
UT	Under Training
UTA	Upper Control Area
UTC	Co-ordinated Universal Time
V	Vertical
VCR	Visual Control Room
VDF	Very High Frequency Direction Finder
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omni Range
VRP	Visual Reporting Point
W	West

AIRPROX REPORT NO 001/05

Date/Time:	5 Jan 1456	
Position:	5124N 00213 W (10nm SW of Lyneham)	
Airspace:	London FIR	(Class: G)
Reporter:	Bristol APPROACH	
	First Ac	*Second Ac*
Type:	B737-700	Jaguar
Operator:	CAT	DPA
Alt/FL:	FL70	FL50
Weather	VMC CLOC	VMC CLOC
Visibility:	>30km	>30nm
Reported Separation:		
	2nm H	1000ft V/1nm H
Recorded Separation:		
	700ft min V 0·6nm min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH CONTROLLER (APR) reports that the B737 was established on the RW27 localizer (LLZ) for Bristol Airport at 20 DME, E of Bristol passing FL70 in the descent for the assigned level of FL40, under a RAS. Another ac squawking A2603 indicating FL50 Mode C was observed 8nm SSW of the B737, tracking northbound at high speed. Traffic information was passed to the B737 crew, who were instructed to level-off at FL60. He almost immediately revised this to an avoiding action climb to FL80. The A2603 squawk passed ½nm behind the B737, still indicating FL50, as the B737 was passing FL60 in the climb. The B737 crew identified the ac visually as a Jaguar.

A subsequent conversation with the Boscombe Down ATC SUPERVISOR confirmed that the A2603 squawk was a Jaguar ac receiving a RIS from Boscombe Down ATC, the Jaguar pilot having reported visual contact with his B737. No co-ordination was proffered by Boscombe APPROACH.

THE B737-700 PILOT reports that he was established on the LLZ to RW27 at Bristol at about 20nm from touchdown heading 270° in the descent to FL50 at 250kt under a RAS from Bristol APPROACH. They were flying under IFR in VMC, some 10,000ft clear below cloud with an in-flight visibility of 30km+. The Bristol APR passed them traffic information about a contact in their 10 o'clock tracking N and then issued an 'avoiding action' climb to FL80. Their ac was passing FL70, he thought, as they responded to the avoiding action climb which was executed with the autopilot and autothrottle engaged with FL80 and 'level change' selected on the MCP. The other traffic – the Jaguar - was seen on TCAS and a TA enunciated about 4nm S of his ac some 1000ft below their level of FL70. The Captain had established visual contact with the ac from a range of about 2nm throughout and identified the other ac as a Jaguar. This information was passed to the APR and "we informed them [the APR] that separation had been maintained" as the other ac was estimated to be no closer than 2nm away and in visual contact. The APR gave timely avoiding action, but "at no time was separation degraded" or a TCAS RA enunciated. He assessed the risk as *"medium"*.

THE JAGUAR PILOT reports that he was conducting a routine training sortie from Boscombe Down. Following departure from the MATZ, he climbed to FL50 to transit to the W of Lyneham towards his low-level entry point in a level cruise. Whilst flying in good VMC, heading 005° at 400kt, under a RIS from Boscombe ATC, squawking the assigned code [A2603] with Mode C, he was passed traffic information about an ac – the B737 - at 1 o'clock some 9nm away [it was actually 5nm]. He was visual with the twin engined B737 from a range of 9nm and reported visual contact to ATC. After discussing their track in relation to that of the airliner with his navigator, they agreed that they would pass behind and well below the B737: therefore, he did not need to alter their heading to avoid the airliner. They passed 1nm behind the B737 and 1000ft below it: neither he nor his navigator considered that there was any likelihood of collision. Neither TCAS nor any other form of CWS is fitted.

He was informed the next day that an Airprox had been raised by Bristol International ATC and was somewhat surprised at this due to the nature of the incident. They had been maintaining their tracks, speed and level for some minutes before the ac tracks crossed, while wearing a Boscombe Down squawk. The airliner was descending into their path and Bristol ATC appears not to have made any attempt to co-ordinate their traffic with Boscombe Down ATC.

MIL ATC OPS reports that the Jaguar ac was in transit at FL50, under a RIS from Boscombe Down APPROACH (APP) to a low level let down point to the north of Lyneham. At 1455:39, APP passed traffic information to the Jaguar crew about the B737 "…*traffic right 1 o'clock 5 miles crossing right left passing FL60 in slow descent I'll keep you advised*". The Jaguar crew immediately responded "*visual with that traffic…*". At 1455:54, APP passed supplementary traffic information about the B737 saying "[Jaguar C/S] *I believe it's descending into Bristol*" followed by "*right turn is approved around the back if required*", but the crew replied "[*C/S*] *happy with this*". The Jaguar was handed over to Filton APPROACH at 1457:41.

[UKAB Note (1): Analysis of the Burrington Radar recording at 1455:00 shows the Jaguar 20nm SSW of Lyneham in a R turn from 315º squawking A2603 indicating FL51 Mode C. Simultaneously, the B737 is shown 6½nm SW of Lyneham, tracking 250º squawking A5710 and descending through FL70 Mode C. At 1455:12, the Jaguar's Mode C is indicating a level cruise at FL50 after steadying on a track of 010º, with the B737 at R 2 o'clock - 10½nm descending through FL65 Mode C. The B737 is shown passing FL60 whilst steadying onto a track of 270º at 1455:37 with the Jaguar in its L 10 o'clock - 6·6nm, maintaining FL50. The horizontal separation between the 2 ac reduces to 4·3nm at 1455:52 with a minimum of 700ft vertical separation evident on Mode C as the B737 bottoms out and reverses into a climb in response to the 'avoiding action' instruction. At 1456:08, the B737's Mode C is shown climbing through FL59 with the Jaguar in the B737's L 10 o'clock - 2·1nm maintaining FL50. The next radar sweep shows the B737's Mode C indicating FL60 with the Jaguar on the port beam at 1·2nm indicating FL50. The Jaguar passes astern of the B737 by 0·6nm with vertical separation of 1200ft Mode C evident between the ac. After this point the separation continues to increase as the B737 ascends to a maximum of FL73 before descending once more.]

At the time of the Airprox the Boscombe APP controller reports his workload as light with 3 ac on frequency. The Jaguar was transiting under a RIS at FL50 in good VMC. APP passed accurate and timely traffic information to the Jaguar about the B737 when the 2 ac were 5nm apart fulfilling his obligations under the RIS as stipulated at JSP 552 235.115.5. The Jaguar crew immediately reported visual. APP offered the Jaguar a route behind the B737 but this was declined by the Jaguar pilot. No co-ordination or traffic information was requested from Bristol International at any stage. There appears to be no military ATC causal factors apparent within this Airprox.

ATSI reports that the B737 was inbound to Bristol International and in communication with the Bristol APR. The crew established contact with the controller at 1449:45 and reported descending to FL110 and self-positioning for the ILS to RW27 whilst in the vicinity of Compton some 50nm E of Bristol Airport. The controller instructed them to descend to FL80 and, shortly afterwards, asked them to reduce speed to 230kt.

At 1451:35, the controller advised the B737 crew that the flight was now under a RAS as the ac exited CAS into Class G airspace and that they could continue their descent to FL50. The first indication, on radar, of the subject Jaguar that was displaying a Boscombe Down squawk some 4nm SW of Boscombe is also at this time. The Bristol APR then instructed the B737 crew to descend to FL40 and to report established on the localiser. At that time, the B737 was passing FL83, approximately 6nm S of Lyneham, whilst the Jaguar, now indicating FL50, was following a track of 315º in the B737's 9 o'clock at a range of 17·2nm.

The pilot of the B737 reported established on the LLZ at 1454:50, whilst passing FL93 at a range of 25nm from Bristol Airport. The Jaguar was in its 10 o'clock position at a range of 13·9nm, still showing FL51, and continuing on its track of 315º. Further descent to 3000ft was given to the B737 and then, shortly afterwards, the Jaguar made a R turn onto a track of about 010º [the turn is first evident on the Burrington Radar recording at 1454:49] directly towards the B737 [the Jaguar is shown steady on course at 1455:12]. At 1455:40, when the Jaguar was in the B737's 10 o'clock position and closing from a range of 6·3nm, the Bristol APR passed traffic information to the B737 crew and instructed them to stop their descent at FL60. The crew acknowledged this and advised that they had the Jaguar on TCAS. The controller then issued an avoiding action climb to FL80. The Jaguar continued to converge with the B737, finally passing behind and below the airliner. The B737 crew reported visual with the traffic and requested to stop the climb at FL70, which was approved by the APR.

The time interval between observing the turn of the Jaguar and the Airprox was very short, leaving the controller few options. The APR passed traffic information promptly and attempted to stop the descent of the B737 at FL60 although the Mode C 'bottomed-out' at FL57 before a climb is indicated. The avoiding action climb was an attempt to provide the requisite 3000ft vertical separation from the Jaguar whose pilot's intentions were unknown to the Bristol controller.

THE JAGUAR PILOT'S STATION comments that the responsibility for safe separation of ac in Class G airspace rests with the ac captain. In this case the Jaguar pilot was flying in good VMC, receiving a RIS, and was informed of the possible confliction in good time. He became visual with the traffic at an early stage and assessed that there was no track confliction. It is difficult to conclude that an Airprox report was warranted. In any case, a simple call from Bristol to Boscombe ATC would have established that the Jaguar captain was visual and ensuring safe separation. There are many instances where separation taken by pilots flying under VFR will appear close to a radar controller. Provided that normal RAS/RIS procedures are followed, this is perfectly acceptable.

DPA DIRECTORATE of FLYING comments that either party could have initiated co-ordination but, since the B737 was IFR under a RAS, to discharge the terms of a RAS contract it would have been in the interests of the Bristol APR to do so. Since Rule 17 of the Rules of the Air requires the commander of an ac to avoid aerial collisions it could be contended that the Jaguar pilot had done exactly that.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

During the period of this Airprox, Bristol ATC was providing a radar service in an area where several ATSUs also provided an ATS – here just above the southwest corner of the Lyneham CTR [sfc to 3500ft amsl] – and a Member opined that there was also a great diversity of ac operators which altogether resulted in a complex piece of airspace that was well-utilised. Whilst providing a RAS to the B737 crew against unknown ac observed in confliction with the airliner, the Bristol APR was seeking to achieve either 5nm horizontal or 3000ft vertical separation against the uncoordinated Jaguar on verified Mode C: if co-ordination had been effected then 1000ft vertical separation could be applied. The ATSI advisor briefed the Board that a direct access (DA) landline was installed between Bristol International and Boscombe Down ATC on 10 May 2005. Before that date – and at the time of the Airprox - contact between controllers for co-ordination could only be accomplished indirectly via the West Drayton PBX thereby leading to protracted calls before the appropriate controller could be contacted. With the advent of a DA line between the two ATSUs, controller – controller co-ordination should potentially be completed much more efficiently. Notwithstanding the introduction of the DA line, either of the controllers here might have initiated co-ordination if the confliction had been recognised early enough and the call had been made in good time. Controller Members suggested that there was a tacit incumbency on Bristol to seek co-ordination with Boscombe Down under the RAS. If there had been an opportunity to ascertain that the Jaguar was maintaining FL50 and coordination could have been promptly agreed then prescribed separation might have been maintained. Some Members thought that there was late realisation of the conflict by the Bristol APR as even on a NW'ly heading the Jaguar was in potential conflict. Apparently, the Bristol APR had not perceived there was a conflict with the Jaguar until just before 1455:40, after it had just turned N by E and was in the B737's 10 o'clock position and flying towards the airliner just over 6nm away. The Bristol APR then passed traffic information to the B737 crew and instructed them to stop their descent at FL60, some 1000ft above the indicated level of the Jaguar that had been steady on its track of about 010° for around ½min. However, at this point there was not enough time for the Bristol APR to contact Boscombe Down and establish co-ordination. By the time this instruction was transmitted to the crew, the B737 had dropped through the assigned level of FL60 and further down to 700ft above the Jaguar before the airliner's descent could be arrested. As co-ordination was not attempted by either controller it remained for the Bristol APR to issue avoiding action to the B737, which he chose to do by instructing the crew to climb to FL80 thereby seeking to achieve the 3000ft Mode C vertical separation under the RAS against the uncoordinated traffic. CAT pilot Members opined that it was this climb that prevented the TCAS TA from becoming a climb RA but expressed surprise that the B737 Captain had executed the avoiding action climb with the autopilot and the auto throttle engaged. These Members advised that avoiding action should invariably be accomplished by hand flying the ac which generally produces the fastest reaction and at least gets the ac moving in the right direction relatively promptly. However, as the B737 pilot had subsequently spotted the Jaguar, CAT Members

agreed that he might have used the automatics because he realised that the situation was not as awkward as the co

The Mil ATC Ops report had shown that Boscombe Down APP had passed traffic information to the Jaguar crew at a range of 5nm at about the same time as the APR had passed avoiding action. The Jaguar crew had acknowledged the presence of the airliner straight away and the pilot was apparently content with the extant separation because both he and his navigator had judged, correctly, that they would pass astern of the B737 leading some Members to believe that this was a controller perceived conflict. The STC Member opined that the horizontal separation would have appeared quite reasonable from the Jaguar pilot's perspective flying under VFR, as they passed behind the airliner: the vertical separation also subsequently achieved made this doubly so. However the STC Member added a note of caution and said in general terms at these distances it still might not be enough to preclude TCAS RAs. Whilst recognising the CAT pilot Members' views that the avoiding action climb had probably forestalled an RA here, fast-jet pilots should still aim to give CAT ac as wide a berth as feasible to avoid such difficulties. As it was, the avoiding action climb instruction executed by the B737 crew had increased the separation to just about 1000ft as the B737 crossed ahead of the Jaguar and the B737 pilot had also seen the fast-jet as it approached from the port side thereby convincing him to stop his airliner's climb some 2000ft above the Jaguar. The combination of these actions achieved a minimum of 1200ft vertical separation at the point of minimum horizontal separation of 0·6nm, as the Jaguar passed astern of the B737, with both crews having spotted each other's ac well beforehand. Therefore, the Board concluded that this Airprox had resulted from a conflict in the FIR, resolved by the Bristol APR, where no risk of a collision had existed.

Following the Members' assessment of this Airprox, the DASC advisor briefed the Board that an airspace users group was to be formed for the southwest, encompassing this airspace. This group – the Southwest Airspace Users Group (SWAUG) - to which ac operators and ATS providers would be invited to attend, would be involved in discussions along similar lines to the well established Lincolnshire Airspace Users Group (LAUG). The Chairman welcomed the establishment of this Group which heralded a useful forum for the interchange of information and discussion of topics of mutual concern.

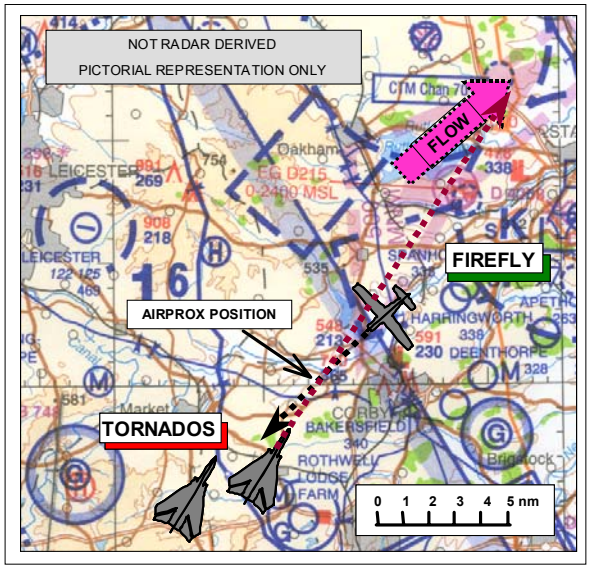
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the Bristol APR.

Degree of Risk: C.

AIRPROX REPORT NO 002/05

Date/Time:	6 Jan 1042	
Position:	5229N 00047W (4nm E Market Harborough)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Firefly	Tornado GR4X2
Operator:	HQ PTC	HQ STC
Alt/FL:	500 agl (RPS 1013 mb)	850 agl (Rad Alt)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	30ft V/10ft H	200ft V / 0H
Recorded Separation:	Not recorded (See UKAB Notes 1&2).	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIREFLY PILOT reports that he was on a navigation instructional sortie with a student in a yellow and black ac with HISLs on, squawking 7001 with Mode C and in receipt of a FIS from Cottesmore [ZONE on VHF]. While just to the E of Market Harborough, heading 227° at 120kt and at 500ft msd on a low-level leg, the student had just levelled the wings having gently turned left after avoiding a village when he came very nearly head on (1130 to 0530) to a pair of Tornado GR4s at the same height as his ac. He estimated that he first saw the ac at about ¼nm and that they had been on a collision course. The instructor took control and firmly lowered the nose and initiated a turn to the left. The other ac appeared to be in a very shallow climb and with a very small amount of right bank applied and passed about 30ft almost directly overhead his ac. The student commented that he had seen another ac fractionally before the subject Tornado, slightly in front of it and to its right and he had been trying to tell the instructor about it when he took control; the instructor did not see the other ac. The instructor was able to discern even the smaller parts of the Tornado in great detail and hear the noise as it passed. He informed Cottesmore of the Airprox, they informed him of the time of the incident and he then landed at Wyton to refuel and consider his best follow-up action. He assessed that had he not taken avoiding action the ac would have collided.

THE TORNADO GR4 PILOT reports that he was No2 of a 2-ship tactical low-level sortie in a grey ac with HISLs selected on, squawking 7001 with Mode C and in receipt of a FIS from Cottesmore DIRECTOR (DIR) [on UHF]. The formation was in loose arrow formation (0.2nm apart, co-alt with the No2 ac swept back on the left) and heading NE at 414kt. They had climbed to above 500ft agl and contacted Cottesmore DIR at 1041:53 for a low-level transit through the MATZ. DIR placed them on a FIS and restricted them to not below 500ft agl over Rutland Water and informed them that North Luffenham Danger Area was active with explosives. The transmissions between his leader and Cottesmore DIR were completed at 1042:13. No further transmissions were received from Cottesmore prior to the Airprox at 1042:45. The leader saw an ac 200ft away, later identified as a Firefly, pass in front and below of his ac and instructed No2 to climb as it passed 200ft below No2's flight path. He assessed the risk of collision as being high and the incident was reported to Cottesmore DIR.

UKAB Note (1): An analysis of the Tornado cockpit voice recording and HUD video verifies the details reported above. The lead Tornado crew saw the conflicting ac and a transmission calling it was recorded at 1042.45. Shortly before that, they had made their initial call to Cottesmore DIR, completed the series of transmissions, done some routine cockpit and weapons management tasks and about 25sec had elapsed before the navigator saw and called the conflicting ac. Cottesmore DIR later identified the ac, by callsign, as the reporting Firefly.

UKAB Note (2): Although the actual Airprox is not recorded, the Tornados can be seen on the recording of the Debden Radar popping up at 1042:34, squawking 7001 and passing over the reported position of the Airprox

heading NNE at FL006 (~700ft agl) climbing very slowly. A contact believed to be the Firefly pops up after the time of Airprox and slightly SW of the reported position, manoeuvring at and above FL005 (~600ft agl).

THE FIREFLY STATION commented that neither pilot had heard the transmissions of the other due to their being on different frequencies. It is possible that had Cottesmore ATC informed the crews of each other's presence, earlier detection would have been achieved. That none of the 3 crews spotted the conflict until the last second emphasises how difficult it is to see another ac at the same height at low-level in a head-on aspect at a high closing speed.

THE TORNADO STATION reported that, even allowing that neither ac was painting on radar, they thought that the Cottesmore Controller could have been more proactive and informed the respective pilots about the presence of the other ac even if only to intensify their lookout.

MIL ATC OPS reports that at the time of the Airprox neither ac was showing on Cottesmore Radar. The Tornado leader had called DIR (which is SOP) about 1min 40sec prior to the Airprox being reported. However, the initial exchange between the Tornado leader and DIR ceased about 25sec prior to the Firefly reporting the Airprox on ZONE. Given that neither ac was showing on radar and that the 2 radar positions are not adjacent in the ops room (there is an APP console and the Supervisor between them) it would be unreasonable to expect the DIR to have passed TI on the Tornados in this time scale. If either ac had been painting on radar it would have made the controllers more aware of the conflicting traffic in the vicinity and TI would, most probably, have been passed at the earliest opportunity.

HQ PTC comments that this was clearly a pretty close call between ac going about their legitimate business in the UKLFS and for which there can be no easy mitigation. Nevertheless, both ac were working the same ATS Unit and presumably known to be in the same area. Notwithstanding the limitations of FIS, a TI call from Cottesmore might have alerted either ac to the presence of the other.

HQ STC comments that FJ ac transiting the flow pattern between Cottesmore and Wittering routinely position themselves early into the flow, as in this case, due to their speed over the ground. It is unfortunate that the Firefly, although not within the defined flow area, was in effect 'going the wrong way'. Good airmanship might have suggested that this was not a sensible place to be; however, notification by ATC of each other's presence, or being on the same frequency, would undoubtedly have helped significantly

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This was without doubt a very close encounter at a high closing speed (approaching 10nm/min) with none of the aircrew involved having much time to react. It is recognised that this was a 'worst case' scenario with both ac approaching each other at low-level, head on, in a confined area. The Board recognised that the incident had not taken place in the mandated low-level flow system. Members thought however, that the Firefly instructor should have been anticipating head-on fast jet traffic in that area and at the height he was operating (the fast-jet Cottesmore Gap minimum height as promulgated in Vol3 of the AIP Mil). With this in mind, he may have elected to fly at a different height or discontinue his exercise, take control and reposition his ac in a less vulnerable area.

This incident emphasises again that it is very difficult for fast jet crews to acquire light ac in a head-on, co-alt scenario, particularly in a nose-up attitude, however small. Notwithstanding, visual collision avoidance is an obligation in the LFS and aircrew must not allow themselves to be distracted by less important tasks. The Board thought that in this incident the Tornado crews may have been distracted by other tasks or subconsciously relaxed and lowered the amount of time allocated to lookout. Further, they may not have been expecting to encounter other ac in the area and were also in contact with Cottesmore Director. It was pointed out that there are the numerous light ac operating strips in the immediate vicinity: therefore it was frequently busy and many GA pilots are not aware of the military flow system and therefore do not conform with it.

The Board discussed at some length the role played by Cottesmore ATC. While the Mil ATC Ops report found that they had performed as required, many Members thought that they could have done more to inform the pilots of

the respective ac, all of whom were in contact with Cottesmore, of the presence of the other ac. Specialist opinion was that, had the ac been on the same frequency, at least one crew would have been aware of the presence of the other ac and, even if they had done nothing else, would have intensified their lookout. The Board was briefed by an advisor familiar with Cottesmore ATC procedures of the reasons why LARS and 'Gap' traffic did not operate on the same frequency but suggested that, in the light of this very near miss Cottesmore may wish to review their procedures.

This clearly was a very close encounter and, although the Firefly pilot recalled even very small details of the Tornado, the Board thought it likely that the vertical miss-distance was rather more than the 30ft he reported: probably closer to 100ft, based on the radar recording. Worryingly though, it was likely that the only avoiding action taken - namely that by the Firefly instructor who at the time was the non-handling pilot - had come too late to be effective; the Board therefore unanimously decided that there had been an actual risk that the ac would have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

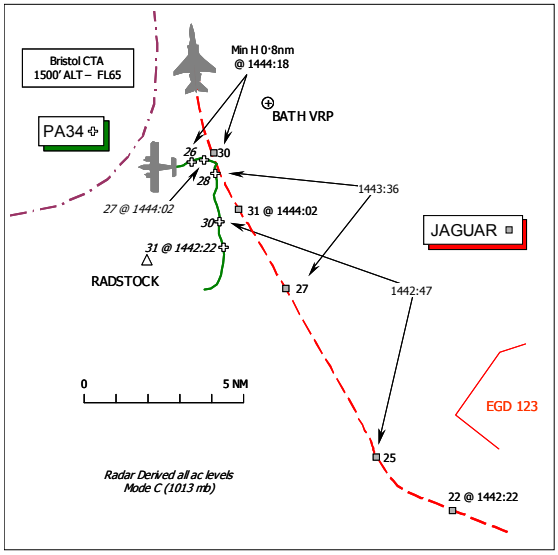
Cause: Very late sighting by the Firefly pilots of the No2 Tornado and non-sighting of the No1 Tornado and an effective non-sighting by the Tornado crews of the Firefly.

Degree of Risk: A.

AIRPROX REPORT No 003/05

AIRPROX REPORT NO 003/05

Date/Time:	10 Jan 1444	
Position:	5120N 00224W (12nm E by S of Bristol - elev 622 ft)	
Airspace:	London FIR	(Class: G)
Reporter:	Bristol APR	
	First Ac	*Second Ac*
Type:	PA34	Jaguar T2A
Operator:	Civ Trg	DPA
Alt/FL:	2500ft (QNH 1013mb)	2500ft (RPS 1011mb)
Weather	VMC CLBL	VMC CLAC
Visibility:	12km	>10km
Reported Separation:	~500ft V/1nm H	Not seen
Recorded Separation:	400 ft V/0·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (BRI RAD) reports that the PA34 was being vectored LH for an ILS approach to RW27 at Bristol International (number 5 in the pattern as the ac commenced the downwind leg) under a RAS outside CAS. After the PA34 turned L base, now number 3 in the landing sequence, he spotted a fast moving contact squawking A2624, some 7nm to the S of Bath tracking N at FL31. The A2624 squawk continued flying towards the PA34, which was now level at 2500ft Bristol QNH (1013mb), so he issued an avoiding action L turn into wind towards the Class D Bristol CTA and also passed traffic information. Prescribed separation was eroded as the A2624 contact passed about 1nm astern of the PA34 indicating 2900ft QNH - 400ft above the PA34 on Mode C - some 12nm ESE of Bristol Airport. He opined that there was no time to effect co-ordination with Boscombe Down ATC that would have afforded resolution of the conflict. The PA34 pilot reported visual contact with the other ac and when clear of it was vectored onto the ILS for RW27.

Boscombe Down ATC confirmed their A2624 squawk was assigned to a Jaguar. He assessed his workload as *"moderate/high"* throughout.

The 1420UTC Bristol Weather was reported as: 230/07kt; Vis: 9999 FEWOB SCT031 QNH 1013mb.

THE PA34 PILOT reports he was instructing a student on a training flight executing a radar vectored ILS approach under a RAS from Bristol RADAR on 136·07MHz. A squawk of A6310 was selected with Mode C: TCAS is not fitted.

On a radar heading of 095°(M), he thought, flying at 128kt, some 12nm ESE of the airport, RADAR issued a change of heading as avoiding action against fast jet traffic. Once steady on the new heading they were informed that the jet was passing about 1nm behind and some 400ft above his ac. He turned to look out over his R shoulder and saw the jet for the first time about 1nm away at 5 o'clock as it passed some 400-500ft above his ac. Once the other ac was clear they were vectored into CAS and onto the final approach for the ILS. In assessing the risk he observed that it was "small" at the time of visual contact, but could have been "high" if no avoiding action had been taken.

THE JAGUAR T2A PILOT reports that the HISLs were on whilst flying VFR in VMC with broken cumulus/strato-cumulus cloud below and ahead of them with some vertical development. They were in receipt of a RIS from Boscombe Down APPROACH (APP) on UHF and squawking A2624 with Mode C. His navigator was occupying the rear seat of the jet. Neither TCAS nor any other form of CWS is fitted.

Heading 345° at 420kt they were in transit within Class G airspace to the E of the Bristol CTA at an altitude of about 3000ft Portland RPS when traffic information was passed by APPROACH about an ac at 11 o'clock, at a range and on a track whereby no conflict existed. The traffic was not seen despite a careful scan and it was assumed that it was probably in cloud below them. Around the time of this reported Airprox he climbed the jet from 2000ft to 3000ft to remain clear of cloud.

MIL ATC OPS reports that the Jaguar was in transit at a reported altitude of 2000ft Portland RPS (1011mb) to enter the UKDLFS within LFA 4. The Jaguar was identified by APP at 1440:18, placed under a RIS and within the same transmission traffic information was passed on unrelated traffic 7nm away that was not the PA34. Shortly afterwards at 1440:26, the Jaguar crew requested "*own navigation to the west*" which was approved by the controller. Further traffic information was passed by APP to the Jaguar crew at 1442:27 and 1443:05 about unrelated traffic before, at 1443:35, APP transmitted "[Jaguar C/S]*…further traffic* [the PA34] *12 o'clock 6 miles, similar heading indicating 500ft above you slowly descending*". The Jaguar crew acknowledged this transmission and further traffic information was passed at 1444:06 on the PA34 as "*… that traffic now 12 o'clock, 4 miles, similar heading, indicating slightly below you, possibly a Bristol inbound*". The Jaguar crew also acknowledged this and reported that "*we're now at 3000ft victor mike".* Traffic information was updated on the PA34 at 1444:32 [although this seems to be just after the Airprox had occurred], as "*…the previously reported traffic now left 11 o'clock, 2 miles crossing right left, indicating slightly below*". The Jaguar crew were warned of the proximity of Bristol CTA which was "*west … 2 miles*" at 1444:51 and reported "*turning*" before going en-route at 1445:17.

[UKAB Note (1): The Clee Hill Radar recording (which is also the source of SSR data for Bristol) shows the Jaguar at 1441:25 climbing out from the vicinity of Boscombe Down tracking WNW squawking A2624 indicating 2000ft Mode C (1013mb). The PA34 is shown at 1442:22, within Class G airspace tracking northbound on a wide L base squawking A6310 and indicating 3100ft Mode C (1013mb) in the Jaguar's R 1 o'clock as the latter turns R. The Jaguar's Mode C indication shows the pilot initiated a slow climb after steadying on about 330° at 1442:47, ascending to a maximum of 3100ft Mode C (1013mb). The PA34's track alters L onto about 340º indicating 3000ft Mode C, with the Jaguar closing from astern at a range of 8½nm tracking 330º indicating 2500ft climbing. The PA34's Mode C indicates the initiation of a descent at 1443:20 through 2900ft when the Jaguar is in its 6 o'clock - 6nm indicating 2400ft Mode C for a short while before, at 1443:36, the Jaguar's Mode C indicates a climb to 2700ft whilst the PA34 is 4·2nm away and 100ft above the jet. Thereafter the PA34 is shown initiating a tight L turn onto 270º in conformity with the APR's avoiding action instruction descending through 2700ft Mode C whilst the Jaguar is 3·4nm astern indicating 2900ft. The Jaguar levels at 3100ft at 1444:02, with 1·8 nm horizontal and 400ft vertical separation indicated as the jet continues to close on the PA34. The CPA occurred at 1444:18, some 12nm E by S of Bristol airport, as the Jaguar passes 0·8nm astern of the PA34 with 400ft of vertical separation evident on verified Mode C. Thereafter, the 2 ac diverge.]

APP was manned by a trainee with a mentor who assessed their workload as low with only one ac on frequency. When airborne the Jaguar crew had called APP in the climb to 2000ft and been identified, placed under a RIS and released under their own navigation to the W. APP passed the Portland RPS and after traffic information about other conflicting traffic, initially called the PA34 to the Jaguar crew at 1443:35 - the lateral separation between the 2 tracks was 6nm and included accurate height information - "*indicating 500ft above you slowly descending*". This traffic information is updated at 1444:06, when the PA34 was 4nm away and also included the supplementary information that the controller suspected – correctly - that it may be "*a Bristol inbound*". Traffic information was passed to the Jaguar crew about the PA34 on the third and final occasion when the 2 ac were 2nm apart, the PA34 "*crossing right/left indicating slightly below*". The Jaguar crew were warned of their proximity to the Bristol CTA [1500ft altitude – FL65] after the Airprox occurred.

Although the Jaguar crew reported climbing to 2000ft on climbout, Mode C indications show that the Jaguar climbed further to 3000ft without advising the controller and without APP perceiving that the Jaguar's Mode C indications were outwith the regulated tolerance stipulated at JSP 552 601.115.2. However, this point is not deemed to be a factor within this Airprox as all traffic information passed by APP to the Jaguar crew was given in relation to indicated levels. APP had provided timely and accurate traffic information to the Jaguar regarding the proximity of the PA34 as per the conditions of a RIS at JSP 552 235.115.1. The traffic information was updated on 2 separate occasions and no upgrade of service was requested from the Jaguar crew. APP fulfilled their obligations under the RIS and there are no contributory Mil ATC factors apparent within this Airprox.

ATSI reports with RT transcript that the PA34 took off from Bristol International to carry out a radar vectored ILS approach to RW27 and climbed to an altitude of 3000ft Bristol QNH (1013mb), as number 5 in the sequence due

to other traffic. [The PA34 crew was provided with a RAS outside the CTA by RADAR. However, this was not specified nor requested in accordance with the caveat at UKAIP ENR 1-6-1-3, para 4 Radar Vectoring – Controlled Airspace - whereby to reduce RTF loading, pilots will not be advised of the change of ATS.]

At 1441:05, RADAR instructed the pilot to turn L heading 010º for base leg. At that time, the ac was in Class G airspace, 12nm SE of Bristol Airport and the Jaguar was 21nm SE of the PA34 displaying a Boscombe Down assigned squawk. The controller instructed the PA34 pilot to turn L onto 345º and, at 1442:50, to descend to 2500ft QNH. The Jaguar was now 8.7nm SE of the PA34, in a R turn from approximately 295º to 330º with its Mode C indicating 2500ft QNH (1013mb). At 1443:25, the PA34 was instructed to turn L heading 310º to intercept and establish on the ILS localiser. The Jaguar continued on its north-westerly track and was closing the PA34 from its 5 o'clock position.

After 1443:30, [UKAB Note (2): The Bristol RTF transcript gives only 30sec and 1min time injects] RADAR passed traffic information to the PA34 pilot together with an avoiding action L turn onto 260º. ["[PA34 C/S] y*ou now have fast jet traffic in 6 o'clock range of 3½ miles indicating 2600ft now for avoiding action turn left heading 260° to keep you inside controlled airspace"*.] At that stage, the Jaguar was in the PA34 pilot's 5 o'clock, 4·2nm, indicating 100ft below the PA34. The Jaguar continued on its track and commenced a gentle climb to 3000 feet whilst the PA34 was still descending to 2500ft. [RADAR reported traffic information after 1444:00 to the PA34 pilot, *"that traffic now passing behind you range of 1½ miles indicating flight level 31 present heading will take you away from it"* which the pilot acknowledged. The PA34 pilot subsequently reported visual contact whereupon RADAR advised *"that traffic has now passed behind you range of 1 mile indicates flight level 30."* To which the pilot responded at 1444:30, *"yeah copied that visual* [C/S]. Horizontal separation continued to diminish until 1444:19, when the Jaguar passed 0·8nm behind the PA34 and 400 feet above it at the CPA.

At the point where the Jaguar turned R onto a conflicting track with the PA34, the ac were only 8·7nm apart. The groundspeed of the Jaguar was 420kt and that of the PA34 115kts. The controller did not have a direct line to Boscombe Down and so, in the time available, direct coordination with the Boscombe controller was not possible. The controller opted to turn the PA34 further left back towards CAS but the difference in groundspeeds meant that it was unlikely that 5nm horizontal separation would be achieved.

A direct access landline was installed between Bristol International and Boscombe Down ATC on 10 May 2005.

THE JAGUAR PILOT'S STATION comments that under the RIS, having received accurate and timely traffic information, the Jaguar pilot cleared his flightpath and elected to continue.

DPA comments that there is little to add to the Station's comment and that made about a previous Airprox in this vicinity [Airprox 1/05: Either party might have initiated co-ordination but, since the PA34 was under a RAS, to discharge the terms of a RAS contract it would have been in the interests of the Bristol APR to do so]. Since Rule 17 of the 'Rules of the Air' requires the commander of an ac to avoid aerial collisions, by clearing his flight path the Jaguar pilot would seem to have complied with this rule.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI report had made it plain to the Members that the reporting BRI APR had first passed traffic information to the PA34 pilot under the RAS after 1443:30, confirming that he had not detected the Jaguar any later and in line with the APR's report that he saw it 7nm S of Bath. The wide timing references on the Bristol RTF recording made determination of the exact moment when this transmission was passed problematic but it would seem from the ATSI report that the traffic information and avoiding action L turn onto 260º was issued when the ac were about 4·2nm apart. In the provision of the RAS to the PA34, some Members were concerned that the confliction with the Jaguar was not detected by the APR until a relatively late stage. Although by this time he was relatively busy – his traffic loading was 3 ac under control – it was recognised that the APR had previously been working hard with 5 ac under an ATS. It was unfortunate that the PA34 had to be extended downwind so far outside CAS and this

Airprox illustrated the benefits of keeping ac either inside or close to the relative sanctuary of Class D airspace if at all possible. Controller Members who routinely provide radar services outside CAS in the Open FIR opined that it can be difficult to avoid fast-jets with slower light twin-engine ac and a comprehensive scan must be maintained in order to detect conflictions early and proffer appropriate avoiding action. There was certainly a significant speed differential, as the Jaguar very quickly caught up with the PA34, but the Board agreed with the ATSI view that the BRI APR was unlikely to achieve the 5nm horizontal separation or 3000ft on verified Mode C that he was seeking to provide here, having only spotted the confliction at a range of under 5nm.

The Mil ATC Ops advisor questioned whether the PA34 pilot was provided with an effective RAS as the traffic was there to be seen: the Clee Hill SSR data provided to Bristol should have made the confliction plain after the Jaguar had steadied on 330° at about 1442:47, some 1½min before the point of minimum horizontal separation occurred. The Board noted the recent commissioning of a direct landline between the two ATSUs, which should now assist the process of co-ordination. Other Members wondered if DPA's comments that either party might have initiated co-ordination were entirely valid in these circumstances with no direct access line and the ATSI advisor questioned if co-ordination could have ultimately been effected in the time available or materially altered the outcome. The Mil ATC Ops advisor's view was that co-ordination might potentially have been achieved: if the confliction had been recognised early enough and the call had been made in good time an accord might have been reached which might have averted this close quarters situation. But he emphasised that such action must be initiated at an early stage if it is to be concluded successfully, which again pointed to the necessity of a far reaching all round scan when operating in Class G airspace. Here a Member thought that although Boscombe Down APP had shown sound appreciation of the situation, the controller might have been more proactive also. That said APP might have been hindered in any attempt at co-ordination by the Jaguar pilot's unannounced decision to climb to 3000ft. It is incumbent of crews in receipt of a radar service to keep the controller advised of their intentions in good time beforehand if they are to gain the maximum benefit from the ATS provided. It was evident that the very comprehensive traffic information given to the Jaguar crew should have painted a sufficiently accurate picture for them to acquire the light twin ahead. However, despite climbing to 3000ft to remain clear of cloud they did not do so. Whereas the Jaguar crew might have been content in their believe that they knew where the PA34 was and thought that no confliction existed this was not the case. A CAT pilot Member was concerned that although the PA34 was there to be seen, the Jaguar pilot appeared to have flown on regardless without taking more robust action to remain clear of it. In his opinion the Jaguar crew had not cleared their flight path sufficiently ahead and had flown too close to the PA34 about which they had been told. Another Member also took this view and emphasised that all three transmissions of traffic information from APP had indicated to the Jaguar crew that the PA34 was ahead as they closed on it but the pilot had not taken sufficient action to stay clear of it; indeed, he had climbed through the level of the PA34 as the latter descended without spotting it at all. Moreover the jet had also flown through the final approach sector at a level where instrument traffic was very likely to be encountered without any word to Bristol from either the pilot or Boscombe ATC, which seemed at odds with good airmanship or 'best practise'. Whereas the Command might suggest that the crew had cleared their flight path sufficiently ahead that was not the view of the pilot Members: this convinced the Board as a whole who agreed than the nonsighting by the Jaguar of the PA34 was a contributory factor to the Airprox. Whereas several Members thought that the APR's avoiding action instruction had entirely resolved the conflict others disagreed: some contended that the Jaguar had also climbed above the level of the notified traffic thereby also resolving the conflict, ultimately increasing the separation, but also climbing through the PA34's level unsighted in the process. The differing views were so closely contested that, unusually, a vote was necessary to decide the Board's view of the cause that in the end, by a very narrow majority, was determined to be a conflict in Class G airspace.

For his part the APR had endeavoured to turn the PA34 out of the way of the faster Jaguar that was approaching rapidly from abaft the beam so there would have been little opportunity for the PA34 instructor to spot the jet. Indeed, he did not see the Jaguar until it was clearing to the N astern. Therefore, effectively there was little more that he could do to effect the outcome apart from complying promptly with the APRs avoiding action advice, which he did. In the end this avoiding action did achieve 0·8nm between the subject ac but it was unfortunate that the controller had not taken action earlier to obtain greater separation. The Jaguar pilot's climb to 3000ft RPS to remain VMC, in the knowledge that the PA34 was descending, had ultimately only achieved 400ft above the latter at the closest point, albeit unseen. Nevertheless, the Board agreed that no risk of a collision had existed in the circumstances reported here.

AIRPROX REPORT No 003/05

PART C: ASSESSMENT OF CAUSE AND RISK

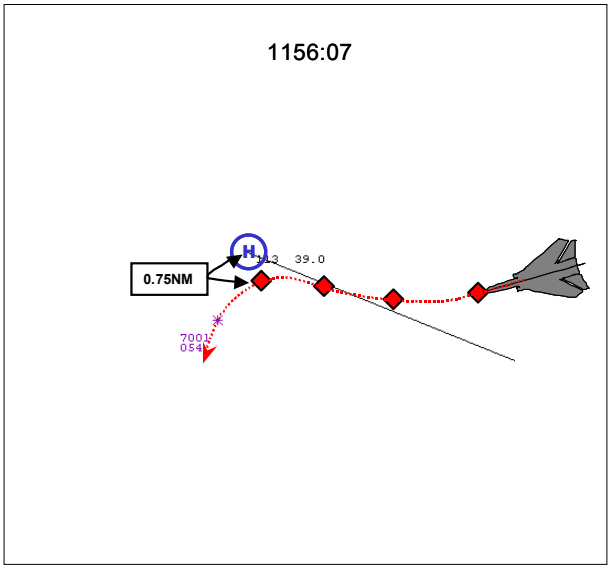
Cause: A conflict in Class G airspace.

Degree of Risk: C.

Contributory Factors: Non-sighting by the Jaguar crew.

AIRPROX REPORT NO 004/05

Date/Time:	12 Jan 1125	
Position:	5137N 00425W (Trewen, 4nm W Launceston)	
Airspace:	LONDON FIR/UKDLFS (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	MD500 Helicopter	Tornado
Operator:	Civ Pte	HQ STC
Alt/FL:	75-100ft (QFE)	NR
Weather	VMC CLBC	NR
Visibility:	6-7km	NR
Reported Separation:	100-150ftV/ 0H	Not seen
Recorded Separation:	Not recorded.	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD500 HELICOPTER PILOT reports that he was flying a black helicopter without strobes but with the anti-collision beacon selected on, on a flight from a private site near Trewen. Ten sec after he lifted off and when he was passing about 75ft agl heading 190° at 60kt a low wing military jet ac passed over him from behind between 100 and 150ft directly above. It appeared in his right window at approximately his 2 o'clock position, banking left, but at the time had been on a similar heading. He immediately broke right turning up the valley and stopped his climb.

UKAB NOTE (1): The recording of the Burrington Radar shows a very high number of military low level contacts operating in the area on the day of the incident. There is no reason to believe that any were not squawking IAW the Mil AIP and the squawking ac are painting at low level in the area of the reported incident. At the reported time and position of the incident, several ac can be seen in the area but the nearest was 2nm to the E and its flight profile did not meet the description provided by the reporting pilot. That ac was traced, the pilot contacted and a confirmatory report was filed which verified the radar information. Further, the HUD video confirmed that it was not in the immediate area of the helicopter operating site.

Following this analysis a further examination of the radar tapes was conducted and a low level military contact was seen to overfly the vicinity of the helicopter site at 1156, 31min after the reported time of the incident. The helicopter pilot was contacted by the UKAB but, although he believed the reported time to be accurate, conceded that if the flight profile of the second ac fitted his description (which it did), it was most probably the one involved.

By good fortune, the data from the Burrington Radar was still available and Radar Analysis Cell was able to identify the second ac as a Tornado from RAF Marham. It was not possible to get a report from the pilot as he was deployed on operational duty and the video information had been routinely destroyed. His wingman was also contacted but his recollection of the incident was hazy and could not provide any significant detail of the sortie.

Although the helicopter did not show on the radar at any time, the Tornado can be seen passing 0·75nm to the SE of the promulgated position of the site in a tight left turn.

UKAB NOTE (2): The site from which the helicopter was operating is promulgated in the UK Mil AIP at 1-2-2-7 as a 'Helicopter Landing Site'. As such it is a 'Warning' but does not attract any mandatory avoidance.

HQ STC comments that it is unfortunate that the initial timing given by the helicopter pilot may have been in error thus delaying the identification of the military ac. However, from the description of the occurrence it is likely that

the Tornado pilot had little chance of spotting the helicopter that had just lifted off and would have been most difficult to spot while on the ground.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the MD500, radar video recordings, and reports from the appropriate operating authorities.

The Board agreed with STC that the apparently incorrect reported time of the incident had inhibited the investigation. Since no report was available from the Tornado pilot to confirm that he was the reported ac, much of the Board discussion was conjecture. A Member familiar with Tornado low-level operations suggested that the Tornado pilot might have been flying directly towards the helicopter site, seen it on his moving map display, jinked to the S to avoid it and by so doing flown into conflict with the helicopter which would not have been visible to him as it was beneath his ac's nose.

There was discussion as to the merits of a 'clearing turn' after take off for helicopters with differing views between military and civil helicopter pilots; in the military it is standard practise but not the norm with civilian pilots. Members agreed, however, that in this case such a turn might have revealed the approaching Tornado.

Since the Tornado pilot did not also report the incident it could be assumed that neither pilot had seen the other ac in time to initiate avoiding action; it was therefore only by good fortune that they did not collide. That being the case, there probably had been an actual risk of collision.

The Board noted however, that they had no reason whatsoever to suspect that the Tornado had been operating below 250ft agl, its minimum authorised height. That being the case and that the helicopter had only been airborne for 10sec, the evidence supporting an 'actual collision risk' was not compelling. On balance the Board elected to assess the risk as 'A' whilst accepting that this was a fine judgement in the absence of further information.

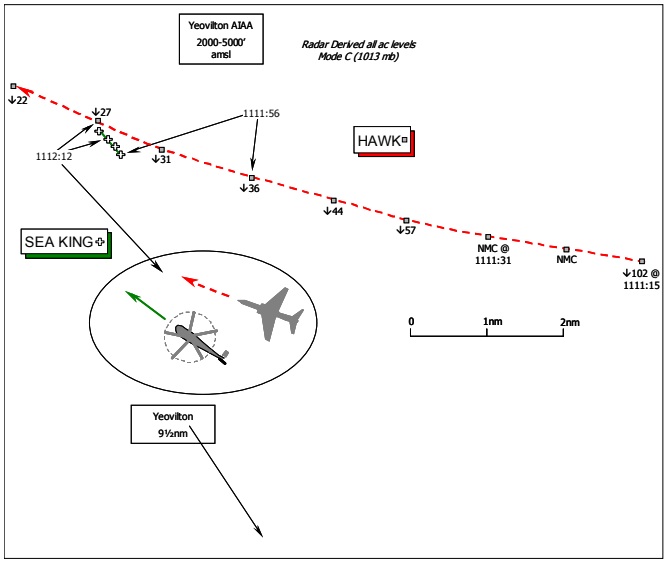
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the helicopter pilot and possible non-sighting by the Tornado pilot.

Degree of Risk: A.

AIRPROX REPORT NO 005/05

Date/Time:	12 Jan 1112	
Position:	5109N 00245W (9½nm NW of Yeovilton elev: 75ft)	
Airspace:	Yeovilton AIAA	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sea King Mk4	Hawk Mk1
Operator:	CinC Fleet	DPA
Alt/FL:	2200ft	3000ft
	RPS (1018mb)	QNH (1017mb)
Weather	VMC NR	VMC Haze
Visibility:	25km	Good
Reported Separation:		
	150-300ft H	3-400ft V/1500-2000 yd H
Recorded Separation:		
	<450m H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE WESTLAND SEA KING MK4 PILOT reports his ac has a dark green colour scheme but the HISLs were on whilst carrying out a check test flight (CTF) within Yeovilton's Northern AIAA. His crew consisted of a co-pilot in the LHS and a maintainer. He was in receipt of a FIS from Yeovil RADAR (VLN RAD) [located at RNAS Yeovilton] on UHF 369·875MHz and squawking A0222; neither Mode C nor TCAS is fitted.

After 2 level 90° turns at 2000ft Portland RPS (1018mb), he commenced a 70kt climb heading W. Upon passing 2200ft RPS a loud noise was heard to starboard and a Hawk jet was spotted passing down the starboard side of the ac on a similar track at about the same altitude, some 150-300ft away. The Hawk continued west for 2nm before making a descending left hand turn. No avoiding action was taken as the first sighting distance was at the closest point and once the jet had passed by it continued opening the range so none was necessary. He assessed the risk as *"medium to high".*

THE HAWK T MK1 PILOT reports his jet has a black colour scheme and the HISLs were on whilst carrying out an engine air test; two pilots crewed the ac. He was in communication with Boscombe RADAR (BOSC RAD) on UHF and squawking A2620 with Mode C. Neither TCAS nor any other form of CWS is fitted.

The air test schedule required him to fly to 550kt at 2000ft agl so to attain the required speed the ac had to be dived from a height of about 10000ft. Heading 300° at 550kt, as they descended through 6000ft, ATC advised them that they were no longer under the RIS but RADAR continued to advise them about other ac. They saw the green Sea King helicopter about 1½ - 2½nm away, flying straight and level on a similar heading to his own at about 2000-2500ft. Shortly after sighting the helicopter visually, RADAR informed them of this traffic at a range of 1nm and he reported that he was visual with it: this Sea King was the only one of three strangers in their vicinity reported by ATC that he was visual with at that time. The necessary air test schedule speed had just about been achieved with about 1500ft to go to the required height and the airspace ahead looked clear. The Sea King was well in sight so he elected to continue with the test profile. His ac's heading was adjusted to overtake the Sea King on its starboard side on a continually descending and accelerating course. The helicopter was subsequently overtaken at a range of about 2000yd off the helicopter's starboard beam and some 300-400ft above it, although still continuing with the descent. He maintained the heading for some time to ensure clearance before carrying out the next part of the test schedule which was a 5·5G turn.

With the information that he had and the good visual contact on the Sea King, albeit that because of the rate of closure there was limited reaction time, he was content that he could continue on his intended course with little

deviation whilst still avoiding the Sea King safely. There was no confliction and the risk was assessed as *"none"*: he added that it was a busy part of the air test schedule with lots of RT.

UKAB Note (1): The Burrington Radar recording shows the Hawk squawking A2620 orbiting to the N of Yeovilton in a broadly E-W racetrack above FL100 before turning westbound and initiating a descent. The Hawk jet is shown descending through FL102 at 1111:15, whereas the Sea King is shown only intermittently up until this point. No Mode C is evident for the next two sweeps until the Hawk is shown again descending through FL57 Mode C (1013mb) just before it penetrates the upper altitude of the Yeovilton AIAA [2000-5000ft amsl] on the next sweep. At 1111:56, the Sea King is shown again (NMC fitted) and tracks consistently NW for the next three sweeps which is slightly at variance with the Sea King pilot's report (it is not until after the Airprox that the helicopter appears to steady on a westerly course) as the Hawk approaches from abaft the helicopter's starboard beam closing to a range of 0·6nm as the jet descends through FL31 Mode C (1013mb). After the Hawk has overtaken the Sea King - in between radar sweeps - the jet is shown descending through 2700ft Mode C (1013mb) in the R 1 o'clock of the helicopter at a range of 0·24nm - about 450m - suggesting that horizontal separation was somewhat less in between these returns. A level of 2700ft (1013mb) would equate to an altitude of about 2850ft Portland RPS (1018mb) whilst the 2200ft (1013mb) level shown on the next sweep is about 2350ft (1018mb).

MIL ATC OPS reports that the Hawk jet was on an air test, receiving a RIS from Boscombe Down RADAR (BOSC RAD) whilst manoeuvring in a block of airspace from FL60-FL240. At 1111:27 the Hawk pilot reported "[C/S] *is descending below six zero for 2 minutes, we'll call you back in the area. We're good visual with the ground*". This transmission was acknowledged by BOSC RAD who passed several pieces of traffic information to the Hawk crew which culminated in "[C/S]*...pop-up traffic west 1 mile manoeuvring no height*" being passed at 1112:29 [some 17sec after the Airprox had occurred suggesting that the Boscombe Down RT recording was running about ½ minute fast]. The Hawk crew reported "*visual with the rotary"*, whereupon BOSC RAD then immediately stated "[C/S] *limited traffic information below at the base of radar cover, you are responsible for your own terrain separation*". At 1113:33, BOSC RAD informed the Hawk crew "[C/S] *loss of radar contact, flight information service".* The Hawk was re-identified, by BOSC RAD, at 1114:56 after the Airprox had occurred.

Meanwhile, the Sea King crew was conducting a check test flight to the NW of Yeovilton in the vicinity of Glastonbury/Wells under a FIS from Yeovil RADAR (VLN RAD), operating below the Yeovilton AIAA up to an altitude of 2000ft Portland RPS (1018mb). At 1111:52, the Sea King crew requested to extend their operating altitude up to 5000ft into the AIAA, which was approved by the controller. The Sea King pilot reported the Airprox at 1112:20, transmitting "[C/S] *we've just had a Hawk aircraft pass down our right hand side approximately 150 yards at the same height*". The Sea King crew then continue to pass further details pertaining to the Airprox including that the estimated height of the Hawk was 2500ft.

Boscombe Down RADAR was manned by a very experienced controller who described her workload at the time of the Airprox as *"medium under good weather conditions"*. The Hawk had been flying an air test profile in the block from FL60-FL240 in the airspace above the Yeovilton AIAA. When the Hawk pilot requested a descent below his notified base level, BOSC RAD passed traffic information on conflicting traffic - the Sea King – whereupon the Hawk crew responded as "*visual with rotary*". There was no earlier opportunity for BOSC RAD to pass traffic information on the Sea King as the helicopter had only just climbed into Boscombe's radar coverage.

According to the memorandum of understanding (MoU) between the 2 ATSUs, Boscombe Down ATC are to:

a. Identify to Yeovilton, any aircraft under their control which requires penetration of the Yeovilton AIAA.

b. Give traffic information in a standard form and pass traffic information in sufficient time to allow Yeovilton controllers to pass appropriate traffic information/avoiding action to their aircraft.

Although BOSC RAD described her workload at the time of the Airprox as *"medium"*, her RT output was very high with 3 ac under control, one of which was carrying out a Radar Practice Forced Landing (PFL). This high output did not allow any spare capacity to immediately pass traffic information to Yeovilton ATC and unfortunately the Airprox occurred before an opportunity presented itself.

The VLN RAD team had been on console for less than 2min having returned to the control position from a break period. The Sea King was conducting a check test flight to the N of Yeovilton for some 6min prior to the Airprox under a FIS. Operating underneath Yeovilton's AIAA, it is normal practise for aircrew to request a climb above an

altitude of 2000ft in this area irrespective of the type of ATS. As the Sea King crew called for a climb neither the APP mentor nor trainee spotted anything untoward; therefore approval to climb was given and their attention was diverted elsewhere. The Airprox was reported by the Sea King crew on RT at 1112:20.

The MoU between Boscombe Down and Yeovilton has been agreed to ensure that this type of incident does not happen. Unfortunately, due to the intensity of operations at the time there was no spare capacity for BOSC RAD to pass additional traffic information to VLN RAD. Moreover, as the Sea King was below radar cover until the range between the helicopter and the Hawk was 1nm it resulted in late traffic information for the Hawk pilots and no traffic information for the Sea King aircrew.

THE SEA KING PILOT'S STATION comments that this incident was clearly a close call as the helicopter crew *heard* the Hawk momentarily before they saw it. With the Hawk approaching from behind one would expect the helicopter to be relatively conspicuous against the clear sky with the HISLs on.

While the Hawk pilot is under no obligation to talk to Yeovilton ATC, there are several learning points for Yeovilton RW aircrew arising from this Airprox. Firstly the published Yeovilton AIAA is clearly subject to incursion by other traffic at any time, this traffic may not be in contact with ATC and may not appear on radar until the last moment. Secondly, there is obviously merit in rotary wing crews requesting a RIS whenever the ac is being operated at a height where it can be seen on radar, even if in good VMC. Yeovilton ATC confirmed that they are in a position to offer this service without overloading controllers.

THE HAWK PILOT'S STATION reports that the Hawk pilot was in good visual contact with the Sea King and there was no risk of a collision. Having said that, the incident undoubtedly appeared very different from the Sea Kings pilot's perspective and his concern is well understood. The MoU between Boscombe Down and Yeovilton exists specifically to avoid this type of incident. It is therefore incumbent on aircrew to keep ATC informed of their proposed actions in order that the MoU can be properly adhered to. Since this incident all aircrew at Boscombe Down have been re-briefed on the importance of informing ATC of any changes to their previously agreed operating altitude blocks in time for deconfliction to be agreed.

CinC FLEET comments that this incident highlights the importance of applying MoU procedures correctly to enhance flight safety within AIAA's. The airspace to the north of Yeovilton is already very busy and the implementation of the current Bristol/Cardiff Airspace Change Proposals will only serve to squeeze the traffic into a smaller operating area putting even greater emphasis on the need to provide additional layers of safety in areas where different aircraft types, military and civilian, routinely conduct manoeuvres which are not always compatible with each other and the 'Rules of the Air'. Whilst content that the Hawk pilot was applying the principal of 'see and avoid' to the Sea King, the margin by which he chose to avoid, during a demanding phase of the air test, having just reached the 'necessary air test schedule speed', with a high rate of closure and limited reaction time was not ideal. The 'Rules of the Air' state that 'ac are not to be flown in proximity to other ac so as to create a danger of collision'. The Hawk pilot did not consider there to be a danger of collision but the Sea King pilot did, which highlights the need for fast jet crews to give helicopters a wide berth especially when overtaking.

DPA DIRECTORATE OF FLYING comments that this was an encounter in Class G airspace, with each ac operating under VFR and the Hawk pilot sighting the Sea King at between 1½ - 2½nm. The events which followed, from the perspective of the Hawk pilot, were perfectly reasonable – given that he had the Sea King in sight and thus took appropriate action. From the view of the pilot of the Sea King, however, the situation would have appeared less reasonable given that he was faced with a descending fast moving jet, very close and overtaking and was not aware that the pilot of the Hawk had him in sight. The Station has reviewed procedures and re-briefed the aircrew at Boscombe Down but the nature of activities in the area predisposes this kind of incident and so 'look-out' remains the maxim.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

With the Hawk approaching from astern it was readily apparent that the helicopter crew would have been unable either to detect the fast moving jet or avoid it without the assistance of ATC. The Mil ATC Ops report had shown

that the VLN RAD controller had not detected the confliction and hence no warning was issued. Despite the controller's tacit approval to climb, under the FIS that prevailed there was no requirement on the part of VLN RAD to effect separation against the jet and it was explained to the Board that the radar recording had shown that the Hawk might well have been obscured in the Yeovilton SRE overhead before it turned westbound and descended. The Hawk had dived so rapidly below FL100 that only two radar sweeps, both of which indicated NMC on the recording, occurred before the Hawk was actually shown within 4000ft of the helicopter: the controller could quite reasonably have discounted it as a potential confliction to his FIS helicopter traffic beforehand, even if he had spotted it. Thus there would have been only very limited opportunity for VLN RAD to spot the confliction before the Hawk was at close quarters. Whilst the Board echoed the Sea King Station's view that a RIS would certainly be beneficial when conducting a CTF, it would not have helped here because, for whatever reason, the VLN RAD controllers had not detected the presence of the Hawk. However, there was no reason to believe that they would not have provided a warning under the FIS if they had seen that other traffic was about to fly into dangerous proximity with the Sea King.

The Board recognised that the promulgation of an AIAA in Class G airspace in no way guarantees that other unknown traffic will not be routinely encountered within it. Nevertheless, with all the mechanisms that were in place here to forestall such an encounter it was unfortunate that this Airprox still occurred. From the Hawk pilot's report it was clear that he had spotted the helicopter about 1½ - 2½nm away just before BOSC RAD had passed traffic information at a range of 1nm. The Mil ATC Ops advisor explained that the controller was working hard with other traffic and the radar PFL would have demanded a certain priority, concentrating her attention. This coupled with the high RT loading left little capacity for co-ordination with other ATSUs. Nevertheless, the helicopter was called as soon as it had climbed into coverage and was recognised as a conflict. Although the RT timing of this transmission might have suggested that the helicopter was called after the CPA, Board Members were well aware of the potential for inaccuracy when reviewing RT timing data from two ATSUs and that of another different radar recording source. Members were however in no doubt that the controller had conscientiously called the traffic as soon as she could.

It was most unfortunate that the Hawk pilot had not given the controller more notice of his intention to descend to 2000ft, especially as his chosen course took the jet at very high speed through the neighbouring ATSU's promulgated AIAA. Clearly the minimal notice given, coupled with the nature of the other traffic under control at the time prevented BOSC RAD from advising VLN RAD what the Hawk was doing. In the Board's view, this was a critical factor and it was clear to Members that the Hawk pilot's station had taken appropriate measures to re-brief aircrew on the importance of keeping controllers informed about their intentions. But an important lesson here also was that this had to be done in sufficient time for controllers to make use of that information and pass it on to the appropriate unit and thereby fulfil the spirit and intent of the MoU, written with previous encounters such as this in mind. Potentially, the benefit to the Hawk pilot would have been an earlier heads-up about the presence of the helicopter climbing up in the AIAA which might have affected his decision to continue this phase of his air test into this Area. But the very nature of this airspace - albeit that it is Class G and within Boscombe Down's local operating area - should have advertised the greater possibility of a conflict to the Hawk pilot. Indeed he had reported only acquiring this Sea King as one of the three contacts reported, illustrating that there was other traffic in the vicinity. Whilst fully aware of the increasing pressures on the available open airspace in which to fly, experienced fast-jet pilot Members – themselves test pilots – thought it unwise for the Hawk pilot to be conducting this air test at these speeds in this busy piece of airspace. It was clear that the Hawk pilot had elected to continue his descent to the required height after spotting the helicopter with the intent of continuing his Air Test profile, achieving the desired speed and the next 'Test Point'. In a pilot Member's opinion these test parameters were, in general, not difficult to achieve and it would have been preferable to have avoided the helicopter by a greater margin and repeated the run if need be. Although the Hawk pilot had spotted the Sea King and taken action to pass clear down its starboard side, in the Board's view, at these speeds he could and should have given the helicopter a wider berth. Here it was the Hawk pilot who chose the horizontal separation as he overtook the Sea King and whereas he believed he had passed some 1500 – 2000yd to starboard the radar recording suggested that the resultant horizontal separation was a lot closer and was significantly less than 450m as he passed abeam the helicopter. The Board concluded, therefore, that this Airprox in the Yeovilton AIAA had resulted because the Hawk pilot, intent on achieving the parameters of his Air Test schedule flew very close to the Sea King causing its pilot concern.

Turning to risk, it was evident to the Members that although the Hawk pilot had spotted the helicopter about 1½ - 2½nm away – broadly 15sec flying time at a closing speed in the order of 480kt – he had the helicopter well in sight and could have afforded it a greater margin if need be in his nimble jet. As it was, although the Hawk pilot

thought he could continue safely it was fortunate the helicopter had not manoeuvred at this moment. Taking all these factors into account the Board concluded that no risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

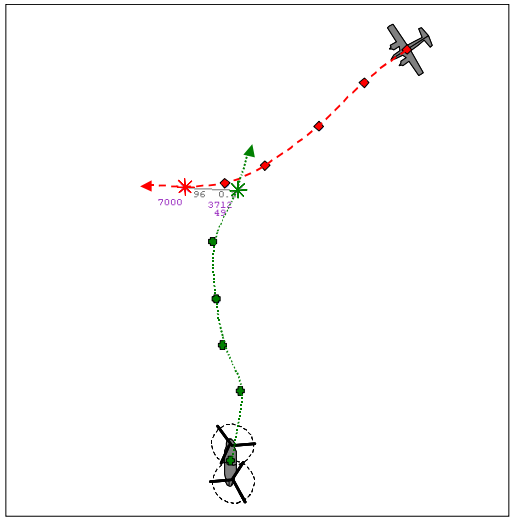
Cause: Within the Yeovilton AIAA, the Hawk pilot, intent on achieving the parameters of the Air Test, flew very close to the Sea King causing its pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 006/05

AIRPROX REPORT NO 006/05

Date/Time:	14 Jan 1148	
Position:	5153N 00104W	(3nm SE Bicester)
Airspace:	LONDON FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Chinook	PA34
Operator:	JHC	Civ Trg
Alt/FL:	FL46↑	4500ft
	(1013)	(QNH 1026 mb)
Weather	VMC	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:		
	100ft V/150m H	200ft V/½nm H
Recorded Separation:		
	100ft V/0.2 nm (370m)H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHINOOK PILOT reports flying a dark green ac with HISLs and Nav lights switched on but with no TCAS fitted, squawking as directed with Mode C and in receipt of a RIS from Brize Radar on a medium level transit flight to Linton on Ouse. The Captain was a QHI IRE in the LH seat and the co-pilot – the handling pilot - was under an IF hood in the RH seat. While heading 359° at 130kt overhead BSO (Benson) at 4400ft on the London RPS 1028mb, they requested a climb to FL50 to fly at the correct quadrantal for the next leg. Brize passed TI on an ac to their right indicating FL40 and cleared them to climb to FL50. As the ac climbed, the Captain (NH) observed a white and blue light twin 300m away, above and to their right, emerging from an area not visible due to the overhead console. The Captain took control, stopped the climb and broke right to pass behind the conflicting traffic. The co-pilot on the RH side did not see the traffic due to the IF visor and it was only seen by the Navigator when it was no longer masked by the RH windscreen wiper motor. He assessed the risk of collision as being high.

THE PA34 PILOT reports flying an instructional flight in a white and blue ac with strobes switched on, squawking 7000 but no TCAS fitted and in receipt of a FIS from Oxford. While level at 4500ft on the QNH [he thought] and heading 245° at 150kt he saw a Chinook helicopter in his 10 o'clock position at about 4nm. It remained on a steady bearing with the helicopter which made no attempt to alter course or height so he took avoiding action by initiating a climbing right turn. He assessed the risk as being low.

UKAB Note (1): The recording of the Heathrow Radar shows the PA34 in a slow but steady climb from 3500ft (QNH) at 1146, when the radar recording starts, to 4900ft at 1148:24, the time of the incident. The Chinook is level at 4400ft (QNH) from the start of the recording until 1147.58 when it is seen to commence a climb and indicates 4800ft (QNH) at the time of the incident.

THE CHINOOK STATION comments that this Airprox occurred in a notoriously busy section of Class G airspace overhead the Benson MATZ whilst the Chinook was under a RIS from Brize Radar. A contact was reported to the crew on the right hand side of the ac just before the incident. This contact was not seen by the crewman, who had primary responsibility for the lookout on that side, because the RH seat pilot was wearing an IF visor. The crewman coincidentally made a move in the cabin at about this time resulting in a momentary loss of lookout cover on the right.

MIL ATC OPS reports that a Chinook ac contacted Brize Norton LARS Controller (LARS) on handover from Benson at 1139:52, "*maintaining 4400ft – 1028 (London QNH*)". LARS identified the Chinook and applied a RIS, passing TI as *"..Pop up traffic 12 o'clock, 4 miles, crossing left to right, no height information, possibly airborne from Benson*". The Chinook crew acknowledged the radar service and reported "*good visual with Benson*". At 1142:09, LARS called "*limited traffic information from all around due to high traffic density"*. Further TI was passed at 1145:05 and 1145:26, the latter being "*C/S, traffic right 2 o'clock, 4 miles manoeuvring, no height information,*

further traffic right 2 o'clock, 5 miles, crossing right/left on a converging heading indicating FL40". At 1147:44, LARS asks the Chinook crew if they "*require a climb to FL50*". The crew confirmed this and a climb instruction was issued by LARS at 1147:58. At 1149:28 the Chinook crew reported that they had "*just had an airmiss with a light twin as we were passing FL46".* LARS responds with "*C/S, that was the previously called traffic at a similar level".*

Analysis of the Heathrow Radar shows, at 1146:00, the Chinook 10.5nm ESE of Oxford Kidlington squawking Mode A 3712 and indicating 4400ft. The PA34 is in the Chinook's right 2 o'clock 11nm tracking 230º, squawking 7000, and indicating 3500ft climbing slowly. The PA34's Mode C indicates 4000ft at 1146:45 when the lateral separation between the ac is 8.5nm. Both ac indicate a similar level of 4400ft, at 1147:50, when the lateral separation is 6nm. At 1147:50, the Chinook is seen to commence a climb with the PA34 in its right 2 o'clock, 3nm indicating 4800ft. At 1148:07, the lateral separation between the 2 ac is 1.5nm with an indicated vertical separation of 100ft and the separation continues to decrease to a CPA of 0.2nm lateral and 100ft vertical separation. Both ac are seen to take late avoiding action against each other.

The Chinook had departed Odiham, via the COMPTON SID and routed towards Benson at 4400ft on the London RPS of 1028mb. It was identified and placed under a RIS, by LARS, at 1140:03. The LARS Controller's workload was of medium intensity, operating up to 5 ac at any one time. The airspace through which the Chinook planned to route was extremely busy and the Controller correctly limited the RIS due to high traffic density. Although LARS passed a variety of TI to the Chinook crew over the 2min prior to the Airprox, after correlation of tape transcripts and radar replays there is no indication of any TI being passed regarding the PA34 or the TI passed was highly inaccurate with regard to both range and altitude. At the time, LARS claims to have passed TI on the PA34 as "*right 2 o'clock, 5 miles, crossing right/left on a converging heading indicating FL40*"; the PA34 was actually in the Chinook's right 2 o'clock by some 10.5nm and should have been indicating FL032+/- 200ft, on the Brize Radar, taking into account pressure differentials. In the one minute preceding the Airprox, the LARS Controller's workload was temporarily raised to a high level due to a series of RT transmissions, including a freecall, and identifying an ac calling on handover. This increase in workload coupled with the application of priorities would have diverted the Controller's attention temporarily to another area and reduced the window of opportunity to pass/update TI. The TI that LARS passed to the Chinook crew at 1145:26 appears to have been concerning another ac routeing some 5.5 nm S of the PA34's position. However, from a follow up conversation between LARS and the Chinook crew it would appear that the crew and the LARS Controller were both under the assumption that TI had been passed by LARS on the subject PA34. Although in a follow-up conversation the LARS Controller was adamant that TI passed to the Chinook was regarding the subject PA34, it cannot be determined positively whether the TI was inaccurate or the Controller was under the misapprehension that he had passed information on the PA34 when he had actually passed TI on another track.

HQ JHC comments that this Airprox occurred in an area of high traffic density and that the Chinook crew were subject to limited TI. Both the Controller and the Chinook crew would have been under high-workload conditions and reliant on good Team Resource Management. In this situation the Chinook crew's attention would have been drawn to the position passed in the TI (that included *'converging heading')*. It is unfortunate that this contact was indicated as being 5nm away and below their height; therefore the Chinook crew's attention would have been directed accordingly. JHC is concerned that this situation was allowed to develop to a point where an Airprox was filed despite the PA34 being visual with the Chinook from 4nm and with the Chinook being under a RIS. This serves as a timely reminder for all crews to maintain an effective lookout and to take early avoiding action.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered in turn the parts played by the 3 participants in this incident, namely the Brize Norton LARS Controller, the PA34 Captain and the Chinook crew.

ATC specialists noted that the Brize LARS Controller was working a very busy and complex traffic situation which the diagram above does not show. Members were informed that the UKAB Secretariat and Mil ATC Ops had independently analysed the radar tape several times and both believed that the Controller had overlooked the conflicting PA34 when passing TI to the Chinook. Members agreed that this would probably have caused the

Chinook crew to focus their lookout in the wrong area. The TI passed otherwise reflected accurately the situation regarding the contacts in the immediate area.

Since the Controller had, correctly in the view of specialists, limited the radar service due to the traffic density, the Chinook crew should have taken note of this and intensified their lookout. If necessary, the IF practise could have been temporarily discontinued thus freeing another pair of (front cockpit) eyes to assist in the lookout task. When the traffic density reduced the exercise could have been resumed. Members noted that at the precise time of the incident the Crewman, who had properly been allocated lookout responsibility for the starboard side, was not carrying out this (primary) function. Despite that the Chinook was under a RIS, the captain was responsible for collision avoidance and the crew should have been briefed and acted accordingly despite the many hindrances to visual acquisition of conflicting ac. Under the Rules of the Air the PA34 had right of way and the Chinook should have given way to it; since the crew had not seen the PA34 until it was 300m away and was already taking avoiding action, they had not been able to fulfil adequately this responsibility. The Board therefore concluded that late sighting had been the cause of the Airprox.

Members noted, however, that although the PA34 had right of way and its pilot had seen the Chinook from a distance reported as 4nm, he took no avoiding action until the ac were separated by under 10sec. This was considered to be much too late. Even though it may have been difficult to determine which way was best to turn by way of avoidance, a levelling off of the climb below the level of the (also climbing) Chinook would have prevented the incident. Further, even though the incident had occurred just below the base of the Oxford AIAA, Members thought that it would have been prudent for the PA34 pilot to request a LARS from Brize Norton; this again may have prevented the occurrence.

In the event however, the Chinook crew had seen and avoided the PA34, albeit at a late stage, thus preventing any risk that the ac would have collided.

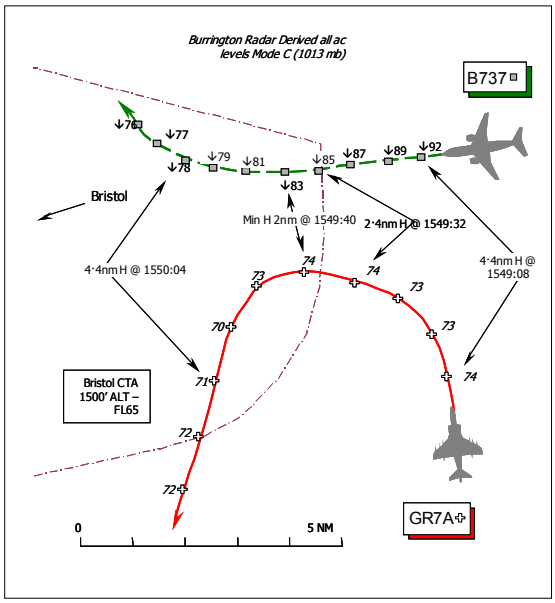
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the Chinook crew.

Degree of Risk: C.

AIRPROX REPORT NO 007/05

Date/Time:	25 Jan 1549	
Position:	5125N 00228W (9½nm E Bristol Airport - elev 622 ft)	
Airspace:	London FIR	(Class: G)
Reporter:	Bristol APR	
	First Ac	*Second Ac*
Type:	B737	Harrier
Operator:	CAT	HQ STC
Alt/FL:	↓FL40	FL80
Weather	IMC In cloud	VMC CLBL
Visibility:	NR	15km
Reported Separation:		
APR:	800ft V/2½ nm H	800ft V/2½ nm H
Recorded Separation:		
	Min H: 2nm @ 900ft V.	Min V: 800ft @ 2·3nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (APR) reports that the B737 was being vectored into CAS at Bristol Airport. The Harrier was spotted SE of the Airport, he thought at low level and climbing towards the B737. Traffic information was passed to the B737 crew and descent issued into the CTA but the Harrier then turned towards the B737 so an avoiding action R turn onto a heading of 360° was passed. The Harrier continued the L turn into the Class G airspace immediately above the Bristol Airport CTA and standard separation was eroded as the Harrier passed about 2½nm away and 800ft below the B737, some 8nm E of the BRI. The pilot of the B737 advised that he had not sighted the traffic; he had however received a TCAS TA.

THE B737 PILOT reports all the ac's lighting was on including the fixed landing lights and HISLs whilst inbound to Bristol IFR. Descending in IMC, in cloud under a RAS from Bristol APPROACH heading 270° at 250kt, a Harrier apparently pulled out of low-level and entered the Class G airspace above the upper level of the Bristol CTA without any contact with Bristol ATC. The other ac was not seen but displayed on TCAS at a range of 7nm and avoiding action was issued by ATC of a R turn onto N. Minimum separation was about 2½nm as the Harrier closed from 10 o'clock and climbed to 800ft below his airliner before turning away and clearing off the port wing. He assessed the risk as "medium" and added that the RoD was reduced when the TA was enunciated to avoid the potential for an RA.

THE HARRIER GR7A PILOT reports his ac has a grey camouflage scheme but the HISLs were on whilst manoeuvring east of Bristol Airport's CAS under a RIS from LATCC (Mil) whilst conducting a reconnaissance mission. Flying as a singleton in VMC at about FL80, some 3000ft above cloud in between layers with an in-flight visibility of 15km, whilst executing a level L turn through 270° at 360kt, ATC reported traffic for the first time, he thought at 3nm to the N, at FL85. To avoid the reported traffic he immediately turned S, but the other ac was not seen so the minimum separation could not be assessed. He stressed that he was operating in Class G airspace throughout under a RIS and acted immediately on the traffic information given. The traffic avoidance did not impact on his mission. He thought that no avoiding action was suggested by the LATCC (Mil) controller but he was not expecting it under the RIS provided. He assessed the risk as *"low"*.

ATSI reports with RT transcript that the crew of the B737 established communications with the Bristol APR at 1547:50 and reported at FL110 reducing speed to 220kt on a heading of 274°. The APR position was being operated by a mentor monitoring a trainee controller who instructed the crew to descend to FL80 on their present heading. At this time, the ac was approximately 10nm SW of Lyneham and 18½nm E of Bristol Airport. The radar return from the Harrier could be seen southbound, routeing through the Swindon RC at FL240 before following a southwesterly track. Shortly after it passed a position 8nm S of the corridor, it can be seen descending but the

displayed SSR Mode C data then becomes intermittent. [NMC is displayed most of the time until the Harrier turns N].

The Bristol controller's plan was to vector the B737 left hand for RW09. At 1548:38, the Harrier can be seen on a northwesterly track at FL85, in the B737's 9 o'clock at 8·3nm. Although the B737, which was passing FL101, had left CAS the pilot was not informed of this nor was any change of ATS specified [UKAB Note (1): the APR OJTI specified that the B737 crew was being provided with a RAS at the time of the Airprox]. At 1549:05, the Harrier was 5nm S of the B737, northbound at FL75 whilst the B737 was descending through FL93. [UKAB Note(2): After 1549:00 (the Bristol RTF transcript gives only 30sec and 1min time injects), the controller passed traffic information to the B737 crew for the first time, *"…there is pop-up traffic to the south of you range 5 miles should cross behind you indicating FL75 descending possible fast jet"*, which the crew acknowledged *"roger"*. The B737 crew was then instructed to descend to FL40 which they read back. The Harrier then made a L turn just above the Bristol CTA whilst starting to converge on the B737 from 8 o'clock at a range of 3·3nm. The controller passed further traffic information to the B737 crew at exactly 1549:30, *"…that traffic now due south of you range 3 miles turning westbound"*. Moments later at 1549:35, the APR issued an avoiding action R turn *"…avoiding action turn right heading of 360°"*. The Harrier was now in the B737's 8 o'clock position at a range of 2·4nm and 1100ft below it. Further traffic information was passed at 1550:00, *"…that previously reported traffic now southbound indicating FL72 descending"*, to which the crew responded *"Roger we're in a right turn we've reduced our rate to minimum and …just passing 310°",* whereupon the crew was instructed to turn onto a heading of 280° downwind. The Harrier's continued L turn through W onto S resulted in a minimum horizontal separation of 2nm whilst 900ft below the B737]. However, the Harrier's continued L turn, together with the avoiding action turn passed to the B737 soon took effect and separation was restored after 1550:10.

Although no level of service was specified by the controller, or requested by the pilot, the controller's subsequent written report on his CA 1261 states that a RAS was being applied to the B737. The controller's plan was to keep the B737 descending so that it entered Bristol's CAS as soon as possible.

MIL ATC OPS reports that the Harrier GR7A was handed over to Controller 32 (CON 32) LATCC (Mil) by Swanwick (Mil) at 1547:30, requesting to manoeuvre in the block between FL50-FL200 under a RIS. Following a short discussion about his intentions at 1548:31, the Harrier pilot reported "*ready to manoeuvre*", whereupon CON 32 advised the Harrier pilot "*C/S, roger if you turn right onto a southerly heading and then manoeuvre in the block between FL50-FL200, traffic north of you 5 miles…cross…correction heading south west indicating FL100 descending*". This traffic information referred to the subject B737 subsequently involved in the Airprox. The Harrier pilot responded at 1548:55 with *"…already down at FL75 at the moment are you happy for me to maintain?"* to which CON 32 replied "[C/S] *negative, if you take up a southerly heading to maintain clear of the traffic, civil inbound to Bristol*". Thereafter, the Harrier pilot reported "*copy that, maintaining above 65 for Bristol* [the Bristol CTA/CTR upper level is FL65] *and requesting if possible a south-westerly heading*". Whereupon at 1549:14 CON 32 reaffirmed "[C/S] *roger turn right onto a south-westerly heading*". This was acknowledged by the Harrier pilot who responded "*roger, southwest* [C/S]". At 1549:34, CON32 updated the traffic information on the subject B737, "[C/S] *previously called traffic now north west 3 miles similar heading indicating FL85"* to which the Harrier pilot replied "*Copied* [C/S] *coming hard south"*.

Analysis of the Burrington Radar recording shows the Harrier exiting the Swindon Radar Corridor and changing to CON 32's squawk with no Mode C displayed at 1548:06. The B737 is shown 11nm N of the Harrier, tracking 260° and indicating FL110 descending. Still with no displayed Mode C level, the Harrier pilot initiated a R turn steadying onto a northerly track at 1548:47, with the B737 7nm N indicating FL94 descending. The Harrier's Mode C indication appears at 1549:08, indicating FL74 with the B737 4·5nm N indicating FL92 descending and moments later at 1549:16; the pilot initiates a L turn as the B737 indicating FL89 Mode C is some 1600ft below and 3·5nm NNW of the Harrier. The minimum horizontal separation of 2nm is observed at 1549:40, whilst the Harrier is still in a L turn: indicated vertical separation at this point is 900ft. The next sweep shows the Harrier diverging laterally from the B737 but the vertical separation has reduced to a minimum of 800ft: the airliner is shown initiating a small R turn at 1549:48 and then a further R turn at 1550:04 whereupon the 2 ac continue to diverge from this point.

According to the recorded radar data the Harrier pilot did not take CON32's recommended R turn, but instead turned L, which had the effect of reducing the lateral separation between the 2 ac. It is considered that CON32 provided a full and proper service throughout the encounter: although CON32 had no obligation to avoid the B737, she appreciated that the fact that the civil airliner would probably be under a RAS and even without a request from Bristol attempted to resolve the confliction. However, CON32's transmission of "*turn right*" was not emphasised

and may have been missed in the 'busy' Harrier cockpit. A better phrase may have been "turn right, long way round" or a repeat of the word "right" to emphasise to the pilot it was a non-standard turn. Nevertheless, it is considered CON 32 did all she could to resolve the confliction.

HQ STC comments that the Harrier pilot would seem to have been quite busy in the cockpit and was, perhaps, not converting all the information that ATC were providing him into a 'mental air picture' of the B737's routeing. Despite being given a R turn direction twice by the LATCC (Mil) controller he positioned his ac to the SW with a L turn which brought him into confliction with the B737.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Whilst this Airprox had stemmed from the APR's concern over the proximity of the Harrier GR7A - operating under VFR - and the IFR B737, the Board had difficulty in translating that view into a situation where there might have been a possible risk of collision in the circumstances that pertained here. Some Members had suggested that this Airprox had resulted because the radar service provided to the B737 had not been as effective as it might have been. In the provision of the RAS to the B737 crew the APR was, wherever possible, seeking to achieve 5nm horizontal separation or 3000ft uncoordinated Mode C vertical separation against other observed traffic not under his control. The trainee APR had told the B737 crew that the Harrier contact was a pop-up and had reported that the Harrier had climbed up from low-level. Analysis of the radar recording had shown that in fact the Harrier had descended through the MAS after clearing the Swindon RC, but that the Mode C had not been clearly evident during that descent. Whilst recognising that the radar recording did not replicate the information displayed to the Bristol APR, controller Members made it plain that it would have been virtually impossible to determine that the Harrier was in the proximity of the descending B737 until it turned N and the Mode C showed that it was in fact just below the airliner. Because it was initially following a southerly course, the Bristol controllers might reasonably have supposed that the GR7A was not a factor and it was not, until its pilot elected to turn and manoeuvre towards the N and W. The Board understood why the APR, having suddenly detected the presence of the GR7A as it turned northbound toward his traffic, might have thought that it had climbed up toward the B737 when in fact the reverse was the case and it had actually descended through the airliner's level when some distance away. Nevertheless, the Mode A was clearly displayed and if the APR had seen it in time he might have thought to co-ordinate with CON32 at LATCC (Mil). In the view of civilian controller Members, having spotted the jet so late - already at 5nm - with the specified separation minima about to be breached, there was no opportunity for the APR to effect co-ordination so the GR7A was unknown traffic to the APR and as such had to be avoided. The ATSI report had said that when the other ac was spotted, the APR's plan was to attempt to descend the B737 into the relative sanctuary of the Bristol CTA but some CAT pilot Members thought this somewhat unwise as the GR7A was already beneath the B737. Civilian controller Members agreed: with hindsight an immediate stop-off above the GR7A in the vertical plane when first spotted might have been preferable, but as the intentions of the GR7A pilot were plainly unknown it was nevertheless a difficult decision for the APR. However, it was noted that the APR was acting as mentor to a trainee and although it should not have effected the application of the ATS in this sudden close quarters situation, it might have had an undesirable impact on the speed of reaction and transmission of avoiding action advice to the B737 crew. Here two transmissions of traffic information were passed before the APR issued the avoiding action R turn onto N, but whilst it was clearly important to alert the B737 crew to the presence of the Harrier and give them sufficient information to try and acquire it visually or on TCAS, controller Members as a whole believed that the initiation of avoiding action was somewhat late and might have been more effective if issued straight away. Whilst civilian controller Members said it was evident that the stipulated separation could not be maintained after the late spot, in the view of the Board the avoiding action R turn should have been proffered at the outset and any delay at these close quarters could make the situation doubly difficult: a positive and early turn away from the unknown traffic and level off would have been beneficial and a greater margin might have been achieved in the end.

From the B737 crew's perspective, as they were descending in cloud IMC at the time, even having been passed traffic information about the small military jet, there was no opportunity to spot the GR7A visually. Nevertheless, the Harrier was displayed to them on TCAS and they wisely elected to reduce the RoD and hence the closure rate which evidently had the desired effect. At these levels with 800ft of vertical separation achieved, TCAS did not consider an RA warranted and the radar recording shows that the B737 crew reacted immediately to the avoiding

action instruction when transmitted by the APR at 1549:35. Moreover, the GR7A pilot also turned away simultaneously. In the other cockpit the Harrier pilot was legitimately proceeding about his own reconnaissance task in the 'Open FIR' and had wisely obtained a RIS from LATCC (Mil) to supplement his own lookout in this 'see & avoid' environment. Clearly, the GR7A pilot would not necessarily have expected to hear any avoiding action under the RIS but CON32 was evidently concerned over the proximity of the B737 when it became plain that the GR7A was operating at an adjacent level.

There was much discussion about the advice proffered by CON32 under the RIS. A civilian controller Member said that he would not have been so keen to provide a directional vector and would have been content to limit the advice to straightforward traffic information, leaving any decision on avoidance entirely to the GR7A pilot. On the contrary, military controller Members believed that CON32 had provided a good service with the fullest traffic information possible and sound advice over the direction of the turn which, if it had been followed, would have placated the situation by expeditiously taking the nimble Harrier jet clear astern of the B737. The HQ STC Member agreed and reaffirmed his confidence in the RIS provided in this manner. Clearly CON32 was endeavouring to provide the Harrier pilot with the best advice she could in the circumstances and the Mil ATC Ops advisor briefed the Board on the regulations that allowed a military controller to proffer such advice under a RIS. As it was, the Harrier pilot never actually saw the B737, possibly because it was obscured in cloud - according to the B737 pilot's report. But whilst recognising that the Harrier pilot had not heeded the advice proffered by CON32 and turned about to the L, at the closest point of horizontal separation - at 2nm range - the airliner was still 900ft above the Harrier before the latter's pilot turned away to the S and the B737 turned away N thereby opening the range very quickly. After weighing all the aspects of this occurrence carefully, the Board decided that this Airprox was fundamentally a Controller perceived conflict, between traffic operating legitimately in Class G airspace, where no risk of collision had existed.

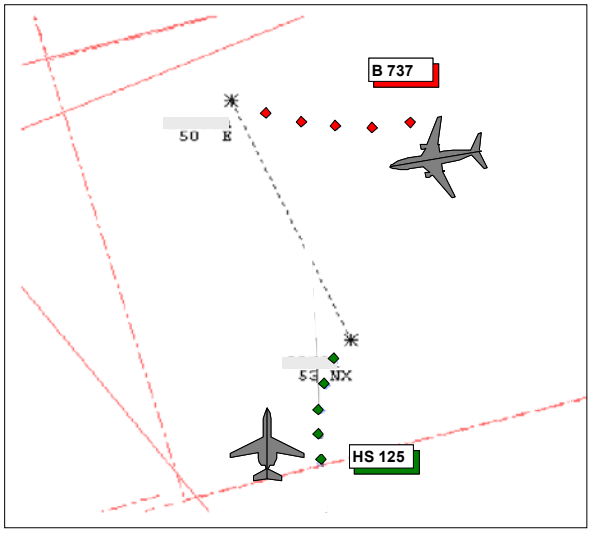
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C.

AIRPROX REPORT NO 009/05

Date/Time:	24 Jan 0741	
Position:	5146N 00035W (4nm N BNN)	
Airspace:	LTCA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B737-300	HS125-700
Operator:	CAT	HQ STC
Alt/FL:	5000ft (QNH)	about FL60
Weather	VMC CLBL	VMC CLAC
Visibility:	>10km	25km
Reported Separation:	100ft V/4nm H	0 V/~2nm H
Recorded Separation:	200ft V/2.3m H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-300 PILOT reports flying a passenger flight from Luton in contact with London Control. He was level at 5000ft and heading 257° at 275kt on a CPT3B SID inbound to HEN. The first alert they had to the incident was when ATC gave an avoiding action turn onto N. The other traffic was observed during the turn, just before they lost visual contact due to their limited field of vision, in their 8 o'clock position about 4nm away and slightly below them. They assessed the risk as being medium.

THE HS125-700 PILOT reports flying a positioning flight from Northolt. When passing about FL60 having just broken cloud in the climb heading 360° at 250kt and under Radar Control from London, he was given an avoiding action right turn onto 090°. He had a TCAS TA on the other traffic and noted that ATC were very busy but assessed the risk as low.

LTCC NW Radar Controller reports that he declined a requested release of an HS125 due to a Luton CPT departure. Several minutes later after the Luton ac was clear of the airspace, he released the HS125 from Northolt via the co-ordinator. The co-ordinator then asked for a release for a Luton departure which he refused. He saw the HS125 depart and at the same time noticed a Heathrow inbound go around. The HS125 had remained at 2000ft for longer than normal but when the pilot called climbing to 3000ft he immediately cleared him to 5000ft to get above Luton Zone. He did not realise at that time that there was a B737 about to depart Luton on a CPT departure but subsequently saw it climbing out and thought that perhaps TC BNN had released it to climb not above 4000ft. The BNN Controller then spotted the confliction as he saw the B737 climbing through 4000ft and they both took immediate avoiding action; he turned HS125 right onto heading 090°, climbed it to 6000ft and passed TI, which the pilot acknowledged, saying that he had traffic on TCAS. After the confliction was resolved he turned the HS125 back on course and continued its climb.

LTCC TC BNN Controller reports that he was controlling a B737 which was at 5000ft when he noticed the STCA activate with an HS125. Initially he gave the B737 an immediate right turn, then avoiding action right turn to 360° as separation was eroded. Prior to working the B737 he had approved its release from the co-ordinator.

LTCC N Co-ordinator reports that he took over the position at 0734 and accepted a handover. Luton Tower had called for a release of a B737 on a CPT departure which he checked with TC BNN and received an acknowledgement. This was then highlighted to TC NW DEPs. He had not noticed a release on an HS125 BUZAD departure, which conflicts with a Luton CPT departure, which had been done prior to his taking over the position. He had, however, noticed the HS125 get airborne and being transferred to TC NW DEPs after it was clear of traffic approaching Heathrow. The HS125 pilot contacted TC NW DEPs after he was already in conflict with the B737 that was released by the controller. Both TC BNN, who were working the B737, and the HS125 who was with TC NW DEPs gave avoiding action.

AIRPROX REPORT No 009/05

ATSI reports that the TC NW Sector was split into the BNN and NW Departures (DEPs) Sectors at the time of the Airprox. Both the N Coordinator and the BNN SC reported their respective workloads as moderate.

In accordance with agreed procedures, Northolt ATC telephoned the N Coordinator at 0729 to request a release for an HS125 on a BUZAD 1Y SID. Because of conflicting traffic from Luton, agreement for the release was delayed until 0733. A few minutes after this time, the Coordinator position was handed over. The on-coming Coordinator said that he could not recollect whether or not this flight had been mentioned during the handover but confirmed none the less that its fps would have been displayed, indicating that the HS125 had been released. Shortly afterwards, Luton ATC telephoned the N Coordinator to request a release for a B737 on a Compton (CPT) 3B SID. The LTCC MATS Part 2, Page NWE-9, states that: 'When the TC NW Coordinator receives a request for the release of a CPT departure from either Luton or Northolt, the TC NW Coordinator is to ask both TC NW DEPs and TC BNN to approve the release'. This procedure addresses the issue that the BUZAD 1Y and CPT 3B SID profiles conflict. The BUZAD 1Y SID routes via BNN, climbing initially to 3000ft, with further climb on passing BNN D6 to 6000ft. The CPT 3B SID routes to HENTON, passing N of BNN and climbing to 5000ft.

The Coordinator said that he had received a positive response from the BNN SC for the B737's release and the latter confirmed that he had agreed to its departure. The Coordinator explained that he had then pointed out the B737 fps to the NW DEPs SC. He recalled that the NW DEPs SC had looked at the appropriate fps but he does not recollect receiving any verbal communication in response. He added that he could not recall the exact circumstances as to whether or not he had received any physical acknowledgement. He thought that, possibly, he had assumed the lack of response as agreement for release. The NW DEPs SC later reported that he had not been aware of the impending Luton departure. The Coordinator stated that the fps display would have shown the potential confliction. He commented that the fps of the subject ac would not have been positioned in the same bay as that of the HS125 which would have been displayed to the right, under the HEMEL designator with the B737 fps to the left, under COWLY.

The Coordinator reported that he had noticed the HS125 departing from Northolt because the Heathrow go-around alarm had sounded, attracting his attention to the radar display. The HS125 was just airborne from Northolt but he did not recognise, at the time, its departure routeing and the potential confliction with the B737. As a result of the Heathrow go-around climbing to 3000ft, Northolt initially restricted the HS125's altitude to 2000ft. Although Northolt's RW is generally aligned with Heathrow, which was operating Westerly on this occasion, due to a tail wind on RW25 at Northolt the HS125 departed from RW07. Under a local arrangement Northolt APR vectors such flights to the N of Northolt Airfield before regaining the SID routeing to BNN and transferring the ac to TC NW DEPs. As a result of the Heathrow go-round, transfer was somewhat delayed. Northolt APR had to wait until the Heathrow traffic had vacated 3000ft, on the climb to 4000ft, before he was able to instruct the HS125 to climb to the vacated altitude and transfer it to TC.

The HS125 pilot established communication with the NW DEPs SC at 0738, reporting passing 2000ft climbing to 3000ft. The SC instructed the pilot to climb to 5000ft. Shortly afterwards the B737 pilot made his initial call on the BNN frequency, reporting passing 2500ft and climbing to 5000ft. He was instructed to squawk ident and given no speed restriction. Both controllers then turned their attention to other traffic in their respective sectors, unaware of the potential confliction between the subject ac.

Activation of the STCA alerted both the NW DEPs and the BNN SC to the confliction between the respective ac. The BNN SC commented that he had not noticed the presence of the HS125 previously because its SSR label had been overlapping with traffic holding at BNN. However, as the STCA activated the HS125's SSR label was just appearing clear of this holding ac. He immediately instructed the B737 pilot to turn right heading 360°. Having received acknowledgement, he then reiterated the instruction, adding the term 'avoiding action' and issued information about traffic at 3nm; the pilot reported visual with the traffic passing behind. The BNN SC said that as he went to warn his colleague, the NW DEPs SC was already in the process of issuing avoiding action to the HS125 pilot. The NW DEPs SC stated that, although he was not aware that B737 had been released for departure he had subsequently observed it on his radar display and made the assumption that it might have been released not above 4000ft. It was only when he observed it passing 4000ft that he realised the situation. At 0740:20, the NW DEPs SC instructed the HS125 pilot to expedite his climb to 6000ft and 10sec later he was instructed to turn right onto heading 090°. Information was then passed on traffic 3nm ahead at the same level but the pilot responded that he had it on TCAS.

The radar recordings of the incident reveal that STCA activated, with a low severity alert, at 0740:20 when the subject ac were on conflicting tracks 5.1nm apart. The HS125 was passing 4800ft and the B737 4300ft. As the STCA changed to high severity, 10sec later, at the time avoiding action instructions were being issued, the ac had closed to 4.3nm, with vertical separation of 400ft. Minimum separation occurred at 0740:58 when the horizontal separation was 2.3nm and the B737 was maintaining 5000ft and the HS125 was climbing through 5200ft and both ac were in their respective right turns.

An LTCC TOI (142/04), with an effective date of 1 Jan 2005, titled 'Coordination Readbacks and Recording' was promulgated. To overcome ambiguous/miss-heard direct coordination, which was assessed as being a causal factor in recent incidents, it set out procedures to be followed on a trial basis, part of which follows: 'To ensure both parties are aware of the details of any 'face to face' discussion, the TC controllers concerned should ensure that any coordination is carried out in the following manner: -

A formal request for Coordination.

A readback of the active part of the message.

A recording of the appropriate coordination information on the flight progress strip of both controllers involved.

A formal end to the process.'

Clearly, this procedure was not followed on this occasion.

Since this incident, a 3-month trial, effective 1 Feb 2005, has commenced for 'free-flow' of Luton CPT departures from RW26 (TOI 08/05 refers). 'When Luton are operating on RW26, CPT departures are free-flow and take-off clearance will be issued by the Luton AIR controller without reference to TC NW. If TC NW have a request from Northolt for a BUZAD or CPT departure, before they are able to release these flights they must instruct Luton AIR to suspend the Free-Flow agreement.' If this trial had been taking place on the date of the incident it is probable that the Airprox would not have occurred. In accordance with the new procedures, the previous Coordinator would have suspended Luton's free-flow as a result of Northolt's request for a BUZAD departure. Subsequently, any request from Luton, in this period, for a CPT departure should have alerted the oncoming Coordinator to the Northolt BUZAD departure and, thereby, the potential confliction.

The Airprox occurred because the North Coordinator agreed a release for the B737 from Luton on a CPT 3B SID, without taking into account the HS125, already released from Northolt, on a conflicting BUZAD 1Y SID. It has not been possible to determine whether or not the HS125 was mentioned during the handover of the Coordinator position. Nevertheless, the oncoming Coordinator should have checked the fps display, which would have shown that the HS125 had been released, or received a positive agreement to the coordination from the NW DEPs SC, rather than assuming his acceptance, before agreeing to the B737's release.

HQ STC comments that a busy controller missed conflicting departures. However, the technology alerted both the aircrew and the controllers to the conflict.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that all the ATC aspects of this occurrence had been covered in detail in the comprehensive ATSI report; specialists echoed, in particular, their comments regarding the checking of fps displays. Members also noted that the incident had occurred in a very busy and complex traffic situation but experienced controllers opined that in such circumstances it is even more important to be vigilant.

The Board was pleased to note the follow-up actions taken by LTCC and outlined in the ATSI report, as a result of this and previous Airprox, to reduce the risk of such incidents recurring.

AIRPROX REPORT No 009/05

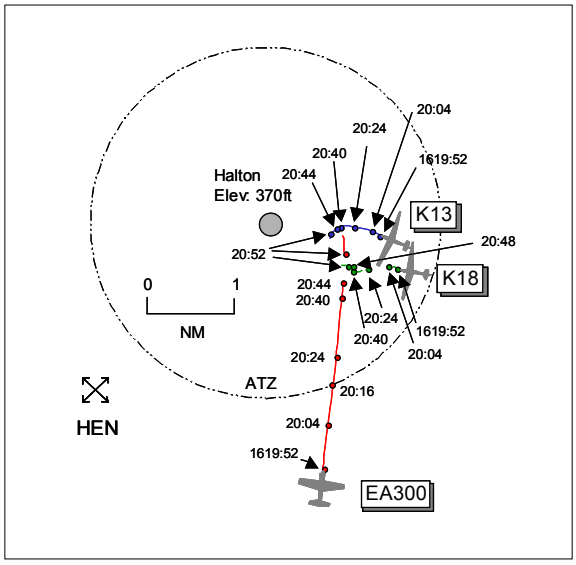
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LATCC N Coordinator released the B737 into conflict with the HS125.

Degree of Risk: C.

AIRPROX REPORT NO 010/05

Date/Time:	26 Jan 1621	
Position:	5147N 00043W (1nm SE Halton A/D - elev 370ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	K18 Glider	Extra EA300
Operator:	Civ Club	Civ Pte
Alt/FL:	1300ft (QFE 1019mb)	
Weather	VMC CLBC	
Visibility:	15km	
Reported Separation:	150ft H	
Recorded Separation:	<0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K18 GLIDER PILOT reports heading 300° at 1300ft QFE 1019mb and 45kt flying solo in weak lift over the N facing ridge to the E of Halton and in communication with Halton on 130·42Mhz. The visibility was 15km across sun, the white/orange glider flying 5000ft below cloud in VMC. About 0·5nm E of Halton, well within the ATZ and after he had just scanned L, he first saw a single engine low wing aerobatic monoplane as it crossed L to R through his 12 o'clock range 150ft at the same level. It was light coloured with dark horizontal stripes and was travelling very fast in a straight and level attitude. He thought the other ac had come from aft of his L wing tip and it had appeared too late to take any avoiding action. He opined that had the ac met 5sec later a collision would have been highly likely.

UKAB Note (1): The incident was witnessed by another glider pilot flying a K13 on the same ridge at 1100ft QFE who saw a tapered wing ac pass 50-60yd to the E of him on a N'ly track about 100-150ft higher.

AIS MIL reports that the EA300 pilot was traced and contacted one week post incident and he stated that he had been flying the reported ac but initially declined to complete a CA1094 as he did not consider it to be an Airprox. However he later agreed to complete an Airprox report form.

UKAB Note (2): Despite numerous follow-up requests from the UKAB Secretariat, the EA300 pilot eventually declined to submit a report.

UKAB Note (3): The UK AIP at ENR 2-2-2-2 promulgates Halton as a government aerodrome with an ATZ as a circle radius 2nm, centred on RW02/20, from the surface to 2000ft above the aerodrome elevation of 370ft and active daily from 0700 – 1900 or SS (1hr earlier in Summer). The A/G station – Halton RADIO – is promulgated as operating on 130·425MHz within the above hours.

UKAB Note (4): The UK AIP at ENR 5-5-1-2 promulgates Halton aerodrome as a Glider Launching Site for winch and aero tow launches where cables and tug ac may be encountered to 2000ft agl, during daylight hours; aerodrome elev 370ft amsl.

UKAB Note (5): The UK AIP at ENR 1-4-10 para 2.7.2, promulgates that for flight within ATZs situated in Class G airspace: *"When flying within an ATZ the requirements of Rule 39…must be complied with".*

In order to comply with Rule 39 during the notified hours of operation the procedures to be adopted by pilots are stipulated at para 2.7.2.3:

Before taking off or landing at an aerodrome with an ATZ or transiting through the associated airspace, obtain...information from the A/G radio station to enable the flight to be conducted with safety.

Radio equipped ac must maintain a continuous watch on the appropriate radio frequency and advise the…A/G radio station of their position and height on entering the zone and immediately prior to leaving it.

Furthermore, para 2.7.2.4 stipulates that:

Failure to establish 2-way radio communication with the…A/G station during their notified hours of operation must not be taken as an indication that the ATZ is inactive. In that event…pilots should remain clear of the ATZ.

UKAB Note (6): Analysis of the Heathrow radar recording at 1619:52 shows a primary only return, believed to be the EA300, 2·9nm S of Halton tracking 010° with 2 other primary contacts ahead, believed to be the K18 and K13 gliders, both slow moving on generally W'ly tracks. The nearest contact, believed to be the K18, is in its 1 o'clock range 2·4nm whilst the K13 is 1230 position range 2·7nm. The EA300 continues to converge with the gliders and crosses the ATZ boundary at 1620:16. Meanwhile the K18 return fades, last paint at 1620:04 before reappearing 20sec later in the EA300's 1230 range 1nm, at which time the K13 is crossing ahead of it at a range of 1·5nm. As the EA300 reaches a position 1·2nm SE of Halton at 1620:40, the K18 is still in its 1230 position range 0·5nm and the K13 has commenced a L turn to the SW. On the next sweep the K18 fades before reappearing at 1620:48 1·1nm ESE of Halton, just to the N of its previous radar position, tracking WNW: however the EA300 is not seen. It is estimated that CPA occurs at that time as the next sweep at 1620:52 shows the EA300 again, now 0·15nm NW of the K18 , having passed the glider, but taking into account the subject ac's positions and speeds, it is estimated that the EA300 passed <0·1nm to the W of the K18. Thereafter the EA300 tracks N'ly and is seen to pass 0·15nm to the E of the K18 on the next sweep.

HQ PTC comments that the JSAT(G), although a Service-sponsored organisation, operates under the aegis of the CAA and the BGA, but from an airfield on MOD land which is within an ATZ. They therefore have a continuing concern over the number of Airprox that occur both within and adjacent to the Halton ATZ. Although none of the parties to this incident were squawking Mode C, the corroborative evidence of the 2 glider pilots points to there having been an unauthorised penetration of the ATZ by the Extra pilot.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the airfield operating authority.

Members were saddened that the EA300 pilot had decided not to cooperate with the investigation. It is to be hoped that a valuable safety lesson has not been lost as a result.

The Board was becoming very concerned at the high number of Airprox resulting from unauthorised penetrations of the Halton ATZ. Members had previously tried to determine why this was but apart from the local airspace constraints no obvious reason could be found. Halton is now a very busy GA and gliding airfield and, regardless of the command and control arrangements of the units located there, HQ PTC as the airfield operator was concerned that if this high number of infringements continued, there would be a serious incident in the near future. In order to try to determine the magnitude of the problem, HQ PTC has started to record statistics of Halton ATZ infringements. The GA Member reminded the Board that a previous UKAB GA booklet had already highlighted 'the Halton problem'.

Notwithstanding that this incident had not occurred with a glider on a launch, the BGA Advisor informed Members that there are frequent cable launches up to 2000ft, numerous aero tows going higher and self launches, 7 days per week. Although an ATZ should afford some degree of protection, at Halton and many other locations this is not the case and glider pilots must expect even some relatively high-speed ac (reducing detection time available): pilots must therefore maintain a high look out regime.

Although modern GPS-based navigation equipment was unquestionably very accurate, specialist Members suggested that it might engender a false sense of security, encourage point-to-point straight-line navigation and foster inadequate pre-flight planning and route study.

This had been a very close encounter with the glider pilot's estimated miss-distance being borne out by the radar recording. In the absence of any other information, it must be assumed that the EA300 pilot did not see the glider as, had he done so, he would most likely have given it a wider berth. The glider pilot did not see the EA300 until it crossed his nose about 150ft away at the same height when it had been too late to take any effective avoiding action. Since neither pilot appears to have seen the opposing ac which had been very close and co-altitude, the Board determined that there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

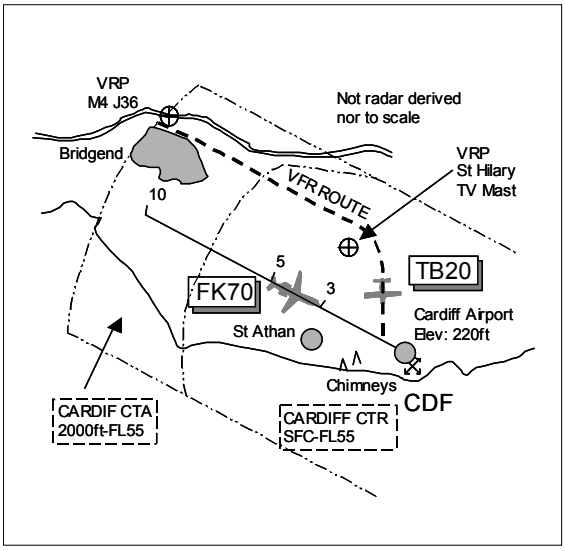
Cause: The EA300 pilot entered the Halton ATZ without complying with the requirements of Rule 39 and flew into conflict with the K18.

Degree of Risk: A.

AIRPROX REPORT No 011/05

AIRPROX REPORT NO 011/05

Date/Time:	23 Jan 1408 (Sunday)	
Position:	5154N 00325W (3nm FIN APP RW12 Cardiff - elev 220ft)	
Airspace:	CTR/ATZ	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	FK70	TB20GT
Operator:	CAT	Civ Pte
Alt/FL:	1000ft↓ (Rad Alt)	1500ft↓ (QNH 1032mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	20km	NR
Reported Separation:	nil V/0·25nm H	not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK70 PILOT reports on final RW12 at Cardiff flying an NDB approach and in receipt of an ATS from Cardiff TWR. Descending through 1000ft Rad Alt with the ac's attitude 3° pitch down and ROD 600fpm at 123kt fully configured for landing, TCAS gave a TA alert on traffic. This was sighted as a TB20 turning from L base onto final ahead of them, before an RA *'climb, climb now'* warning was annunciated. An avoiding action L turn away from the ac was initiated by the FO, PF, followed by a 'go-around' because they were unsure if the RA would have provided enough separation. After the 'go-around' an uneventful ILS was made. They estimated the separation to be 0·25nm as the other ac turned in ahead at the same level.

THE TB20 PILOT reports inbound to Cardiff for RW12 at 120kt and in communication with Cardiff TOWER on 125·0MHz. Previously he had been working Swansea and, on passing Neath, he transferred to Cardiff Radar on 126·62MHz, after obtaining 'Information Echo' from the Cardiff ATIS, and requested to follow the published VFR approach via St Hilary VRP. This was approved and he followed the M4 Motorway towards the VRP at 2500ft QNH 1025mb but, owing to moderate turbulence, he requested climb to 3000ft. The controller approved this but told him to remain below 1500ft when entering the Cardiff CTA. By now he was visual with the St Hilary TV mast and tracking to the N of it, ATC warned him of an ac departing via St Hilary to the W. As he was unable to see the mentioned ac he asked the controller for further TI and was told it was in his 11 o'clock position at 2500ft; at this time he was level at 1500ft. Approaching the TV mast he was told to contact Cardiff Tower and he set the ac up for a R turn around the mast for a direct track towards the chimneys on the coast. Whilst lowering the u/c he called on frequency but he believed his first transmission was 'stepped on' so he called again. He was setting the ac up for its landing configuration, carrying out the checks and lowering the first and second stages of flaps. During the base leg heading 180°, he heard 2 transmissions from ATC to other flights, one to an incoming airliner, the subject reporting FK70, whose crew reported carrying out an NDB approach to RW12 and the second was to a helicopter stationary on the ground. The clearance given to the helicopter pilot was incorrectly read back which necessitated a further transmission to correct the wrong QNH stated. He was now in the descent with the RW12 threshold clearly in view, and he informed the Tower controller that he was turning finals but before doing so he looked L and R and was not aware of any traffic within the cct. The controller then told him to carry out a RH orbit but because of his position, he asked the controller to read back and to confirm that the instruction was for his ac. The controller then said to disregard the orbit and told the FK70 crew to go-around and then told him to continue his approach. He landed long which he believed was owing to the surface wind being NW'ly and could have been favouring RW30. At no time did he see, or was aware of, another ac in the vicinity whilst turning onto final approach.

THE CARDIFF ADC reports the TB20 pilot reported on frequency inbound VFR approximately 10nm NW of the airfield and was instructed to join L base for RW12. No TI was passed on the FK70 nor any instruction to report on L base. The FK70 crew called at 3nm and, following the issuance of a surface wind check, was cleared to land.

The FK70 flight had previously been 'warned in' by the Radar 1 controller, when the ac passed overhead the CDF, advising that the flight would be carrying out an NDB/DME approach to RW12. The gliding operations at St Athan were subsequently warned of the FK70's presence when the ac was on 9nm final. At some stage he looked towards the RW12 final approach and saw a small ac flying R to L above the FK70 and, not being able to ascertain whether this ac was in front of or behind the FK70, he looked at the ATM. Both ac were displayed in close proximity and it was not possible to determine their relative positions. By this stage the FK70 had deviated L of track and, not knowing the flight's intentions, he instructed the crew to 'go-around'. After ascertaining that the ac was above 2 other ac, which were downwind LH in the visual cct, he told Radar that the FK70 was going around and transferred the flight to the radar frequency.

The Cardiff METAR shows EGFF 1350Z 35008KT 9999 FEW020 05/M01 Q1032=

ATSI reports that the Cardiff ADC described his workload as light at the time of the Airprox, adding that he had taken over the position about 10min previously. He said that, on arrival, he had been dismayed to see that the Meteorological Information Monitor, sited in the desk in front of the ADC's position, was still unserviceable, having been out of service for some 2 weeks. He explained that a temporary monitor had been installed, but that had been positioned at R angles to the controller's position, consequently making it difficult to observe easily. He commented that he felt that this continuing unserviceability had detrimentally affected his state of mind, leading to a subsequent reduction in concentration on the ATC task. Additionally, he mentioned that, having taken over, he had instigated a conversation with another controller concerning the serviceability state of headsets. He believed that both of these factors had allowed him to be distracted from his ADC function and this distraction had been a contributory factor to the incident.

The TB20 pilot, inbound to Cardiff on a VFR flight from Haverfordwest, had established communication with the LARS Controller at 1355. It was allocated a squawk of 3642, provided with a FIS, and routed inbound via a 'St Hilary' arrival. This is an inbound visual route, published in the UK AIP, with an entry point at Bridgend. The route is stated as *'Enter CAS via Bridgend and route north of the St Hilary TV mast* (situated north west of the airport), *then as directed by Cardiff ATC'*. The maximum altitude is 1500ft. At 1401, the Cardiff LARS Controller passed details of the flight to the ADC, stating an ETA of 1410. Subsequently, at 1404, the TB20 was transferred to the Tower frequency in accordance with local procedures (MATS Part 2, Page APR 1.2). *'To reduce the amount of co-ordination between the Approach Radar ATCO and the Aerodrome ATCO, VFR inbound aircraft are to be transferred to the Aerodrome ATCO without prior co-ordination providing that the aircraft are being routed via a published VFR route and the aircraft are displaying an assigned SSR code. To facilitate the passing of traffic information and for planning purposes, the aircraft are to be transferred to the Tower as early as possible'*.

Meanwhile, the FK70 crew had contacted the Cardiff APR, having already requested, and been approved for, a procedural NDB approach to RW12. The ADC had been advised of the type of approach and, at 1358, he was informed that the FK70 was *"about to coast out at Weston"*. This information was updated to the ADC, at 1401, with a Beacon Outbound report.

The TB20 pilot made his initial call to Cardiff Tower at 1404:15. The ADC initially issued a clearance to join RH downwind but realising his error, this was immediately changed to join L base for RW12. The pilot was passed the QFE and replied *"joining left base now for one two"* and read back the pressure value correctly. The ADC recollected that he had observed the TB20 on the ATM at the time, the ac being about 10nm NW of the airport, having not yet reached the St Hilary VRP.

The FK70 crew established communication with the ADC at 1407, over 1min after it had been transferred by the APR. Just prior to this call, the ADC had been occupied with issuing an outbound clearance to a helicopter, to the extent that it was not possible for the pilot of the FK70 to transmit on the frequency. He reported on the NDB DME approach to RW12 and was cleared to land. The ADC commented that he could see the ac, which was on a 3nm final at the time. Although the TB20, now on base leg, would also have been visible from the VCR, he did not look for its position, as, he admitted, he had forgotten its presence. He agreed that, not only would both ac have been visible from the VCR but also they would have been displayed on the ATM. Additionally, fpss for both ac would have been positioned on the fps display. He reasoned that he had overlooked the presence of the TB20 because of the distraction, previously mentioned, concerning the meteorological equipment and headset unservicabilities.

The ADC said that, shortly afterwards, he looked towards the final approach of RW 12 and spotted a light ac, crossing from R to L, close to the FK70. His initial belief was that the TB20 was behind the FK70, although it was

not possible to detect their relative positions on the ATM due to their close proximity. Accordingly, he instructed the pilot of the TB20 to *"orbit right in your present position"*. However, he then observed that the FK70 was L of track and the ATM was now showing that the TB20 was just in front of the other ac. Consequently, when the pilot of the TB20 queried if he should continue on final, the controller responded *"confirm"* and then he instructed the FK70 crew to go around. The ADC estimated that, at their closest, the subject ac were 0·25nm apart at the same altitude.

MATS Part 1, Section 2, Chapter 1, Page 1, states the responsibilities of an ADC Controller. Of relevance to this incident are: *'Aerodrome control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: a) aircraft flying in, and in the vicinity of, the aerodrome traffic zone; b) aircraft taking off and landing'. Additionally, MATS Part 1, Chapter 2, Page 1, states that, in Class D airspace, the minimum services to be provided by the ATC unit are; 'separate IFR flights from other IFR flights b) pass traffic information to IFR flights and give traffic avoidance advice if requested c) pass traffic information to VFR flights on IFR flights and other VFR flights'*. Clearly, on this occasion, no TI was passed to either pilot of the subject ac. The pilot of the TB20 had not been advised that he would be following the FK70 nor issued with appropriate instructions for him to be able to integrate safely into the traffic pattern. A request to report on base leg would have assisted the ADC in establishing the position of the TB20, subsequent to its initial call.

From the pilots' reports filed after the event, it would appear that this Airprox was resolved by the activation of TCAS. The pilot of the FK70 had only sighted the TB20 after receiving a TCAS RA, as it turned onto final approach ahead of their ac. The pilot of the TB20 did not see the FK70 on approach as he turned final. The MATS Part 1, Section 1, Chapter 5, Page 7, states that: *'The conspicuity code, 7000, together with Mode C should be displayed by all suitably equipped aircraft unless: a) they have been assigned a discrete code; b) they are flying in an aerodrome traffic pattern below 3000ft; or c) they are transponding on one of the special purpose codes or one of the other specific conspicuity codes assigned in accordance with the UK SSR Code Allotment Plan'*. Fortuitously, because the pilot of the TB20 was squawking with Mode C, having been allocated a discrete code by ATC, it allowed the pilot of the FK70 to receive a TCAS alert, leading to a visual acquisition of the other ac.

UKAB Note (1): The Airprox occurred below recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted the full account of the circumstances of the incident provided by the TB20 pilot even though he did not see the other ac. Since the incident had taken place below radar cover, this had been a significant factor in facilitating a thorough investigation.

ATC specialist Members were disappointed that in a light workload situation the Cardiff ADC had apparently allowed several minor irritations to assume an importance such that he had not been concentrating fully on his primary function of controlling the flow of ac into and in the circuit. Had he been focussed fully on his task the conflict between the 2 ac on the final approach would most likely not have occurred.

It was fortunate that the TB20 pilot had not selected his IFF to standby as the FK70's TCAS RA provided the first indication of the confliction and by following it correctly the FK70 pilot resolved the situation. This being the case and that the he became visual with the TB20, there was never any actual risk that the ac would have collided but there was little doubt the situation had developed beyond the point which safety had been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

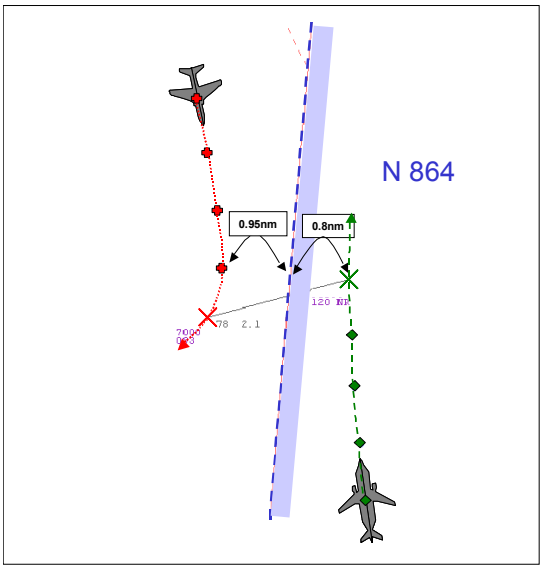
Cause: The Cardiff ADC allowed himself to be distracted by non-essential factors and did not provide instructions to the TB20 pilot to allow him to safely integrate into the circuit.

Degree of Risk: B.

AIRPROX REPORT NO 012/05

Date/Time: 10 Jan 0956
Position: 5303N 00327W (15nm SW Chester)
Airspace: LONDON FIR (Class: G)

	Reporting Ac	*Reported Ac*
Type:	A300ST	Hawk
Operator:	CAT	HQ PTC
Alt/FL:	FL121	FL90
Weather	IMC	VMC
Visibility:	NR	>10km
Reported Separation:	5000ft V/3nm H	Not seen
Recorded Separation:	2700ft V/1.8nm H (estimated between sweeps)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A300-600ST PILOT reports flying a non-scheduled IFR freight flight from Toulouse to Hawarden with strobes switched on, squawking as directed with Mode C, and in receipt of an unspecified radar service from London Control [he thought]. While heading 005° at 12000ft in the descent and at 270kt, another ac passed through their nose from right to left generating a TCAS RA which he reacted to. He did not assess the risk.

THE HAWK PILOT reports flying a VFR instructional sortie with a student in a black Hawk ac with HISLs switched on, squawking 7000 with Mode C, but not in contact with any unit. They had pulled up from low-level, VMC in the climb, to conduct GH in the middle air at the E end of Class G airspace. As they were closer than planned to the CAS boundary, they were turning away but did not infringe it. At the time of the incident they were climbing through FL90 at 300kt and did not see any other ac.

THE HAWK STATION comments that this incident occurred in good weather in the open FIR adjacent to CAS with the Hawk in clear airspace and entitled to operate there. If the reporting ac were less than 5nm from the boundary of CAS then any ac just outside would trigger a TCAS RA. Had the Hawk also been fitted with TCAS then the pilot would also have been aware of the other ac. All staff and students have been briefed on the occurrence.

ATSI reports that as a result of the late receipt of the Airprox notification and some inaccuracies in the pilot's report, it took some time to establish the ATC controlling authority of the A300-600ST at the time. Consequently, by the time the controller was identified it was nearly six weeks after the event. The controller concerned said that he could not recall the occurrence and would, therefore, not be able to add anything to the investigation.

The RTF recording reveals that the A300-600ST established communication with the MACC W Sector at 0951, reporting at FL200. This was in accordance with the Standing Agreement between LACC S5 and MACC. Ac inbound to Hawarden on N864 are to be level FL200 20nm before MONTY. LACC S5 shall position traffic to the W of the N864 centreline.

Descent to FL70 was given in stages, the flight being positioned close to, but inside, the W edge of the airway. It is noticeable on the radar recording that there was slower traffic, inbound to Warton, positioned to the E of the A300-600ST at FL100. At 0956, just after the A300-600ST had been instructed to turn right heading 005°, presumably to keep it within CAS, the pilot reported a TA. The controller replied, "*I've spotted that one just outside controlled airspace. I think it's a military coming a bit too close to the airway*". At the time the two ac were approximately 6nm apart, separated by about 6000ft. The radar recordings show the two flights passing each other at 0956·32, 1.8nm apart. The A300-600ST was descending through FL121 and the military traffic was climbing through FL94, with the former tracking just inside the airway and the latter just outside.

MATS Part 1, Section 1, Chapter 5, Page 11 applies. 'Although ac operating in controlled airspace are deemed to be separated from unknown ac flying in adjoining uncontrolled airspace, the radar controller should aim to keep the ac under his control at least two miles within the boundary where possible. Unpredictable manoeuvres by unknown ac can easily erode separation.' On this occasion the radar recording reveals the presence of potentially conflicting traffic at FL100, on a parallel track, to the E of the A300-600ST. The controller had to descend the A300-600ST through this traffic to position it for Hawarden, resulting in it having to track towards the Western side of the airway. In the event, the controller had to instruct the A300-600ST crew to expedite descent through FL90 to accomplish the level change, preparatory to handover to Hawarden.

HQ PTC concurs with the Hawk station comments.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, a radar video recording, and a report from the Hawk operating authority

Members noted that the guidance in MATS Part 1 is designed to prevent incidents such as this but agreed that, on occasion, it may be difficult to implement. In addition, although quite legal, pilots of training and fighter ac should be aware of the consequences of operating close to the boundaries of CAS.

The Board was informed that all crews at RAF Valley have been briefed on this incident and that HQ PTC would make other Stations aware of it.

Members determined that there had not been any compromise to the safety of either ac in this case.

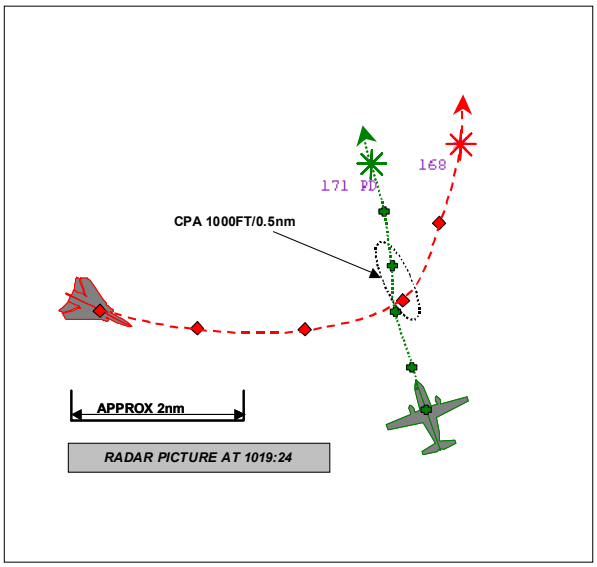
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: TCAS sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 013/05

Date/Time:	1 Feb 1019	
Position:	5548N 00140W (10nm E Berwick)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Jetstream 41	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL165	13000-17000ft (RPS 1029 mb)
Weather	VMC CLAC	VMC CLAC
Visibility:	>50km	>10km
Reported Separation:	TCAS <100ft V/0H	0 V /.7nm H (after CPA)
Recorded Separation:	1000ft V/ 0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 41 PILOT reports flying a scheduled flight from Teesside to Aberdeen squawking as directed with Mode C, in receipt of a RIS from ScOACC [TAY Sector]. While level at FL165 and heading 352° at 280kt, he received a TA showing an ac less than ½nm astern and climbing fast. Five seconds later a RA climb at 2000fpm was given which he followed. 'Clear of conflict' was given as the ac passed FL171 and they levelled off. At that point the other ac, identified as a Tornado, positioned itself alongside them to starboard at 100-200 yards, waggled its wings then rolled off. Scottish Radar was advised of the Jetstream's actions and had not been aware of the other traffic until the Jetstream pilot reported it. He assessed the risk of collision as being high.

THE TORNADO PILOT reports flying a grey ac with lights and HISLS switched on, squawking 7000 with Mode C, and was part of 2-ship operating VFR autonomously in OTA E, carrying out Targets of Opportunity (TOO) intercepts as part of a Sqn exercise. An ac, later identified as a JS41, was picked up on the ac AI radar at 1016 heading 340° at 16000ft. The position of the JS41 was 095° 25nm from the bull's-eye and their ac was 051° 20nm from the same point at 13000ft heading S. This put the JS41 on a bearing of 150° and 25nm away from the Tornado. A visual identification (VID), stern converting intercept was flown by the Tornado on the JS41. The Tornado became visual with the JS41 at 7nm and was able to make a positive identification at 0.7nm. In accordance with TI 4/84, Chapter 4, Paragraph 5 the intercept was broken off and the Tornado passed 0.7nm (4500ft) behind the JS41 heading 070°. They then climbed to 17000ft and overtook the JS41 on the right 1nm abeam (IAW JSP 550 R307.100.4 and R307.115.1). Whilst overtaking they performed an exaggerated quote *wing–waggle* unquote and then turned further right. [See HQ STC comments below re regulations].

THE ScOACC TAY SECTOR CONTROLLER reports that the JS41 was in the vicinity of position ALASO northbound. Traffic was passed to him regarding a Newcastle inbound also receiving a RIS from the same controller. There were a number of military tracks in potential conflict to both flights 2 of which were working Scottish Mil and co-ordination was effected with them. He called traffic on manoeuvring military unknown traffic to the JS41 initially, then again subsequently, when one of the targets was seen to break off from the main group and head towards the JS41 at FL130. At this point he was also in the process of transferring the other ac to Newcastle. While doing this the JS41 reported a TCAS climb and he saw a 7000 squawk to have merged with the JS41 with garbling Mode C. The JS41 then reported that he wished to file an Airprox. Some minutes before this his assistant had informed him that Boulmer had called her on an outside extension at a position remote from his desk attempting to effect co-ordination against the Newcastle inbound.

UKAB Note (1): The recording of the Great Dun Fell Radar shows the event as taking place 50nm due N of NEW at 1019:10. The F3 squawking 7000 first appears [coming on to the 25nm scale recording from the N heading 170°] in the JS41's 11 o'clock initially level at F127, 2 min before the CPA. It then climbs and turns left slowly,

passing through the latter's 6 o'clock at a distance of 0·4nm and 1000ft below at 1019:10. The Tornado then crosses behind the JS41 and climbs to 300ft below its alt and on a similar heading to it, 1nm on its right side. The Newcastle inbound is seen tracking about 190° about 20nm to the S of the Airprox position.

ATSI reports that the Jetstream established contact with the Scottish Tay Controller at 1015, when the ac was some 30nm N of Newcastle, maintaining FL165 northbound towards St Abbs and then Aberdeen. The pilot requested a RIS and the controller confirmed that he would provide the service. There was traffic inbound to Newcastle, working the Tay SC, over the North Sea and descending to FL175 on top of the Jetstream. TI was passed to the Jetstream crew about this traffic as well as to the crew of the flight inbound to Newcastle.

Whilst this was taking place, a 7000 squawk with an unverified Mode C readout of FL127 can be seen Southbound in the 11 o'clock position of the Jetstream at a range of 27nm. Shortly afterwards, at 1017, the crew of the Jetstream reported the Newcastle inbound visible on their TCAS. By now, the previously mentioned 7000 squawk had made a right turn onto a track of 180º, indicating FL126. If both the Jetstream and the 7000 squawk had continued on their tracks then the 7000 traffic would have passed 14nm to the W of the Jetstream.

The 7000 squawk then turned left, to track approximately 130º, and at 1017:40, was in the 11 o'clock position of the Jetstream at a range of 17nm. The Jetstream crew reported visual with the Newcastle inbound at 1018, which coincided with the 7000 squawk once more turning right onto a S track. The Tay controller then turned his attention to the traffic operating just to the NW of the Jetstream and passed traffic information on three contacts manoeuvring in the 10–11 o'clock position of the Jetstream, at levels between FL125 and FL200 at a range of 10nm. One of these was the subject 7000 squawk that then made a left turn from a southerly heading onto a track directly towards the Jetstream that was only 6.2nm away. The controller informed the crew that the traffic was turning towards them and that the Mode C indicated FL128. The pilot of the Jetstream reported that he had a contact on TCAS in his "*…ten thirty at three and a half thousand above*".

The controller then returned to the Newcastle inbound and passed the crew their acceptance level at the Newcastle VOR. This was acknowledged and the controller advised the crew of further traffic at FL185, 20nm to the S. Whilst this exchange took place, the 7000 squawk continued to close on the Jetstream and also climbed towards it. At 1019:00, the pilot of the Jetstream reported a TCAS climb.

Analysis of the Great Dun Fell radar shows that at 1019:01, the 7000 squawk was in the 9 o'clock position of the Jetstream at a range of 0.8nm and 1200ft below, before passing 0.4nm behind the JS41, 1000ft beneath it. The 7000 squawk then turns N and is seen, at 1019:26, to be in the 3 o'clock position of the Jetstream at a range of 1nm and 300ft below, before clearing away to the E.

The controller placed the Jetstream under a RIS and passed TI as required on the military tracks. Due to the random and unpredictable flight profile of the subject 7000 squawk, it was not until very late in the proceedings that the ac turned directly towards the Jetstream and climbed towards it thus becoming a confliction. The controller was engaged in dealing with other traffic and so, by passing TI, complied fully with the requirements of a RIS as detailed in MATS Part 1.

HQ STC comments that the TOO intercept was not conducted iaw the version of TI4/84 extant at the time of the intercept. The TI clearly stated *"Only military fast jet aircraft flying VFR below FL245 may act as, and be intercepted as, targets of opportunity"*; the JS41 was clearly outside this classification. Furthermore, a letter written from HQ 1 Group to all Tornado F3 Sqn Cdrs on 15 May 03 stated *"If the target cannot be identified as a valid TOO by 5nms, crews are to ensure that a minimum of 3000ft vertical separation is maintained".* Therefore, the Tornado crew were misguided in their understanding of the extant rules and guidance. The guidance was issued as an interim measure until TI4/84 could be re-written; the amended version was subsequently released on 28 Feb 05, some 27 days after this Airprox occurred. This re-issue now *states "If the TOO target cannot be positively identified as a military fast jet aircraft by 3nm, it should be presumed to be a civil aircraft. In this instance crews are to break off the attack and ensure that a minimum of 1000ft vertical and 2nm horizontal separation is maintained".* HQ 1 Group undertook to remind all of their Tornado F3 crews of the need to adhere strictly to the TOO rules immediately after the Airprox was reported. HQ STC is therefore content that sufficient action has been taken to prevent a recurrence.

Moving on to the actual risk of collision in this particular Airprox. Notwithstanding that the crews unintentionally broke their rules, the intercept profile that they used is one that is practised on a very regular basis both in the

simulator, when joining tankers for air-air refuelling and during other training sorties. The crew were always aware of the JS41 either by radar and/or then visually and they knew that they had the collision avoidance responsibility. With this in mind it is HQ STC's opinion that the collision risk in this Airprox was minimal.

Finally, it is pleasing to see that the Tornado crew gave a 'wing rock' to the JS41 in an attempt to re-assure the crew that the Tornado pilot had seen them. This initiative was developed, in conjunction with the JS41's operator, to communicate to the civil pilots that the fast jet had seen their ac and that there was little chance of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board viewed this as a most serious occurrence, similar to one 3 years ago which had resulted in the policy clarification letter on VIDs being issued by HQ 1 Group. It is the continuing view of the Board that fighters must not use non-consenting civil ac as targets of opportunity.

That this VID had occurred had been as a result of a straightforward error by the Tornado crew and their supervisors in not adhering to promulgated HQ 1 Group policy. Members were reassured by the follow-up action taken by HQ STC and that the updated Training Instruction had finally been issued. In the event there had never been any risk that the ac would have collided as the Tornado crew were in visual (or, initially, radar) contact with the JS41 throughout the encounter. Their action however had most certainly caused the JS41 crew concern.

Members asked DASC to ensure again that fast jet crews were educated as to the consequences of pointing their ac at civil ac that are TCAS equipped. This very often resulted in a TCAS RA which civil pilots are obliged to react to whether or not there is any actual collision risk.

Members discussed a proposal to allocate an SSR conspicuity code for ac conducting VIDs but it was decided that this single incident did not warrant such a safety recommendation.

PART C: ASSESSMENT OF CAUSE AND RISK

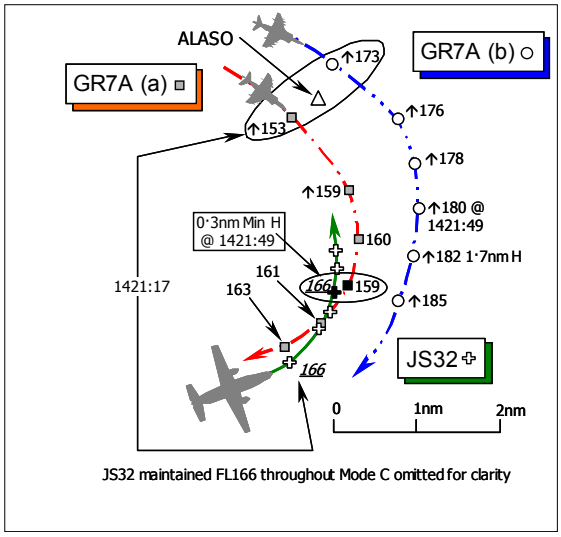
Cause: Following a visual ID and in contravention of extant policy, the Tornado crew flew close enough to the JS41 to cause its pilots concern.

Degree of Risk: C.

AIRPROX REPORT No 014/05

AIRPROX REPORT NO 014/05

Date/Time:	2 Feb 1421	
Position:	5525N 00135W (4nm S of ALASO)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	JS32	Harrier GR7 pr
Operator:	CAT	HQ STC
Alt/FL:	FL165	FL50-240
Weather	VMC CLOC	VMC NR
Visibility:	20-30km	50km
Reported Separation:		
	600ft V/nil H	Not seen
Recorded Separation:		
	v GR7 (a) 700ft V @ 0·3nm min H	
	v GR7 (b) 1·7nm min H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETSTREAM 32 (JS32) PILOT reports that he was bound for Aberdeen in VMC on an IFR FPL, having been offered and accepted a RIS by ScACC on a routeing between the NEW VOR and the ATF Aberdeen NDB. The allocated squawk was selected with Mode C, TCAS is not fitted.

Flying in level cruise at FL165 about 013° NEW 25nm, at 235kt, they were advised of traffic at 12 o'clock - 12nm. The traffic was called again at a range of 5nm, 1000ft above and 1000ft below their level. They were not in visual contact with the reported traffic at that stage so he initiated anB avoidance turn to the R onto 060° to take them E of the area where the traffic seemed to be manoeuvring. They were then advised that the traffic was moving away to the E so he elected to resume their previous course for the ATF. Having rolled out on a heading of 360° (M) they were then advised that the traffic was turning towards them. He spotted the other ac – a Harrier - about 1-2nm away at 12 o'clock, flying straight and level on a reciprocal heading, which then passed 600ft directly beneath them according to ATC. He was prepared to execute further avoiding action against the Harrier if necessary; however this was not required as he watched the jet pass beneath them.

He questioned why did the other pilot have to "play high energy manoeuvres, in airspace which is known to have a high level of civilian traffic?" He said that his company operates a considerable number of flights in this area every day; whilst he recognised that it was Class G airspace, he opined that military ac could easily avoid the area.

[UKAB Note(1): The JS32 pilot's account suggests that he only sighted one of the Harrier ac whereas his RT report to the TAY SC reveals that he actually saw both jets.]

THE HARRIER PILOT reports he was leading a pair of grey Harrier jets on a close air support training sortie in VMC with nil cloud and an in-flight visibility of 50km. A squawk of A7000, he thought, was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

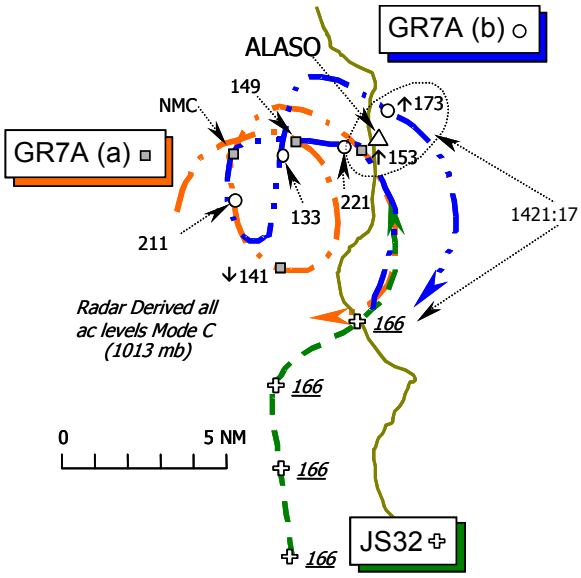
In an area of good weather to the N of Newcastle, it was decided that the pair could practice some Standard Attack Profiles (SAP). Therefore whilst under a "radar service" from Newcastle they climbed to FL160 and orbited above Boulmer VFR at 350kt, practicing talk–on attacks and high dive profiles, descending at 30-40° nose down and turning R between FL50-240. The other ac was not seen; the risk was assessed as *"nil"*.

THE HARRIER PILOT'S STATION had nothing further to add.

[UKAB Note (2): At 1409:00, the Harrier leader called Newcastle ATC on UHF and advised that they would be "operating N of Newcastle between 5000ft and FL230 for 20min" and were inappropriately squawking A7001. The

leader reported "going en-route" at 1409:45. After the Airprox had occurred, at 1428:00 the Leader advised Newcastle ATC that they were "leaving the area and returning to base".

THE ScACC TAY SECTOR CONTROLLER (TAY SC) reports that the JS32 was routeing via NEW to the ATF within Class G airspace under a RIS. Traffic information was given to the JS32 crew on military targets and they were subsequently given 3 traffic updates. The JS32 crew reported turning onto 060° so he advised them that the contacts had also turned E: consequently, the JS32 crew turned N again. However, the JS32 crew did report visual contact as one of the other ac turned onto an opposite direction heading at the same level so a further update was given. The contact turned and passed 500ft underneath the JS32 whose crew asked to file an Airprox, identifying the other ac as a Harrier. The crew was asked to pass the details of the Airprox to Scottish INFORMATION on 119·87MHz.



UKAB Note (3): The small scale Great Dun Fell Radar recording shows the Harrier GR7 pair's (both squawking A7001) convoluted manoeuvres in the vicinity of ALASO at medium level as the JS32 approaches the vicinity from the S maintaining FL166 Mode C throughout. The JS32 is shown turning R onto a NE'ly course at 1420:26, as reported by the pilot, whilst the Harrier pair manoeuvre in tight turns. At 1421:17, the JS32 executes a L turn back onto track for the ATF as reported; meanwhile the larger scale picture shows the Harrier pair both turning R as GR7A (a) some 5·4nm away climbs through FL153 and 2000ft below GR7A (b) whilst passing ALASO. GR7A (a) turns directly toward the JS32 climbing steadily towards it as GR7A (b) maintains a R turn displaced about 1nm away just abaft GR7A (a)'s port beam and gradually drawing aft. The closest of the pair - GR7A (a) - is on the inside of the turn in a climb to FL160, some 600ft below the JS32 at a range of 1·7nm. The minimum recorded horizontal separation occurs at 1421:49, with GR7A (a) about 0·3nm NE of the JS32 and subsequently passing just to the E of the latter. GR7A (a) then opens astern and crosses behind the JS32 at a range of 1·2nm as the jet climbs through FL161, whilst GR7A (b) closes to a minimum of 1·7nm some 1600ft above the airliner. The maximum level that GR7A (a) ascended to was FL163 and GR7A (b) to FL190; although Mode C indications are then lost from the GR7A pair for a short period thereafter, a rapid descent is subsequently evident by both jets as they continue the tight R turn astern of the JS32 which continues on course through ALASO.

ATSI reports that the JS32 was en-route from Leeds to Aberdeen and in receipt of a RIS from the ScACC TAY SC. Traffic information was passed about 2 military ac operating 20nm N of NEW VOR. The civil pilot initiated an evasive turn and reported visual sighting.

Under a RIS, controllers are required to pass traffic information on potential conflicts but not avoiding action (unless requested by the pilot). [ATSI Note: When a pilot in receipt of a RIS requests avoiding action, controllers will take this to mean a request to change the service to a RAS. The controller's prime responsibility is collision avoidance and so it is permitted that avoiding action instructions may be passed, if the circumstances warrant, before a formal change of service is agreed.] On this occasion, analysis by ScACC showed that traffic information

was passed nine times between the Jetstream crew's first call on the TAY Sector at 1403 and the time of the Airprox at 1421.

Radar analysis by the unit showed that neither the Separation Monitoring Function (SMF) nor Short Term Conflict Alert (STCA) was triggered on the ScACC radars. The JS32 was not fitted with TCAS and thus the pilot was totally dependent on ATC and visual lookout to spot conflicting traffic.The ScACC TAY SC provided detailed traffic information to the JS32 crew, keeping them informed of the developing situation and fully meeting the requirements of the RIS provided.

UKAB Note (4): Before clearing CAS, the first indication of the subject traffic was issued by the SC at 1413:50 when TAY advised *"…outside controlled airspace…north of Newcastle there is a high level of military activity"* which the crew acknowledged. After being placed under a RIS at 1415:40, TAY SC then advised *"..there's no known traffic to affect your climb FL165 correct quadrantal"* whereupon the JS32 crew reported climbing to that level. From 1417:10 there then followed a sequence of traffic information calls from TAY SC on traffic at a range of 10nm until 1419:10 when TAY SC reported *"…previously mentioned traffic is still manoeuvring in your 12 o'clock range of 8 miles 1* [ac] *showing FL150 1 showing FL220…there's only two contacts at this time".* This was updated 20sec later with *"…one of those targets is now in your 12 o'clock 5 miles showing 151 climbing"* to which the JS32 crew responded at 1419:40 *"…and visual with the one descending"*. Later at 1420:10, TAY SC advised *"..one target opposite direction 4 miles same height"* whereupon the JS32 pilot reported turning R onto 060°. Further information followed 20sec later that the contacts were manoeuvring but *"…previously mentioned one is now tracking north showing 143 climbing".* When told by TAY SC at 1421:10, *"those two previously mentioned contacts have also turned eastbound now",* the JS32 crew advised that *"we'll resume track and visual with* ???? ???? (unintelligible words). Ten sec later at 1421:20, TAY SC added *"…there's one 1000 feet below one 1000 feet above and they are in your 10 o'clock range of 2 miles and 3 miles this time",* whereupon the JS32 pilot reported *"visual with two…"* - confirming that he had seen both jets at the time. After TAY SC advised that one ac had passed 600ft below his ac, the JS32 pilot advised that he wished to file an Airprox.

HQ STC comments that the clear weather up to FL150+ in the area allowed the Harriers to practice a skill not often available to them in the UK. As the lead Harrier pilot did not see the JS32, it may well indicate that his concentration was on the ground and his wingman rather than a split between those 2 areas and searching for other ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Opening the discussion on the topic raised by the JS32 pilot who questioned whether the Harrier pilots had to conduct their high-energy manoeuvres in airspace that was known to have civilian flights in an area that could easily be avoided by military ac, the STC Member disagreed strongly with this somewhat parochial view. The Class G airspace available to conduct such training flights was shrinking all the time, with the attendant expansion of regulated airspace, and military aviators had an equal entitlement to use Class G as indeed did all other airspace users. The increasing frequency of CAT flights to/from regional airports through Class G airspace where 'see and avoid' prevails was indeed a source of concern, when CAS – specifically established for the benefit of public transport flights – was readily available with its greater degree of protection to such flights. Experienced CAT pilot Members agreed: they recognised the legitimacy of the military task and the need to use Class G to the maximum extent possible whilst also recognising the effect on other airspace users. Here the two Harrier pilots were legitimately proceeding about their tasks in Class G airspace - as was the JS32 crew on their scheduled flight - and each had equal right of passage through this airspace. It was noted that CAA policy is that CAT should wherever possible operate within CAS, utilising the highest level of air traffic service available. There was a route structure available within CAS between Leeds/Bradford and Aberdeen, albeit involving extra track miles.

Whilst the Harrier pilot might have thought when he wrote his account that he had been in receipt of an ATS from Newcastle, analysis of the applicable RT transcript and the accompanying report from the ATSU had shown that he had been mistaken and the ATS had been terminated before the Airprox had occurred. One controller Member wondered if this misunderstanding might have been intrinsic to the pilot's non-sighting of the JS32, perhaps believing, erroneously, that other ac might be routed clear or warned of his activity when evidently they were not.

It was clear that Newcastle ATC could do little for the Harrier pair because they had elected to terminate the ATS and although the controller at the time might have had some notion of what the jets were doing he was under no remit to pass this on the TAY SC who was providing a RIS to the JS32 crew. Moreover the lead Harrier ac and the No2 were inappropriately squawking A7001 whilst evidently conducting their manoeuvres between FL50 and FL240. This was most unhelpful as the unverified LL conspicuity squawk of A7001 is assigned for use by military fixed-wing ac on passing 2000ft msd in descent into the UK LFS and should be retained whilst operating in the LFS or on climb-out from the LFS by those pilots requiring a radar service until other instructions are issue by the ATSU. Controller Members were keen to emphasise that to squawk A7001 outwith the LFS can be very confusing when endeavouring to provide comprehensive traffic information to pilots in receipt of a radar service. In this scenario an A7000 squawk with Mode C would have been far more appropriate and have indicated correctly to other controllers that the jets were not operating in the UKDLFS and had no intention to descend below 2000ft agl at the time, thereby reducing any potential for misleading traffic information.

This Airprox illustrated the benefit of obtaining a radar service – here a RIS – and the Board commended the TAY SC for the copious flow of traffic information that he conscientiously provided to the JS32 crew about the Harrier pair. The traffic information had provided a comprehensive warning of what the jets were doing and the JS32 crew had wisely taken account of this information when they elected to turn to the NE to get around the Harriers reportedly at that time operating ahead of the airliner to the N. Unfortunately, the Harrier pilots, who were operating purely VFR without the benefit of any warning of the JS32's approach from the S, had themselves moved the locus of their manoeuvres thereby negating entirely the JS32 crew's detour around them. The JS32 pilot's decision was a wise one at the time but this event also clearly illustrated the random nature of flight operations in the 'Open FIR' where such evolutions as the Harrier pilots were practising will be encountered commonly throughout UK airspace – often unannounced and not presaged by a NOTAM. This added weight to the CAT pilot Members' contention of utilising CAS whenever possible for public transport flights. A controller Member expounded the view that given the excellent flow of traffic information provided by the TAY SC, the controller clearly had the capacity to do this at the time and wondered why a RAS was not commonly provided to CAT flights in Class G airspace. Long-standing Members of the Board were well aware of the background to the provision of a RAS by controllers at ACCs to transit civilian flights in the 'Open FIR'. A controller Member mentioned the difficulties that had ensued over the provision of a RAS in the FIR following the assessment of past reports where some controllers' actions had been called into question when seeking to achieve the separation prescribed under this radar service. Notwithstanding the responsibilities of the Sector controllers whose prime aim will be the provision of an 'ATC Service' within their areas of responsibility in CAS and whereby any other service will be secondary to this provision, the NATs advisor to the Board reaffirmed to the Members the NATS Ltd company policy - that a RAS will not normally be provided by ScACC to an en-route ac in transit through the Scottish FIR. Such radar services as might be available in the Open FIR from time to time are dependant on the traffic loading on the sector (excluding Class F ADRs) and are normally limited to a RIS. This was felt by some to be a significant flight safety issue as some would contend that a RAS is probably the most suitable service for CAT flights outwith CAS. However, mindful of the review already in progress regarding Air Traffic Services Outside CAS (ATSOCAS), the outcome of which is eagerly awaited, the Board was not moved to make a recommendation on this topic here.

Many Members thought that a non-sighting in the see & avoid environment of the 'Open FIR' was intrinsic to the cause: fast-jet pilot Members thought that the geometry of this encounter reflected by the radar recording suggested that the Harrier pilots should have been able to see the Jetstream as they climbed up towards it. It was most surprising to Members that having passed about 700ft beneath the JS32, neither the Harrier Ldr nor his wingman had reported sighting the ac. One CAT pilot Member thought the airliner's crew might have seen the military jets a little earlier given the warnings provided and the clear prevailing weather. But as the reporting pilot had seen the two jets approaching from 2-3nm away, according to the RT transcript of the TAY Sector frequency, even though it was from below the nose, other Members were not convinced. Moreover the JS32 pilot had reported seeing at least one of the jets some minutes beforehand. The contrasting view was that this was a conflict between two fundamentally differing spheres of aviation activity in airspace where either can operate legitimately with due regard for other users who must operate to the guiding principle 'see and avoid'. CAT pilots must be under no misconceptions that fast-jet ac will be encountered regularly throughout the FIR conducting all manner of operations and fast-jet pilot's must be alert to encounters with commercial air transport ac, taking action to give them a wider berth if need be – a salutary lesson. This consensus prevailed and with only one dissenting voice it was concluded that the cause of this Airprox had resulted from a conflict in Class G airspace, compounded by a non-sighting by the Harrier pilots.

Even at 700ft vertical separation between GR7A (a) and the JS32 at the closest point as the former under-flew the airliner, a CAT pilot Member pointed out that this was only 300ft less than that achieved under the quadrantal system when flying reciprocal tracks under IFR. However, a CAT pilot Member also experienced on fast-jets expressed concern that the high energy manoeuvres flown by the Harrier pilots, as they climbed up beneath the airliner coupled with the non-sighting instilled an element of risk as GR7A (a) had carried on climbing to within 300ft of the JS32 after it had passed astern. This was, however, a solitary view and the overwhelming opinion of the Members as a whole was that no risk of a collision had existed in the circumstances reported here.

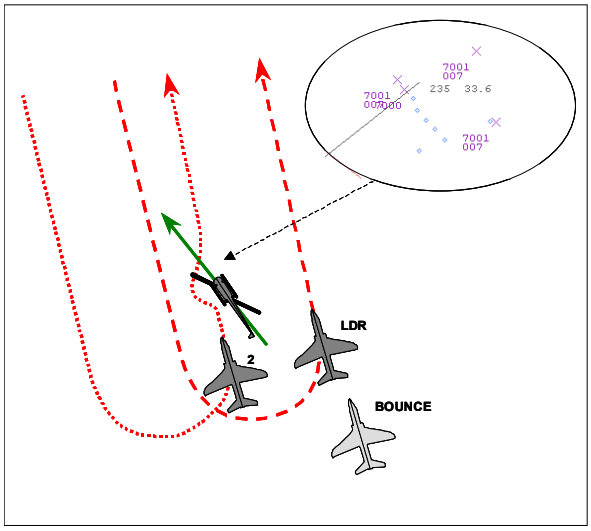
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace compounded by a non-sighting by the Harrier pilots.

Degree of Risk: C.

AIRPROX REPORT NO 015/05

Date/Time:	9 Feb 1512	
Position:	5204N 00232W (5nm E Hereford)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk	Robinson R22
Operator:	HQ PTC	Civ Trg
Alt/FL:	500ft agl	1000ft (QNH)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>10km	>20km
Reported Separation:	50ft V/400ft H	0 V/ <500ft H
Recorded Separation:	NR V ~800ft H (See UKAB Note (1)).	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a black Hawk with HISL selected on squawking 7001 with Mode C and on a Valley tactical frequency. He was instructing a student on a flying training sortie teaching evasion and was the LH man and No2 of a battle pair formation being attacked by a third Hawk. They had rolled out of a low-level battle turn onto 350° (out of sun) at 420kt when 3sec later they passed a blue and white helicopter, slightly below (50ft) and 400ft to their right. At the time the third ac was setting up behind the battle pair for a stern attack. The student in his front cockpit saw the helicopter a fraction before the instructor and he jinked to the left to increase the separation. The helicopter was heading away from them, so it was unlikely that the pilot would see them until after they had passed. He does not feel he was distracted by the teaching element of the sortie and both the instructor and student saw the helicopter after rolling out of the turn but their relative speed meant their closure rate led to a narrow lateral separation. He assessed the risk of collision as being medium.

THE ROBINSON R22 PILOT reports flying a training flight from Gloucester with the anti-collision and nav lights on, listening out on, but not yet in contact with, Shobdon and squawking 7000. Mode C was not fitted. They were heading 330° at 80kt and 1000ft on the QNH when a dark coloured military fast jet overtook them about 500ft away on his left. He had first seen the ac (all 3) 5 min before a short distance to the E. Since he was being overtaken he was not able to take any avoiding action and assessed the risk as being medium to high.

UKAB Note (1): The recording of the Clee Hill radar shows the incident; however the CPA occurs between sweeps. The recording largely verifies the reports given by both pilots. By predicting the ac tracks the Hawk passes 800ft to the left of the R22 (NMC).

UKAB Note (2): The Shobdon QNH was 1023mb. The average terrain height in the immediate area of the incident is 65m (210ft) and it can be seen from the radar that the Hawks were at F007. It follows therefore that they were just under 800ft agl at the time of the incident. The R22 was at 1000ft QNH so it is estimated that he too would have been at about 800ft agl.

THE HAWK STATION comments that this Airprox occurred in the Low Flying System, in good weather, while the Hawk formation was performing high-energy manoeuvres. Both the formation and the helicopter were entitled to operate in the area and the Hawk pilot spotted the helicopter approximately 3sec before passing close down its LHS. The lateness of the sighting was possibly attributable to the high-energy manoeuvre but it is unlikely that the teaching element of the sortie was contributable.

The incident serves as another reminder for the need for vigilance and thorough lookout in an increasingly busy LFS. All staff and students have been briefed on this incident.

HQ PTC comments that this was an encounter in the open FIR that was resolved by see and avoid, albeit at a late stage. If TCAS had been fitted, even with the lack of mode C from the helicopter, the Hawk may have been able to detect the conflict at an earlier point and avoid the Helicopter by a more comfortable margin.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended the Hawk pilot for filing his report which will serve to highlight conspicuity problems to others. Members were informed that it was probable that the Hawks were flying a racetrack pattern and the R22 pilot's sighting may have been of a previous rotation.

In this incident the R22 had been almost tail-on to the Hawks. Being on the horizon from the Hawk pilots' viewpoint would have added to the difficulty of acquiring the helicopter visually. The Hawk formation had just rolled out of a turn and the crews would probably have been concentrating on their evasion exercise, trying to spot the aggressor ac from beam or tail sectors which is normal for the early stages of training. The student (front seat) HP of the No2 Hawk did see the R22 at about the same time as the instructor who initiated successful avoiding action, albeit late.

Due to the lateness of the avoiding action the Board determined that safety had been compromised.

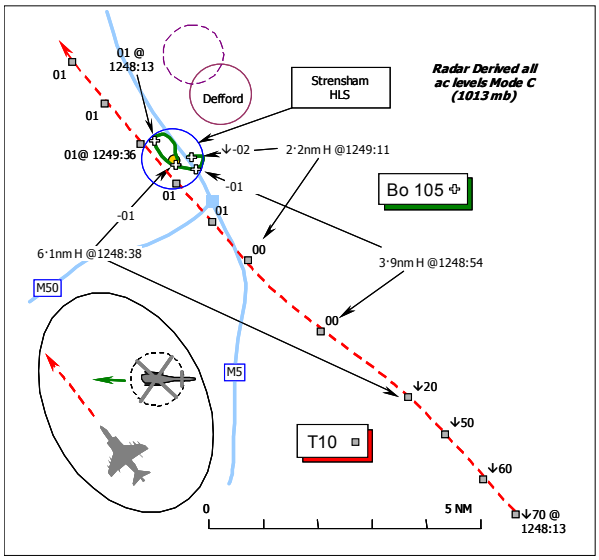
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the Hawk crews.

Degree of Risk: B.

AIRPROX REPORT NO 016/05

Date/Time:	9 Feb 1249	
Position:	5204N 00209W (Strensham HLS elev - 80ft)	
Airspace:	FIR/UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Bo105	Harrier T10
Operator:	Civ Comm	HQ STC
Alt/FL:	300ft (QNH 1026mb)	250ft (Rad Alt)
Weather	VMC CLBC	VMC CLBC
Visibility:	20km	>10km
Reported Separation:	50ft V/250m H	Not seen
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BOLKOW Bo105 PILOT reports his helicopter has a distinctive red livery and the HISLs, anti-collision beacons and both landing lights were all on whilst circuiting to land at Strensham Helicopter Landing Site (HLS). A squawk of A0020 was selected with Mode C. Neither TCAS nor any other form of CWS is fitted.

Although tasked with an Air Ambulance mission to the NW of Strensham, shortly after take off they had been stood down by Ambulance Control so he was returning back to Strensham to land and so he had not established communication with Gloucester ATC. Flying VFR some 900ft below cloud with an in-flight visibility of 20km he broke off from the NW'ly outbound track, turning L inbound to fly a circular cct to the S back into base. As he rolled out onto short finals heading 270°(M) at 50kt descending through an altitude of 300ft QNH (1026mb), the front seat paramedic drew his attention to a jet which he himself spotted at 10 o'clock some 250m away crossing obliquely from L to R on a NW'ly track about 50ft below his helicopter. No avoiding action was taken as the jet - a grey Harrier – was opening away from his helicopter in straight and level flight when it was first seen at the closest point some 250m away. Assessing the risk as "high" he also added that the workload was high whilst landing and that no lights were observed being displayed by the jet.

THE HARRIER T10 PILOT reports his jet has a standard dark grey camouflage scheme but HISLs are fitted. He was conducting a low-level instructional sortie in LFA4 with the student flying the ac from the front seat and himself as captain of the ac occupying the rear-seat. They were not in receipt of an ATS but listening out on the LFS frequency of 300·8MHz and squawking A7001 with Mode C: neither TCAS nor any other form of CWS is fitted. Heading 320° at 420kt, flying in level cruise at 250ft Rad Alt, no other ac was seen in the vicinity of Strensham. Therefore he was unable to provide anymore detail about the Airprox.

Subsequent to being informed of the report he has reviewed the HUD video of the sortie: no other ac is apparent anywhere near the Strensham area.

[UKAB Note (1): The UK MIL AIP at Vol III Part 1-2-4-5 promulgates the co-ordinates and a *warning* only for the Air Ambulance Helicopter Landing Site at Strensham (HA03) so no mandatory avoidance criteria are stipulated. This HLS is the most southerly of a group of three activities that attract warning status in this vicinity, including the minor aerodrome at Defford.]

[UKAB Note (2): The Clee Hill SSR recording shows the Bo105 identified from its A0020 squawk departing from the vicinity of Strensham and then at about 1248:13, reversing about to return as reported indicating 100ft unverified Mode C (1013mb), which equates to an altitude of about 490ft QNH (1026mb). Meanwhile, the Harrier is shown approaching from the SE descending through 700ft unverified Mode C (1013mb) – about 1090ft

(1026mb). Subsequently, at 1248:54, the jet levels at an indicated 0ft Mode C (1013mb) which is about 390ft amsl, 3·9nm SE of the Bo105 as the helicopter turns about to the S of Strensham indicating –100ft - about 290ft QNH. The latter turns onto finals and is last shown westbound indicating –200ft Mode C, about 190ft QNH just before the helicopter fades from coverage crossing the M5 motorway. Meanwhile the Harrier, indicating 100ft Mode C, an altitude of about 490ft QNH (1026mb), approaches from abaft the helicopter's port beam from a range of 2·2nm before subsequently crossing just to the W of Strensham and the last observed Bo105 helicopter contact. At these levels the reliability of the unverified Mode C is questionable and clearly does not replicate the geometry of the Bo105 pilot's report which stated that the jet underflew his helicopter by 50ft.]

[UKAB Note (3): Meteorological Office archive data reveals the Cotswold RPS for the period 1200 -1300UTC was 1021mb. An estimated actual QNH for the vicinity of Strensham was given as 1024mb.]

OC LF OPS SQN, the manager of the military UKLFS, comments that the MOD recognises that there are many other users of the airspace encompassed by the military UKLFS and takes due regard of the numerous and varied activities which take place in this airspace. In order that military flying training can be conducted safely, whilst allowing training objectives to be achieved, means that a balance has to be struck as to whether avoidance or warning status should be granted to another airspace users' activity. Civilian helicopter operations, which includes Air Ambulance operations, are just one of the activities that military aircrew must take into account when using the UKLFS. Where civilian helicopter pilots are engaged in operations where aircraft are subject to manoeuvring limitations and/or restricted lookout, avoidance status would usually be granted under the Civil Aircraft Notification Procedure. In other circumstances, although many other factors would be taken into account and each site/ operation would be considered on its own merits, it would be the norm to grant warning status to civilian helicopter operations in the UKLFS; this is the case for the Strensham Helicopter Landing Site, one of 23 notified helicopter landing sites in LFA 4. It should be noted that major hospitals away from built-up areas, with their associated HLS, do attract avoidance status from military low flying aircraft.

HQ STC comments that this HLS is just one many such sites around the UK LFS which crews are warned about on their charts; these sites have varying levels of activity. It is unfortunate that, on this occasion, the T10 crew did not spot the helicopter on its approach to the site. However, it is difficult to equate the Bo105 pilot's recollection of the Harrier's position in relation to his own ac with his reported altitude at the time – 300ft QNH or about 220ft above the HLS elevation of 80ft. However, the Harrier is unlikely to have been below him and may have been difficult to spot against the ground. Work has been done with our own helicopters to increase the conspicuity from above by colouring one of the main rotor blades yellow which has proved effective.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed that this was but one of two reports that had been filed recently relating to helicopter operations from Strensham HLS, although the first was subsequently withdrawn as it did not fulfil the stipulated requirements for submission as an Airprox. Nonetheless, it was explained that the reporting pilot had been concerned at the proximity of fast jets passing the site and the valuable comment provided by the Board's LFS advisor had explained why the HLS did not attract the status of a mandatory LFS avoidance.

Here it was evident that this Airprox was a sighting issue in the 'see and avoid' environment of Class G airspace. Evidently the T10 pilots had not spotted the circling red helicopter as they approached the vicinity and were completely oblivious to its presence. Moreover, neither had the Bo105 pilot seen the jet for the short period that he was heading towards it as he circled to the S of Strensham whilst the T10 descended towards him and approached the HLS on a steady course from the SE. Pilot Members thought that the jet should have been skylined to the helicopter pilot but the fast moving camouflage-grey Harrier of small cross-sectional area flying directly toward him with little relative motion to draw attention to it clearly defeated earlier visual acquisition. The Members recognised that in all probability the helicopter pilot would have been concentrating on setting up for his approach to the HLS and it was unfortunate that neither the T10 crew nor the Bo105 pilot had the benefit of a CWS to provide an additional 'heads-up'. It was in similar scenarios to this incident – a head-on closing geometry - that the PTC TCAS trial had proved so effective. Indeed 30sec warning had been achieved, which attested to the desirability of a collision warning system to supplement lookout scan. The Board wholeheartedly endorsed the acquisition of such equipment to assist pilots and its use here might well have averted this Airprox. As it was, with

the T10 approaching from abaft the Bo105's port beam, unseen until it passed, and neither of the T10's pilots sighting the other ac, the Board determined that this Airprox had occurred as a result of a non-sighting by the Harrier T10 crew and effectively, a non-sighting by the Bolkow Bo105 pilot. Despite its red colour, the helicopter had not been seen and the Board noted the comments from STC regarding the use of odd coloured helicopter main rotor blades as an aid to visual conspicuity. The helicopter pilot Member was unsure if this had been tried in commercial practice so the Chairman undertook to research this topic with the BHAB outwith the Meeting.

In their assessment of risk the Board noted that the Bo105 pilot had reported that the jet underflew his helicopter by 50ft when he was descending through an altitude of 300ft. The radar recording did not replicate this geometry and suggested that the jet was indicating broadly 490ft amsl and some 300ft above the helicopter when the latter was last shown descending through about 190ft amsl. At these low altitudes with the indicated unverified Mode C of questionable accuracy, the Board agreed that any firm reliance on this data was unwise. The STC Member stressed that it would have been most unlikely that the T10 crew would have descended significantly below 250ft Rad Alt, which was the lowest they were permitted to fly, and invariably the Rad Alt 'bug' was set to warn pilots beforehand. With only one pilot's version of events and questionable radar data, the Board was briefed that attempts had been made to clarify the relative geometry with the Bo105 pilot. However, these were frustrated because the pilot was no longer contactable through the company and had moved abroad. Members agreed that it was unlikely that the Bo105 pilot had mistaken the relative vertical position of the jet when he spotted it flying away from him so on that basis Members accepted the Bo105 pilot's estimate of the separation that pertained but were unable to resolve beyond doubt the relative geometry, which was somewhat unsatisfactory. Despite this anomaly, as the T10 pilots had not seen the helicopter at all and the Bo105 pilot had not spotted the jet before it passed, in the Board's view the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Harrier T10 crew and effectively, a non-sighting by the Bolkow Bo105 pilot.

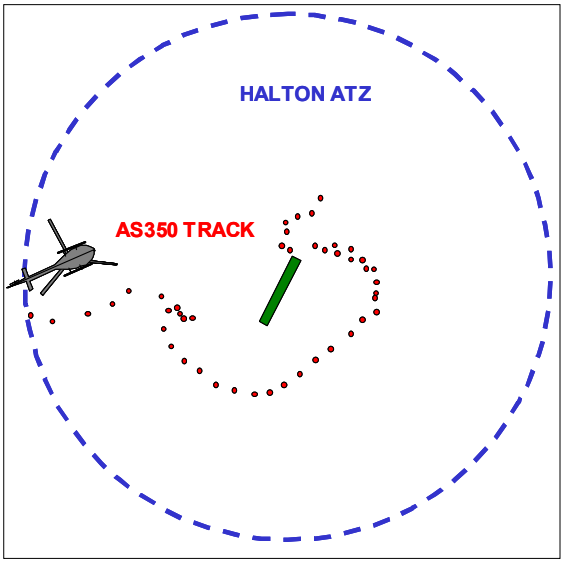
Degree of Risk: B.

Post-Meeting Note The Chairman contacted the BHAB on the day after the Board meeting, passing on the observation from STC regarding the colouring of helicopter rotor blades. The BHAB CEO commented as follows.

Opinion was collected from a number of its members and a paper was reviewed that referred to the findings of a DERA investigation. Experience amongst those that have tried differential blade colours is inconclusive. A number of operators employ a red/white or blue/white scheme. It is understood that there are structures issues, particularly in relation to carbon or glass fibre as used in the construction of modern rotorblades, and painting can affect their integrity. Also, any additional paint finish adds weight and it is believed that if one blade was to be painted then the complete rotor system would have to be statically and dynamically balanced. The DERA See and Avoid Study (April 1997) concluded with the recommendation that helicopters should be fitted with a collision warning system such as Skywatch; be painted matt black and use high intensity lights at all times. The study did not mention the use of differential rotorblade colour. In contrast, a road safety study has concluded that white is the most distinctive vehicle colour and this may have relevance to aircraft fuselage colour schemes since it reflected 97% of light and is appropriate under most lighting conditions. Lastly, it is felt that the higher head speeds of modern helicopters reduces the effectiveness of any disruptive scheme.

AIRPROX REPORT NO 018/05

Date/Time:	13 Feb 1702 (Sunday)	
Position:	5147N 00044W (RAF Halton - elev 370ft)	
Airspace:	Halton ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Ask 21 Glider	AS350 Helicopter
Operator:	Civ Club	Civ Pte
Alt/FL:	600ft (QFE 999 mb)	NR
Weather	VMC CAVOK	NR
Visibility:	>20km	NR
Reported Separation:	500m H	NR
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 21 GLIDER PILOT reports flying a white glider on a local sortie from RAF Halton and receiving an AG service from them. While heading 290° at 50kt and over the W edge of the airfield at 500-600ft QFE, he saw a dark coloured helicopter with strobes, overhead Stoke Mandeville [2nm to the W] heading directly towards the airfield. The helicopter was climbing and descending from a mean level of about 500-600ft and due to the erratic nature of its flying he thought [in error] that it may have been a police-operated helicopter. It continued towards the airfield and was well inside RAF Halton's ATZ when it became apparent that the helicopter was going to continue on its path so he turned 180° to the right to avoid it. The helicopter continued along the NE edge of the airfield boundary then turned onto an Easterly heading and departed. Due to his avoiding action, he assessed the risk as being low.

UKAB Note (1): The helicopter was traced by the Radar Analysis Cell, getting airborne near Chipping Camden at 1628 and landing at a Farm near Watford at 1715. The operator was contacted and confirmed that he had flown that route at that time but refused to provide a report. This was the second occasion that he had been involved in an Airprox and had refused to co-operate.

UKAB Note (2): Although the glider cannot be seen and therefore the incident is not recorded on radar, a 7000 NMC squawk (the AS350) can be seen tracking erratically through the Halton ATZ for several minutes before and after the presumed time of the Airprox [1702:10]. The contact first appears from the W, manoeuvres for some time and later departs on an Easterly track as described by the glider pilot.

HQ PTC comments that the RAF GSA, although a Service sponsored organisation, operates under the aegis of the CAA and the BGA, but from an airfield on MOD land which is within an ATZ. They therefore have a continuing concern over the number of Airproxes that occur both within and adjacent to the Halton ATZ, whether military or civilian. In this case, they are particularly concerned that one should arise from such a flagrant disregard of the ATZ, compounded by such contempt for the investigative process.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the glider and radar photographs/video recordings.

The Board considered this incident to be a serious breach of flying discipline and was most concerned that the pilot of the AS350, although positively identified, did not cooperate with the investigation process. On noting that this was the second occasion that this pilot had declined to cooperate with the Board some Members requested that formal disciplinary action be taken; the Director felt however, that this might be counter-productive.

Members determined that the AS350 pilot had either disregarded Rule 39 of the Rules of the Air and entered the Halton ATZ without contacting them on the appropriate RTF, or he had not been aware of the existence of the ATZ which they considered to be equally inexcusable. In the absence of a report from the helicopter pilot however, it had not been possible to determine why this breach had occurred. No one could offer any possible explanation for the erratic track or height fluctuations flown by the helicopter pilot.

HQ PTC as the airfield operators again expressed considerable concern at the number of infringements of the Halton ATZ.

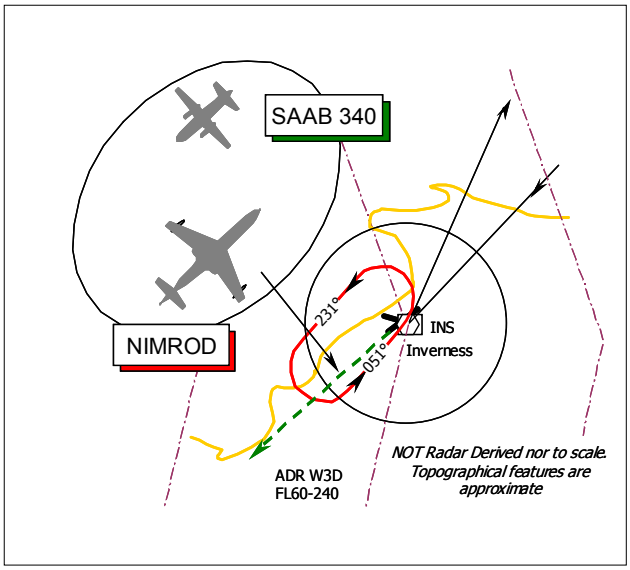
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AS350 entered the Halton ATZ without complying with the requirements of Rule 39 of the Rules of the Air and flew into conflict with the ASK21 glider.

Degree of Risk: C.

AIRPROX REPORT NO 019/05

Date/Time:	18 Feb 0902	
Position:	5731N 00406W (RW23 Inverness - elev 31ft)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Saab 340	Nimrod MR2
Operator:	CAT	DPA
Alt/FL:	2600ft↑ (QNH 1014mb)	3500ft (QNH 1014mb)
Weather	VMC CLOC	NK CLBC
Visibility:	>10km	20km+
Reported Separation:	1nm H	½nm H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT reports he was departing Inverness under IFR, bound for Edinburgh and in receipt of an ATS from Inverness TOWER on 122·6MHz. A squawk of A4361 was selected with Mode C; TCAS is fitted. Navigation lights, HISLs and the landing lights were all selected on.

After take-off from RW23, as they began their climb out from Inverness in VMC, heading 235° (M) at 156kt they observed the Nimrod turning L back towards the airfield overhead to commence his approach. He believed that if they had commenced their L turn to establish on the ADR W3D at 1500ft, in accordance with their company's SOPs, there may have been a conflict with the Nimrod. They elected to maintain the RW heading and announced this and their passing altitude to the Nimrod pilots, who acknowledged this. They then received a TCAS RA. Due to the proximity of the ground, they believed the safety of their ac may have been compromised and so they then elected to maintain their own separation from the Nimrod. They maintained visual contact with the Nimrod at all times as it passed down their port side at a range of 1nm, with a *"medium"* risk of a collision some 2nm SW of the aerodrome as they climbed steadily through 2600ft Inverness QNH (1014mb). On arrival at their home base, he contacted both Inverness ATC and Kinloss to advise them what had happened and to inform them of his intention to file an Airprox.

THE NIMROD PILOT reports some seven days after the event that he was conducting a training flight in the "instrument hold" at Inverness. In addition to himself, the flight deck complement included another test pilot and a flight engineer, with a "standard pilot training rear crew". The ac has a hemp camouflage scheme, but the navigation lights, HISLs and the 3 taxying lights were all selected on. He was in receipt of a FIS from the combined Inverness ADC/APP controller on 122·6MHz and squawking the assigned squawk of A3702 with Mode C selected on. Neither TCAS nor any other form of CWS is fitted.

Inverness ATC had cleared him to join the VOR/DME hold at the INS in VMC at 0855, which he did. As they began the inbound turn of their first hold at 3500ft Inverness QNH (1014mb), Inverness ATC advised them that the Saab 340 [C/S specified] would be departing from RW23 shortly, climbing through their altitude to the SW. ATC cleared the Saab 340 crew for departure with a warning that they [the Nimrod] were in the hold and that the Saab 340 pilot was to maintain "visual clearance" which the Saab 340 pilot accepted. At the time they thought this was an unusual clearance for a passenger ac against known potentially conflicting traffic. One of the rear crew acquired the civil ac as it began its take-off roll from RW23 and both pilots acquired it shortly afterwards [he specified that it was first seen whilst still on the ground 4-5nm away]. Aware that their inbound track was "close to the departure lane" for the Saab 340, to increase the separation between their inbound track and the RW23 extended centre-line they widened their hold to the S and broadcast their altitude to the climbing Saab 340 crew on RT, telling its pilot that they were visual with his ac. The Saab 340 pilot replied that he was visual with their Nimrod. As they rolled out

of the turn inbound towards the beacon heading 050° at 210kt, the Saab 340 climbed through their level when it was in their 10 o'clock at approximately ½nm. There was no risk of collision since both pilots were fully aware of each other's presence and he had taken positive measures at an early stage to increase the lateral separation himself. At no point were they informed on RT by either the Saab 340 pilot or ATC that an Airprox was to be filed. He added that notably, during a subsequent hold, a further civil ac departure was held down to an altitude 1000ft below them until it was visually clear of them. All three players in both events - the Saab 340 crew, the Nimrod crew and Inverness ATC - were in uninterrupted RT communication with each other throughout and full 3-way situational awareness was maintained through RT, in addition to the Saab 340 being in continuous visual contact from the Nimrod.

THE INVERNESS COMBINED AERODROME/APPROACH CONTROLLER (ADC/APP) reports that at the time of the Airprox the Nimrod was joining the 'INS' VOR hold at 3500ft Inverness QNH (1014mb) in VMC on a VFR training flight. The Saab 340 was lined up for an IFR departure from RW23, routeing W3D with a clearance to FL100, and to climb when instructed by Radar to FL120. Prior to the departure of the Saab 340 the pilots of both ac were given traffic information about each other's ac. Both ac were visual to the controller at all times. The Saab 340 pilot telephoned at around 1100 to report that he intended to file an Airprox.

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

THE NIMROD PILOT'S STATION comments that it is clear that both acs' crews were fully aware of each other's positions throughout this incident and it would appear that Inverness ATC were content to offer a VFR departure clearance to the Saab 340 pilot which he accepted. We can only conclude that the Saab 340 pilot was unaware of the implications of this clearance. No risk of collision existed at any time since the Nimrod crew were in constant visual contact with the civil ac as it climbed after take off and the Saab 340 crew had also called visual with the Nimrod. This is a very peculiar Airprox and it would appear that the Saab 340 captain was expecting IFR separation to be applied to his VFR departure.

UKAB Note (2): The UK AIP at AD 2-EGPE-1-6 notifies the Inverness ATZ as a radius of 2½nm centred on RW05/23, extending from the surface to 2000ft above the aerodrome elevation of 31ft amsl.

ATSI reports that once again problems with the Inverness RTF recording precluded the production of an RT transcript. However, a cassette was obtained covering the RT transmissions during the relevant period, albeit not of very good quality. Apparently, new equipment is being ordered to address the situation.

The RT recording reveals that the Saab 340 crew requested taxi clearance at 0853 and were cleared to enter and backtrack to line up on RW23. Approximately 4 minutes later, the Nimrod crew attempted to establish communication with Inverness ATC. Although Inverness replied to all the calls made by the Nimrod crew, it took five attempts before satisfactory two-way RT communication was finally established. The Nimrod pilot requested a join at the VOR for an approach to RW23. The controller asked if he was VMC and if he could provide his own separation from other traffic: the pilot of the Nimrod confirmed he was VMC and would provide his own separation. After the Nimrod pilot reported he was 3nm E of Inverness he was given a joining clearance at the INS, VMC, at 3500ft QNH. He was informed of the Saab 340 about to depart RW23 'very shortly' to route southbound on ADR W3D.

Prior to departure, the Saab 340 was issued with its clearance via W3D, to leave Class F airspace at RANOK, to request a rejoin at STIRA, climbing to FL100 and to climb when instructed by RADAR to FL120. The Saab 340 pilot was then warned that he may see a Nimrod just approaching the overhead at 3500ft, to join the hold, operating VMC, which the Saab pilot acknowledged. Take off clearance from RW23 was issued to the Saab 340 crew at 0900, with a L turn out on track, to join the ADR, which the pilot acknowledged, also reporting visual with the Nimrod. Shortly afterwards, the Nimrod reported joining the INS hold at 3500ft QNH and was requested to call commencing the VOR/DME procedure for RW23.

At 0902, the Nimrod pilot was asked to confirm if he had the Saab 340, that had been airborne for 30sec in sight, and which was shortly to turn L. The Nimrod pilot reported the traffic in sight and was advised it was climbing to FL100. The Saab 340 pilot reported visual with the Nimrod, adding that he was passing 2600ft and continuing straight ahead. The Saab 340 was transferred to Lossiemouth at 0903, no further comments being made on the Inverness frequency by the pilot.

Inverness is situated in Class G airspace. There is no requirement for IFR and VFR flights, outside CAS, to be separated. The Inverness ADC/APP controller passed appropriate traffic information to both flights. The Nimrod pilot had been specifically asked if he could provide his own separation VMC (although it was not technically established that he was VFR) and had agreed to do so. Both pilots reported the other ac in sight, the Saab 340 whilst still on the runway and the Nimrod within 30sec of the Saab 340's departure.

DPA comments that it would appear that the Inverness Approach Controller was using the VMC Climb and Descent procedure (MATS Part 1, Section 1, Chapter 3, Paragraph 5.5). From the information available it would also appear that all the conditions were met to enable the controller to do so. The crew of the Saab 340 do not seem to have appreciated the significance of accepting this VMC Climb procedure and that, even though conducting the flight under an IFR clearance, the responsibility for separation rested with the Saab 340 crew and not the Inverness ADC/APP Controller.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

Before the Inverness combined ADC/APP controller could provide an ATS, the flight rules of each of these two flights had to be established: in the Board's opinion this had not at the time been established beyond all doubt. The Saab 340 had filed a FPL for a scheduled IFR flight to Edinburgh via the ADR. Therefore it was clear that although VMC prevailed, his flight was departing under IFR and would comply with an IFR joining clearance for W3D. From the other cockpit the Nimrod pilot had not filed a FPL but had reported that he was conducting an "Instrument hold" inferring – and the Board was advised that this was subsequently confirmed by DPA – that he had considered he had been operating under IFR although also in VMC. This was significant as the controller would then have been responsible for the separation of these two IFR flights. However, the ADC/APP had reported that the Nimrod was conducting a VFR training flight: consequently, although the controller had not specifically asked the Nimrod pilot to confirm the flight rules under which he was conducting his flight, the controller considered the Nimrod was operating VFR. The ATSI report had made it plain that there is no requirement for IFR and VFR flights, outside CAS in the FIR, to be separated by ATC where the controller would generally just pass traffic information. But here the ADC/APP had asked a general question of the Nimrod pilot when the controller asked if he could provide his own separation in the prevailing VMC and the Nimrod pilot had agreed so to do, but the ADC/APP had not specifically mentioned the Saab 340 flight at that point. When the ADC/APP had subsequently given traffic information about the Saab 340 to the Nimrod crew they saw it at a very early stage, even before it was airborne. Similarly, traffic information had been given to the Saab 340 before take-off and its pilot had the Nimrod in sight as he departed although he had not specifically agreed to accept visual separation against the Nimrod. This should have been clarified by the controller: had he done so then the conditions for the VMC Climb and Descent procedure stipulated at MATS Part 1, Section 1, Chapter 3, Paragraph 5.5 would have been met. Nonetheless, it was explained that in a subsequent discussion with the Saab 340 pilot he accepted that he was indeed taking visual separation against the Nimrod, until it flew astern of his ac. So with both crews in visual contact and with the benefit of traffic information from the controller, Members could only speculate as to the Saab 340 pilot's underlying reason for filing this report.

CAT pilot Members noted specifically that the Nimrod pilot had said that he had endeavoured to increase the separation between their inbound track and the RW23 extended centre-line and so had widened their hold to the S in order not to hamper the Saab's departure, broadcasting their altitude to the climbing Saab 340 pilot on RT at the same time and telling him that they were visual with his airliner. Members speculated as to whether the Nimrod pilot's widened hold had inadvertently placed his jet in the intended path of the Saab 340 because the latter's pilot desired to turn L to join the ADR straight after departure. As it was the Saab pilot said that he had to maintain RW heading rather than turn, as he had wanted to do at 1500ft, to pick-up the ADR. But he later said that he had then lost sight of the Nimrod as it flew inbound to the INS whereupon a TCAS RA was triggered. Although not specified, this might have been a descend RA away from the jet holding at 3500ft QNH. CAT pilot Members surmised that it was this TCAS descent toward the high ground to the S of the aerodrome that caused the Saab 340 pilot concern. CAT pilot Members said that under current procedures there was no room for any discretion by the pilot when a TCAS RA was enunciated, even when in good visual contact. After a very wide-ranging discussion the Board agreed that the cause of the Saab pilot's Airprox report was that in following a TCAS RA, the combination of his visual separation from the Nimrod and high ground had caused the Saab 340 pilot concern.

Whilst it was clear to the Members that in the circumstances reported here there was no risk of a collision between these two ac, this Airprox did illustrate a number of points for the unwary. Controllers should always confirm the rules under which flights are being conducted and it might not be wise to assume that if a crew is flying in VMC they are operating under VFR: this is especially so when dealing with military crews. Moreover, the pilot's concurrence must be obtained if controllers are going to ask pilots to maintain visual separation when departing under IFR. Whilst cognisant of the promulgated procedures at civilian aerodromes and the range of services provided by civilian ATSUs, military pilots might not be so familiar with some of the more unusual or less obvious differences between military and civilian ATC practice. Consequently, military crews should not always assume that when conducting an instrument approach/departure procedure that ATC would provide separation against other ac, which, as illustrated here, is not the case at all at civilian aerodromes outside CAS if pilots declare that they are operating VFR. Thus when operating with civilian ATSUs, military crews should be careful to emphasise the flight rules under which they are operating and ensure that the controller is in no doubt about it. This will remove any room for misunderstanding as to whether it is the pilot or the controller who is going to take the appropriate steps to ensure the requisite separation between flights.

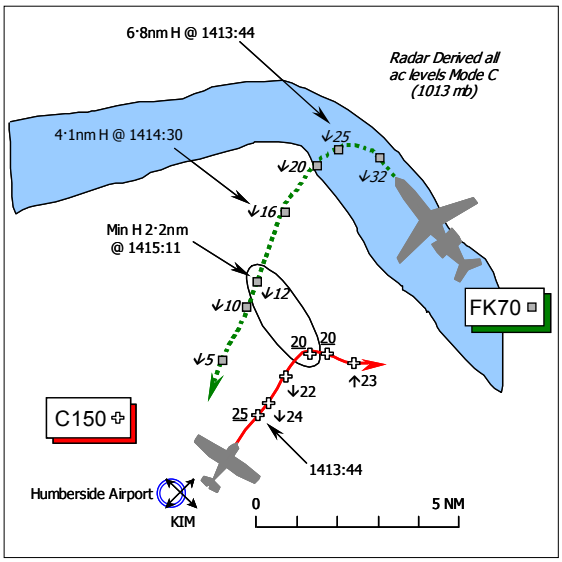
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a TCAS RA, the combination of his visual separation from the Nimrod and high ground had caused the Saab 340 pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 021/05

Date/Time:	3 Feb 1415	
Position:	5338N 00016W (5nm NE Humberside Airport - elev: 122ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	F70	C150
Operator:	CAT	Civ Trg
Alt/FL:	1700ft (QNH 1034mb)	3000ft (QNH)
Weather	VMC CLOC	VMC CLOC
Visibility:	8km	4nm
Reported Separation:	500ft V/2nm H	1000ft V/3nm H
Recorded Separation:	800ft @ 2·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FOKKER FK70 PILOT reports that he was flying inbound to Humberside from Amsterdam and in communication with Humberside APPROACH on 119·12MHz. [UKAB Note (1): The APR placed the flight under a RAS upon leaving CAS].

Heading 205° at 160kt inbound on the ILS approach to RW21 passing 1700ft Rad Alt, there was VFR single engine traffic descending "within minimum separation". The other ac's pilot had been instructed to maintain 3000ft outbound on the procedure from the 'KIM' NDB, but descended to 2000ft. Minimum horizontal separation was 2nm as the other ac passed to port some 500ft above his FK70. ATC discovered the "altitude bust" of the other traffic and instructed its pilot to climb. The other ac was spotted – although he did not specify the range – and no avoiding action was required nor was a TA or RA enunciated. The risk was not assessed.

THE C150 PILOT, a flying instructor, reports he was conducting an IFR training sortie and executing the NDB/DME procedure to RW21 at Humberside, whilst in receipt of a RIS from Humberside APPROACH on 119·12MHz.

Flying at 80kt in VMC some 500ft clear of cloud with an in-flight visibility of 4nm, outbound on the procedure heading 025° level at 3000ft as instructed by ATC, he acquired the inbound FK70 visually N of the Humber and informed ATC accordingly. The student had allowed the height to reduce to 200ft below their assigned altitude of 3000ft and he had told the student to climb back to 3000ft before ATC instructed them to turn onto 090°. He was then asked if he still had the FK70 visual which he did as the latter crossed the S bank of the Humber and said so, only losing visual contact with the FK70 as it passed through their 7 o'clock and then well behind them – at a range of 3nm or more. He assessed that there had been "no " risk as he had been visual with the airliner throughout.

THE HUMBERSIDE APPROACH RADAR CONTROLLER (APR) reports that the C150 pilot had been cleared for an NDB/DME approach to RW21 and had reported "Beacon Outbound" after being instructed to "maintain altitude 3000ft until advised" under a RIS. The FK70 was established on the LLZ under a RAS and had been cleared to descend on the ILS from an initial cleared altitude of 2000ft Humberside QNH (1034mb). Traffic information was passed to each pilot about each other's ac and the pilot of the C150 reported he was "visual" with the FK70. Whilst the APR's attention was briefly diverted by other tasks, he noticed that the C150's Mode C was indicating 2700ft descending. At that point the C150 was established on the outbound leg of the procedure from the 'KIM' and as such was on an opposite course to that of the FK70, offset to the E by about 2nm. When he detected the "level bust" he instructed the C150 pilot to fly a heading of 090° to deconflict with the FK70 and checked that the C150 pilot was still 'visual' with the airliner, which he was. Further traffic information was passed to the FK70 crew who reported "visual" with the C150 and affirmed that they were happy to continue. At the point he noticed the confliction, he believed that the two ac were about 3-4nm apart and vertical separation was about

600ft on Mode C. After the avoiding action vector passed to the C150 pilot the minimum separation was about 2-3nm and 800ft respectively; he did not believe there was any risk as both pilots reported 'visual' with each other's ac. The Captain of the FK70 indicated that he would file a report with his company.

The Humberside 1420UTC weather was reported as surface wind: 320/07kt; vis: >10km; cloud: BKN 4800ft; OAT: 08/03. QNH: 1034mb.

[UKAB Note (2): The Claxby radar recording shows the FK70 inbound to Humberside and turning onto the LLZ at 1413:44, descending through 2500ft Mode C (1013mb) which equates to about 3130ft Humberside QNH (1034mb). Simultaneously, the C150 is shown 6·8nm away at the same level. A review of the RT transcript (the Humberside RTF transcript gives only 30sec and 1min time injects) reveals that the C150 crew reported visual with the airliner just before 1414:30 whereupon a continuous descent becomes evident. As the FK70 descends on the ILS approach the ac converge. The APR first noted the C150's excursion below the assigned level after 1414:30, when the APR queried "[C150 C/S]..*can you confirm you are maintaining altitude 3000"*, to which the C150 crew responded *"maintaining 3000ft"*. Whereupon the APR then issued a R turn transmitting "[C150 C/S] *make a right turn heading 090° immediately acknowledge"*, which the C150 crew read-back, just before the APR confirmed that the C150 crew was still visual with the FK70. The avoiding action turn becomes evident as the C150 eventually 'bottoms out' at an indicated 2000ft Mode C, which equates to about 2630ft QNH at 1415:11, when the minimum horizontal separation of 2·2nm occurs. Nonetheless, by this time the FK70 has descended and is shown 800ft below the C150, before the latter is shown in a climb back to their assigned altitude. The APR advised the FK70 crew of the C150's descent within traffic information transmitted at 1415:00, whereupon the crew confirmed that they *"have him in sight no problem"*.]

ATSI reports that there are no ATC causal factors readily apparent within this Airprox. The pilot of the C150 was cleared for the NDB DME approach to *"maintain altitude 3000 feet until advised"*. This instruction was read back correctly by the C150 pilot. As soon as the controller realised that the C150 was not maintaining 3000ft he took action by turning the ac, but did not use the term 'avoiding action'. Both pilots reported visual with each other.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was noted that there had been no RT Airprox report nor any mention of an Airprox until the FK70 pilot's report was received at the UKAB nearly 3 weeks after the event. The Board implored pilots to make clear their intentions to file an Airprox on RT at the time to ensure that ATCOs were made aware of the situation. This sequence ensures that timely data gathering actions would commence, allowing reported pilots and controllers alike the opportunity to compile their submissions promptly whilst events were still fresh in their minds. Fortunately, the ATCO involved here had filed a report for an 'incident' anyway.

The crux of this Airprox had evidently been the descent by the C150 below the assigned altitude of 3000ft QNH. Whilst the APR's plan in the provision of the Approach service was to separate these two IFR flights vertically, this entailed the FK70 descending through the C150's altitude on the procedure whilst horizontal separation existed. It was therefore essential that the C150 student pilot should maintain their assigned altitude accurately whilst the FK70 was vectored onto finals and then descended on the LLZ beneath the light ac. Consequently any descent by the C150 below 3000ft would immediately heighten the potential for confliction.

The radar recording showed that the C150 student pilot had indeed descended some 370ft below the assigned altitude at the closest point and this was the fundamental reason for the erosion of standard separation. The C150 instructor pilot had reported that he had noted the descent below 3000ft QNH and had told his student to climb back to this altitude before the APR had instructed them to turn R onto 090°. Although the C150 instructor pilot had the FK70 in sight throughout, his student had taken some time to regain their assigned altitude and even 30 sec after the turn instruction was issued Members noted there was no evidence of a climb back to 3000ft. Vertical separation was based on strict compliance with controller's instructions and Members were concerned that the C150's assigned altitude of 3000ft QNH (1034mb) had not been regained as expeditiously as might have been warranted. Clearly there is a happy mean in allowing students to identify/rectify their own mistakes so that they can learn from them. Notwithstanding any learning point that might have arisen and which the instructor might

have been endeavouring to explain to his student, civilian controller Members stressed that it was absolutely essential that pilots maintain their assigned levels accurately and it was not acceptable to deviate significantly from that given. The learning point here was that whilst flying in the instrument pattern instructors must not allow their students to deviate to any marked degree and such excursions as might occur must be identified and corrected before there is any possibility of their student's error impacting on other flights and eroding standard separation against other traffic in the pattern. As it was the APR had detected the C150's descent from the ac's indicated Mode C and was able to initiate a turn away to the E, thus removing any potential for the situation to deteriorate further if the student pilot could not regain his altitude quickly, which he did not. Nevertheless, with the pilots of both ac aware of the situation and visual with each other's ac vertical separation was quickly restored as the FK70 descended on finals. Members concluded therefore that whilst the FK70 pilot's concern about any erosion of separation was entirely understandable, this Airprox report was but a sighting report of the C150, where, in the circumstances reported here, no risk of a collision had existed.

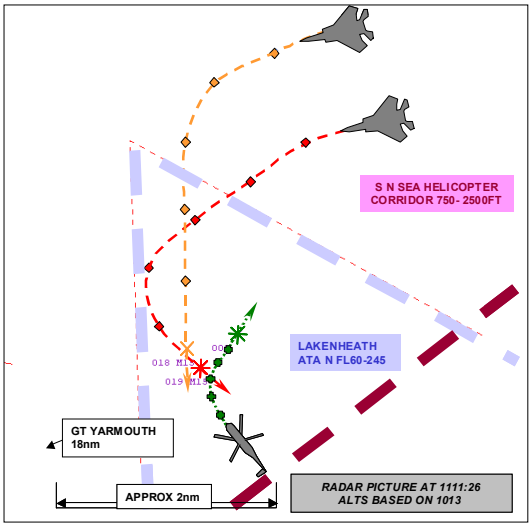
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 022/05

Date/Time:	22 Feb 1111	
Position:	5249N 00158E (25nm ENE Norwich)	
Airspace:	S N Sea Helicopter Corridor (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	SK76	F15 C (x2)
Operator:	Civ Comm	Foreign Mil
Alt/FL:	1000ft	2000ft
	(RPS 1013 mb)	(N/K)
Weather	VMC CLOC	VMC
Visibility:	8-10km	Unlimited
Reported Separation:		
	<1nm H	1000ftV/1.5nm H
Recorded Separation:		
	1000ft ft V/ 0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S76 PILOT reports flying a passenger flight to an oilrig 65nm NE of Norwich with HISLs, anti-colls and searchlights on squawking as directed with Mode C and in receipt of a modified RAS from Anglia Radar, but TCAS was not fitted. While heading approximately 065° at 140kt and 1000ft he was given an 'avoiding action' turn onto heading 320°. He complied with the instruction and simultaneously sighted 2 low-wing military fast-jet ac with twin tails. Once they stated and reconfirmed that they were visual, they were invited to resume their own navigation. The 2 ac then turned towards them and passed close behind and above them. They assessed the risk of collision as low if the jets had seen them otherwise high.

UKAB Note (1): The S N Sea Helicopter Corridor is promulgated at the UKAIP ENR 1-15-2/3 and in the UK Mil AIP Vol 3 Part 1–8-14. In the area of the incident the vertical dimensions are 750-2500ft amsl and ac wishing to penetrate the Corridor are to call Anglia Radar. (The Cromer radar recording shows that S76 was operating well inside both the lateral and vertical dimensions of the Corridor).

THE F15 C PILOT reports that he was leading a pair of grey F15 ac with no TCAS fitted on a tactical sortie conducting high energy manoeuvres in the Lakenheath ATA (N) [he thought]. London Mil Radar had cleared the formation to work from the surface to FL190 in the ATA [see UKAB Note (2)] for low altitude formation work followed by Basic Fighter Manoeuvres (BFMs). They set up the formation in 2.0nm line abreast tactical formation and descended to 2000ft agl and began practising basic tactical manoeuvres at 1500-2000ft until comfortable in the low altitude regime. He visually picked up traffic 5nm S of the formation while passing through W in a turn to the S. He called the traffic to his No 2 who immediately also acquired the traffic visually. The formation flew a southerly heading to avoid flying outside the confines of the ATA and ensured they did not conflict with the helicopter, passing to its W. The formation had climbed back to 2000amsl and came no closer than 1.5nm to the helicopter that was radar locked and assessed to be at 1000amsl. Upon passing 4-5nm S of the helicopter he turned the formation back to the E and manoeuvred 10-15nm E of the helicopter, continuing their low altitude training. A few minutes later the formation was asked by London Mil to climb above FL50 to avoid the helicopter. Since he saw the helicopter throughout and manoeuvred to avoid it, he assessed the risk as none.

UKAB Note (2): The Lakenheath ATA (N) is defined at UK MIL AIP Gen and ENR 5-2-7. The vertical dimensions are from FL060 to FL245. The horizontal boundaries in the area of the incident are as marked on the diagram above. In the incident area the Helicopter Corridor (UKAB Note (1)) lies below the base of the ATA, from 750-2500ft amsl.

ABERDEEN CONTROLLER reports that he was acting as instructor on Anglia Radar. Two London Mil squawks were observed on a N track, their Mode C indicating a rapid descent. The student passed TI to the S76, which was on a NE track, as the military ac descended through FL100. On the next radar sweep, the military squawks

were observed at approximately FL35, just ahead of the S76. An avoiding action L turn onto 330° was given and although the S76 pilot reported the ac in sight, he complied with the heading instruction. The Military squawks then turned S and further avoiding action of 090° was issued to the S76. He then telephoned London Mil to advise that their ac had been involved in an Airprox and the S76 pilot indicated he would also be filing.

UKAB Note (3): The recording of the Cromer radar shows the incident in detail.

MIL ATC OPS reports that the London Military Controller 15 (Con 15) was working a pair of F15s transiting from Lakenheath to the Lakenheath ATA under a RIS. At 1104:50 he broadcast *"...manoeuvre as required between surface to FL190, I cannot give you vectors below FL40, you are responsible for terrain clearance, limited traffic information below FL100 for the base of radar cover."* The lead F15 pilot acknowledged this call. The second F15 in the pair was given a squawk and at 1107:45 was identified *"...Radar Information."* Con 15 reminded the pilots of the previous limitations and at 1111:00 Con 15 informed the F15s *"...I've lost radar contact FIS now"* and then at 1113:00 he told them *"...I've got... ...Anglia Radar on the line... ...working a helicopter in your present position, were you visual with the helicopter?"* One of the pilots replied *"...negative we were tally ho the aircraft, working towards the south now."*

Con 15 was using the Great Dun Fell/Debden composite picture at the time of the incident. However, analysis of the Cromer Radar at 1107:00 shows the F15s coasting out 7.5nm SE of Cromer, tracking NE and indicating FL230; at the same time the SK76 was squawking Mode 3/A 0227, 2.5nm NE of Cromer tracking NE and indicating FL10. The F15s and the SK76 continued on parallel tracks and at 1107:41 the second F15 can be seen to squawk 6155. Shortly afterwards the ac indicated FL194 whilst the first F15 indicated FL181; the F15s were in a descent whilst the SK76 continued at FL10. At 1108:22, as the F15s indicated FL161 & FL162, they commenced a left-hand orbit, completing the orbit at 1109:26 with the lead F15 indicating FL120 and the second F15 FL131; they then appeared to begin aggressive manoeuvring. At that point the second F15 was 7nm SE of the SK76 which indicated FL11. At 1109:48 the F15s took up a NW track heading towards the SK76 but at that point their Mode Cs were not showing. Shortly afterwards, at 1109:53, the second F15 displayed a Mode C of FL80 and was 4.3nm from the SK76 and on a converging track. On the next radar sweep the same F15 indicated FL071 whilst the SK76 continued to indicate FL11 and the first F15 displayed no Mode C indication. The second F15 then lost its Mode C for 2 sweeps as it continued to converge with the SK76 and then at 1110:16 when the ac were 2.5nm apart, it indicated FL43. The F15s continued their descent line-astern as they passed 2.3nm ahead through the SK76's 12 o'clock at 1111:31, indicating FL21 on the second F15 and FL25 on the lead F15 (which was astern of his playmate). At the same time the SK76 commenced a tight left turn, continuing to indicate FL10. The F15s continued their descent, though less quickly, and at 1111:00, when they were 3.6nm NE of the helicopter, both jets were indicating FL15 and commenced a L turn coming back towards the SK76 which had taken up a NW track. At 1111:19 the helicopter made a tight R turn as the F15s, which were then 1.4nm N it, turned S towards the helicopter indicating FL17. The CPA was at 1111:31 when the F15s passed 0.5nm astern of the SK76 with the jets indicating FL18 and FL19 and the SK76 indicating FL09.

Con 15 used correct phraseology throughout to identify the F15s and also to pass their clearance to manoeuvre along with appropriate limitations to their service for both terrain clearance and radar cover. Since Con 15 lost radar contact with both F15s as they indicated passing FL15 it is reasonable to accept that he would not have been able to see the SK76 (which indicated between FL09 and FL11) throughout the encounter. However, it is standard best practice at LATCC(Mil) for a controller, who is controlling ac in the vicinity of the Airprox and below FL50, to liaise with Anglia Radar to ascertain whether any traffic is known in that area. If this liaison had taken place then TI would have been exchanged between LATCC (Mil) and Anglia and the aircrew informed. The appropriate unit action has been taken.

ATSI reports that the pilot of the S76 contacted Anglia Radar at 1103:25 advising that they were outbound from Norwich bound for the Sean Papa (approximately 70nm NE of Norwich) at 1000ft. The flight was identified and initially placed under a RIS until it crossed the coast, at 1105:30, when it was placed under a modified RAS.

The S76 continued on its track and at 1109:40, the controller passed TI on two military tracks that were manoeuvring to the SE of the S76 by some 6nm. The height readouts, at that stage, were FL105 and FL141. Shortly after 1110, the two tracks turned towards the S76 and so the controller updated the TI as one Mode C readout was indicating FL43. During this transmission the two tracks continued to close on the S76 and so the controller issued an avoiding action turn instruction to turn left onto 320º. At that time, the closer of the two tracks was in the 2 o'clock position at a range of 2.5nm. The S76 pilot reported "*..we are visual both of those but we're*

manoeuvring as instructed". The two tracks then continued northbound and crossed 2.3nm to the E of the S76 as they descended through 2500ft. The controller advised the S76 crew that it appeared the ac were clearing to the N descending through 1600ft and so the S76 could resume its own navigation. The pilot of the S76 reported visual with them, as they appeared to be turning back towards the coast.

At 1111:10, the controller requested the crew of the S76 to report if they lost visual contact with the traffic, as they were now 2nm N of the S76 at 1500ft and turning back towards the helicopter. Without breaking the transmission, an advisory avoiding action turn onto 090º was issued as the ac passed down the left hand side of the S76 at a range of 0.6nm and 700ft above it. The S76 pilot reported visual and, soon afterwards, that he would be filing an Airprox report.

HQ 3AF comments that the F-15 formation was cleared by Con 15 to manoeuvre between the surface and FL190; the formation then operated in accordance with Con 15's seemingly unambiguous clearance. On acquiring the S76 both F-15s avoided it by what they assessed to be an adequate margin. The crews were unaware that they had infringed the Helicopter Corridor until after landing.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

At very short notice the HQ 3AF Advisor could not be present so Members were briefed by the Secretariat that even with hindsight opinion among 3 AF's pilots was far from unanimous on what they would have done when faced with a similar situation. Only those with extensive experience of operating in the UK understood that there was no clearance to enter the Corridor as it was controlled by a different agency (based 500 miles away). Among Members too there was some sympathy with the F15 pilot's view that the 'clearance' even if not positively stated at least implied that they were permitted to enter the Corridor. This however, perhaps only due to technicalities, was not the case. That said, it was unanimously agreed that the London Military Controller could have been much more pro-active in preventing the occurrence either by warning the crews about the Corridor or by contacting Anglia Radar and informing them of the F15s.

Following a correct and timely avoiding action by Anglia Radar the S76 pilot was able to acquire the F15s visually and manoeuvre to avoid them; they too saw and avoided the S76. Although the Anglia Controller did not achieve the separation required under a modified RAS, this was never going to be possible due to the dynamics of the situation: the avoiding action he did give was effective in preventing a conflict.

The Board was pleased to note that since this incident London Military Radar routinely informs Anglia of any ac in the area receiving a service from them.

PART C: ASSESSMENT OF CAUSE AND RISK

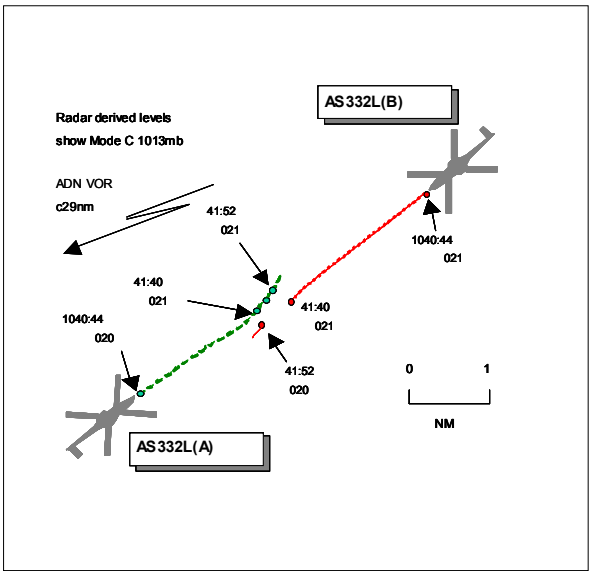
Cause: The appearance of the F15s in the S N Sea Helicopter Corridor caused concern to the S76 crew.

Degree of Risk: C.

Post Meeting Note: The HQ 3AF Advisor undertook to ensure that 3 AF crews were debriefed on the S N Sea Helicopter Corridor and entry procedures.

AIRPROX REPORT NO 023/05

Date/Time:	2 Mar 1042	
Position:	5729N 00126W (28nm ENE ADN VOR)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	AS332L (A)	AS332L (B)
Operator:	CAT	CAT
Alt/FL:	2000ft (QNH 1010mb)	2000ft (QNH 1010mb)
Weather	VMC CLOC	IMC CLOC
Visibility:	>10km	10km
Reported Separation:	nil V/100m H	nil V/100m H
Recorded Separation:	0V/0.2nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS332L (A) PILOT reports heading 060° at 117kt and 2000ft QNH 1010mb outbound to Buchan Oil Rig and in receipt of a Modified RAS from Aberdeen RADAR, squawking with Mode C. ATC had given a 'Forties non-standard 2000ft' and when abeam NOBAL they were given a direct routeing to Buchan A. In clear air with good visibility and approaching a cloud bank approximately 2nm ahead, the Capt (PNF) saw a helicopter appear out of the cloud directly ahead at a range of 0·25nm at the same level. He took control and banked 30-40° L and the other ac passed down their starboard side, within 100m, 3sec later. The other ac's decals and markings were clearly visible and it was identified as another AS332L from his company, registration X-XXXX. ATC were informed and they admitted that they had made an error. The crew were in no doubt that a collision was imminent had evasive action not been taken.

THE AS332L (B) PILOT reports heading 240° at 132kt and 2000ft QNH 1010mb inbound from Tiffany Platform and in receipt of a Modified RAS from Aberdeen RADAR [on the same frequency] squawking with Mode C. They had just flown out of a snow shower when the Capt (PNF) saw a helicopter 0·25nm ahead at the same level and on a reciprocal heading. He assessed that they would miss, as the other helicopter was seen to be in a steep turn and it passed 100m down their starboard side. He informed ATC on the RT that an Airprox would be filed.

THE ABERDEEN HELS SC provided a comprehensive report the content of which is encapsulated in the ATSI report below.

ATSI reports that the Controller had been in an operational position for just over 90min when the Airprox occurred. Initially he had opened the BRENT Sector before switching 15min later to the REBROS Sector. This was subsequently bandboxed with the HELS Sector. However, realising that the combined sector was going to get busy, it was decided to split the sector and he then took over the HELS Sector and this occurred 15-20min before the incident. He described the traffic loading as moderate-busy but the workload as high at the time of the incident. He explained that the high workload was as a direct result of a number of events which built up to form a major distraction from his task. These events included co-ordination with the CRC Boulmer, a temporary failure of the CCTV screen showing the weather information, perceived unavailability of ATC staff, weather avoidance and Aberdeen airspace becoming Class A due to a Royal Flight.

Aberdeen is not equipped with Short Term Conflict Alert (STCA) and neither of the helicopters involved in the Airprox has TCAS fitted.

AS332L (B) established communication with the HELS Controller at 1020, reporting at 2000ft. The flight was identified on the 063° Radial at 74nm and provided with a Modified RAS (MRAS). It was issued with a joining clearance to RW34, direct to BALIS, to enter the zone VFR not above 1000ft.

(Note: There is an MOU between NATS and specified companies operating offshore support helicopters for Aberdeen ATSU to provide a modified form of RAS tailored to their requirements. This MRAS is defined in the Aberdeen MATS Part 2, Section 2, Appendix A, as: 'The aim of the Aberdeen ATSU will be to provide 'Standard Separation'. However, when tactically advantageous, the following separations may be offered within North Sea Airspace: 500ft vertical separation together with associated traffic information. NB. This separation will only be accepted in VMC or for participating traffic operating at the same level on either converging, following, or overtaking tracks, traffic information together with pilot confirmation that visual contact exists with the conflicting traffic. The pilot then assumes the responsibility for maintaining adequate separation from the conflicting traffic in accordance with the Rules of the Air. A pilot may elect at any time not to accept these separations, in which case 'Standard Separation' will be applied.' Additionally, the following applies to terrain clearance under a MRAS: 'In order to provide the flexibility necessary for the Aberdeen ATSU to be able to vector aircraft during the provision of MRAS, the pilot of a specified helicopter will at all times, when flying within 'North Sea Airspace', be responsible for terrain clearance and the prevention of collision with any object on the surface').

In the event, both helicopters should have been provided with standard separation under the conditions applicable at the time.

Approximately 9min after AS332L (B) had made contact on the frequency, the HELS Controller received a telephone call from Boulmer, saying that they were breaking previously agreed co-ordination. He said that he had already been somewhat agitated by a previous request for co-ordination, which should have been addressed to another controller as it was not in his area of operation and, additionally, when receiving various 'scraps' of paper detailing proposed military movements in the Danger Areas to the E of Aberdeen. He explained that he was rather concerned when told that the co-ordination already agreed was to be broken as he had helicopter traffic in the area that he believed would be affected. It took over 3min on the telephone to try and resolve the situation. Just as this telephone exchange was terminating, AS332L (A) made its initial call on the frequency on a Forties 2.0 (i.e. 2000ft) IFR departure. The normal method of operations at Aberdeen is to assign altitudes of 1000ft and 3000ft to outbound helicopters and 2000ft (or quadrantal flight levels which provide 1000ft separation against 3000ft outbounds) to inbounds. On this occasion, because of icing conditions, it was agreed that outbound helicopters would be issued with an 'Opposite Direction Level' of 2000ft. In accordance with local procedures, the non-standard level was agreed with the HELS Controller and the level on the fps was 'boxed' to indicate its non standard nature. The flight was identified, placed on a MRAS and routed direct to Buchan.

The controller commented that he was aware of the potential confliction between the inbound AS332L (B) at 2000ft and the outbound AS332L (A) at the same altitude. His plan was to issue AS332L (B) with an early descent to 1000ft, to achieve the requisite vertical separation between the subject helicopters and to this end he had taken the precaution of 'cocking out' AS332L (B)'s fps as an aide memoir. He mentioned that, when he was warned of the departure of AS332L (A) at 2000ft, he had requested the APR Controller to transfer the helicopter to his frequency early. But, as this was not operationally possible, the flight only contacted him at the Zone Boundary. He explained that had it called earlier, with the pilot's agreement he would have cleared the flight at 1000ft, with the pilot assuming responsibility for terrain clearance, in order to achieve separation from AS332L (B). By the time that AS332L (A) came on frequency, he had already given descent to another inbound helicopter to 1000ft, to ensure separation between those two flights. Consequently, AS332L (A) maintained 2000ft with the controller's intention of monitoring the situation and descending AS332L (B) when appropriate.

In the 10min period after AS332L (A) had contacted the frequency, there were 5 inbound and 4 outbound flights under the control of the HELS Controller. During this period, having been reminded by the ADC Controller that the CTR was becoming Class A airspace due to a Royal Flight, he had to change the clearances to the inbound helicopters from VFR to Special VFR. In the same period one helicopter had to relay messages for another that was outside radio range and to add to the workload another requested weather avoidance. The controller said that also during this time he had been closely monitoring the progress of the military traffic operating to the E of Aberdeen that had been the subject of the previous co-ordination. He explained that his impression was that when Boulmer had informed him that the agreed co-ordination would be broken, it would occur straight away. Even though the military traffic was indicating on the radar display as being above FL200, a sudden dive he reasoned could put these aircraft into confliction with one of the outbound helicopters under his control. Consequently, in

the period leading up to the Airprox, his attention was drawn to that part of the radar display. It was also around this time that he wished to inform the Watch Manager of the difficulties he was experiencing with Boulmer and their associated traffic but was unable to locate him. Additionally the weather CCTV situated above the radar console momentarily failed. This again distracted his attention away from the radar at a critical time, as he had to spend time resetting the displayed information. Distracted from his task, he did not observe the subject helicopters flying into close proximity. He first became aware of the situation when the pilot of AS332L (B) reported, *"just had a aircraft pass same level same height half a mile"*. Once this transmission was acknowledged, the pilot of AS332L (A) transmitted *"and XXX we er concur we saw it going the other way"*. Both pilots, subsequently, reported the miss-distance as 100m at the same level, having only seen each other at a range of 0.25nm, as AS332L (B) had flown out of a snow shower.

Much discussion took place concerning the Letter of Agreement between NATS Aberdeen, RAF Leuchars and CRC Boulmer. Basically, when Boulmer becomes aware of any intended sortie profiles intending to operate below FL100 in the vicinity of the Helicopter Main Routes (HMR), the controller will telephone Aberdeen to advise of the details. They will not effect any form of co-ordination at that stage. Once Boulmer are aware of the actual flight details, including the base level, then co-ordination can be effected. Aberdeen may ask, as on this occasion when the previous co-ordination was being re-negotiated, if an alternative base could be accepted but the possibility exists that this might not be agreed, again as in this event. Military crews are responsible for ensuring compliance with the base unless reasonable notification is given to Aberdeen, through Boulmer, that an altitude change is required. There would appear to have been some ambiguity over the aspect of reasonable notification in the period leading up to the Airprox i.e. when the co-ordination was being broken, whether it would affect the base level immediately.

It is understood that the Unit Management at Aberdeen are to review the procedures, whereby in icing conditions departing helicopters are cleared outbound at the same altitude as the inbounds. As a result of the investigation into this Airprox, it is considered that this matter should be treated with some urgency. The present system is not 'fail-safe' in that it relies on the controller monitoring the situation to the extent that he would be able to intervene in a timely manner to ensure separation is maintained. Clearly, as on this occasion, the controller concerned could be distracted from this task and with the lack of any other safety back-up, apart from see and be seen by the helicopter crews involved, serious consequences could follow. Whereas it is realised that during icing conditions the altitudes available are severely restricted, the use of 1500ft offshore should be explored, not necessarily to provide only 500ft separation, but as an initial clearance whilst the progress of the relevant flights are monitored. Should, subsequently, the controller be distracted from his task, it would at least ensure a minimum vertical separation of 500ft.

FLIGHT OPS INSPECTOR (HELICOPTERS) comments that it appears that it is an ATC problem and not one which calls into question the procedures carried out by the helicopters' crews. Non-standard altitudes are not uncommon and they require pilots to have good situational awareness, but this is no different from the requirements of normal airmanship. They do not consider that there would be any benefit in reviewing helicopter SOPs as a consequence of this incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Specialist Members agreed that the 'Modified RAS' is an appropriate ATS for this type of operation. The NATS Advisor confirmed that action is in hand regarding the ATSI recommendation that the Unit Management at Aberdeen should review the procedures whereby in icing conditions departing helicopters are cleared outbound at the same altitude as the inbounds. The Advisor confirmed that the issue would be resolved before the onset of the Winter season.

The Board considered this to be a most serious incident. Members agreed with FOI (H) that it appeared to be purely an ATC lapse and that both pilots had acted correctly in the circumstances. A helicopter specialist Member informed the Board that it was likely that both ac were equipped with precision navigation and height keeping systems and would have been operating on autopilot: their three-dimensional positional accuracy on the nominated radial would therefore have been quite precise.

ATC specialist Members stated that the practise of using 'opposite direction levels' (ODL) is discouraged in all types of airspace throughout the UK as it is never a failsafe procedure and, as in this case, is especially vulnerable if the controller becomes distracted and does not adequately monitor the situation. Best practise is always to build in lateral or vertical separation from the outset thereby ensuring no confliction arises in the first instance. In this Airprox the icing conditions had caused the controller to allocate an ODL initially. Had he carried out his plan to issue AS332L (B) with an early descent to 1000ft, normal separation standards would then have been applied. Regrettably, self-induced pressure and distraction had combined to degrade his attentiveness to an extent that he missed this vital action. The Board was advised that some of the distractions were perceived and avoidable. In the light of the controller's comments, Members considered the supervision aspects and level of support provided to the controller but on the basis of advice from ATSI and the NATS Advisor concluded that these had not been factors. At the time of the incident the Watch Manager was correctly located in his office and was on a pager. Other staff could have reset the Weather TV system. It would seem however, that the controller had allowed the busy military situation to assume an unnecessarily high significance and this had caused him to temporarily overlook his plan to separate the subject ac which were on conflicting flight paths.

Under the terms of the Modified RAS he was providing, the Aberdeen SC was required to ensure that the stipulated separation minima were maintained between these two helicopters. Notwithstanding the workload and distractions, that he did not do this allowed the ac to fly into conflict. Consequently the Board agreed that the cause of the Airprox was that the Aberdeen Hels SC did not ensure separation between the subject ac. Members agreed that the very prompt action taken by the pilot of AS332L (A) had done just enough to avert a collision. This together with the assessment by the pilot of AS332L (B) that as the other helicopter pilot had already effected an avoiding action steep turn and that they would miss each other clearly showed that the safety of these two ac had been compromised in this situation.

The Board was encouraged that considerable follow-up action had already been suggested and as mentioned above, NATS has already proposed the limited use of 500ft separation when weather conditions so require. The NATS Advisor informed the Board that this suggestion had been rejected some time ago by, he thought, an international pilot body (see Post Meeting Note (1) below). Nonetheless, it seemed both to ATC and specialist pilot Members that this would provide a pragmatic solution to the problems encountered in this incident: Members therefore proposed an appropriate Safety Recommendation stressing that, with the agreement of the operators who use a Modified RAS, 500ft separation should be available as an option to the controller when necessary.

The Board is firmly of the view that safety can be enhanced by the fitment of electronic collision warning systems, either in the air (ACAS) or on the ground (STCA). The Board was informed by a specialist helicopter pilot Member that the AS332L operator had set aside funding for the fitment of TCAS 1 to their ac but that difficulty was, he thought, being encountered in gaining EASA approval for the modification (see Post Meeting Note (2) below). Wishing to add its weight to the operator's efforts, the Board was minded to make an appropriate Safety Recommendation. In addition to the above NATS have confirmed that whereas STCA cannot be fitted to existing radar equipment at Aberdeen, installation is scheduled for 2008. Furthermore, procedures for liaison with military units have been clarified.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Aberdeen Hels SC did not ensure separation between the subject ac.

Degree of Risk: B.

Safety Recommendations:

023/05-1 The CAA should require NATS to devise and implement a standard procedure for use in the North Sea Area, under conditions agreed with the helicopter operators, such that in circumstances when helicopters would otherwise be obliged to fly at the same altitude on conflicting tracks, an acceptable form of separation is assured from the outset.

023/05-2 The AS332L operator should proceed with its plans to fit a CWS to its North Sea helicopter fleet with all speed.

Post Meeting Note (1): Enquiries after the Board meeting established that some five years ago discussions had been held between pilot bodies and NATS regarding the possible use of 500ft vertical separation minima *generally* over the North Sea. No changes were made to extant procedures, not least because such a procedure does not comply with ICAO standards. In the light of this Airprox, the proposal to use 500ft separation in a limited way as an alternative to Opposite Direction Levels, only for initial clearances when the available levels are compressed by icing conditions, might have merit. The appropriate organisations are therefore giving the proposal full consideration.

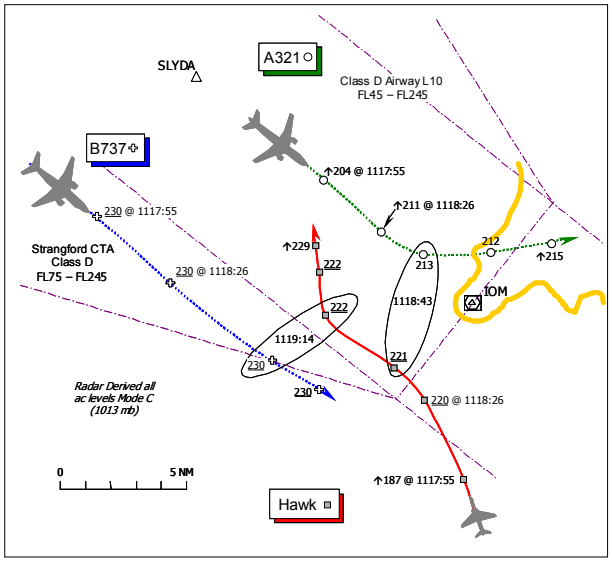
Post Meeting Note (2): To clarify the situation regarding the modification of the AS332L to accept ACAS – specifically TCAS I - a representative of the AS332L operator was contacted after the Board meeting. The subsequent discussions lead to the detailed wording of Safety Recommendation 023/05-2 above.

AIRPROX REPORT NO 024/05

Date/Time: 3 Mar 1122
Position: 5410N 00440W (IOM)
Airspace: Airway L10 (Class: D)
Reporter: ScACC ANTRIM SC

	First Ac	*Second Ac*	*Third Ac*
Type:	A321	B737-700	Hawk
Operator:	CAT	CAT	HQ PTC
Alt/FL:	FL218	FL230	FL220
Weather	VMC CAVOK	VMC CLAC	VMC
Visibility:	50km+	>10km	
Reported Separation:			
ANTRIM SC: 800ft V/5nm H			
	800ft V/5nm H	5nm H	nil V/2nm H
Recorded Separation:			

v A321: 800ft V/4·6nm H. v B737: 800ft V/2·8nmH



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ScACC ANTRIM SECTOR CONTROLLER (ANTRIM SC) reports that the LJAO NW Controller (LJAO NW) phoned to co-ordinate the Hawk against the A321 and the B737. LJAO NW was given a crossing clearance of Airway L10 with the Hawk at FL180 and then to take 1000ft Mode C separation below the A321, which was still in the climb. Moments later the Hawk was observed in the vicinity of ISLE OF MAN (IOM), within L10, climbing through the level of the A321. The A321 crew was passed traffic information and a L turn before a further L turn was given as avoiding action. The Hawk was now pointing at the B737 and appeared level at FL220: as the Hawk's intentions were still unknown the B737 crew was given traffic information. When the Hawk cleared behind the A321 the crew was instructed to resume their own navigation to WAL. The A321 pilot reported he had reacted to a TCAS RA against the Hawk and was subsequently handed over to LACC. STCA was activated but he thought that prescribed separation was not lost and reported that the minimum horizontal was 5nm and the minimum vertical 800ft.

THE A321 PILOT reports that he was en-route from Belfast City to London Heathrow, IFR, executing an en-route climb to their cleared level of FL250 and in receipt of a RCS from ScACC. Passing FL218 in CAVOK approaching IOM heading 130° at 400kt, traffic "appeared" on TCAS at 2 o'clock and a TA was enunciated. ATC "advised" a "turn left due traffic ahead 090°", then a further L turn onto 050° for avoiding action simultaneously with the TA; an RA was not enunciated. The other ac – which was not seen - passed 5nm away 800ft above his Airbus and ATC advised them to "continue en-route". He assessed the risk as *"low"*.

THE B737-700 PILOT reports that he was outbound from Aldergrove to Liverpool IFR and in receipt of a "Radar Advisory" service, he thought, from ScACC ANTRIM SC, in VMC. Heading about 120° at 320kt, SW of the IOM, in a level cruise at FL230, they heard the SC passing avoiding action to the A321 crew. The controller then told him [the B737 pilot] in a subsequent transmission that the Hawk was also climbing up through their level. As they replied to ATC, TCAS enunciated a TA. He looked in the direction of the TCAS warning symbol and saw the Hawk some distance to the N of their position flying in the opposite direction whilst turning away from his B737 as it climbed through their level abaft the port wing. The Hawk was about 5nm away he estimated when he first sighted the jet, because he could just make out the shape and colour. He assessed the risk as low because they had been warned by ATC and were flying in good VMC.

THE LJAO NW SECTOR CONTROLLER (LJAO NW) reports that the Hawk was pre-noted to depart from Valley, requesting a climb to FL280, then to enter low-level at the Isle of Arran before recovering to Leuchars. When

established under a RCS he climbed the Hawk to FL180 because the LAKES and ScACC SOUTHWEST Sectors were experiencing high levels of traffic. He telephoned ANTRIM SC for co-ordination against the A321 climbing out of Belfast City to Heathrow and the B737 in-bound to Liverpool. He had requested that the A321 be stopped at FL250 which would have given him sufficient time to climb the Hawk above both the subject airliners but ANTRIM could not agree that request. ANTRIM SC subsequently informed him that the A321 was in a continuous climb but offered a cleared Flight Path [CFP] of FL180 (which, with hindsight, would have been the safer option) or co-ordination of 1000ft Mode C for the Hawk below the climbing A321. The 1000ft Mode C separation below the climbing A321 option was accepted. To enable further climb to the requested level he turned the Hawk, planning to go astern of the A321 whilst instructing the Hawk pilot to climb to FL220 immediately, unwittingly breaking the agreed co-ordination. The turn was not enough as the A321 had appeared to turn towards the Hawk (possibly due to the wind): therefore a further L turn was necessary. The Hawk was going behind the A321, but too close, and with the A321 unnaturally slow in the climb, he gave an avoiding action turn onto a heading of 270° to maintain 5nm horizontal separation as the Hawk was approaching FL220 and the A321 had still not climbed through FL230. After approximately 1nm he turned the Hawk back onto a heading of N and instructed the pilot to climb to FL280, as the jet was now clear of both the A321 and the B737. At the moment he issued avoiding action to the Hawk it appeared that ANTRIM had given an avoiding action turn to the A321.

THE HAWK PILOT reports that he was flying as a singleton outbound from Valley and in receipt of a RCS from Swanwick (Mil) LJAO NW whilst transiting N to descend low-level at Arran. The assigned code was selected with Mode C but neither TCAS nor any other form of CWS is fitted.

Whilst approaching the IOM heading N at M0·78 clearance to climb from FL180 to FL220 had been issued by LJAO NW. When he reported level at FL220 he was informed of co-ordinated traffic 1000ft above their level. Initial avoiding action was given by the controller to turn L 340° whereupon they became visual with a twin jet airliner banking away from them "co-altitude" just R of the nose about 4nm away. They were then given further avoiding action eventually onto a heading of 270° before turning back to track 360°. The risk of collision was assessed as high due to the "head-on co-altitude flight path".

ATSI reports that the A321 and the B737 were both eastbound on airway L10 routeing towards the Isle of Man and in communication with the Scottish ANTRIM SC. Both flights had been placed on headings by the SC and the A321 was climbing to FL250 whilst the B737 was climbing to FL230. At 1116:30, the LJAO NW controller telephoned and requested whether the ANTRIM controller was in contact with the A321 and the B737. The ANTRIM SC advised that he was and passed the levels to which the two ac were climbing. The LJAO controller advised that he wanted co-ordination in respect of traffic 10nm S of the IOM – the Hawk - which was some 30nm SE of the A321. After a brief discussion the ANTRIM SC said "*You're clear to cross at 180 and take a thousand feet below the (A321 callsign) if that helps*". This was agreed and the conversation ended with the ANTRIM SC saying: "*Okay co-ordinated*".

At the time this conversation ended, the A321 was passing FL190 for FL250 with the Hawk at FL180 in its 2 o'clock at a range of 21nm. Meanwhile the B737 was level at FL230 8nm SW of the A321. At 1117:53, the Mode C of the Hawk indicated a climb when 14½nm from the A321. The Hawk continued to converge on the A321 and climb when, at 1118:05, the ANTRIM SC passed traffic information and avoiding action to the A321 pilot. The Hawk was in the 2 o'clock position of the A321 at a range of 10nm and both were at FL207. With both ac climbing and still converging the ANTRIM SC passed a further avoiding action turn. At 1118:40, traffic information was passed to the B737 crew, as the Hawk, now at FL220, had turned L towards the B737. The Hawk was now 5·3nm S of the A321 and 700 feet above it. The Hawk then maintained FL220 and passed down the left hand side of the B737, which was maintaining FL230, at a range of 2·8nm.

In a subsequent telephone conversation between the ANTRIM SC and the LJAO NW controller, it became clear that although the agreed co-ordination was to cross at FL180 the LJAO controller intended to 'take 5 miles' on the A321 and cross at a level above that agreed.

MIL ATC OPS reports that the LJAO NW Controller was controlling a Hawk transiting from Valley to Leuchars via the Isle of Arran whose pilot was requesting a climb to FL280. ScACC ANTRIM Sector was controlling the A321 heading SE climbing on L10 and a B737 on a parallel track to the S routeing to Liverpool and climbing to FL230. At 1112:40, LJAO NW transmitted to the Hawk pilot that the flight was *"...identified FL90, climb FL180, approaching controlled airspace, radar control."* The pilot acknowledged and there then followed several administrative transmissions dealing with items such as the pilot's intentions and the status of ranges, none of which were

relevant to the Airprox. At 1116:32, LJAO NW contacted the ANTRIM Sector to request coordination against the B737 and the A321. In response to the request by NW, ANTRIM stated that the B737 would be stopping its climb at FL230 and when asked about the intentions of the A321 the ANTRIM controller said that, *"...he's going to 250 and then further with Southwest."* NW then asked if the ANTRIM controller could stop the Airbus's climb at FL250 in order that he could climb the Hawk to FL 260 and be co-ordinated above. The ANTRIM controller refused and stated that NW was, *"...cleared to cross at flight level 180 and take a thousand feet below...*[the A321]." NW responded *"...I'll do that, I'll take a thousand feet below...*[A321 C/S]." Immediately after this conversation, at 1117:27, NW instructed the Hawk pilot to *"...turn left heading of 340°"* for co-ordination. Nine seconds later NW told him to *"...climb FL220"* and followed that transmission with traffic information on the A321 at 1117:53, *"...traffic northwest, 12 miles, tracking southeast, coordinated a thousand feet above you."* The pilot of the Hawk replied that he was *"...looking"* and at 1118:14 was told to turn further L onto 320° for co-ordination. The pilot acknowledged and confirmed that he was level at FL220. At 1118:36, NW transmitted to the Hawk *"...avoiding action, turn left heading 270"* and the pilot acknowledged the turn and stated that he was *"...visual with traffic in the right 2 o'clock"* which was the A321 indicating FL211. At 1119:05, with the ac safely diverging, NW turned the Hawk back onto a northerly heading and instructed the pilot to climb to FL280.

Analysis of the Great Dun Fell Radar recording at 1116:32, shows the Hawk 28nm SE of SLYDA, tracking 350° level at FL180 Mode C. At the same time the A321 is seen 2·4nm NW of SLYDA tracking SE with its Mode C indicating that it was climbing through FL170; the B737 is seen 11nm W of SLYDA on a parallel southeasterly track to the A321 and indicates level at FL230 throughout the incident. At 1117:55, the Hawk and the Airbus are 14·1nm apart; the Hawk turns L onto NW and is seen to commence a rapid climb with the Mode C indicating FL187, then NMC and then FL206. Both ac maintain their respective tracks until 1118:26 when the Hawk's Mode C indicates that it levels off at FL220 as the A321 indicates FL211 when the two ac are 6·8nm apart. Upon the next sweep both ac start to show L turns, which correlate with the avoiding action instructions issued as the Hawk continues to indicate FL221 whilst the A321 indicates FL212. Both avoiding action turns continue to take effect and the CPA can be seen on the recording at 1118:43, when the ac are 4·6nm apart with the Hawk indicating FL221 and the A321 indicating 800ft lower at FL213. The Hawk maintains FL222 on a northwesterly track to pass 2·8nm abeam and parallel to the B737, which maintains FL230. Shortly afterwards, as the Hawk continues to diverge from both airliners, it is seen to turn R onto N and recommence a climb.

At the time of the incident the traffic situation on LJAO NW was light and the controller was acting as both TACTICAL and PLANNER controller. He had 2 ATC students plugged into the console with him but stated in his report that their presence on the Sector did not influence the outcome of the incident. When the Hawk first called LJAO NW, the controller correctly identified the ac, placed it under a RCS and climbed the ac to FL180. The controller was aware that the requested cruising level was FL280 but elected to stop off the climb at FL180 to avoid GAT. LJAO NW was aware of the B737 and the A321, which was climbing en-route to Heathrow. The controller's intentions were to climb the Hawk to FL260 to be above the B737 and hope that ANTRIM would stop off the Airbus at FL250, which is the standard outbound level from Belfast City for high level ac entering LACC airspace. However, when he contacted ANTRIM for co-ordination, the ANTRIM controller refused to stop the climb because the ac had to make its assigned level in LACC airspace. Although a relatively inexperienced controller and notwithstanding the standing agreement level between ScACC and LACC for Belfast City high level outbounds, NW should have known that given the late notice of his request it was highly unlikely that ANTRIM SC would agree to it. What ANTRIM offered was a crossing clearance at FL180 and co-ordination to take 1000ft Mode C separation beneath the A321, which at the time was passing FL189 in the climb. LJAO NW signalled his agreement to the proffered co-ordination, but immediately after he turned off the landline with ANTRIM SC he instructed the Hawk to turn L onto a heading of 340° and followed this up with an instruction to climb to FL220. At this point the A321 was 15nm NW of the Hawk climbing through FL196. LJAO NW reported that he had decided to turn the ac L with the intention of going behind the Airbus in order to allow the Hawk to climb further. However, from the radar replay it was clear that this heading would not be sufficient to maintain 5nm horizontal separation. Traffic information on the A321 was passed to the Hawk pilot by LJAO NW stating that GAT was co-ordinated 1000ft above, which at this stage it was. However, by the time that the further L turn on to 320° was issued the ac were around 10nm apart with the Hawk passing FL206 and the Airbus climbing though FL207. It is clear from the radar replay that the heading of 320° was also insufficient to maintain the required separation and by his actions NW had clearly breached the agreed co-ordination with the ANTRIM SC. The subsequent avoiding action was effective and STCA on the LJAO NW controller's display did not activate but without the intervention of the ANTRIM SC separation would have been reduced still further.

HQ PTC had nothing further to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was emphasised that whilst STCA did not enunciate on LJAO NW's display, the ScACC STCA did activate on the ANTRIM SC's display between the Hawk and the A321, and later the B737, which added credibility to the ANTRIM SC's justifiable concerns over this Airprox. Evidently, LJAO NW had elected to initiate co-ordination to facilitate an early climb in compliance with the Hawk pilot's requested transit level of FL280, the controller suggesting that ANTRIM might stop the A321's climb to accomplish this. The Mil ATC Ops report had made it plain that LJAO NW should have realised that it was highly unlikely that ANTRIM SC would have been able to agree to his request and a civilian controller Member confirmed this view. The Member explained that the ANTRIM SC was working to a standing agreement with LACC that was quite complex and any variation from the 'norm' would have entailed further co-ordination by ANTRIM SC, both internally with ScACC SW Sector and externally with LACC. Co-ordination at this late stage - just prior to switching the A321 across to LACC at the Sector boundary - was not justifiable and as such ANTRIM could not accede to LJAO NW's request. As it was, ANTRIM proposed a crossing of this Class D airspace at the lower level of FL180, beneath the level that the A321 was passing at the time, with the facility of climbing the Hawk beneath the climbing A321, which NW accepted saying *"...I'll do that, I'll take a thousand feet below...*[A321 C/S]" - but the Board recognised significantly that this agreement did not encompass the B737. The Mil ATC Ops report had shown that although LJAO NW had accepted this co-ordination, he had subsequently elected not to adhere to what he had agreed. Whilst recognising that LJAO NW was perfectly entitled to do this in CAS with OAT under his control, he had not communicated this to the ANTRIM SC. Moreover, the onus was solely on LJAO NW to maintain separation against the two GAT flights. In effect, LJAO NW had elected to 'take 5' [5nm horizontal separation or 5000ft Mode C] by climbing the Hawk to FL220, intending to vector the Hawk astern of the climbing A321. However, although this placed the Hawk 1000ft below the level of the B737 upon which no co-ordination agreement had been reached, the radar recording had shown that the nimble jet had out-climbed the A321 and was now above it as the Hawk closed rapidly on the still climbing A321 whilst horizontal separation was reducing. By then there was insufficient airspace within which to manoeuvre between the two airliners and it had been shown that the controller's plan to effect separation was not working as the LJAO NW controller had expected. Therefore, the Board agreed unanimously that this Airprox had resulted because the LJAO NW controller elected not to follow the coordination agreed and did not achieve standard separation against the two ac in the airway.

In their consideration of the risk inherent within this encounter, the Board was also assessing the level of risk against both the A321 and the B737. Controller Members were concerned that the LJAO NW controller had not communicated his intentions to the ANTRIM SC when he changed his plan. Thus when confronted with the Hawk above the climbing A321, contrary to the agreed co-ordination, ANTRIM was wise to take pre-emptive action by passing both traffic information and avoiding action. Whilst LJAO NW subsequently recognised his plan would not work and issued an avoiding action westerly turn to the Hawk pilot to try to prevent the erosion of standard separation, it was clear to the Board that it was also the combination of ANTRIM SC's prompt avoiding action turn which also helped to preserve what separation there was. Nevertheless, ANTRIM should not have been placed in that difficult situation. A controller Member also noted that the traffic information passed by LJAO NW about the A321 at 1117:53 – just under 1min before the CPA - *"...traffic northwest, 12 miles, tracking southeast, coordinated a thousand feet above you",* whilst theoretically correct was potentially misleading. At that stage the A321 had not achieved its assigned level and the Hawk was already above it which might have had the pilot looking the wrong way. It was therefore fortunate that the Hawk pilot spotted the A321 when he did - without any further prompt - when it was 900ft below him to starboard after he had been given avoiding action. From the other cockpit the A321 crew had also been alerted to the presence of the Hawk by TCAS, but the situation was such that an RA was not enunciated.

Concern was expressed about some of the phraseology used by CAT pilots when reacting to TCAS. Here, after being told that the Hawk was passing behind their ac, the A321 crew had said, *"..with a TCAS..*[C/S] *roger we got ours as an advisory"* which, the Board was told, had made ANTRIM SC concerned over the potential for a further RA. CAT pilot Members emphasised the applicable promulgated terminology and encouraged pilots to stick to the recognised phraseology when advising ATC to avoid confusion and a salutary lesson. Whilst the Hawk pilot had assessed the risk as "high due to the head-on co-altitude flight path", the combination of the avoiding action proffered at these distances coupled with the Hawk pilot's visual sighting had, in the Board's opinion, effectively

removed any risk of a collision against the A321. No traffic information had been proffered by LJAO NW about the B737 nor had the Hawk pilot reported sighting it. Conversely, ANTRIM had advised the B737 crew about the Hawk who had spotted it to the N. Moreover, the Hawk was stopped off 1000ft below the B737 and the former had cleared to the N of the airliners path. Therefore, the Board agreed that no risk of a collision had existed in the circumstances reported here.

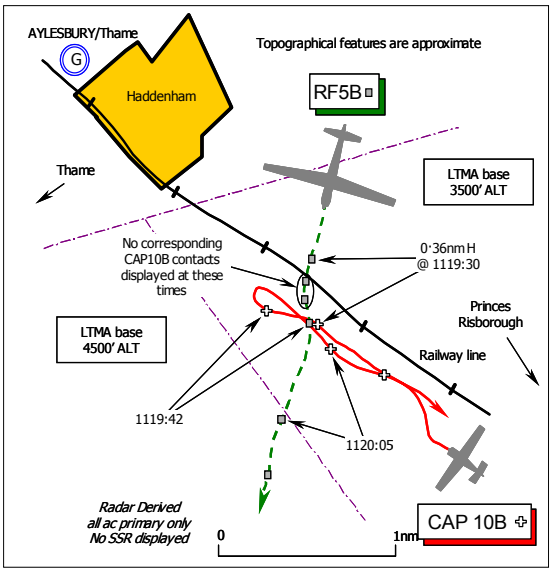
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LJAO NW controller elected not to follow the coordination agreed and did not achieve standard separation against the two ac in the airway.

Degree of Risk: C.

AIRPROX REPORT NO 026/05

Date/Time:	6 Mar 1119 (Sunday)	
Position:	5145N 00054W (2nm SE of Haddenham)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Sportavia RF5B	CAP10B
Operator:	Civ Pte	Civ Trg
Alt/FL:	2800-3000ft (QNH 1029mb)	2500-3400ft amsl
Weather	VMC CLBC	VMC NK
Visibility:	10km	NK
Reported Separation:	20m H	Not known
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SPORTAVIA RF5B MOTOR GLIDER PILOT reports his ac has a predominantly white colour-scheme with yellow trim. SSR is not fitted.

The flight was conducted with his co-owner as a passenger - who is also a PPL holder - they had departed from Peterborough/Sibson aerodrome and were en-route to Popham VFR in level cruise at 3000ft QNH (1029mb) in VMC some 500ft clear below cloud whilst listening out with Cranfield on 122·85MHz, but he was not in receipt of any ATS.

At the time of the Airprox he had been flying for about 30min in the cruise between an altitude of 2800 - 3000ft to keep clear of cloud and well below the lower levels of the Luton CTA in the area some 5nm S of Milton Keynes. Heading 205°, some 3nm E of Little Horwood disused aerodrome he thought, [UKAB Note (1): The radar recording reveals the Airprox actually occurred some 2nm SE of AYLESBURY/Thame Glider site at Haddenham] at 90kt, the white CAP10B was first seen low, in his 11 o'clock about 50m away as it flew towards him climbing and rolling R. To avoid a collision with the CAP10B, he very quickly dived down in a port turn as the other ac passed some 20m ahead of his ac – he stressed this was just a little more than his ac's wingspan of 17m - from L- R with a *"very high"* risk of a collision. Whereupon he realised that the CAP10B was inverted – as it flew into his 2 o'clock high position – before its pilot completed a barrel roll to a wings-level upright position as it flew away from them. As they continued southbound away from the area where the Airprox occurred, both he and his passenger noticed that the CAP10B had continued with its aerobatic manoeuvres well behind them. The flight to Popham was continued with no further incidents. He added that his ac has excellent all-round vision from the omni-visual cockpit except downwards because of the low-wing.

He stressed that he has been flying for over 42 years with an amateur PPL with over 1370 power flying hours and over 1900 gliding hours, including over 1000 hours as a BGA full rated Instructor with a CFI rating for 2 Gliding Clubs. His passenger is also a current glider pilot and they have not seen anything, not even another glider in a thermal, pass as close as the CAP10B did.

THE CAP10B PILOT reports his ac is coloured white and on the day of the Airprox he was operating VFR from Denham aerodrome and was not in receipt of an ATS. Although SSR is fitted, Mode C was selected off.

Although he has no recollection of the event itself he provided a frank and very comprehensive account: his logbook shows that his chock-chock times to/from Denham were 1045-1140 UTC, thus placing him airborne at the time of the reported Airprox - 1119. The flight was a dual aerobatic training sortie for a moderately experienced qualified pilot with whom he had flown once before. The operating area chosen was along a stretch of railway line

which tracks approximately 300° between the towns of Princes Risborough and Thame; this railway line constituted the axis for their aerobatics - 180° clearing turns were carried out either between manoeuvres or as they approached the limits of their operating area, typically after 2 manoeuvres. The flight consisted of a transit flown to the operating area below 2500ft amsl, completion of the appropriate checks, followed by his demonstration and student practice of a variety of aerobatic manoeuvres, using a base altitude of 2500ft. Typically, looping manoeuvres in the CAP10B have a vertical extent of 800ft.

Since commencing operations from Denham in late January, he has flown some eighteen sorties with a similar profile in the same area. On a typical occasion, he sights 5-6+ other aeroplanes in reasonably close proximity as they transit the area, some of which pass sufficiently close for him to suspend manoeuvring for the duration of their passage. He recalls nothing untoward about the flight in question and he therefore concludes that either he sighted the other ac and did not consider its presence as a threat to their safety or the other ac remained unsighted at all times. It is somewhat sobering to contemplate the latter case, due to the heightened lookout required during aerobatics.

It is clear that, for a variety of reasons, the area to the NW of the Chiltern Hills is a busy piece of sky. Maybe there is a case for alerting other pilots to regular aerobatic practice areas in a manner similar to that carried out in, say, France. One has to ask why a White Waltham based aeroplane is forced to conduct its training flying from Denham, thus limiting the choices of aerobatic operating area to a dramatic extent.

UKAB Note (2): The Heathrow Radar recording does not illustrate this Airprox clearly. Nevertheless, the RF5B Motor glider is shown as a primary contact approaching the Airprox location [no SSR fitted], which occurred to the W of the of the railway line to the SE of Haddenham. Meanwhile the CAP10B is shown on a generally northwesterly course, but does not display SSR at all. The two ac are shown some 0·36nm apart at 1119:30, just before primary contact on the CAP10B is lost for two sweeps, during which the Airprox occurred. The CAP10B ac is not evident again until 1119:42, when it is shown flying away on the RF5B's starboard beam at a range of 0·24nm, presumably after the CAP10B has crossed from L-R ahead of the RF5B. Meanwhile the avoiding action L turn (and dive) reported by the RF5B Motor glider pilot is evident. The CAP10B then turns about and proceeds SE bound astern of the Motor glider that continues southbound.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Whilst understanding the CAP10B pilot's difficulties in the choice of an area to undertake the training, this locale beneath the LTMA was perhaps in retrospect not a good place to conduct aerobatics. The presence of CAS from an altitude of 3500ft had the unwelcome effect of compressing the myriad of other airspace users - all vying for passage and the use of the limited Class G airspace available - into this narrow piece of the FIR where the principle of 'see & avoid' predominates. The CAP10B pilot's suggestion of separate areas for aerobatics did not meet with widespread support amongst the Board Members, the GA Member opining that there was little justification for 'exclusive aerobatics' areas in the already confined airspace over the heavily populated areas of southern England. Whilst the main railway line SE of Haddenham might be a useful reference feature for aligning the axis of an aerobatic manoeuvre, Members warned that it was probable that other GA pilots would be encountered navigating along it, heightening the potential for encounters - although not the case here. The radar recording had shown that this Airprox had occurred a little further down the RF5B pilot's track than he at first thought, just as he was crossing the line feature. He reported the CAP10B was first seen only 50m away to port and indeed the small CAP10B would have been a difficult ac to spot closing on a fairly steady relative bearing until it finally crossed ahead of the Motor Glider. It was evidently a very late sighting on the RF5B pilot's part which in the Board's opinion was part of the cause.

The Board commended the CAP 10B pilot for his comprehensive account which had revealed that although he could not recall anything untoward about the flight, he had surmised that either he had spotted the other ac and did not consider its presence a threat or the other ac had remained unsighted at all times. In the former case it seemed inconceivable to the Board that a pilot would continue to execute an aerobatic manoeuvre across the nose of another ac at the distances reported if he had actually sighted the other ac in time to do anything about the confliction. Such an action would be foolhardy in the extreme so the Board dismissed this possibility. Alternatively, as the CAP10B pilot had himself suggested, in all probability he had not seen the RF5B Motor Glider at all beforehand which the Board agreed in their experience was far more likely despite the excellent visibility from this

ac's cockpit. In this crossing scenario the CAP10B pilot was required by the 'Rules of the Air' to give way to the RF5B but it would not have been feasible to comply with these responsibilities if he had not sighted the other ac in time to do so. The CAP10B pilot's suggestion that the "heightened lookout required during aerobatics" made it more likely that other traffic would be spotted was, in a Members' opinion, a questionable assumption. Just because a pilot is actually looking out of the cockpit for visual cues during aerobatics does not necessarily imply that a pilot's lookout to detect other ac during the manoeuvres was any better: his view was probably concentrated only into the airspace into which the ac was about to fly and possibly to the detriment of an all-round scan for other ac entering the chosen airspace. This Airprox illustrated that point of view quite clearly. The Board concluded, therefore, that this Airprox had resulted from a non-sighting by the CAP10B pilot and a very late sighting by the RF5B pilot.

The radar recording had not shown the CAP10B at the critical moment as it crossed ahead of the RF5B, possibly because of the high-energy manoeuvres being flown in this ac of small cross-sectional area, which made it doubly difficult for the primary radar to detect at these altitudes and so far from the radar head. Therefore, the minimum separation that pertained could not be confirmed independently with any certainty. Nonetheless, the predicted track of the CAP10B in relation to the RF5B contact suggested that the minimum separation reported by the latter's pilot was possibly not too far wide of the mark. The reported avoiding action L turn was shown, but at a speed of 90kt the dive might have been the most effective form of avoiding action to get out of the way of the inverted CAP10B. Despite the avoiding action taken, at these relative distances with only one pilot aware of the proximity of the other ac, which was conducting aerobatic manoeuvres of an unpredictable nature, the Board concluded an actual risk of a collision had existed in the circumstances reported here.

Whilst not specifically germane to this incident, the Board noted that the radar recording had shown that the CAP10B was apparently not transponding on either Mode A or C throughout the encounter, despite the pilot's report that the ac was so fitted. Members wholeheartedly recommended that pilots select their SSR transponders to an appropriate conspicuity code with Mode C to make their ac more 'visible', both to ATC radars and also to other ac's TCAS equipment. Here, although the RF5B pilot was not in receipt of a radar service, the selection by the CAP10B pilot of the special purpose code of A7004 [Aerobatics & display] would have made his ac far more apparent to controllers at SSR equipped ATSUs with an indication of what he was doing. Thus, if necessary, they could have either given his ac a wider berth or informed other pilots in receipt of an ATS flying in the vicinity that aerobatics were being conducted. Purely in the interests of flight safety, the Board recommended that GA pilots use their SSR equipment to the maximum extent feasible, in line with national guidelines and the SSR operating procedures stipulated within the UK AIP at ENR 1-6-2-1.

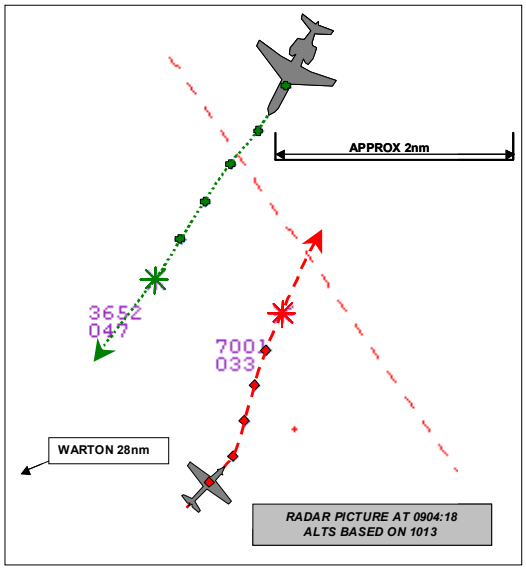
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the CAP10B pilot and a very late sighting by the RF5B pilot.

Degree of Risk: A.

AIRPROX REPORT NO 027/05

Date/Time:	4 Mar 0904	
Position:	5401N 00217W (27nm NE Warton)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	FA20	Tucano
Operator:	Civ Comm	HQ PTC
Alt/FL:	4000ft	NR
	(QNH 1010 mb)	NR
Weather	IMC in Cloud	VMC CLBC
Visibility:	Nil	
Reported Separation:		
	1000ft V/<1nm H	Not seen
Recorded Separation:		
	1400ft V/0.9nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FA20 PILOT reports flying a transit to Warton in receipt of a 'limited radar service on transponding ac only' IMC in the descent heading 220° at 220kt squawking as directed with Mode C. He was initially cleared from FL60 to 3500ft on Warton QNH but ATC subsequently amended clearance to level at 4000ft due to pop-up traffic in his 11 o'clock at 5nm indicating 3000ft. He saw a TCAS contact in that position which closed and was observed climbing through 3000ft. He received a TA alert inside 3nm that quickly changed to an RA requiring a gentle climb and the crew elected to turn right, away from the TCAS track, whilst following the RA. The target ac was displayed as topping off at 3400ft before descending back to 3000ft and passing down the LHS at an undetermined range. No visual contact was gained and the cloud base was 3000-3500ft with scattered Cu. He assessed the risk as being medium.

THE TUCANO PILOT reports flying a Medium Level Navigation instructional sortie with a student pilot squawking 7001 then 4506 with Mode C. The sortie was discontinued due to weather to the N and they were booked into the DLFS to enable flight below 2000ft AGL if required. At the probable time of the incident they were VFR clear of CAS positioning for recovery and establishing contact with Linton ATC. As neither ac saw the other he cannot say for certain that his ac was involved: however, probability and radar evidence suggests that his ac was the one reported. As he was not aware of the Airprox until some time later his recollection of the events is vague.

UKAB Note (1): The recording of the St Annes Radar shows the incident clearly. The Airprox occurs at 0904:18 with the Tucano in a left turn onto a NNE track climbing through FL33 and the FA20 tracking SW at FL47 descending. The Tucano passes 0.8nm behind the FA20.

MIL ATC OPS reports that the Tucano was not yet in contact with Linton on Ouse at the time of the Airprox.

ATSI reports that at the time of the Airprox the FA20 was in receipt of a radar service from Warton. The Warton radar was unserviceable and so use was being made of the Great Dun Fell radar. This permitted the Warton APR to provide traffic with a Limited Radar Service, issuing traffic information and avoiding action only in respect of transponding ac.

The FA20 pilot established contact with the Warton APR at 0859:50 and, for the reasons described above, was placed under a Limited RIS. The ac was maintaining FL60 and 48nm NE of Warton. At 0902:45, the APR asked the crew to report ready for descent. The pilot replied that he was ready and was cleared for initial descent to an altitude of 3500ft. Almost immediately after this clearance was issued, a 7001 squawk appeared to the SW of the FA20: initially, this ac appeared to be on a SE track but then commenced a left turn towards the FA20. APR instructed the latter's crew to stop their descent at 4000ft and passed traffic on the 7001 squawk that was now in

their 12 o'clock position at a range of 7.2nm. The FA20 had just started descent and the Mode C was indicating FL59 whilst the unverified Mode C from the 7001 squawk showed FL30.

The pilot of the FA20 reported a TCAS contact and confirmed he was levelling at 4000ft. Further TI was given at 0904:05, when the 7001 squawk was in the 11 o'clock position of the FA20 at a range of 2.6nm and indicating 1400ft below. The APR transmitted "C/S *that traffic now climbing in your left half past eleven range two indicating three thousand four hundred unverified if not sighted suggest a right turn heading three zero zero*". The 7001 squawk continued and passed down the left hand side of the FA20 at a range of 0.9nm and 1400ft below. The APR advised the crew of the FA20 that the traffic was passing down their left hand side to which the pilot replied that they had just taken avoiding action and they were now turning left back on track.

Even though the FA20 was under a Limited RIS the APR both passed TI and instructed the crew to stop their descent, additionally suggesting suitable avoiding action. The APR had therefore gone beyond the normal level of service detailed in MATS Part 1 and accordingly no civil ATC causal factors have been disclosed.

HQ PTC comments that had this encounter occurred in VMC, it is unlikely that a report would have been filed. TCAS provided an extra safety margin, that ensured that adequate separation was maintained

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members considered the comprehensive reports from ATSI and the respective pilots and considered that timely and appropriate action by Warton APR and the FA20 pilot had prevented a conflict from taking place.

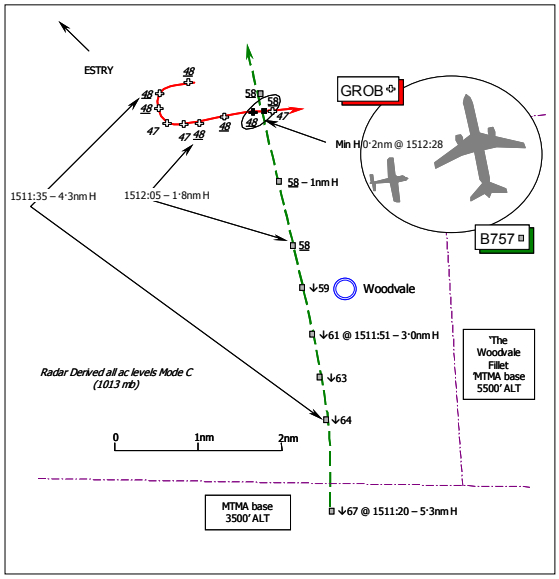
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: TCAS sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 028/05

Date/Time:	10 Mar 1512	
Position:	5337N 00304W (2½nm NNW of Woodvale - elev 37ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B757	Grob Tutor
Operator:	CAT	HQ PTC
Alt/FL:	↓4000ft (QNH 1028mb)	FL48
Weather	VMC CLBL	VMC CLAC
Visibility:	NR	Unlimited
Reported Separation:	1000ft V/nil H	~1000ft V/½nm H
Recorded Separation:	1000ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT provided a comprehensive account reporting that he was descending inbound to Blackpool from Alicante. About half way between WAL VOR and Blackpool Airport, further descent was given by Manchester RADAR from FL60 to an altitude of 4000ft QNH (1028mb) together with a L turn of 10° onto a heading of 352° followed by a frequency change to Blackpool RADAR. The speed was about 230kt and he had noticed slow moving traffic on TCAS below them in their 11 o'clock. He was somewhat surprised, therefore, to be given both descent and a turn toward this traffic but, before they had fully turned and could assess the situation, a frequency change was given to Blackpool so he decided to switch frequencies and inform them of the conflict. Adjusting the altimeter to the QNH (1028mb) placed them at an altitude of 6500ft - some 1500ft above the traffic indicated on TCAS. The rate of descent was reduced to achieve 1000ft separation from the displayed traffic and Blackpool RADAR was contacted and informed of the conflict. Blackpool informed them that they were aware of the traffic in that location but were not in radio contact with it and had no altitude readout from it. They were then turned back to the R and descended towards Blackpool Airport but not before passing directly over the traffic 1000ft below them. They told Blackpool that they would report the clearance given by MACC.

At the time, they were VMC with a cloud layer below them, which obscured the traffic displayed on TCAS and prevented visual acquisition. They never did see the other ac nor find out what it was. He was in no doubt that without the TCAS TA they would have descended directly toward the traffic and through its level creating at least a very close quarters situation.

THE GROB TUTOR PILOT, a QFI, provided a comprehensive account reporting that he was instructing a student on a *"straight and level 2"* elementary training exercise. His ac has a predominantly white colour-scheme and the taxy lights, HISLs and anti-collision lights were all on whilst flying clear above a solid overcast cloud cover that was some 1800ft below them. Operating under a FIS from Woodvale APPROACH on 312·8 MHz, a squawk of A7375 [MTMA & Woodvale local area (Woodvale UAS conspicuity)] was selected with Mode C.

Whilst flying at 100kt, eastbound at FL48 in VMC with unlimited visibility in all directions and the sun high in his 4 o'clock, his student sitting in the R seat alerted him to another ac high in their 2 o'clock that had been hidden from view behind the canopy arch. The other ac – a B757 – was quite close when first spotted at about 2nm away, in a straight descent heading generally N crossing his course at 90° from R – L, but about 1000ft above his aeroplane at the initial sighting. To avoid the B757 he immediately turned R and descended to go behind and below the airliner which continued on a steady unaltered course passing about ½ nm away and about 1000ft above his Grob descending, he assumed, towards Blackpool. He immediately reported the encounter to Woodvale APPROACH as this encounter with this civilian airliner had been virtually in the Woodvale Overhead in clear airspace.

He added frankly that a contributory factor to his late pick-up was that the B757 had been on a steady bearing that had hidden the ac behind the canopy arch. The risk he assessed as being *"low as there was always high separation"*. The omission of any pre-notification by either Blackpool ATC or MACC to Woodvale ATC was also cited as a contributory factor.

THE BLACKPOOL APPROACH RADAR CONTROLLER (APR) reports that Manchester ACC had co-ordinated the release of the B757 with Blackpool RADAR at 4000ft QNH (1028mb) to the BPL routeing WAL-ESTRY-BPL. He rang MACC for an 'ident' on the ac when it was in the vicinity of WALLASEY. The B757 did not track towards ESTRY: instead it exited CAS tracking towards Woodvale. He had seen some contacts in this area and his trainee had called the traffic [the Grob Tutor] as soon as the B757 crew reported on the frequency. However, by this time they were about 1½nm apart but without SSR he did not have an indication of either ac's level. The B757 pilot reported a TCAS contact about 1000ft below his ac. He believed that the other ac was a Grob Tutor from Woodvale but it was not in communication with Blackpool RADAR.

MACC WEST/ISLE OF MAN RADAR CONTROLLER (W RADAR) reports that the B757 was transferred to Blackpool descending to 4000ft Blackpool QNH, on a heading to keep it clear of the active Woodvale Fillet. The ac had previously been identified on radar to Blackpool by his co-ordinator – W COORD. The B757 was transferred approximately 4nm S of the CAS boundary, but after the transfer traffic was observed outside CAS indicating an altitude of about 5000ft Mode C. He understood that the B757 crew took some kind of TCAS action but was not aware of the exact details. Nonetheless, he observed that the FIR N of WAL is often very busy.

THE GROB TUTOR PILOT'S STATION comments that the Grob pilot is an experienced QFI who was operating VFR in class G airspace at the time of this Airprox with a notified conspicuity squawk being displayed [albeit unvalidated and unverified]. The Grob instructor reacted to his student's sighting of the conflicting traffic by giving way in accordance with the 'Rules of the Air'. Moreover, he maintained adequate separation with the B757 at all times. Undoubtedly, the actions of the B757 pilot in reacting to the TCAS TA forestalled any need for any dynamic reaction from the Tutor pilot and reduced the likelihood of a collision. In our view, there is no reason to doubt that the Grob QFI would have seen the B757 and reacted to it prior to this becoming a significant danger to either ac.

The area around RAF Woodvale can be very busy with GA, RAF Elementary Flying Training traffic and even the occasional airliner; this is exacerbated by the lack of radar at RAF Woodvale. Therefore, it behoves all pilots to maintain a good lookout, including monitoring TCAS where fitted, and, as in this case, to react early. Although not strictly required to, when operating in Class G airspace, RAF Woodvale traffic is generally content to contact ATC units, when asked, to help reduce potential conflictions.

UKAB Note (1): The St Annes Radar recording shows the B757 exiting the Class A MTMA into Class G airspace after descending through FL67 with the Grob steady westbound as reported at 4800ft (1013mb). The Grob Tutor which is squawking the unvalidated and unverified Woodvale UAS conspicuity squawk then turns about losing 100ft in the turn before steadying eastbound at 4800ft, which is maintained. The B757 levels at 5800ft Mode C (1013mb) some 1000ft clear above the Grob that is 1·8nm distant as the subject ac converge in conformity with both pilots' reports. At the CPA the B757 crosses 0·2nm ahead of the Grob still 1000ft above it, whereupon the Grob descends 100ft on the next sweep but no other change of course is readily apparent.

ATSI reports that the MACC W RADAR SC described his Sector as moderately busy at the time of the Airprox.

The MACC MATS Part 2 specifies the procedures for traffic inbound to Blackpool. This states that via Wallasey (WAL):

"Inbound routeing will be: WAL – ESTRY – Blackpool Airport (ESTRY is not a published hold and therefore traffic will not be held at this point). The West ATSA will pass an estimate including the SSR code to Blackpool. The West Coordinator will request an inbound level from Blackpool ATC and then coordinate this with MACC IoM. When clear of MACC conflictions the traffic will be transferred to Blackpool'. NB The MATS Part 1 states in the Preface, under the title 'Interpretation of Words', that 'will' is only used for informative or descriptive writing." This interpretation is reiterated in the MACC MATS Part 2.

The B757 crew established communication with MACC W RADAR at 1501 and reported approaching FL200, heading 011°. The flight was cleared to descend to FL170 and to route WAL-ESTRY for Blackpool. Thereafter, it was given descent in stages to FL60 and tactical turns resulting in a heading of 010°. The controller explained

that the heading changes were to ensure horizontal separation from southbound traffic routeing to the west of WAL, outside CAS under a RIS. (Except in certain circumstances, not applicable to this incident, [in accordance with company policy] MACC SCs are not permitted to provide a RAS to ac outside CAS. The resultant track placed the B757 E of the proposed WAL-ESTRY routeing.

In accordance with the procedures quoted in the MACC MATS Pt 2 above, the W COORD, at 1506, informed Blackpool about the inbound B757 that they were *"going to route him…WALLASEY ESTRY to start with".* The Blackpool Controller replied *"Okay in that case…he can have altitude four thousand feet on the QNH of one zero two eight"*. The W COORD responded, *"he'll be released at the edge of controlled airspace"*. The flight was, subsequently, identified to Blackpool APR when it was about 2nm NE WAL.

At 1511, the B757 was instructed to turn a further 10° to the left and descend to 4000ft, the altitude agreed by Blackpool. The flight was then transferred to Blackpool. The radar photograph, timed at 1511:20, as the transfer message was issued, shows the B757, passing FL67, just approaching the lateral edge of CAS i.e. the Manchester TMA, base 3500ft. The pilot was not informed that he was about to leave CAS. Also visible on the photograph, is an ac in its 11 o'clock position, 5·3nm away, squawking A7375 – the Grob Tutor – which was tracking W, with a Mode C indicating FL48. The W RADAR controller commented that he had not noted the presence of this ac when he transferred the B757 to Blackpool. W COORD stated that although he had been looking at the radar display, he also had not detected the presence of this unknown traffic. Only after the transfer had occurred did the Grob Tutor change direction to track E at FL48. This resulted in a potential confliction between the subject ac. Both controllers said that, if the unknown ac had been spotted, they would have coordinated a course of action with Blackpool to try and deconflict the two flights.

The B757 crew established communication with Blackpool APPROACH at 1511:50, reporting passing 6400ft QNH [about 5950ft (1013mb)] descending to 4000ft. The Blackpool APR Controller informed the pilot that he was providing a RIS and immediately passed information about *"traffic in your eleven o'clock range of a mile and a half no height information crossing from left to right"* – the Grob tutor. (Blackpool is not equipped with SSR.) The pilot reported that the ac was on TCAS, indicating 1000ft below. The radar recording of the incident shows that the B757 had levelled off 1000ft above the Grob Tutor.

During the investigation mention was made about the 'Woodvale Fillet'. This is described in the MACC MATS Part 2 as follows. 'In order to protect the MIRSI hold up to and including FL140 a fillet of CAS (Class A) exists which extends the MTMA to the north of the MIRSI position and is referred to as the Woodvale Fillet. Since the airspace encompassing the Woodvale Fillet is used by ac from the Liverpool and Manchester University Air Squadrons (UAS), for general handling, an airspace sharing agreement exists. During the hours 0900-1800 local daily, RAF Woodvale will normally have priority over the Woodvale Fillet airspace up to and including FL100. For conspicuity purposes only all UAS ac will squawk Code 7375 with Mode C. Both the Code and Mode C are to be considered unvalidated and unverified.' On this occasion neither of the ac involved in the Airprox were inside the Woodvale Fillet. The W RADAR controller said that the headings issued to the B757 ensured that the ac remained outside this airspace.

The W RADAR Controller was somewhat restricted in the routeing he could offer the B757. He could not go E of the track because of the Woodvale Fillet and the previously mentioned conflicting southbound traffic precluded the standard inbound track of WAL-ESTRY. Had this routeing been utilised it would have resulted in the B757 tracking further to the W, clear of the Grob Tutor.

The Blackpool APR Controller did well, in the time available to him, to issue traffic information to the B757 after its initial call on his frequency. The Airprox occurred as the B757 routed necessarily outside CAS inbound to Blackpool. It is unfortunate that neither the W RADAR controller nor the W COORD spotted the potential confliction between the subject ac before the B757 was transferred. However, the Grob Tutor had been steady on a westerly heading for some time and if it had continued on the same track, the B757 would have passed behind it. Due to known conflicting traffic routeing southbound outside CAS, the B757 was, understandably, not following the inbound routeing as stated in the MACC MATS Part 2. More importantly, W RADAR did ensure that it routed clear of the Woodvale Fillet, which was ceded to Woodvale at the time.

HQ PTC comments that this sort of encounter is not unexpected when operating in busy and constricted class G airspace. The existing arrangements to mitigate the risks in this area did not prevent this Airprox due to a chain of causal events, but in the end, TCAS and see and avoid worked and safe separation was achieved. This incident

also serves to highlight the need for pilots to be aware of the potential blind spots caused by ac structures and adjust their lookout patterns accordingly to allow an effective scan.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

This Airprox had occurred in the 'see & avoid' environment of Class G airspace and whilst both acs' crews were operating legitimately here in the 'Open FIR', the Board's Gliding advisor questioned whether it was wise for the Grob QFI to be conducting his elementary training exercise at these levels in the vicinity of the well established route into Blackpool via ESTRY. The Board was briefed that the 'Woodvale Fillet' was not occupied by any Woodvale training ac at the time of the Airprox even though the W RADAR controller had taken positive action to avoid this portion of CAS which was released to Woodvale at the time. However, it was also clear that the B757 was not following the arrival routeing WAL – ESTRY – Blackpool Airport because W RADAR had elected to modify the routeing to afford separation against other traffic operating slightly further to the W of this route, also in Class G airspace, unbeknownst to the Blackpool APR beforehand. It was not clear if the Grob pilot was aware of this route and had purposefully turned about to avoid any potential traffic on it or whether this was just purely a coincidence. Similarly, it was not entirely clear if the B757 pilot was aware that he had exited CAS into the 'Open FIR' just before the encounter. Whereas some might question the routeing of CAT through Class G airspace there was no CAS encompassing Blackpool Airport or connecting it to the main airways structure, of which in all probability the B757 crew was aware. However, when operating without a RAS there is always the potential for encounters such as this in the 'Open FIR' to the N of WAL which, the Board was aware, is a fairly busy stretch of Class G airspace utilised by many different operators. The B757 crew had certainly not been informed by W RADAR that they were about to exit Class A CAS before they switched to Blackpool ATC. Members felt that it was important that pilots should not be left in any doubt when they cross CAS boundaries resulting in a change to the ATS provided with all that this entails.

The ATSI report had made it plain that neither W COORD nor the Blackpool APR had detected the presence of the westbound Grob when the 'ident' was passed on the B757's radar contact to the latter unit. Although the Grob was correctly displaying the Woodvale conspicuity squawk with Mode C, which might well have suggested to some that the ac would not be straying very far from its base, it seemed it was not readily apparent that the conflict was about to develop before the Grob turned L, eastbound. Neither the Grob's conspicuity squawk nor the Mode C level would have been available to the Blackpool controllers who did not have the benefit of SSR data displayed to them. It was unfortunate that Blackpool ATC was not provided with SSR Mode A or C data, either from their own head or from a remote source. Nevertheless, the Grob was there to be seen on radar - both as a primary & secondary contact - and even if the Grob had maintained a westerly course the B757 would have passed relatively close astern. Moreover, if the APR had seen it at that stage he might well have asked that traffic information was passed to the B757 crew earlier. If W COORD or W RADAR had detected the Grob from its conspicuity squawk this incident might have turned out differently: indeed, both controllers had reported that they would have taken action to deconflict the two ac if they had spotted the Grob. As it was, neither of the MACC controllers had spotted the potential for confliction before they switched the B757 to Blackpool. Fortunately, the APR's trainee called the unknown contact to the B757 crew as soon as they reported on the RT but it was evident from his report that the B757 pilot had already detected the presence of the Grob before this occurred and he had elected to avoid it by effecting separation above the observed TCAS contact. This was a clear demonstration of the importance of squawking a conspicuity code and the usefulness of Mode C when operating VFR without a radar service which here had clearly 'advertised' the Grob's presence to the B757's TCAS.

For his part, the Grob QFI had spotted the B757 after a prompt from his alert student. It was unfortunate that the ac canopy arch had obscured the B757 closing on a steady relative bearing: Members echoed the Command's comments and observed that a disciplined lookout scan was intrinsic to operations in Class G airspace, moving the ac if necessary to clear blindspots behind the ac's structure. But with 1000ft of vertical separation little avoiding action was apparently necessary: although the Grob QFI had reported executing an avoiding action R turn and descent to go behind and below the airliner, little change in the ac's flightpath was apparent from the radar recording. Nevertheless, the Grob QFI was forewarned and ready to act further if needs be.

From the B757 pilot's perspective the Board understood his concern at being confronted with unknown traffic directly below him whilst following W RADAR's vectors and descent instruction. Nonetheless, he had detected the presence of the small Grob from the displayed TCAS information at an early stage. His decision to reduce the RoD - indeed the radar indicates that the B757 crew actually levelled their ac 1000ft above the Grob for a while - effectively stopped the situation from deteriorating further and whilst the B757 crew had not acquired the Grob visually, they had evidently managed to maintain safe separation by the use of TCAS alone. On this aspect CAT pilot Members observed that the B757 pilot had exhibited good situational awareness and made good use of the information displayed to him. Adding a note of general caution, these Members observed that if to avoid traffic in the 'see and avoid' environment of Class G airspace pilots necessarily depart from ATC instructions, they should do so with care and advise ATC immediately. Pilot Members were concerned that whereas it was perfectly acceptable for the B757 pilot to reduce his ac's rate of descent below 500ft/min in Class G airspace, to do so within CAS was an entirely different matter. The general flight procedures and advice for the use of TCAS stipulated in the UK AIP at ENR 1-1-3-5/7 does not differentiate between inside or outside CAS, but pilots need to keep the distinction in mind. Also, insofar as pilots should only react to RA's and shall not manoeuvre their ac solely in response to a TA, any departure from this guidance must be weighed carefully by the pilot in command against the perceived risk. Clearly here the B757s pilots decision prevented an RA from being triggered as he had detected the conflict early and taken prompt action: the Board agreed that this was entirely reasonable in the circumstances. With this in mind the Board agreed unanimously that this Airprox had resulted from a conflict in Class G airspace which had been resolved by the B757 crew.

Turning to risk although the B757 pilot had acquired the Grob on TCAS and was monitoring his display carefully to achieve vertical separation above the other ac he had not spotted the ac visually because of the intervening cloud layer he said. Conversely, the Grob pilot had indeed spotted the larger airliner after his alert students warning as it approached, notwithstanding the Grob QFI's frank assessment that this was a late pick-up at a range of 2nm, in the Board's view, he had spotted the other ac in time to avoid it if necessary. However, this was not essential because the B757 pilot had taken action himself to effect no less than 1000ft of vertical separation at the closest point as evinced by the radar recording. Consequently, the Board agreed unanimously that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

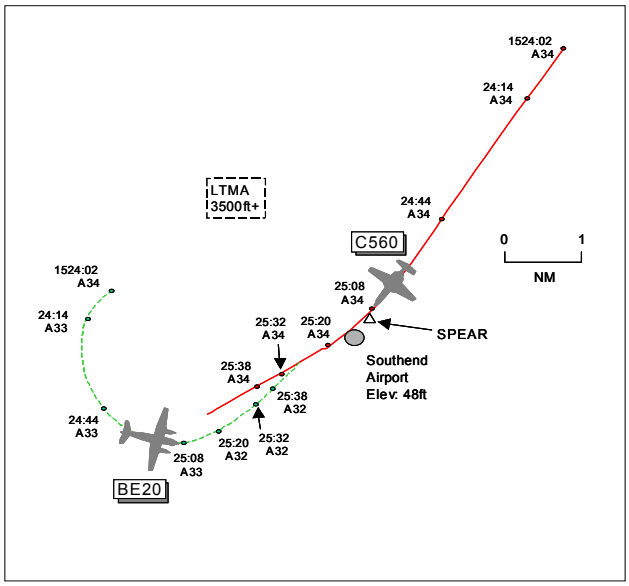
Cause: Conflict in Class G airspace resolved by the B757 crew.

Degree of Risk: C.

AIRPROX REPORT No 029/05

AIRPROX REPORT NO 029/05

Date/Time:	14 Mar 1526	
Position:	5133N 00040E (1·5nm SW Southend Airport - elev 48ft)	
Airspace:	LFIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BE20	C560
Operator:	Civ Trg	Civ Trg
Alt/FL:	3250ft (QNH)	3400ft (QNH)
Weather	VMC	VMC CAVOK
Visibility:	10km	NR
Reported Separation:	150ft V/90ft H	'below'/3nm H
Recorded Separation:	200ft V/0·15nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE20 PILOT reports heading 050° at 155kt carrying out a dual instrument training sortie in the SND holding pattern at 3400ft QNH and in receipt of an ATS from Southend on 130·77MHz squawking 7000 with Mode C. The visibility was 10km in VMC and the ac was coloured white/blue/grey with strobe lights switched on. They had previously been receiving a RIS when they departed Southend but were under a FIS in the Southend O/H. They first saw a Citation about 0·25-0·5nm away flying in the opposite direction slightly above them. They took no avoiding action as it was a late sighting of the conflicting traffic which passed about 150ft above and 90ft clear on their L with a high risk of collision. When they asked ATC if they knew of the traffic they said no, later telling them it was an oversight in a radar handover between Wattisham ATC and Thames Radar. No one had told Southend ATC of the traffic, hence no information had been passed to them. The C560 was confirmed to be at 3400ft altitude through the holding pattern; at the time of the Airprox their ac was at 3250ft which facilitated them missing the C560.

THE C560 PILOT reports heading 250° at 250kt and 3400ft QNH on an IFR plan from Norwich to London City. No airways clearance was received from London to enter CAS at CLN VOR at FL60 so radar services from Wattisham and Thames were obtained. He assumed Wattisham would liaise with all ATC units: however with TCAS and CAVOK he saw no immediate threat and in the open FIR, everyone is responsible to see and avoid. The training Capt was seated in the RH seat with a pilot U/T in the LH seat. A TCAS TA initiated abeam SPEAR – the crew had inhibited RA warnings - and the P1 saw the other ac, a BE20, and turned slightly R to avoid it, there being no immediate conflict. The P1 assessed the BE20 passed 'below' and about 3nm away to their L. Later he talked to Southend ATC and sympathised with their position having a procedure outside CAS and suggested the CAA and Southend discuss this issue.

SOUTHEND APP/APR reports that the BE20 was training in the SND hold at altitude 3400ft QNH 1013mb. The pilot reported a Citation had flown through the O/H at the same level but she did not know any details of it. Nothing was known to her, as the APP/APR, and no strange looking contacts had been observed on radar heading towards the O/H so her immediate reaction was perhaps it was a London City inbound in CAS. The BE20 pilot confirmed the other ac was SW bound but emphasised the Citation was at her level. The Southend APP/APR's colleague straight away called Thames Radar to investigate and the BE20 pilot was informed of this. The Thames Radar Controller confirmed that the C560 en route from Norwich to London City was just past the Southend O/H and had passed over the SND at 3400ft IFR. At the time of the Airprox. the BE20 was under an approach control service.

The Southend METAR shows EGMC1520Z 28012KT 9999 FEW040 BKN200 09/M02 Q1013=

LTCC THAMES RADAR CONTROLLER reports that the C560 called on 132·7Mhz in the vicinity of Wattisham, altitude 4000ft, Norwich to London City requesting a straight-in ILS R/W 28. He enquired whether the C560 pilot required to join CAS to which the response was negative. The C560 pilot was informed that he was well outside radar cover and that the service provided was FIS, London/City information 'S', RW in use 28, expect no delay. The C560 pilot was asked to report W of Southend. The pilot reported 12nm N of SPEAR and was told that the Southend area appeared to be very busy. He observed a 7000 squawk on the edge of the display heading E O/H Southend at 3400ft and the C560 was passed generic TI. The C560 pilot reported W of SPEAR and was assigned squawk 7052, identified, provided with a RIS with a tactical vector to intercept London/City RW28 ILS. Southend ATC telephoned to report that a BE20 had filed an Airprox on a Citation jet O/H Southend. The C560 pilot was informed and reported that he had had the BE20 in sight.

ATSI reports that at the time of the Airprox the BE20 was holding at the SND at 3400ft in receipt of an Approach Control service from Southend whilst the C560 was receiving a FIS from Thames Radar. The BE20 had, initially, been provided with a RIS after departure from Southend but, at 1520:10, radar service was terminated as the ac entered the Southend O/H. The radar controller reported that she had not noticed any traffic approaching the O/H from the N and was only aware of the confliction with the Citation when the pilot of the BE20 commented about it on the frequency.

Meanwhile, the Citation pilot contacted Thames Radar at 1521 on transfer from Wattisham, 12nm N of SPEAR. The flight was placed on a FIS and requested to report W of SPEAR. On making the report, the flight was asked to squawk 7052 (1524:40), the pilot reporting at 3400ft. At 1525:20, whilst still under a FIS, the Thames Radar Controller warned the pilot to *"keep a good lookout several contacts in the Southend overhead. One's indicating three thousand three hundred eastbound"*. The flight was identified and placed under a RIS only after the ac had passed. There were no ATC causal factors disclosed, with both flights receiving a FIS. However, it may have been prudent for the Thames Controller to have transferred the Citation to Southend, especially as there was traffic seen on radar in the vicinity.

UKAB Note (1): The Debden radar recording at 1524:02 shows the C560 4·8nm NE of Southend tracking 215° squawking 7000 at altitude 3400ft with the BE20 3·2nm W of Southend tracking 240° also squawking 7000 showing unverified 3400ft. Shortly thereafter the BE20 commences a L turn inbound to the SND NDB. At 1525:08 the C560's squawk changes to the allocated Thames code of 7052 showing 3400ft with the BE20 in its 12 o'clock range 3·1nm indicating 3300ft. The C560 is seen to then commence a R turn steadying on 240° 12sec later with the BE20 just L of its 12 o'clock range 1·75nm showing 3200ft. The CPA occurs between 2 radar sweeps and is estimated to occur just before the sweep at 1525:38 when the 2 ac pass port to port separated by 0·15nm horizontally, the C560 at 3400ft and the BE20 200ft below.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members empathised with the Southend APP/APR's predicament where the BE20 was holding overhead the aerodrome, just below the LTMA base, being provided with a procedural Approach Control service and its pilot had reported getting close to a Citation Jet which was unknown to the controller. Although the C560 pilot had assumed that Wattisham would liaise with all ATSUs, ultimately he is responsible for airspace avoidance or communicating with the appropriate ATSU. Although the incident occurred above the ATZ in Class G airspace with both crews responsible for separation from other ac through 'see and avoid', some Members thought it would have been prudent for the C560 crew to call Southend ATC for a service - the aerodrome is shown on charts to have a published instrument approach procedure. That said, ATCO Members opined that had he done so, the TI given on the BE20 would have contained more information on its flight details than the pilot could have gleaned from his TCAS or the 'generic' TI from Thames Radar. The C560's routeing seen by the APP/APR on her display - without the benefit of SSR, the APP/APR could not see the C560's Mode A code nor height readout - had not been assimilated as being a potential conflicting ac below CAS; she had believed it to be an ac inside CAS using SPEAR.

Pilot Members could not understand the C560 Captain's decision to 'inhibit' RA warnings on his TCAS equipment. Although the ac was flying just below the base level of CAS, so that any climb in response to an RA would have resulted in CAS entry, this element of TCAS is an important 'safety net' to guide pilots to take timely action to avoid

collisions. Without RA warnings, the flight crew would have to assimilate and monitor the situation whilst searching visually for the other ac before deciding and then taking resolution action. As seen in this incident, the TA alert and TI from Thames Radar had given the C560 crew the 'heads up' on the BE20 and the pilot had turned slightly R to avoid.

Members could not reconcile the separation distance stated by the C560 pilot as the radar recording had shown the subject ac passing 0·15nm (about 280m) not 3nm apart. Initially Members thought that the crew had not seen the correct ac but the pilot had reported on the RT seeing a BE20 over Southend. The radar recording had shown that, as the C560 turned at SPEAR, it turned SW bound across the BE20's projected track. However, following the C560 pilot's visual acquisition, he had elected to pass as close laterally as he did to the BE20 with 200ft vertical separation. The BE20 pilot was clearly surprised when she saw the C560 very late without time to take avoiding action, seeing it just before it passed 150ft above and 90ft clear to her L. Taking these factors in account the Board agreed that the C560 pilot had selected the separation distance by which to pass the BE20 but it doing so, had flown sufficiently close to cause concern to its pilot. However, the C560 pilot was always in the position to manoeuvre his ac further, if necessary, to avoid a collision which was enough to persuade the Board that safety had been assured during the encounter.

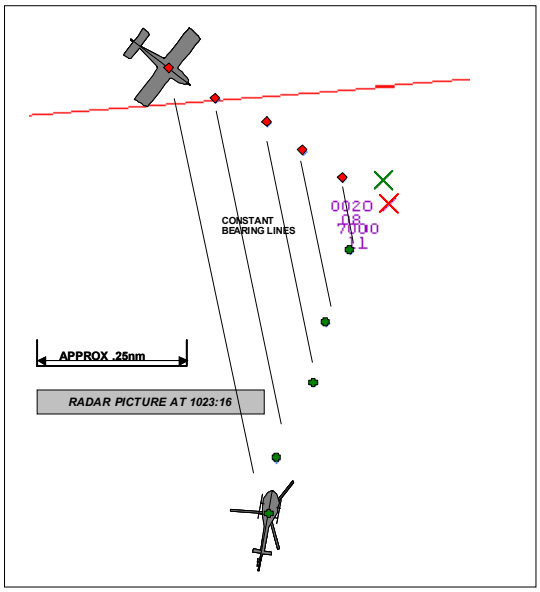
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C560 pilot flew sufficiently close to the BE20 to cause its pilot, who saw the C560 late, concern.

Degree of Risk: C.

AIRPROX REPORT NO 030/05

Date/Time:	15 Mar 1023	
Position:	5135N 00025E(1nm N Basildon Hospital - elev 70ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	EC135 T	Aero AT-3 R100
Operator:	Civ Comm	Civ Pte
Alt/FL:	1100ft (QNH 1017mb)	1200ft (QNH 1018mb?)
Weather	VMC CLBC	VMC CLBC
Visibility:	5km	>5km
Reported Separation:	0·H/ <100ft V	>100mH/150ft V
Recorded Separation:	~200ft V (See UKAB Note (1))	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135 T PILOT reports flying a yellow ac with landing lights and HISLs switched on returning to his base following an air ambulance flight, squawking with Mode C and listening out on Southend APR. While about 1nm N of Basildon Hospital, heading 005° at 130kt having levelled off into the cruise, he was waiting for a gap in the RT to transmit to his details to Southend when he saw an ac ·5-·75nm away in his 10 o'clock at the same level and on a conflicting track. He indicated the ac to the crew, a paramedic, to see if the ac was going to take avoiding action but it did not. He decided that a collision was becoming inevitable so he initiated a violent descent and passed under the other ac by a distance of less than 100ft. He was able to read the registration of the other ac and he contacted Southend APR and filed an Airprox. He assessed that, but for his avoiding action, the risk of collision would have been high.

THE AT-3 R100 PILOT reports flying a private flight to Belgium in a white ac with strobes and the beacon switched on, squawking 7000 with Mode C. After departing North Weald he requested a RIS from Southend but they could only provide a FIS due to his altitude of 1100-1200ft at which he was flying due to the low cloud base of about 1400ft. He had been heading 120° at 100kt and had just reported his position as passing Laindon when, about 30sec seconds later, the incident occurred. He did not see the helicopter until it was about 100m away in his 3-4 o'clock position, was already pulling up and to the left and then passed behind him. The EC135 then formated on him on his port side, he thought to note his registration. The EC135 then reported an Airprox to Southend APR saying that he had just taken off from Basildon Hospital so he assumed that it must have climbed to the position of the Airprox out of his line of sight below the starboard wing. The EC135 then departed on a N track to Boreham. Southend APR later told him that the helicopter's call to report the Airprox was the first call he had made to them. If the EC135 had been monitoring the Southend APR frequency he should have heard his position report about 30sec before the incident. Preceding the incident he had been in a very shallow climb trying to gain altitude while remaining below cloud and on a constant heading. His altimeter was set to Southend QNH but he could not recall the setting. He assessed the risk of collision as none due to the helicopter's effective avoiding action.

SOUTHEND APR reports that the AT-3 was routeing VFR to Belgium under a FIS and was last reported at 1100ft. The EC135 pilot made his first call lifting from Basildon Hospital back to Boreham and asked if we had any traffic in the Laindon area. After passing the relevant TI on the AT-3 to the EC135 he responded by saying *'I want to file an Airprox on that ac'*. The AT-3 acknowledged that he had heard the transmission. Although the AT-3 had reported in the Laindon area the ac was not positively identified on radar and it was not known if it was definitely that ac which was in conflict with EC135.

UKAB Note (1): Events leading up to the Airprox are shown on the recording of the Debden radar. The EC135 first paints at 1022:26, some 50sec before the incident, indicating 600ft in the AT-3's 10 o'clock at 2·5nm. The

contacts close on a constant bearing with the EC135 climbing to 1000ft on the sweep before the CPA and the AT-3 remaining level at 1100ft. The incident occurs between sweeps, at 1023:16, with the contacts merging, the EC135 initially at 1000ft but descending on the next sweep (4sec) to 800ft, and the AT-3 at a constant 1100ft. By projecting the tracks the EC135 passed almost directly below (within 20m) of the AT-3. Immediately after crossing, the EC135 turns sharply right, apparently formating on the AT-3, in its 8 o'clock initially at 200m but closing to 150m before breaking off to the right behind the AT-3 and departing to the N.

ATSI had nothing to add to the Southend Controller's report.

UKAB Note (2): The transcript of the Southend APR RT frequency shows that the AT-3 pilot initially called with a position report and intentions at 1018:20. A further position report followed a request from Southend at 1022:30 to confirm his altitude. This sequence of transmissions ended at 1022:50. The EC135 pilot made his initial call of 'lifting out of Basildon …' immediately after this commencing at 1023:30. [4sec after it first showed on the radar recording at 600ft].

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board focussed on the roles of both pilots in this incident since Members considered that Southend ATC had no part in the Airprox. Until it was 100m away, the AT-3 pilot had not seen the EC135 which had right of way: his sighting was too late to allow him to fulfil his responsibility to give way. Members noted that the helicopter had presented a small target to acquire and had been on a constant bearing. Additionally the AT-3 pilot may have been concentrating on navigation and remaining VMC in the visibility conditions pertaining: his lookout may thus have suffered.

The EC135 pilot had seen the AT-3 over ½nm away but initially did not take any avoiding action. Members noted that continuing to head towards another ac, even though one has right of way, can be ill advised. Equally, formating on another ac without its pilot's consent (as would appear from the AT-3 pilot's report and the radar recording happened here) is for good reason contrary to the Rules of the Air.

Even though the EC135 pilot did see and avoid the AT-3, Members thought that the avoidance manoeuvre came too late to ensure the safety of the respective ac.

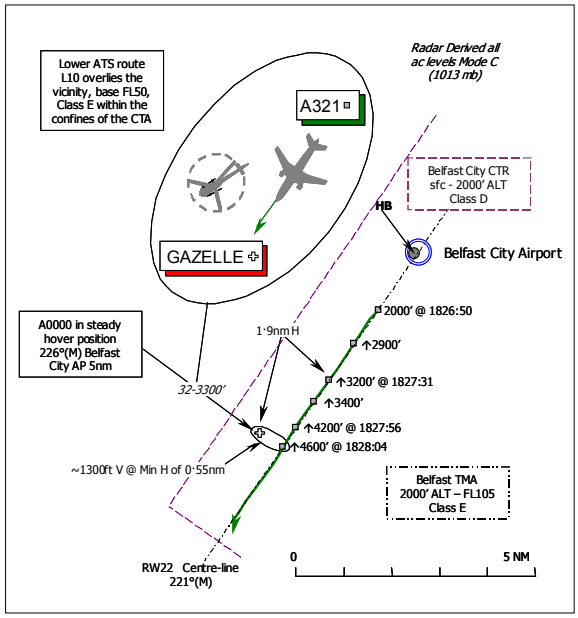
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An effective non-sighting by the AT-3 pilot and a late sighting by the EC135 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 031/05

Date/Time:	16 Mar 1828	
Position:	5423N 00558W (5nm SW Belfast City Airport - elev 15ft)	
Airspace:	Belfast TMA	(Class: E)
	Reporting Ac	*Reported Ac*
Type:	A321	Gazelle AH1
Operator:	CAT	HQ JHC
Alt/FL:	3000ft↑	2-3000ft
	QNH (1004mb)	QNH (1004mb)
Weather	NR	VMC NR
Visibility:	NR	10km+
Reported Separation:		
	600ft V/½nm H	NR
Recorded Separation:		
	~nil V @ 1·9nm H	
	0·55nm H @ ~1300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports that he was departing from Belfast City Airport under IFR bound for London Heathrow. TOWER issued a take-off clearance from RW22 of straight ahead on RW track (QFU of 221°) to 3000ft Belfast QNH. He had been advised by TOWER of helicopter traffic "remaining well N of the centreline at 3000ft", he thought, and separation was accepted on that basis. Whilst climbing out heading 220° at 220kt, it transpired that the other ac – the Gazelle - was on the 230 radial from HB [the locator beacon situated at Belfast City Airport] at a range of 5nm flying at 3000ft. When transferred from Belfast City ATC to Aldergrove ATC, he questioned the traffic that was 2½nm ahead at 3000ft to be told that it was not under their control. Therefore to avoid the helicopter the climb rate was increased after being cleared to FL90 by Aldergrove ATC. The helicopter was never acquired visually but TCAS showed it was 600ft below his ac as they passed abeam the helicopter ½nm to starboard and a TA was received, but an RA was not enunciated and was probably avoided by his early action.

[UKAB Note (1): In his report, the A321 pilot queried "what do ATC and the 'military' consider as remaining "well north of the centreline"?" This phrase was not used in the traffic information provided to the A321 crew by the trainee ADC.]

THE GAZELLE AH1 PILOT reports his helicopter has a grey/green camouflage scheme and the HISLs were on whilst operating VFR in VMC in the vicinity of the City of Belfast. He was in receipt of a LARS, he thought, [actually an aerodrome control/FIS] from Belfast City ATC on 130·75Mhz and squawking the assigned squawk. Whilst stationary in the hover at 0kt, with the ac's heading set on 240° at 2-3000ft QNH (1004mb), the A321 was seen to pass above his altitude. He did not specify the minimum vertical or horizontal separation, but added that no avoiding action was required and the risk was *"very low"*.

THE BELFAST CITY AERODROME CONTROLLER (ADC) reports that she was acting as mentor to a trainee who had been in position for just under 1½ hours before the Airprox was reported. A military helicopter – the Gazelle - was operating VFR over the city to the W of Belfast City Airport, to the N and W of the RW22 climb out, not above an altitude of 3000ft Belfast QNH (1004mb). The helicopter was squawking but the code was corrupt and the pilot had been having problems with his transponder. Based on previous RT exchanges with him over the preceding 1½hr period, the Gazelle pilot was maintaining a good listening watch and had last reported level at 3000ft QNH (1004mb). At 1805 [about 23 min before the Airprox occurred] another ac had departed on RW22 whose crew reported temporarily levelling at 2000ft to avert a TCAS RA on traffic 1000ft above his ac. This other ac had turned L at 2000ft as per the noise abatement procedure and then climbed further to 3000ft. There were 2 further departures after this before the A321 departed but no TCAS reports were made. The A321 crew was

issued a local departure clearance – [after take-off from RW22] climb straight ahead to 3000ft ALT and maintain. The A321 crew was then given traffic information about the Gazelle helicopter to the right of the climb-out not above 3000ft VFR, which was acknowledged, whereupon the A321 departed at 1826UTC and was transferred to Aldergrove Radar on 128·5MHz at 1826:52. Prescribed separation was not eroded.

The 1820 UTC Belfast City Airfield weather is reported as surface wind: 200°/17kt; Visibility: 30km; Weather: nil; Cloud: FEW @ 2500ft; SCT @ 3500ft; BKN @ 5000ft; QNH: 1004mb.

[UKAB Note (2): The Belfast Aldergrove radar recording provided by ScATCC (Mil) was particularly difficult to assess and the definition of the indicated Mode C was virtually unreadable without reference to the original SSR data. Moreover, the Gazelle is shown squawking A0000 [data unreliable] with Mode C, the accuracy of the helicopter's indicated level (1013mb) is therefore questionable. The Gazelle is shown in a steady, stationary hover located at 226°(M) Belfast City Airport at a range of 5nm, indicating between 3200-3300ft (1013mb) throughout the encounter, the higher value equating to about 3030ft Belfast QNH (1004mb). The A321 is first shown as it climbs into coverage passing 2000ft (1013mb) at 1826:50, and climbs steadily through 3200ft - the indicated level of the Gazelle - at a range of 1·9nm from the helicopter. Maintaining an outbound track on the extended runway centre-line, the A321 passes abeam the Gazelle at 1828:04, at a range of 0·55nm as the airliner climbs through 4600ft (1013mb) – broadly 1300ft above the helicopter.]

ATSI reports that the Belfast City ADC assessed her workload as "light to moderate" at the time of the Airprox. She was monitoring a trainee who had completed just over half of the training hours that it takes, on average, to obtain a Certificate of Competency for Aerodrome Control at the unit. The incident occurred within the Class E airspace of the Belfast TMA where the base is 2000ft amsl. Sunset time for the day in question was 1830, the Airprox occurring just before this time.

At 1646, Aldergrove ATC telephoned the Belfast City ADC to advise that the Gazelle operating VFR was leaving to the SE en-route to the Belfast City area. Subsequently, because the Gazelle's Mode C was not fully serviceable, Aldergrove offered Belfast City use of the 'Harbour Box'. In accordance with the LOA between the two ATSUs, this Class E airspace is a rectangle aligned on the Belfast City airport RW04/22 centreline extending 15nm to the NE and 12nm to the SW and 1½nm NW of the 22/04 centreline to 5nm SE of the centreline, from 2000 to 3000ft on the Aldergrove QNH. When Belfast City has control of the Harbour Box, they may operate up to 3000ft QNH within the 'Harbour Box', but NOT W of the RW04/22 centreline without prior co-ordination with Aldergrove APPROACH. The Belfast City ADC commented that, in her opinion, control of this 'Harbour Box' had no material affect on the Airprox.

The Gazelle pilot established communication with the Belfast City ADC at 1656, on transfer from Aldergrove. The flight was *"cleared to enter the zone not above altitude three thousand feet VFR".* The pilot stated his intention of operating N and W of the RW04 approach and this message was acknowledged by the ADC. Over the next hour or so a number of departing flights were informed about the presence of the Gazelle helicopter operating VFR not above 3000ft to the R of the RW22 departure path. The Belfast City ADC commented that Belfast City Airport is equipped only with primary radar and there is no serviceable Aerodrome Traffic Monitor (ATM) in the VCR. Additionally, in the case of the helicopter, its primary return would not have been displayed on the radar display in the Approach Room. She explained that, because its task involved a lengthy period of hovering over one position, in her opinion the Moving Target Indicator (MTI) would have blocked the radar return, assuming it to be a stationary fixed target. VDF equipment is not provided. Consequently, any information issued about the Gazelle was based on the pilot's position report of his operational area. At 1802 [about 26 min before the Airprox occurred] this was established as 230° from the airport at 5nm. Shortly afterwards, the pilot of a departing FK50 who had been informed about the Gazelle operating VFR to the R of the departure track, reported that *"we have to level off otherwise we get er a resolution advisory"*. He added that TCAS was showing traffic 1000ft above, as he was in the L turn to RINGA. Two more ac departed ahead of the A321, but neither pilot commented about the presence of the helicopter or receiving any TCAS information about it.

The A321 crew was cleared to taxy for a RW22 departure at 1821 and whilst taxying the crew were passed their airways clearance to Heathrow. In accordance with local procedures, a departure clearance was requested from Aldergrove who allocated a clearance. This was passed to the A321 crew after they had been cleared to backtrack the runway for departure at 1824:50, *"after departure runway 22 climb straight ahead to maintain altitude 3000 feet."* This heading restriction was as a result of a slower ac ahead and complied with the noise abatement routeing whereby all jet ac climb straight ahead to an altitude of 3000ft before turning. Following a readback of

this instruction, just after 1825:10 the trainee ADC transmitted *"traffic information Gazelle helicopter right in the climb-out over the city not above 3000 feet VFR"*, whereupon the A321 pilot responded that he *"understood".* Although the foregoing is quoted from the RT transcript, the ADC commented that she was sure that her trainee had said right 'of' the climb out. It has not been possible to determine conclusively the word used but it would appear that the pilot understood that the traffic information referred to the helicopter being right of the climb out [see UKAB Note (1)]. The A321 departed at 1826 and, shortly afterwards, was transferred to Aldergrove APPROACH, the rationale being that it would get further climb straight away. On its initial call to Aldergrove the A321 pilot was instructed to climb to FL90. The pilot responded just after 1827:10, that their TCAS was *"showing traffic 2½nm* [ahead] *200ft above us"* – presumably the Gazelle's Mode C was working at the time [which it was but displayed with A0000]. The Aldergrove APPROACH Controller confirmed it was Belfast City's traffic at 3000ft and was in his 12 o'clock at a range of 2nm – the Gazelle. The pilot commented that he had been told that it would be N of the RW22 centre line. In a subsequent transmission, he said that the traffic was showing 700ft below, less than 1nm away, but he never sighted the Gazelle. After the incident, the Gazelle pilot was asked to confirm his position and this was reported again as 230° at 5nm.

The MATS Part 1, Section 2, Chapter 1, Page 1, stipulates that Aerodrome Control is:

"responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: a) aircraft flying in, and in the vicinity of, the aerodrome traffic zone".

The same publication at Section 1, Chapter 2, Page 1, summarises the minimum services that are to be provided by controllers in the various classes of airspace. In Class E, within which VFR flights do not require a clearance, they are to:

"*(a) Separate IFR flights from other IFR flights. (b) pass traffic information, as far as practicable, to IFR flights on VFR flights. (c) VFR flights in contact are to be given traffic information as far as practicable".*

On this occasion the pilot of the A321 crew [operating IFR] was passed traffic information about the Gazelle [operating VFR]. However, the A321 pilot would appear to have been under the impression that the helicopter was operating further to the R of the climb out than it actually was. The pilot of the Gazelle was never informed about any traffic departing from Belfast City although he was listening out on the frequency and later reported that he had *"seen a couple of the departures go past I'm happy if you are".* The ADC fulfilled her responsibilities in respect of ensuring that her trainee had issued traffic information to IFR flights [about VFR flights], but it may have been prudent to have retained the A321 on the Belfast City TOWER frequency until the A321 pilot had reported visual with the traffic, rather than handing over a potential confliction to another ATSU.

Local ATC management at Belfast City confirm that they are actively seeking, with other appropriate agencies, to establish some form of geographical separation to deconflict such flights in future. With the use of motorways and other features, the plan would be to ensure that IFR & VFR flights would be a minimum of 2nm apart. Without the benefit of SSR, it is not possible to positively identify the position of flights such as the Gazelle helicopter here, which is considered to be the best solution without overly restricting the operational use of the airspace.

In conclusion, the pilot of the A321 was advised, in accordance with the procedures stated in MATS Part 1 for operations in Class E airspace, of the presence of the Gazelle pilot operating VFR. Reciprocal information was not passed to the pilot of the Gazelle, although he was listening out on the frequency. It is understood why the pilot of the A321 was concerned about the presence of traffic, albeit VFR, operating at the same altitude as his clearance. He undoubtedly believed that this traffic was operating further from the climb-out track than it actually was. Although the ADC was operating within the rules for operations in Class E airspace it is encouraging that the Unit, in consultation with other interested parties, is trying to resolve the issue and establish some method of deconfliction.

HQ JHC comments that this Airprox occurred in class E airspace and that the Gazelle pilot appears to have misunderstood the service being provided. The Gazelle's position was clearly a possible confliction for departing Belfast City traffic and the situation would have benefited from either clarification of, or restrictions being placed on, his positioning. We also note that an initial climbout restriction was given to the same altitude that the Gazelle was operating at prior to transfer of the B757 to Aldergrove. This is an ideal situation where a deconfliction plan

would have been appropriate, however, JHC support Belfast City's active role in initiating the use of geographical separation in order to ensure deconfliction in the future.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI report had made it plain that this Airprox had occurred in one of the two TMAs within the UK FIRs that are notified as Class E airspace, involving on the one hand the A321 flying under IFR, but where conversely the Gazelle was operating in conformity with the VFR. The Board recognised the intrinsic operating differences that applied here and which had been explained in the comprehensive ATSI report. Members stressed that it was not compulsory for the pilots of VFR flights in Class E to contact ATC and ac could be encountered which are entirely unknown to the controller. Nevertheless, good airmanship would dictate that such contact is made with the appropriate ATSU where the sortie permits and the Gazelle pilot here had done just that. The Army helicopter pilot Member was entirely familiar with the nature of this sortie which required the Gazelle pilot to fly over the city for long periods: indeed, the Board was briefed that there might often be more than the one Gazelle operating here. That the helicopter pilot was hovering into wind just to the R of the climb-out for RW22 was unfortunate but the location may well have been dictated by the circumstances of the flight.

The Board accepted the Member's advice that the nature of the sortie dictated that the hover be maintained at an altitude of 3000ft. This again was an awkward choice as it placed the helicopter at the level required by jets to comply with the noise abatement procedures (straight ahead on RW heading to 3000ft), which was another complicating factor. Nevertheless, compliance with noise abatement routeings did not take priority over traffic avoidance. Traffic information had been provided to the A321 crew about the helicopter. Whilst the Board realised that the information was based on a reported position that had been transmitted over 20 min before the A321 departed, the Gazelle was still hovering in that general position at the time of the Airprox (although the radar suggested he was marginally closer to the climb-out than he thought). As traffic information had been given about the helicopter at 3000ft it was incumbent on the A321 crew to avoid it – that was the nature of the airspace – which might seem odd to some CAT pilots more used to the relative sanctuary – and simplicity - of Class A airspace. The Board noted that one of the exact words used within the transmitted traffic information was still unclear from the RT transcript. Nevertheless, the A321 pilot had interpreted this message to mean that the helicopter was "remaining well N of the centreline at 3000ft", whilst it appeared that this was not what he had been told insofar as the trainee ADC transmitted *"traffic information Gazelle helicopter right in the climb-out over the city not above 3000 feet VFR"*, which had been acknowledged by the A321 crew that they *"understood".* Conversely, the Gazelle pilot had not been informed about the A321's departure as he should have been. Although this helicopter was a single pilot operation and therefore there was only one pair of eyes looking out for other traffic, it was apparent that the pilot had seen the A321 when it flew above his ac. Pilot Members stressed that earlier sighting was very unlikely whilst hovering into wind with the A321 approaching the helicopter from astern and abaft the port beam.

Some controller Members were concerned that the ATS provided to the A321 crew here was the minimum necessary and it was unfortunate that the Belfast City ADC had not taken a more proactive stance. However, it was clear to the Board that both pilots were ultimately responsible for avoiding each other's ac in accordance within the 'Rules of the Air' and the promulgated procedures for Class E airspace where no separation is effected by ATC between IFR and VFR flights. Here the A321 crew had accepted their departure clearance and were cognisant before take-off that the Gazelle was operating in the vicinity of their intended climb-out. On that basis the Board concluded that the A321 crew were aware that they had a duty to avoid the helicopter, which they did but seemed to have been somewhat surprised when they detected it ahead on TCAS following the TA. Whilst somewhat understandable, the Board concluded that this Airprox had resulted because the ATC clearance that placed the A321 in conflict in Class E airspace with known VFR traffic – the Gazelle helicopter – had been accepted by the A321 crew who should have been aware that they had to effect their own separation.

The radar recording had shown that the Gazelle's Mode C data with the A0000 squawk was unreliable. Nevertheless, during the period of this Airprox it appeared to be within the normal tolerances applicable to Mode C and the Gazelle pilot did not apparently fly above the assigned 3000ft Belfast QNH. The A321 had passed through the helicopter's altitude at a range of 1·9nm from the helicopter as the airliner maintained its outbound track on the extended runway centre-line and was about 1300ft above the helicopter as the A321 passed abeam

the Gazelle at the point of minimum horizontal separation of 0·55nm without an RA being triggered. With this in mind the Board agreed unanimously that no risk of a collision had existed in these circumstances.

The Board was encouraged that the ATSU was now seeking a formula to deconflict such flights in the future. This was a very pragmatic approach, the ATSI advisor explaining that this topic was still under discussion. A controller Member had noticed a small difference between the definitions within the MATS Pt 2 and the UK AIP at ENR 1-4-8 regarding the traffic information given to VFR flights within Class E airspace. Although this did not fundamentally effect the Board's assessment of this Airprox it was worthy of review.

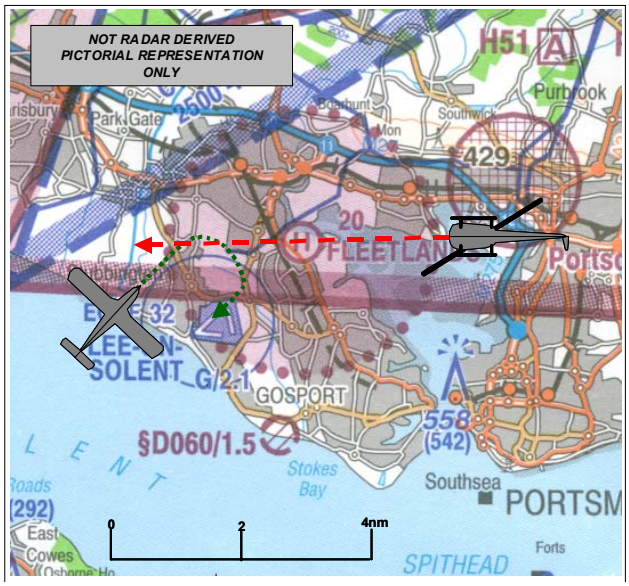
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ATC clearance accepted by the A321 crew placed their ac in conflict with known VFR traffic in Class E airspace.

Degree of Risk: C.

AIRPROX REPORT NO 032/05

Date/Time:	18 Mar 1310	
Position:	5049N 00112W	(Circuit Lee-on-Solent)
Airspace:	Fleetlands ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	Robinson R44
Operator:	Civ Pte	Civ Pte
Alt/FL:	700ft (QFE)	1000ft (N/K)
Weather	VMC CLBC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:	0ft V/200-300ft H	Not seen
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports that he was flying a local sortie from Lee on Solent with strobes and anti colls switched on, squawking 7000 with Mode C. Having completed the local sortie he had returned to Lee on Solent and rejoined the visual circuit at 80kt and had made standard calls as required in the Fleetlands ATZ. He had re-entered the ATZ halfway downwind and had established his descent on right base. He checked the extended approach to his left and to his right to check for any other traffic. A helicopter had reported on the Fleetlands frequency but gave no position. As he (the PA28 pilot) re-entered the ATZ, having heard no other ac, he assumed he was alone as the helicopter had not been given permission to enter the ATZ so should have avoided it. In the finals turn passing through about 150° he saw a R44 about 300ft away and head-on so he initiated a hard left turn with full power thus preventing a very dangerous situation. As far as he could tell the R44 did not change it's heading. He went around from the approach and contacted Solent Radar to file the Airprox.

THE ROBINSON R44 PILOT reports flying VFR from a private site in Kent to Bournemouth squawking 7000 with Mode C in a blue ac with the tail strobe switched on, on a route that he flies regularly. He was informed of the Airprox 3 days after the event when he was flying the same route and confirmed that he was the ac involved. He was unaware that an Airprox had occurred and was flying a safe distance from all known ac.

FLEETLANDS ADC reports that in accordance with Helicopter Landing Site Directory the Tower is not permanently manned. The pilot of a PA28 in the visual CCT at Lee on Solent made several standard blind calls and an R44 pilot made an initial blind call. Whilst the PA28 was on finals, the R44 cut across approach path and may have changed frequency. The above incident was recorded on digital taping of the Fleetlands RT. [As transcribed below]

1244 XX (PA28 C/S) is departing the circuit to the South.

1301 Fleetlands YY(R44 C/S)

1302 YY this is XX over the island at the moment, they called about ½ hour ago, they are active but not sure if they are manned at the moment

1302 YY this is XX, did you copy my last?

1303 YY, no not copied

1304 This is XX over the island inbound to Lee on Solent, they are active at the moment but nothing going on

1305 Fleetlands this is YY radio check

1307 XX inbound to Lee on Solent 2500ft

1308 Fleetlands XX is with you

1309 XX joining overhead Lee to land

1311 XX downwind to land at Lee

1314 YY-XX are you finals?

1314 YY-XX

1314 YY-XX

1315 XX going round, changing frequency to Solent 120.22

UKAB Note (1): Fleetlands is promulgated in the UKAIP at 2-2-2-4 as a Government Airfield ATZ of 2nm radius and is annotated as having 'Hours of Service' Mon-Thu 0830-1600 Fri 0830-1500 (1hr earlier in Summer) [see HQ Fleet comments]. That being the case, Rules of the Air, Rule 39 (1) Table (a) and (2) apply. This states:

'An aircraft shall not fly, take off or land within the aerodrome traffic zone of an aerodrome to which this paragraph applies unless the commander of the aircraft has obtained permission of the air traffic control unit at the aerodrome or ' etc'

It is therefore incumbent on Fleetlands to provide a radio service continuously during the published hours of the ATZ (as in the UKAIP) so that pilots are able to obtain the permission required. This interpretation of the regulations has been confirmed by the CAA (DAP).

UKAB Note (2): There is no reference to the Fleetlands Tower not being manned in the UKAIP 2-2-2-4 which is the master document.

UKAB Note (3): The majority of the surface area of Lee on Solent lies inside the Fleetlands ATZ. Therefore ac operating from Lee on Solent must comply with Rule 39 (2) during the published hours of the Fleetlands ATZ.

UKAB Note (4): Although Fleetlands is operated by DARA, CinC Fleet is responsible for the provision of ATC services.

ATSI reports that they had nothing to add.

CinC FLEET comments that this Airprox has highlighted a key discrepancy between the Fleetlands operating hours published in the UK AIP and the RAF FLIP Helicopter Landing Sites UK. The correct hours of operation, 0830–1530 Mon–Thu and 0830–1200 Fri, are reflected in the military document. The RAF FLIP Helicopter Landing Sites UK document also states on page 211 (the Portsmouth Area Site Location map) that 'Fleetlands Twr not permanently manned, blind calls are to be made on 135.7 MHz'. This is a legacy comment that was introduced to allow the single controller operating at Fleetlands to support the administration elements of the helicopter test and evaluation flights between sorties. This necessitated the controller being away from his communications suite situated in the tower. Fleet recognise that this does not fully support Rule 39. The following action has been taken to address the above:

UK AIP amendment has been submitted to reflect correct hours of operation to those published in RAF FLIP Helicopter Landing Sites UK.

RAF FLIP Helicopter Landing Sites UK page 211 comment, 'Fleetlands Twr not permanently manned, blind calls are to be made on 135.7 MHz', to be removed in toto. The current 'blind calls' option only applies to current Lee On Solent based aircraft such as the SAR and Police Helicopter Support Unit and is covered in a letter of agreement between the Lee On Solent operators and Fleetlands. Comment added to remarks column of UK AIP

and RAF FLIP Helicopter Landing Sites UK to indicate that limited helicopter operations at Fleetlands may occur outside of published hours. Outside of published hours, Fleetlands operations are conducted without ATZ protection.

Communications fit at Fleetlands is currently being updated to provide the Fleetlands tower controller with a mobile communications system to allow him to receive and transmit to aircraft when away from the main comms system situated in the control tower (Rule 39 compliant).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

Members noted the very complex situation regarding Lee on Solent and its position partially within the Fleetlands ATZ and that there was no obvious 'operating authority' for the unlicensed (Lee on Solent) airfield. That being the case, it was not easy to identify with whom any LoA with Fleetlands should be; individual LoAs with all operators based at Lee may provide one solution.

The Board considered that regardless of the legality of the situation and that it was not possible to trace a LoA, the PA28 had a right to enter the Fleetlands ATZ and the pilot had made the appropriate blind calls. The R44 on the other hand was not locally based and its pilot had not complied with the requirements of ANO Rule 39 and the UK AIP 1-4-11 Para 2.7.2.4, the latter stating that failure to establish communication should not be taken as an indication that the ATZ is not active. That being the case, the R44 did not have permission to enter the ATZ and should have avoided it; had the pilot done so he would not have flown into conflict with the PA28. In mitigation however, Fleetlands Tower should have been manned in order to provide an ATZ crossing service. Having noted this discussion, one Member observed that even had there been a controller in place it would not have changed the basic facts of this incident since it was clear from the RT transcript that the R44 pilot was aware that the ATZ was active and was aware of the presence and most probably the position of the PA28 but he did not appear to take any pre-emptive action to avoid it. This, the Board concluded, had been part of the cause of the Airprox.

Members considered the degree of risk: they thought that since the R44 had not seen the PA28 and that the sighting (and avoiding action) by the PA28 pilot had been very late, the safety of the respective ac had not been assured.

Members noted DAP's interpretation of the current regulations regarding the manning of the Tower (RT) during promulgated Fleetlands airfield (ATZ) opening hours and the UKAB's difficulty in obtaining an expert opinion on their interpretation. Members also noted that while there was no specific regulation requiring ground radio stations to be manned during the promulgated hours of operation of ATZs they agreed that perhaps there was a moral obligation to do so. It was observed that any such requirement would have to be carefully investigated as there are potentially far-reaching implications for Government and civilian airfields alike. The Board decided, on balance, not to make any safety recommendation but welcomed the Director's undertaking that he would discuss the situation with the CAA and report back.

The Board noted the very complex 'command' situation at DARA Fleetlands and welcomed CinC Fleet's attempt to resolve the situation. Members were informed that the amount of activity at Fleetlands would probably increase and that in view of new additional commitments this might result in extended hours of operation. As a consequence a review of ATC services at Fleetlands and requirements would be carried out by CinC Fleet.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The R44 pilot entered the Fleetlands ATZ without permission and flew into conflict with the PA28 which he did not see.

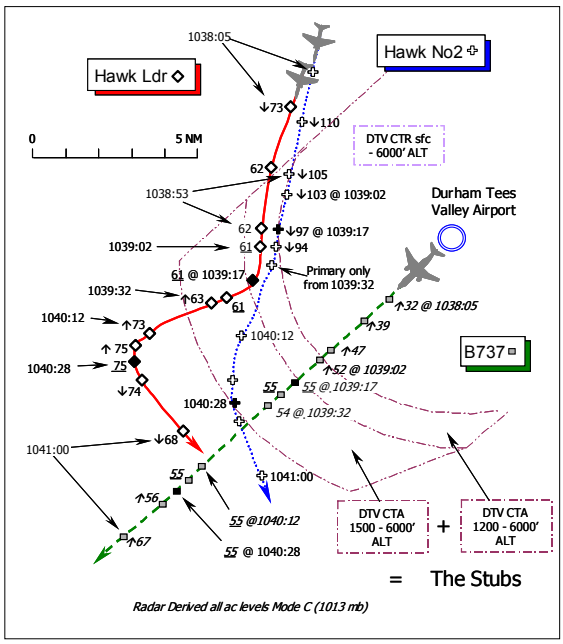
Degree of Risk: B.

AIRPROX REPORT NO 034/05

Date/Time:	14 Mar 1039	
Position:	5428N 00136W (5nm SW Teesside - elev 120ft)	
Airspace:	CTA/FIR	(Class: D/G)
Reporter:	Durham Tees Valley APR	
	First Ac	*Second Ac*
Type:	B737-200	Hawk x2
Operator:	CAT	HQ STC
Alt/FL:	↑FL130	7000ft QFE (1004mb)
Weather	IMC in cloud	VMC CLOC
Visibility:	NR	30km

Reported Separation:
APR: 500ft V/3nm H
500ft V/3nm H Not seen

Recorded Separation:
v Hawk Ldr: 600ft V 3·3nm H. v Hawk No 2: 3·17nm H.



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DURHAM TEES VALLEY AIRPORT APPROACH RADAR CONTROLLER (DTV APR) reports that the B737 requested start at 1028 whereupon Leeming ATC was informed as per the DTV/Leeming LoA. At approximately 1037, two contacts [subsequently identified as the Hawks] - notified by Leeming ATC as Leeming inbounds - were seen to approach the DTV CTR/CTA boundary. Leeming attempted to co-ordinate their transit but at the same time the ac were seen to be in confliction with the B737. The departing B737's climb was stopped as avoiding action against the two Hawks and traffic information was passed to the B737 crew. The Leeming controller attempted to take avoiding action against the B737 but one of the Hawk pilots reportedly refused to take the turn as he was 'fuel priority'. This Hawk ac entered CAS and passed very close to the outbound B737. He assessed the minimum separation was 3nm/500ft.

THE B737-200 PILOT reports that he departed Durham Tees Valley Airport (DTV) IFR, off RW23 at 1037, with a clearance to 'GASKO' climbing to FL130 under a RCS from DTV ATC - TEESSIDE RADAR. Heading approximately 230° at 250kt, still in CAS passing approximately 5000ft QNH, IMC in cloud, TEESSIDE RADAR issued avoiding action by instructing him to stop his climb due to the proximity of another ac not under the control of TEESSIDE RADAR. No turns were given as part of the avoiding action but the climb was arrested at 5400ft QNH (1007mb). The other ac was not seen; neither does he nor his 1st Officer recall any TCAS TA or RA. He did not assess the risk.

THE HAWK PILOT, a qualified pilot navigator instructor (QPNI), reports that he was leading a formation of two Hawk ac on recovery to Base: both ac have a high-conspicuity black colour scheme and the HISLs and nose lights were on.

After pulling up out of the UKDLFS about 50nm N of Newcastle, the formation was climbed to medium level with Newcastle ATC for recovery to Leeming. The formation was subsequently handed from Newcastle RADAR to Leeming DIRECTOR (DIR) under a RIS, approximately 20nm from Leeming in VMC with 6 octas of cloud, the tops at 6000ft and the base at about 2000ft.

Southbound at 300kt the formation was split N - S by about 4nm with the lead ac the most southerly of the pair. On initial contact with Leeming on Stud 5, DIR was informed that the formation were 2 "separate elements" split by 2-3nm and that the No2 was 'fuel priority', the plan being to get his No2 down first for a Radar - Visual recovery and that the No2 would require a separate squawk. The task of communicating the situation to DIR seemed to

take an inordinate length of time and culminated in 2 RT calls from himself, one of which was a radio check, not being answered by DIR. Due to the perceived urgency of the situation, as the formation leader he initiated a frequency change to APPROACH (APP) on Stud 3 and after checking-in, APP issued an avoiding action turn against traffic departing from DTV. He informed APP that he would take the avoiding action but that his No2 was probably unable to do so as he was 'fuel priority'. At this point his No2 informed APP that he was visual with the surface, descending for a visual recovery and switched to Leeming TOWER. As the lead pilot he complied with the avoiding action R turn onto 270° maintaining 7000ft Leeming QFE, but after approximately 1min he also had to declare a 'fuel priority': because of the lack of urgency by APP to action his fuel priority call and with "high awareness" of the departing DTV traffic (the B737) whilst in sight of the surface he also switched to TOWER for a visual recovery.

The B737 was not seen and at the time of the Airprox neither he nor his No2 were aware that there was anything wrong with the flight paths they had flown. The risk was assessed as *"nil-low"* and he stressed that a fuel priority recovery had been declared.

MIL ATC OPS reports that prior to the Airprox the DTV ATC Assistant (ATSA) had attempted to pass traffic information to Leeming ZONE at 1034:36. However, the conversation was interrupted by RT transmissions and was not copied or acknowledged by ZONE. When ZONE's workload allowed the conversation to recommence the DTV ATSA had rung off.

The formation of 2 Hawks (Hawk Ldr & No2) was recovering to Leeming from the N. The formation freecalled Leeming Director (DIR) at 1036:46, "*23 miles…north of the field No2 fuel priority".* DIR, which was manned by a mentor and trainee, identified the formation, acknowledged the No2's fuel priority status and asked the crews to confirm that they were flying 2nm in trail. At 1037:02 DIR placed the formation under a RIS, passed the Leeming recovery data including the Leeming QFE (1004mb) and asked the crews to "*report set*". The formation confirmed the Leeming QFE was set and requested "*separate squawks No2 down first please*". Therefore, DIR assigned A0412 to the No2 and at 1037:26, DIR instructed the Hawks to "*descend report level 6000ft*". The pilot of Hawk No2 advised DIR that he would like to delay the descent but Hawk Ldr confirmed he would be continuing descent to 6000ft. After this exchange DIR advised Hawk Ldr to turn R onto 200º and that his transmissions were very distorted. Hawk Ldr acknowledged the turn. A landline communication was commenced between DIR and the DTV ATSA at 1037:48 but was instantly interrupted by transmissions from Hawk Ldr regarding recovery details. The landline conversation recommenced some 14sec later with DIR requesting whether DTV ATSA was aware of any traffic climbing out of DTV. DTV ATSA asked DIR to repeat his message and then informed DIR that there was traffic to affect: DIR requested to speak to the DTV controller (APR). A conversation then ensued between APR and DIR regarding the conflicting tracks:

DIR:*Leeming Director, your 4427, is it climbing out?*

APR:*We've already passed this information to you…(garbled).*

DIR:*OK, see my traffic NW of Teesside by 5 miles southbound, 0411 and 0412*.

APR:*Contact.*

DIR:*Can I come down instead please and take 1000ft below you on 4427* [the B737].

APR:*Er, I doubt very much you'll get 1000ft below me I suggest you go behind.*

DIR:*Can I descend in the Stub please?*

APR:*Yes you can but if you come behind.*

DIR (Screen):*No avoid it*.

During this conversation the No2 Hawk pilot had called ready for descent and Hawk Ldr had called DIR for a radio check. As the conversation between RAD and DIR ended the Hawk formation transmitted that they were transferring to "*Stud 3*". At 1038:47, DIR attempted to pass avoiding action "*turn right heading 240º, traffic was left 10 o'clock 4 miles crossing left to right, indicating 4000ft and climbing*" - the B737 - but no response was

received from the Hawk formation. [Mil ATC Ops Note: In pursuance of their prime objective of preventing collisions, it is accepted that controllers may pass avoiding action instructions if the circumstances warrant, before a formal change of service is agreed.] At 1038:50, the Hawk Ldr freecalled Leeming APPROACH (APP) stating "*nothing from DIRECTOR, 6000ft,* [C/S] *3 miles trail descending".* APP responded "[C/S] *Leeming APPROACH, DIRECTORS…transmitting to you, I don't know what went wrong, avoiding action turn right heading 250º, traffic left 10 o'clock, 3 miles crossing left - right Teesside outbound climbing through FL55*" - the B737. Hawk Ldr acknowledged the turn but restated that Hawk No2 was fuel priority. Hawk No2 instantly reported "*happy visual recovery to TOWER squawking stand-by*". APP passed further traffic information to Hawk Ldr on the departing B737 at 1039:31, "*traffic southeast 3 miles, tracking southwest indicating FL55 climbing*". Hawk Ldr reported "*nothing seen…climbing 7000ft to remain VMC*". At 1040:14, Hawk Ldr himself declared "*fuel priority*" and 5 sec later "*now visual recovery coming left 7000* [ft]". At 1040:22, APP passed further traffic information to Hawk Ldr on Hawk No2 and the departing B737. At 1041:03, Hawk Ldr reported "*squawking standby visual to tower*".

Analysis of the Great Dun Fell Radar recording shows the B737 at 1037:13, climbing out of DTV squawking A4437 climbing through 500ft Mode C (1013mb), tracking 230º. Hawk Ldr is 340° DTV, 8·75nm, squawking A0410 descending through FL109 Mode C and tracking approximately 190º. Hawk No2 is 1·5nm in trail of Hawk Ldr but not squawking. Continuing in descent, at 1038:05 Hawk Ldr is passing FL73 with the B737 in Hawk Ldr's 10 o'clock, 5nm crossing L - R, climbing through FL32. At 1038:16, Hawk No2 squawks A0412 with 'ident' descending through FL110. At this stage, the horizontal separation between the B737 and Hawk Ldr is 5¾nm with 2700ft Mode C separation evident.

[UKAB Note (1): The B737 continues to climb and Hawk Ldr maintains a slow descent to FL61 that is maintained for 30sec before a climb is evident. A level of 6100ft verified Mode C (1013mb) would potentially place the lead Hawk ac 80ft below the 6000ft DTV QNH (1007mb) upper altitude of the DTV CTA - and thus within Class D CAS - for the short period before the Hawk Leader's climb was executed and evident on the recording from 1039:32. Simultaneously SSR contact on the No2 Hawk is lost as the pilot selects SSR to standby and this ac is evident only as a primary contact: thus is not possible to determine the No2 ac's level thereafter. Separation between the Hawk Ldr and the B737 continues to diminish and the CPA occurs between these two ac at 1039:17 with 3·3nm horizontal and 600ft vertical separation evident as the Hawk Ldr is seen to initiate a hard R turn southwesterly maintaining FL61 and the B737 levels at FL55, which is maintained until 1040:35 whence the airliner is shown recommencing the climb through FL56. Just moments before this at 1040:28, minimum horizontal separation with the No2 Hawk occurs at a range of 3·17nm just before the No2 crosses directly astern of the B737 as the Hawk leader turns southeasterly to cross the B737's track from the latter's starboard quarter after ascending to a maximum of FL75. After this point the ac diverge.]

DIR had accepted a reasonably late handover of the Hawk formation from Newcastle RADAR some 15nm NNE of Leeming. The Hawks were given a descent to 6000ft – Leeming QFE (1004mb), which would [theoretically] have kept the formation above the upper limit of the Teesside CTA 6000ft altitude DTV QNH (1007mb). An LoA between DTV and Leeming details the operating procedure that both units employ when either unit has traffic that may affect the other. Part of this LoA concerns the western portion of the DTV CTA. This portion of the Class D CTA is colloquially known as 'The Stubs' and DTV control access to this airspace. In essence, if DTV have traffic wishing to utilise this portion of their CTA, Leeming must seek specific clearance to transit the stubs. When DTV have no traffic to affect the airspace, Leeming does not require clearance to enter The Stubs. As Leeming had not received [nor acknowledged] traffic information on departing traffic, although DTV had attempted to pass it, Leeming ATC had not anticipated that traffic would be climbing out from DTV. DIR became aware of the climbout traffic shortly before 1038:02 when he rang DTV to enquire whether they had traffic climbing out. The landline was answered by the DTV ATSA and once confirmation was received that the conflicting traffic was climbing out, DIR immediately requested the *"controller* [DTV APR] *for co-ordination"*. DIR became involved in a landline conversation with the APR and missed a ready for descent call from Hawk No2 and a radio check from Hawk Ldr. These missed RT calls led the Hawk crews to believe that they had lost 2-way communications with DIR and so they switched to APP. DIR had not passed any traffic information to the Hawk formation on the departing B737. The Hawk formation freecalled APP with 4nm lateral separation evident between Hawk Ldr and the B737. Unsure as to what type of service the Hawks required, APP applied an avoiding action turn to take the Hawk Ldr away from the B737. The CPA between the B737 and the Hawk Ldr occurred just as the avoiding action turn is shown to take effect. Hawk Ldr subsequently reported that he was not visual with the B737 and initiated a climb to 7000ft QFE.

The breakdown in the flow of information between Leeming and DTV is a major factor in this Airprox. DTV ATSA attempted to pass traffic information to Leeming ZONE on the departing B737 but due to ZONE's workload the information was not copied or acknowledged. The LoA allows Leeming to utilise the Class D Stub CAS when DTV have no traffic to effect: in this instance DIR made an assumption that no traffic would be departing as no traffic information had been received. On observing the B737 climbing out DIR contacted DTV in an attempt to achieve co-ordination even though the Hawks were under a RIS. Once 2-way communication was established with the APR, DIR offered a plan of action which was arguably unachievable given the proximity of the 2 conflicting ac. During this protracted landline conversation, DIR missed 2 RT transmissions from the Hawk formation which resulted in the Hawks changing frequency to APP. The DIR screen's instruction to *"avoid it"* came as the Hawks were transferring frequency so no avoiding action could be applied or traffic information passed to the Hawks. Immediately after the Hawk formation contacted APP, timely and effective avoiding action was passed.

ATSI reports that an LoA specifies agreement between DTV and Leeming over the joint use of the airspace within the 2 Southwesterly segments of the DTV CTA known colloquially as 'The Stubs'. This part of the CTA is primarily used for DTV public air transport arrivals and departures (A 'public air transport' movement is defined as the movement of a civil aircraft carrying fare-paying passengers which is operating to a published programme, including charter flights) and Leeming arrivals/departures. DTV ATC will always retain administrative control of the DTV CTA but Leeming will have operational access to The Stubs. Unless notified by DTV of a conflicting public air transport movement, Leeming will assume free access to The Stubs. However, upon notification to Leeming of a public transport movement departing RW23 to the SW – the B737 - (or inbound to land on RW05) operational control within The Stubs will revert to DTV.

In accordance with the LoA, at 1034 the DTV ATSA telephoned Leeming to pass traffic information about a RW23 departure routeing to GASKO - the subject B737. Despite being told to go ahead twice and repeating the message twice, no acknowledgement was received from Leeming before the ATSA disconnected the landline some 1½min after the telephone call had commenced. It would appear that Leeming ZONE did not assimilate the message, believing that The Stubs were theirs. Conversely, the DTV APR had overheard the ATSA pass the message and believed that Leeming were aware of the B737 departure. It is unfortunate that Leeming ZONE, presumably because of other operational commitments, was not able to afford priority to this telephone call.

Subsequently, at about 1037:48, Leeming DIR telephoned DTV to enquire about the traffic climbing out – the B737. Leeming DIR passed traffic information about the two southbound Hawks - 5nm NW of DTV. DIR requested descent in 'The Stub' to take 1000ft below the B737 on indicated Mode C. The descent was agreed but the DTV APR suggested that the Leeming traffic should go behind the B737. Just after 1038:00, the APR instructed the B737 to *"stop your climb avoiding action".* The B737 pilot reported leveling at FL54 and was passed traffic information about the southbound Hawk Ldr to the N at 6000ft. The B737 pilot reported at 1038:30 that the traffic was displayed on TCAS, *"5 miles north at…700 feet above"*. The APR advised that Hawk Ldr was *"…about 3 miles on my radar"*.

THE HAWK PILOT'S STATION comments that the recollections of all of the Leeming based personnel are that there was no penetration of 'The Stubs'. It would appear that although the co-ordination element that normally works so well had apparently broken down on this occasion, controllers from both ATSUs were aware of the presence of all of the 'players' and that therefore the risk of collision was significantly reduced – DTV called for their traffic to stop climb and Leeming initiated a turn to avoid. Had the normal actions prescribed by our LoA with DTV been completed there would have been no requirement to file an Airprox. The key to all of this is readily achievable - better communication.

HQ STC comments that a number of factors - the late handover from Newcastle, the missed climbout information from the DTV ATSA, the missed calls from the Hawks and the Fuel Priority status came together resulting in this Airprox. The LoA between Leeming and DTV normally works well. However, on this occasion it did not, with ZONE not acknowledging the traffic information on the departing B737. The subsequent landline call to affect co-ordination took long enough that the Hawks changed frequency and the opportunity to pass timely avoiding action was lost.

The action of the Hawk pilots could also have gone some way to reducing the likelihood of the Airprox taking place. The 'Fuel Priority' call by No2 ensured that the controllers did their best to give the ac the best routeing. However, the call does not result in a 'parting of the waves' through CAS and crews should have sufficient fuel to allow for

avoiding action. Also, squawking standby so far from the visual aerodrome cct, still in the descent, with DTV outbound traffic known to be in the vicinity removed an important safety barrier from the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In opening the discussion the Chairman reminded the Board that a joint safety Audit had been conducted by staff from MOD and CAA of the interface between these two adjacent aerodromes' ATC units. This independent overview seemed a positive step in enhancing co-ordination and airspace sharing arrangements at these two busy ATSUs and should result in improved integration of the ATSs provided, which augured well for the overall aim of improved flight safety for all. It was understood that the Audit report would be issued shortly.

The Board next discussed the issue of the extant LoA between the two ATSUs and the ability of DTV to allow Leeming ATC use of 'The Stubs' without reference to DTV ATC if not notified by them of a conflicting public air transport movement. The ATSI Advisor believed this was to enable quick access to this airspace by Leeming but it seemed to controller Members that there was significant potential for error. Use of the 'The Stubs' airspace here is predicated on notification by DTV, as 'owners' of the Class D CAS, to Leeming and if there has been none then Leeming could use it. But this did not 'fail-safe' and this Airprox was a good example of what can happen when 'lines of communication' break down. From the outset the DTV ATSA had endeavoured to notify Leeming ATC of the B737's departure by way of the call to ZONE in accordance with the LoA. However, it was evident from the Mil ATC report that ZONE's priorities were engaged elsewhere and the controller was not able to receive the information at that time - neither did ZONE call DTV back to enquire what the ATSA was trying to tell Leeming. Thus unaware of the B737's impending departure, from the terms of the LoA Leeming controllers would have believed that they could transit 'The Stubs' without reference to DTV ATC. Conversely the DTV APR believed that Leeming ATC were fully aware of the B737's departure and would co-ordinate any of their traffic as appropriate. Not only controller Members but CAT pilot Members also recognised the issues here: clearly, the act of 'notification' was not a replacement for co-ordination. Any notification was plainly not effective until an acknowledgement was received from the Leeming controller that the message conveyed was understood which did not happen on this occasion. It was this misunderstanding that appeared to be the catalyst to the Airprox. Many controller Members – both military and civilian - agreed that the methodology here appeared to be unsound and not a good example on which to base CAS sharing arrangements. However, with the joint safety Audit report pending the Board was not minded to make a Safety Recommendation at this stage. Here then, Leeming DIR was not expecting any imminent departure from DTVA to affect the recovery of the Hawk pair so the controllers were probably somewhat surprised when the B737 was detected climbing out and the trainee controller rapidly sought co-ordination from the APR. A controller Member highlighted communication difficulties of another form during this conversation, specifically that of the Leeming DIR, neither trainee nor mentor, simply not responding to the lead Hawk pilot when he called. Thus two transmissions went unanswered and the Hawk pilots consequently switched to APP without delay, believing they had suffered an RT problem. The Mil ATC Ops Advisor thought the Hawk leader was perhaps a little a hasty in switching to APP, the difficulties that ensued providing a timely example of what can unfortunately result. It was evident that by this stage it was all getting 'a bit too close' and the DIR mentor had wisely prompted his trainee to take avoiding action to remain clear of the departing B737. A controller Member thought that these various communication difficulties were the cause of this Airprox, a view shared by ATSI. Thus when DIR attempted to pass avoiding action himself the pilots had already switched to APP who was unaware of the ATS provided. Commendably, Leeming APP showed a rapid grasp of the situation and swiftly issued prompt and effective avoiding action against the observed B737.

There were lessons here for pilots and controllers alike. A controller Member believed that if the trainee was so engrossed in trying to achieve co-ordination the mentor should have stepped in on the RT and answered the Hawk lead pilot who had commented on the difficulties associated with communicating his intentions. Acting as a mentor to a trainee controller is not an easy task and pilots should bear in mind that there is a significant ongoing training burden on all military ATSUs. In general, whenever a pilot is speaking to a controller at a military ATSU, practically '9 times out of 10' they would be talking to a trainee controller (of variable experience) monitored by a mentor. There is a happy mean that is often difficult to achieve between allowing a trainee sufficient 'rope' so that he can learn the task and develop their skills themselves and allowing the student not to go awry. From the controller mentor's perspective, the guiding principle should be that the service provided to the pilot should ultimately not be

degraded by the training task - but practically speaking it might well have some impact as here, a point which ATC Watch Supervisors must always keep in mind.

The discussion turned to the status of the 'fuel priority' declared for the No2 when the lead Hawk pilot first called. It was explained that controllers might react to such a call with differing degrees of 'priority' but crews should be in no doubt that unless an emergency message is declared and acknowledged by ATC, controllers will not normally afford any priority status to such a call unless specified in the local Flying Order Book/ATC orders. The HQ STC Member questioned the wisdom of the Hawk lead pilot here as this was the second Airprox assessed recently by the Board (see also Airprox 55/05) that involved pilots declaring a 'fuel priority': he thought there was a lesson to be emphasised that if you are running short of fuel make your situation plain by declaring an emergency from the outset. A PAN call will invariably elicit an immediate reaction and generally afford you priority over other traffic – this is not a new lesson but one worth repeating. The lead Hawk pilot was obviously keen to get his No2 down first; although he had accepted the avoiding action turn proffered by APP the No 2 had not. Clearly whilst operating VFR - under a RIS originally - there was no onus on the pilot to accept the avoiding action instruction if content that he would be able to spot any confliction ahead in time to take appropriate action. Thus the No2 had understandably taken the earliest opportunity to turn for base and in the meantime had selected his SSR to 'standby'. Consequently, no Mode C data was available to determine the No2's level. The pilot's station had commented that there was no penetration of 'The Stubs' and it was mentioned that standard visual Cct rejoin checks would probably include switching the SSR to 'standby'. Perhaps consideration should be given to reviewing the policy of selecting the SSR to 'standby' at such an early juncture but Members agreed with the STC view that this did not seem to be 'best practise' at this range from base because it denied level information to both of these two adjacent ATSUs. This could be detrimental to the overall service provided in this busy airspace, especially when crossing through the climb-out of another airport. Controller Members stressed the importance of squawking Mode A together with Mode C to assist in the provision of comprehensive traffic information and collision avoidance to other ac in the vicinity. Moreover, the lack of SSR data also rendered the No2 Hawk invisible to the B737's TCAS thereby preventing this extremely efficient and reliable 'backstop' from detecting and issuing a warning to forestall any confliction.

Whilst examining all the various factors for relevance in their assessment of cause and risk, some Members thought that the lack of proper notification by DTV to Leeming was the basic cause as foreknowledge of the B737's departure would have changed the situation entirely. Other controller Members wondered what Leeming DIR would have done differently if the initial notification by the DTV ATSA had been fully completed but potentially it would have prompted the co-ordination required by the LoA at an earlier stage and forestalled the whole incident. The responsibility of the Leeming DIR under the RIS provided to the Hawk pilots was to pass traffic information in a timely manner so that the pilots could make best use of it. That DIR had not answered the pilot's calls nor discharged their responsibility to pass traffic information because of the co-ordination discussion with the DTV APR was significant. Other Members noted that the only controller charged with affording separation was the DTV APR. Here he had spotted the Hawks and issued avoiding action by wisely stopping the B737's climb and subsequently agreed co-ordination with DIR for the Hawks to pass astern. For their part the B737 crew had responded to the stop-climb instruction and had little effect on the outcome. After a wide-ranging discussion it was concluded that this Airprox had resulted from a conflict in the vicinity of the Durham Tees Valley CTA that had been resolved by the DTV APR's avoiding action. Although some Members had suggested another cause, after extensive debate it was decided that the non-assimilation of the B737's departure by Leeming ATC had led to the DIR becoming involved in a protracted co-ordination dialogue with the DTV APR at a late stage, which had thereby prevented Leeming DIR from passing timely traffic information about the B737 to the Hawk formation and was a contributory factor.

In terms of risk: as none of the ac involved flew within 3nm of one another as the Hawks passed clear astern of the B737, the Board agreed unanimously that no risk of a collision had existed in this situation.

PART C: ASSESSMENT OF CAUSE AND RISK

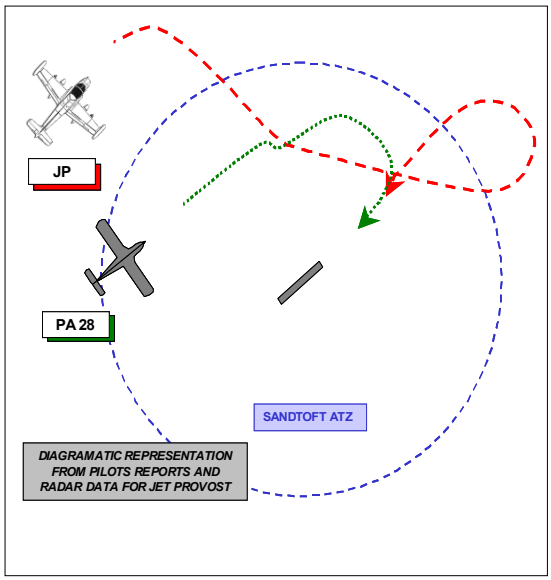
Cause: Conflict in the vicinity of the Durham Tees Valley Airport CTA resolved by the DTV APR.

Degree of Risk: C.

Contributory Factors:The non-assimilation of the B737's departure by Leeming ATC led to the DIR becoming involved in protracted co-ordination with the DTV APR at a late stage, thereby preventing Leeming DIR from passing timely traffic information to the Hawk formation.

AIRPROX REPORT NO 035/05

Date/Time:	19 Mar 1122 (Saturday)	
Position:	5336N 00052W (Overhead Sandtoft Airfield - elev 11ft)	
Airspace:	Sandtoft ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	Jet Provost
Operator:	Civ Trg	Civ Pte
Alt/FL:	1000ft (QFE 1025 mb)	1200ft (QFE)
Weather	VMC CLBC	VMC CLBC
Visibility:	5-7km	3nm
Reported Separation:	0 V/<50 yd H	0V /75-100ft H
Recorded Separation:	Not recorded.	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports flying a dual circuit training sortie at Sandtoft but intending to land back at Leeds Bradford, in a white and blue ac with the beacon and strobes selected on but with the SSR at standby and in communication with Sandtoft A/G. He was in the mid downwind position for a right-hand visual circuit to RW23, heading 050° at 100kt and at the circuit height of 1000ft on the QFE, with the student handling the ac and conducting the pre-landing checks. He (the instructor) was conducting the lookout when an RT call *"Jet Provost joining downwind"* was heard. His lookout at the time was concentrated in the 4 o'clock position where he would have expected to see the ac. He then looked left and immediately saw the Jet Provost in his 9 o'clock position, approximately 100yd away at the same level, heading directly towards them on a collision course. He immediately took control and carried out a steep descending turn to the right and transmitted "*avoiding*". From commencing the avoiding action until he was established downwind again he lost sight of the other ac. After the avoiding action the Jet Provost was seen in his 2 o'clock, to the E of the airfield approximately 2nm away having appeared to take no avoiding action. He continued the circuit and landed the ac to report the incident to the airfield staff. A C152 was also in the circuit at the time and the instructor in that ac witnessed the incident. During the previous circuit detail in the PA28 and also whilst on the ground, the Jet Provost was seen making a number of short trips which included a number of non-standard joins and some aerobatic manoeuvres on the final approach path. At no time during the circuit was an RT call heard to indicate that the ac was approaching the ATZ. If his sighting of the Jet Provost had been even seconds later he was convinced that a collision could not have been avoided. Despite his avoiding action, he assessed the risk as being high.

THE JET PROVOST PILOT reports flying a local sortie in a black ac with the strobe selected on in contact with Sandtoft A/G and squawking 7004 [aerobatics]. He was passing heading 180° at 120kt when he saw a white and blue PA28, very late due to the sun and haze, 100ft below and ahead of him in a right turn. The PA28 was in the circuit at Sandtoft at 1000ft and he was at 1200ft. He had just called Right Base when the PA28 called avoiding and he immediately saw it below and in front. He thought that the PA28 pilot had been able to see him since he had been looking down sun at the time. He was not able to take any avoiding action as he saw the other ac, which was already avoiding him, too late. In the light of this incident he had decided that VFR flight in such hazy conditions might be ill advised. He assessed the risk as 'close'.

UKAB Note (1): The Jet Provost paints throughout the period manoeuvring between 1000 and 3500ft inside 3.5nm of the aerodrome. At 1122 the ac is seen 3.4nm NNW of the aerodrome apparently in a wide downwind position heading 050 then commencing a right turn at 1660ft amsl. It rolls out of the turn heading 145° and descends to be at 1060ft at a position 2.1nm N of the aerodrome. It then commences a left hand orbit from that position, remaining at about 1000ft, to roll out on the final approach at 2·8nm at 960ft and commences a straight-in approach

with the recording ending as he passes the 0·9nm point. Although a 7000 squawk can be seen in the visual circuit at 1000ft before the reported time of the incident, the PA 28 which was not squawking, does not paint at any time.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board concentrated solely on the actual occurrence and determined that it had been straightforward. There was no report from the A/G operator nor was a transcript or recording of the RT available. That being the case, equal weighting was given to the reports of the two pilots. Members noted from the radar recording that the Jet Provost pilot had not joined the circuit in the standard manner nor had he flown a standard circuit. Although haze may have been a factor, if the weather was not adequate for his operations pilot Members considered that he should not have flown. Members could not determine with any accuracy the sequence of RT transmissions made by the Jet Provost pilot. The Board therefore concluded that either the Jet Provost pilot's 'Right Base' call was not transmitted or the PA28 pilot did not hear it.

Members agreed that the sole cause of this incident had been that the Jet Provost pilot had not integrated safely into the circuit at Sandtoft, as he is required to do under the Rules of the Air. By not doing so he had compromised the safety of both ac. When determining the degree of risk, Members put considerable weight on the Jet Provost pilot's own assessment of 'close'.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jet Provost pilot did not integrate safely into the circuit pattern as required by Rule 17 of the Rules of the Air and flew into conflict with the PA28.

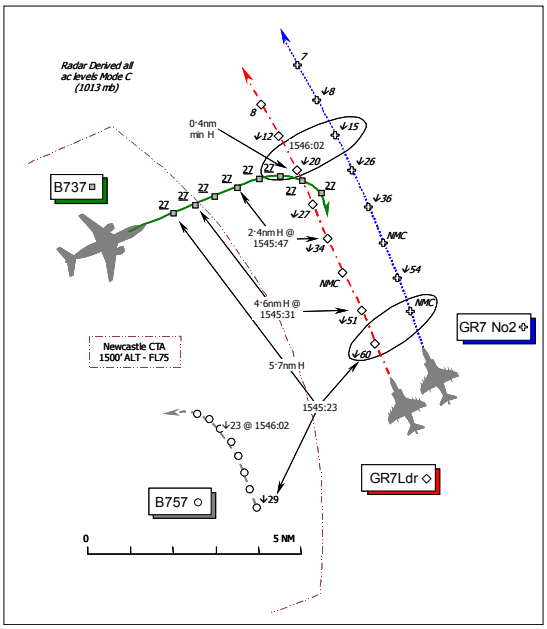
Degree of Risk: B.

AIRPROX REPORT NO 036/05

Date/Time:	16 Mar 1546	
Position:	5510N 00125W (13nm NE Newcastle - elev 266ft)	
Airspace:	CTA/FIR	(Class: D/G)
	Reporting Ac	*Reported Ac*
Type:	B737-700	Harrier GR7 pr
Operator:	CAT	HQ STC
Alt/FL:	2500ft	4000ft↓
	QNH (1004mb)	(RPS)
Weather	VMC NR	VMC CLOC
Visibility:	>10km	>10km

Reported Separation:
1000ft V/~ 1·5nm H 2000ft V/4nm H

Recorded Separation:
v GR7 Ldr:700ft V @ 0·4nm Min H
Nil V @ 1·4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-700 PILOT reports he was inbound to Newcastle from Belfast and in receipt of a RCS from Newcastle RADAR (DIR) on 124·375MHz. The assigned squawk [A3766] was selected with Mode C and TCAS is fitted.

They had been under radar vectors for sometime and were flying at 210kt clean, heading 070° downwind RH for RW25 at Newcastle, level at 2500ft QNH (1004mb), and No 2 to other traffic for a vectored VOR DME approach to RW25, when the DIR issued a R turn onto a closing heading of 190°. At that point 2 ac "popped up" on TCAS <2·5nm away, whereupon TCAS enunciated a TA. The other ac were descending fast, and approaching from 2 o'clock within 2nm and separated by about 1000ft from his ac, so he took "all the automatics out" and expedited the R turn at 45° AoB, which subsequently generated a bank angle warning, to ensure clearance from the other ac. Two military jets were spotted visually about 2nm away but they lost sight of them 2sec later because of their high RoD. He estimated that the minimum separation was about 1·5nm horizontally and about 1000ft vertically: no RAs were enunciated but it was very close. He subsequently discussed the occurrence with the controller on the telephone.

UKAB Note (1): It was intimated that the B737's TCAS might not have been able to generate an RA because the SSR transponder system on the military ac was not compatible with ACAS II. This is not the case and, in general, TCAS will enunciate an RA on detected 'intruder' ac, military or civilian, which are squawking Mode C/S where appropriate.

THE HARRIER PILOT reports he was leading a pair of GR7 jets on a straight descent into low-level after having terminated a RAS with London (Mil). Consequently, they were not in receipt of an ATS at the time of the Airprox and squawking A7001 with Mode C whilst descending VFR. The formation was flying in a 1½nm 'Battle' formation with his No2 positioned off to starboard. Heading 350° over the sea at 420kt passing an altitude of about 4000ft he estimated, in the descent clear of cloud, a B737 was spotted at 8 o'clock about 5nm away in a climbing turn. To remain clear he increased the RoD and speed as the B737 passed by some 4nm away off his port quarter some 2000ft below his ac at the closest point in a R turn. He assessed the risk as "nil".

THE NEWCASTLE RADAR CONTROLLER (DIR) reports that the B737 was being vectored downwind RH at 2500ft Newcastle QNH (1004mb) for positioning as No 2 to a B757 in the sequence for RW25. As the flight was turned onto a BASE-LEG of about 170°, a pair of fast moving contacts flying northbound at 4000ft within, he thought 12nm of the airport, descended through the B737's level and passed less than ½nm ahead of the airliner from SE-NW. The BASE-LEG turn of 170° was changed to 'avoiding action' onto 190°, whilst the crew received

a TCAS TA but not an RA. Furthermore, at no time did the other ac, believed to be military jets, contact Newcastle during their transit.

UKAB Note (2): The Great Dun Fell Radar recording shows the GR7 pair in a 1·2nm 'Battle' formation (both squawking A7001) descending through FL120 as they pass E abeam Newcastle Airport. The B737 is shown just crossing the CTR/CTA lateral boundary level at 2700ft (1013mb) which is maintained throughout the encounter. The lead GR7 – the westerly of the two jets - is shown descending through FL51 at a steady rate, 4·6nm from the B737, just as the latter exits the CTA into Class G airspace at 1545:31: it was just after this time that the APR instructed the B737 crew to *"…turn R heading 170°descend to altitude 2000 feet".* At 1445:54, GR7 Ldr descended through the level of the B737 that was 1·4nm NW in the R turn and converging on the pair. Vertical separation had increased to 700ft as GR7 Ldr descended through 2000ft (1013mb) and crossed through the B737's nose at a range of 0·4nm from the airliner in Class G airspace. Thereafter the GR7 pair maintained their descent to low-level and the B737 turned inbound onto the RW25 centreline.

ATSI reports that the Newcastle DIR described both the workload and traffic loading as 'medium'. The relevant ATC equipment, with the exception of the ILS, was all reported to have been serviceable. At Newcastle the normal division of duties between RADAR 1 and DIR is that RADAR 1 takes responsibility for all transit flights, outbounds and inbound traffic that is not routeing via airway P18 whereas DIR deals with all inbounds via airway P18 together with the final approach sequencing. At the time of the Airprox, the positions were split and two controllers were operating the RADAR 1 and DIR positions separately.

The B737 had been initially positioned downwind RH for RW25 by the RADAR 1 controller. At 1543:15, the B737 crew contacted DIR and reported heading 070º. The B737's position at that point was within the Class D Newcastle CAS 3½nm N of the airport, at 3100ft QNH. At the same time, the GR7 pair was descending through FL209, 25nm SE of the B737. The DIR instructed the B737 to descend to 2500ft as it continued downwind right hand. A short time later, an inbound B757, also under the control of the DIR, which was some 10nm SE of the Airport reported 'visual' with the airport and was cleared to make a visual approach to RW25. The DIR instructed the B737 crew to reduce speed to 210kt or less, as he had changed his plan and had now made the B737 No2 in the sequence.

At this point, the GR7 pair was in the 2 o'clock position of the B737 at a range of 14½nm, passing FL135. Although the B757 had turned in towards a L BASE-LEG, the flight was still flying a wider circuit than the DIR had expected. This resulted in the B737 having to continue downwind. At 1545:10, the B757 was on a BASE-LEG some 10nm E of the Airport whilst the B737 was 10nm NE of the Airport still tracking downwind with only 2nm to run to the eastern CTA boundary. Meanwhile, the westerly of the two Harriers was passing FL78 in the 2 o'clock position of the B737 at a range of 7·7nm outside the CTA.

At 1545:15, the pilot of the B737 reported that they could "*….take a right turn anytime*". The controller replied "[B737 C/S] *roger you're number two at the moment*". At 1545:35, the controller instructed the B737 to turn R heading 170º and descend to an altitude of 2000ft. At that time, the B737 was just about to cross the CTA boundary at 2500ft, whilst the westerly Harrier was in its 2 o'clock position at a range of 4·6nm and passing FL51 (approximately 4800 ft QNH). The pilot of the B737 responded "*Er turning right stand by*" to which the controller replied "*Roger avoiding action left say again right 190°*".

The Harriers continued descending following a track of 340º which kept them E of the Newcastle CTA boundary by approximately 2nm. As the B737 commenced the right turn onto 190º the westerly Harrier descended through its level and passed 0·4nm ahead of and 700ft below the B737. The pilot of the B737 reported that he had received a TCAS TA but no RA. Later, in a telephone conversation with the controller, he advised that he would be filing an Airprox.

The DIR explained that his initial plan was to make the B737 No1 in the sequence and the B757 No2. When the B757 crew reported visual, he saw no difficulty in changing the plan. He had applied speed control to the B737 in order to prevent it running too far downwind, and added that this technique was a common method of operation at the unit. He said that it was his normal practice to inform the pilot of a change in radar service but did not do so on this occasion. He recalled seeing the GR7 pair in his peripheral vision but, at that time, they did not seem to be a potential confliction as they were at medium level. He could not recall, exactly, when he first saw the GR7 pair but he had definitely seen the Harriers by the time that the B737 crossed the CTA boundary. He had been slightly caught out by their RoD – approximately 7500ft/min - which brought them into confliction with his ac much

quicker than he originally thought. His initial assessment was that the B757 would have flown a tighter circuit than it did, and so the B737 would have been turned onto a R BASE earlier, thereby keeping it within CAS. This would have ensured that no confliction existed with the GR7 pair.

The DIR could not explain why he had not passed any traffic information to the B737 crew as he felt he had time to do so. He advised that he had not practised passing avoiding action in his unit 'Training in Unusual Circumstances and Emergencies (TRUCE)' scenarios and that was probably why he was slightly hesitant. In discussion, the DIR advised that the Newcastle radar overhead is large and so there is a reluctance to route traffic to the holding fix and vector traffic from there into the radar pattern. He added that it was common practice for military fast jets to call Newcastle when crossing the extended centreline of RW25/07. This frequently occurred when they were passing W of Newcastle but it was rather more 'ad hoc' if they were routeing to the E. Even though the Harriers routed close to the eastern boundary of the CTA, they remained in Class G airspace and there is no requirement for such flights to contact Newcastle. Nevertheless, the Newcastle DIR should have either kept the B737 within CAS or provided the flight with a RAS if it operated outside. No traffic information was passed to the crew of the B737 and the crew were not advised what radar service they were being provided with.

HQ STC comments that these ac got extremely close together considering the apparent weather conditions at the time which allowed the GR7s to descend visually with a high RoD. It may have been the RoD which did not trigger a TCAS RA in the B737 cockpit. The difference in opinion of the range between the two pilots' reports is also difficult to reconcile. Had the lead GR7 pilot appreciated that he was only 0·4nm away from the B737 he may have adjusted his flight path accordingly. Yes, they could have considered calling Newcastle ATC as they passed, but they were about 13nm from the airfield as they passed abeam. However, if you choose not to call ATC your lookout has to be good enough to spot ac which have 'strayed' outside CAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Clearly the B737 crew was merely following ATC instructions and had little influence on the underlying cause of this encounter as they exited the Class D CTA into the Open FIR, of which they were not advised by the controller. From the Harrier leader's perspective the Board realised that he was proceeding legitimately about his sortie in Class G airspace. Whilst the STC Member opined that it might have been helpful if the leader had called Newcastle to advise his intentions, the GR7 pilots were under no remit to do so outwith the confines of the UKDLFS. The Harrier pilot had reported that he had spotted the B737 at 8 o'clock about 5nm away in a climbing turn. The Great Dun Fell Radar did not reveal a climb from the B737 - either before or after the CPA - the B737 maintaining a level of 2700ft Mode C throughout the encounter. Similarly the minimum distance reported by the GR7 leader - some 4nm away off his port quarter when the B737 was some 2000ft below his ac at the closest point – did not accord with the radar recording. Whilst it was evident that the B737 was in a R turn throughout, some Members wondered if it was the B757 that the GR7 leader saw instead – that ac was certainly shown at the distances reported – and these Members questioned whether the Harrier leader or his No2 had seen the B737 at all. It seemed unlikely that the leader would have intentionally flown his formation 700ft and 0·4nm away from the airliner if he had seen it beforehand. Whilst this was straying into the realms of speculation somewhat, the HQ STC fast-jet Member agreed this was a possibility that should not be discounted: it was therefore agreed that a possible non-sighting of the B737 by the GR7 pilots might have been a contributory factor in them passing so close.

The Harrier ac were individually squawking with Mode C which should have made them relatively conspicuous on the DIR's radar display and alerted the controller to their presence. Members recognised that the Harrier leader had no intention of entering the Class D CTA and had no reason to do so whereas it seemed that the DIR was prepared to allow his pattern to extend downwind outside CAS if needs be. This was why the inbound B737 flew into Class G airspace when the crew could reasonably have expected the protection of CAS throughout the final stages of their approach. The ATSI Advisor and some controller Members questioned whether Newcastle ATC was utilising the CAS that they already had to best advantage and perhaps the utilisation of a holding pattern within Class D might be more advantageous. The CAS provisioned for Newcastle might normally be sufficient but the DIR had himself suggested that the apparently large Newcastle 'radar overhead' was a significant factor in preventing them from utilising a hold within CAS. However, civilian controller Members were sceptical and agreed

that the DIR should have been able to keep the B737's recovery pattern within Class D CAS. Although DIR had said that he recalled seeing the GR7 pair in his peripheral vision, at that time they did not seem to be a potential confliction. The ATSI Advisor explained that controllers are trained to scan over a wide area to identify potential conflicts at an early stage so that avoiding action can be issued if needs be and standard separation maintained where appropriate – depending in the nature of the ATS provided. The track passing NE of the airport outside the CTA, as flown here by the Harrier formation descending from medium level, was flown daily by military flights in transit: those familiar with the local traffic scenario might well have predicted a potential conflict. It should have been readily evident to the DIR that any extension downwind outside the CTA would potentially place his B737 in conflict with any ac operating in the Open FIR. DIR said that he had definitely seen the Harriers by the time that the B737 crossed the CTA boundary, making this a very late spot at less than 5nm away if that was the case. The ATSI Advisor explained that with 4 ac inbound, the B737 had originally been set up to be No 1 in the recovery sequence but then the B757 crew reported visual contact and elected to continue for a visual recovery which DIR approved. However the B757 crew were still technically operating under IFR, despite being VMC, but as a consequence of the visual approach Members realised that the DIR's task was made more difficult as the requirement to maintain standard separation in the pattern was unchanged. DIR's plan relied upon the B757 crew turning in tight toward the airport but the decision to release the B757 crew for the visual approach, whilst appearing expeditious, placed the leading crew in the recovery sequence under their own navigation. Thus, rather than dictating when the B757 would be turned in, DIR could now only follow the B757s pattern no matter how wide that might be. Therefore, he had effectively 'lost control' of the size of the pattern. That the B757 crew flew a wider pattern than DIR anticipated was the fundamental catalyst to the B737 being vectored outside the CTA. The Board agreed that the cause of the Airprox was that the Newcastle DIR vectored the B737 outside controlled airspace not recognising the confliction with the Harrier GR7 pair.

A civilian controller Member opined that when traffic is vectored outside CAS then it was a virtual certainty that other traffic would be encountered in the FIR that would warrant some action to remain clear of it – as evinced by this encounter. The controller's comment that he had not practised avoiding action manoeuvres during recent TRUCE training left controller Members somewhat aghast: in the ATSI Advisor's view, for a fully validated controller regularly providing radar services in the Class G airspace such as that surrounding Newcastle, avoiding action is regularly taken in many traffic situations so little formal practise is required in training exercises. Having run the B737 so far downwind into the 'Open FIR' it was DIR's responsibility to achieve 5nm horizontal separation against other observed traffic once outside CAS. Although he had not changed the nature of the ATS to a RAS outside the CTA, he was still seeking to achieve horizontal separation of 5nm. In order to provide the appropriate level of service a wide-ranging scan of the radar display was necessary to detect any conflicting tracks. Here it appeared that the confliction was not recognised by DIR before the B737 crossed the CTA boundary - at less than 5nm range from the nearest Harrier. Consequently, when seen so late DIR was never going to be able to achieve the requisite separation with his avoiding action R turn. Separation was eroded to 1·4nm as the GR7 leader descended thorough the level of the B737 and further to the minimum horizontal separation of 0·4nm after the nearest GR7 had descended 700ft below the airliner. Some CAT pilot Members believed that the Harriers' rapid RoD was taking them clear below and effectively removing any actual risk of a collision with the B737. Moreover the GR7s were apparently outside the TCAS RA envelope so with only a TA being enunciated TCAS did not need to act further. Some Members therefore argued that safety had not been compromised. Other Members were sceptical, asking if the Harrier leader had in fact seen the B737. The latter's crew caught only a momentary glimpse of the Harriers as the B737 turned belly up to the formation, into its R turn at 45° AOB in response to the DIR's belated attempt to avoid the jets. Other Members held the view that safety had not been assured. Following this wide-ranging discussion and a vote, the Board was evenly divided on the issue of risk and in this scenario the Chairman unusually had to exercise his casting vote. So by the smallest majority it was decided that the safety of the subject ac had been compromised in the circumstances described here.

PART C: ASSESSMENT OF CAUSE AND RISK

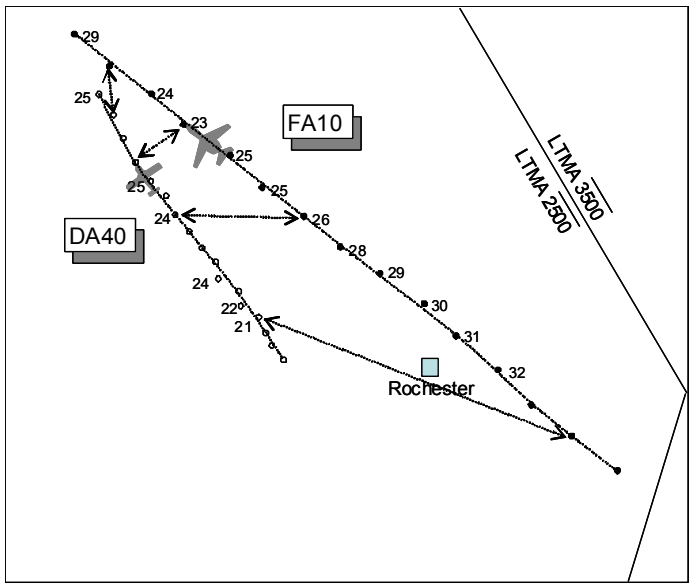
Cause: The Newcastle DIR vectored the B737 outside controlled airspace not recognising the confliction with the Harrier GR7 pair.

Degree of Risk: B.

Contributory Factors: Possible non-sighting of the B737 by the GR7 pilots.

AIRPROX REPORT NO 037/05

Date/Time:	18 Mar 1538	
Position:	5125N 00024E (10nm NW DET)	
Airspace:	FIR	(Class: G
Reporter:	LTCC Thames Radar	
	First Ac	*Second Ac*
Type:	FA10	DA40D
Operator:	Civ Comm	Civ Pte
Alt/FL:	2700ft (QNH 1027mb)	2300ft (QNH)
Weather	VMC CAVOK	VMC CLOC
Visibility:	>10km	>10km
Reported Separation:	5nm/700ft	500-600m
Recorded Separation:	0·4nm/100ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTCC THAMES RADAR CONTROLLER reports that traffic loading was light to moderate. The FA10 was being vectored for an ILS approach to RW 28 at London City. Approaching DET, the ac was given descent to 3000ft QNH. Other tasks diverted his attention from the FA10's descent until he noticed a red STCA indication, a possible 'level bust'. His first reaction to the STCA (due to label garbling) was that it was a spurious activation due to traffic in the FIR setting the system off against a descent to 3000ft above. Other tasks continued to distract from close inspection of the garbled labels; however a further glance at the Mode C seemed to show the FA10 had descended below its cleared altitude. Rather than query the FA10's level, because of the proximity of the two ac he issued an immediate climb. This was amended to avoiding action during transmission as the Mode C data briefly became readable. The pilot was given traffic information and reported the other traffic in sight. A subsequent telephone conversation with the pilot highlighted confusion on the flight deck over the cleared altitude. The ac was not TCAS equipped.

THE FA10 PILOT reports descending inbound to London City under the control of Thames Radar. (UKAB Note: Thames Radar RT recordings show the pilot was heading 310 at 230kt.) He understood they were cleared to descend to 2000ft; passing 2700ft they encountered a VFR flight on a parallel track about 5nm to the left. He did not consider avoiding action necessary. On reaching 2000ft the controller asked him to climb to 3000ft, a previous clearance. After landing he explained, by phone to the controller, that they had kept the VFR flight in sight and decided not to file an Airprox.

THE DA40D (DIAMOND STAR) PILOT reports heading 330° at 125kt, cruising at 2300 ft on the London QNH, in communication with Rochester A/G, squawking 7000 with Mode C. He saw a small white twin jet about 5-600m away, descending low in his 4 o'clock on a track to cross ahead and climbing towards his 10 o'clock. The risk of collision was low.

DA40 Diamond Star (DieselEngine)→

ATSI reports that the FA10 established contact with the Thames Radar controller descending to 4000ft. Further descent was given to 3000ft and 3000ft was clearly read back by the crew. A 7000 squawk, with an unverified Mode C readout of 1700ft, was in the vicinity. The descent clearance given to the FA10 would ensure that the ac remained 500ft above the 2500ft base of the LTMA, in accordance with MATS Part 1.

STCA activated at 'low severity' as the FA10 was passing through 4000ft, at 1537:07. The controller then instructed the pilot to report established on the ILS at which time the FA10 was passing 3400ft and the other ac was indicating 2200ft.

At 1537:43, STCA changed to 'high severity' and some 10 seconds later the Mode C of the FA10 was observed at 2900ft with the 7000 squawk indicating 2400ft. The controller could then see that the FA10 was continuing to descend and so he gave an 'avoiding action' climb to 3000ft and passed traffic information. The pilot advised he was climbing to 3000ft and had the other ac in sight. At that time, both ac were indicating 2500ft and the 7000 squawk was in the 10 o'clock position of the FA10 at a range of 0.8nm, on a converging course. The FA10 descended to 2300ft before arresting its descent at which point it was 0·5nm from the 7000 squawk and 200ft below its indicated level. The FA10 climbed back to 3000ft which it reached at 1538:46. When the controller reminded the pilot that his cleared level was 3000ft the pilot apologised and accepted that it was his error. No ATC causal factors were disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members discussed whether the Thames Radar controller should have reacted with more urgency to the STCA but it was pointed out that in that environment a huge number of such alerts were triggered with traffic operating close beneath the base of CAS and that it was considered prudent to check the situation carefully before reacting. In this case Members agreed that the cause of the Airprox was the descent of the FA10 below its cleared level into Class G airspace and into confliction with the DA40D. The geometry of the situation indicated to the Board that there had been no risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

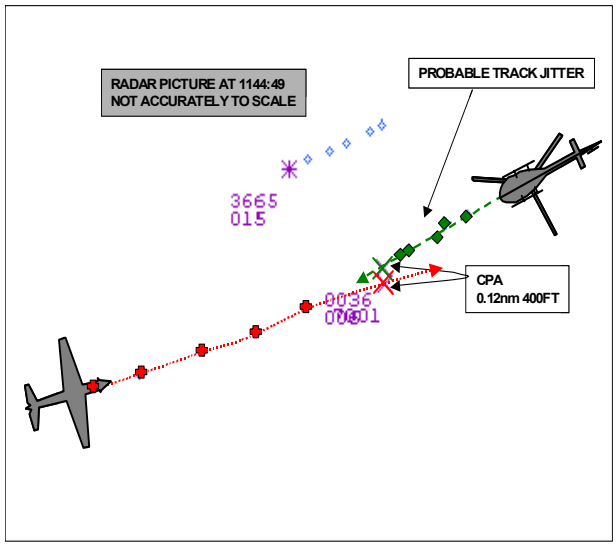
Cause: The FA10 descended below its cleared level into Class G airspace and flew into conflict with the DA40D.

Degree of Risk: C

AIRPROX REPORT NO 038/05

Date/Time:	23 Mar 1145	
Position	5236N 00005E (5nm SW Wisbech)	
Airspace:	London FIR/UKDLFS (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Schweizer 333	Tucano
Operator:	Civ Comm	HQ PTC
Alt/FL:	400ft (QNH 1012 mb)	250ft (RPS 1008 mb)
Weather	VMC CLBC)	VMC HAZE
Visibility:	14nm	10km
Reported Separation:	150-200ft V/100-150ft H	100ft V/200ft H
Recorded Separation:	400ft V/0·12nm (220m) H	

(Due to track jitter the horizontal distance may not be accurate)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCHWEIZER 333 PILOT reports flying a pipeline survey inspection sortie from Norwich with an observer in a silver ac with strobes and nav lights selected on, squawking 0036 with Mode C and ACAS is fitted. He had just terminated a FIS from Marham and was heading 240° at 95kt and 400ft, flying into sun with the visors down, when he first saw a black Tucano ac at a distance of ¼nm just to the right of his 12 o'clock and coming towards him. The ac was below their horizon with little relative movement until the last seconds: at that time of the year black ac blend in against a background of freshly ploughed fields. He initiated a right turn to avoid the ac but it was too little and too late so he assessed the risk of collision as being high. He did not get an ACAS warning of the other ac. Just before he saw the Tucano he had been in the process of confirming the next turning points and trying to contact Peterborough Conington for a FIS. His company had notified a PIN for the flight.

THE TUCANO PILOT reports flying an instructional low-flying sortie with a student pilot in the front seat of a black ac with landing lamps and HISLs selected on squawking 7001 with Mode C in receipt of a FIS from Marham Zone. He was heading 070°, out of sun but in haze, at 250kt and at 250ft agl when he saw a small pipeline inspection helicopter 1nm away in his 12 o'clock (the conflicting traffic was seen with 15 seconds to point of passing). It was heading about 250° at about 400ft agl in straight and level flight. He took control and pointed out the helicopter to the student before commencing a gentle bunt to provide enhanced separation. At this point they did not feel that the crew of the helicopter had spotted them. They passed as described and continued the Nav Ex through the Marham Gap Eastbound to land at Marham. He assessed the risk as being low so did not report the incident.

UKAB Note (1): The recording of the Debden radar shows the incident clearly. Both ac are squawking as reported above and both display Mode C. There is no apparent reason for the Schweizer pilot not receiving an ACAS warning.

UKAB Note (2): PIN Area H2 was notified as active from 0800-1200z.

UKAB Note (3): The Marham weather for 1150Z was:

EGYM 231150Z 21010KT 9999 BKN018 14/09 Q1015 WHT BECMG SCT025 BLU

The Chatham RPS for 1100-1200 1012mb

HQ PTC comments that this appears to have been a routine encounter at low level. While it was closer than ideal, the Captain took control promptly and had to make only a small adjustment to his flightpath to ensure safe separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was informed that the helicopter concerned had a rudimentary collision warning system and that the audio warning feature was disabled. It was suggested that with the visors down the crew might not have noticed a visual ACAS warning. If that was not the case specialists suggested that the Schweizer ACAS must have been inoperative as it was clear from the radar recording that the Tucano had been squawking with Mode C throughout. This effectively placed the helicopter pilot in the same situation as the Tucano pilot with no T/ACAS. Members were surprised that despite the dark colour of the Tucano the helicopter pilot had not seen its wing mounted landing lights. The Board was informed by an authority on helicopter ops that there is guidance in the UKAIP AIC on Pipeline Inspection Operations which recommends that, since Military Low-Level operations are conducted largely in the 250-500ft height band, pipeline inspections should be conducted between 600 and 1000ft thereby reducing the risk of a collision.

The Board determined that this had been a routine encounter in the LFS/FIR where both pilots had an obligation to see and avoid other traffic and both had done so thus ensuring that there was no risk that the ac would have collided.

The paucity of TCAS equipment in military ac remains a serious concern to the Board.

PART C: ASSESSMENT OF CAUSE AND RISK

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

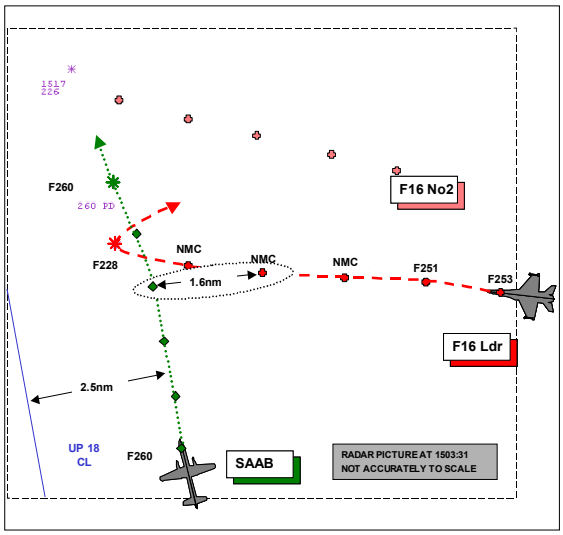
Degree of Risk: C.

AIRPROX REPORT NO 039/05

Date/Time: 23 Mar 1503
Position: 5547N 00138W (10nm S MADAD)
Airspace: UP18/Lon FIR (Class: B/G)
Reporter: ScOACC

	First Ac	*Second Ac*
Type:	Saab 2000	F16
Operator:	CAT	Foreign Mil
Alt/FL:	FL260	NR
Weather	IMC	VMC CLBC
Visibility:	NR	>10km

Reported Separation: 500ft V/½-1nm H 1000ft V/5000ft H
Recorded Separation: NR V/1.6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ScOACC CONTROLLER reports that prior to the incident he had advised the Saab 2000 pilot that due to intense military activity the next sector would only be able to offer a FIS below FL245 in Class G airspace. The pilot was given an option of remaining high under radar control, in Class B airspace, or a FIS if he descended into Class G airspace. He elected to remain high, in Class B airspace, to descend at a later time than is normal when inbound to Aberdeen. At the time of the incident the ac was therefore on UAR UP18. As the Saab 2000 approached the area of intense military activity, he passed TI on a contact squawking 1516 or 1517 with Mode C indicating FL245 and climbing in the 2 o'clock position to the Saab at a range of 8nm. The Saab pilot informed him that he had the contact on TCAS. The contact continued to climb through FL250 so he passed avoiding action to the Saab pilot. He estimated that the CPA between the ac was 0.5-1nm and 500ft. The conflicting ac then appeared to descend away on a Westerly track. Due to the intense activity, proximity and high speeds of the ac, it was very difficult to differentiate, due to garbling and label overlap, between the 1516 and 1517 squawks but both ac were on similar flight profiles and so he passed TI and avoidance based on the highest indicating Mode C.

THE SAAB 2000 PILOT reports heading N on UP18 at FL260 IMC inbound Aberdeen. He received a TCAS TA and avoiding action from ScOACC but did not consider the incident to be an Airprox.

THE F16 PILOT reports that he was flying on a NOTAMed exercise as a 3-ship formation as part of COMAO under Magic [AWACS] Control. They intercepted an ac not complying with IFF codes for friendly participants. The formation decided to visually identify the ac, adhering to VID procedures, and approached the radar contact until it was in visual range. At 1nm they recognised it as a civilian ac and broke away to the right. There was never any risk of collision.

MIL ATC OPS reports that all timings in this report are UTC.

An E-3D crew was supporting a military exercise during which a Composite Air Operations Strike package was to hold in the North Sea, proceed W over parts of Northumberland and S Scotland to strike the airfield at West Freugh. Weapons Controller 3 (WC) was controlling the package, all of whom were not yet on frequency as some elements were still under the control of CRC Boulmer after air refuelling. The F16 formation was holding between FL260-FL300 under radar control whilst the rest of the package was holding in the middle airspace under a RIS. The F16 formation began a descent into the middle airspace but 2 of the F16s (F16C & D) requested approval to operate at FL260. The WC confirmed approval for this change of level with the Fighter Allocator (FA) who in- turn informed the WC that she would have to apply a Radar Control Service above FL 245; the WC acknowledged this. At 1502:44, F16D was instructed to "*descend below 245*" by the WC and 5sec later she instructed "*F16D C/S, one stranger, BRAA 250/10, tracks north flight level 260, expedite descent, call when below*". F16C & D reported "*below 245*" at 1502:56. The WC passed further TI at 1503:03 as "*that traffic passing south west, 3 miles, flight*

level 260, not above (pause) 24 thousand". At 1503:11 the WC stated "*F16C, Magic shows you above 245*" and instantly transmitted "*F16C C/S, Magic, avoiding action, hard right west, correction east*" and the F16C acknowledged the turn "*F16C C/S, avoiding to the right, tracking north*". No further reference was made to the conflicting traffic.

Analysis of the Gt Dun Fell radar shows the Saab 2000 ac 15 nm S of MADAD tracking 350º, indicating FL260. The F16 was NE of the Saab by 12.5 nm squawking Mode A 1520 with and indicating FL243. The F16 was one of a 2 ship manoeuvring to roll out on a W heading and was indicating a climb. At 1502:44 the F16 was in the Saab's 2 o'clock, 6.75 nm indicating FL250. The F16 continued to climb peaking at FL253 for one sweep and then a descent is observed, at 1503:00, indicating FL251. The F16's Mode C indication disappears at 1503:06 when the lateral separation between the ac was 3nm. The next sweep shows the lateral separation of 1.6 nm, reducing to 0.9nm as the F16 passes behind the Saab 2000 which at this stage is seen to initiate a left turn. The Mode C indication returns to the F16 at 1503:29, for one sweep, showing FL228 when it is in the Saab 2000's 7 o'clock 0.9nm. The F16 is seen initiating a hard right turn to pass behind the Saab 2000 by 1.1nm with no Mode C indication and the separation increases from this point onwards.

The WC was aware of her responsibilities of operating in the UIR. She was very busy working across a wide area. She had instructed the F16 2-ship, which had elected to remain in the UIR, to descend "*below FL245*" which was followed by TI on the conflicting Saab 2000 and an instruction to "*expedite descent, call when below*". The F16 2-ship reported "*below 245*" at 1502:56. The WC passed further TI when the tracks were 3nm laterally separated and again reiterated "*not above 24 thousand"*. The FA informed the WC at 1503:08 that the F16s were still indicating "*at 255*": the WC informed the F16s of this and passed an avoiding action hard right turn. Although there are some differences and omissions in the use of callsigns during the passing of TI and avoiding action it is considered that this was not a factor in the Airprox. The initial descent instruction given to the F16s was passed when the formation was 10nm from the Saab 2000; although the instruction was to expedite descent no use of the term "avoiding action" was used. The F16 2-ship reported "*below 245*" but the controller did not assimilate that both the F16's Mode C was still indicating above FL245. It was a prompt from the FA that led to lateral avoiding action being taken by the WC.

UKAB Note (1): The procedures for AWACS ac within the UK FIRs/UIRs in peacetime are contained in HQSTC 'Interface Document No8'. The following references apply:

Para 18. Traffic priority. Within CAS and MRSAs Defence Air Traffic (DAT) controlled by a WC, except in an emergency, is to give way to all other traffic.

Para 29. (Prohibited Interceptions) d. Civilian ac, except when participating in a pre-briefed exercise.

ANNEX D Para 5. (Horizontal Separation) … In addition, WCs are not to permit the engagement/terminal phase of a Practice Intercept to take place within 10nm of on route GAT following UARs or CDRs unless prescribed vertical separation is known to exist.

UKAB Note (2): Despite several requests/prompts by the UKAB Secretariat commencing on the day following the incident, Controller's Reports, RT Transcripts and Radar data were not provided by the AWACS base until 7 months after first requested. It is understood that remedial action regarding investigation procedures has been taken at the unit concerned.

UKAB Note (3): NOTAMS H0479/05 and H0476/05 were issued for the exercise. The NOTAM states …aircraft will remain clear of controlled and regulated airspace unless under the control of the appropriate ATC authority'.

ATSI reports the Airprox occurred in Class B airspace on UAR UP18. The Saab was at FL260 and was in receipt of an RCS from the ScACC Montrose sector. The controller was performing the joint tasks of Tactical and Planning and the traffic levels were described as low-moderate. Approximately 10min after establishing communication with the Montrose sector, the Saab was routed direct to ADN. Subsequently the pilot was advised that once in lower airspace approximately 60nm S of Aberdeen, a RIS would be provided (by Aberdeen) but if earlier descent was requested the service provided would be a FIS due to military activity. The pilot replied *"Alright that's .. okay and we can descend as well"*. He was instructed to maintain FL260.

AIRPROX REPORT No 039/05

STCA activated at 1502:20 between the Saab and a 1520 squawk. The latter was approximately 8nm NE from the Saab heading W and climbing through FL246. The Montrose controller passed TI and asked the pilot if he had the traffic in sight. He replied *"we have him on TCAS anyway"*. At the time the subject ac were about 6nm apart with the military ac passing FL248 climbing. The Montrose controller turned to the adjacent Tay controller, who was responsible for the airspace below the Montrose sector in that position, to check whether anything was known about the 1520 i.e. was it likely to remain below FL250. The Montrose controller, establishing that its intentions were unknown, immediately transmitted *"avoiding action turn left now heading two six zero immediately traffic in your two o'clock two five five climbing"*. Receiving no response, the instruction was reissued *"left two six zero avoiding action"*, whereupon the pilot responded. The ac were then 5.1nm apart.

Action to be taken by ATC in respect of unknown ac is detailed in MATS Part 1, Section 1, Chapter 5, Page 13. In Class B airspace 'Neither avoiding action nor traffic information shall be passed unless radar derived or other information indicates that an ac is lost, has experienced a radio failure, or has made an unauthorised penetration of the airspace'. On this occasion it was only apparent to the controller that the military ac had apparently climbed above FL250 at a late stage, although he had taken pre-emptive action in passing traffic information and establishing that the Saab had the military ac on TCAS. Radar recording shows the 1520 passing FL250 at 1502:44, avoiding action being issued about 16 sec later. Due to the disparity of performance of the two ac, he was then unable to provide the minimum 5nm horizontal or 5000ft vertical separation as stated in MATS Part 1, Section 1, Chapter 5, Page 9.

HQ STC comments that exercise planning ensures that segregated airspace is NOTAMed for all such activities. In this case it would appear that, having been given clearance to operate at F260, the F16s assumed that the non-friendly squawk was a valid target. Despite the WC calling the F16s off the SAAB their delay in descending, and erroneously calling "*…below 245"* slightly before they actually were, resulted in a minor erosion of separation and them passing closer than necessary to the Saab, albeit well after they had descended into Class G airspace.

TIMETABLE OF EVENTS

Note: This is based on the timings provided; although all were reported as accurate there might be small discrepancies.

TIME	AGENCY	EVENT
1449:30	AWACS WC (WC)	F16 cleared to FL260
	WC	F16 Radar Control
1452:40	Scottish	Saab given reroute direct ADN
1500:00	Scottish	Saab offered late descent to remain under radar control or FIS below F245.
1500:20	Saab	Accepts late descent
1500:20	Scottish	Saab instructed to maintain F260.
1500:30	Radar recording (RR)	F16s first seen establishing in CAP (*Combat Air Patrol) ~15nm to E of UAR. Saab not yet on radar recording.
1501:30	RR	Saab first appears on 15nm scope radar recording. F16 still in CAP 15nm E of Saab track.
1502:00	WC	Transmits tactical situation to F16s. Saab not mentioned.
1502:17	F16	Left CAP heading 280 towards 'enemy' at FL 245. Saab was ~10nm S of F16 track at FL260 heading 355. This is the first time that conflict became evident (i.e. before that, ac were not in conflict).
1502:20	F16	F16 continue to climb to peak at F253 at 1502:50.
1502:31	F16	Call 'sorted' (indicates radar lock on target). *[UKAB Note: This would without doubt have been a lock on the correct target ac which at this time were in the F16's 12 o'clock at 10+nm. When the F16 radar goes to lock the PPI picture is lost. This indicates that the F16s were conducting the intercept on the target ac which can be seen manoeuvring probably to counter the radar lock which they would have detected. The Saab was most likely not the subject of the intercept and simply flew through the area of 'fight' but in the CAS above].*

1502:40	Scottish	Passed TI to Saab on F16 and asked if visual.
1502:44	WC	F16 instructed to descend below F245. (At that time indicated F16 indicated F250 climbing).
1502:49	WC	Saab mentioned as stranger. F16 told to expedite descent and call below F245.
1502:50	Saab	We have him on TCAS.
1502:56	F16	Called below F245.
1502:58	RR	F16 indicate F251 descending ~4nm NE of Saab.
1503:00	Scottish	Passes avoiding action to Saab.
1503:08	RR	F16 Mode C drops out.
1503:03	WC	Updated TI
1503:16	WC	Passes avoiding action to the F16s which were in the Saab's 3 o'clock at ~1.5nm with no Mode C.
1503:29	RR	F16 Mode C reappears at FL228.
1503:29	RR	CPA as F16 at FL228 passes 1.6nm behind the Saab at FL260.

*A CAP is a holding pattern (normally a racetrack) with one or more of fighter ac, often at medium altitude, with the object of providing (normally radar assisted) 'fighter cover' of a specified volume of airspace.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed on the sequence of events and that there appeared to be some small inaccuracies and a lack of detail in the F16 pilot's report. Specifically, it was the opinion of specialists that the intended recipient of the F16 intercept was not the Saab but ac participating in the exercise that were further to the W and heading towards the F16s, albeit at a slightly lower level. It was suggested that the Saab had unfortunately flown through the middle of the exercise tracking precisely into the 12o'clock position of the F16, albeit slightly above (in the upper air), while in that area and at that time all the exercise activity should have been in the middle airspace. The instruction to the F16 to descend below F245 was given by the AWACS control team - albeit not quite as early as it might have been - and this was also the case with the avoiding action. More timely and positive action by the military control team would most probably have alleviated the ScACC controller's concern. Military Members also considered that it would have been wise to plan the exercise to take place solely in the Low/Middle Airspace; had this been the case this incident would not have occurred.

In considering the occurrence the Board noted that the pilot of the Saab (the recipient) considered that it had not been an Airprox. However it was clear that the ScACC Controller was concerned that there might have been an erosion of the prescribed separation minima. Members also noted that in such situations where civilian ACCs are not able to co-ordinate with an AWACS, unfortunately such awkward situations can occur.

It was most unfortunate that the Mode C indications of the descending F16 had dropped out at the precise moment when needed as they were the sole indication available to the ScACC controller as to whether the F16 had descended through FL245 (and thus was not in confliction with the Saab). The Board was informed that another radar source had also been checked but its data was also inconclusive. Having no more up to date information, the ScACC Controller - in the opinion of the Board, rightly - assumed the F16 to be still above FL245 (although it was probably not) and gave the Saab pilot an 'avoiding action' turn. The Board recognised however, that by the time the level ambiguity became apparent, it was not possible to achieve the separation advocated in MATS Part 1. While not in any way implying criticism of the ScACC Controller's actions, a specialist informed Members that there was always some, albeit unquantifiable, lag between the Mode C indication on the radar screen and the actual level of an ac in a descending situation; it was his view that in such cases the pilot's altitude call should be accepted as the more accurate. The call made by the F16 pilot of passing FL245 was however made on the AWACS frequency and could therefore not have been heard by the ScACC Controller.

Despite that at the time it may have appeared otherwise to the ScACC Controller, Members determined that it was most likely that at the CPA (H) of 1.6nm the F16 had been passing about FL240 in the descent (based on average descent rate) and that it was probable that it had descended out of the Upper Air. The controller however had no

way of knowing this: that being the case the Board considered that there had not been any risk of collision in this incident.

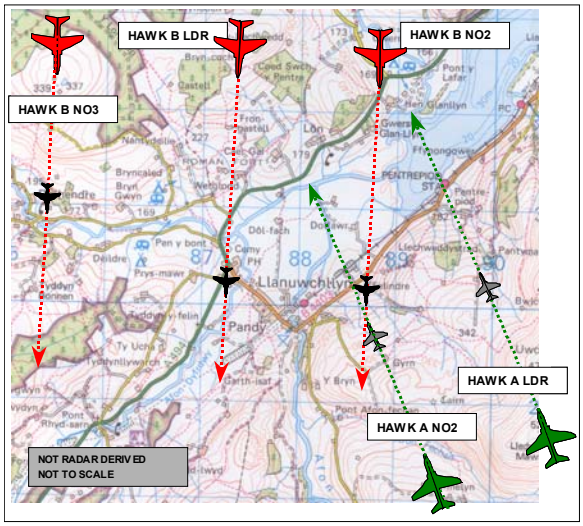
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ScACC Controller was concerned by the flight profile of the F16 which was in conflict with the Saab 2000.

Degree of Risk: C.

AIRPROX REPORT NO 040/05

Date/Time:	23 Mar 1611	
Position:	5241N 00339W (SW end Bala Lake)	
Airspace:	UKDLFS LFA 7	(Class: G)
	Reporting Ac	*Reporting Ac*
Type:	Hawk	Hawk
Operator:	HQ PTC	HQ PTC
Alt/FL:	500ft (agl)	500ft (agl)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	~400ft H	~400ft H/20ft V
Recorded Separation:	NR	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK A PILOT reports that he was the wingman of a pair of black Hawk ac with another QFI in the rear seat and with HISLs and nose light selected on, squawking 7001 with Mode C and operating on a tactical frequency. While transiting NW at 420kt at low level in LFA7, having just descended off a ridge by the SW corner of Bala Lake, they saw an ac in their left 10 o'clock at about 2nm and their attention was on him at that time. This ac turned out to be the bounce ac of another formation from their Squadron (Hawk B formation). He happened to look right 1 o'clock shortly after and saw the nose light of another ac which was part of the formation being bounced. This ac was co alt, very close and pointing straight at him so he broke hard left. His leader saw the potential collision and called it on the RT. The opposing ac did not appear to react and, at the time, he estimated its range to be 150ft. Subsequent examination of the video evidence suggested that it was closer to 400ft but confirmed that his avoiding action would have been too late to take effect. (The opposing pilot picked him up as he passed close aboard during his break away). He was first alerted to the presence of the other ac by the nose light. They thoroughly debriefed the incident on the Sqn and both decided to file an Airprox. RAF Valley operates a low level deconfliction system where LL routes and times are published on a board before take off for others to see. However, although both formations were aware of each other's routes, the second formation had slipped by 15 minutes and the expected air picture was different.

THE HAWK B PILOT reports that he was a solo student and was the wingman of a pair [plus a bounce] of black Hawk ac squawking 7001 with Mode C and with HISLs and nose light selected on, conducting evasion training in LFA7 on a tactical frequency [different to the other Hawks]. At the time of the incident he was heading S on the left side of the formation and had increased speed to 440kt on the leader's instruction in response to a 'Bandit' in their right 2 o'clock and at the same level. He called that he had seen and 'padlocked' the ac and was standing by to initiate countering action. He then saw a third ac pass through his field of view at a range later established to be about 400ft but at the time he estimated it to be about 200ft. He then called another ac between the formation and his leader called 'Terminate' which he acknowledged. There was not enough time to react to the other Hawk before it had flown through his field of view and hence he took no avoiding action.

THE HAWK STATION comments that Hawk B was part of a formation of 3 ac with the No 3 acting as the bounce with a planned take-off time of 1520Z. Hawk A was part of a formation of 2 ac planned as part of an instructor's A2 work-up syllabus and expected to take off 10 minutes later at 1530Z. Both formations planned an anticlockwise route around Western Wales with a target just to the SE of Aberystwyth. During the planning the captains of both ac realised that a confliction existed in the area of Tregarron, especially as Hawk A was planning to re-attack their target 12min after their first attack. The 2 leaders decided that the best course of action was for Hawk B formation

to delay their take-off time by 20 minutes so that their formation was in the vicinity of the target whilst Hawk A was further to the E.

Hawk A formation was airborne on time at 1530Z but Hawk B leader was unserviceable after start so the formation waited with engines running whilst the pilot changed ac; this resulted in take-off being delayed by 20 minutes and finally getting airborne at 1600Z. During the delay the problem of deconfliction with the other formation was not discussed.

During the approach to the Airprox, Hawk B leader and his No2 were in 2000yd Battle formation heading approximately 180° with the No2 on the left. The attentions of both pilots were initially focussed on the Bounce who was sighted initially in the 2 o'clock to the formation. Leader 1 called *"buster"* but before any other reaction against the bounce could be made No 2 called that another ac had flown through the formation. Leader looked in the direction of No 2 and saw another ac but this was probably Hawk A leader who was not an obvious threat to his No 2. Hawk B leader called *"terminate".* Hawk B No2 had seen a Hawk cross his field of view at an estimated 400ft but he did not have time to react.

Hawk A formation was also in 2000yd Battle formation with No 2 on the left heading 340° on the approach to the incident. They sighted Hawk B bounce in their 10 o'clock at about 2nm as they were coming off the high ground into the Bala valley. They realised that it could be a bounce ac and started looking for the rest of the formation but did not see anything until No 2 saw the headlight of Hawk B formation No 2 on what appeared to be a collision course. He immediately broke left and down and estimated the miss-distance as 150ft. Subsequent viewing of the other ac's video showed the miss-distance to be approximately 400ft and that his reaction did not take effect until after the 2 ac had passed. The leader of Hawk A formation saw the potential conflict between the 2 ac but due to his range he could not determine the best avoiding action to offer and just called *"one ac on your nose".*

Pilots from both formations had fully considered the problem of deconfliction and initially planned an adjustment of take-off times to compensate for the problem in the target area. With the take-off time delayed the apparent problems of deconfliction were believed to have been resolved and the need to look further into the sortie was thought, understandably, unnecessary. Once Hawk B formation had been further delayed by the change of ac there was no discussion regarding deconfliction. However, the Station does not believe that this would have changed their plan, as the problem of deconfliction in the target area would now have gone due to the further 20 minute delay. The 2 formations were now split by 30min in their take-off times and it would be impossible, without a copy of the other formation's plan in the cockpit to pick up on any further conflictions on the routes. Ultimately, the 2 formations' deconfliction came down to lookout through no fault of the pilots involved.

At the time of the incident the student pilot in Hawk B No 2 "padlocked" the bounce ac in preparation for the expected reaction. Both pilots in Hawk A formation were aware of the bounce ac and were looking out for the rest of the formation. However, they were coming off the high ground looking for a pair of black Hawks against a dark background, one of which was not presenting any significant movement to the 2 pairs of eyes in the cockpit of the No2.

Without the addition of a collision avoidance system in the Hawk it is difficult to see how these 2 formations could have done anything more to prevent what was a very close Airprox. Better quality maps for faxing between Sqns are being produced and pilots will now display a colour photocopy of their route map for the deconfliction board. One additional process that will be adopted at Sqn level is that when it is considered that there might be a possible confliction, the crews request the authorising officer to undertake an additional deconfliction check. Although this will not absolve crews of their ultimate responsibility, it will provide a safety check that perhaps in this case would have alerted the crew of Jester to the consequences of the additional delay.

HQ PTC comments that this incident caused sufficient concern for the Command to require the Station to carry out a full Flight Safety Investigation (F765B) iaw JSP551 (Flight Safety Manual). The Station Comments therefore encompass the findings of this. At the time of the occurrence there were existing safeguards in place designed to minimize the possibility of such an incident. However, these were circumvented by the sort of random factors that can conspire to defeat the best efforts of the considerable number of painstaking individuals involved. It could have as easily been a weather or tactical re-route as an ac change that consumed or extended the planned time deconfliction. The limited number of additional measures that the Station was subsequently able to add to the process can give us no absolute assurance of no repetition of this occurrence – only a sophisticated CWS could give us such assurance. However, the Hawk's nose-light has again been instrumental in preventing a worse

outcome. An unserviceable nose-light is now a “no go item” for 4FTS low-level operations. We are therefore pleased that we have succeeded in adding the requirement for a 40k candela nose-light to the Hawk 128. It will also have TCAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, extracts from the Station Flight Safety investigation and a report from the Hawk operating authority.

The Board considered this to be a most serious high speed low level incident and welcomed the openness of the pilots and their station. Further, Members noted the in-depth investigation ordered by HQ PTC and the follow-up action already taken by RAF Valley.

While deconfliction measures are welcome and necessary, they can only serve to mitigate low flying collision risks, not eliminate them. The RAF and its crews are aware that low flying is inherently a risky but nonetheless necessary activity. For such training to be meaningful however, it must be realistic, flexible and meet the considerable demands of the front line. It was pointed out to the Board that sophisticated flight planning systems, even if they were available (which they are not at present), are only a pre-flight tool and that there can be no replacement for airborne visual or electronically-assisted detection of conflicting ac. If another Hawk can get close to a formation without being detected then in other circumstances so can an unfriendly fighter intent on shooting the ac down. Development of the skills of intensive, all-round lookout and mutual cross-cover is therefore essential.

The Board unreservedly welcomed the HQ PTC insistence on fitting of both ACAS and a nose light to the Hawk 128 despite the cost implications. As has been witnessed in many incidents that have been reviewed by the Board, an ACAS can literally be a lifesaver even in the low level environment for which it was not specifically designed. It was the view of the Board that had all the Hawks involved in this incident been fitted with an ACAS system, the respective pilots would have been given about 10 sec additional warning of the presence of the opposing ac. This would have permitted more than enough time to initiate sufficient avoiding action to have prevented there being any risk of collision whatsoever. Members noted however that only a detailed study of the precise circumstances of the incident could verify their view. In the interests of the safety of their own and other ac, the Board continues to urge the MoD to consider fitting ACAS to all of the ac they operate.

In determining the cause of this incident, the Board accepted completely that in these circumstances early sighting might not have been possible due to the geometry of the formation dispositions and/or the terrain.

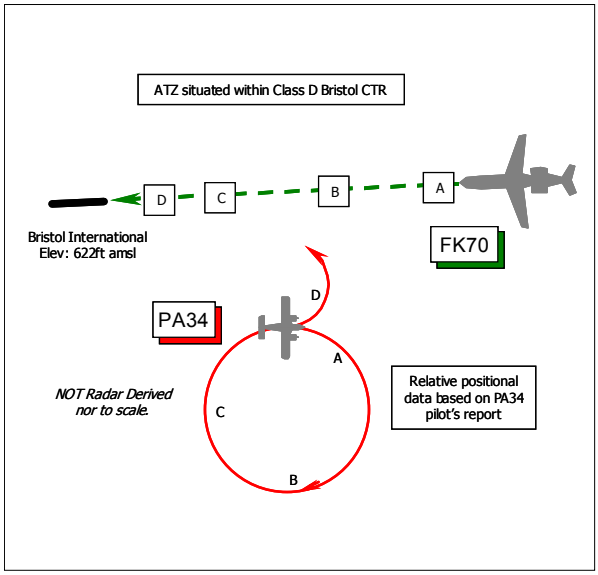
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effective non-sighting by the crews of Hawk A formation and a non-sighting by the crews of Hawk B formation.

Degree of Risk: A.

AIRPROX REPORT NO 041/05

Date/Time:	17 Mar 1405	
Position:	5123N 00241W (1nm finals RW27 at Bristol -elev 622 ft)	
Airspace:	Bristol ATZ	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	Fokker 70	PA34
Operator:	CAT	Civ Trg
Alt/FL:	900ft↓ (Rad Alt)	Cct height QNH (1027mb)
Weather	VMC	VMC CLBC
Visibility:	>10km	15km
Reported Separation:	Nil V/<1nm H	~1nm
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FOKKER FK70 PILOT reports that he was inbound to Bristol International IFR, executing an ILS approach to RW27 and in receipt of an Aerodrome Control Service from Bristol TOWER on 133·85MHz. When the Airprox occurred they were just becoming VMC with an in-flight visibility of 10km. Significantly, TCAS is fitted. During the approach, TOWER reported a PA34 L downwind that was holding in the pattern to land, after their FK70 in the landing sequence. Descending through about 1500ft Rad Alt at about 5nm finals flying at 130kt, he saw the traffic on TCAS coming "rather close" and at that moment horizontal separation was around 2½nm. Breaking out of the clouds at 900ft Rad Alt with the autopilot and auto throttle selected off, the gear down and 25° of flap selected with the Speed brake out, he thought, at about 1nm from touchdown heading 270° he spotted the PA34 twin circling on base leg to RW27. Just after identifying the traffic, a TCAS TA was enunciated as the PA34 passed by less than 1nm away on the port side at the same height. In his opinion, with a 70% cloud ceiling of 900ft TOWER should have separated the traffic more under the prevailing weather conditions. No avoiding action was taken and he did not assess the risk.

THE PA34 PILOT, a locally based flying instructor, reports he was conducting a local IFR instructional sortie with a student in his white coloured ac. They were in communication with Bristol TOWER on 133·85MHz and in receipt of an ATC service, flying in VMC some 200ft below cloud with an in-flight visibility of 15km.

An ILS approach had just been completed under IFR for training purposes, followed by a go-around into the visual Cct to RW27 at Cct height, still IFR. Orbiting right-hand (RHD) at 110kt, he was making sure that the student was not going to go into IMC and did not notice that he had not switched the transponder to "SBY". The FK70 was acquired visually at a range of about 2nm as they turned R through SE [at A] and passed by on the centre-line as they orbited through W [at B]. The FK70 crossed through the nose at the same altitude with *"zero"* risk as they orbited R through N [at C] and they did not turn base until the FK70 was clearing in their 7 o'clock [at D]. The minimum horizontal separation was about 1nm. He stressed that ATC had passed traffic information about the FK70 on finals and they were under positive control so no avoiding action was required.

The FK70 crew questioned on RT whether his ac was in the left-hand (LHD) Cct to RW27 because they had seen a warning on the airliner's TCAS and the FK70 pilot had said that they would have had to go around if he had not been visual. The FK70 pilot did not clarify whether he meant that he had their PA34 in sight, or whether he meant in VMC and no mention was made of any intention to file an Airprox on RT. Consequently, he was surprised to learn of the report as they had been flying under positive air traffic control, had followed the instructions given and both acs' captains had been made aware of the positions of each other's ac. Emphasising that they did not continue onto base leg until visual with the other ac and had been cleared to do so by ATC, he added that supervising his student carrying out the visual Cct below the cloudbase had imposed a high workload.

THE BRISTOL AERODROME CONTROLLER (ADC) reports that the landing FK70 on an ILS to RW27 had received a TCAS alert on short final against a PA34 which was orbiting in the Cct at the end of the downwind leg for RW27. The PA34 had executed a 'Go-around' from an IFR approach into a bad weather Cct to land. Traffic information was given to the PA34 crew about the FK70 but the latter's crew had received a TCAS alert on the PA34 just as they broke cloud: the FK70 pilot opined that he nearly had to 'Go-around' as a result.

The Bristol International 1350UTC Weather was reported as Surface wind: 260°/19kt; Vis: 15km; Cloud: SCT 500ft; BKN 900ft; QNH: 1027mb.

UKAB Note (1): This Airprox occurred outwith the coverage of recorded radar. The FK70 fades from coverage as the ac descends through 700ft Mode C (1013mb), whilst inbound on the RW27 centreline.

UKAB Note (2): The UK AIP at AD2-EGGD-1-4 notifies the Bristol ATZ as Class D airspace of a radius of 2½nm centred on RW09/27, extending from the surface to 2000ft above the aerodrome elevation of 622ft amsl and encompassed within the Class D CTR [radius 5nm].

ATSI reports that the PA34 had completed an ILS approach followed by a 'go-around' into a visual LHD Cct for RW27. TOWER reported the cloud as scattered at 500ft and broken at 900ft with a visibility of 15km. The FK70 crew contacted Bristol TOWER at 1402:15 and reported established on the ILS for RW27 at a range of 7·5nm. At 1403:10, the PA34 pilot reported downwind LHD for runway 27. The ADC transmitted "[PA34 C/S] *report final number two following a Fokker 70 who's on a 4 mile final. Caution vortex wake the recommended spacing is 6 miles, you may orbit right as required*", which was acknowledged by the PA34 pilot. Immediately afterwards, the ADC transmitted: "[FK70 C/S] *traffic information a Seneca* [PA34] *will be orbiting 1 mile south east of the airfield low level*". The FK70 pilot advised that they were still IMC and at 1403:50, the controller cleared the FK70 to land.

After landing the FK70 pilot advised that just as they became visual on final approach they received a TCAS TA that was obviously the PA34. The FK70 pilot added that if he had not been visual then they would have had to execute a missed approach. Subsequently an Airprox report was filed.

This Airprox took place within Class D airspace and so ATC was required to provide standard separation between IFR flights. The ADC had kept the PA34 in sight at all times during the bad weather Cct and was satisfied that it was sufficiently south of the ILS localiser course, if a little close to it, the ADC's lookout being supplemented by reference to the Aerodrome Traffic Monitor (ATM). It was the controller's intention to use 'reduced separation in the vicinity of the aerodrome'. However, as the FK70 was IMC then the conditions for this reduced separation were not met, neither could the ADC see both ac and the pilots could not see each other's ac until the FK70 descended out of cloud.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI report had made it plain that both of the flights involved were operating in accordance with the IFR because, as is required by civil procedures, the PA34's IFR flight plan had not actually been cancelled by its pilot on RT after completion of the student pilot's ILS approach and 'go-around' into the visual LHD Cct for RW27. This seemed to some military pilot Members who do not operate regularly at civilian aerodromes to be at odds with the operation of a 'visual' aerodrome Cct: any visual Cct traffic at military aerodromes would be considered to be operating under VFR without any need for a declaration by the pilot to that effect on RT. It was explained by the ATSI Advisor that the provision of separation between flights at civilian aerodromes by civilian ATCOs depended more strictly on the declared flight rules under which the flight was being conducted. Here, although operating by visual reference in VMC the PA34 was considered to be IFR as the PA34 pilot had not elected to tell ATC that he was operating VFR nor had the ADC queried if that was the case after completion of the ILS approach. As an IFR flight, therefore, the Board recognised that ATC was required to afford separation between the two ac. Although TOWER was providing the ATC service at the time of the Airprox, the responsibility of the approach radar controller (APR) with regard to the separation of these two ac was also discussed. When established on final approach, until the FK70 crew were flying with visual reference to the surface the APR was also responsible for separation against other IFR flights. It was also evident from the ATSI report that the specified parameters for 'reduced separation in the vicinity of the aerodrome' could not be met at the time. In essence, civilian controller Members said that the

requirement was to maintain horizontal separation between these two IFR flights until the FK70 had descended below cloud into VMC and could be seen by the ADC: because these requirements were not fully met, the ADC was not able to ensure IFR separation between these two ac under the prevailing conditions. This led the Board to conclude unanimously that this Airprox had resulted because Bristol ATC did not separate the two IFR flights.

Turning to risk, it was clear from the PA34 pilot's report that having been told about the FK70 on finals to land he was looking for the other ac, saw it in good time at a range of 2nm and took action to remain clear of it by keeping it in sight until it was safe to turn onto finals in the landing sequence in conformity with the ADC's instructions. Furthermore, the FK70 crew had been warned about the presence of the PA34 and had decided that no avoiding action was necessary. Consequently, the Members agreed unanimously that no risk of a collision had existed in these circumstances.

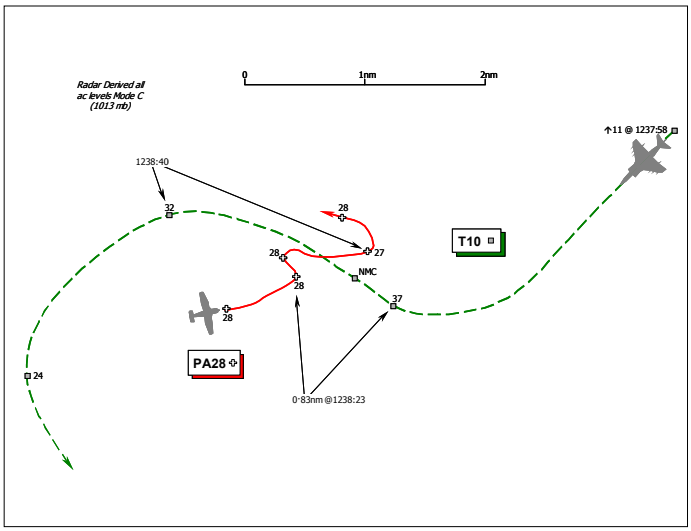
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Bristol ATC did not separate the two IFR flights.

Degree of Risk: C.

AIRPROX REPORT NO 042/05

Date/Time:	7 Apr 1238	
Position:	5203N 00210W (9nm N of Gloucestershire Airport elev 101ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Harrier T10	PA28
Operator:	HQ STC	Civ Trg
Alt/FL:	↓2300ft (RPS 994mb)	2000ft (QNH 999mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	30km	15km
Reported Separation:	Nil V/300m H	750ft V/600ft H
Recorded Separation:	Tracks crossed in azimuth	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER T10 PILOT, a QFI, reports that he was instructing the student PF from the rear seat whilst flying a dynamic manoeuvre simulating an attack using slick weapons. His ac has a grey camouflage scheme and the HISLs were on. They were not in receipt of an ATS whilst operating VFR some 1400ft below cloud with an in-flight visibility of 30km, squawking A7001 with Mode C. Neither TCAS nor any other form of CWS is fitted.

Flying at low level approaching a position 9nm N of Gloucestershire Airport heading about 220°, the ac was pitched to 20° nose up at a range of 4·3nm from the target. Climbing through an altitude of 3400ft, the ac was rolled to 135° angle of bank and from an apex of 3900ft was then dived at 10° nose down on a heading of 300° at 435kt. Passing about 2600ft RPS in descent for the simulated attack a white civilian single engine ac was spotted about 300m away as it passed some 300m to port. No avoiding action was taken since he did not see the other ac until after they had passed through its level. The student PF did not see the other ac in sufficient time to take any avoiding action either. The risk was assessed as *"medium".*

THE PA28-161 PILOT, a flying instructor, reports his ac has a predominantly white colour-scheme and the white HISLs situated on each wing were on. They were in receipt of a FIS from GLOSTER APPROACH on 128·55MHz flying VFR some 1200ft clear below cloud with an in-flight visibility of 15km. A squawk of A7000 was selected with Mode C; TCAS is not fitted.

The flight was a local instructional sortie practising general handling and they were manoeuvring at 2000ft QNH (999mb) some 10nm N of Gloucestershire Airport, at 95kt carrying out a 45° steep turn to the L when he spotted the Harrier jet himself some 4000m away as it executed a descending L turn. To avoid the Harrier he instructed the student to roll out of the turn as he watched the jet's pilot execute a descending L turn to the E, as it passed by astern off the port quarter. He thought the minimum separation was 600ft horizontally and 750ft above them at the closest point. At no time did he feel that his ac was in danger and as such he did not execute any evasive manoeuvres apart from returning to straight and level flight. He assessed the risk as "nil" adding that both ac were on diverging courses.

UKAB Note (1): The Clee Hill SSR recording illustrates the respective tracks of the subject ac but the intermittent nature of the T10's unverified Mode C at the critical point does not replicate the geometry of the encounter as reported by the Harrier T10 pilot. The jet is shown approaching the vicinity from the east at low-level heading SW before it is shown climbing through 1100ft Mode C (1013mb) – about 530ft RPS (994mb). Meanwhile the PA28 is shown proceeding generally easterly whilst manoeuvring in azimuth level at 2800ft unverified Mode C (1013mb), which equates broadly to about 2230ft Cotswold RPS (994mb). No Mode C is displayed by the T10 as it climbs further until it is shown at 3700ft (1013mb) at 1238:23 – some 3130ft RPS - when the jet is then probably

descending 0·83nm from the PA28. The PA28 turns E at 2800ft as the T10 displays NMC on the next sweep just before crossing the track of the PA28 in between sweeps where it is next shown at 3200ft. This would suggest that the Harrier did not descend through the level of the PA28 as it crossed ahead of the latter, which is somewhat at variance with the T10 pilot's report. The PA28 descended 100ft and is shown indicating 2700ft at this point which might be when the PA28 instructor saw the T10. The T10 is then shown turning about to the S of the PA28 and descending further at 2400ft unverified Mode C - now 400ft below the level of the PA28 before clearing south and east at low-level.

UKAB Note (2): In a subsequent telephone discussion with the PA28 instructor, he explained that the T10 was not seen as it crossed ahead from R – L. The Harrier was first spotted by the instructor to their left [SW] across the cockpit from his RHD seat after 1238:40, as the PA28 rolled out NW'ly and as the Harrier descended through their level and turned L about easterly.

HQ STC comments that the Harrier crew will have done their best to clear the area of the 'Pop' attack before pulling up. Subsequently, the dynamic nature of the manoeuvre which the crew were performing may have contributed to the difference in the perception of the distance/height between the two ac. The front seat student would have been concentrating his lookout towards the front to acquire the target and it was the rear seat instructor who saw the PA28, albeit too late to take any action.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident that both pilots were conducting their respective sorties legitimately in Class G airspace under VFR but some Members questioned whether it was wise for the T10 crew to be conducting such high energy manoeuvres here in the 'Open FIR' which, it appeared, had not allowed them to clear their intended flight-path adequately.

The initial accounts provided by both pilots did not seem to correlate with the relative geometry displayed on the radar recording. The intermittent nature of the Mode C received from the T10 – possibly owing to a high RoC/RoD during his simulated weapons release [though no dummy weapons were actually carried here, it was stressed] and furthermore the large scale of the radar recording could potentially result in some 'track jitter' which could give a misleading impression of the PA28's 'track made good'. The Board was briefed that the PA28 pilot had subsequently advised that they were only executing steep L turns during this phase of their sortie and it was this information which suggested that the R turn after the radar return timed at 1228:23 may have been spurious. Therefore, it might actually have been a steady ENE'ly course that was flown by the PA28 over the short period prior to the L turn at 1238:40 and the Board was cautioned that, unusually, the radar recording might not have accurately portrayed the situation at this large scale.

The T10 QFI's laudably frank account stated that he saw the PA28 to port, flying towards him at the same level as he descended and crossed ahead of it. But the radar recording did not show the T10 below the PA28 until the jet was to the SW of the light ac where, in between sweeps as he was descending through its level, the PA28 would then probably have been turning about onto NW. The Board could only speculate on why this was so: the T10 QFI might have mistaken the direction in which the PA28 was flying which, given the high energy manoeuvres executed at the time, was feasible but doubtful. It seemed that the QFI had more probably seen the PA28 as he was descending after his student had stopped the R turn – where up until that point they would have been 'belly-up' to the PA28 - on NW and where they would have been over banking into the L turn giving them the first opportunity to see the light ac. Here a fleeting glance of the PA28 might have made it appear to be at the same level at a high AoB, whereas in all probability it was below them as they crossed ahead and descended from above it and first saw it: this would accord broadly with the radar recording. The Board accepted this view as the most plausible explanation but was concerned nonetheless that the T10 crew had not seen the PA28 earlier. The Members agreed that part of the cause was that although the Harrier T10 crew had seen the PA28 it had not been in time to do anything about it and effectively, this non-sighting was part of the cause. Furthermore, it was explained that the PA28 pilot had reported that he first saw the T10, turning L to head to the E, off his port quarter astern some 4000m away. This was probably as the PA28 rolled out NW'ly, but it was subsequently established that its pilot had not seen the T10 cross ahead from R – L above him in the first instance at the point of confliction. The Board wondered if there had been an opportunity for the PA28 instructor to spot the jet as it pulled up from

low-level where it should have been clearly skylined to him. Nevertheless, the jet had not been seen and the GA pilot Member opined that the instructor would have been under a high workload monitoring his student very closely as they executed the steep L turns. Although the jet was eventually seen, it was after the critical moment when the conflict arose and effectively, a non-sighting on the part of the PA28 instructor which, Members agreed unanimously, was the other part of the cause.

With regard to risk, the paucity of Mode C indications from the T10 during its manoeuvres did not allow the vertical separation to be determined accurately. Some Members speculated that it may have been in the order of 400ft and thought this was enough to remove the risk of a collision, but this could not be confirmed. Moreover, what separation there was had not been engineered and was purely fortuitous. Others contended that regardless of whether it was a close quarters situation at this point, neither of the ac's crews had been aware of each other's presence as they approached each other before the tracks crossed. By a narrow majority, therefore, the latter view held sway and the Board determined that the safety of the ac involved here had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

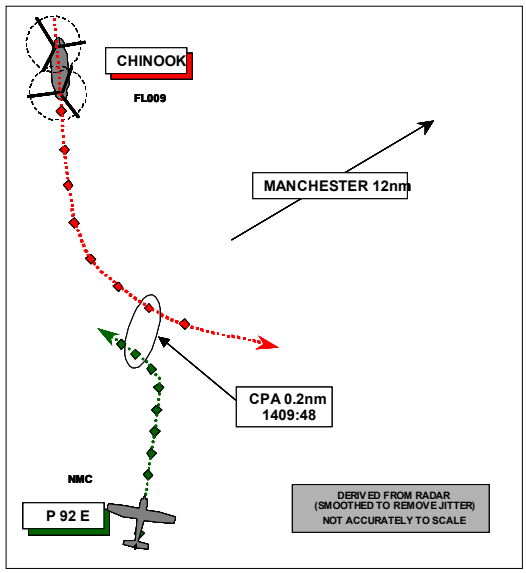
Cause: Effectively, a non-sighting by the Harrier T10 crew and the PA28 instructor.

Degree of Risk: B.

AIRPROX REPORT NO 043/05

Date/Time: 11 Apr 1410
Position: 5318N 00233W (Northwich Manchester Low Level Route)
Airspace: Manchester CTR (Class: D)

	Reporting Ac	*Reported Ac*
Type:	Tecnam P92E	Chinook
Operator:	Civ Pte	JHC
Alt/FL:	1200ft (QNH 1028mb)	1200ft (Rad Alt)
Weather	VMC CLBC	VMC
Visibility:	>30km	>10km
Reported Separation:	0m V/500m H	0 V/200m H
Recorded Separation:	NR V/0.2nm (370m) H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TECNAM P92E PILOT reports leading 2 ac on a VFR flight from Henstridge to Manchester Barton. His ac had only an underbelly strobe that was switched on and he was in receipt of a FIS from Manchester APR, was squawking 7000 but Mode C was not fitted. Heading 357° through the Low Level corridor [see UKAB Note (1)] at 80kt and 1200ft, he was passed TI on an ac heading S which he acknowledged, seeing the contact at a distance of about 8nm. He informed the controller that he was visual with the traffic and kept it visual right up to and beyond the incident. He thinks he queried the other traffic's track but took avoiding action by turning left which he announced on radio. The other traffic gradually turned towards him and then banked severely to its left in front of him. He then encountered severe turbulence resulting in a 90° rotation to the right. The pilot of the accompanying ac, which was behind him, witnessed the incident. He was very concerned about the rotor wake and assessed the risk of collision as being high.

UKAB Note (1): The Manchester Low Level Route is a corridor 4nm wide running N/S through the Manchester CTR. Procedures for its use are at the UKAIP Manchester AD2-EGCC-1-19. In the corridor ac can fly without individual clearance subject to the following:

They remain clear of cloud and in sight of the ground.

The Max alt is 1250ft on the Manchester QNH.

Minimum in flight visibility: 4km.

They are transiting through the CTR or proceeding directly to an aerodrome in the CTR.

Note: Flights using the Low Level Route are responsible for their own separation from all other flights when operating within the Low Level Route airspace at all times.

THE CHINOOK PILOT reports flying VFR from Carlisle to Odiham with HISLs and landing lights selected on. They were in receipt of a FIS from Manchester APR and squawking as directed with Mode C while tracking Southbound (out of sun) on the VFR route heading 140° at 120kt. Thirty seconds before the crew sighted two ac, Manchester APR had informed them of a Northbound contact at a similar height. The crew searched for the notified contact but saw nothing. One second before the ac passed down their RHS the crewman saw two Cessna type ac in close formation approx 300m in their 1230 and passing to their 5 o'clock; the RH seat pilot saw the contacts at the same time. They did not have time to take any avoiding action and did not assess the risk.

MANCHESTER APR reports that the P92E was one of two tracking Northbound in the Manchester low level route (LLR). While at Northwich [about 3nm into the route] and at about 1250ft the P92E pilot was passed TI on a Chinook southbound; the Chinook was also given TI on the P92E(s). The Chinook had earlier asked for routeing to Congleton VRP and this was approved at that time. [Congleton is about 15nm ESE of the position of the incident i.e. tracking towards it would require the Chinook to make a left turn through 80°]. The P92E pilot then advised him that he wished to report an Airprox.

UKAB Note (2): The radar recording shows both ac tracking approximately on the centreline of the Route in opposite directions.

ATSI reports that the incident took place at 1409:50 in the Manchester CTR Special Low Level Route, a 4nm wide corridor aligned N to S in the CTR which is Class D CAS [the rules governing the airspace are at UKAB Note 1].

Though not required to communicate with any ATC authority while on the Low Level Route, both flights involved in the incident elected to make their intentions known to Manchester APR, passing their details on the Approach South frequency. Approach South is operated by an Approach Radar controller (APR South) whose principal responsibility is the control of IFR flights inbound to Manchester from the SE. Other responsibilities include all VFR and SVFR traffic operating within the whole of Manchester Approach's airspace as well as VFR traffic in adjacent areas outside CAS.

In the 10min or so leading up to the incident the APR South was handling a steady flow of inbound IFR flights; nevertheless he issued TI to both the ac involved in the incident, in accordance with the minimum service requirements to VFR traffic in class D airspace (Ref: MATS Part 1, Section 1, Chapter 2, Page 1, Classification of Airspace).

At 1408, about two minutes before the incident, the controller asked the P92E pilot to confirm the ac type and he replied *"...it's a Tecnam similar to Charlie one fifty".* The controller then responded with *"Roger and tra- traffic for you believed to be twelve o'clock range five miles southbound showing twelve hundred feet one helicopter",* and the pilot reported *"No contact er opposing traffic...".* The Chinook pilot had earlier requested to route direct from STRETTON VRP (about half way along the Low Level Route) to Congleton, which would have involved a track to the SE through the **CTR**. This was refused because the flight would have passed through the Manchester outbound flightpath; however, at 1408:50, the controller transmitted to the helicopter *"Er Chinook C/S you can set course for Congleton now if you wish er I believe you're approaching the southern end of the Route and traffic for you er two Cessna one fifty type aircraft northbound believed twelve o'clock range of about three miles opposite direction".* The Chinook pilot acknowledged but then sought confirmation that the flight could proceed through *"...your Class D controlled airspace",* and the controller re affirmed this. Although the Microlight was not advised of the helicopter's intentions to alter its course this information would have been apparent from the RTF exchanges. Twenty five seconds later the P92E pilot reported, *"Rotary turning across me"* followed immediately by *"Breaking left".* The helicopter pilot made no comment on the RTF about an encounter. Two minutes later, after the Chinook had been issued a clearance through a segment of the Manchester CTR towards Congleton, the P92E pilot indicated in a transmission that he had just experienced an Airprox with the helicopter.

HQ JHC advises that the Manchester LLR is a natural choke point and often an area of high workload. Military helicopter pilots are taught to be extra vigilant when using this airspace. Nevertheless, even when given TI, there can be occasions when it can be very difficult to see opposing ac. Given that the P92E pilot was visual with the Chinook for the previous 8nm, it is surprising that the ac became so close as to be affected by the rotor downwash. This would have been an occasion for either the Chinook pilot to request a traffic update or for the P92E pilot to take vertical as well as lateral separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended both pilots for requesting a service from Manchester and making their intentions known, even though not required to do so by the regulations for the use of the corridor in the AIP. In some respects it was unfortunate that, probably in ensuring that they did not leave the lateral confines of the route, both ac were flying

close to the centreline albeit in opposite directions. Although a moot point, some Members opined that when equipped with very accurate nav systems, they would elect to fly slightly displaced from the route centreline. Further, the Board opined that both were close to the maximum altitude in order to minimise nuisance and maximise their ability to communicate with Manchester. A combination of these circumstances had put the ac precisely on a collision course.

Although not required to do so when providing a FIS, Manchester had given both pilots timely and accurate TI when already busy with other higher priority tasks. Thus the onus on collision avoidance had lain with the pilots (crews) involved. For whatever reason, the Chinook operating pilots had not seen the P92E which was very small, head on and on the horizon, despite an accurate warning of its position and track from Manchester. It was unfortunate that the Chinook was very slightly to the W of the P92E which meant that its navigation turn towards Congleton had taken it directly across the latter's flight path.

The Board discussed the distance that the P92E pilot had seen the Chinook in some depth since there was a conflict between the report submitted and the RT transcript. It was not possible to resolve the discrepancy but Members thought that even if it had been the closer figure (about 5nm) then at a closing speed of about 200kt this would have given the P92E's pilot about 1½ min to determine the Chinook's flightpath and avoid it both horizontally and vertically rather than continue flying directly towards it. This would be particularly soas the P92E pilot should have heard Manchester clear the Chinook to turn towards Congleton. Members accepted however that the airspace in the area was very constrained both horizontally and vertically and that the P92E pilot may not have been aware of the position of Congleton.

Notwithstanding the factors above the Chinook pilot had turned across the flightpath of the P92E without seeing it until after the commencement of the turn and was unable to initiate any avoiding action; the Board therefore agreed that this had been the sole cause of the incident.

Discussion ensued regarding the degree of risk. Members were reminded that their remit was solely to determine the risk of collision and not to determine any danger from downwash or other factors. Since the P92E pilot had seen the Chinook and taken avoiding action it was most unlikely that there was any risk that the ac would have collided. Because the Chinook pilots had not seen the P92E when they commenced their left turn the situation had not been completely safe.

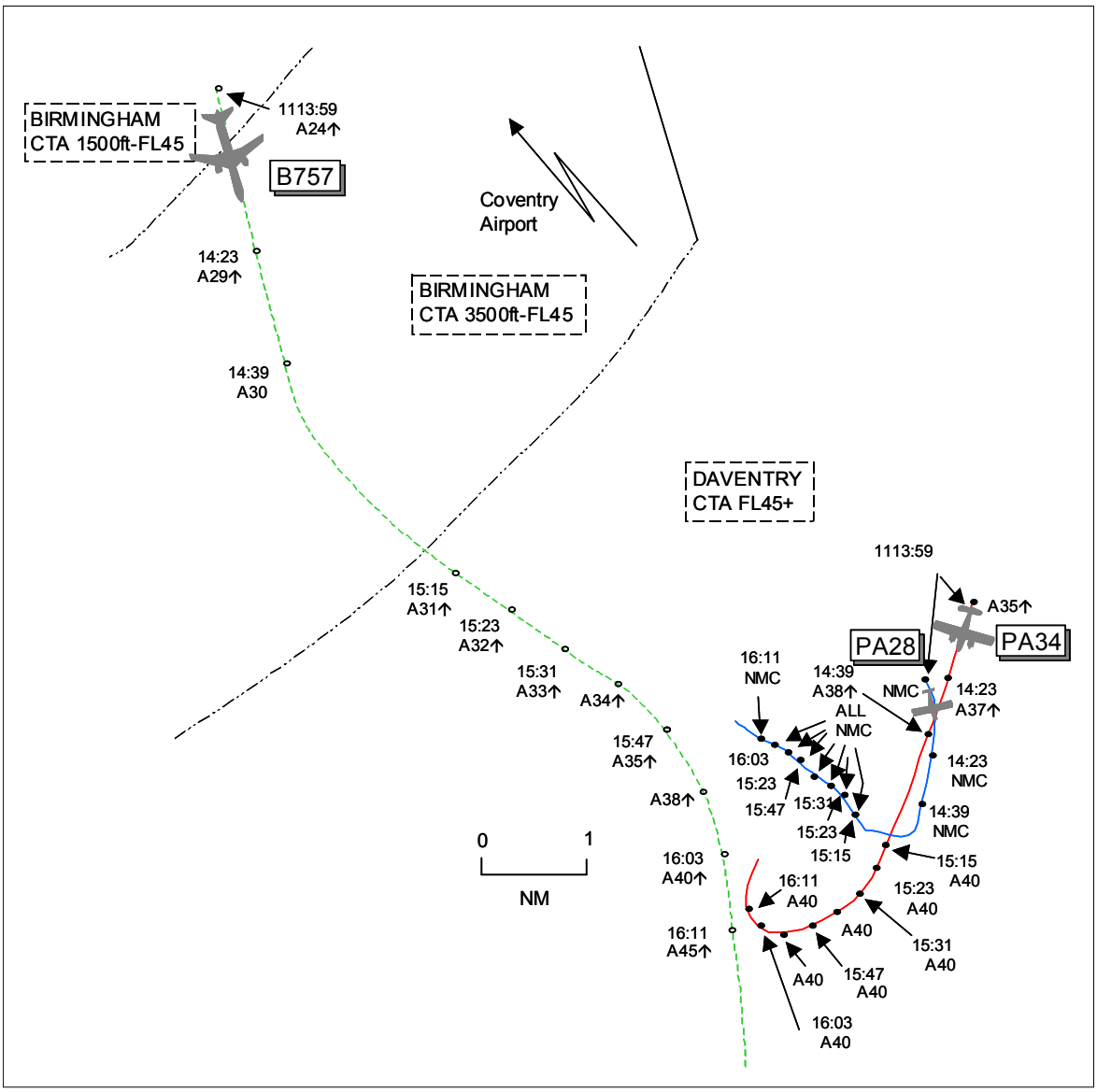
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Chinook turned into conflict with the P92E which the pilots did not see.

Degree of Risk: B.

AIRPROX REPORT NO 044/05

Date/Time:	10 Apr 1116 (Sunday)		
Position:	5211N 00121W (9nm W DTY)		
Airspace:	FIR	(Class: G)	
	Reporting Ac	*Reported Ac*	*Reported Ac*
Type:	B757-200	PA34	PA28
Operator:	CAT	Civ Trg	Civ Trg
Alt/FL:	↑4000ft (QNH)	3800ft (QNH)	<2500ft (QNH)
Weather	IMC KLWD	VMC CLBC	VMC CLBC
Visibility:	20nm CLOC	20km	>10km
Reported Separation:			
	c1nm H	Nil V 800m H	not seen
Recorded Separation:			
	Nil V/0·8nm H or 500ft V/0·2nm H		



AIRPROX REPORT No 044/05

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports heading S at 250kt after departure from Coventry flying a COWLY SID but held down to 2500ft. The met conditions were excellent with 20nm visibility above and below a layer of scattered cloud at 2500ft. Birmingham Radar cleared him to climb to 4000ft and informed him that they were leaving CAS with traffic to affect them straight ahead and to contact London ATC. Immediately after the end of the transmission, two TCAS RA targets (he thought) appeared 2nm ahead (one slightly left and one slightly right) and TCAS commanded *'climb'* (display showed traffic range 1nm and +02). The RA guidance was followed which changed to *'monitor vertical speed'*. No visual contact was made from the flight deck as they were IMC in the cloud layer but some passengers on the L side of the ac saw a light ac turn away and were very disturbed. He informed Birmingham ATC of his TCAS manoeuvre and then transferred to London.

THE PA34 PILOT reports flying a local dual training sortie from Coventry with a student undertaking Multi Engine Piston (MEP) class rating instruction; the port engine was shutdown and secured in accordance with AIC 52/1999. The visibility was 20km 1000ft below cloud in VMC and he was in receipt of a FIS from Coventry APPROACH on 119·25Mhz squawking 0250 (Coventry conspicuity) with Mode C. Overhead Chipping Warden at 3800ft (altimeter settings: No1 QNH, No 2 1013mb) at 120kt turning R, he saw a large twin engined passenger ac at low-level approx 10nm away. Already established in a slow R turn passing N, having right of way over the other ac but practice asymmetric and therefore limited in manoeuvrability, he watched the airliner pass approximately 800m clear to their L at the same level, flying straight and level, with a low risk of collision. He could read the company name written on the other ac's fuselage.

THE PA28 PILOT reports flying a local dual training general handling sortie from Coventry in the Coventry local area carrying out revision of PPL Ex 6,7,8,9. During this flight there were a number of turns carried out in climbs/ descents/straight & level to practice the skills required for the cct with a base altitude 1500ft to a ceiling of 2500ft on various headings at various speeds. The visibility was >10km 1500ft below cloud in VMC and he was in receipt of a FIS from Coventry APPROACH on 119·25MHz squawking Mode A (no code reported to UKAB); Mode C was not fitted. He was not aware of the situation between the B757 and the PA34 above him.

BIRMINGHAM RADAR 2 CONTROLLER reports that Coventry asked for release on the B757 on a COWLY 23 departure. A restricted release of 2500ft was issued owing to traffic in the pattern at Birmingham for RW33 and he requested the ac to call on his frequency early after departure. During a subsequent telephone call to Coventry to enquire how long before the departure was airborne, he amended the release to 3000ft. He asked for the ac to contact him on 131·32MHz and again to call early after departure, in anticipation of being able to facilitate not only earlier climb for the Coventry departure but descent for his inbound traffic too (whose routeing had been extended already to facilitate Coventry traffic) once both ac were on his frequency and identified. The Coventry departure called him maintaining 2500ft and he gave the flight climb to 3000ft and identified it. The ac was put on a heading for tactical reasons against Birmingham traffic and climbed to 4000ft. A RIS was issued with continuous climb to FL60 and TI on unknown traffic in the FIR. Subsequently the B757 pilot reported that he had received a TCAS RA at about FL40 although no deviation from the flight's profile was reported or observed. It is recommended that Coventry ATC work departing traffic; however, in this situation it was deemed more expeditious to both his and Coventry's traffic to be on the same frequency thus enabling 3nm separation to be used once identified. His inbounds had already been given extended routeing and with the ILS GP on RW33 being out of service, further restrictions on their descent would have meant even more extended routeing and running out of CAS – either that or Coventry's traffic staying at 2500ft until at least 7nm S of Coventry and climb above 4000ft being unavailable until about 12nm S owing to the fact that on separate frequencies 5nm separation is required. If the subject B757 had called him early on departure, as requested, he would have been able to give continuous climb to the B757 and it would have remained inside CAS.

COVENTRY ADC/APC reports that on watch on a fairly busy Sunday morning, the B757 was passed a standard COWLY 23 departure clearance to Palma de Mallorca. After some delay Birmingham gave a release clearance to maintain altitude 2500ft with an early call to 131·32MHz. Following some TI the B757 flight was given take-off clearance at 1115Z. He was not advised of any incident with this flight until 2 days later and was certainly not aware of any problem at the time.

COVENTRY APR reports he was informed on Tuesday 12th April of the alleged Airprox which is believed to have occurred at approximately 1115Z on Sunday 10th. On the morning shift at that time, his duties involved providing a combined ADC/APC service on 119·25MHz and ad-hoc APR service for the commercial IFR inbound traffic on

122·0MHz as and when required. At the time of the alleged Airprox he was on a SRATCOH break but had been summoned into the APR room for a pending B737 inbound which required radar vectoring for the ILS RW23. Whilst positioned in the radar room awaiting the radar handover on the inbound B737, he requested and received the departure release from Birmingham (BB) APC for the B757 on behalf of the ADC/APC. This was a COWLY 23 departure to climb to 2500ft which he passed to the ADC/APC. The ADC/APC position was quite busy at the time so the full 2min elapsed before the B757 got airborne. The BB APC rang to enquire 'was the B757 rolling?' and the Coventry ADC/APP was able to confirm he was and passed the airborne time. BB APC rang back shortly after to offer climb to 3000ft which the Coventry APR passed to ADC/APC via intercom. With the initial release, BB APC had requested they (Coventry) transferred the B757 to 131·32 MHz as soon as possible and this was passed to ADC/APC. At some point BB APC rang again to enquire did they (Coventry) have traffic inbound to Coventry from the NW. He scanned the radar and could not see any contacts from the NW or from any direction that appeared to be close to Coventry. He checked with ADC/APC via intercom whether he had any traffic inbound from that direction; the ADC/APC confirmed nothing known from that direction. The B757 was transferred to BB APC on 131·32MHz by the ADC/APC position. He had been unaware of the position that the incident occurred or what the circumstances were. No potential traffic conflict was observed by himself on radar at the time. He subsequently accepted the pending inbound B737 vectored to the ILS and vacated the APR position.

Coventry METAR shows EGBE1050 33012KT 290V010 9999 SCT030 12/04 Q1026=

ATSI reports that this Airprox took place on a Sunday morning when Coventry Radar was only manned for IFR commercial inbounds on an 'as required' basis. The Tower controller was carrying out the functions of combined ADC/APP. The Radar controller had taken up position as an inbound ac was expected. Whilst waiting for the flight the subject B757 requested pushback with the ADC, which was approved, and a departure clearance requested from Birmingham.

A few minutes later the ADC requested a release on the B757 and was advised by Birmingham that there would be a delay. At 1110:30, Birmingham advised the APR that the B757 could depart on a COWLY 23 departure but to maintain 2500ft and to call Birmingham on 131·325MHz. This was then passed to the ADC who, at 1112:10, cleared the B757 for take off. When the APR passed the departure time to Birmingham, they advised that the flight could now climb to 3000ft. This was relayed by the APR to the ADC but he did not read this back and transferred the B757, which was still only climbing to 2500ft, to Birmingham at 1113:30.

Birmingham then rang the APR and asked if they had traffic inbound from the NW to which the APR, having checked, replied "*No*". The B757 crew established contact with Birmingham at 1113:55, and were instructed to climb to 3000ft. Shortly afterwards (1114:20) the controller instructed the crew to turn L heading 130°. Analysis of the radar recording shows two returns from ac squawking 0250 (the PA34 and PA28), 8·5nm SE of the B757. Further climb was given, firstly to 4000ft (1114:40) and then FL60 (1115:20) as well as an instruction to turn R heading 180°. At 1115:30, the Birmingham controller transmitted "*B757 c/s that's correct and it's a Radar Information Service until you enter controlled airspace at flight level four five in the climb and there is currently traffic showing southeast of you by four miles indicating four thousand feet unverified wearing a Coventry squawk*" to which the crew replied "*B757 c/s roger*".

[UKAB Note (1): As the B757 commences the R turn at 1115:47 passing 3500ft, the PA28 is in its 10 o'clock range 1·25nm tracking NW to pass clear down its LHS showing NMC. Simultaneously, the PA34 is in its 12 o'clock range 2·25nm indicating altitude 4000ft, 500ft above the B757. At 1116:03, the B757 is indicating 4000ft with the PA34 at the same level just L of its 12 o'clock range 0·8nm before it passes 0·2nm in front of the PA34, 8sec later at the CPA, which is now 500ft below. At 1116:20, the Birmingham controller instructed the B757 crew to contact London Control, which was read back and, at the same time, the pilot reported receiving a TCAS RA on passing 4000ft.]

At the time, the Birmingham controller was vectoring two other ac within CAS, onto the ILS at Birmingham. The B757 crew were advised that they were in receipt of a RIS but not that they had been identified or given their position as is required in MATS Part 1, Section 1, Chapter 5, page 9 Table 5. Although TI was passed to the B757 crew this was not updated even though it continued to remain a definite confliction. The turn instruction from 130° onto 180° put the two ac onto converging tracks and so, with the benefit of hindsight, it would have been prudent to have updated the TI given the continued proximity of the other traffic. However, the unit's MATS Part 2 does state that the control of Coventry inbound/outbound traffic will be undertaken subject to the workload of the No. 1 Radar controller.

AIRPROX REPORT No 044/05

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was noted from the outset that the PA28 did not have Mode C fitted so although the ac would have shown on the B757's TCAS display, no RA warning could be generated for the B757's crew, only a TA alert. The PA28 had been operating in the same area as the PA34 but with a maximum altitude of 2500ft and effectively clear of the encounter between the other 2 flights. Although the Birmingham controller had requested that Coventry ATC transfer the B757 early onto his frequency climbing to 3000ft, this was not passed on to its crew. After some debate, Members felt that the B757 crew had called Birmingham within a reasonable time after taking-off from Coventry climbing to 2500ft and the flight was cleared straight away to climb to 3000ft. The NATS Advisor commented that reference to the 'COWLY 23 SID' by the B757 crew was factually incorrect. With Coventry airport being situated in Class G airspace, Departure Routes, not SIDs, are published to facilitate integration into CAS on tactical routeings with ATC being responsible for specifying the level requirements in the initial Airways joining clearance. It was thought that perhaps the B757 pilot may have been expecting more protection than he had been afforded by the airspace and level of service offered. Indeed, the B757 had entered the Birmingham CTA where the base level was 1500ft and then left it soon after, eventually levelling at 3000ft under the CTA base level of 3500ft. Also, after being given a tactical heading of 130° and climb to 4000ft, then FL60 and heading 180°, the controller next placed the B757 crew under a RIS under the Daventry CTA. ATCO Members thought that the B757 appeared to be slow climbing from 3000ft but pilot Members opined that the crew had commenced their climb within 30sec and were initially only being given a step climb of 1000ft so their ROC would be commensurate with the flight profile until further climb was issued. Members also wondered whether a RAS would have been a more appropriate service for the B757 flight. Although the Birmingham Radar 2 had elected to work the B757, it was noted that the provision of the service was a secondary task, subject to controller workload, his primary function being to sequence inbound/outbound Birmingham traffic. The Birmingham controller, after stating the level of service (RIS), passed TI to the B757 crew on the PA34 ahead. One ATCO Member believed that both ac had then met in confliction whilst operating legitimately in Class G below the Daventry CTA. This view was not shared by the other Members as they agreed that this 'coming together' had occurred only after the Radar 2 had given vectors which, at the end of the day, had placed the B757 into conflict with the PA34 thereby ultimately causing the Airprox. It was agreed that the Radar 2, having seen the B757 climbing with traffic ahead, could have updated the TI and/or additionally instructed the B757 crew to expedite their climb to enter CAS sooner to resolve the confliction.

Turning to risk, the controller had issued climb clearance into CAS and passed TI on the PA34 to the B757 crew who immediately saw 2 targets (the PA34 and PA28) on the TCAS display. A TCAS RA 'climb' command was received and the guidance was followed whilst the crew informed ATC of their manoeuvre; separation estimated about 1nm. The radar recording had revealed the B757 had rolled out on a S'ly track climbing through the PA34's level with 0·8nm separation before passing 500ft vertically above it and 0·2nm to its W. The PA34 pilot saw the approaching B757 at some distance, below but climbing towards them, and monitored its flight path, content to watch it pass an estimated 800m clear to their L at the same level. Although the radar recording had revealed the subject ac passing closer than thought by all parties, the Board agreed that the combination of all of these elements/actions were sufficient to ensure that safety had been assured during the encounter.

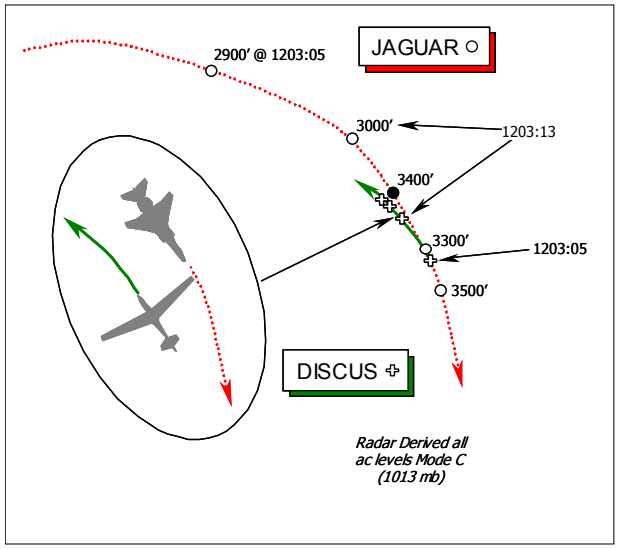
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Birmingham Radar 2 vectored the B757 into conflict with the PA34.

Degree of Risk: C.

AIRPROX REPORT NO 045/05

Date/Time:	11 Apr 1203	
Position:	5119N 00130W (14nm NE of Boscombe Down - elev 407ft)	
Airspace:	London FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Discus Glider	Jaguar T2A
Operator:	Civ Pte	DPA
Alt/FL:	3200ft (QNH)	3000ft (QFE 1016mb)
Weather	VMC NR	VMC CLBC
Visibility:	17km	>30km
Reported Separation:	Nil V/100-150ft H	200ft V/200m H
Recorded Separation:	0·1nm H (200yd)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DISCUS GLIDER PILOT reports that he had launched from Lasham and was in transit cross-country in his white coloured glider. Approaching a position about 9nm ESE of Marlborough, heading 300° at 70kt at an altitude of approximately 3200ft, he spotted what he initially thought was a light ac, but the closure speed was so rapid that he realised within about 5sec that it was a jet. He started a dive and turn to the left to avoid the other ac, which he identified as a Jaguar, that passed about 100-150ft to starboard at exactly the same altitude as his glider and on a reciprocal heading. It all happened very quickly and he estimated that he lost about 100ft of altitude but cannot be sure. Equally, he was not sure how much horizontal clearance he created by his own avoiding action, but he assessed the risk as *"fairly high"*. As they passed 'starboard to starboard' the Jaguar was banking to the R which suggested to him that the Jaguar pilot had not seen his glider.

THE JAGUAR T2A PILOT reports his ac has a distinctive red, white and blue colour scheme and the white HISLs were on whilst inbound to Boscombe Down on an instrument approach in VMC some 2000ft below cloud. He was in receipt of a RIS from Boscombe Down ATC and squawking A2602 with Mode C, but neither TCAS nor any other form of CWS is fitted.

About 13nm NE of the aerodrome, whilst turning R through about 140° on the inbound turn of a radar recovery at 260kt, level at 3000ft QFE (1016mb), he first spotted the white glider as it appeared at close range from under the nose of his jet about 200m away. The glider had already passed when it was seen, thus no avoiding action was taken. No call had been received from ATC about any traffic in their area and both pilots were looking out of the cockpit in good visibility. He made a brief comment to ATC about the glider and some seconds later the controller reported that it had appeared on the radar behind them. However, during the sortie debrief, both pilots estimated that the glider had been masked by the Jaguar's nose during their turn and would, therefore, have been unseen until it passed their flight path some 200ft below them.

He reported the risk as *"medium"*, but added that is difficult to make an assessment as they had already passed the traffic when it was first seen and he could not satisfactorily judge the glider's flight path relative to theirs whilst the jet was in the R turn.

MIL ATC OPS reports that the Jaguar T2 was recovering to Boscombe Down for an instrument approach under a RIS from Boscombe APPROACH (APP). Due to compass problems the crew was executing a 'no compass - no gyro' procedure. Whilst downwind at 3000ft QFE (1016mb) the Jaguar crew changed their 'intentions' for the approach into an overhead recovery. APP initiated a positioning R turn and at 1203:41, the Jaguar crew reported "[C/S] *just rolled out there's a glider flying 200ft below us*". APP responded "[C/S] *roger nothing showing on radar*". Some 6sec later APP reported to the Jaguar crew, "[C/S] *pop-up traffic north 3 miles manoeuvring and traffic east*

3 miles manoeuvring slow moving no height". The Jaguar crew continued with their approach inbound to the aerodrome without any further reference to the glider.

[UKAB Note (1): Analysis of the Heathrow Radar recording shows the Jaguar at 1203:01, 13·5nm NNE of Boscombe Down squawking A2602 indicating 2900ft Mode C (1013mb) in a R turn. A primary contact appears 1·6nm SE of the Jaguar flying a reciprocal course, believed to be the Discus glider. The Jaguar's Mode C indicates a climb at 1203:05, to 3000ft Mode C for a further 2 sweeps and then a further climb to an indicated 3400ft Mode C at 1203:17; at this point the primary contact of the glider is not shown. The glider does not reappear until the next sweep whence the Jaguar indicates 3300ft Mode C after both ac have passed an estimated 0·1nm/200yd (by interpolation) starboard to starboard. An indicated level of 3300ft Mode C (1013mb) would equate to a height of 3390ft Boscombe QFE (1016mb).]

APP described his workload at the time of the Airprox as *"medium"* and the radar equipment in use was fully serviceable. This Airprox occurred in Class G airspace, in colour code BLUE weather conditions, with the Jaguar operating in the Boscombe Down radar training circuit under a RIS. The airspace to the E of Boscombe Down is often highly congested with gliders, light aircraft and military helicopters operating without an ATS. Here the Jaguar crew was receiving a RIS from APP: however, whilst shown on the radar recording the glider did not show on the Boscombe Down controller's radar display until after the Airprox had occurred. There are no military ATC causal factors evident within this Airprox.

DIRECTORATE OF FLYING MOD DPA had nothing further to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The difficulties of detecting gliders on primary surveillance radar equipments (SRE) were well known to controller Members who noted that gliders are also quite difficult to recognise as an 'aircraft' contact in a busy traffic scenario even when clearly shown on a steady track and constant speed. It was reported here that the Boscombe Down SRE had not displayed the glider to the controller at all before the event; hence no warning was feasible to the Jaguar crew under the RIS that pertained. It was unfortunate that the much-heralded 'light-weight' transponder was not available yet: such equipment might go some way to improving the radar conspicuity of gliders, resolving the evident difficulties of their detection on radar as revealed here.

The glider pilot reports that having taken about 5sec to realise that it was a jet and not a light ac, he fortunately had time to dive and turn to the left to avoid the Jaguar. At a generally 'head-on' aspect the Jaguar presented a relatively small cross-sectional area for the glider pilot to see so it was a good spot - nonetheless the jet should have been apparent as it turned R toward the glider beforehand and crossed ahead from L - R. Whilst the Board's gliding Member explained that the Discus glider has a relatively good performance, it was stressed to the Board that it would never outstrip a Jaguar. The Member advocated the view that glider pilots should be alert to the possibility of meeting fast-jets when transiting through the approach patterns of military aerodromes; time spent at the pre-flight planning stage to identify potential areas of conflict within aerodrome instrument patterns is time well spent he suggested. From the Jaguar pilot's comprehensive account it was evident that the glider had not been seen by either crew member in time to take any avoiding action as it passed by, the glider's white colour scheme defeating earlier visual acquisition by the two Jaguar pilots, making the event effectively a non-sighting. Again the difficulties of detecting a glider visually – of even smaller cross-sectional area than the jet – were well know to the Board and clearly this Airprox, in the 'see and avoid' environment of the 'Open FIR', was essentially a sighting issue. The Board agreed unanimously that this Airprox had resulted from effectively a non-sighting by the Jaguar crew and a late sighting by the Discus glider pilot.

It was reported that although the Discus pilot had spotted the Jaguar in time to turn and dive away from it he was unsure if this avoiding action had been intrinsically effective: he had assessed that this had been a risk-bearing encounter. The Jaguar pilot had also provided a similar assessment of the risk here. The Heathrow radar recording – which Members recognised did not reflect the picture displayed to the controller - did show the glider just before the encounter and replicated the geometry of this Airprox broadly as described by both pilots. Only one of the pilots involved here had sighted the other ac in time to do anything about it, with the other crew

unsighted on the glider beneath the nose of their jet whilst looking into the turn. This, coupled with the minimum separation suggested by the radar recording of about 200yd, led the Board to concur with the view of the pilots involved insofar as the safety of these two ac had not been assured by any means.

PART C: ASSESSMENT OF CAUSE AND RISK

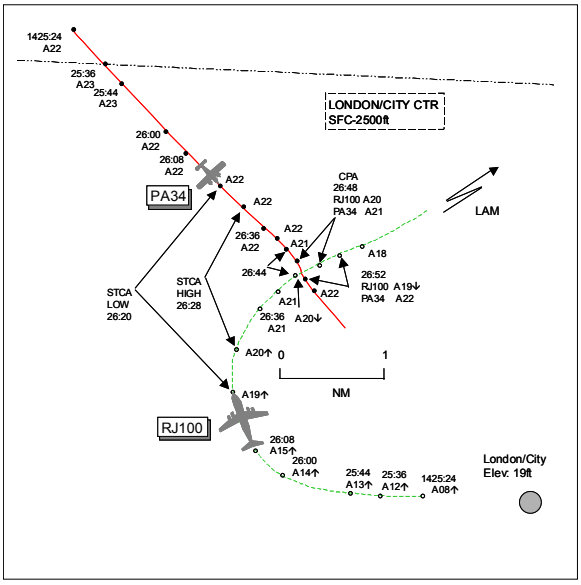
Cause: Effectively a non-sighting by the Jaguar crew and a late sighting by the Discus glider pilot.

Degree of Risk B.

AIRPROX REPORT No 046/05

AIRPROX REPORT NO 046/05

Date/Time:	24 Mar 1427	
Position:	5132N 00001W (3nm NW London City Airport - elev 19ft)	
Airspace:	CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	RJ100	PA34
Operator:	CAT	Civ Pte
Alt/FL:	2000ft↑ (QNH)	2200ft (QNH)
Weather	VMC CLOC	VMC CLBC
Visibility:	10km	>20nm
Reported Separation:	'glimpsed' NR	Nil V 1000m H
Recorded Separation:	100ft V/0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RJ100 PILOT reports he was given a Brookmans Park departure off RW28 at London City Airport climbing to 3000ft. As he turned R at 170kt to establish on the track of 045° he was informed of traffic from the N at a similar altitude, 2000ft. Almost at the same time he received a TCAS TA followed by an RA 'descend' demanding >1500fpm ROD. This was as he was accelerating to initial climb speed, flaps up. Simultaneously, he was asked to change to Thames Radar which call was followed by another voice saying 'stay on frequency'. He followed the RA and after the RA had cleared he continued with the departure. He was busy flying the ac during the RA and had no time to search for the other ac. His FO briefly saw the ac but with their ac in a R turn and the other ac approaching from the N, only a brief glimpse of it was seen. After landing at his destination, he was asked to speak to a passenger who had seen the other ac very close but did not mention distances. The RJ100 pilot did not at the time consider that it had been an Airprox – he had not seen the ac and only reported a TCAS RA. He explained to the passenger that they had taken TCAS avoidance and demonstrated the equipment to him. The passenger seemed to go on his way a happier man. On return to London City a controller came to the ac to speak to the RJ100 pilot. The ATCO explained that he had stopped them changing frequency whilst supervising a trainee. He advised the RJ100 pilot that Thames Radar also had a controller under instruction and that the London City Tower had had a very late handover of the traffic and he could not give him any more warning than he did. Because the RJ100 was in a turn at the time – although looking out – he thinks it would have been difficult to see a light twin coming at them head on. It was primarily the TCAS that gave them information on the traffic which they avoided by flying the RA. As the event happened so rapidly he cannot recall the distance at which he received the TA as it went so quickly into an RA he was immediately flying the RA manoeuvre.

THE PA34 PILOT reports en route from Elstree to Shoreham heading 120° at 145kt and in receipt of a RIS, he thought, from Thames RADAR on 132·7MHz squawking an assigned code with Mode C. The visibility was >20nm 1000ft below cloud in VMC and the ac was coloured white/blue with strobe lights switched on. Cruising at 2200ft QNH, he was advised by ATC of traffic which he saw, a high wing 4 engined ac, possibly an RJ100, 5nm away below him to his R in a climbing R turn. The other ac appeared to level off on a crossing track R to L passing 1000m away at the same level before it was seen to commence a descent. He turned slightly R for avoiding action assessing the risk of collision as low as he had been in constant visual contact with the other ac throughout.

THAMES RADAR CONTROLLER reports that between 1330 and 1430 he had been very busy on Thames Radar supported by a Coordinator and he had declined a trainee having had one the previous day. He was informed that he had no option because they were unexpectedly oversubscribed. He was then aware of a person next to him plugging in, perceiving that he was being relieved until becoming aware that a new trainee was plugging in with

him for the first time for live training. He had not instructed this trainee before other than to provide him with some familiarisation. Fortunately this was a brief quiet period with, he recalls, little or no traffic on the frequency. This allowed a very short time in which to settle down with the trainee and make enquiries as to whether the trainee's training had commenced in earnest and about any training plans made for the remainder of the shift. The PA34 pilot then called requesting a VFR crossing of the London City CTR. He recalls the pilot making a statement to the effect that he had *'spoken to Gatwick on the landline'* regarding a *'crossing of the zone'*. He dismissed the pilot's remark as irrelevant and ensured that the trainee instructed the PA34 to remain outside CAS. Meanwhile the Coordinator released the RJ100 on a BPK3T SID. He recalls the PA34 entering, by a small margin, the London City CTR without clearance which he pointed out to the trainee. The trainee's response was to clear the PA34 VFR across the London City CTR. The mentor instructed the trainee immediately to pass TI on the RJ100 and inform London City Tower. The PA34 pilot reported early sighting of the RJ100 taking off, or immediately after take-off. The London City Tower controller asked if the PA34 would be transferred to the Tower frequency to which the trainee replied negative. The mentor informed the trainee that it is preferable, on Thames Radar, to transfer VFR transits to Tower so that both ac are on the same frequency working the same controller. The trainee's response was that was not the case on Gatwick Radar. The mentor observed that the PA34 was taking no apparent avoiding action therefore he telephoned London City Tower to confirm that TI on the PA34 had been passed to the RJ100 flight – this was confirmed. The subject ac continued to fly in close proximity and STCA subsequently turned red. He was subsequently informed by London City Tower that the RJ100 crew had responded to a TCAS RA therefore he completed the relevant TCAS form.

THAMES RADAR CO-ORDINATOR reports that his report was compiled some weeks after the incident without reference to recordings. In accordance with SOPs he took a call from City Tower requesting release on the RJ100 which he then obtained from TC NE Deps. After alerting the Thames Radar Controller to the forthcoming departure he passed the release to City Tower and instructed the departure should contact London Control on 118·82MHz.

LONDON CITY TOWER CONTROLLER reports that the RJ100 departed RW28 on a BPK SID. When the RJ100 was 1300ft (approximately) they received information on VFR traffic from Thames Radar on a 7050 squawk. The light ac 7050 was approximately 3nm N of the RJ100 at 2200ft (approximately and unverified). TI was passed straight away to the RJ100 flight which subsequently had an RA and descended to 1500ft. Thames Radar was informed of the RA and the descending RJ100.

ATSI reports that the incident took place at 1427 UTC within the London City CTR which is Class D CAS. The RJ100 had recently departed from RW28 at London City Airport on an IFR flight plan to Edinburgh and was in a R turn in accordance with the BPK3T SID. The PA34 was transiting the London City CTR from N to S under VFR from Elstree to Shoreham. Although at the time the pilot of the RJ100 reported responding to a TCAS RA, it was not until some 20 days later that he elected to file an Airprox.

At the time of the Airprox the RJ100 was under the control of the London City ADC, the position being operated by a trainee accompanied by a mentor. The PA34, meanwhile, was being provided with an Approach Radar service by the LTCC Thames Radar controller, also being operated by a trainee. In his written report, the Thames Radar mentor explained that a short while before the incident he had been unexpectedly allocated the trainee whose training status he had not had time to fully acquire. The trainee was already experienced on another TC Approach position but was in the early stages of extending his competency to Thames Radar.

At 1421:50, the PA34 pilot made his first call to Thames Radar, reporting airborne from Elstree en-route to Shoreham and requesting a routeing via the London City NDB at 2000ft. The controller issued the flight with a discrete SSR code, 7050, and sought confirmation that the flight was VFR. A minute later the flight was identified and advised it was being provided with a FIS. The controller added that he would be issuing '*a clearance in* (ie into the City CTR) *shortly'.*

Meanwhile, at London City Airport the RJ100 had commenced taxi for departure from RW28 having been issued with a BPK3T SID. This SID essentially requires a R turn after departure onto a NE'ly track towards LAM VOR and a climb to 3000ft altitude. The London City ADC had already requested the RJ100's departure release from the Thames Coordinator and, at 1424, the latter 'phoned back with approval. Fifteen seconds later the flight was given take-off clearance.

At this point the radar recording shows the PA34, wearing code 7050, tracking SE with 3nm to run to the CTR boundary and indicating at 2100ft Mode C. It was not, however, until over 1min later, at 1425:26, when the ac was about to cross the CTR boundary, that the Thames radar controller 'phoned the City ADC to warn him of the presence of this flight stating *"The 7050 is VFR and is going to come through the zone at 2000 feet".* The ADC acknowledged this and asked if Thames would be *"…going to put him over or keep him"* to which the Thames controller responded that he would retain him and *"…pass the traffic".* In his written report the Thames mentor states that he was surprised that the trainee had elected to 'keep' the PA34 on his frequency. He reports pointing out to him that it was preferable for VFR transits to be transferred to the Tower so that both ac would be on the same frequency. It would appear that the trainee was adopting the custom he used at the other TC APR Unit position. Nevertheless, it was now certainly too late to re-co-ordinate and transfer the flight. This unexpected decision by the trainee highlights the need for mentors to first establish the level of 'sector' knowledge and familiarity acquired before allowing a trainee to operate 'live'. This issue was identified in the LTCC Unit report and an internal recommendation made to draw attention to this need. By this time (1425:36), the recording shows the PA34 is entering the CTR at 2300ft Mode C and the RJ100 can be seen tracking W, climbing through 1200ft Mode C, before commencing a R turn in accordance with the SID.

As soon as the Thames controller had completed his call to the ADC he issued the PA34 pilot, at 1425:45, with a clearance to enter the City CTR, not above altitude 2400ft VFR, adding *"…the traffic for you is RJ100 just airborne off er City will be turning right towards you".* The pilot reported "*looking"* and read back the clearance. (It is noted that the controller did not advise the pilot of the change of service from FIS to 'Radar Control' as the ac entered Class D airspace.) The controller then updated the TI with *"That traffic's passing 1500 feet at this time in your right one o'clock range 3 miles",* to which the pilot responded *" and er we have him visual…".* No further RT exchanges took place between Thames and the PA34 pilot until after the tracks of the two ac had crossed.

Bearing in mind the potential for conflict between the two flights, the notice given to the ADC by the Thames Radar on the PA34's flight details was very short. However, without delay the City ADC provided the RJ100 crew with TI, stating, at 1426, *"…a light aircraft just entering the Zone five miles north-west of the airfield track south-easterly".* This was acknowledged by the pilot, then moments later the controller added that the traffic was at 2000ft and initiated a transfer of the flight to the appropriate TC sector but this was cancelled by the mentor. The pilot reported *"we've got traffic at 12 o'clock we're turning through him at the moment same level".* The controller reiterated that the traffic was VFR and adding *"…if you can if you turn left if you want to avoid".* The pilot then announced that he was descending in accordance with a TCAS RA which was acknowledged.

Under the flight rules that the subject ac were operating, IFR and VFR, and in the airspace concerned, Class D, separation standards were not required to be applied by ATC. MATS Part1, Section 1, Chapter 2, Flight Rules, para 2, Classification of Airspace, describes the Minimum Services to be provided in such circumstances which are *"pass traffic information to IFR flights on VFR flights and give traffic avoidance advice if requested"* AND *"pass traffic information to VFR flights on IFR flights and other VFR flights"*. On this occasion, notwithstanding the late warning provided by Thames to the ADC on the VFR traffic and that the pilots involved would probably have been better served if they had been on the same frequency, this Minimum Service was met by the ATC participants involved. That said, MATS Part 1 also gives advice and guidance to controllers on the safe integration of VFR flights with the IFR traffic flow in the vicinity of aerodromes - Ref: Section 3, Chapter 4, Para 3, Control of VFR Flights, part of which states *"Although in Class D, E, F and G airspace separation standards are not applied, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to see and avoid each other".* And in addition, *"Instructions issued to VFR flights in Class D airspace are mandatory. These may comprise routeing instructions, visual holding instructions and level restrictions in order to establish a safe, orderly and expeditious flow of traffic and to provide for the effective management of overall ATC workload".* This theme is re-enforced specifically for Thames Radar controllers under their responsibilities in the LTCC MATS Part 2, THS 1.3.1, which states *"Traffic information will be provided to VFR transit aircraft to enable them to avoid IFR and arriving/departing aircraft. If necessary routeing instructions or altitude instructions may be issued to the VFR traffic. Thames Radar may delay issuing a clearance to transit aircraft for traffic reasons. In such situations Thames Radar will advise the pilot when to expect a clearance".*

UKAB Note (1): The radar recording shows that when the pilot of the RJ100 announced the TCAS RA (1426:36), the ac was just rolling-out onto the SID track to LAM (radial 225) at 2100ft Mode C with the PA34 in its 1030 position, 100ft above at a range of 0·8nm. The two ac converge further to 0·25nm range (1426:44) at which point the PA34 is in the RJ100's 9:30 position, still displaced vertically by 100ft, the former's Mode C showing 2100ft

while the latter is indicating a descent, no doubt as a result of the TCAS RA. The CPA occurs on the next sweep as the PA34 moves into the 0730 position relative to the RJ100 at a range of 0·2nm still indicating 100ft above it. Finally, a momentary turn to the R by the PA34 can be detected on the next sweep at 1426:52 which resulted in it passing 0·4nm astern of the RJ100, the respective Mode Cs showing, at the time, 2200ft and 1900ft. At this time the pilot of the RJ100 reported, *"…clear of traffic resuming cleared level"*. Subsequently, the two flights continued to diverge, though the RJ100 did descend further to 1800ft Mode C before finally commence a climb to the initial SID level of 3000ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI Advisor informed Members that a draft OJTI 'best practice' package was being created for eventual 'roll out' by year end 2005. The NATS Advisor also stated that when the Coordinator had issued the departure release on the RJ100, this would have been on a telephone handset, not on a headset plugged into the console sharing the frequency He would not therefore have been aware of the transiting PA34. A change in working practices, due to be implemented shortly, will have a support controller carrying out the Coordinator task using a headset so the position will be better served in future.

The PA34 pilot had called Thames Radar and been given clearance to transit the London City CTR by the Thames Radar trainee: this was after the ac had already entered CAS, albeit by a small margin. The flight was given TI on the departing RJ100 which the pilot saw after receiving updated TI shortly afterwards. Members wondered whether pilots of ac transiting VFR within a Class D CTR were aware of their responsibilities: 'see and avoid' prevails against other ac, IFR or VFR, following receipt of TI, with no separation being applied by ATC although traffic avoidance will be given to IFR flights if requested by their pilots. It was noted that the TI given to the RJ100 crew on the PA34 had been given late, with height information being passed on a second transmission. A Member commented that this TI was probably too late for avoidance to have been given by ATC if it had been requested by the RJ100 pilot. The Mentor controller at Thames had been prompting the trainee prior to the Airprox and although the trainee had not done anything wrong, the Mentor had elected not to intervene as the situation developed.

The VFR PA34 traffic was required to give way to the IFR RJ100 on a crossing track: avoidance by turning R would have ensured compliance with the Rules of the Air. The PA34 pilot had been passed TI so that he could separate himself from the RJ100. He visually acquired the RJ100 but then continued on his track and into confliction, only turning R as the RJ100 passed ahead. Pilot Members thought that the TI given to the PA34 pilot did not contain enough information on the RJ100's flight path to facilitate an informed decision on how best to avoid the airliner. This may have been why the PA34 pilot had continued towards the London City O/H, only turning R just before passing behind the RJ100. This had caused the Airprox.

Turning to risk, the RJ100 crew were undoubtedly concerned when TI on the PA34 was received late, almost simultaneously with TCAS giving a TA alert then an RA warning. The FO had briefly seen the PA34 whilst the Captain reacted to the TCAS commands, eventually arresting his climb before commencing descent as he passed in front of the PA34. The PA34 pilot had seen the RJ100 about 5nm away, below him climbing, had watched it turn towards him onto a crossing track, turning R as the RJ100 passed in front so as to increase separation. Although the subject ac had passed in close proximity, the PA34 pilot had monitored the RJ100s flight path throughout and was always in a position to deviate further if necessary which led the Board to conclude that safety had not been compromised during the encounter.

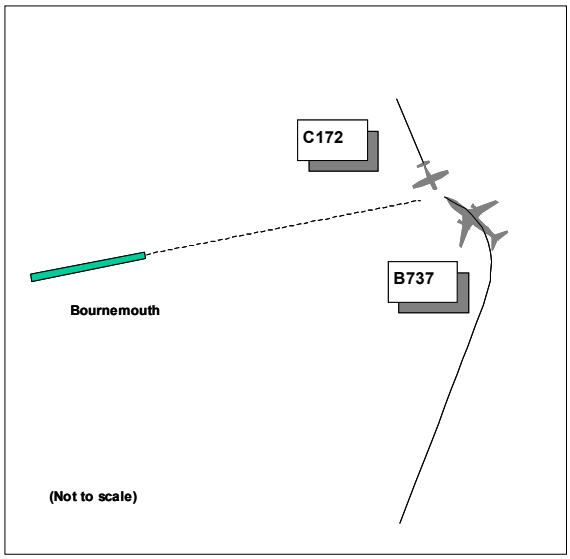
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following TI and visual acquisition, the PA34 pilot flew into conflict with the RJ100 in Class D airspace.

Degree of Risk: C.

AIRPROX REPORT NO 047/05

Date/Time:	12 Apr 1044	
Position:	5050N 00138W (10nm ENE Bournemouth Airport - elev 38ft)	
Airspace:	CTA/FIR	(Class: D/G)
	Reporting Ac	*Reported Ac*
Type:	B737	C172
Operator:	CAT	Civ Club
Alt/FL:	2400ft (QNH 1024mb)	<2000ft (QNH 1022mb)
Weather	IMC KLWD	VMC CLBC
Visibility:	0km	10km
Reported Separation:	500ft V/3·2nm H	NK
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports rolling through 320° onto 210° decelerating through 200kt under radar vectors, descending through 2400ft to a cleared altitude of 2000ft and cleared to "lock on" to the localiser for RW 26 at Bournemouth. TCAS indicated traffic 8 NM ahead and as the speed was decelerating from 200kt they received a TA closely followed by an RA "Climb". A climb was effected and the appropriate "TCAS Climb" call transmitted. During the RA their ac locked onto the localiser so he deselected VORLOC and took up a heading of 290°, their last advised heading. This took him north of the localiser. They climbed to approximately 2800ft and were subsequently given an option of re-establishing the localiser but he requested and obtained radar vectors back onto the localiser further out. An ILS was flown to an uneventful landing. Later the controller advised him that the other contact was a Cherokee tracking SE in an approved low level corridor at 1800ft. Their TCAS had indicated the other ac at 1900ft QNH. The controller said that the Cherokee was entitled to be at this location and that he was not in direct radio contact with Bournemouth Radar. He also stated that the B737 was cleared down to 2000ft to avoid conflict with an ac in the hold at 3000ft. They had been in cloud and estimated passing 3·2 NM from and 500 ft above the other ac; he did not estimate the risk of collision.

THE C172 PILOT reports that at the time of the Airprox he was heading 153° at 95kt at altitudes below 2000 ft on the Old Sarum QNH. The flight was a trial lesson, routing Old Sarum – Needles, Isle of Wight – Old Sarum via Stoney Cross VRP. He did not see other ac, being informed of the TCAS alert by AIS subsequent to the flight.

ATSI reports that the incident was initially reported as a TCAS RA by the pilot of the B737. However, the commander later elected to file the event as an Airprox which took place close to the base of the Solent Control Area (CTA). The B737 was inbound to Bournemouth from Spain, operating on an IFR flight plan. The other aircraft involved was 'unknown' at the time but was subsequently believed to be the C172.

Unfortunately, due to a radar upgrade programme, one of the radar sources was not available for replay. Almost certainly as a consequence, the presence of the C172 was not captured on the recordings of the remaining available radar resources. For the same reasons some radar data on the B737 at the lower levels and during its TCAS RA manoeuvre is also missing.

At 1040, some 4 minutes before the incident, the C172 pilot made an initial call on the Bournemouth Approach frequency, requesting a Flight Information Service (FIS). There was no response to this call by the Bournemouth Approach Radar Controller (APR) who subsequently could not account for this apparent lapse. According to the RTF recording, there is no evidence that the C172 made any further calls on the frequency.

At 1041:50, the B737 made its first call to the Bournemouth APR reporting descending to 4000 feet on a heading of 015°. The APR responded by instructing the flight to turn left onto a heading of 350° and descend to altitude 2000 feet on QNH 1024mb. After this was correctly read back by the pilot, the controller then added that it would be radar vectoring for an ILS approach to RW 26 and the flight was 'number one' in traffic. In the absence of a report that the pilot had already received the current Bournemouth weather, the APR did not subsequently provide this information as required by MATS Part 1, Section 3, Chapter 2, Page 2, Para 6.1 (**Inbound Aircraft - Provision of Weather Information**) which states *"As early as practicable in the procedure, the radar controller shall transmit the latest weather observations to aircraft on radar approaches, except when this information has already been passed by approach/aerodrome control, or the pilot indicates that he has received it from the ATIS broadcast."* The radar recording shows that at this point the B737 was about 18 track miles from touchdown and passing FL47.

It is surprising that the B737 was issued with a descent clearance to 2000 feet at this stage, as the flight would soon be entering that part of the Solent CTA where the base of CAS is 2000 feet. MATS Part 1, Section 1 Chapter 6, Page 4, Para 9 (**Use of Levels by Controllers)** advises *"Except when aircraft are leaving controlled airspace by descent, controllers should not* (ie strongly advise against) *normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace."* The APR concerned has since explained that he had cleared the B737 immediately to 2000 feet partly as it was common practice with flights in this position to ensure they arrived at the ILS localiser below the glide path. Also, he recalled, it was partly to resolve a potential conflict with jet traffic joining from the NW that had recently been cleared to 3000 feet and would be vectored downwind north of the field. Reflecting since, the controller accepts that it would probably have been wiser to use 3000 feet or more likely 2500 feet as the initial descent clearance for the B737, followed by a review of the situation later.

Less than one minute later, at 1042:30, the APR issued the B737 with traffic information on a Sea King helicopter which was *"…crossing right to left your twelve o'clock range of six miles he's at 900 feet."* As soon as this was acknowledged the controller addressed the flight again: *"There is further traffic unknown at twelve o'clock range of seven miles tracking south-eastbound at nineteen hundred believed to be a Cherokee"* (information from another unit led the APR to believe, erroneously, that it was a PA28/Cherokee). The helicopter appears intermittently on the radar recording just north of the RW 26 centreline at 9·5nm final: however the 'unknown' traffic, believed to be the C172, is not evident. While there is no specific requirement for traffic information to be passed on 'known' or 'unknown' flights operating below the base of CAS, on this occasion it was certainly prudent to do so as the B737 had been cleared to a level equivalent to the base of CAS in that area (2000 feet).

At 1043:30, the APR instructed the B737 to turn left onto heading 290° and report established on the localiser, advising the range from touchdown as 10 miles. Following the pilot's correct readback, the controller then stated *"That's correct that traffic twelve o'clock three miles south-eastbound two thousand"* and this was acknowledged. By this time the B737 was indicating at FL 023 Mode C (2600 feet adjusted to altitude) and about 2nm south of the runway centreline. Seconds later the pilot reported, *"…TCAS climb…"* but the APR did not respond. The pilot then reported *"…we're in a TCAS climb now on a heading of 290"*, to which the controller responded *"… roger that traffic is behind you now and you may continue the left turn heading two two zero to close from the north"*. The pilot advised that he was too high to re-close the localiser and ultimately elected to break off the approach and be repositioned for a second attempt which was completed successfully.

Recorded radar data on the B737 is incomplete from the point the flight is issued with the closing heading for the localiser until after the TCAS manoeuvre is complete. However, some Mode C readouts are apparent during this period. The flight reaches FL 020 (2300 feet) in the descent, when just south of the final approach centreline. Thereafter, a climb is indicated, the flight achieving FL 026 (2900 feet), which it maintains for several sweeps. By this time the aircraft is north of the centreline in a left turn and commencing a descent once more.

Without the supporting radar data it is difficult to determine the CPA reached between the flights involved and therefore the degree of risk to which each was exposed. Consequently, much reliance will necessarily be placed on controller and pilot reports and the details of the traffic information that was passed to the B737. Analysing this information it would appear unlikely that the two aircraft came closer than 3nm horizontally and 400 feet vertically, as they passed abeam each other.

In conclusion, TCAS equipment determined that the flight profile of the B737, descending towards the base of the Solent CTA, presented a risk of collision with a flight (the C172) operating below, in adjacent uncontrolled airspace,

and consequently generated a TCAS RA 'climb' instruction to the pilot of the B737. This instruction was complied with and any previously existing conflict between the two flights was removed. This conflict and the subsequent TCAS event should have been avoided by a more considered allocation of descent levels to the B737 in respect to the 'unknown' traffic, albeit the latter was indicating below the base of CAS.

UKAB Note: 2 min before the Airprox, LATCC radar recordings show a 7000 squawk at 600 ft Mode C approaching the Airprox position from the N and then fading from radar. The B737 is seen in a descending L turn onto the Bournemouth centreline. There is some label garbling during which the B737 shows 2000 ft Mode C before climbing and going around for another approach. The Airprox itself is not shown on radar.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered that the main cause of the incident was that the Bournemouth APR, by clearing the B737 to descend to the base of CAS, vectored the ac into confliction with the C172 of whose return, although unidentified, he was aware. In this respect he had had an opportunity to bring this traffic into the 'known' environment when its pilot called for a service. However, Members considered that it was primarily the Cessna pilot's responsibility to ensure he was heard: he should have called again when his first call produced no response. Members also commented on the B737 pilot's continuing down to 2000ft having been advised of *"further traffic unknown at twelve o'clock range of seven miles tracking south-eastbound at nineteen hundred".* By not querying this he had missed an opportunity to avert the incident.

Members noted, and agreed with, the controller's subsequent reflection that it would have been wiser to have cleared the B737 initially to an intermediate level, re-assessing the situation later. The Board discussed at some length the MATS Pt 1 injunction to controllers to avoid descending ac to the base level of CAS. The non-mandatory wording appeared to give controllers more latitude than was desirable, controller Members agreeing that this should only be done if there was absolutely no alternative. Members discussed whether the MATS Part 1 entry 'Use of Levels by Controllers' should be reviewed. However, as there might be genuine reasons for using a base level, it was felt to be unlikely that the entry would be changed. The Chairman therefore accepted the ATSI Advisor's offer to take the matter up with CAA's Air Traffic Standards Department (ATSD).

The intervention of TCAS and the actual separation of the ac at their closest point led the Board to conclude that there had been no risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

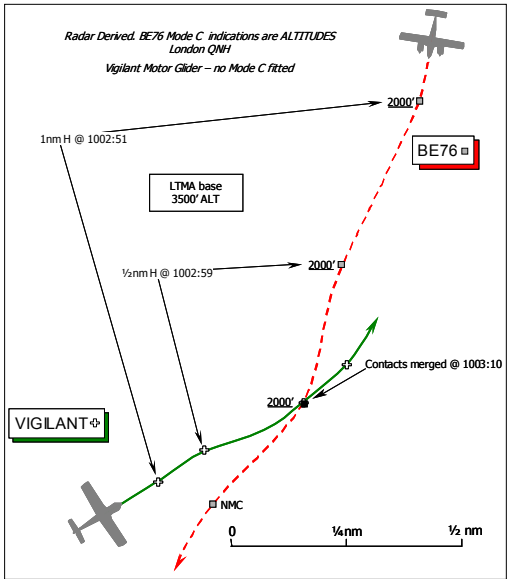
Cause: Contrary to MATS Part 1 advice, Bournemouth APR vectored the B737 into conflict with the C172 operating just below CAS.

Degree of Risk: C.

Post Meeting Note: ATSD has been asked to issue an ATSIN reminding controllers of their responsibilities.

AIRPROX REPORT NO 048/05

Date/Time:	16 Apr 1000 (Saturday)	
Position:	5146N 00050W (4·3nm WSW Halton - elev 370 ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Vigilant	BE76
Operator:	HQ PTC	Civ Trg
Alt/FL:	1600ft (QFE 998mb)	2000ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	20km	10km
Reported Separation:	Nil V/100ft H	nil V/100ft H
Recorded Separation:	Contacts merged in azimuth	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT PILOT, a QFI, reports his motor-glider has a white and high visibility orange colour-scheme. All the ac's lighting including the HISLs and anti-collision lights were also displayed whilst conducting a dual instructional sortie from Halton. He was operating VFR some 200ft below cloud with an in-flight visibility of 20km and in communication with Halton RADIO A/G Station on 130·42MHz. A squawk of A7000 was selected but Mode C is not fitted.

Whilst repositioning to remain a safe gliding distance from the aerodrome after descending from a sequence of stalling exercises, they had climbed to a height of 1600ft Halton QFE (998mb) and had just levelled the ac to brief his student for the next phase of the sortie. Some 4nm SSW of Halton heading N, he thought, at 60kt, a blue and white coloured low wing ac - believed to be a twin - appeared in his 11 o'clock position 100ft away rolling R and descending past his port wing about 1½ wingspans away – he estimated about 100ft - heading in a SW direction (240°). No avoiding action was taken as the other ac had emerged from the cloud base on a reciprocal heading i

THE BEECH BE76 DUCHESS PILOT, a flying instructor, provided a concise and frank account reporting that he was instructing a student on a dual sortie in his blue and white ac. He was not in receipt of an ATS, but squawking A7000 with Mode C whilst operating VFR in VMC some 1000ft below cloud with a visibility of 10km. TCAS is not fitted.

Flying in level cruise at about 2000ft QNH some 3nm NE of Princes Risborough heading approximately 240° at 140kt, a white Grob motor glider – the Vigilant - was spotted in level flight at 11 o'clock 100ft away. No avoiding action was taken owing to the late sighting as the MG passed 100ft away to port at the same level with a "moderate" risk of collision. He opined that the Grob has a small profile, was virtually head-on and white in colour against the cloud backdrop, adding that it probably appeared from behind the blind spot above the windshield.

He observed that this area is used by 2 fixed-wing training organisations at Booker plus numerous private owners, as well as the Halton ac. Extreme vigilance is required by all pilots; nevertheless with most ac involved in general handling manoeuvres, late sightings are inevitable. He stressed that white ac with small head on profiles complicate the matter.

UKAB Note (1): The Heathrow 10cm radar recording confirms in broad terms the separation reported by both pilots and illustrates this Airprox quite clearly. The BE76 is shown approaching the Vigilant from the N steady on a SSW course maintaining 2000ft Mode C London QNH (1010mb) throughout. The Vigilant was proceeding generally NE, not a heading of N as the pilot describes, converging with the BE76 and at 1003:10, both contacts

merge about 4·34nm WSW of Halton aerodrome. The Vigilant pilot reports he was flying at 1600ft Halton QFE (998mb): an altitude of 2000ft London QNH (1010mb) would equate to a height of about 1640ft Halton QFE.

HQ AIR CADETS comments that both ac were operating close to cloud, which would have contributed to their late sighting of each other. The proximity of Halton to the Luton CTR/CTA and the overlying London TMA coupled with the Brize Norton CTR and Benson MATZ causes considerable congestion in the area, which aggravates the problem. Further reducing the available airspace with a low cloud base only serves to compound it. Another close encounter in very congested but 'open' airspace.

HQ PTC had no further comment to add.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings and a report from the Vigilant pilot's operating authority.

The Board recognised that this Airprox in the 'see and avoid' environment of the Open FIR was entirely a lookout issue where both instructors had seen the other ac – probably at the same moment – about 100ft away but were unable to do anything about it. Both of the predominantly white coloured ac had approached at a virtually head-on aspect to each other, at a near constant relative bearing with virtually no relative motion to draw attention to either. Thus early visual detection by the pilots against the backdrop of the cloudscape was defeated and the presence of each other's ac masked until the last moment. It was in similar scenarios to this incident – at a head-on closing geometry - that the PTC TCAS trial had proved so effective. Indeed 30sec warning had been achieved, which attested to the desirability of a collision warning system to supplement lookout scan. The Board wholeheartedly endorsed the acquisition of such equipment to assist pilots and its use could well have averted this Airprox. Although this was an extremely late sighting by both acs' crews, neither instructor could probably have done anything about it in the time available. The Board agreed unanimously, therefore, that the cause of this Airprox had been effectively, a non-sighting by both pilots.

Regarding the inherent risk, both pilots' accounts correlated as to the relative geometry and the separation that pertained. The radar recording had confirmed that the contacts had merged in azimuth with no appreciable horizontal separation supporting both pilots' reports. However, it was not feasible to determine with absolute certainty the vertical separation that pertained here because the Vigilant was not fitted with Mode C. Nevertheless, the Vigilant pilot's reported height of 1600ft Halton QFE (998mb) and the BE76 pilot's altitude of 2000ft London QNH (1010mb) suggested a height separation of about 40ft which was very close indeed. At a closing speed of about 200kt and a sighting range of 100ft neither crew would probably have been able to significantly alter their acs' flight path to take effective avoiding action, suggesting that any separation that existed was purely fortuitous. The Board agreed, again unanimously, that in the circumstances reported here an actual risk of collision had existed.

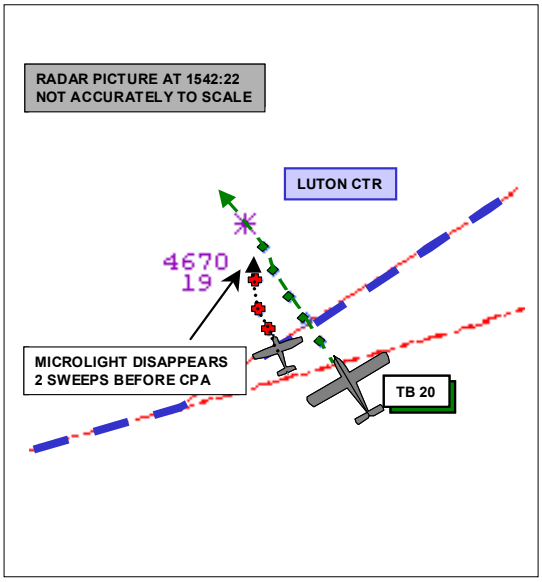
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by both pilots.

Degree of Risk: A.

AIRPROX REPORT NO 049/05

Date/Time:	16 Apr 1542 (Saturday)	
Position:	5149N 00015W (Luton CTR - elev 526ft)	
Airspace:	Luton CTR	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	TB20	Skyranger 912
Operator:	Civ Pte	Civ Pte
Alt/FL:	2000ft (QNH 1009mb)	2000ft (N/K)
Weather	VMC CAVOK	VMC Below Haze
Visibility:	>10nm	>10km
Reported Separation:	0 V 50yd H	30ft V 0 H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TB20 PILOT reports flying a VFR flight from Le Touquet to Cranfield in a white and blue ac with strobes selected on. He entered the UK close to Lydd at 3400ft on the RPS, routed abeam DET and descended to 2400ft on the London QNH to remain outside the London TMA. Skirting the London City Control Zone, he turned towards BPK and contacted Luton APR while S of LAM with a view to getting a RIS and a Zone Transit towards Cranfield; a squawk was allocated but they were not identified. About 10nm later, as they approached BPK, his ac was identified and a zone transit was approved "*VFR not above 2000ft on the QNH, to pass to the east of Luton"* which was acknowledged. He initiated a descent to 2000ft, maintaining 155kt, and turned onto W short of BPK to avoid penetrating the Panshanger ATZ. Presumably, because the flight continued to head W before turning into the zone, he was reminded by the Luton Controller that his clearance was to route to the E of Luton. He pointed out his alt and the Panshanger ATZ and shortly afterwards, turned right onto a heading of approximately 350° to enter the Luton CTR NW abeam Panshanger, level at 2000ft on the Luton QNH. He could not recall being explicitly placed under a Radar Control Service but his understanding was that this would be the type of ATC service that applied after entering the Zone [CTR]. A very short time after he entered the Zone, he became aware of an ac ¼nm away in his 10-11 o'clock position at about his level and well inside the Zone. The ac did not display on his ac's TCAS 1 system, suggesting that it was not transponding. No prior TI was received from Luton APR. It took a few seconds at most for the risk of collision to become apparent and for him to initiate a descent to 1800ft followed by a slight turn to the R. He could not judge the precise direction of flight of the other ac given the late sighting so he thought that attempting a vertical separation would be a better way of achieving the desired result. In the event they passed down the RHS of the other ac in the descent. The fixed-wing microlight appeared to hold its track and alt for the brief period that it took for the TB20 to overtake it and pass out of view. He assessed that the microlight was flying a similar ground track to his but converging by 10-20°. As they passed the microlight the TB20 pilot transmitted to Luton that he was taking avoiding action on a Cessna or similar and he called the other ac's registration. Once they had passed it, he corrected his earlier comment and transmitted that it had been "Blue and white homebuilt type with a high wing". TI was subsequently passed to other ac by Luton in relation to the microlight.

The TB20 pilot accepts that the responsibility of a pilot when flying in VMC is to maintain an adequate lookout. He feels that his lookout and subsequent avoiding action averted a certain collision with the other ac. He did not observe any avoiding action being taken by the other ac and he thought that since they passed on his RHS in a descent he had not seen him. He also accepted that the responsibilities of the Luton Controller towards a transiting VFR flight in Class D airspace are quite limited. Nonetheless he felt that some warning of the conflicting radar return would have been appropriate, even simply in the spirit of the ATCO's Duty of Care. When evaluating the risk of collision, which he assessed as being low, in a control zone, he recognised that he had reacted more slowly than was ideal. This was partly because of his late sighting, but also due to the inbuilt expectation that traffic

in such a zone has the right to be there and its profile is part of the controller's plan. Second-guessing such a plan, he suggested, can heighten rather than reduce the risk of conflict.

THE SKYRANGER 912 PILOT reports flying a blue and white fixed-wing microlight with no lights or IFF inbound to Plaistows Farm [6.5nm S Luton] at 70kt listening out on the microlight common frequency. He saw a low-wing ac pass above his canopy from his 6 o'clock position about 30ft directly above him and heard over the RT the words *"Did you see that"* but he was not sure if it had related to them. He had no time to initiate any avoiding action. They had been on the microlight frequency of 129·825 but with hindsight he felt that he should have been on Panshanger frequency; however as he was returning to Plaistows Farm he had stayed on microlight frequency in case they flew into Hunsdon Microlight Site as they often do.

THE LUTON INT CONTROLLER reports that she was a mentor working with a trainee. They had been working for about 1hr when a TB20 called for zone transit from SE to NW through the overhead direct to Cranfield. This request was granted and the appropriate clearance issued. The first that they knew about the infringer was when the TB20 called taking avoiding action whilst inside CAS. There was no contact observed on radar at that time so they had not known of any other traffic. The pilot advised them that he had managed to get the registration of the ac and it had been at 2000ft – the same level. There was further traffic positioning for the final approach to R/W 06 at Luton that was given TI and had almost broken off the ILS when the infringer became visible on radar heading towards final approach. It was seen to turn S and the inbound ac elected to continue. The TB20 later came back on frequency to add that the ac was a blue and white microlight. The pilot also phoned TC later and advised that he would be filing an Airprox.

UKAB Note (1): The TB20 paints on the Stansted radar throughout the incident heading NNW at 2000ft. At the point of the Airprox a descent to 1900ft is shown and a slight jink to the right. Then a primary only contact - assumed to be the microlight - shows for a few sweeps prior to the incident but it disappears at 1542:17, 2 sweeps before the point where it is assumed the incident takes place. It is not possible to estimate the miss-distance from the radar recording but it would appear that the lateral separation was minimal. The first indication that the TB20's track had changed was 1 sweep (4 sec) before the presumed CPA; at that time it had also descended by 100ft.

ATSI reports that the TB20 was en route from Le Touquet to Cranfield VFR, calling Luton at 1533:20. The pilot requested a RIS and a transit of the Luton CTR from S to N. The Luton Int Controller instructed the ac to remain outside CAS, issued a squawk and passed the QNH. At 1537:40, the pilot was advised that the ac was identified 15nm SE of Luton and was cleared to transit the Luton CTR to pass E of Luton, VFR and not above 2000ft; this was correctly read back.

As the TB20 approached the edge of the CTR, an intermittent primary contact was visible just inside the CTR. At 1540:50, the Luton controller reminded the pilot to route E of Luton Airfield and passed TI on a contact 2nm to the NW with no height information displayed. The TB20 pilot replied that he was avoiding the ATZ at Panshanger and would be turning N shortly.

At 1542:10, the pilot transmitted "*(TB20 callsign) is turning to avoid a Cessna which appears to be in your zone*". The Luton Controller acknowledged this and advised that a faint return could be seen just on the edge of the zone. Examination of the radar recording shows the other ac just inside the CTR tracking NE. The two returns merged and a short time later the TB20 pilot passed a description of the other ac which he advised was a microlight and not a Cessna.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

From the radar recording and RT transcript, the Board had determined the Skyranger had entered the Luton CTR without a clearance but that it had painted for only a short period on the radar which had not been sufficient for the Controller(s) to see and react to it before the incident took place. Since both ac had been operating under VFR in good weather the Board considered this incident to be largely a sighting issue. While Members sympathised with the TB20 pilot's surprise at encountering unnotified traffic in the CTR, they noted that since he was operating under VFR he had an obligation to see and avoid other traffic, even allowing for the complexities of Class D

airspace. Although the same applied to the Skyranger pilot, the Board considered that he could not reasonably have been expected to see the TB20 since it was approaching him from behind.

Due to the lateness of the sighting by the TB20 pilot and the small amount of separation achieved by his avoiding manoeuvre, the Board considered that the safety of the respective ac had been compromised.

Members welcomed the comprehensive and honest report from the TB20 pilot.

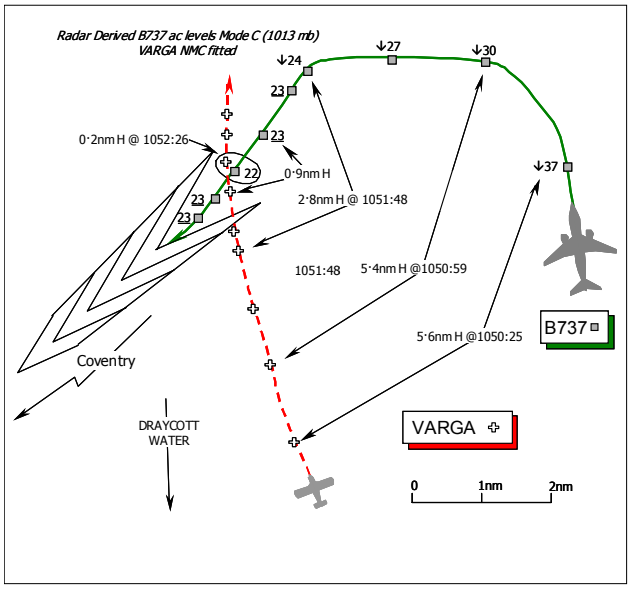
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the TB20 pilot of the Microlight which had penetrated the Luton CTR without clearance.

Degree of Risk: B.

AIRPROX REPORT NO 050/05

Date/Time:	17 Apr 1052 (Sunday)	
Position:	5227N 00120W (7½nm finals Coventry RW23 - elev: 267ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	B737-500	Varga 2150A
Operator:	CAT	Civ Pte
Alt/FL:	2000ft (QNH 1003mb)	1800ft (QNH 1004mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	>10km	>10nm
Reported Separation:	Nil V/1500m H	100ft V/1000ft H
Recorded Separation:	0·2nm H (400yd)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-500 PILOT reports that he was heading 231° at 170kt, established on the LLZ to RW23 at Coventry approaching about 8nm finals, whilst in receipt of a RIS from Coventry RADAR. They had been monitoring the position of another ac in the vicinity of the airfield which they had first detected on TCAS from a range of about 10nm: the other ac was displayed as "proximate" traffic but with no height information. When they first spotted the other ac visually, at a range of 4nm, he assumed the ac to be larger than it actually was and to be tracking from L to R. Because of the perceived size and the rate at which it was traversing their path it was concluded that the approach could be continued safely. As they proceeded inbound flying level at 2000ft Coventry QNH (1003mb) the ac became recognisable as a low wing white coloured light ac flying at the same altitude on a conflicting heading toward their jet from their 1 o'clock, he thought, and both he and his 1st Officer agreed that there was a high risk of collision at this point. To avoid the light ac he disconnected the autopilot and broke L as the other ac passed about 1500m to starboard at the same altitude. Once they were clear of the traffic, he continued with a visual approach to RW23 and landed without further incident.

Upon their return to the crew room, he spoke to the radar controller and discussed the incident and during this telephone conversation he advised he would be submitting an Airprox. His ac has a white/blue colour-scheme.

THE VARGA 2150A PILOT provided a brief report stating that his ac has a white & light blue colour-scheme and the HISL was on whilst flying in very good flying conditions below a cloudbase of about 5000ft and visibility in excess of 10nm. He had departed from N Weald routeing BPK – overhead Luton - DTY – direct to Holly Meadows using the TNT VOR whilst transporting a pilot to collect another ac following maintenance. Although listening out with Nottingham E Midlands ATC on 134·175MHz, he was not in receipt of an ATS; a squawk of A7000 was selected, Mode C is not fitted.

Flying at an altitude of 1800ft QNH (1004mb) heading 343° approaching a position 9nm NE of Coventry at 100kt, the B737 was spotted ½ - 1nm away as it descended from slightly above his altitude through his level and passed 100ft below his ac from off his starboard quarter about 1000ft astern. No avoiding action was taken and the risk was assessed as *"nil"*, whilst they enjoyed their Sunday morning visual flight in very good weather conditions.

THE COVENTRY APPROACH RADAR CONTROLLER (APR) reports that the B737 was being vectored for an ILS to RW23 at Coventry under a RIS in Class G airspace when an un-identified ac, squawking A7000 but with no Mode C, was observed tracking N at North Draycote. The B737 crew was given traffic information about this unknown ac – the Varga – and as the B737 established on FINALS for RW23 at about 8-8½nm further traffic information was given whereupon they reported that the other ac had been observed on TCAS. When the B737 crew was asked if they were happy to continue the approach, they replied that "yes, we have the traffic visual".

The B737 was at 7½-8nm FINALs at 2000ft QNH (1003mb) when the unidentified ac crossed the RW23 centre-line at about 6½-7nm FINALs. Later, the pilot of B737 telephoned ATC to advise that he was filing an Airprox.

UKAB Note (1): The 1050UTC Coventry weather was reported as: Sfc wind: 170/10kt; 18km CAVOK; QNH: 1003mb.

UKAB Note (2): The Clee Hill Radar recording shows the Varga on a northerly course squawking A7000 just before the B737 turns westerly in conformity with the APR's instruction issued at 1050:20. When the B737 steadies W, descending through 3000ft (1013mb) – about 2700ft Coventry QNH (1003mb) - the Varga is 5·4nm SW. A very gentle R turn is evident from the Varga from about 1051:48 as the B737 descends through 2400ft (1013mb) – about 2100ft QNH – and steadies inbound. The airliner levels at 2300ft (1013mb) – 2000ft QNH – as the Varga converges from the L to cross ahead of the B737 from L – R in between sweeps. The minimum recorded horizontal separation of about 0·2nm is shown on the Claxby Radar recording and occurs at 1052:26, after the Varga has crossed into the 3 o'clock of the airliner, indicating 2200ft Mode C momentarily before resuming its assigned altitude. The relative vertical separation cannot be determined as the Varga has no Mode C fitted.

ATSI reports that the B737 was inbound to Coventry from Pisa and the crew contacted the Coventry APR at 1048:30 who advised that they could expect vectoring for an ILS approach to RW23 and instructed them to maintain FL50. Soon afterwards he issued instructions to make a R turn onto 355º and descend to 4000ft QNH (1003mb). Further descent to 3000ft was given and the APR informed the crew that they would be under a RIS as they left CAS: the crew read back the radar service as is required. At 1050:10, the crew were cleared to 2000ft and then advised to turn L onto 270º to establish on the LLZ. Once this had been acknowledged, at 1050:30, the APR passed traffic information on an A7000 squawk which had been observed 5½nm SW of the B737 tracking NW – *"I've got unidentified traffic at the moment..south east of the CT by approximately…3½ to 4 miles no height information north..westbound at the moment I'll keep you updated".*. The crew advised that *"we have the traffic on TCAS…but no height information"*. Further traffic information was passed at 1051:00, as the B737 was about to complete its turn to close the localiser, "[C/S] *no information apart from a 7000 squawk on that traffic it's…just..6 miles..to the east of the field at the moment".* Whereupon the B737 crew replied *"we're looking for the traffic".* The APR then transmitted "*you happy to continue?*" to which the B737 crew responded "*Affirm* [C/S]". The crew reported established on the LLZ and again the APR updated the traffic at 1051:50, which was now *"just coming up to your left 11 o'clock now range of 2¾ miles"* crossing from L to R. The B737 crew reported visual with the traffic at 1052:10 and that they were continuing with the approach. When asked if the other ac was above or below, the B737 crew replied that it was at the same level. Whereupon the crew was switched to the TOWER.

The radar recording shows that the B737 turned L and passed behind the Varga by approximately 0·2nm. The crew informed the APR that it was at the same level as them, which at the time, was 2000ft QNH. After landing the B737 captain telephoned the APR and advised that an Airprox report would be filed.

The APR correctly informed the B737 crew of the radar service they were under and the crew acknowledged this. Traffic information on the other ac was passed 3 times and the crew reported visual with it. The APR asked the B737 crew if they were happy to continue with the approach, given the other traffic, and they confirmed that they were. The APR complied with all the requirements of providing a RIS and so there are no ATC causal factors disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Within the B737 pilot's laudably frank account he had reported that having detected the presence of the light ac his first assessment of the situation was that the approach could be continued quite safely. Subsequently, both he and his 1st Officer then reassessed the geometry and considered that there was a risk of a collision so elected to take avoiding action. During this encounter the relative positions altered considerably from what was originally a wide overtake into a crossing situation, with the Varga on the inside of the turn just where the B737 crew wanted to fly to converge onto the LLZ for RW23. The ATSI report had made it plain that the B737 crew, whilst in receipt of vectors from the Coventry APR, had been advised of the presence of the unknown ac under the RIS that pertained. Furthermore, it was evident that the B737 crew had detected the other ac on TCAS before acquiring it

visually from a range of 4nm and when asked by ATC if they wished to continue had elected to do so. But it seemed to the Board that the B737 pilot might have confused the geometry a little in the latter stages of the encounter because of the size of the light ac: he had correctly deduced in the first instance that the small Varga ac was crossing his course from L – R on a NW'ly track but had then reported that it later closed directly toward his airliner from 1 o'clock. Whilst the CPA occurred with the Varga at about 1 o'clock, the later perception he reported was not entirely correct and some Members wondered if the relative position displayed by TCAS might have misled the B737 pilots as they turned onto finals for RW23. CAT pilot Members explained that displayed TCAS azimuth information was not as accurate as level information and stressed that pilots must not rely too closely on the displayed position of another ac's TCAS contact that is only an aid to acquiring the traffic visually. The radar recording had revealed that the Varga pilot had maintained a steady NW'ly track until the B737 had turned onto finals, whence he appeared to enter a very slight R turn onto a more northerly course which had the effect of reducing any horizontal separation that there was still further. In the final stages of this encounter it would certainly have appeared close to the B737 crew as the Varga passed ahead from L - R and crossed into their 1 o'clock at 400yd which was the closest point. Thus the B737 pilots' assessment of the geometry/separation clearly effected their decision to continue with the approach and might have caused them not to take earlier action to avoid the Varga so, in the Board's opinion, this was a contributory factor to the Airprox.

From the Varga pilot's report, Members thought he seemed content with the situation. However, after turning westerly the B737 had 'right of way' under the 'Rules of the Air' and in the final crossing situation some Members suggested that the Varga pilot should have given the airliner a wider berth. But as he had only detected the presence of the B737 at ½ - 1nm away as it descended from slightly above his altitude he was not best placed to do so. This was, therefore, a late sighting in the very good weather conditions that the Varga pilot had reported, so at these distances robust action was needed if greater separation was required, but he deemed that none was necessary. It was evident that the instrument approach procedure (IAP) to RW23 at Coventry was marked on CAA topographical charts and in terms of 'airmanship' the GA pilot Member suggested this was not a good route to choose. Each pilot clearly had a legitimate right to fly where they did and this encounter occurred in Class G airspace where 'see and avoid' prevails. However, given the nature of the Varga pilot's flight it was unfortunate that he had crossed the IAP here at a position and height where airliners would be marshalling to intercept the glidepath and commencing their instrument descent: in airmanship terms, it was certainly a point to avoid if at all possible. Moreover, whilst flying through Coventry's instrument approach the Varga pilot had been listening out with Nottingham E Midlands ATC which was of questionable benefit at this position. The lesson here was that it was far better to call Coventry ATC and tell them what you are doing which indeed might have elucidated earlier traffic information about the B737. Such sage advice is promulgated on CAA charts where it is stated that pilots *"..who intend to fly to or route adjacent to aerodromes with IAPs are strongly recommended when flying within 10nm of the aerodrome to contact the aerodrome ATSU".* Consequently, the Varga pilot's decision to route through the Coventry RW23 IAP final approach track at a height and position that would conflict with instrument traffic was also considered by the Board to be a contributory factor to this Airprox.

The lack of a Mode C altitude reporting facility on the Varga's SSR equipment was unfortunate and this clearly denied both ATC and the B737's TCAS altitude data about the light ac. Moreover it also prevented any determination of the minimum vertical separation that pertained here, which was apparently no more than 100ft according to the Varga pilot's own report. Although the Varga pilot was content not to take avoiding action the B737 crew elected to do so, resulting in a minimum horizontal separation of 400yd as they passed clear astern of the light ac. Taking all these factors into account the Board concluded that this Airprox had resulted from a conflict in Class G airspace which had been resolved by the B737 crew whose own avoiding action had effectively removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

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

Degree of Risk: C.

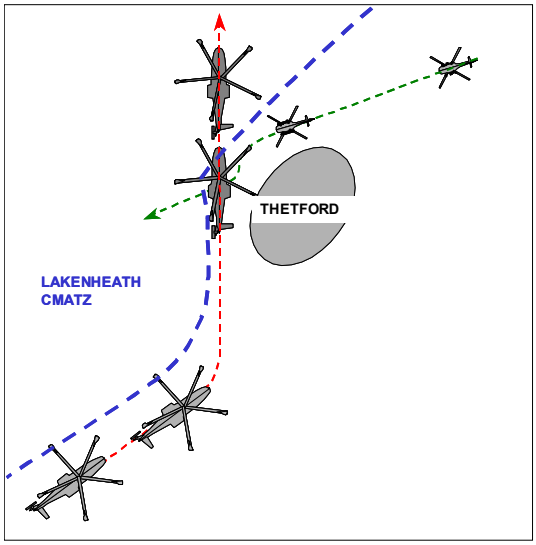
Contributory Factors:

a. The B737 pilots' assessment of the geometry/separation between the two ac.

b. The height of the Varga and its location in relation to the RW23 IAP final approach track.

AIRPROX REPORT NO 051/05

Date/Time:	12 Apr 1330	
Position:	5228N 00041E(2nm NE of Thetford)	
Airspace:	London FIR (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Bo105	Merlin
Operator:	Civ Comm	HQ JHC
Alt/FL:	600ft (RPS)	400ft (agl)
Weather	VMC IN RAIN	VMC IN RAIN
Visibility:	2-3km	4km
Reported Separation:	200ft V/200m H	Not Seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BO105 PILOT reports flying a black and silver ac with all lights on, squawking 0052 with Mode C, on a police ops sortie with 2 observers. He was heading approximately 250° at 105kt and 600ft in poor visibility and rain with scattered cloud above and at same level. In receipt of a FIS from Lakenheath and approaching Thetford for a Police Operation, he noticed a TCAS contact to the S at 3nm converging with him, 200ft below. He called the observers' attention to the traffic and requested that they called visual once they had sighted it. A few seconds later he received a TCAS TA followed by TI from Lakenheath and a visual sighting from the observers of 2 helicopters at an estimated ½nm in their 11 o'clock, converging and slightly below. Having acquired the traffic visually himself, he climbed and turned left to increase separation. There was no indication from the traffic that they had seen his helicopter. He assessed the risk of collision as being slight but would have been higher without the initial warning from TCAS.

THE MERLIN PILOT reports that he was leading a formation of 2 Merlins VFR but in poor weather from Mildenhall to the Stanford training area at 130kt and 400ft on a NE heading under a FIS from Mildenhall, he thought. None of the aircrew in the formation saw the police helicopter and were not aware that an Airprox had been filed until after landing back at their home base so they could not recall any detail.

UKAB Note (1): The incident was not recorded on either the Debden or Cromer radars.

UKAB Note (2: The transcript of the Lakenheath RAPCON frequency reveals that both the Bo105 and the Merlin formation were receiving an ATC service from Lakenheath APR. The Bo105 was in receipt of a FIS and the Merlin formation in receipt of a RIS from the same controller. The transcript shows that the Merlin formation was passed accurate TI on the Bo 105 AT 3nm. Despite not being required to do so since the Bo105 was in receipt of a FIS, Lakenheath APR also passed TI to the Bo105 pilot, albeit passing an incorrect alt of 1000ft.

HQ JHC comments that at the low levels the ac were operating this is a typical situation: it is nonetheless a timely reminder for crews to maintain an effective lookout, especially in poor visibility. Formation flying is inherently high workload and during poor visibility the tendency is for the formation to close-up with an increase in workload for both elements of the formation. However, it is essential that a good lookout is maintained whatever the weather. The benefits of TCAS are well known and are under constant review. In this particular case, JHC views the risk of collision as slight given the Bo105's warnings and subsequent sighting of the Merlins.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, an RT transcript and a report from the Merlin operating authority.

It was clear to the Board that the weather conditions at the time and position of the incident had been poor with 2-4000m visibility in rain. In such conditions TCAS had again proved its utility in giving the Bo105 pilot early warning of the presence of the other ac. Had the Merlins been similarly equipped Members thought it probable that this incident would have been avoided. A military helicopter pilot informed the Board that in such weather the pilot of the No2 ac is concentrating primarily on station and height keeping: therefore the other cockpit crew member in the left hand seat would have had prime responsibility for lookout. In this case, looking out to the right (in the direction of the Bo105) would have involved looking across the cockpit with the associated airframe obstructions. The Bo105 being slightly above the height of the Merlins further exacerbated the situation. Notwithstanding this and particularly in poor weather, only good lookout will enable pilots to fulfil their obligation to see and avoid other ac. Even with accurate TI from Lakenheath the Merlin crews did not see the Bo105 and were therefore unable to take any avoiding action; however, with the aid of TCAS and equally accurate TI, the Bo105 pilot was able to see the Merlins and take avoiding action in good time to ensure that the safety of all 3 ac was not compromised.

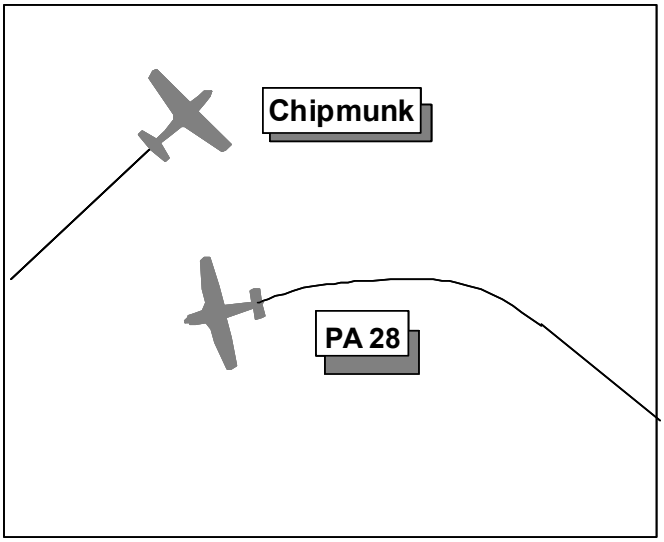
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non sighting by the Merlin crews in poor weather conditions.

Degree of Risk: C.

AIRPROX REPORT NO 052/05

Date/Time:	17 Apr 1243 (Sunday)	
Position:	5225N 0104W (2nm SW Husbands Bosworth - elev 505ft)	
Airspace:	LFIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	Chipmunk	PA28
Operator:	Civ Club	Civ Pte
Alt/FL:	700ft (QFE 994mb)	1500ft (QNH)
Weather	VMC CAVK	VMC CLBC
Visibility:	>10km	12km
Reported Separation:	100ft V/100m H	200ft V/200 yd H
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CHIPMUNK PILOT reports heading 045° at 120kt returning to Husbands Bosworth after an aerotow to 3000ft – the glider was dropped near Cold Ashby. Passing through 700ft QFE, descending at 1000ft/min and 120kt, while looking for a motor glider on the downwind leg, he noticed an ac shadow on the ground. He looked over his right shoulder (south) then scanned around to the east and saw a yellow/white Cherokee type about 100m away, turning slightly left and passing 100ft above and 100m behind his ac. There was no time for him to take avoiding action but he could see the ac were not actually going to collide and therefore the risk of collision was low.

THE PA28 PILOT reports heading 310° at 90kt and 1500ft QNH. He saw a white Chipmunk converging from about 2nm in his 10 o'clock; it was trailing a tow-rope. He waited a while to assess its track and when he realised they were on a converging course, he waited to see if it would give way and position behind him. When he saw this was not happening, he turned slightly left to alter his track behind the Chipmunk. He then maintained contact with it in case any further avoiding action was required. There was no risk of collision because he kept it in sight all the time.

UKAB Note: While the track of the squawking PA28 can be seen on radar recordings, the no-SSR Chipmunk can only be seen intermittently and the Airprox is not recorded on radar.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was suggested that having seen the tow rope and, hopefully aware of the proximity of a gliding site, the PA28 pilot might have realised the Chipmunk would be intent on rejoining and avoided it immediately. Some Members therefore thought that the PA28 pilot had flown close enough to the Chipmunk to cause its pilot concern for the safety of his ac. But Members understood the PA28 pilot's thought processes which caused him not to turn away from the Chipmunk immediately he had assessed its track and that this was always a matter of fine judgement. A majority of Members thought that the PA28 pilot had done what was expected to remove any risk of the ac colliding and that the cause of the Airprox report was the fact that the Chipmunk pilot did not see the PA28 until it was fairly close to him

AIRPROX REPORT No 052/05

PART C: ASSESSMENT OF CAUSE AND RISK

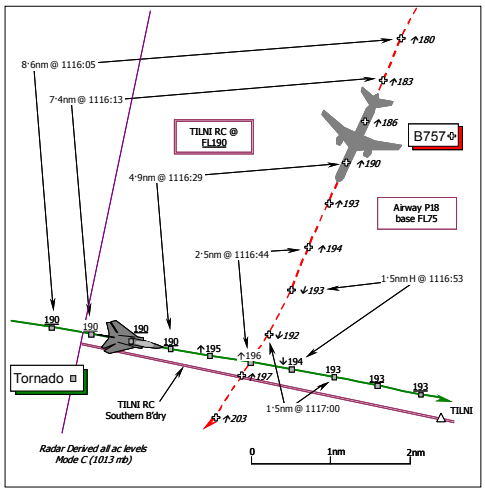
Cause: Late sighting by the Chipmunk pilot.

Degree of Risk: C

AIRPROX REPORT NO 053/05

Date/Time: 20 Apr 1116
Position: 5434N 00157W (3·3nm WNW of TILNI)
Airspace: Airway P18/TILN RC (Class: A)

	First Ac	*Second Ac*
Type:	Tornado GR4	B757
Operator:	HQ STC	CAT
Alt/FL:	FL190	↑FL250
Weather	VMC CLAC	VMC NR
Visibility:	10km	NR
Reported Separation:	200ft V/1·5nm H	nil V/5nm H
Recorded Separation:	100ft V @ 1·5nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports that he was inbound to Marham as a singleton and in receipt of a RCS from Scottish (Mil) on 252·475MHz, squawking A4620 with Mode C, but neither TCAS nor any other form of CWS is fitted.

Whilst in transit through the TILNI Radar Corridor (RC) at FL190 heading 100° at 390kt, they were informed of co-ordinated traffic in their 10 o'clock that was levelling at FL180 below them. The other ac was sighted visually by both himself and his navigator at a range of 5nm. The controller then informed them that the other ac – the B757 - had "busted its flight level" and so they were instructed to expedite a climb to FL200 for avoiding action. They started to climb whilst telling the controller they were visual with the traffic, so the controller then said that as they were visual they could level and keep separation. They maintained visual with the B757 throughout and the other ac passed astern whilst initiating a R turn. Minimum horizontal separation was 1·5nm and 200ft vertically below his jet; he assessed the risk as *"minimal"*.

UKAB Note (1): The UK MIL AIP at ENR5-2-11 para 7.9 – TILNI Radar Corridor (RC) specifies that LATCC (Mil) and ScATCC (Mil) are responsible for the provision of a radar controlled airways crossing service through P18 by military ac at FL190 within specified co-ordinates. The RC is defined as two parallel lines 10nm apart perpendicular to the centreline of airway P18 at specified co-ordinates.

THE B757 PILOT reports that he had departed Newcastle bound for London (Heathrow) heading 190° at 290kt. They were in receipt of a RCS from MACC climbing to FL180 on a radar heading of 190°. As they levelled at FL180 they were further cleared to FL250 he thought, which was read back to the controller. A few seconds later a 'pop up' was spotted on TCAS, which enunciated "TRAFFIC", followed in rapid succession by an RA "REDUCE VERTICAL SPEED". ATC then issued an avoiding action turn onto a heading of 270° and the RA changed to a "CLIMB", commanding approximately 10° nose up. The RA and ATC avoiding action instructions were complied with and TCAS reported "CLEAR OF TRAFFIC" very quickly. They levelled their ac at FL210 and steadied on a heading of 215°. The controller then informed them that the clearance to climb to FL250 was intended for another flight.

THE MACC NORTH & EAST COMBINED RADAR CONTROLLER (MACC NE RADAR) reports that he was operating the MACC NORTH and EAST Sectors bandboxed under a generally light/moderate workload. The B757 crew – C/S ABC 13F - contacted him climbing to FL150 and was instructed to climb initially to FL190 before he corrected the instruction to FL180, the TILNI RC being active at FL190. A correct readback of FL180 was acknowledged by the crew. Elsewhere in his Sector, near DENBY, he climbed another flight – C/S XYZ 1DF - outbound from Manchester on a DESIG 1S SID to FL150, under an overflight at FL160. When C/S XYZ 1DF was

clear of this traffic, he instructed its crew to climb to FL250. An ac's crew acknowledged the instruction- he believed the call was from C/S XYZ 1DF - but shortly afterwards another flight said that some other ac had responded to the climb instruction issued to C/S XYZ 1DF. His initial response was to ask the other ac of company XYZ on the frequency - C/S XYZ 19G – that was descending inbound to Manchester whether he had taken the call: the crew responded "negative". There being no other "obvious candidate" he continued to issue further instructions to other flights. Shortly afterwards, he became "very aware of the STCA flashing red" in the TILNI RC, with both the B757 and the Tornado indicating FL195, and the B757 about 1·5nm W of and passing behind the Tornado. He immediately issued an avoiding action turn to the B757 crew who responded that they were already following a TCAS RA CLIMB. Minimum horizontal separation was 1·7nm, he thought, and the vertical separation 100ft before standard separation was rapidly restored.

THE MACC NORTH & EAST COMBINED CO-ORDINATOR (MACC NE COORD) reports that he was operating on the bandboxed NORTH & EAST Sectors. He was busy dealing with a flight that was generating a lot of work due to a re-route when Scottish (Mil) called to request a crossing of the TILNI RC at FL190 for the Tornado GR4, which he agreed. Scottish (Mil) asked about the subject B757 departing Newcastle and he told them it would be climbed to FL180. He pointed out the Tornado GR4 to NE RADAR who climbed the B757 to FL180 and, he thought, the pilot read back the correct level. He was then on the phone to WEST and sorting out a re-route with the NE Sector ATSA when he observed the STCA flashing. Simultaneously, NE RADAR also saw the STCA flashing and issued a turn to the B757 crew as he suggested 'avoiding action' himself, which was given immediately, but separation was eroded. As he had been busy on the phone and dealing with the ATSA he was not aware that another ac had queried the level instruction until later.

MIL ATC OPS reports that the Tornado GR4 crew was inbound to Marham under the control of ScATCC (Mil) Controller 3 (CON3), who identified the GR4 at 1110:28 and placed the flight under a RCS at FL190. At 1113:09, CON 3 rang MACC NE COORD "*requesting the TILNI corridor flight level 190*". A series of administrative calls ensued between the 2 agencies during which CON 3 observed, and pointed out, an ac to NE COORD – the B757 - climbing out of Newcastle that would affect the GR4. Nevertheless, MACC NE COORD agreed to the RC crossing saying "[GR4 C/S] *cleared to cross at flight level 190 we'll go a thousand feet underneath*". CON 3 replied "*OK* [are] *you happy* [if] *I'll maintain that track just to route to the south of the corridor*?". NE COORD stated "*we'd rather you went through it*". After an RT transmission to another ac CON 3 instructed the GR4 crew "[C/S] *turn left heading 080° I have to route you through the TILNI corridor*". NE COORD on overhearing this broadcast specified "*Yep, you've got it then*". At 1114:21, CON 3 confirmed with the GR4 crew that they had copied the L turn for positioning through the RC and changed the type of service on the GR4 to RIS, at 1114:38, whilst it transited Class G airspace for a short period. CON 3 informed the GR4 crew that "[C/S]*…I'll route to the southern edge of the TILNI corridor and expect a right turn once to the east, there is conflicting civil traffic currently in your left 11 o'clock at 12 miles, left - right. Climbing beneath you*". The GR4 crew reported "[C/S] *copied happy to climb*", whereupon CON 3 instructed the GR4 crew to "[C/S]*…maintain flight level 190 that's co-ordinated at 180 and then will be climbing once clear of you."* The GR4's type of ATS was changed to a RCS by CON 3 at 1115:40, just before the ac re-entered CAS. At 1116:09, CON 3 passed traffic information to the GR4 crew about the B757 for the second time "[C/S]*, previously reported co-ordinated traffic now left 10 o'clock at 5 miles left - right",* to which the GR4 crew reported "*visual*". Whereupon CON 3 immediately reported at 1116:19, "[C/S] *that traffic has now climbed, avoiding action, climb report level FL200 and expedite*." Five sec later the GR4 crew stated "[C/S] *visual climbing to 200*". Then CON 3 instructed the GR4 crew "[C/S] *with that traffic in sight stop climb maintain level*", which the GR4 crew acknowledged adding at 1116:37, "[C/S] *descending to 190, traffic is now left 9 o'clock*". This was acknowledged by CON 3. After this point the B757 passed behind the GR4.

Analysis of the radar recording shows the B757 climbing out of Newcastle at 1111, initiating a R turn towards Airway P18 climbing and squawking A5130. At 1114:03, the GR4 is shown 20nm W of TILNI, tracking 110º squawking A4632 indicating FL190 Mode C climbing; the B757 is 30nm NE of the GR4 tracking 230º climbing through FL128. At 1116:05, the B757 is at FL180 still climbing, as the GR4 is in its R 1 o'clock - 8·6nm at FL190. The GR4 enters CAS at 1116:13, maintaining FL190, with the B757 in its L 10 o'clock - 7·4nm climbing through FL183 Mode C. Both ac indicated the same level at FL190 at 1116:29, with 4·9nm horizontal separation evident. The next sweep shows both ac having taken a climb, the B757 indicating FL193 and the GR4 indicating 200ft above at FL195 with the horizontal separation reduced to 3·7nm. The 2 ac continue to indicate a climb and the sweep at 1116:44, shows the B757 at FL194 and the GR4 at FL196 some 2·5nm apart. At 1116:53, the GR4 has passed through the B757's 12 o'clock as the B757 reverses into a descent through FL193 whilst the GR4 descends through FL194 with 1·5nm horizontal separation. Both ac descend 100ft on the sweep at 1117:00, after

which the B757 recommences a climb and the separation between the two ac increases as the Tornado maintains FL193.

CON 3 complied with SOPs for an ac crossing the TILNI RC and MACC granted authority for CON 3 to utilise the TILNI RC for the GR4, with the B757 stopped off at FL180 below it. As the GR4 entered CAS, CON 3 correctly applied a RCS and passed traffic information about the co-ordinated B757. CON 3 observed the B757 climbing through its co-ordinated level when it indicated FL183 and not knowing if this was a minor deviation from the assigned level of FL180 or a continuation of the B757's climb, initiated an avoiding action climb. The next sweep of the radar showed that the B757 was continuing the climb outwith the flight's assigned level and taking into account that the GR4 pilot had reported visual with the B757 and was unlikely to out-climb it, the GR4 crew would be better placed to maintain their level and take their own visual separation. CON 3 had considered giving the GR4 an avoiding action turn but had considered it inappropriate as the turn would have put the GR4 "belly-up" to the B757 rendering the GR4 crew unsighted on the conflicting airliner. CON 3 acted in a safe and appropriate manner; there are no Military ATC causal factors apparent within this Airprox.

ATSI reports that although NE RADAR was operating the N and E Sectors combined, another controller was available if it had been considered necessary to split the sector. He described his workload generally as light to moderate with the added complexity of unexpectedly having to handle an ac on an airtest. The B757 crew – C/S ABC 13F - established communication with the MACC NE RADAR controller at 1114, after departure from Newcastle, reporting climbing to FL150, heading 205° - radar recordings show the flight climbing through FL132 at the time and thereafter climbed at approximately 3000ft/min. The controller initially instructed the flight to climb to FL190 but immediately corrected this to FL180 and to continue on the heading. Just before this RT instruction the NE COORD had agreed with ScATCC (Mil) CON 3 an eastbound crossing of the TILNI RC for the Tornado GR4 at FL190, which was the reason for restricting the B757 crew's climb to FL180.

Over the period of the next 90sec, NE RADAR dealt with 3 other ac, including issuing C/S XYZ 1DF with a turn and a climb instruction to FL190, which was correctly read back by the pilot concerned. Later at 1115:40, the other flight was instructed to climb "[C/S XYZ 1DF] *climb flight level 250"*. Although the instruction was passed clearly and distinctly, on this occasion the pilot of the B757 responded to the message equally clearly, *"climb flight level 250* [C/S ABC 13F]". At the time, the B757 was passing FL172, 13·7nm NE of the Tornado level at FL190. NE RADAR later said that he had not detected that the wrong crew had replied to the climb instruction. He mentioned that he recollected hearing "FOXTROT" at the end of the response and assumed it was from the correct flight. However, the pilot of XYZ 1DF queried whether the climb instruction had been addressed to his flight. Receiving confirmation that he had been the intended recipient, he informed the NE RADAR controller that another flight had answered the call addressed to him. The controller checked with the only other ac of company XYZ on frequency - C/S XYZ 19G - whether it had answered but, on receiving a negative response, the controller did not pursue the matter. The NE RADAR controller agreed that as this ac was in fact descending, the pilot would have been unlikely to respond to a climb instruction. He could not readily explain why he had not checked whether any other ac had in fact responded, especially as the C/Ss of the two flights involved had some similarities. He commented that, whilst the incident was occurring, both the NE COORD and ATSA were busy discussing the airtest ac. Not only did he feel that this presented him with a distraction but also it meant that the NE COORD was not able to listen to the RT, potentially preventing NE COORD from noting the incorrect readback. The MACC MATS Part 2, Page 1.8, states one of the responsibilities of the CO-ORDINATOR is to 'Monitor the RTF, whenever primary duties permit, in order to facilitate efficient operation of the sector'.

With the erroneous perception that the situation between the B757 and the Tornado had been satisfactorily resolved, NE RADAR continued to pass instructions to XYZ 19G and another ac, both of which were operating in the southern part of the sector. He was alerted to the confliction between the subject ac when STCA activated with a high severity alert. At 1116:29, the radar recording shows both ac at FL190, 4·9nm apart. NE RADAR immediately issued the B757 with avoiding action at 1116:40, *"…avoiding action turn right heading 270°"*. The B757 crew replied immediately *"right head 270 we're responding to* [an]*..RA*". The radar photograph timed as the instruction was passed, shows the subject ac on conflicting tracks: the B757 climbing through FL193, 3·7nm NE of the Tornado, which is climbing through FL195 as a result of action taken to resolve the situation by ScATCC (Mil) CON 3. The pilot of the B757 reported that he was responding to a TCAS RA, but did not state the action being taken. The radar recording of the event reveals that the B757 stopped its climb at FL194, at which time the Tornado was indicating FL196, 2·5nm away. Thereafter, the B757 is on a track to pass behind the Tornado, maintaining a minimum of 1·5nm horizontally and 100ft vertically from each other. The B757 passed 2.6nm behind the Tornado, by which time it was climbing again and passing FL197, 400ft above the Tornado.

The MATS Part 1, Appendix E, Page 8, states that:

"Errors in a readback must be corrected by the controller until the pilot gives an accurate readback".

Although the climb instruction was passed clearly, the inappropriate response from the pilot of the B757 was equally as clear. In accordance with MATS Part 1 procedures, although the initial error was made by the pilot of the B757, it was the responsibility of the controller to ensure a correct readback of the message was obtained.

HQ STC comments that there is little to comment on from the military point of view. Had the Tornado crew not been visual with the B757 things could have been a little more exciting. Controllers can't assume that aircrew will always get it right and must listen before transferring their attention elsewhere.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident from the comprehensive reports and the RT recordings provided that the catalyst of this Airprox was callsign confusion. The ATSI report had clearly shown that the crew of the B757 had responded in the first instance to an instruction addressed to another flight with a slightly similar alpha-numeric callsign suffix - FOXTROT being the last letter of both callsigns - even though it was not from the same airline. Consequently, the B757 crew climbed through the co-ordinated level of FL180 into direct confliction with the Tornado which was legitimately proceeding through the TILNI RC, co-ordinated to cross at FL190. The Board agreed unanimously that here then was the first part of the cause of the Airprox insofar as the B757 crew responded to the climb instruction addressed to another ac and climbed into conflict with the Tornado GR4. Unfortunately even though the B757 crew's inappropriate reply to this transmission lead them to readback this climb instruction, which was transmitted clearly and accurately, the error was not detected by the MACC NE RADAR controller at the time. The Board was advised by ATSI that workload did not appear to be a factor for although there were 5 flights on the frequency the situation at the time was neither busy nor complex. Therefore, Members were somewhat surprised that even when the pilot to whom the climb instruction was addressed pointed this out to NE RADAR, who did not pursue the matter to identify who had made this critical mistake. It was unfortunate that NE RADAR had not picked this up and it was clear that the MATS Pt 1 placed the onus on the controller to ensure conformity with his instructions. The Board therefore agreed that another part of the cause was that after the MACC NE RADAR controller was alerted to a wrong ac taking the instruction he did not establish which ac this was.

Turning to risk, evidently ScATCC (Mil) CON 3 had negotiated the Tornado GR4's crossing of P18 through the TILNI RC correctly and had wisely passed on traffic information to the crew about the B757 approaching from the N, climbing up beneath them, on two occasions. Clearly CON 3 had no reason to suspect that anything was awry until he spotted the B757 climbing through FL183 Mode C. Controller Members recognised that this was the first possible opportunity for CON 3 to spot (from the B757's Mode C indication) that the crew had exceeded their assigned level. The Board commended CON 3 for his alertness, rapid grasp of what was happening and his prompt reaction by immediately issuing a positive and effective avoiding action climb. Fortunately both of the GR4 crew members had seen the B757 from a range of 5nm away and reacted quickly to the avoiding action climb instruction from CON 3. The visual sighting however, prompted CON3 to reassess the situation and exhort the GR4 crew to stop the climb and maintain their level. Whilst potentially there might have been room for confusion with a climb instruction countermanded by a descent, the Board agreed that in the circumstances that pertained here CON 3's decision to rely on the crew's visual sighting for collision avoidance was sound and facilitated safe resolution of the conflict at these close quarters as quickly as possible. But this also had an affect on the TCAS solution generated in the other cockpit, where the B757 crew had been alerted to the presence of the crossing GR4 by the TCAS TA followed by an RA. This preventative RA of "MONITOR VERTICAL SPEED" quickly changed to a corrective RA of "CLIMB", it was reported, but the radar recording actually illustrated a momentary descent from 1116:55 when the B757 was only 100ft below the descending GR4 and following it down at the same rate for two sweeps before the climb RA took effect and the B757 began to outstrip the GR4 in the vertical plane. However, when the CPA occurred the GR4 had already crossed through the airliner's 12 o'clock some 1·5nm distant: thus the jet was rapidly drawing away to the left and the latter's crew had sighted the GR4. This resulted in the B757 not climbing through the GR4's level until it had passed clear astern. It was evident that NE RADAR's avoiding action turn onto 270°, although promptly transmitted when he quickly realised what was happening, had

little actual effect on the resultant separation here. Weighing all these factors carefully, the Board agreed that no risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

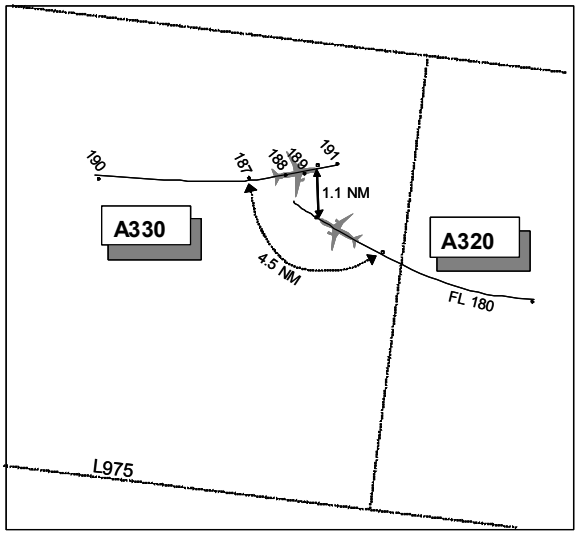
a. The B757 crew responded to the climb instruction addressed to another ac and climbed into conflict with the Tornado GR4.

b. The MACC NE RADAR controller was alerted to a wrong ac taking the instruction but did not establish which ac.

Degree of Risk: C.

AIRPROX REPORT NO 054/05

Date/Time:	14 Apr 0836	
Position:	5328N 00355W (7 nm NNW Llandudno)	
Airspace:	Airway L975	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	A320	A330-200
Operator:	CAT	CAT
Alt/FL:	FL180	FL190
Weather	VMC CLAC	VMC CLBL
Visibility:	>10km	10km
Reported Separation:		
	600ft V/2·5nm H	600ft V
Recorded Separation:		
	700ft/2·5nm or 1100ft/1·1nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports heading 275° at 380kt, maintaining FL180. The RT frequency was busy at the time. He first sighted the A330 between 10-5nms on TCAS and then visually acquired it. The other ac was turning away and a TA annunciated on TCAS: he did not get an RA. He was uncertain why he was instructed by Manchester to turn right onto hdg 300°, towards the other ac and which he heard being instructed to turn onto 060° and to maintain FL190. They saw it pass 2·5nm away and 600ft above, recognising its airline colours. He considered the risk of collision was moderate.

THE A330 PILOT reports heading about 045° at 330kt. PF was the ac captain operating from the RHS. Initial descent clearance was given to FL150. TCAS showed a potential confliction on their descent path and below their level. ATC gave a revised clearance to level at FL190 and turn left heading 045°; this occurred as his ac passed FL190 and a short TCAS 'TA' was followed immediately by a TCAS 'RA' 'Reduce Vertical Speed'. Because the revised clearance was given as he passed FL190, the ac descended about a further 300ft (to FL187) before he

THE MANCHESTER ACC WEST/IOM RADAR CONTROLLER reports that she had just taken over the position. The traffic situation was busy and complex and she requested another controller to stay as a support controller which he did. She had two ac (one of which was the A330) from the west descending on headings on L975 to get under traffic in level flight on a SE heading on L10. She had the A320 on a heading west bound on L975 in level flight going between the two east bound descenders. The traffic situation was busy and complex and her attention was mainly focused on the TMA with slow traffic climbing out of Hawarden to go to the NE against outbound traffic off Manchester's RW 06 to the SW and W. She looked back to the A320 and realised she needed to put him on the north side of the buffer zone so gave an instruction to that effect. As she realised the implication of her action (the turn would take the ac across the front of the A330) she could not get in on the frequency immediately to cancel the instruction due to other ac calling. When she did get onto the frequency she gave the instruction to the A330 to stop descent at FL190. When she gave the instruction the ac had not passed FL190 on Mode C. The A330 acknowledged the descent instruction and informed her he had the ac on TCAS, then informed her that he had an RA. The A320 pilot reported a separation of 2·5nm and 600ft and (she thought) informed her that he too had had a TCAS RA.

She was informed that the sector although flowed at 39/hr actually had correct target flow of 35 in the hour in the sector. Further analysis showed 32 in the half hour 0830 to 0900 although one ac in the system as a joiner ended up working Liverpool after being told to stand by for some considerable time.

ATSI reports that at the time of the Airprox, both the workload and traffic loading were described as 'high'. The West and IOM sectors at Manchester ACC were being operated in a bandboxed mode - this aspect is discussed

later. The relevant ATC equipment was all reported to have been serviceable and no other factors which may have adversely affected the controller's performance were identified during the course of the investigation.

The controller arrived at the sector to find it busy. In position at the time was a trainee undergoing a 180-hour check together with an Assessor. The mentor was nearby and monitoring the situation. The Assessor unplugged from the position and the handover commenced between the trainee and the subject controller. The handover only took a few minutes and then the subject controller was in position. Due to the complexity of the situation, as well as the traffic loading, the controller requested that the Assessor remain at the sector and plug in to act as a Support controller, to which he agreed. The unit's MATS Part 2, GEN 1.8, para 1.8.5 (Use of a Support Controller) states: '*Such use should be considered exceptional and should only be used when other methods of meeting demand such as splitting the sector and/or appropriate flow measures have been taken. It may also be required to assist with an emergency*'.

The A320 established communications with the trainee controller at 0827:30, and reported level FL180 routeing direct to Wallasey, which was acknowledged. The ac was, at that time, 22nm south east of Wallasey. By 0829:50, the controller had taken over the position and it is clear from the RT recording that the sectors were busy. The controller reported that a TB20 from Hawarden was reluctant to accept radar vectors due to the presence of weather in the area. This resulted in the ac being taken on a non standard routeing which potentially conflicted with traffic inbound to Manchester as RW 06 was in use. This situation required close monitoring.

At 0831:00, the A330 established contact with the controller, reporting at FL240, heading 095º and maintaining 300kt. This ac was 61nm W of the A320 which was just about to turn overhead Wallasey on track for Liffy, a reciprocal track to that of the A330. The controller instructed the A330 to continue on its heading and, at 0832:00, to descend to FL170. At that time, the A320 was in the 12 o'clock position of the A330 at a range of 41nm, maintaining FL180 and had turned left, under its own navigation, routeing from Wallasey to Liffy. This situation continued and at 0834:00, the controller cleared the A330 to descend to FL150. The controller, mindful of the fact that traffic inbound to Dublin must be positioned on the north side of airway L975, instructed the A320 to turn right heading 300º. When the instruction was passed, the A320 was in the 1 o'clock position of the A330 at a range of 11nm as the latter was descending through FL198 for FL150.

The controller issued a heading change to another ac, which was acknowledged, and it was at this time that the confliction between the A330 and the A320 was recognised. Unfortunately, another ac reported on the frequency which delayed any corrective action by the controller. The first instruction issued was for the A330 to stop descent at FL190 and turn left heading 060º which the crew acknowledged and reported the traffic on TCAS. When these instructions were given the A320 was in the 1 o'clock position of the A330 at a range of 7·8nm as the latter was passing FL193. As both ac were now turning, separation reduced to a minimum of 2·5nm and 700 ft, as the A330 stopped its descent at FL187. The A320 then passed down the right hand side of the A330 at a range of 1·2nm; however by then the latter was maintaining FL190.

The Assessor, who had been plugged in as a Support controller at the time of the Airprox, explained that the sector is rarely split but flow control is applied. The subject controller reported that she could only recall the sector split about 5 times during the past 12 months. A discussion with the Watch Manager confirmed that the normal system was to apply flow restrictions for the sector: however, the sectors can be split if necessary although this might create staffing problems. The subject controller, when asked whether she had requested a sector split, replied that she had not and was not practised in doing so. She added that the mentor, on being relieved from the position, went to the supervisor's desk and requested that the sectors be split but there were, allegedly, insufficient staff available to do this. With regard to traffic levels, the Target Sector Flow is 35 ac per hour (35/60). However, during the period that the Airprox occurred the flow rate had been set at 39/60. Later analysis showed that at 0830 there were 8 ac in the sector and between 0830 and 0900 a further 19 ac arrived. A total of 45 ac passed through the sector between 0800 and 0900, but of these, 2 ac left the sector at 0800 and 2 entered at 0859.

The subject controller reported that on approaching the sector she could see that it was busy. The handover was completed promptly; although she could not recall whether the A320 was specifically pointed out, she was aware of its existence. Her normal practice was either to place such flights on a heading or instruct them to leave Wallasey heading 295º - thus positioning towards the northern part of the airway - before handing them over to Dublin. She firmly believed that the A320 was on a heading although later examination of the flight progress strips showed neither an 'H' nor a specific heading. The Support controller also believed the ac was on a heading but advised that he had unplugged from the position whilst the subject controller took over. In all likelihood, it was

during that time that the ac came on frequency and so he would have missed hearing the instruction or lack thereof.

It was reported that the Coordinator was busy with his own duties and so not able to assist or monitor what the subject controller was doing. The controller said that she was relying on the Support controller as a 'safety blanket' to monitor her actions. When the A330 was instructed to descend to FL170, the controller frankly admitted that this had been 'black holing' and not a combination of reference to strips and the radar. Similarly, when further descent to FL150 was issued, again this was carried out without reference to the strips and the looming confliction with the A320 was not identified. The controller instructed the crew of the A320 to turn right heading 300º, not to avoid the A330 but to be correctly positioned before transfer to Dublin. It was not until after this instruction had been given that the Support controller drew the subject controller's attention to the conflict. Although on the radar replay (as shown to the subject controller by the unit) STCA activated at about the same time as the right turn instruction was issued, the controller was certain that this had not been the situation on the day. She reported that she was experienced in passing avoiding action, having had a military background, and so decided that the quickest way to resolve the problem was to instruct the A330 to stop its descent at FL190. The words "avoiding action" were not used as she believed that speed was of the essence.

With regard to the workload at the time, the subject controller reported that she was operating at maximum capacity and at times beyond it. It had reached the point where she was reacting to ac calls and not checking as well as planning ahead. She felt that the flow restrictions in place were not effective.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that the heading given by the Manchester W / IOM SC to the A320 was part of the cause of the Airprox but observed that the earlier descent given to the A330, to FL170 and subsequently to FL150, would at least have resulted in a loss of standard separation. It was unfortunate that the SC might have been expecting the Assessor/Support Controller to have picked up any workload-induced aberrations but the latter appeared to have been unplugged when the descent instruction was issued. The Board concluded that the cause of the Airprox was that the SC vectored the A320 and A330 into confliction, in what was clearly a very high workload situation. Although it was suggested that the very high flow in the hour may have peaked after the event, Members considered it remiss that the situation had not been reported as an overload and investigated as such.

The fact that the sector had not been split, the question of whether the Mentor had asked for a split, and whether there were enough staff present to effect such a split were subject to conflicting information presented to the Board at the meeting which prevented Members from drawing any conclusions on these aspects. However, the Board was advised that there were sufficient personnel available to have split the sector. Members therefore considered that with a Watch Manager, Deputy Watch Manager and a Tactical Traffic Manager present, the situation could and should have been averted by splitting the sector in anticipation of the high flow arriving, and that the management of the sector was a contributory factor. Members were pleased to hear that since the Airprox the W / IOM sectors are now split on a routine basis.

Because both pilots were aware of the other ac from TCAS and had plenty of time to resolve the situation, the Board concluded that there had not been a risk of the ac actually colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

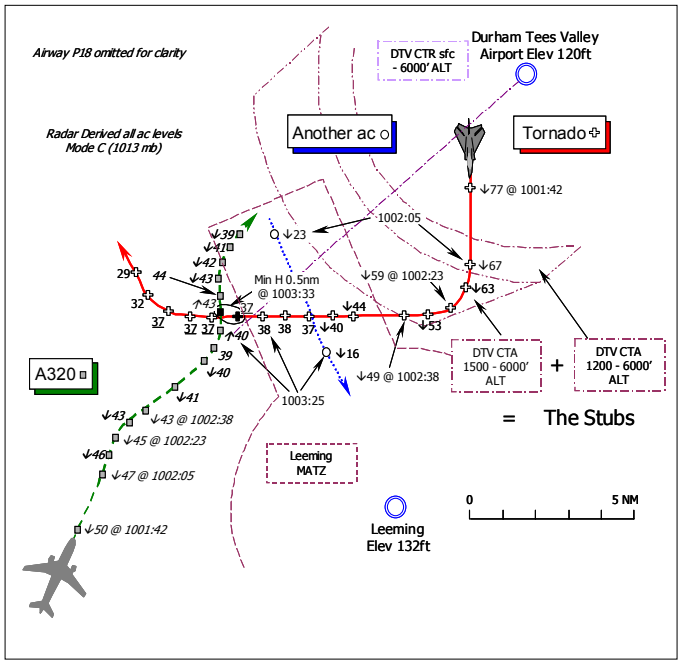
Cause: The Manchester ACC West/IOM Radar Controller vectored the A330 and the A320 into conflict in a very high workload situation.

Degree of Risk: C.

Contributory Factors: The management of the Sector immediately prior to the Airprox.

AIRPROX REPORT NO 055/05

Date/Time:	26 Apr 1003	
Position:	5423N 00141W (7½nm NW Leeming aerodrome - elev 132ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	A320	Tornado
Operator:	CAT	HQ STC
Alt/FL:	3800ft	3500ft
	QNH (1009mb)	QFE (1005mb)
Weather	IMC	IMC Between layers
Visibility:	0km	0·5nm
Reported Separation:		
	>200ft V/nil H	200ft V/0·5nm H
Recorded Separation:		
	100ft minV @ 2·3nm	
	600ft V @ 0·5nm minH	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports that he was inbound from London (Heathrow) to Durham Tees Valley (DTV) under IFR in IMC and in communication with TEESSIDE RADAR, squawking the assigned code of A5067 with Mode C.

Approaching a position about 12nm SW of DTV, flying a radar heading of 040° and cleared by TEESSIDE RADAR to descend to 3500ft DTV QNH with the speed at 230kt reducing to 220kt, ATC issued an immediate avoiding action L turn onto a heading of 320°. This was followed 2sec later by a TCAS RA CLIMB which was complied with in accordance with SOPs. At 3800ft QNH, TCAS enunciated "clear of conflict" whereupon ATC instructed them to head 270° before being vectored back towards the LLZ for a short approach for RW05.

THE TORNADO F3 PILOT reports that he was inbound to Leeming for an individual recovery and the HISLs were on, flying in IMC some 200ft below cloud with a flight visibility of ½nm in haze between cloud layers. They were under a RAS from Leeming APPROACH (APP) on 358·65MHz and squawking the assigned code of A0415 with Mode C: neither TCAS nor any other form of CWS is fitted.

Flying straight and level at 3500ft Leeming QFE (1005mb) on a course of 270° at 300kt, traffic was called by APP as a "Teesside inbound" immediately before visual contact was made with the A320 at a range of ½nm. No avoiding action was required as the A320 crossed ahead from L – R about ½nm away and 200ft above his jet at the closest point. He opined that it was a "late visual pick-up due to the flight conditions" but the vector was taking his ac clear astern of the A320 and the risk was assessed as *"low"*.

THE DURHAM TEES VALLEY APPROACH RADAR CONTROLLER (DTV APR) reports that the A320 was inbound under IFR in receipt of a RAS in Class G airspace at 3500ft QNH (1010mb). In accordance with the LoA between the two ATSUs he identified the A320 to Leeming ATC some 35nm SW of DTV when the crew called after being released by MACC. When the A320 was approaching a position 20nm SW of the airport, he recalled Leeming to decide a course of action as they had ac on recovery to their RW16. As the A320 established on the ILS to RW05 at approximately 12nm, he saw an A0415 squawk - the Tornado - descending S of DTV and turning onto a westerly track. He immediately called Leeming DIRECTOR to ascertain their intentions, but the Tornado tracked towards the A320 and continued to descend towards the same level as his traffic. Avoiding action and traffic information was passed to the A320 crew but the Tornado continued toward him. Despite the avoiding action given, both acs' radar returns merged with an indicated Mode C separation of 200ft; the A320 crew reported that TCAS had enunciated an RA.

AIRPROX REPORT No 055/05

The 0950UTC DTV weather was: Sfc wind: 240°/1kt; Vis: 2800m in Haze; Cloud: SCT800ft, BKN1600ft; QNH: 1010mb.

THE COMBINED LEEMING APPROACH CONTROLLER/DIRECTOR (APP), who was actually the rostered SUPERVISOR, reports that Leeming were on RW16 Weather State Colour Code (CC) YL02 with broken cloud at 300ft, overcast at 700ft and visibility down to 3800m in mist. The controller rostered for DIRECTOR had been unavoidably delayed which meant that the position would be band-boxed into Approach. At 0950, the flying programme was assessed and there where no ac due to recover. Therefore, the APPROACH Controller was sent for a break as he had been on console for just over 3 hours. Almost immediately a handover was received on a single jet for recovery. Immediately after this, other ac came on frequency and multiple landlines rang with agencies requesting handovers or co-ordination. Traffic was co-ordinated with Newcastle ATC, who also tried to co-ordinate traffic that Newcastle thought might be working Leeming shortly: despite lengthy conversations she was unable to provide the required co-ordination. From one ac on frequency at 0950, she soon had six speaking units under control, close to the adjacent airway of P18 with ac inbound to Newcastle in very poor weather conditions. At one point she was unable to take a handover from Boulmer and informed them that she would call them back. However, Boulmer free-called the ac across, which increased her workload dramatically.

The subject Tornado was handed over from ScATCC (Mil) above the DTV CTR at FL130 under a RIS. On contact the pilot requested a RAS. As she was very busy at the time she did not check that the service requested matched that indicated and so did not change the FPS annotation from RIS to RAS. Presuming incorrectly that the ac was on the ATS indicated on the FPS – RIS - as passed during the hand over, she had no reason to refer to this until later. Whilst initially number 5 in the pattern, the subject Tornado crew subsequently declared 'fuel priority' and became the immediate priority for recovery. Her scan was divided between 6 ac and was therefore "reduced". As soon as the Tornado was clear of the DTV CTR she descended the ac to 3500ft Leeming QFE (1005mb), to enable a feed in from the W of Leeming for an expeditious recovery. At no point was she able to liaise with DTV regarding the fuel priority situation.

Two other flights on recovery reported icing, which exacerbated her division of attention as she had not heard the initial icing report whilst the APP/DIR plugged in and was attempting to reduce her workload by taking some of the tracks. Two other flights reported ready for descent so she descended them from FL100 to FL60, conscious of their proximity to P18 (FL60 is below the base level of P18 and affords more room to manoeuvre). As she continued to scan, it was at this point that she noticed the DTV inbound – the A320 - and called it immediately to the Tornado pilot at 12 o'clock – 2nm; the pilot reported visual and flew behind the A320 ac. Avoiding action was not offered as the FPS was annotated RIS. The DTV inbound then continued inbound for RW05 at DTV and flew between the two ac on TALKDOWN at 4 and 8 miles from touchdown.

ATSI reports that at the time of the Airprox, the A320 crew was in communication with the DTV APR who described both his workload and traffic loading as *"quiet"*.

DTV is located to the E of airway P18 that is aligned between POLE HILL and Newcastle Airport. The base of the airway from 21nm NE of POLE HILL to W abeam DTV Airport is FL125. This means that traffic following the airways system will have to transit Class G airspace when routeing between P18 and the DTV CTA/CTR.

The A320 crew established communications with the DTV at 0956:00 and reported levelling at FL140 tracking towards GASKO. Very shortly after this, the subject APR took over the control position and, at 0956:40, he instructed the A320 crew to descend to FL90 which was acknowledged. The Approach ATSA then telephoned Leeming, in accordance with the LoA, to inform them of the position, squawk and intentions of the flight. Leeming replied: "*…I'll get DIRECTOR to call you – got multiple inbounds*". The APR reported that he could see at least 3 ac to the NE of DTV displaying Leeming squawks that were being vectored for RW16 at Leeming. At 0958:10, when the A320 was passing FL100 for FL90 31nm SSW of DTV, the APR instructed the A320 crew to descend to 4500ft. Shortly afterwards the crew were instructed to turn R onto 355º and then onto 030º as they tracked towards the LLZ for RW05 at DTV. At this stage, the A320 was passing FL70 and entering the area where the base of CAS changes to FL125. The APR neither changed the ATS nor did he inform the crew that they were outside CAS. He telephoned Leeming and requested to speak to the DIRECTOR so that he could coordinate the A320 against the Leeming inbounds. The call was answered by the ZONE controller who then asked the DIRECTOR to take the call: however, she did not. It was at this stage that the Tornado could be seen, passing FL170, 7nm NNE of DTV tracking S. Some 40sec after the APR had initiated the call to Leeming, the DIRECTOR had still not answered the call and so the APR requested to speak to the SUPERVISOR. Further requests for the DIRECTOR to take

the call went unheeded and, by this time, the Tornado was passing almost overhead DTV airport passing FL130 and tracking approximately 200º. The A320 was now 20nm SW of DTV passing FL58 for 4500ft. At 1001:05, the APR instructed the A320 crew to descend to 3500ft. Almost immediately after this transmission, the Leeming SUPERVISOR came on the line. The APR attempted to coordinate the A320 in respect of the Leeming inbound sequence. He advised that he would route behind traffic he could see on a 10nm final for RW16 at Leeming and in front of another inbound which was some 20nm to the NW of Leeming. There was no distinct response to this request and, after the APR said "*Hello*" a couple of times without obtaining a response, he disconnected the call. By now, the Tornado was in the A320's 1 o'clock - 19nm, with the latter passing FL53 and the Tornado indicating FL94. The APR then passed traffic information to the A320 crew on the first Leeming inbound which was on final approach to Leeming at a range of 8½nm indicating FL23 - approximately 2200ft QNH. The Tornado had now made a slight L turn and at 1001:42, was passing FL77, 3nm S of DTV airport tracking S. The APR explained that he was still confident that his plan would work: the first Leeming inbound would pass well ahead of the A320 and he would cross ahead of the second inbound which was some 13nm behind the first. The subject Tornado was not seen as a problem as it was heading S, clear of the A320 and he expected it to be vectored around into the traffic pattern at Leeming remaining clear of his inbound A320. At 1002:00, the A320 crew reported established on the LLZ, passing FL49, and the APR instructed the crew to maintain 3000ft. At 1002:23, the return from the Tornado is seen to turn R from S towards a westerly track and the Mode C indicates that it had entered the DTV CTA on passing 6000ft without a clearance from the APR. This turn placed the Tornado (indicating FL59 Mode C [5810ft DTV QNH (1010mb)]) in the 2 o'clock of the A320 at 10·8nm, the latter passing FL45. The APR immediately telephoned Leeming and the call was answered by the DIRECTOR. The APR asked "*Zero Four One Five* [the Tornado's squawk] *what's he doing please*", to which the reply was "*Zero One Five is a fuel priority*". The APR responded "*Can you get him out of the way of my Five Zero Six Seven* [the A320's squawk] *please*", to which the reply was "*Roger standby*". An exchange between the Leeming controllers then took place, all spoken off the telephone but picked up on the landline recording. Realising that co-ordination was not forthcoming, and the two subject ac were still converging, after 1002:30, the APR transmitted "[A320 C/S] *avoiding action turn left heading 320 traffic 12 o'clock 5 miles working Leeming descending through your level*" which was acknowledged by the crew. At that time, the Tornado was actually in the 12 o'clock position at a range of 7nm and 600ft above the A320. The APR then said to Leeming "*I'm going left onto 320 now to get out of your way what are you doing please*" to which the reply was "*Sorry Teesside*". The two ac continued to close and the APR updated the traffic information and passed a further avoiding action turn to the A320 after 1003:00, *"and that further traffics in your in your 12 o'clock range of 3 miles still tracking towards continue the turn now please heading 270°"*. The crew then replied that they had received a TCAS RA. At that time, the Tornado was in the 1 o'clock position of the A320, 100ft below and at a range of 2·3nm. The effect of the turn started to take effect as the Tornado closed to 1·3nm and 200ft below the A320 at 1003:25. Minimum horizontal separation of 0·5nm occurred on the next sweep at 1003:33, as the A320 climbed through FL43 some 600ft above the Tornado. Shortly thereafter, the effect of the TCAS RA resulted in the Tornado passing 0·7nm behind the A320 crew and 700ft below.

The DTV MATS Part 2 contains the LoA between Leeming and DTV ATC. The basic procedures, relevant to this Airprox, are that inbounds from Pole Hill will be notified by DTV to Leeming, which was complied with. The two southwesterly CTA segments, herein referred to as 'The Stub', has the following caveat: '*DTVA will always retain administrative control of the DTVA CTA/CTR; Leeming will have operational access to..*'The Stub'. *Unless notified by DTVA of a conflicting public air transport movement, Leeming will assume free access to..*'The Stub'. *However, upon notification to Leeming of a public air transport movement inbound to land on runway 05, or a similar aircraft departing runway 23 to the southwest, operational control within..*'The Stub' *will revert to DTVA*'. As traffic had been correctly notified to Leeming then operational control of 'The Stub' was with DTV at the time of the Airprox.

The APR reported that he was watching the inbound traffic to Leeming and this distracted him from advising the crew of the A320 that they had left CAS. The Tornado was not considered a problem until very late on in the sequence of events. He advised that it was normal practice for Leeming traffic to be vectored on a southerly track and, when approaching the Leeming overhead, turned R before being vectored for a right hand circuit onto final approach for RW16. Normally, such traffic was above DTV's CTA/CTR: provided the APR descended his inbound traffic there was not a problem. However, on this occasion, the Tornado was descended into the CTA/CTR without a clearance and turned directly towards the DTV inbound. The APR's plan to coordinate the A320 through the Leeming sequence was thwarted by the APR's inability to speak directly to the Leeming DIRECTOR and co-ordinate the A320, which resulted in an avoiding action turn being passed to the crew. The APR elected to turn the A320 L as this would take it away from the Leeming overhead, which was the direction he still believed the Tornado would be turned. However, the Tornado did not turn but descended through the level of the A320 as it closed on the ac and passed behind.

Although the APR did not inform the crew of the A320 that they had left CAS and were, effectively, being provided with a RAS, this did not materially affect the outcome. The APR, on realising that the Tornado had turned into conflict with the A320, passed both traffic information and avoiding action, in accordance with MATS Part 1.

MIL ATC OPS reports that due to technical difficulties, the recorded landline conversations only contained the home base's liaison and the outside agencies speech had not been recorded; this fault is being investigated.

The Tornado F3 ac was returning to base in marginal weather conditions under the control of Leeming APPROACH (APP). Topcliffe DIRECTOR - which is based at Leeming - had taken traffic information from DTV at 0958:02, [from the DTV TT] *"..inbound ILS runway 05…Airbus…going onto* [switching SSR code to] 7060", which was acknowledged by Topcliffe DIRECTOR as "*5067 inbound 05 changing to 7060. I'll get* [Leeming] *Director to call you back".* A background conversation is recorded with APP acknowledging "*inbound 05 changing to 7060*". [UKAB Note (1): However, the SSR code was never changed during the approach]. APP identified the Tornado at 1000:04, and said "[C/S] *identified FL130 radar advisory you are number 5 in the pattern*" which was acknowledged by the Tornado crew. At 1000:12, the Tornado crew declared "*fuel priority*": APP acknowledged the fuel priority call and instructed the Tornado crew to turn L heading 230º and descend to FL50. The L turn was queried by the Tornado crew and APP instructed the Tornado crew to "*descend report level 6000ft. Maintain your current heading. I'll feed you in as soon as I can"*. The Tornado crew requested the QFE (1005mb) and, at 1002:03, APP instructed the Tornado crew to "*…turn right heading 270º descend report level 3500 feet*". The Tornado crew reported level at 1003:13. At 1003:20 APP passed traffic information to the Tornado crew, "[C/S] *traffic 12 o'clock, 2 miles, crossing left - right similar level descending inbound Teesside".* The Tornado crew immediately reported visual after which a series of heading and height instructions were passed. No further reference was made to the conflicting A320.

Analysis of the Great Dun Fell Radar recording shows the Tornado at 1001:12, 1nm W of DTV tracking 200º squawking A0415 descending through FL116 Mode C; the conflicting A320 is 21nm SW of the Tornado tracking 030º squawking A5067 and indicating FL55 descending. The Tornado is seen to initiate a L turn onto a southbound track at 1001:26, whilst descending through FL87, with the A320 in the Tornado's R 2 o'clock 17·5nm and indicating FL52 descending. The Tornado turned R and steadied onto a westerly heading at 1002:38, whilst indicating FL49. The A320 is in the Tornado's left 10 o'clock - 9nm indicating FL43. Horizontal separation reduces to 4·6nm at 1003:01 with the A320 indicating 100ft above the Tornado. The A320 commences a L turn at 1003:25 with 1·3nm horizontal and 200ft vertical separation evident with the A320 indicating FL40 in a climb and the Tornado indicating FL38. The A320 continues to climb and steadies onto a northerly track whilst indicating FL43 at 1003:33, with the Tornado passing astern of the A320 by 0·5nm and indicating FL37. After this point the separation increases.

At the time of the Airprox, the workload on the APP controller was extremely high with no opportunity to off load traffic immediately available. The flying programme had been assessed and there were no expected movements in the near future and so the rostered APPROACH controller had been relieved, by the rostered SUPERVISOR, for his first break of the day after the controller had been some 3hr on console. However, the traffic situation and associated workload changed dramatically in a very short period and resulted in 5 ac being vectored for recovery simultaneously. In addition, a report of "icing" was received and a further request for a fuel priority recovery made by the subject Tornado. A sixth ac requested recovery but was sent to a different controller who had been recalled to assist.

The Tornado had been number 5 in the radar pattern for recovery. APP had routed the Tornado over the top of the DTV CTA and then descended it to 3500ft QFE (1005mb), a descent that would take the ac momentarily inside the CTA. The crew declared "fuel priority" and the controller attempted to hasten the Tornado's recovery by turning the ac onto a westerly heading to sequence it 3nm N and then to the W of Leeming. It was this turn which placed the Tornado and the A320 in direct confliction but the controller reports she was not expecting to find an airliner so close to Leeming and was focusing on separating and sequencing her own traffic. The traffic information which was passed to the Tornado crew was late and no avoiding action was proffered due to APP being confused as to which type of ATS the Tornado was under, and applying a RIS instead of a RAS because of her incorrect logging on the fps. However, after passing traffic information, the Tornado crew did report visual with the A320.

Leeming was operating on RW16 and DTV on RW05. In this configuration, all ac recovering to Leeming or DTV are required to route through a point approximately 8nm N of Leeming and there is, consequently, a known and significant choke point, as both recovery routes require ac to be at a similar height. The LoA between the 2 ATSUs

makes no specific ruling concerning operations in this configuration but does require Leeming radar training circuits to be right hand on RW16 and states that Leeming are not to route E of the extended centreline. Furthermore, the LoA states that DTV ac are required to route POL-GASKO or TILNI or POL direct DTV, but only if the traffic situation permits. However, when routeing via GASKO, co-ordination is to be clearly effected before the traffic leaves CAS. Although DTV had offered 'traffic information' on the A320 inbound at no stage was co-ordination agreed against the Tornado. The DTV APR was under the impression that such an act had been negotiated and that APP would avoid their inbound A320. However, this was not the case and this appears to have been a major factor as to why DTV did not take avoiding action against the Tornado sooner. The DTV controller had been attempting to contact APP for 2min 19sec to co-ordinate against 2 other ac inbound to Leeming. After answering the landline, APP's workload was so high that no co-ordination was achieved.

This Airprox has resulted from a succession of unfortunate circumstances. APP was operating under an excessive workload in marginal weather conditions with no immediate scope to off load traffic to another controller. The Tornado had requested RAS for recovery but RIS had been erroneously applied by APP due to a logging error. Traffic information was passed to the Tornado crew when they were 2nm away from the A320 which allowed little opportunity for the crew to avoid the A320 by a greater margin. DTV had passed traffic information to Leeming which had been taken by DTV erroneously as co-ordination and this resulted in DTV delaying their avoiding action.

HQ STC comments that there is little to add following the comprehensive investigation by the ATC agencies. Poor weather, a confusion about the service being offered/received, and a high workload combined to bring the 2 ac into confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was explained that the Leeming APP controller - herself also the SUPERVISOR of the Leeming ATC watch - was operating under a severe manning shortfall with two controllers unavoidably absent from the watch at very short notice, a situation which was just barely workable before the scenario related here unfolded and the Airprox occurred. The Mil ATC Ops Advisor explained that the sequence of events, whilst operating with an intensive workload at the time of the Airprox, was a salutary lesson in team/crew resource management and the circumstances surrounding this encounter would be used as a training example for future ATC Supervisors' courses.

It seemed to the Board that this Airprox stemmed from various errors or misunderstandings on the part of the two controllers involved and that the pilots of both ac had not contributed significantly to the fundamental cause. Whilst ATSI had correctly reported that the Tornado had descended into the DTV CTA, the Airprox occurred in Class G airspace and the Board agreed that the brief incursion into Class D CAS, whilst inopportune, had little relevance to the intrinsic cause or risk of this encounter.

It was explained that the Leeming Supervisor had allowed a controller a break from the APPROACH position when the traffic was predicted to be relatively light, well before the onset of an anticipated busy period. The Supervisor had herself elected to take over the combined APPROACH/DIRECTOR position, this being a calculated decision based on the information to hand at the time which suggested that little traffic would be encountered during the short period that she expected to be 'on console'. Here the controller broke a 'golden rule', which some might consider most unwise, but the Board was briefed that in the extremely tight manning situation that pertained she had acted with the best of intentions. However, events took a different turn and unfortunately she quickly found herself in a very difficult situation under an extremely high workload in marginal weather with no opportunity to immediately off-load traffic.

The Board was briefed that it was against this background that a singular omission was made by Leeming APP: when the Tornado crew requested that the ATS be upgraded from a RIS - the radar service specified during the handover from ScATCC (Mil) – to a RAS, APP did not note this down on the Tornado's FPS which she subsequently overlooked. In effect, the Tornado crew's ATS was never changed and to all intents and purposes APP continued to provide a RIS whilst the crew was flying in IMC. Moving on, civilian controller Members questioned the implications for ATC of the 'fuel priority' status declared by the Tornado crew. The Mil ATC Ops

Advisor explained that notification of a 'fuel priority' did not accord any higher priority to the flight in the recovery sequence. But whilst under no remit to do so, APP had nevertheless elected to afford the flight priority and was attempting to feed the F3 in more tightly within the established pattern, thereby artificially increasing the complexity of the situation. Crews should be in no doubt that unless an emergency message is declared and acknowledged by ATC, controllers will not normally afford any priority status to such a call unless specified in the local Flying Order Book/ATC orders. The lesson here is if you are running short of fuel make your situation plain by declaring an emergency from the outset. These factors, plus the added complication of icing reports, all combined and built up into a very complex and exceptionally busy traffic situation for Leeming APP.

The discussion turned to the issue of the notification to Leeming ATC of the inbound A320. The ATSI report had quoted from the LoA which specified "…***notification*** [UKAB emphasis] *to Leeming of a public air transport movement inbound to land on runway 05…" w*hereas the Mil ATC report had specified that when routeing via GASKO, ***co-ordination*** is to be clearly effected before the traffic leaves CAS. It was evident that several attempts had been made by both the DTV ATSA and the DTV APR to communicate with Leeming APP about the inbound A320. Although DTV had offered 'traffic information' on the A320, in the Mil ATC Ops Advisor's opinion, co-ordination was never agreed against APP's recovering traffic. Controller Members were concerned that the APR should allow the A320 to run in toward the LLZ and the Leeming recovery pattern without appropriate co-ordination against ac on FINALS beforehand. The DTV APR might have been under the impression that the act of *notification* had afforded priority to the inbound A320 and that Leeming APP would avoid it. However, this was not the case and there had been no meaningful communication with the overloaded APP controller beforehand. The Board concluded that no co-ordination 'agreement' had evidently been struck between the two controllers concerned over the A320's approach to RW05 at DTV nor through the Leeming recovery pattern. One controller Member asked whether given the difficulties revealed here a preferential runway selection scheme would be advantageous and go some way to unlocking the 'puzzle' of intersecting approach paths for the two closely located aerodromes. The Board was briefed that issues of co-ordination under the LoA between the two ATSUs was already under review by HQ 3 Gp and ATSD and a combined safety audit of the Units had been conducted by the two authorities. Consequently, the Board elected not to make any Safety Recommendation on that topic at this stage.

The DTV APR had evidently detected the presence of the Tornado as it cleared S of DTV Airport and it was clear from the ATSI report that the controller did not believe that the subject Tornado was a confliction with his A320 until the military jet was turned westbound towards it. He was possibly also under the erroneous impression that the Leeming controller was fully aware of the airliner. The APR's plan to co-ordinate the A320 through the Leeming pattern was thwarted by the APR's inability to speak directly to the hard-pressed Leeming controller. Whilst the APR was evidently trying to establish co-ordination with Leeming about the A320, it had been shown that this was not forthcoming. Prudence might have dictated a change of plan was necessary earlier and there was apparently a misunderstanding by the DTV APR over what he thought the Leeming APP controller might be doing. Frustrated in his attempts to initiate a meaningful dialogue with the Leeming controller, the ATSI report had showed that when the APR issued the avoiding action L turn to the A320 crew the Tornado was about 7nm away, which some might say was leaving it a little too late in the low workload situation that pertained for him. Disturbingly, the Mil ATC Ops report had made it plain that Leeming APP was not aware of the A320 and had not seen it until it was a mere 2nm away – undoubtedly a very late spot by APP and because of the logging error regarding the type of service being provided the controller did not immediately proffer avoiding action to the Tornado crew. When traffic information was given at 1003:20, the Tornado was 2nm away from the A320, which allowed little opportunity for the crew to avoid the A320 by a greater margin if need be. The Board noted that APP should have been applying a RAS, affording horizontal separation of 5nm against unco-ordinated traffic. However, a military controller Member suggested that was not her mindset at the time and evidently she made no attempt to do so in the close quarters situation that now obtained. It was evident to the Members that neither controller had managed to achieve the requisite separation under the RAS that the respective crews had either specifically requested or could reasonably have expected to be afforded. After weighing all the differing facets of this very complex encounter for relevance, the Board concluded that this Airprox had resulted because in a high workload situation for Leeming APP and following a misunderstanding by the DTV APR, neither controller achieved the separation required under a RAS.

Whilst assessing the risk inherent in the encounter, it was indeed fortuitous that the Tornado crew spotted the airliner ½nm away – less than 6 sec flying time at these closing speeds - having reported flying in IMC, in between cloud layers, after APP belatedly issued traffic information to them. However, the fighter pilot recognised instantly that in this situation his ac was heading clear astern of the A320 and he therefore personally assessed the risk as low. CAT pilot Members identified that TCAS had detected the presence of the Tornado and commanded a CLIMB RA when the A320 was in the descent. The A320 pilot had reported this was apparently only moments after the DTV

APR had issued the avoiding action L turn when the Tornado was 7nm away and closing rapidly on the airliner. Because of the 30sec timings on the DTV RT transcript it is difficult to correlate exactly the interval between the avoiding action being transmitted by the APR and the crew taking up the turn and reacting to the commanded CLIMB RA as displayed on the radar recording. This all occurred with about 600ft of vertical separation as the two ac descended towards each other. The radar recording showed that this descent had been arrested by the A320 crew at FL39, 100ft above the Tornado that had levelled at FL38. However, by 1003:25 the A320 crew was complying with the commanded RA and climbing again through FL40 whilst also turning through N. It was not clear if the A320 crew had steadied their ac northbound in order to achieve the maximum climb performance in response to the RA but this was just 8 sec before the CPA and probably just before the Tornado crew spotted the airliner 200ft above when it was 1·3nm away with horizontal separation still reducing. However at the closest point horizontally of 0·5nm, the A320 had climbed 600ft above the Tornado as it passed through the latter's 12 o'clock and were opening to the N achieving a maximum of 700ft above the fighter, but still in IMC. Fortunately, the A320 crew did not continue the L turn onto 270° as advised by the APR as the Tornado passed 0·7nm astern and opened to the west when the vertical separation then began to decrease again as the A320 descended, probably after TCAS had enunciated that they were 'clear of conflict' and the fighter turned north-westerly. The Board agreed unanimously that compliance with the TCAS RA and the visual sighting in these circumstances had removed any risk of a collision despite the minimum separation that pertained.

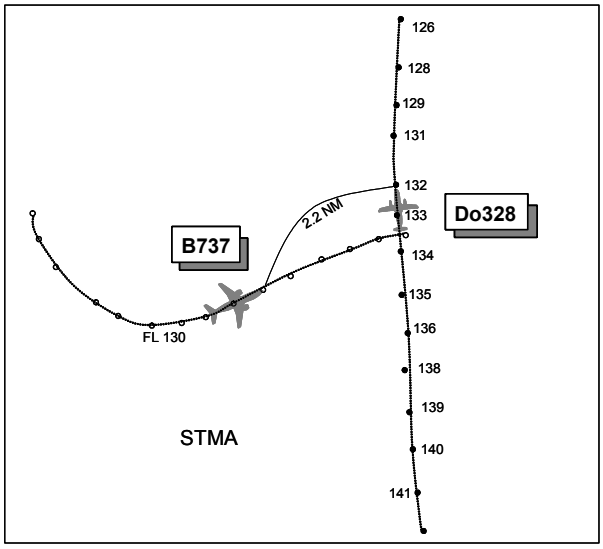
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In a high workload situation for Leeming APP and following a misunderstanding by the DTV APR, neither controller achieved the separation required under a RAS.

Degree of Risk: C.

AIRPROX REPORT NO 056/05

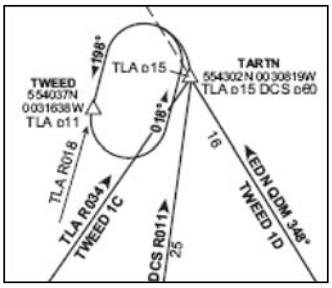
Date/Time:	22 Apr 0735	
Position:	5541N 0316W (Tweed Hold)	
Airspace:	STMA	(Class: D)
Reporter:	ScACC	
	First Ac	*Second Ac*
Type:	B737	Do328
Operator:	CAT	CAT
Alt/FL:	FL130	FL130
Weather	VMC CLOC	VMC CLAC
Visibility:	>20km	>10nm
Reported Separation:		
	0ft V/3nm H	<2nm
Recorded Separation:		
	2·2nm - 200ft	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC TALLA NORTH TACTICAL CONTROLLER reports that he was doing Tactical duties on the new Talla North sector for the first time since his training in 2004; he was slightly tense at the prospect. Edinburgh required larger than normal spacing due to a long-term ILS unserviceability on RW 06 and had changed the runway in use twice. Consequently there had been 4 to 5 ac in the TWEED hold since he had taken the sector over. To start with they had transferred ac at the lower levels of the hold to Edinburgh APC (MSL being FL70) but finding the latter were slow at descending this traffic, he and his Planner decided to retain control of all but the lowest in the stack.

The B737 was in the hold at FL130 and the Do328 was descending towards TARTN from the SE to join the hold at FL140. Just before the Airprox happened the London D and D telephone rang; it was unanswered by anyone else so he answered it to find that it was an enquiry about emergency traffic well outside his sector. While he was handling this call his Planner took a few RT calls and descended one ac in the hold before starting to hand over his position. He (Tactical) then cleared the Do328 to FL120 from FL140 but annotated the FPSs to show that he had cleared the B737 from FL130 to FL120.



He believes he must have seen another ac vacating FL120 before clearing the Do328 to descend and when he returned to monitoring the FPSs he would not have noticed his error. When he observed the Do328 approaching FL130 in close proximity to the B737 and at the same level, he told the B737 to continue his heading as he wanted to stop the ac turning toward the Do328. He told the Do328 to turn right and the pilot replied that they were visual with the B737 and below it. He turned the B737 right to increase separation; the pilot replied that they were visual with the Do328. With the Do328 reporting visual and below, he felt there was no need to use the words '*avoiding action*'.

THE SCACC TALLA NORTH PLANNER (P) CONTROLLER reports that Edinburgh had been holding traffic at TWEED for about 1 hour before the incident. Generally there were 3 or 4 ac in the holding pattern with about 10 min holding time per ac. The hold was operating smoothly with the ac being descended to Min Stack Level. Edinburgh ATC were offered traffic on a tactical basis from FL90 and below. The incident occurred about 3 min after starting to hand over the Planner duties; the Tactical controller was on duty throughout this handover. Immediately before the handover, the Tactical controller was involved in a telephone discussion and several ac called on the frequency. He replied to these calls, acknowledging one ac transferred to the sector and one ac reporting entering the hold. He cleared this ac to descend to FL110 when that level was vacated. These calls

were pointed out to the Tactical controller once he was no longer engaged. Shortly afterwards his relief arrived. He pointed out the operation of the hold and that Edinburgh had control of an ac at FL90 within the pattern, and indicated the traffic in and joining the hold, all vertically separated. When able to, he pointed out vacated levels to the Tactical controller. The last level he remembers him clearing the Do328 to was FL140. He does not recall hearing any ac being cleared to FL120 during the period of the handover. As he was leaving the Sector he heard an exclamation from the Tactical controller and looked to see STCA activating. The oncoming P controller reports that he had just completed the handover from the out going Planner when the incident happened and has nothing further to add.

THE B737 PILOT reports turning left at 205 kt outbound in the TWEED Hold at FL130 when he noticed traffic on his TCAS display change from blue to amber; it was descending through their level on a northerly heading. He assessed the ac would pass in front so he continued to turn and monitored the situation (the RT was quite busy). As expected, about half way through the turn ATC instructed them to 'maintain heading'. He rolled out on an easterly heading. No TCAS RA was received and after vectoring he rejoined the hold. Minimum separation was 3nm at the same level.

THE Do328 PILOT reports heading 330° at 250 kt. Scottish Control had made them aware that Edinburgh Approach was not providing radar cover and that consequently there would be holding at TWEED. They were given progressive descents to FL140 on their own navigation to TARTN to take up the hold at TWEED. They became aware on TCAS of traffic some 12nm ahead to the left of their track and were monitoring its relative position. Visibility was good VMC above cloud. They were then cleared to FL120. When approaching FL130 it became obvious that the other ac was either holding or inbound to TWEED, which they were passing down their left side inbound to TARTN. This was confirmed when the B737 came within his visual range and they immediately increased their descent rate down to FL120 to be below the B737 as he anticipated the B737 would turn at TWEED and come up behind them. At this point Scottish Control cleared both ac to turn 10° right (themselves first) both ac reported 'visual with the traffic' and continued on radar headings. Because they were VMC the risk of collision was slight.

ATSI reports that the Talla N Tactical Controller reported the traffic loading on the sector as moderate but his workload as high at the time of the incident. When he took over the sector, some 35 minutes earlier, there were four to five aircraft holding and this situation continued whilst he was in position. This was the first time he had been on duty on the 'new' TLA N Sector. He had completed his training/familiarisation some three months earlier and reported that he was somewhat 'tense' at the prospect about taking over the sector, especially as it was busy. The revised TLA Sector had been due to become operational earlier in the year but for various reasons, including desk layout and staffing considerations, its implementation had been delayed until April 2005. The new procedures include splitting the Talla sector into TLA S and TLA N between 0700-1000 and 1600-1800 local. Both sectors are manned with a Tactical and a Planning Controller and are provided with a full set of FPS. The sector controllers are not co-located, TLA N operating from the Dean Cross North console. Basically, TLA N is responsible for Scottish TMA airspace within the TLA Sector at FL160 and below and TLA S for all the remaining TLA airspace, excluding the Scottish TMA airspace at FL160 and below.

The B737 contacted the TLA N Sector, on transfer from TLA S, at 0722, reporting descending to FL170 on a radar heading of 335°. The aircraft was given descent to FL160 and FL150 as the levels became vacated and instructed to route direct to TARTN to take up the hold at TWEED. The Do328 made its initial call on the frequency at 0728, reporting descending to FL170, heading 340°. Over the next five minutes both the B737 and the Do328 were given stepped descent clearances to FL130 and FL150 respectively, as the levels became available. The Do328 was also instructed to route to TARTN to take up the hold at TWEED. The Tactical Controller said that, having just taken over the sector, he and the Planner (P) Controller, discussed how they would manage the traffic in the TWEED hold. He commented that, usually, the lowest three aircraft would be transferred to Edinburgh Approach. However, it was decided, because it appeared that Approach were, previously, being slow in descending the traffic, to retain the arriving aircraft on the TLA N frequency until they were at the Minimum Stack Level, when they would then be transferred. This resulted in an increase in the workload.

Just before the Airprox, the Tactical controller answered a telephone call from the D & D Cell at London. Although the call would probably not concern his sector, he had decided to answer it (at 0732) as it had been left to ring for some time. In the event it did turn out to concern an aircraft well outside his sector. With hindsight, he realised that this call had presented an unnecessary distraction from his task. Whilst he was on the telephone the Planner Controller had transmitted on the frequency. This included descending another aircraft in the hold for which he

had annotated the FPS accordingly. As soon as the telephone call had been terminated, the P Controller informed the Tactical Controller of the actions he had taken. It was at about this time that the P position was handed over to another controller. The Tactical Controller commented that, up till that point, the P Controller had been able to assist him in establishing the available levels in the hold. Thereafter, because the incoming P Controller was still fully familiarising himself with the traffic situation, this assistance was not forthcoming. The ScOACC MATS Part 2, Page GEN 1.5, states that 'Neither the 'T' nor the 'P' controller is responsible for monitoring each other's actions, although they should do so when workload permits'. The Airprox occurred shortly afterwards.

After the B737 had been seen on the radar display to vacate FL140, the Tactical Controller, at 0733:40, instructed the Do328 to descend to that level. Approximately 40 seconds later, having issued descent to two other flights, the Tactical Controller instructed the Do328 to descend to FL120. The radar recording shows the Do328 passing FL148 at 0734:20, 9nm SE of the B737, which is maintaining FL130 in the holding pattern. The Tactical Controller said that he could not readily explain why he had issued descent to the Do328, through the level of the B737. All he could surmise was that, when he looked at the radar display the B737's SSR label had been overlapping with other aircraft in the holding pattern. He said that he would normally rotate individual aircraft SSR labels to avoid any such overlap. He could not remember carrying out this action on this occasion. Consequently, when he observed that FL120 was vacated, he forgot about the presence of the B737, although the FPS display would have shown the situation, and issued the descent to the Do328. This aircraft had not yet reached the hold and was, consequently, showing clearly on the radar display. However, having taken this action, he then compounded the error by annotating the descent on the B737's FPS. As a result, the potential confliction was no longer apparent from the FPS display. He explained that the FPS would have been displayed in level order, with that of the Do328 directly above the B737. The levels are already printed on the FPS, the controller circling the appropriate level as descent clearances are issued.

Having issued the Do328 descent to FL120, the Tactical Controller turned his attention to other traffic in the sector. About forty sec later, following a scan of the radar display, he realised that the subject aircraft were now in confliction. Apparently STCA had activated before this but the controller commented that he had not noticed its activation. At 0735:13, he instructed the B737 to *"continue present heading as a radar heading"*. He then instructed the Do328 to turn right heading 060°. The pilot responded *"we had the traffic in sight we're just descending below him"*. To increase separation, the B737 was given a right turn heading 110° and again, the pilot reported the traffic in sight. The controller commented that, determining that there was no risk of a collision, he did not use the term 'avoiding action'. He added that he realised, if he could stop the B737 continuing its turn in the hold, separation would increase as the Do328 was already passing through its twelve o'clock. Accordingly, he wanted to pass the instruction in as short a transmission as possible, allowing him to then issue a turn instruction to the Do328. At 0735:13 the radar recording shows the B737, as it was instructed to continue on its present heading, at FL130 with a ground speed of 221 kt, in a left turn just passing through an easterly track, with the Do328, passing FL136, with a ground speed of 326 kt, in its 12 o'clock 3·2nm away, heading N. Separation reduces to 2·2nm and 100 ft as the Do328 descends through FL131. By this time, the B737 has stopped its left turn and is tracking ENE. Thereafter, the horizontal separation increases as the Do328 continues its descent. Subsequently, the Do328 is positioned ahead of the B737 for approach to Edinburgh.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The cause of the Airprox was clear to Members who discussed at length the factors that may have led to the Talla N Tactical controller descending the Do328 into confliction with the B737. Controller Members considered that the Tactical controller's technique was questionable; had he been working primarily from his FPS display, the incident would probably not have occurred. There was comment about how seductive a radar picture can be: indeed, rather than concern himself about label positioning, reference to the FPS would have provided the controller with a clearer picture.

The telephone call from D&D was discussed. While it did not appear to be the Sector's responsibility to take the call, Members were most concerned that the Tactical controller had answered it rather than asking his Planner controller to do so. This would have obviated the Planner taking the RT, which controller Members considered to be abnormal. It appeared to Members that there was some room for a better SOP at ScACC for taking such calls or for them to terminate at a specific position. The Chairman undertook to ask for this matter to be looked into.

The 'first time' duty was discussed. The training for it (on a simulator because the sector to train on did not exist) had been completed far enough in the past for some Members to have wondered if the controller should have had some sort of refresher training. It was explained that the operation on the Talla N sector was familiar to controllers before the splitting of the sector. No assistance was organised by the watch manager, or indeed asked for by the controller himself. It was clear that the controller's technique was breaking down in the seconds before the incident as evinced by the miss-marking of the B737's FPS.

The controller apparently did not notice the STCA which gave rise to some discussion as to whether its attention-getting qualities were adequate. Controller Members considered that it was but that in the stress of the moment, and concerned with issuing avoiding action, it was not unusual for a controller not to notice such things.

As a final point, controller Members agreed that despite the Talla N Tactical controller's reasoning, the words *"avoiding action"* should have been used.

The Board concluded that because of the existing horizontal separation between the ac and that their pilots were aware of each other from TCAS and visually, there had been no risk of the ac colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

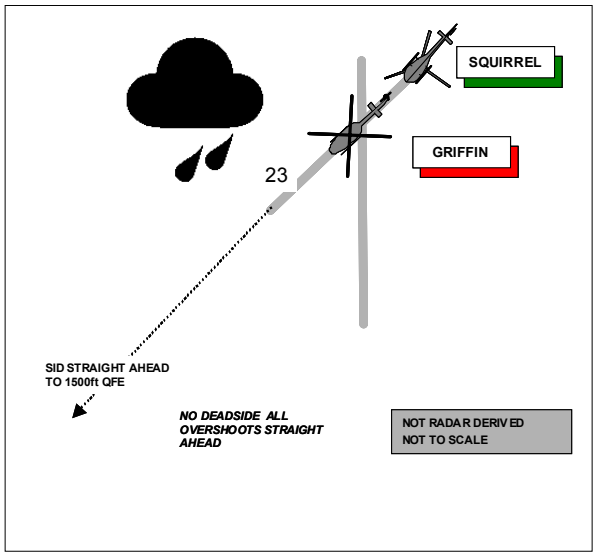
Cause: The Talla N Tactical controller descended the Do328 into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT No 057/05

AIRPROX REPORT NO 057/05

Date/Time:	27 Apr 1205	
Position:	5245N 00235W(SW Shawbury)	
Airspace:	Shawbury MATZ	(Class: G)
	First Ac	*Second Ac*
Type:	Griffin	Squirrel
Operator:	HQ PTC	HQ PTC
Alt/FL:	1500ft	1200ft
	(N/K)	(QFE 1002 mb)
Weather	VMC IN RAIN	IMC IN RAIN
Visibility:	2000m	1000m
Reported Separation:		
	100ft V/100m H	NR
Recorded Separation:		
	Variable	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GRIFFIN PILOT reports conducting a QHI IF training sortie from RAF Shawbury with the handling pilot under a visor. They were cleared for the RW23 SID climbing to 1500ft QFE. As they levelled, heading 230° at 70kt, the Controller asked if they were visual with the other traffic overshooting from a radar approach. They had not been advised of this traffic and as they started to look for it they saw it pass down the RHS slightly above them. The other ac (a Squirrel) moved ahead of them and so he maintained his speed of 70kt to increase the separation and assessed the risk as being significant. It was never stated subsequent to their identification by ATC what type of service was being provided.

THE SQUIRREL PILOT reports flying a QHI instructional sortie. Having overshot from a PAR, they were carrying out the 23 SID and heading 230° at 90kt. When they were passing approximately 1200ft in the climb to 1500ft QFE they heard a Griffin come on to the APP frequency and announce that he was also carrying out the same SID and was also in the climb to 1500ft. He was asked if he was visual with their Squirrel and he initially replied *"no"* due to the heavy rain. After a short interval he called that he was visual and they were then identified formally by ATC and asked to turn left on to 140°. They asked for confirmation that the Griffin was visual with them, which was confirmed, and they turned as directed. Throughout the incident they had no visual contact with the Griffin since at the time the visibility was low due to the very heavy rain in a localised shower. He did not assess the risk.

MIL ATC OPS reports that a Squirrel was completing a dual staff IF sortie while a Griffin was taxiing for a procedural IF sortie. Having carried out a PAR approach to RW 23 at 1202:36, the Squirrel crew was given a clearance to overshoot by the ADC and an all stations broadcast on the ADC frequency was made at 1202:45 "*Squirrel, 3 miles overshoot*". The Squirrel crew completed the PAR and climb out calling Shawbury Approach at 1204:44 "*on overshoot from PAR for further*". APP climbed the Squirrel to 1500ft QFE and applied a RIS: although this was not stated, it automatically applied after previous radar circuits. Simultaneously the Griffin was taxiing for a SID departure (Climb on runway track to 1500ft QFE) and was passed a departure clearance "*squawk 0222, SID on departure, stud 9".* At 1204:10, the Griffin crew informed ADC "*C/S, ready for departure*". After an interruption by another RT exchange ADC issued "*Griffin C/S, cleared take off, surface wind 270-12*". At 1205:16, the Griffin crew reported "*airborne SID Stud 9*". The Griffin crew contacted APP at 1205:28 reporting "*C/S, airborne SID, passing 700ft 1002".* APP asked the Griffin crew to repeat the transmission and the Griffin crew reconfirmed their climbout details and added "*requesting radar information service*". APP instantly replied "*Griffin C/S, climb report level 1000ft are you visual with the Squirrel overshooting*". The Griffin crew responded "*Griffin C/S, we're just at the side of a very large shower and we have very little visibility…(unintelligible)…of me*". APP asked the Griffin crew for their position followed by the Supervisor instructing APP to "*stop him at 1000ft*" which APP started to do but was interrupted by the Griffin crew reporting visual with the Squirrel. A series of RT transmissions then

took place between APP, the Griffin crew and the Squirrel crew regarding TI on the other respective ac and whether each crew was visual with the other.

Analysis of the Clee Hill Radar shows, at 1203:45, the Squirrel 1.5nm finals for RW23 squawking Mode A 0024 with no Mode C. The Griffin was 0.5nm SW of Shawbury squawking Mode A 0222, indicating Mode C FL003. The next sweep shows the Squirrel indicating Mode C FL006. At 1204:08 the lateral separation between the ac reduced to 1.1nm with the Griffin in the Squirrel's 12 o'clock indicating Mode C FL003 with the Squirrel indicating 200ft above. The Squirrel initiated a climb at 1204:16 with the Mode C indicating FL006 and the lateral separation at this stage was 0.9nm. At 1204:42, the Squirrel indicated overhead Shawbury with a Mode C of 010 climbing slowly, the Griffin was in its 12 o'clock 0.4nm with no Mode C indication. The next sweep showed the Squirrel 0.25nm SW of Shawbury indicating FL011 with the Griffin in its 12 o'clock 0.2nm indicating FL005. The lateral separation had reduced to 0.1nm at 1205:15 but neither ac was indicating Mode C and the blips merged at 1205:26 with no Mode C information. The Griffin reappeared in the Squirrel's left 10 o'clock 0.1nm indicating FL013 with the Squirrel indicating FL019. The Griffin continued in a slow climb and the next sweep showed 0.1nm lateral separation between the ac and 500ft Mode C. At 1206:06 the Griffin was in the Squirrel's 6 o'clock, 0.25nm on a similar heading and from then the ac diverged.

The ADC reported that at the time of the Airprox his workload as medium although in the period leading up to the Airprox the RT transmissions between ADC and ac under his control were continuous. The Squirrel was correctly allocated a clearance at 3nm on PAR to overshoot. The ADC carried out the correct safety actions and made an all stations broadcast giving the Squirrel's position to all circuit traffic and then he placed the Squirrel's pin in the 'overshooting' section of the pinboard as a visual reference. RAF Shawbury orders allow traffic waiting for a RW departure to line up whilst another locally based ac makes an IF recovery, thus allowing the controller to expedite the flow of traffic. This had been ADC's plan with the Griffin and had positioned the relevant pin on the "centre of the runway" position on his pinboard in anticipation of this. When the Griffin called ready for departure, ADC should only have issued a clearance to depart after having carried out safety checks that included checking that the Squirrel had completed his overshoot and that 3 nm separation would be achieved between the 2 ac. When ADC issued the clearance for the Griffin to depart he did not ensure that the necessary separation would be incorporated against the Squirrel. The weather at the time was such that the overshooting Squirrel was not immediately visible to ADC due to the heavy rain shower in the vicinity and in addition, the Squirrel would not be showing on the slave radar display in the visual control room as at the time the Squirrel was directly in the radar overhead. Although the Airprox occurred on the APP frequency there was very little time for APP to deconflict the ac.

UKAB Note (1): Although referred to as a 'SID' Shawbury departure procedures are published only in the Shawbury Flying Order Book and therefore apply only to locally based ac. In this case both ac were locally based.

THE HELICOPTER STATION provided an account of the incident that agreed with the above reports.

HQ PTC comments that the root cause of this Airprox was the ADC persisting with a Flying Order Book procedure designed to expedite training traffic in VFR during a temporary period of poorer weather. In these circumstances it can only be the ADC who can exercise discretion because only they can see out of the window. If they cannot maintain sight of both ac it is near certain that the pilots cannot see a clear flight path for themselves either. The Griffin should therefore have been held clear of the Squirrel's flight path until such time that they could reasonably have seen each other. Such discretion comes only with experience – controllers must learn from this to avoid a repetition. That this incident was reported formally does credit to the Station for not being tempted otherwise. There has been a full Flight Safety Investigation iaw JSP551 (Flight Safety Manual) and measures taken to mitigate further such occurrences – the whole purpose of the Airprox reporting system.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered this to have been a straightforward but nonetheless serious incident with its roots in human factors. Members accepted without reservation the findings of the investigation ordered by HQ PTC as outlined in the Mil ATC Ops report above. They noted also that the procedures at Shawbury had been tightened in an

attempt to prevent a recurrence of such an incident. It was however, pointed out by an ATC Advisor that **if adhered to** the previous procedures were safe in both VMC and IMC. In this case the ADC had not conducted the full safety checks before releasing the Griffin.

Due to the precise circumstances of this incident Members considered that although there had not been any risk that the ac would have collided, there had been a clear erosion of the safety of both ac.

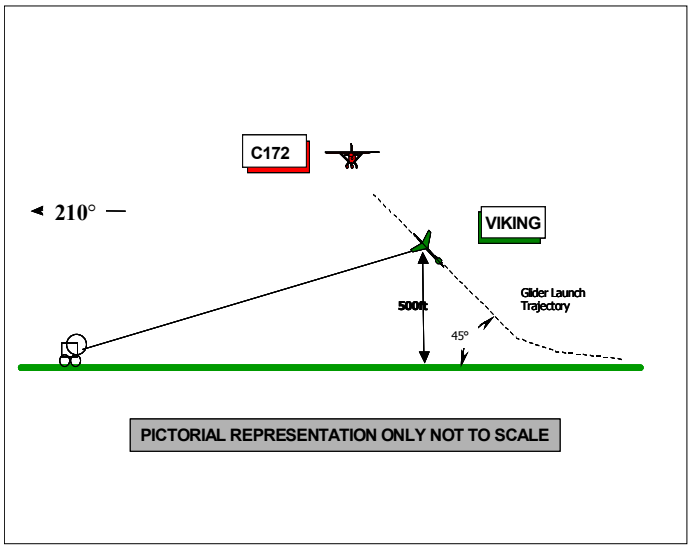
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Shawbury ADC cleared the Griffin to take-off into conflict with the Squirrel.

Degree of Risk: B.

AIRPROX REPORT NO 058/05

Date/Time:	30 Apr 1543 (Saturday)	
Position:	5118N 0005W (Kenley - elev 566ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Viking Glider	C172
Operator:	HQ PTC	Civ Trg
Alt/FL:	500ft (QFE)	1700ft (N/K)
Weather	VMC CLBC	VMC
Visibility:	20km	NR
Reported Separation:	200ft V/300m H	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING T MK 1 GLIDER PILOT reports that he had initiated a winch launch, heading 210° at 55kt, and was passing 500ft when an ac was spotted approaching Kenley Airfield from the W at approximately 700ft. When it became apparent that the ac was not changing course and was on a collision course with the glider, he aborted the launch by releasing the cable to avoid confliction. The launch was terminated at approximately 500ft by carrying out a standard launch failure recovery procedure. The glider pilot assessed the risk as being very high.

UKAB Note (1): The Duty Instructor contacted Biggin Hill Tower shortly after the event to ascertain the identity of the other ac. Subsequently the pilot of the C172 called to apologise. He said that he had intended to route to the N of Kenley; he was pointing out the glider to his passenger when he realised that he was tracking over the airfield.

THE C172 PILOT reports that at the time of the incident he was in contact with Biggin APP at 1700ft and saw no other ac.

UKAB Note (2): Kenley is promulgated in the UKAIP at ENR 5-5-1-3 as a Glider Launching Site (Winch) up to 1700ft agl. Its elevation is 566ft.

UKAB Note (3): The glider is not seen on radar at any time. A primary-only contact with no Mode C is seen on the recording of the Gatwick radar to track directly over Kenley Airfield at 1544, initially heading 080° but turning right onto 100° while over the airfield. From the reports it is assumed that the contact was that of the C172.

HQ AIR CADETS comments that from a gliding operator's standpoint a fast approaching ac at such a low height would not be seen until very late in the launching process as it would have been obscured by surrounding trees etc and therefore the launch could not have been stopped while the glider was still on the ground. When the glider is in the air, the launch cannot be terminated by the use of the normal lights signalling system because the winch operator should be concentrating on the airborne glider. Similarly, the use of a radio to stop a launch would not be effective as the winch operator would not be able to hear the radio above engine noise. With a very high nose attitude, the pilot of a launching glider has very limited visibility so it was very fortunate that the Viking instructor saw the C172 in time to abort the launch and take avoiding action. It cannot be stressed enough that to fly through a glider site is courting disaster. Gliders at Kenley are launched using 5mm wire rope attached to an 8 tonne winch. An ac flying into such a cable is unlikely to survive the encounter.

HQ PTC concurs with the HQ AC comments.

AIRPROX REPORT No 058/05

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac and a report from the glider operating authorities.

Kenley is a busy winch launch glider site operating 7 days per week such that pilots arriving at Biggin Hill should be aware of Kenley's position and avoid it. The reason that winch launch glider sites are given special mention in the UK AIP is they require protection since winch cables can be lethal to any ac striking them as well as to the crew of the glider - winch wire strikes are not survivable accidents. Further, the point at which an ac infringes a launch site can make abandoning a glider's launch a very hazardous but nonetheless unavoidable option (particularly in the early stages of a launch sequence). GA expert opinion was that it was poor airmanship to see a glider on a launch and not to avoid it by a considerable margin. In this case since the glider pilot saw and took appropriate action to avoid the light ac, there had not been a risk that the ac would have collided. The Board considered that safety had not been assured however.

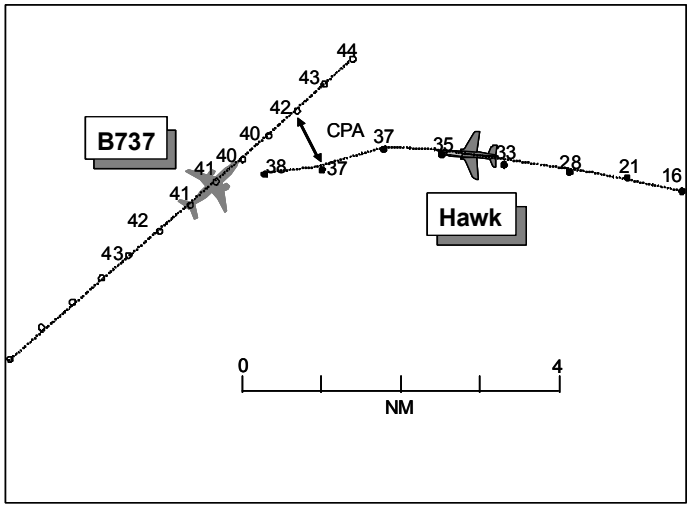
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C172 flew through a promulgated and active glider site into conflict with a glider on a winch launch.

Degree of Risk: B.

AIRPROX REPORT NO 059/05

Date/Time:	4 May 1212	
Position:	5420N 0143W (14nm SW Durham Tees Valley)	
Airspace:	LFIR	(Class: G)
Reporter:	Teesside APR ATCO	
	First Ac	*Second Ac*
Type:	B737	Hawk
Operator:	CAT	HQ STC
Alt/FL:	3800ft↓ (QNH 1023 mb)	4000ft (RPS)
Weather	IMC HZBL	VMC
Visibility:	10km on ground	>10km
Reported Separation:	400ft below	1nm
Recorded Separation:	1nm H, 500 ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DURHAM TEES VALLEY AIRPORT APPROACH CONTROLLER (TEESSIDE APR) reports that the B737 established on localizer for RW 05 at 13nm. Leeming was informed when the B737 was 10nm NW of LBA. The controller was told 'nothing to affect' and that Leeming would ring back if subsequent traffic became relevant. A primary contact departed Leeming RW 34 turning west; Leeming was called to co-ordinate this departure which then squawked 7001 indicating 3100 ft climbing. The B737 pilot asked if Durham Tees Valley Airport (DTVA) had the contact on radar and avoiding action was given, a left turn onto 360°. The B737 pilot reported that they had a TCAS RA and climbed to 4500ft. Leeming informed Teesside that the traffic was a VFR low level departure and that they did not know why the ac had climbed.

THE B737 PILOT reports heading 050° at 210kt on the localiser for RW 05 at DTVA. Pop up traffic 400ft below (later known to be a pair of Hawks departing RAF Leeming) gave a TCAS climb RA whilst the B737 was descending through about 3800ft QNH for 3000ft to intercept the glide path. The RA was followed using high thrust and the ac was clear of conflict at about 4500ft: he thought the risk of collision had been high. He notified ATC of the RA climb. At the time DTVA ATC were not aware of the conflicting traffic. He observed that the N/S R/W at Leeming could lead to conflict with 05/23 at DTVA, when Leeming were on northerly departures with DTVA on easterly arrivals, as in this case. He added that another Airprox for this airline has very recently been filed with about 200ft separation and that perhaps a review of local ATC procedures and local airspace is required to avoid further Airprox.

THE HAWK PILOT reports heading 285° at 350kt; he had departed RAF Leeming as the 'bounce' for a 2 ac formation. Before take-off, no notification of Teesside inbound traffic was given by ATC. On checking in with Leeming Approach after take-off, notification was given of conflicting traffic at 8nm – both pilot and nav understood this to be at "2000 descending into Teesside". He initiated a climb from 2000ft to 4000ft whilst looking below for traffic. A range request was made at 3nm, shortly after which traffic was sighted at about 2nm, level. He made a climbing turn to pass above and behind it. His late sighting was due to late notification and misheard level.

MIL ATC OPS reports that TI on a DTVA inbound to RW 05 had been passed to Leeming ATC as per the LoA which states that DTVA ATC is to inform Leeming of any inbounds to RW 05 and for Leeming to notify DTVA of traffic likely to affect DTVA operations. At the time Leeming had no traffic to affect the inbound. At 1205:38 Leeming Ground (GRD) prenoted a Hawk for departure "*VFR west*" to Leeming Approach (APP). At 1206:44, GRD asked APP "*Do you require any releases at the moment*?" APP assessed the weather conditions and decided no release calls were necessary. At 1211:04, the Hawk crew reported "*C/S, airborne VFR to the west*";

AIRPROX REPORT No 059/05

APP placed the Hawk under a FIS. TI was passed by APP, at 1211:37, to the Hawk crew as "*C/S, traffic 12 o'clock, 5 miles, crossing left right Teesside inbound in indicating 2000ft above, descending*". The Hawk crew requested that the range should be restipulated and APP responded "*Now left 11 o'clock 3 miles*". TI was again passed on the same track 5 secs later "*C/S that traffic now left 11 o'clock, 2 miles crossing left/right indicating 700ft above"*. The Hawk crew replied "*C/S is good visual now coming left".* Simultaneously, DTVA is heard on the landline passing avoiding action to the B737 with 2nm separation evident against the Hawk.

Analysis of the Great Dun Fell Radar shows the B737 routing inbound to DTVA, 1nm east of GASKO tracking 050º squawking 7061A and indicating FL65 Mode C descending. The Hawk appears 2·8nm NNW of Leeming at 1211:22, tracking west squawking 7001 and indicating FL10 Mode C; the B737 is in the Hawk's left 11 o'clock, 8·5nm indicating 3500ft above. The B737 continues to descend as the Hawk climbs and at 1211:31 the lateral separation is 6·3nm between the 2 ac and vertical separation has reduced to 2100ft. The next sweep shows the lateral separation further reduced to 4·8nm and 1300ft vertical. At 1211:57, the B737 is in the Hawk's 12 o'clock, 2·6nm, with the B737 indicating FL40 Mode C and the Hawk indicating FL35 Mode C. The B737 passes through the Hawk's 12 o'clock, 1·5nm with the B737 indicating 300ft above the Hawk. At 1212:03 the Hawk is seen to initiate a left turn to pass behind the B737 by 0·9nm. A climb is indicated by the B737 to FL43 Mode C with the Hawk indicating FL37 Mode C. After this the separation between the 2 ac increases. No turn is observed from the B737.

This Airprox occurred in good flying weather conditions. There was a thin layer of scattered cloud between 2000 and 2500ft and excellent visibility all round. DTVA had informed Leeming ATC of the inbound B737 as per the LoA between the 2 units which details the operating procedures that both units employ when either unit has traffic to affect the other. On this occasion, however, no further commitment was agreed or implied by either unit. When APP received the prenote on the departing Hawk he made a considered decision that due to the B737's proximity, 20nm SW of Leeming and indicating above FL130, the 2 ac would not come into conflict and as such APP did not pass TI to DTVA on the departing Hawk. After a short delay, the Hawk took off and continued VFR to the west. APP reassessed the situation, judging that the 2 ac would come into conflict so passed TI to the Hawk crew on the B737. The Hawk crew requested a confirmation of the range of the conflicting traffic after which the Hawk crew reported visual with the B737 and was taking a left turn to pass behind. APP reports having made an assumption that the Hawk would be departing low level and this was enhanced by the Hawk departing wearing a low level conspicuity squawk - Mode A 7001 – Military Fixed-wing Low level conspicuity/climbout, for use by military fixed wing on passing 2000ft MSD in the descent to the UK Low Flying System and retained whilst operating therein – ENR 1-6-2-3.

ATSI reports that the DTVA APR position was being operated by a mentor and trainee. As the B737 was passing abeam Leeds, Teesside ATC informed Leeming in accordance with the Letter of Agreement. The details were passed and Leeming replied "*We have nothing to affect, if we have we'll let you know*".

The B737 reported on the Teesside frequency and was given descent, in stages, to 4500 feet. As the ac left CAS it was placed under a RAS. At 1208:50, the APR instructed the crew to turn right onto a heading of 020º and to report established on the localiser for RW 05. Further descent was given to 3500 and then to 3000ft. At 1211:20, as the B737 was passing FL43, a return can be seen from the Hawk displaying a 7001 squawk with an unverified Mode C readout of FL15, in the 2 o'clock position of the B737 at a range of 7nm. The B737 crew then queried the traffic, which was now showing FL28. The APR then transmitted "*(B737 callsign) it's just popped up now turn left avoiding action turn left immediately heading three six zero*". At that stage the Hawk was in the 2 o'clock position of the B737, range 3·8nm and 800ft below but climbing. Very shortly afterwards the B737 crew reported responding to a TCAS climb. The Hawk closed to 1·5nm and 300 below before the B737 started to climb and the Hawk then passed 0·9nm down the right hand side of the B737, 600ft below before turning behind it.

On contacting Leeming, Teesside were advised that the traffic had been pre-noted as a VFR low-level departure. No civil ATC causal factors disclosed.

HQ STC comments that this Airprox resulted, ultimately, from the misheard level of the B737 by the crew. However, there were a number of occasions where the 'Don't Assume – Check' mantra could well have been implemented by Leeming ATC.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear to Members that the cause of this Airprox was that the Hawk pilot misunderstood the height element of the traffic information that he was passed about the B737. Having understood that the traffic was passing 2000ft in a descent he decided that it would be sensible to climb above it while looking for it. His sighting might have been delayed by the 'thin layer of scattered cloud between 2000ft and 2500ft' and no doubt he would have been looking for it below him. Meanwhile the B737 pilot, still above that level, was responding to a TCAS instruction to climb above the Hawk. The net result was that each pilot was unsighted and trying to climb above the other, a potentially hazardous situation. However, the Hawk pilot eventually saw the B737 some 2 miles away and the Board concluded that he had plenty of time to remove any risk of the ac colliding.

A Member observed that, as a result of an accident, civil controllers are now required to pass TI as a relative height. But this was usually in a flight level environment where a separation in feet should not be confused with a level to go to, or the level of the other ac. The Board was advised that Leeming ATC are advising crews of the benefit of pre-noting heights with their VFR departure details and encouraging the crews to do so to enable better liaison with DTVA. In addition Leeming ATC are no longer passing relative heights in TI transmissions to avoid any ambiguity.

PART C: ASSESSMENT OF CAUSE AND RISK

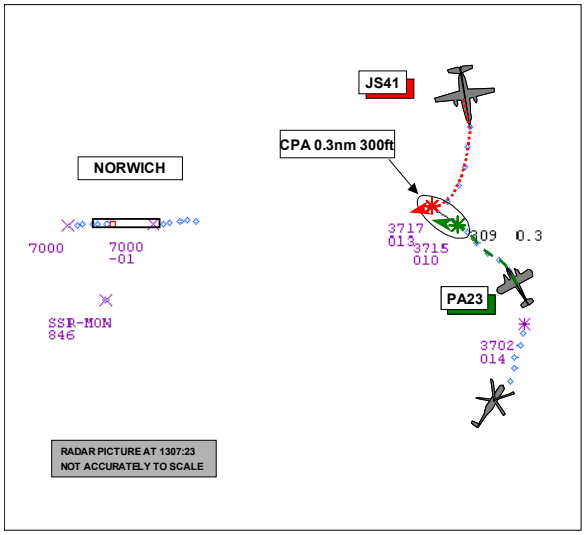
Cause: Having misinterpreted TI, the Hawk pilot climbed into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT No 060/05

AIRPROX REPORT NO 060/05

Date/Time:	5 May 1307	
Position:	5240N 00151E (3nm E Norwich)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA23	Jetstream 41
Operator:	Civ Comm	CAT
Alt/FL:	6-900ft	1200ft
	(QNH 1019mb)	(QNH 1019mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	9km	6km
Reported Separation:		
	200m H/300ft V	< 1nm H
Recorded Separation:		
	0.3nm (550m) H/300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA23 PILOT reports flying a passenger charter flight IFR from Ostend to Norwich and at the time of the incident he was in receipt of an A/G service from Norwich TWR. No form of ACAS is fitted to his ac. He was turning left onto final for RW27 at 110kt, almost over the NH beacon, when a turboprop ac from an airline he recognised passed about 300ft above him, displaced horizontally by about 200m, in a right turn. He heard another pilot say *"Too close"* on the RT and then noticed the ac climbing away so he took no avoiding action. He thought that both left and right circuits had been in operation at the time and both ac had been turning onto final at the same time. He noted that it was hard to see the other ac from the LH seat (he was operating single pilot) and assessed the risk as being high.

THE JETSTREAM 41 PILOT reports that the FO was flying the ac, fitted with TCAS, from the RHS on a training flight. Following a missed approach for RW27, they were cleared to join the RH visual circuit at 1500ft QNH. They were flying downwind at 130kt and were advised by ATC that they were No 5 in sequence and to continue downwind so the ac was configured for landing; they were then advised by ATC to turn base leg and to report on final. The PF positioned onto base leg and commenced a shallow descent. As they were about to turn final they received a TCAS TA and saw a light ac in their 11 o'clock position at about the same alt and obviously also on final about 1nm (or less) distant. The captain took control, turned right and initiated a climb and during the climbing turn they received a TCAS RA 'increase climb' alert. Their climb was continued to 1600ft QNH when he received a TCAS call 'Clear of conflict'. With ATC co-ordination they positioned to a further RH circuit and landed on R/W27. He assessed the risk as being low/medium but observed that the dual circuit directions had contributed to the incident.

NORWICH ADC reports that the JS41 was in RH circuit for RW27 following a go around from an NDB approach. At the time there also were 2 light ac in the LH circuit. Having reported downwind the JS41 pilot was subsequently instructed to turn base No 3, two light ac ahead on final. [See ATSI report]. The PA23 called on frequency, from APR, joining left base from the SE approaching the NH NDB (he was seen on ATM to be 5nm to the SE), having been apprised of the circuit state by the APR. The PA23 was told that he was No. 4 in the pattern, No 3 being the JS41 that was on right base. The PA23 pilot asked if he should maintain speed but was advised to slow down which he agreed to do. A helicopter that was joining behind was advised of the PA23 ahead and also advised to slow down. The JS41 pilot then asked if he should turn final, which the ADC assumed he would do in accordance with normal practice, so he advised the JS41 pilot to do so and passed TI on the PA23 approximately 1nm SE of him. The JS41 then decided to go around and the PA23 landed.

UKAB Note (1): The 1250 Norwich weather observation was: surface wind 280°/12kt; visibility 9km; cloud, scattered at 1800ft, broken at 3500ft.

ATSI reports that the ADC described his workload as high at the time of the incident. This, he explained, was mainly due to the disparity of performance of the various types of ac in the circuit. He had been in position for approximately 25min.

The JS41 was been carrying out IFR training at Norwich and at 1258 was cleared into a RH visual circuit by the ADC. This followed approval from Norwich APR in advance of it completing an NDB approach and go around on RW27. At 1301 APR informed the ADC that the PA23, inbound on an IFR flight plan, was expected on left base in 5min to be followed by a helicopter on an IFR training flight. Having carried out a go around after his NDB approach, the JS41 pilot reported turning cross wind to position right hand downwind at 1303 and just over one minute later reported *"late downwind for two seven"*. The ADC Controller responded *"call me before turning base leg please you could end up being number five"*. The radar photograph timed at 1305:10 shows the JS41 at an equivalent of 1600ft downwind for RW27, about to pass 2nm N of Norwich Airport. There were 2 ac on final approach, the second at just under 3nm. Additionally the PA23 was 7nm SE of the airport and just behind that was the helicopter. The ADC thought that at the time the JS41 might need to be positioned No 5 behind the helicopter, depending on how wide a circuit the pilot required. About 40sec later the ADC, assessing that if the JS41 was prepared to turn base it would fit in as No 3 ahead of the PA23, transmitted to the JS41 *"if you want to turn base now it would be good"*, the pilot replying *"affirm".* The radar recording shows the JS41 then 2.8nm NE of the airport at 1500ft, the second of the ac on the approach is at 2.1nm and the PA23 is 6nm SE. Shortly afterwards the PA23 pilot established communication with the ADC on transfer from APR, having been informed by the latter of 2 light ac and a JS41 in the circuit.

On first contact the PA23 pilot was informed that he was No 4, with No 1 and No 2 on short final, No 3 being a JS41 *"on a right base slightly ahead of you I'll keep you advised"*. The pilot asked if he should continue at normal speed and was advised to *"slow down a bit it would help"*. The ADC then turned his attention to the other circuit traffic. Some 40sec later the JS41 pilot requested confirmation that he could turn final. The ADC said that he could see the subject ac in close proximity and transmitted *"Affirm I wanted you to turn final you're one mile, one mile east of you is another one on coming on to final"*. The ADC commented that he could not remember whether he had used the ATM to ascertain their positions. As it is difficult to establish relative positions by looking out of the VCR, he thought it probable that he had done so. After the pilot acknowledged the call, the helicopter pilot commented, *"They're too close together there"*. The radar photograph, timed at 1307:04, showed both ac at 1300ft. The JS41 is tracking S on base leg and the PA23 is 1.1nm SSE, tracking towards final approach on a NW heading. The helicopter, whose pilot made the 'too close' comment, was just behind the PA23. Thereafter, the SSR Mode C return of the JS41 disappeared from the radar recording although the PA23 maintained 1300ft. By the time both ac were showing Mode C again 3.5nm E of the airport and 0.3nm apart, the PA23 had descended to 1200ft and the JS41 had climbed to 1500ft. The PA23 pilot reported turning final *"to the other one who's just er climbing above me"* and was instructed to continue approach. The ADC said that as he could see that the conflict was being resolved by the JS41 climbing, he did not consider it necessary to intervene. The JS41 was cleared into the left hand traffic pattern and the PA23, on reporting on a 2-mile final, was cleared to land.

At the time of the Airprox, both ac were operating IFR, albeit visually. The JS41 had completed an IFR approach before positioning into the circuit and the PA23 was joining visually on an IFR flight. The MATS Part 1, Section 1, Chapter 3, Page 1, states that standard separation shall be provided between 'IFR flights in Class G airspace being provided with a service by an approach control unit'. Further to this, it also states, Section 3, Chapter 1, Page 4, that 'IFR flights operating with visual reference to the surface may be transferred by approach control to aerodrome control in the following circumstances: (Only the two applicable have been quoted.) Aircraft operating in the circuit; ac approaching visually below all cloud when the reported aerodrome visibility is 10 km or more'. In these two cases 'the volume of traffic and aerodrome control workload must be such as to allow the use of one of the reduced separations permitted in the vicinity of aerodromes'. These are quoted, Section 1, Chapter 3 Page 1, as 'a) adequate separation can be provided by the aerodrome controller when each ac is continuously visible to this controller; or b) each ac is continuously visible to the pilots of the other ac concerned, and the pilots report that they can maintain their own separation; or c) when one ac is following another, the pilot of the succeeding ac reports that he has the other in sight and can maintain separation'.

The ADC said that he was aware that he had to separate the two ac. He believed that, if the JS41 had turned base when expected, the Airprox would not have occurred. The radar recordings reveal that the JS41 started the right turn onto base leg some 30sec after the pilot was asked if he wanted to turn. The controller admitted that he had not monitored the progress of the subject ac, as required by the MATS Part 1 procedures quoted above, but had turned his attention to the other ac in the circuit and probably other operational matters although he could not be

specific. Although he had not received confirmation that the PA23 pilot would provide his own separation from the JS41, he assumed, having passed TI about the JS41, he would arrange to turn final safely behind it.

The Airprox occurred in Class G airspace whilst both ac were operating under IFR. Consequently, both ac should have been provided with standard separation unless one of the criteria for the reduction of minima within the vicinity of an aerodrome was applied. Clearly, on this occasion, the MATS Part 1 procedures were not followed. Notwithstanding that the pilot of the PA23 had been given TI about the JS41, no confirmation was received that either/both of the pilots could maintain their own separation. It was therefore, incumbent on the ADC to continuously monitor the relative positions of the subject ac. Had he done so, he should have been able to intervene early enough to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Specialist Members informed the Board that in such conditions and with a visibility below 10km the responsibility for the safe separation and sequencing of inbound IFR traffic lay with APR. The visibility of 9km had also precluded the use of 'reduced separation in the vicinity of aerodromes'. The APR should not have handed ac over to the ADC unless required separation had already been accomplished on all IFR ac, which in this case included the JS41 (and although not a factor in the Airprox the helicopter behind). Notwithstanding that it was flying in the visual circuit and in contact with the ADC the JS41 had been operating under IFR and the controllers should have effected required separation from other IFR traffic. Having accepted the ac without the required separation however, the ADC then accepted the responsibility to separate them by the appropriate distances.

Although as both ac turned onto the final approach they would have been belly-up to one another, one turning right and the other left. Fortunately they were alerted to the presence of the other ac by the sequence of RT transmissions and by TCAS in the case of the JS41. It had been primarily the TCAS that had allowed the JS41 pilot to initiate avoiding action by discontinuing his approach and following the RA thus permitting the PA23 to approach ahead of him.

The JS41 pilot took suitable avoiding action that had prevented there being any collision risk; however, due to the confliction of the ac on opposite direction circuits, Members considered that there had been an erosion of the safety of both the ac involved.

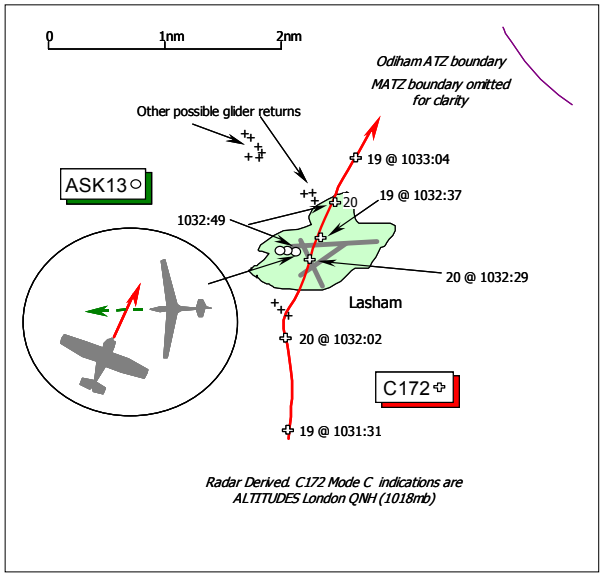
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Norwich APR and ADC did not did not provide the separation required under IFR.

Degree of Risk: B.

AIRPROX REPORT NO 061/05

Date/Time:	6 May 1032	
Position:	5111N 00101W (Overhead Lasham - elev 618 ft)	
Airspace:	Odiham MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	ASK 13 Glider	C172
Operator:	Civ Trg	Foreign Private
Alt/FL:	1500ft (QFE 996mb)	2000ft (QNH)
Weather	VMC CLBC	NK NR
Visibility:	>10nm	30nm
Reported Separation:	20ftV	(2000ft)
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 13 GLIDER PILOT, a gliding instructor, reports that he was executing a winch launch from Lasham aerodrome with a trainee, about 2000ft below a cloudbase of about 4000ft and with a visibility in excess of 10nm on a heading of 270°, out of the sun. Whilst climbing through about 1500ft Lasham QFE (996mb) at 55kt his trainee first alerted him to the presence of another ac. At the same instant he first saw the Cessna himself, some 20ft away as it was passing obliquely under his glider from the 10 to the 4 o'clock position about 20ft below his glider. He could not take avoiding action whilst on the cable so he continued to the top of the launch. The pilot of the white Cessna ac – it was either a C172 or C182 - did not appear to alter course to avoid his glider, but he stressed that whilst on the winch launch the climb-rate is high and the visibility is limited from his glider, which has a red fuselage and white wings.

UKAB Note (1): The UK AIP at ENR 5-5-1-3, promulgates Lasham Glider launching site as active during daylight hours for winch and aerotow launches which may attain a height of 3000ft agl, above the site elevation of 618ft amsl. Lasham is not a licensed aerodrome nor does not have an ATZ; the Class G airspace above the glider site is just within the boundary of Odiham MATZ sfc to 3000ft above the Odiham elevation of 405ft.

THE C172 PILOT reports he was flying his white Cessna from the Isle of Wight to Cambridge VFR. The intended route was Sandown – Havant – Lasham – Olney – Cambridge at a planned transit altitude of 2500ft. Before taxiing at Sandown, he adjusted the QNH correctly because he compared it to the Isle of Wight elevation of 60ft [The elevation promulgated for Isle of Wight/Sandown in the UK AIP is 55ft]. Passing N of Havant heading 360° at 100kt, he contacted London INFORMATION on 124·60MHz, to receive flight information, during which he "heard" a new QNH being transmitted on the RT; this might possibly have been the QNH for "another area" because now he is sure it was a wrong QNH. Nevertheless, "in case of gusts and clouds" he descended to an altitude of 2000ft. He tried in vain to contact London Radar but at last, to the S of Lasham, he contacted Odiham, he thought, on 125·25MHz, [it was actually Farnborough LARS] to give information about his position, altitude and heading. At first the controller tried to give him a squawk; during this RT interchange "time was passing and he reached the glider site in a low altitude". However, he stressed that on his [Chart manufacturer's name given] **VFR GPS Chart EG-2, United Kingdom, Edition 2005, 1:500 000 for Lasham and Odiham you will not find a glider site** [or such activity marked at either Lasham or Odiham] and he provided a sample copy of a chart fragment. In his view it would be better if the glider site were marked on the chart.

After he had contacted Cambridge on RT he noticed he had the wrong QNH set. He is "so sorry about this incident" but queried if any of the glider crew "looked at the sky" before the glider was launched. He did not report sighting the subject glider or any others but assessed the risk as *"high"*.

UKAB Note (2): A comparison of the chart used by the C172 pilot - with the appropriate chart legend obtained from the manufacturer - and the equivalent CAA 1:500 000 graphic reveals that the VFR GPS Chart EG-2, United Kingdom, Edition 2005, 1:500 000 does not depict that there is a Glider site at Lasham nor does it specify the use of cables or the maximum elevation that they could attain. Consultations with the Chart manufacturer revealed that it is not their practice to insert information about gliding activity at aerodromes – specifically the danger from winch cables - on any of their European charts.

THE LASHAM GLIDER SITE LAUNCH POINT CONTROLLER reports that the ASK 13 winch launch was commenced after checking ahead, above and behind for other ac. The powered ac was then seen to be converging with the glider's anticipated "Top of Launch" height of about 2000ft AAL as it was being launched through a height of about 1500ft aal.

He estimated that the surface wind was 300/10-15kt; the visibility about 75km, with the cloudbase at about 3500ft.

THE FARNBOROUGH LARS CONTROLLER reports that the C172 pilot called on frequency at 1032 stating that he was at 2000ft overhead "my airfield". The C172 was identified from the assigned A0434 squawk when the ac was positioned about ½nm N of Lasham airfield, indicating 2000ft altitude Mode C and the pilot was advised of his position. Although the pilot's intended routeing was requested his RT was difficult to interpret. Traffic information was passed to Odiham RADAR. As the C172 was tracking towards their overhead so the C172 pilot was asked if he would accept a climb to 2500ft to avoid Odiham. The ac was then observed to climb as requested and tracked N from Odiham switching to an en-route frequency at about 1040UTC. Shortly afterwards, notification was received from Lasham of an Airprox in their vicinity which appeared to correspond to the flight path of the C172.

UKAB Note (3): The Airprox is not illustrated clearly by the Heathrow radar recording as, perhaps understandably, the glider is not shown at the time of the Airprox. However, the C172 squawking A7000 – subsequently identified from the allocated Farnborough squawk - is shown approaching Lasham from the S on a northerly course flying at an indicated 1900–2000ft London QNH (1018mb) unverified Mode C, which is maintained throughout. Many primary returns are shown in the vicinity of Lasham throughout the period which are, in all probability, manoeuvring gliders. After a slight course alteration onto a NNE heading at 1032:02, the C172 crossed the Lasham aerodrome boundary level at 2000ft QNH. At 1032:29, the C172 indicating 2000ft approaches the area of the winch launch which was situated just to the N of and parallel to RW27. No contact that might be the ASK13 is readily apparent until after the aeroplane has cleared to the N of RW27 at 1032:37, indicating 1900ft London QNH. At 1032:49 a succession of 3 returns are evident which in all probability is the glider flown by the reporting pilot; a height of 1500ft Lasham QFE (996mb) – the reported height of the ASK13 at the time of the encounter - would equate to an altitude of about 2160ft London QNH (1018mb). The C172 then clears to the NNE of Lasham on a steady course indicating 1900ft QNH.

ATSI reports that the C172 had departed from Isle of Wight/Sandown and planned to route to Cambridge via Havant – Lasham – WOD. The pilot contacted Farnborough LARS at 1031:10, but used the incorrect callsign of 'ODIHAM TOWER'. After dealing with another call, the controller requested the 'other station' to try again; the C172 pilot then passed his flight details and gave his position just after 1031:30, [UKAB Note (3): The Farnborough RTF transcript gives only 30sec and 1min time injects] as "*…we are 1 mile south of your field and we cross your field in (*sic*) 2000 feet…*". Later analysis of the radar recording shows the C172, at 1031:31, to be 1½nm due S of Lasham. At least three primary returns, probably from gliders, can be seen within a mile of the overhead. The Farnboro' controller advised that she would provide a FIS and requested that the pilot squawk A0434. This squawk had to be repeated and the radar shows that the pilot initially selected A3434 at 1032:25, just moments before the Airprox probably occurred. The controller requested that the code be reset and, at 1033:05, the C172 was identified approximately ½nm N of Lasham. The controller informed the C172 pilot of his position but no mention was made of sighting any gliders. No ATC causal factors were disclosed.

UKAB Note (4): Later at 1038:30, Farnboro' advised the C172 pilot *"…for future reference…your position when you called me up was overhead Lasham and then you actually flew overhead Odiham in future you have to avoid the Odiham Aerodrome Traffic Zone"*. To which the C172 pilot responded by apologising". The C172 pilot was instructed to freecall his en-route frequency some 8nm N of Odiham.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Board Members recognised that a glider on a winch launch will climb rapidly – a RoC of 1500-2000ft/min was not untypical, at a high 'pitch attitude' – thereby limiting the pilot's lookout ahead which would make detection of other ac from the air difficult. From the glider pilot's perspective the Board believed that there was nothing he could do when the C172 was spotted just 20ft away as it passed some 20ft below his glider. It appeared to the Board that any attempt to abort the launch and disconnect from the winch-wire at that stage could potentially have been disastrous and might have allowed a falling wire to damage the under-flying C172. The Board agreed that in the few seconds available, all the glider instructor could do was continue to the top of the launch, thereby climbing clear of the other aeroplane.

The Lasham glider site launch point controller reports that the winch launch was commenced after checking ahead, above and behind for other ac. Members debated the efficacy of this visual check as the C172 had approached from the S, almost perpendicular to the direction of launch, and the other ac was evidently not detected by their lookout regime. The Board's gliding Advisor later explained that at Lasham the launch party signaller will look all around, above and behind before giving the signal to take up slack on the cable. Before the winch driver opens the throttle he will also look from his end of the runway. During the slack take up, whilst a lookout will be maintained, the primary focus will be on potential difficulties with the launch itself - cable snagging, release system malfunction, over-run of the cable etc. After the commencement of the launch run there is a period in which the launch should not be aborted as experience has shown that 'low aborts' can lead to accidents. When the glider is fully visible to the winch driver he will concentrate on guiding the launch by looking only at the glider. The BGA does not recommend aborting launches unless absolutely necessary, but instructors at the launch site will still be keeping an eye open for potential hazards on the ground and in the air. On an average day at a site like Lasham, 3 launches might be aborted at the lookout stage due to other ac. Flying at 100kt over the period of the launch – about 1½min - would place the C172 just under 2nm away which, coupled with possible obscuration by the local terrain or trees, makes it very difficult to spot a small light ac. Therefore, whilst a good lookout is maintained during the launch it was feasible that a light ac might not be spotted before the initiation of the winch launch. This was still a concern to at least one Member insofar as the primary method of checking the safety of the launch was not failsafe and could not necessarily guarantee to detect another ac which might potentially be in very close proximity to the glider when it was still being launched on the cable. The Member noted that the approaching C172 was neither seen nor heard. Consulted subsequently in this latter respect, the Board's gliding Advisor noted that at winch sites, general ambient noise plus the radio from tugs and winches are relayed by speaker from the launch bus/vehicle for safety purposes. Signals for the launch itself, primarily by light, are also relayed by sound signals. Unless there is virtually no activity at the launch point, sounds from an approaching ac will not be heard. The winch driver is in an enclosed cabin. When launching is taking place, it is likely the engine will be running at all times, except when the cables are being towed back, which again makes it extremely unlikely that an approaching powered ac will be heard.

The C172 pilot was evidently not aware before this Airprox had occurred that Lasham was a very busy glider site, promulgated in national AIPs as such, with intensive glider launching in progress at the time. His route had been planned to pass just to the E of Lasham, which was only marked on the VFR GPS chart that he used as an "airport" and so, in the Board's opinion, this Airprox had its origins at the pre-flight planning stage. Even so, to plan to route so close to an aerodrome was not in itself a sound practice as there was immediate potential for a confliction with arriving/departing traffic. But if such a route was undertaken it demanded an intensive lookout so as to spot any conflicting traffic at an early stage. Moreover, good airmanship demanded that the aerodrome ATC be contacted in good time to advise of the transit, elicit traffic information and if necessary, obtain permission to enter the ATZ where appropriate. Here, the C172 pilot – who was not apparently familiar with the local area at all - may have been confused as to which aerodrome he was approaching. The Farnborough RT transcript revealed that he had addressed his call to Odiham, whereas he was actually communicating with Farnborough RADAR, who can provide a service to flights in transit. He then said he was "*…1 mile south of your field"*, presumably referring to Odiham, whereas he was actually approaching Lasham from the S and analysis of the radar recording had clearly shown that the C172 had flown through the area of the winch launch at Lasham. Moreover, as he had not seen the glider on the winch at all, at the distances reported it seemed very surprising. One theory postulated was that the radar recording showed that the C172 pilot had incorrectly selected A3434 just moments before the aeroplane overflew Lasham and the RT transcript reveals that the controller requested that the required SSR code be reset.

So it seemed highly probable that the C172 pilot was 'heads-in' his cockpit selecting the appropriate SSR code at the time the Airprox occurred. Consequently, the C172 pilot did not detect the rapidly climbing glider at all as he flew over Lasham.

The Board was briefed on the consultations with CAA Directorate of Airspace Policy (DAP - the producer of the CAA VFR topographical charts) by UKAB secretariat staff and also discussions with the company that produced the chart the C172 pilot was using. As had been explained at UKAB Note (2), CAA charting provided comprehensive information about the hazards associated with glider launch sites – including Lasham - which was not the case with the commercial chart used by the C172 pilot. It was mentioned that if the C172 pilot had consulted the UK AIP or a CAA chart – both of which could have been accessible to him before he planned his flight – it should have been evident to him that a significant hazard existed along his route from the glider launching activity at Lasham. Consultation with the chart manufacturer also suggested that other documents produced by that company – if consulted by the C172 pilot – might have revealed the same information as that in the UK AIP. There was a view, therefore, that although the chart in use by the C172 pilot did not provide information on the gliding activity at Lasham such information was readily available from other sources. The Board Members empathized with the C172 pilot's dilemma, using his chart in good faith and expecting it to provide him with the fullest information of any hazards. Nevertheless, in the Board's opinion it remained the C172 pilot's responsibility to avail himself of the most complete information obtainable from which to plan his route and which should have been available to him – albeit from other sources – which was a salutary lesson for the unwary. The Board unanimously concluded, therefore, that the cause of this Airprox was that the C172 pilot overflew the Lasham Glider launching site, which was not marked on his chart as such, and flew into conflict with the ASK13 glider.

Whilst the vertical separation that pertained here could not be ascertained independently this was certainly a close call by all accounts. The potential for catastrophic damage to the C172's airframe from the winch-wire was readily apparent and evidently the unsighted C172 pilot was completely oblivious to the presence of either the wire or the attached glider. The glider pilot was also powerless to prevent this occurrence. Mere seconds separated these two ac from being in exactly the same piece of sky above Lasham. The Board concluded, unanimously, that a definite risk of collision had existed in the circumstances reported here because no action had been taken by any of the individuals involved to avert this close quarters situation: therefore, it was purely fortuitous that a collision did not ensue.

Returning to the issue of the depiction of glider sites on commercial charts: in the Board's view air charts should provide a comprehensive warning of the dangers posed to other airspace users and so the Board was minded to make a Safety Recommendation on this topic. The Board was briefed that currently, there is no regulatory oversight of commercial aeronautical publications such as the chart produced here, which was of concern to the Board. Whilst recognising the inherent limitations of the medium it seemed that such glider launch sites should be marked on charts to provide pilots with the fullest information about these locations and so the Board charged the Chairman with formulating a Recommendation to the chart production company on this topic to do just that.

Post Meeting Note: Subsequent to the Board meeting, the Chairman raised the charting issue with the CAA's Director of Airspace Policy. These discussions, coupled with discussions with the company concerned, subsequently elicited an undertaking from the chart production company to add a glider symbol for Lasham to their VFR/GPS chart at the next regular update. Whilst this is a very helpful development, it was evident that this did not cover the issue of airports in addition to Lasham where glider launching also takes place. The chart production company was requested to consider this point, subsequently informing UKAB that various options are being studied with the intention of depicting winch launch glider sites, especially in the UK, on their VFR GPS charts. Such a change would be introduced with the next routine revisions: UKAB would be advised of the company's plans.

PART C: ASSESSMENT OF CAUSE AND RISK

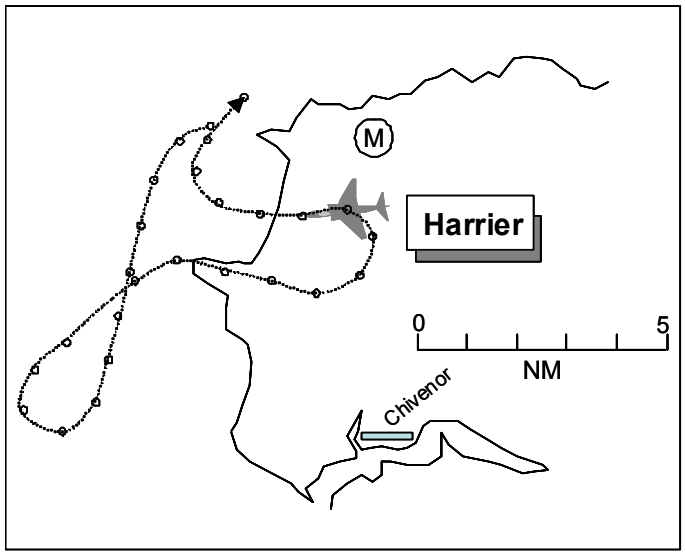
Cause: The C172 pilot overflew the Lasham Glider launching site, which was not marked on his chart as such, and flew into conflict with the ASK13 glider.

Degree of Risk: A.

Recommendation: In the light of this Airprox, the chart production company should review its policy with respect to the depiction on its VFR GPS charts of aerodromes where glider winch launching take place.

AIRPROX REPORT NO 062/05

Date/Time:	5 May 1416	
Position:	5110N 00412W (5nm NNW Chivenor)	
Airspace:	LFIR/LFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Harrier GR7	Untraced M'Light
Operator:	HQ STC	N/K
Alt/FL:	1000ft (RPS)	(N/K)
Weather	VMC CLBC	NK
Visibility:	5km	
Reported Separation:	150ft V/800yds H	
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HARRIER GR7 PILOT reports that whilst attempting to go inland he was talking to Chivenor who instructed him that there were multiple helicopters to the south of Chivenor and that the north was clear. He attempted to go inland to the north but had to turn around and exit again to the north. When he crossed the coast, heading 270° at 450kt, he saw at least 4 ultralights/hang gliders with brightly coloured wings at about ½nm. Once passed them he asked Chivenor if, because of his proximity to the other ac, they were aware of any NOTAMS that he had not seen and they informed him that there was no NOTAM but they always operated there. The minimum separation was about 800 yd, 150 ft vertical; he did not assess the risk of collision.

UKAB Note: Despite many enquiries, no microlight or hang glider pilot has been found who was aware of an Airprox. Radar recordings show the Harrier tracking as shown in the diagram. There are several intermittent primary-only returns in an area 2-3nm inland of the Harrier's U-turn but none in the reported Airprox position.

HQ STC comments that the indications of ultralight flying activity have been removed from the LFCs because their operating associations have advised that hang gliders and microlights can be encountered anywhere where the conditions are suitable for their operation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the Harrier pilot and radar video recordings, and reports from the appropriate operating authorities.

The Board was advised that there is no ATC at Chivenor; the advertised frequency is for the air ground station which is usually manned by duty SAR personnel who on this occasion provided information based on their personal experience. Members could only conclude that this incident was a confliction of flightpaths in Class G airspace which was resolved by the Harrier pilot who appeared to have been in a position to avoid the risk of collision with the light ac.

PART C: ASSESSMENT OF CAUSE AND RISK

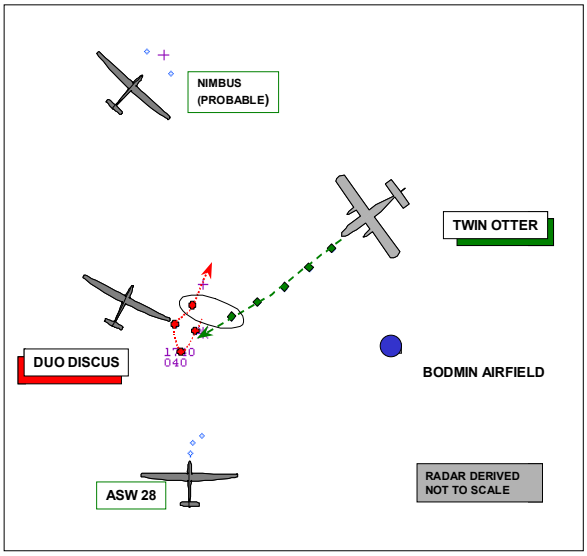
Cause: Conflict in Class G resolved by the Harrier pilot.

Degree of Risk: C.

AIRPROX REPORT No 063/05

AIRPROX REPORT NO 063/05

Date/Time:	10 May 1238	
Position:	5030N 00440W (Bodmin Airfield)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DHC-6 Twin Otter	Duo Discus Glider
Operator:	CAT	Civ Club
Alt/FL:	FL40	~5000ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	20km	>20km
Reported Separation:		
	200ft V 200ft H	1000ft V
Recorded Separation:		
	NR V ~450m H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC-6 TWIN OTTER PILOT reports flying a scheduled passenger flight from Bristol to St Mary's on a VFR flightplan squawking as directed and with HISLs selected on in receipt of a RIS from St Mawgan. While overhead Bodmin airfield heading 240° at 148kt he first sighted a glider in his 1 o'clock position displaced by about 200ft horizontally and 200ft above him. The glider was coloured white with black markings on its T-tail and was flying alongside a cloud and was difficult to break out from the background even though it was almost side-on to them. He assessed the risk as medium ("no conflict"), being unable to take any avoiding action before the glider had passed down their right side.

UKAB Note (1): In an e-mail, a glider pilot subsequently reported that there were 3 other gliders flying near Bodmin at the time of the Airprox. Analysis of the radar recording indicates that the DHC-6 flew between 2 ac, the first identified as an ASW28 and the second believed to be a Duo Discus.

THE DUO DISCUS GLIDER PILOT reports flying a white glider and that at the time of the incident he was at 5000ft heading NE at 80kt shortly after leaving a turning point at Bodmin town. Both he and his passenger first saw a twin engined ac at a distance of about 2nm and 1000ft below, identified as a Twin Otter. He estimated that at the closest point he was 1000ft above the twin which flew below him; he took no avoiding action - as none was required - and assessed the risk as being nil. He thought it unlikely that it was his glider that the Twin Otter pilot reported as he was so far from him that there was zero risk of collision. Another glider in the area at the time was Nimbus 30T "XXX" and he knew that the pilot had a logger trace.

UKAB Note (2): The UKAB contacted the pilot of the Nimbus 30T "XXX" who reported that the logger showed his ac circling approximately 8km N of Bodmin at the time of the Airprox. This pilot recalled that an ASW28 was closer to Bodmin.

THE ASW28 GLIDER PILOT reports that his ac was all white and that he based his response on the data from his flight logger that takes position and height fixes every 4sec. He also forwarded a map showing his position at the time of the reported Airprox and his raw logged data for that portion of his flight. He has used the time reported by the other pilot (Twin Otter) as he did not record the time he saw the other ac.

Just before the Airprox he had been climbing in a thermal with another glider [the Duo Discus, see UKAB Notes] to the N of the town of Bodmin. He was a few hundred feet higher than it and he left the thermal first when he reached cloudbase at 5400ft (QNH). He thought that the Airprox may have occurred while he was in the area of the BGA Bodmin turn point which was to the SE of the town; at the time he was in level flight at 60kt, below but close to the base of a cloud. He saw a twin-engine ac at about the same height and it passed from his right to left in front of him at about 90° across his track and about 1km away. He had not seen it prior to this so was not sure

if it had already taken avoiding action to achieve this separation. There was a significant reduction in the cloudbase and visibility to the S and W of the area with generally more cloud in that direction and he thought that it might have been from that direction that the ac had come.

After going to the turn point he headed back NE and saw the other glider ahead of him, heading in the same direction. He assumed that this glider had headed back NE directly after completing its climb and therefore he would have been the closest glider to the twin-engined ac.

Ten to fifteen minutes later he saw a third glider but this was a large open-class ac and it was climbing between Bodmin and Roadford Reservoir. He had not seen this glider before but it also appeared to be heading back towards the E. It was much higher and did not see its registration.

UKAB Note (3): A detailed analysis of the radar tapes shows the Airprox as taking place at 1237:47 2nm due W of Bodmin airfield. At the time there were 2 primary contacts in the area and the Twin Otter can be seen heading SW at FL41 as described by its pilot. Careful comparison of the radar recording and the ASW28 data log shows that it was not the glider involved in the Airprox. At the time it was 2nm WSW of Bodmin and the incident occurred just under 1nm N of its position with another primary only contact. This broadly confirms the ASW28 pilot's report that the twin crossed his nose from right to left at about 1km and slightly below (he was at 4566ft). From back-plotting the primary contact of the ac involved in the incident it can be seen to circle in the same thermal as the ASW28 about 5min previously. From the ASW28 pilot's report it is therefore deduced that the ac involved was the Duo Discus. Another primary contact, presumed to be a third glider (the Nimbus 30T), can be seen well to the N.

THE FLIGHT OPERATIONS INSPECTOR reports that the operator of the DHC-6 has issued a Flight Safety Notice reminding crews that glider pilots seek out convective clouds and that gliders present poor radar targets.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, glider data-logger information, and a radar video recording.

The Board and the BGA advisor accepted the analysis of the situation at Note (3). That being the case, they were not able to reconcile positively the different miss-distances reported by the Duo Discuss pilot(s) and the Twin Otter pilot(s). Members thought however that it was most likely that the Twin Otter pilot had underestimated the distance between his ac and the glider, both vertically and horizontally, and that the actual separation was closer to that reported by the glider pilot. It is frequently difficult to 'scale' white gliders against a similar light background of cloud and no other visual references; a false impression of the size of such ac also leads to a false impression of their distance away. The glider crew on the other hand were familiar with Twin Otters and would have had had other objects in their field of view to assist with their determination of the range of the Twin Otter.

UKAB Note (4): The BGA comments were not received until after the meeting due to an e-mail outage.

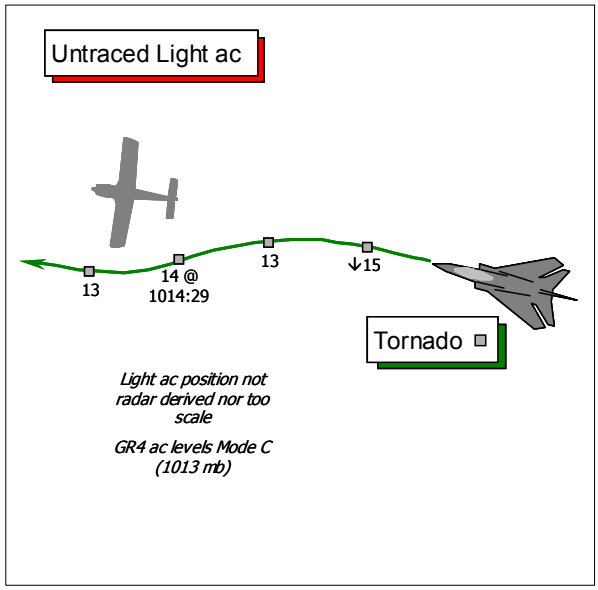
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 064/05

Date/Time:	10 May 1014	
Position:	5159N 00202W (7nm NE of Gloucestershire Airport)	
Airspace:	UKDLFS/FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Untraced Lt Ac
Operator:	HQ STC	NK
Alt/FL:	1500ft↓ (Rad Alt)	NK
Weather	VMC CLOC	NK
Visibility:	50km	NK
Reported Separation:	50ft V/50ft H	
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports that he was descending to enter low-level in LFA4 to the NE of Gloucester as a singleton, flying in VMC, some 1500ft below a 3000ft cloudbase with only 1/8th of St Cu at their level, more than 2000ft away horizontally and with an in flight visibility of 50km. A squawk of A7001 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

An ATS with Swanwick (Mil) had previously been terminated some 10-15nm earlier after they had cleared the Lichfield Radar Corridor (RC). Now descending through 1500ft Rad Alt at 418kt on a heading of 285° a white ac was suddenly spotted dead-ahead some 4-500m away tail-on flying a similar heading at the same level. To avoid the other ac he immediately executed a maximum performance 'break-away' rolling L and pulling down at "max performance" as the light ac passed some 50ft away horizontally and vertically, with a high risk of a collision. He added that if he had not performed a "max performance breakaway" the two ac would have collided.

He stressed that although they were executing a good lookout, they were following the same track as the other ac, therefore, it presented a very small visual cross section. Additionally, with the bright light levels coupled with the white colour scheme meant pick up was not possible "until almost too late", even under a low workload.

THE RADAR ANALYSIS CELL LATCC (MIL) [formerly known as AIS MIL] reports that despite reviewing the Clee Hill, Burrington, Claxby and Heathrow radar recordings another ac is not shown in the vicinity at the reported Airprox location, where the GR4 pilot's avoiding action break is apparent. Extensive enquiries have been made in an attempt to identify the reported Tutor type ac and service Tutor ac have been ruled out. However, despite exhaustive enquiries they have been unable to trace the other ac, the identity of which remains unknown.

THE TORNADO GR4 PILOT'S UNIT comments that the navigator had a brief glimpse of the other ac as it passed below and believed the other ac was a white Grob Tutor. From initial sighting to passing below and ahead took a mere 5sec, but the other ac was not shown in the HUD video. Nonetheless, the rapid onset of avoiding action makes it clear that the risk of a collision was high.

UKAB Note (1): This Airprox is not shown on recorded radar. The GR4 is shown exiting the Lichfield RC on the Clee Hill Radar recording westbound and in a steady descent as the jet approaches the Airprox location passing 1500ft Mode C (1013mb) and then 1300ft. On the next sweep the ac is shown momentarily 100ft above the previous return at 1400ft Mode C (1013mb) and a small course alteration of about 10° to the L is apparent, at a position 7·7nm NE of Gloucestershire Airport. This might be indicative of the GR4 pilot's reported avoiding action 'breakaway', before the descent is then resumed to low-level and the jet turns northbound.

HQ STC comments that this Airprox is very difficult to comment upon as there is little available evidence other than the Tornado pilot's report. The crew undoubtedly spotted another ac which the pilot took avoiding action on resulting in a very close pass.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the Tornado GR4 pilot, radar video recordings, and a report from the appropriate operating authority.

It was unfortunate that despite the best efforts of the Radar Analysis Cell at LATCC (Mil) it had not been possible to trace the other ac involved. Consequently, the Board had only the laudably frank account from the GR4 pilot upon which to base the assessment of this Airprox. Nevertheless, it was clear to the Members that this Airprox, in the 'see and avoid' environment of the Open FIR, was fundamentally a lookout issue. In this overtaking situation it was the GR4 pilot's responsibility to see and avoid the other ac as its pilot would not have been able to detect the jet approaching rapidly from astern. However, the Board recognised that, when approached from astern at an exactly tail-on aspect at a constant relative bearing and with virtually no relative motion, the reported white-coloured light ac could easily defeat early visual detection. From the GR4 crew's perspective even a CWS would not have helped because the other ac was not squawking but it would seem that in the prevailing circumstances the GR4 crew spotted the other ac as early as might reasonably have been expected. The Board agreed unanimously therefore that this Airprox had resulted from a very late sighting by the GR4 crew.

Regarding the inherent risk, it was not feasible to determine with absolute certainty the separation that pertained because the other ac was not shown on the radar recording. Nevertheless, there was no reason to doubt the veracity of the GR4 crew's account. At a closing speed in the order of 310-340kt it was fortunate that the GR4 pilot had seen the light ac when he did some 400m away and was able to alter his jet's flight path sufficiently to take avoiding action. Whilst the pilot had managed in the time available to take robust action to avoid the untraced light ac the reported 50ft of separation was nonetheless a very close call. The Board concluded, therefore, that although the GR4 pilot's avoiding action might have been barely enough to avert a collision, the safety of the ac involved had been compromised.

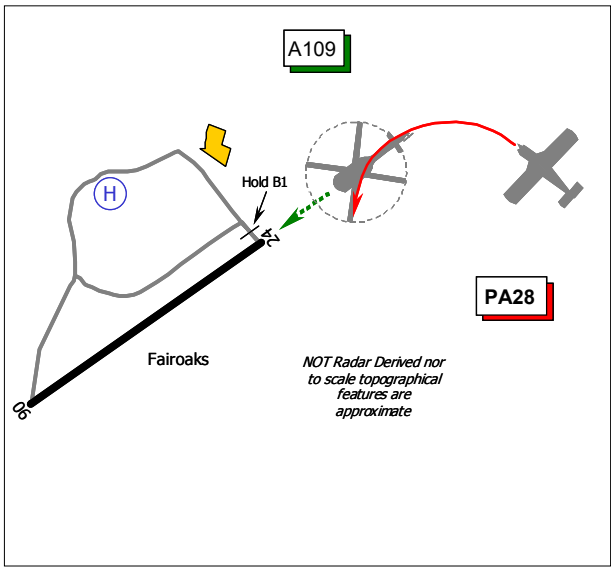
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the Tornado GR4 crew.

Degree of Risk: B.

AIRPROX REPORT NO 065/05

Date/Time:	30 Apr 1414 (Saturday)	
Position:	5121N 00032W (1½nm FINALS to Fairoaks RW24 - elev: 80ft)	
Airspace:	Fairoaks ATZ	(Class: A/G)
	Reporting Ac	*Reported Ac*
Type:	Agusta A109C	PA28 -161
Operator:	Civ Pte	Civ Trg
Alt/FL:	NR	600ft
	(NR)	(QFE 1011mb)
Weather	VMC CAVOK	VMC CLBC
Visibility:	>10km	7-10km
Reported Separation:		
	NR	50-100ft V/nil H
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA A109C HELICOPTER PILOT provided a very extensive account, stating that his helicopter has a black livery but all the ac's lights including the 2 HISLs and the 2 landing lights were on whilst repositioning to Fairoaks from Battersea in CAVOK weather.

Upon passing Sunbury Lock on London Helicopter Route H3 he was instructed by Heathrow to fly not above 1000ft direct from Sunbury Lock to Fairoaks and change frequency to Fairoaks on 123·425MHz, but retaining the allocated squawk until well inside the Fairoaks ATZ. He started talking to Fairoaks [it was actually Fairoaks INFORMATION, manned by a FISO] at about 5nm out and he told them that he was an A109 helicopter out of Battersea cleared by Heathrow not above 1000ft direct from Sunbury Lock to Fairoaks. Reporting FINALS at 3·2nm, he was told by the FISO that there was one ac performing a touch and go and two downwind, whereupon he was cleared, he thought, to land on the grass and break when required to the 'H' pad. He then read back the "clearance" *(sic)* given: Visual with number one performing a touch and go; cleared to the grass then break when required to the 'H'.

Continuing his flight inbound at an airspeed of 110kt with the height reducing from 900ft, his intentions were to fly the approach to RW24 and when over the boundary fence at about 75ft, turn R to the grass reducing speed into the hover over the grass and then at a walking pace to the 'H' parking pad. He reasoned that flying this approach would be in accordance with the noise abatement procedures which required pilots "to avoid overflying the properties in the NE corner of the airfield below 1000ft QFE" [which is an accurate quote from the UK AIP at AD 2-EGTF-1-3 2.21]. With the RW heading being 240° he felt that he was already 30° within the sector and he was also below 1000ft. He had also been to Fairoaks only a few months prior to do his License Proficiency Check and instrument rating renewal on the A109 and he had been informed that this was the preferred approach.

At about 1½nm FINALS he heard on the RT a pilot (at that stage he did not know if it was from a fixed wing or a rotary) transmitting statements to the effect of: "There is a helicopter it has just flown under me I don't know where it's come from – it's passed in front of me and it's below me - it's very close to me - it's in front of me now and I am catching it up - if he does not speed up I will have to go around - he's very close now - Oh that's it I will have to go around now". The pilot made lots of statements on the RT but he could not remember them all. At this stage he was looking very hard to find the ac and also perform his landing checks. With so much talk on the radio he found it very disconcerting and very frustrating due to not being able to make an RT call if it was necessary to take avoiding action. He was also very aware that Fairoaks is an INFORMATION / A/G service. Because he could not see the other ac in question – the PA28 - and the possible threat that if he slowed down or moved off track he might move into the path of this ac which, from all the radio calls he was receiving, lead him to believe it was very close to his helicopter, he continued with the approach at a higher speed than normal to try to keep some distance away

from the ac behind him but still in line with his plan. However, as he approached the threshold for RW24 he noticed an ac at HOLDING POINT B1 which was holding for the RW. He continued his flight to remain in front of this ac and turned for the grass after passing clear. He then hovered over the grass and hover taxied to the 'H' pad for parking as planned.

When he had parked, FISO (B) came over to his helicopter to have a word about the incident and asked him why he had not executed his approach to the grass to the N of RW24. In reply he said that he was not asked to remain north of the RW and if he did that would have put him further into the NE corner which he was required to avoid. She then carried on to say that the FISO on the radio did not make the call very clear but he replied that he understood the FISO fully and read back his "clearance" *(sic)* as given.

In reply to his question about the NE corner she replied by saying, "That's right over there somewhere" and pointed to a big house. She added that "all the resident helicopters know they can fly over the land N of the RW" but in the 2 years that he has been visiting Fairoaks no one has said that this was acceptable; moreover, this would not be in accordance with the promulgated Noise Abatement Procedure. He highlighted that he had never used this route and the approach that he used today was the same approach that he had always used.

A short time later two instructor pilots came over to him, one of whom was the PA28 pilot complaining about the occurrence. When the A109 pilot asked him 'How and when did you see me?', the PA28 pilot carried on to say that he did not initially see the A109 pilot, it was his student who, as they started the turn, spotted the helicopter down through the gap between the engine and wing on the port side of the ac, the helicopter passing from R to L. From this the A109 pilot deduced and highlighted that he was on 'FINALS' and the PA28 was on base leg turning on to 'FINALS' when the Airprox occurred.

In his view, there may have been a risk of the two ac colliding; upon reflection and sitting in the ac to check, he had no way of visually spotting the other ac from the RHS of his helicopter. Moreover, with the PA28 being high on his port side this could have been obscured by the large overhead panel and door surround. He opined that he did not hear any RT calls from the PA28 pilot reporting 'BASE LEG' or 'FINALS' but if he did he would have expected the ac to follow him as he had been "cleared" to land.

THE PA28-161 PILOT, a flying instructor, reports that he was instructing a student in the left hand (LHD) cct to RW24 at Fairoaks in his white and yellow coloured ac; the wing and tail strobes were on. They were in communication with Fairoaks INFORMATION on 123·425MHz; the SSR was selected off.

After flying in the Cct for approximately ½hr, he heard the A109 helicopter pilot call inbound to the field. As this ac was inbound from the E the pilot was advised by the FISO, as is normal, to approach and land N of the RW. Whilst DOWNWIND at 70-80kt flying level at 1000ft Fairoaks QFE (1011mb) with another circuiting ac behind him at the time, the student carried out the required checks, made the DOWNWIND RT call whereupon they were advised to call FINAL.

They started the L turn onto BASE LEG, whereupon the student started to lose height for the final approach: descending towards 600ft QFE, he looked to their R which is a normal check for any traffic that might have been doing a straight in approach for RW 24. He had not heard any ac calling for a 'straight-in' approach; also it is not standard procedure when there are ac in the cct. At this point he was unaware that the A109 was in the ATZ doing a straight-in approach at a height of approximately 400ft; when looking to the R, because of its dark colour against a dark green background, they did not see it and did not expect it to be there. They commenced a L turn descending onto FINAL and with about 30° to go to the final approach heading, passing 600ft QFE, his student shouted "helicopter". He immediately reacted, looking all around the ac L and R, not realising that it was immediately below them, until he spotted it just in front of them about 50ft-100ft below and 100yds ahead. They then started to gain on it and he immediately took avoiding action to the L and landed shortly after. He assessed the risk as "very high" and added that although the workload was not high they were in a descending L turn from BASE onto FINAL.

After landing he talked to the Tower regarding this incident, then, accompanied by the CFI, went to talk to the pilot of the helicopter to see if they could understand what had taken place. This does not alter the fact that they did not see him and would have taken the appropriate action if they had. The A109C pilot should have been, if carrying out standard procedures for Fairoaks, flown about 300yd north of his position to land at the helicopter parking area.

AIRPROX REPORT No 065/05

THE FAIROAKS AERODROME FISO (A) reports that the A109 pilot called stating that he had 3nm to run to the aerodrome from London Battersea. Subsequently airfield data along with the position of the two ac in the circuit were passed, the PA28 involved being DOWNWIND at this stage. When the progress of the helicopter was checked visually he could see he was already relatively close so, to avoid a possible confliction, he suggested the A109 let down on the N side of the R/W which the pilot acknowledged.

After landing, on chatting with the pilot of the helicopter, the A109 pilot said that he thought that "let down north side" meant he was being asked to track the R/W centre line until the threshold and on reaching the threshold, break right to the north of the R/W. He also stated that he had been told never to overfly the property to the NE of Fairoaks aerodrome, as published in the AIP.

THE FAIROAKS AERODROME FISO (B) reports that she was on watch with FISO (A) who was working the radio. The A109 initially called and stated that he was 3nm to the E inbound from Battersea. Assuming the pilot required a straight in approach, FISO (A) was heard to give the RW in use and pressure settings. The PA28 established in the circuit called DOWNWIND but whether its pilot was aware of the inbound helicopter or not she was unsure as she was not concentrating 100% on the situation due to manning other areas in the Tower at the time. FISO (A) asked the pilot to let down at his discretion for the N side so as to give way to Cct traffic on BASE LEG - by this time, the subject PA28. She heard a positive readback from the A109 to let down to the N side and the pilot also said that he would be breaking right to a specified position. As the helicopter was on FINALS the PA28 pilot was heard on RT saying that the helicopter was very close and also said "Where did that helicopter come from?".

UKAB Note (1): The UK AIP at AD 2-EGTF-1-2 notifies the Fairoaks ATZ as a radius of 2nm centred on RW06/24, extending from the surface to 2000ft above the aerodrome elevation of 80ft amsl. Either an INFORMATION or A/G Service is provided 07-1700UTC on Saturdays. The ATZ lies partly within the Class A London CTR and the airspace above a height of 1500ft aal is ceded to London Heathrow.

ATSI reports that when the Airprox occurred both flights were in communication with the Fairoaks FISO (A) who described both his workload and traffic loading as "medium". There is no mandatory requirement for RTF recording at aerodromes where only an INFORMATION service is provided. Accordingly, as no such recording equipment is provisioned at Fairoaks, this report has been compiled following a review of the radar recording, written reports and an interview with the FISO concerned.

Although Fairoaks is situated within the Heathrow CTR, which is Class A airspace, flights operating within a 2nm radius of the aerodrome are permitted to do so without compliance with the IFR. Pilots are responsible for providing their own separation from other traffic operating in the relevant airspace. [The full details can be found in the UK AIP at AD 2-EGTF-1-4].

The PA28 was carrying out LHD Ccts to RW24 at Fairoaks with an instructor and student on board. The A109 had departed from Battersea at about 1405, inbound to Fairoaks. When the A109 pilot established contact with the Heathrow SVFR controller, the pilot was cleared to follow Helicopter Route H3, not above 1000ft London QNH, and then route from Sunbury Lock direct to Fairoaks. [ATSI Note: Sunbury Lock is approximately 6½nm FINALS for RW24 at Fairoaks]. The pilot was also instructed to contact Fairoaks passing Sunbury but to retain the allocated squawk of A7036 until well inside the Fairoaks ATZ. The pilot reported that he contacted the Fairoaks FISO approximately 5nm from the aerodrome. The FISO recalled that when the pilot of the A109 contacted him, he passed the RW in use, pressure setting and position of the two ac carrying out Ccts to RW24 – which included the subject PA28. The A109 pilot added that shortly afterwards he called FINALS when at a range of 3·2nm and was told that there was one ac on FINAL, which was carrying out a touch and go, and another downwind. The pilot reported that he was "cleared *(sic)* to land on the grass and break when required to the 'H' pad". Analysis of the radar recording shows that when the A109 was on final at a range of 3·2nm, one of the circuit ac – the No1, not the subject PA28 - was turning from a L base onto a 1nm final. Shortly afterwards, at 1413:48, when the A109 is crossing the M25 at 2·2nm FINAL, the first Cct ac is on a 0·7nm final and the subject PA28 is mid DOWNWIND LHD for RW 24. At 1414:05, the radar recording shows the No1 on a 0·4nm final at 200ft, with the A109 at 1·7nm FINAL at 500ft, whilst the subject PA28 is commencing a L turn from DOWNWIND onto BASE LEG at 1·4nm out. Unfortunately, this is the last radar print where the PA28 is shown before carrying out a go around; consequently, the Airprox is not shown on the radar recording.

The FISO explained that he recalled the pilot of the A109 calling soon after passing Sunbury Lock. He had expected the helicopter to join on a R BASE LEG for RW24 and land to the N of the RW about half way between

the north side 'H' and the runway itself. However, it is clear from the A109 pilot's report that this was not what he was planning to do. When the A109 crossed the M25 the first Cct ac would have been on final: however the FISO stated that he was not monitoring the final approach area any more than the other parts of the Cct. He recalled that he did not update the traffic information to the A109 nor did he advise the pilot of the PA28 about the helicopter traffic when the former reported downwind. He stated that he was awaiting a 'trigger' call from the A109 pilot, i.e. that it was on BASE LEG, before passing any traffic information to the PA28 pilot. He did not consider the two ac to be in potential conflict.

The relevant responsibilities of FISOs are documented in CAP 410 (Manual of Flight Information Services) Part B – Aerodromes. Page 1 states that FISOs are responsible for:

"*Issuing information to aircraft flying in the aerodrome traffic zone to assist pilots in preventing collisions*'.

Page 4, Joining circuit, states:

"*Landing direction and traffic information on known traffic flying within the ATZ and the immediate surrounding local area is normally passed when the aircraft is still some away distance from the ATZ. This enables the pilot to determine if it is safe to proceed with the flight as planned. FISOs are not to instruct pilots to join the circuit at a particular position. Furthermore, FISOs may not allocate a landing order, e.g. 'Report final number 3'. The pilot must be told that there are two aircraft ahead in the circuit and it is up to the pilot to position himself accordingly".*

In the UK AIP, at GEN 3-3-5, para 5.53, there is a note that states:

"*Pilots are reminded that, when operating in the vicinity of aerodromes and not in receipt of Air Traffic Control instructions to the contrary, Rule 17 para 5 (a) of the Rules of the Air Regulations 1996 applies and they should 'conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome'. Flights contemplating carrying out a straight in approach should bear in mind that, on many occasions, this method of joining will not permit compliance with this Rule*".

Furthermore, in the Aerodrome Manual (which includes the local instructions for FISOs) it states:

"Where possible helicopters are to reduce speed, maintain 1000ft and then let down over the centre of the aerodrome and then hover taxi to the helicopter pad".

Although this information is contained in the Aerodrome Manual, it is not readily available to pilots nor is it what the FISO expected the pilot of the A109 to do. It would therefore appear that the FISO's expectations did not match those of the pilot of the A109 due to the lack of promulgated arrival procedures for helicopters. Accordingly, the following recommendation was made by ATSI to the Aerodrome Operator:

The Aerodrome should publish in the UK AIP the procedures for inbound helicopters arriving at the aerodrome so that both pilots and FISOs are aware of the flight path to be followed.

The lack of traffic information provided to the pilots of the PA28 was undoubtedly a contributory factor here. Although the PA28 instructor reports that he had heard the initial call from the A109 he expected the helicopter to approach N of the final approach track (FAT) and land between the RW and the north side 'H'. The radar pictures would indicate that the pilot of the A109 had positioned himself into the traffic pattern formed by the other ac in the Cct, thereby complying with the terms of Rule 17. The A109 pilot reports that he called 'FINAL' at a range of 3.2nm and this should have been the prompt to the FISO to pass or update traffic information and also for the pilots of the PA28 to visually scan for the helicopter. The radar pictures, supported by the report from the PA28 instructor, would indicate that the A109 was ahead of the PA28 when the latter turned onto final approach. Furthermore, the PA28 was catching up the helicopter on final but the FISO could do nothing as the frequency was blocked by comments transmitted by the PA28 instructor on the RT. The apparent reliance by the PA28 instructor pilot that the approaching A109 helicopter would follow 'standard procedures at Fairoaks' and approach only 300yd displaced from the FAT routeing to a landing area to the N of the RW was flawed.

The Fairoaks FISO anticipated that the A109 would follow a non-published local procedure, to land N of RW24, and therefore did not recognise the conflict between the helicopter and the PA28. Accordingly, he did not pass any traffic information to the PA28 pilots about the A109, as required in CAP 410 Part B. This was contributory to

the PA28 pilots not sighting the helicopter when either downwind or on base leg. However, at non-ATC airports [where only a FISO or A/G Operator is provided] there is a clear onus on all pilots to maintain a good lookout throughout the Cct for all other ac. The fact that the A109 was ahead of the PA28 would suggest that the pilot of the helicopter had complied with the requirement to follow the traffic pattern established by other ac: however, as neither pilot aboard the PA28 saw the A109 until they were virtually on final approach it would appear that they flew into confliction with the helicopter.

UKAB Note (2): ATSI report further that the aerodrome operator accepted their recommendation. Approaches by helicopters should normally be made to the grass to the north of the runway. The following note will be included in the Fairoaks entry in the UK AIP at AIRAC 11 to be published on 27th October 2005.

"*Subject to traffic, including taxiing aircraft, approaches may also be made to the grass to the north of the runway. Helicopters making an approach to the grass to the north of runway 24 must avoid over-flying the buildings in the north-east corner of the airfield.*

Helicopters which require an approach to the runway must state their intentions on first contact with Fairoaks INFORMATION/RADIO.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar video recordings, reports from the aerodrome Flight Information Service Officers involved and a report from the appropriate ATC authority.

The Board considered it was unfortunate that the recording of RT was not mandated for aerodromes where only an Aerodrome Flight Information Service or A/G Service was provisioned. Therefore it was impossible to determine exactly what was said by AFISO (A) to the A109 pilot or indeed what the A109 and PA28 pilots had themselves said on the RT. Nevertheless, there was no reason to doubt the veracity of the respective reports and evidently a misunderstanding had developed over the arrival procedure to be followed by visiting helicopters. Furthermore, in this visual Cct, Members were clear that both pilots have a responsibility to look out for one another.

When the A109 pilot was instructed by Heathrow SVFR to fly from Sunbury Locks direct to Fairoaks the route took him almost directly onto finals for RW24 from about 6½nm out: a straight-in approach seemed to be a reasonable option. Moreover, the helicopter pilot had reported that he had communicated his intentions for a straight-in approach to Fairoaks INFORMATION, which should also have been heard by the pilots of the subject PA28. The A109 pilot also mentioned that he was told by the FISO about other Cct ac: consequently he should have been looking out for the subject PA28 as he approached the Cct area. This was imperative, especially at aerodromes where full ATC was not provided, but it was clear from the ATSI report that there were two ac including the PA28 in the Cct when the A109 pilot called FINALS. Whilst it was reported that FISO (A) had been waiting for the A109 pilot to make a BASE LEG call as a 'trigger' call before passing any traffic information to the PA28 pilot, this seemed illogical to some Members because it should have been evident that the helicopter would not have flown a BASE LEG as such whilst joining straight-in from Sunbury Lock toward FINALS.

Members were concerned that the A109 pilot had made this FINALS call a long distance outside the ATZ (at 3·2nm) and a GA pilot Member voiced his concern over a propensity by GA pilots to call early, thereby effectively 'staking their claim'. Nonetheless, in a helicopter pilot Member's opinion, relatively early calls could be of help to other pilots in the Cct by alerting them to the position of the ac in good time, thus enabling them to plan their own Cct more effectively. Discussion ensued about whether the A109 pilot had integrated himself correctly into the established pattern and whilst he said that he had positioned behind the No1 ac doing a 'touch and go', he evidently had not seen the subject PA28 downwind at all. Here then was part of the cause insofar as this was a non-sighting by the A109 pilot having been informed of the PA28 in the Cct. After passing 1½nm finals for RW24, from when he first heard the RT transmissions from the PA28 instructor, the other ac was then approaching from his 'blind quarter' astern and he would therefore not have been able to see it at all. Nevertheless, Members agreed that the FINALS call from the helicopter pilot should have prompted FISO (A) to check the proximity of other Cct traffic and to pass traffic information to the PA28 which was then established downwind. Clearly this might then have alerted the PA28 instructor pilot to search more thoroughly for the A109 because he said that whilst he was aware that there was a helicopter running-in to the aerodrome he did not see it. If therefore the PA28 pilot had been warned or the FISO had passed further traffic information about the PA28 to the A109 pilot then it could have

prevented this close quarters situation from developing further - Members thought these omissions a significant contributory factor to this Airprox. Board Member's agreed with ATSI's sage advice regarding non-ATC aerodromes and exhorted pilots to be punctilious about their scan and lookout in a visual Cct: from the PA28 pilot's report it was also evident that although he might have looked down the approach he never actually saw the helicopter, possibly because he did not expect the A109 pilot to fly where he did and thought the A109 would fly some 300yd N of the RW centre-line to land directly at the helicopter parking area. Here then was the other part of the cause and the Board agreed that whilst there was clearly an opportunity to spot the approaching helicopter earlier it was a very late sighting by the PA28 instructor pilot indeed.

Whilst Members were agreed that the fundamental issue here was one of lookout, another significant contributory factor was the differing perceptions of the arrival procedure that this visiting helicopter pilot should follow whilst making his visual approach into Fairoaks. A GA Member commented that whilst a straight-in approach might be the most expeditious method of recovering to the aerodrome it does not permit easy detection and recognition of the position of other Cct traffic, which can make integration into the circuit difficult. Consequently traffic information about ac flying in the Cct was very important to help pilots integrating into the established pattern. For this reason he always advocated an overhead join but clearly for helicopters this might not be the most practical option especially here with limited room to manoeuvre below 1500ft aal with the airspace above ceded to Heathrow. Evidently, the respective reports from the PA28 pilot and FISOs had shown that they both expected the A109 pilot to approach direct to the N of the RW centreline. Whereas, this information was contained in the aerodrome manual it was not promulgated in the AIP, so the helicopter pilot believed that to comply with the promulgated nose abatement procedures he had to approach the RW surface, turning to the North side after passing the threshold. The Board was pleased to see that any further potential for confusion on this aspect had now been reduced following the recommendation by ATSI and the subsequent planned amendment to the AIP entry for Fairoaks which included more specific helicopter procedures.

Turning to risk, it was very fortunate that the PA28 student pilot had spotted the helicopter when he did and alerted his instructor. Here was a salutary lesson for student pilots who should always be briefed to alert their instructors to the unexpected. However, it had apparently taken a few moments before the PA28 instructor pilot could establish where the helicopter was and during this period his ac was closing continuously on the A109, from above and astern. Members agreed that it would have been helpful if the PA28 pilot had transmitted a more precise warning to the helicopter pilot when he took avoiding action, as by that stage the helicopter pilot was unable to see what was happening. Furthermore, the A109 pilot reports that a steady stream of RT calls prevented him from making a transmission himself, which might also explain why FISO (A) was also unable to transmit any further warnings. In this close quarters situation it was not until after the PA28 instructor pilot's visual sighting that avoiding action was initiated by breaking L and away from the helicopter some 50-100ft below them. Given the non-sighting of the PA28 by the A109 pilot, the latter was not best placed to do anything other than keep the helicopter's speed up on finals, which he did. Whilst the Board agreed that the PA28 instructor's avoiding action had just about removed the actual risk of a collision, it was still a very close call and the Members where unanimous that the safety of these two ac had certainly been compromised in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A very late sighting by the PA28 instructor pilot and a non-sighting by the A109 pilot.

Degree of Risk: B.

Contributory Factors:

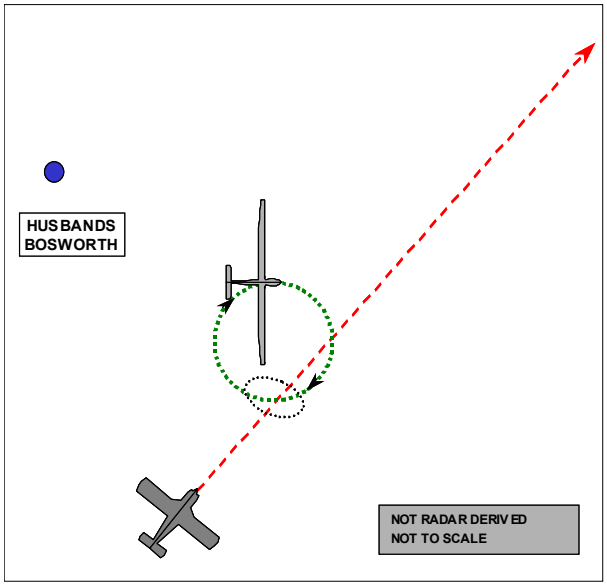
a. Helicopter arrival procedures were not sufficiently promulgated in the UK AIP, which led to confusion between FISO (A) and the pilots involved.

b. No traffic information was passed to the PA28 pilots about the A109, nor was the latter's pilot given updated traffic information about the PA28.

AIRPROX REPORT No 066/05

AIRPROX REPORT NO 066/05

Date/Time:	6 May 1315	
Position:	5225N 00101W (1.5nm SE Husbands Bosworth - elev 505ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	LS8 Glider	PA28
Operator:	Civ Pte	Civ Pte
Alt/FL:	3500ft (QFE 999mb)	4000ft (RPS)
Weather	VMC CLBC	VMC IN HAZE
Visibility:	>30km	10km
Reported Separation:	50ft V/0 H	50ft V/100ft H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS8 GLIDER PILOT reports flying a white glider on a local soaring flight from Husbands Bosworth and listening out on their frequency. He had launched 15min previously and was gaining height in a thermal, circling right at 50kt about 1.5nm SE of the airfield and about 500ft below the cloud base of 4000ft agl [i.e. at about 4000ft amsl]. As he glanced into the turn to check for other traffic he was startled to see a light ac very close to him (100m away) and slightly below his glider. It appeared at that stage to be diving below him and after passing continued on track, turning slightly further to the N and slightly closer to Husbands Bosworth Airfield. The noise level was very high and he was not able to take any avoiding action in the time available, assessing the risk as being very high. The power ac was a low wing T tail 4-seater, apparently of all metal construction with ribbed control surfaces, and was coloured brown and white or cream. He was very concerned as around a dozen other gliders were soaring in the immediate area and it is well known that white ac are notoriously difficult to see, especially against a grey sky. The area is marked as an Area of Intense Gliding Activity with winch cables up to 3000ft.

The glider pilot was disappointed at his late sighting of the other ac due, in part, to distraction through a minor instrument problem; however, a circling glider pilot can often miss approaching traffic from his blind area.

UKAB Note (1): Husbands Bosworth in promulgated in the UKAIP ENR 5-5-1-3 as a 'Glider Launch Site' (by winch/ground tow (W) and tug aircraft/motor glider (T) up to 3000ft agl. There are no 'Areas of Intense Gliding Activity' promulgated in the AIP only 'Glider Launching Sites'.

THE PA28 PILOT reports flying a brown and white ac VFR from Bournemouth to Sandtoft at 130kt squawking 3721 (Cottesmore) and in receipt of a RIS from Cottesmore. They had been advised en route of intense glider activity and this was confirmed by many sightings as a result of which they had changed their heading to more Easterly to achieve more separation from them. In addition there had been a slight haze on the day of the incident. Both the pilot and his co-pilot had been keeping a good look out but both the traffic density and workload were high due to intense glider activity. When they were about 2nm S of Husbands Bosworth they were passed TI from Cottesmore on a contact in their right 10 o'clock at ½nm and shortly after he saw a white glider about 100ft away and slightly above them. He immediately commenced an "acute" dive missing the other ac by an estimated 50ft: he assessed the risk as being medium/high.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted solely of reports from the pilots of both ac.

The Board determined that both ac had been operating legitimately in a busy part of Class G airspace and therefore had an equal and shared responsibility for collision avoidance, albeit with 'power giving way to sail'. Obviously, this requirement can only be achieved if both pilots see one another's ac in sufficient time to act.

As it became apparent that there was heavy glider activity ahead, the PA28 pilot had sensibly intensified his (their) lookout and taken pre-emptive avoiding action based on apparently good TI from Cottesmore APP. His action had not, however, been sufficient to route around all the gliders in the area and, as he stated in his report, he had not seen the glider involved in the incident until it was an estimated 100ft (2 sec) away. It was therefore unlikely that his 'acute dive' would have generated very much (if any) additional separation in the time available. The glider pilot, possibly due to distraction, did not see the PA28 until it was too late and it had effectively passed him; he was therefore not able to avoid it. That being the case, and noting the probability that the PA28 avoiding action might have been too late to take effect before the ac passed, the Board considered that there had been an actual risk that the ac may have collided.

Even though, in this case it had not prevented the ac from coming very close the Board commended the PA28 pilot for opting for a LARS to assist his passage through congested airspace.

PART C: ASSESSMENT OF CAUSE AND RISK

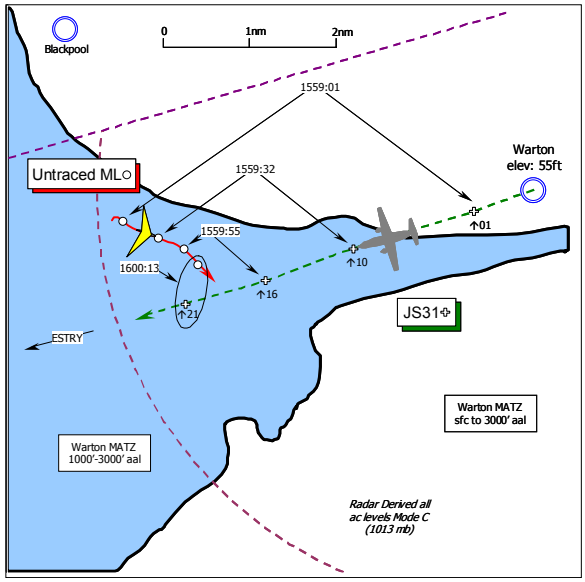
Cause: Effective non-sighting by the glider pilot and a very late sighting by the PA28 pilot.

Degree of Risk: A.

AIRPROX REPORT No 068/05

AIRPROX REPORT NO 068/05

Date/Time:	11 May 1600	
Position:	5343N 00300W (4nm WSW of Warton - elev 55ft)	
Airspace:	MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	BAe JS31	Unk Microlight
Operator:	CAT	NK
Alt/FL:	2200ft (QNH 1026mb)	NR
Weather	VMC CLBC	NK
Visibility:	20km	NK
Reported Separation:	400-500ft V/<¼nm H	NR
Recorded Separation:	0·4nm @ 1600:13	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe JETSTREAM 31 PILOT, the PF from the LHS, reports that his ac has a predominantly white livery and all the ac's lighting including the HISLs and landing lights were on whilst outbound from Warton to Bristol Filton. He was in receipt of an Aerodrome Control Service from Warton TOWER on 130·8MHz under IFR, but flying in VMC into the sun some 2600ft below cloud with a flight visibility of 20km. Mode C and TCAS is fitted, though at the time of the Airprox the TCAS was not released for service.

Heading 256° climbing-out through 2200ft Warton QNH (1026mb) on the extended centreline for RW26 at Warton at 160kt, a high wing microlight was spotted <¼nm away at R 2 o'clock some 4-500ft above his ac. No avoiding action was taken as their course was taking them clear of any further conflict but he assessed the risk as *"high"*. He cited workload during take-off as a significant factor, adding that the microlight was in his blind-spot and had been spotted by the P2 PNF whilst completing the after take-off checks.

Suggesting that MATZ penetration procedures be reviewed for all airspace users, he opined that the microlight pilot's airmanship was very poor and this ac was a hazard to military and civil traffic out of Warton. He believed that if you are not talking to the controlling ATSU then other pilots should stay out of the MATZ.

THE RADAR ANALYSIS CELL (RAC) AT LATCC (MIL) reports that a replay of the St Annes Radar recording suggests that the microlight landed at Ince Aerodrome. Despite exhaustive enquiries through known operators and local clubs in the area and with the assistance of the British Microlight Association, it has not been possible to identify the reported microlight.

THE WARTON AERODROME CONTROLLER (ADC) reports that the Jetstream 31 was cleared by MACC to join CAS bound for Filton, routeing ESTRY-WALLASEY, to join CAS level at FL90, squawking A5120. Warton RADAR, utilising the Great Dun Fell Radar as the Warton SRE was unserviceable, issued the release as 'on track ESTRY remaining on the TOWER frequency'. The flight departed off RW26 and the crew subsequently reported sighting a microlight some 400ft above them, apparently outside the ATZ but within the MATZ. The microlight was not displayed to Warton RADAR nor was it in contact with Warton or Blackpool ATC. The pilot of the JS31 subsequently informed Warton RADAR that he would be filing an Airprox.

ATSI reports that the Great Dun Fell Radar in use by Warton at the time provides no primary coverage in the Warton area below an altitude of 3500ft. The JS31 was cleared to depart on track ESTRY, prior to joining CAS at Wallasey, climbing to FL90. The ADC cleared the JS31 for take off at 1557:20 and at 1600:20 the pilot transmitted "..[JS31 C/S] *2500 feet and do you have on frequency a microlight which just crossed above us about 400 feet*". The ADC advised that he would check with the radar controller who had no knowledge of the reported ac.

Analysis of the recording from Great Dun Fell Radar gives no indication of the microlight. However, on the St Annes radar (which was not available to the Warton controllers at the time) an intermittent primary contact can be seen tracking approximately 140º passing approximately 4nm W of Warton. Warton ATC contacted Blackpool who were not working the microlight but could see it on their radar. No ATC causal factors were disclosed.

UKAB Note (1): The JS31 is clearly shown on the St Annes Radar recording departing from Warton. At 1559:01, as the JS31 passes 100ft Mode C (1013mb) in the climb – equating to 490ft Warton QNH (1026mb) a primary contact which might well be the reported microlight is shown steadying on a SE'ly track within the MATZ and intermittently thereafter. As the JS31 coasts out and climbs steadily on departure through 1000ft Mode C – an altitude of about 1390ft QNH – the contact presumed to be the microlight is in the JS31 crews R 1 o'clock at a range of 2·3nm. At 1559:55, the contact is shown again at R 2 o'clock a range of about 1nm and drawing slowly aft. The JS31 climbs through 1800ft Mode C at 1600:02, equating to the altitude at which the JS31 pilot reported sighting the microlight of about 2200ft QNH, but the microlight's primary contact is not shown. The minimum horizontal separation when the contact is displayed of about 0·4nm occurs at 1600:13, after the microlight has started to draw astern of the JS31.

UKAB Note (2): The UK AIP at ENR 2-2-3-2 notifies the non-standard Warton MATZ as a rectangle of airspace 20nm x 6nm centred on the ARP and aligned to the main RW08/26 axis but offset 1nm to the S. The portion of the circle radius of 5nm, centred on the ARP, extends from the surface to 3000ft above the aerodrome elevation of 55ft amsl but outwith 5nm the base is 1000ft aal.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report solely from the JS31 pilot, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

It was most unfortunate that despite their considerable efforts the RAC had been unable to identify the reported microlight. Therefore, the Board had only the information contained in the JS31 pilot's report; the scant radar data available and the supporting report from ATC upon which to base their assessment of the cause and risk. Whilst not an ideal situation, Members believed that there was sufficient information available.

The Board was acutely aware that the rules for flight within MATZs around military/government aerodromes and here specifically a contractor's aerodrome are significantly different to those for ATZs. A MATZ is not universally recognised as 'controlled' airspace by the civilian aviation community so when active, outwith the concomitant ATZ, transit of the airspace encompassed within a MATZ requires neither communication with - nor clearance from - the associated ATSU by civilian pilots flying in conformity with civilian procedures. So although the location of MATZs (together with their dimensions); contact information for the controlling ATSUs and applicable guidance is published in the UK AIP, civilian pilots are not compelled to abide by the procedures contained therein, a point that was well understood by Members. From the unknown microlight pilot's perspective, whilst not in communication with Warton and outwith the Airspace contained by the Warton ATZ, he was indeed flying quite legitimately across the MATZ which is Class G airspace. Nevertheless, in the Board's view it was most unwise to ignore these well established procedures, thereby penetrating invariably busy traffic patterns unannounced and without the benefit of an ATS. Good airmanship should dictate that an applicable MATZ crossing service should always be sought when the MATZ is active, in accordance with promulgated procedures, as suggested here by the JS31 pilot. Controller Members were perfectively aware of the inherent dangers of not communicating with the applicable controlling authority when flying near aerodromes and their associated instrument/approach patterns. Moreover, military controller Members endorsed the JS31 pilot's view that ac pilots should remain outside the MATZ if they were not in communication with the applicable ATSU.

Turning to the events related here, it was clear that neither the JS31 crew nor Warton ATC could have prevented this close encounter in the climb-out from RW26 at Warton. The unknown microlight would have been extremely difficult to detect from the Tower at this range, unannounced, before the JS31 departed. Moreover, it was clear that although the St Annes Radar recording had shown the small ac intermittently, this was not available to the Warton controllers who were operating without their own aerodrome SRE and temporarily using the remotely situated Great Dun Fell source. As it was, it was left to the JS31 crew to detect the microlight visually in this 'see & avoid' environment, which they did at a range of <¼nm away as the latter approached from their R 2 o'clock some 4-500ft above them. Some Members thought that this might have been a late sighting on the crew's part but others thought that given the circumstances the microlight was spotted in reasonable time. That said it was

fortunate that the alert JS31 PNF had spotted this small ac when he did, as he was executing the 'after take-off checks'. Without the microlight pilot's report it was fruitless to speculate further. Therefore, the Board could only conclude that this Airprox had resulted from a conflict with an untraced microlight in the Warton MATZ.

Whereas the JS31 pilot had cited a "high" risk in his report, the Board did not come to the same conclusion from the information he provided coupled with the St Annes Radar data. Here the JS31 pilot might have been considering potential risk: this was not within the Board's remit: Members only consider what actually occurred. Therefore, as the JS31 pilot had reported no avoiding action was taken as their course was taking them clear of the microlight that passed apparently no closer than 0·4nm away, in the circumstances that pertained here there was in the Board's view no inherent risk of a collision.

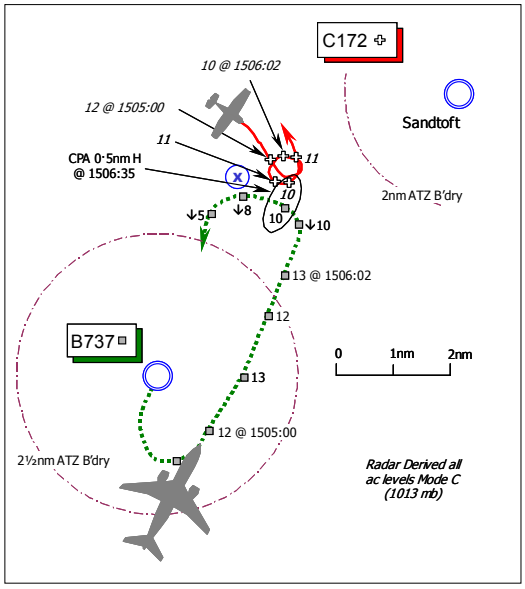
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict with an untraced microlight in the Warton MATZ.

Degree of Risk: C.

AIRPROX REPORT NO 069/05

Date/Time:	12 May 1506	
Position:	5332N 00057W (4nm NE Doncaster Sheffield Airport - elev 55ft)	
Airspace:	FIR	(Class: G
	Reporting Ac	*Reported Ac*
Type:	B737-500	C172
Operator:	CAT	Civ Pte
Alt/FL:	1100ft (QNH 1025mb)	1200ft (QNH 1015mb)
Weather	VMC CLOC	VMC CLOC
Visibility:	NR	>10km
Reported Separation:	3nm	nil V/~1-1½nm H
Recorded Separation:	Nil V/0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737-500 PILOT reports he was flying circuits at 140kt in the left hand visual cct to RW20 at Doncaster Sheffield Airport (DSA) and in receipt of an aerodrome control service from DONCASTER TOWER. After turning onto the BASE LEG heading 290°, descending from 1100ft Doncaster QNH, a TCAS TA alerted them to a high wing ac - probably a C172 – flying at the same altitude on a heading of about 190°. The TA rapidly changed to an RA "DESCEND NOW" which was actioned coincident with the turn onto final approach for RW20 that was also avoiding action. The Cessna ac, first spotted in a L turn away from his ac and from DSA, departed the area heading approximately 030°. DSA ATC was informed: he assessed the risk as "medium".

THE C172 PILOT reports his ac is coloured white with brown stripes, the landing light was on but HISLs are not fitted. He was flying VFR from Sandtoft and in communication with Sandtoft RADIO A/G station on 130·42MHz. A squawk of A7000 was selected with Mode C.

Circling L at about 80kt in a left orbit, about 1nm E of Lindholm disused aerodrome, after one turn he first spotted the other ac – a low-wing twin engine passenger jet, possibly a B737 - about 2-3nm away also in a 30° AoB L turn, after the point in both of their turns when the other ac had passed through the 12 o'clock. His attention was drawn to the other ac by its bright landing lights. As they were already turning away from each other, he continued to turn at an increased rate and rolled out flying away from the other ac. Minimum separation was 1-1½nm at the same altitude as he turned through 110° at the closest point and the B737 descended through his level. He does not think there was any danger of collision as both pilots saw and avoided each other's ac "in the normal way". In assessing the risk he said that if both pilots had continued turning at the original rate, the minimum separation would still have been about ½nm: therefore, the risk of collision was low. He opined that this is a very busy area with all kinds of ac, including light ac, passenger jets, military fast jets at low and medium level and helicopters, so passing another ac within 1nm is quite common.

DONCASTER SHEFFIELD AERODROME CONTROLLER (TOWER) reports that at 1507 the B737 was turning L base for RW 20 on a circuit training flight when an Airprox was reported against unknown traffic to the NE of Doncaster. No other traffic was known to ATC at that time. The B737 pilot reported that when he was at a range of 2·5nm from DSA, a high wing light ac - possibly a Cessna 172 - was seen in a left turn 3·5nm to the NE. Reporting his altitude as 1100ft DSA QNH (1025mb), the B737 pilot said the other ac was at the same level. At 1512, he contacted Waddington (the local LARS) to see if they were working the ac. At 1514 he contacted Sandtoft who did not know of any such traffic but were using RW05 LH.

The 1450UTC DSA weather was sfc wind: 100/11kt; Vis: 28km, nil Wx; Cloud: FEW 500ft; SCT 2500ft. QNH: 1025mb.

UKAB Note (1): The UK AIP at AD 2-EGCN-1-6 notifies the Doncaster/Sheffield ATZ as a radius of 2½nm centred on RW02/20, extending from the surface to 2000ft above the aerodrome elevation of 55ft amsl.

UKAB Note (2): The Claxby radar recording illustrates this Airprox broadly as described by both pilots and shows the B737 circuiting L at DSA squawking A2000 with Mode C as the C172 approaches a position 1nm E of Lindholme from the NW. The B737 steadies downwind L for RW20 at 1505:00, level at 1200ft unverified Mode C – which equates to about 1560ft DSA QNH (1025mb) - as the C172 enters a left hand orbit, as reported, at the same indicated level. As the B737 transits downwind, the C172 completes one L turn through S and is shown at 1100ft unverified Mode C turning through 110°, commencing the second orbit as the B737 turns base leg descending through 1000ft Mode C. The CPA occurs as both ac are shown passing starboard to starboard at 1506:35, at a minimum range of 0·5nm, both indicating 1000ft unverified Mode C (1013mb). The C172 then steadies NNW and the B737 continues the turn descending towards FINALS for RW20 as reported.

ATSI reports that there are no apparent ATC causal factors. The B737 was carrying out visual circuits and the C172 concerned was not in communication with Doncaster/Sheffield. The airfield is not equipped with radar at present.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

CAT pilot Members commented that the size of the Cct that the B737 crew was flying seemed quite reasonable and a 3nm FINAL was within normal parameters for an ac of this size. Although the B737 had exited the Doncaster Sheffield ATZ into the unregulated airspace of the open FIR between the two airfields, this was to be expected when conducting visual ccts in an airliner. This should be borne in mind by those operating in the vicinity - such as the C172 pilot here - although at the time of the Airprox he appeared to be neither approaching nor circuiting to Sandtoft. As it was, the B737 pilot reported that after being alerted by a TCAS TA he had spotted the C172 as they turned onto the BASE LEG heading 290°, descending from 1100ft. CAT pilot Members thought that in order to generate a TCAS "DESCEND NOW" RA the B737 pilot had been flying only marginally above the normal height - 1000ft agl - at which such RA's are inhibited but the 'sense' of the RA was fortunately the same as his descending turn onto FINALs. Thus, having sighted the C172 from the restricted view of the B737's flight deck and been turning away from it, the radar recording had shown that the C172 had passed just ½ nm away at the same level. From the other cockpit, the C172 pilot - clearly flying quite legitimately here - had reported spotting the airliner flying toward him from about 2-3nm away which the radar recording revealed was when the airliner steadied downwind in the pattern. Whilst this was apparently after one complete orbit of the C172, its pilot had wisely turned away from the B737. This Airprox illustrated the benefit of bright landing lights as an aid to conspicuity in daylight (compared to HISLs) which the C172 pilot had reported had first drawn his attention to it. With both pilots legitimately proceeding about their various tasks the Board concluded that this Airprox had resulted from a conflict in Class G airspace. Despite both pilots' assessments of the minimum horizontal separation being significantly more than that revealed by the radar recording, even with the relatively close distance involved here of 0·5nm both pilots had sighted each other's ac and turned away from one another. In the Board's view, this effectively removed any risk of a collision in the circumstances reported here.

The ATSI Advisor added that a Letter of Agreement had now been drafted (and is in the process of being ratified) for use between the two units whereby DSA TOWER will inform Sandtoft of inbound traffic enabling the A/G operator to broadcast a warning on the Sandtoft frequency. It was not clear if this would cover such a situation as arose here with continuously circuiting traffic. The C172 pilot reported that he was in communication with Sandtoft RADIO whilst flying outside their ATZ which caused some Members to wonder whether this was the best option. Whilst recognising that the chosen option was perfectly reasonable and in no way questioning the autonomy of the service available from Sandtoft A/G Station, Members discussed whether communication with DSA TOWER would have been preferable whilst operating in the vicinity of this Airport especially when flying through or under the approach to RW20. In the opinion of some Members it would have been preferable whilst passing to have given DSA TOWER a call who might then have been able to provide an ATC service in the vicinity of the aerodrome and pass traffic information about any traffic that was circuiting outside the ATZ. Similarly this would have alerted DSA TOWER to the presence of any light ac that might be difficult to spot from the Tower, enabling the ADC then to pass on traffic information to other ac under their control.

PART C: ASSESSMENT OF CAUSE AND RISK

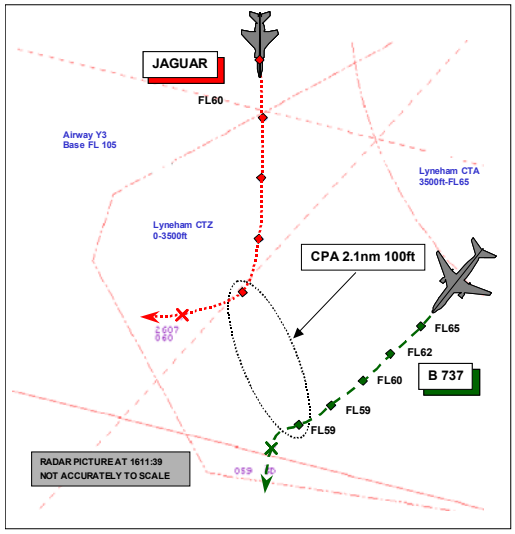
Cause: Conflict in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT No 070/05

AIRPROX REPORT NO 070/05

Date/Time:	16 May 1612	
Position:	5121N 00212W (10nm SW Lyneham)	
Airspace:	London FIR	(Class: G)
Reporter	Bristol ATC	
	First Ac	*Second Ac*
Type:	B737	Jaguar
Operator:	CAT	DPA
Alt/FL:	FL40[59]	FL60
Weather	IMC Rain	VMC CLBL
Visibility:	10km	8km
Reported Separation:		
	0ft V/3.0nm H	Not seen
Recorded Separation:		
	100ft V/2.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL RADAR CONTROLLER reports that she was the radar controller having just taken over the position approximately 1½min prior to the incident. A B737 was on a radar heading of 245° descending to FL40 out of Class A airspace to intercept RW27 localizer. She observed a 2607 squawk N of Bath fast moving southbound but could not recall if it was climbing or descending. The B737 was given an avoiding action left turn HDG 190° and told to stop descent at FL60: the pilot was slow to respond to the turn instruction so further left HDG 360° and descent to FL40 was given. The pilot advised that the [other] ac was observed on TCAS and was surprised that there was unknown ac in the vicinity of the localiser. The pilot was advised of the type of airspace he was in and the service he was under. The B737 continued to re-establish on the localizer and subsequently landed. Later discussions revealed that the conflicting ac was squawking 2607, a Boscombe Down squawk, but was under the control of Brize Radar. She could not explain why she had stopped the descent of the B737 at FL60 which was the level of the conflicting ac. She had sighted the confliction late and did not know whether there was a period of time either when the Jaguar was not squawking or if it had come out of an area where there was possible garbling.

UKAB Note (1): The 'Avoiding Action' turn was passed by Bristol APR at 1610:40. The first indication on the radar recording of the B737 in a left turn is at 1611:34.

THE BRIZE NORTON LARS CONTROLLER reports that he was controlling the Jaguar ac on a RIS at FL60. He gave a TI call on a track in its 10 o'clock at 5nm. The Jaguar pilot was not visual and asked for an upgrade to a RAS. An avoiding action turn was given until minimum separation was achieved, then the Jaguar was turned back onto track.

THE B737 PILOT reports that he was flying a passenger flight into Bristol under IFR. He was cleared by Bristol ATC to descend to FL40 on a heading of 245° to intercept the localiser for RW27 and to report "*established*". He was descending at about 1500ft/min at 210kt and while he was passing FL55 Bristol ATC passed a "Traffic Advisory" [see UKAB Note 1 above]. At the same time, traffic appeared on his TCAS level at FL40, he thought, which was confirmed by the crew to ATC and Bristol instructed him to turn left HDG 190°. At this point the ac had the automatic flight control system engaged and they were in a right turn from HDG 245° onto the localiser level at FL40, he thought. The crew had to disengage the AFCS and initiate the left turn requested by ATC which took a few seconds. During the descent they were IMC but just below the cloud base at FL40 in rain. He estimated the separation as being about 3nm from the TCAS. The TCAS gave a TA only and no RA was received.

THE JAGUAR PILOT reports heading 190° at 300kt and FL60 under a RIS from Brize Norton but in the process of handing over to Boscombe APR for recovery when traffic was called which he deemed to be a potential conflict. The traffic was not sighted and the weather conditions were deteriorating so he requested a RAS. He was

straightaway given an avoiding action turn of approximately 90° to the right. Once they called clear of the traffic, 'own navigation' was resumed and the handover to Boscombe APR was completed. At no time was the other traffic seen.

THE JAGUAR STN (endorsed by DPA) comments that VFR transits to the E of the Bristol Zone have been the subject of considerable debate recently in the context of proposed increases to the size of regulated airspace for Cardiff and Bristol Airports. This debate has included personal visits to Boscombe Down by senior Bristol ATC personnel in order to facilitate co-ordination of traffic between the units: a good working relationship now exists. A dedicated land line is being installed to facilitate traffic co-ordination. However, in this particular case the Jaguar was in the process of handover from one ATCRU (Brize Norton) to another (Boscombe Down). This handover of control coincided with a deterioration in the weather conditions. HQ DPA are satisfied however that the Jaguar pilot did the right thing in calling for a RAS when he did and that in taking the avoiding action provided, there was no risk of a collision as witnessed by the separation of 2nm. It is important to note that this Airprox occurred in Class G airspace. One advantage of the proposed changes to Bristol/Cardiff airspace will be to provide regulated airspace for commercial inbounds to Bristol after they have left the protection of Airway L9.

MIL ATC OPS reports that a Jaguar ac was under a RIS from RAF Brize Norton LARS at FL60 routeing to Boscombe Down. TI was passed to the Jaguar pilot at 1610:57 on "*traffic left 11 o'clock 5 miles crossing left/right indicating FL65*". The pilot responded "*C/S, copied and request radar advisory*". LARS instructed "*C/S, avoiding action, turn right heading 280º traffic 12 o'clock 4 miles crossing left/right indicating FL062 descending*". The Jaguar pilot acknowledged taking the turn; at 1612:14 LARS advised the pilot "*C/S, clear traffic turn left heading 190º".*

Analysis of the Clee Hill Radar shows the Jaguar 10nm NW of Lyneham tracking S squawking 2607 and indicating FL061. The conflicting B737 is 2nm S of Lyneham tracking 250º and indicating FL090 descending. The Jaguar continues on its heading and level as the B737 maintains a track of 250º but indicates a steady descent. At 1610:41 the Jaguar is 6.5nm W of Lyneham with the B737 in its left 10 o'clock at 6nm, indicating FL074 and still descending. The next sweep shows a lateral separation of 4.7nm and a vertical of 800ft. At 1611:16 the ac indicate a similar level with 2.7nm lateral separation and the B737 is seen to level off at FL059. At 1611:32, the Jaguar is seen to initiate a hard right turn onto W at the point where the lateral separation between the ac is 2.1nm. From this point onwards the separation increases between the ac.

The Jaguar was returning to base under a RIS from LARS. As per regulations at JSP 552 235.115.1 LARS correctly applied a RIS, passing timely and accurate TI on the conflicting B737. The Jaguar pilot requested a RAS as he was not visual with the traffic whereupon LARS provided timely and effective avoiding action that obtained the maximum lateral separation that could be achieved at that stage. At no stage did Bristol APR attempt to contact LARS to co-ordinate.

ATSI reports that two controllers were initially working Bristol Approach: APR (A) was providing LARS whilst APR (B) provided the Approach service. APR (A) described both the workload and traffic loading as 'very light'. The B737 pilot contacted APR 'B' at 1608:00 and reported maintaining FL110. The pilot was instructed to fly a heading of 245º and to descend to FL40 which was correctly acknowledged. Prior to this, coordination had been effected with Lyneham to descend into their CTR/CTA as required. APR 'B' advised that the flight would be vectored for an ILS approach to RW27. This was the last transmission made by APR 'B' before the LARS and Approach Radar positions were bandboxed with APR 'A' assuming operational control of both positions. At the time the B737 pilot was instructed to turn onto 245º, a Southbound return displaying a Brize Norton squawk with a Mode C readout of FL67 can be seen in the 2 o'clock position of the B737 at a range of 20nm. This was the Jaguar. APR 'A' made her first transmission on the bandboxed frequency at 1609:23, and informed the B737 pilot to close the localiser and report established. The Jaguar was now in the B737's 3 o'clock position at a range of 13nm as the latter was passing FL92 and the Jaguar's Mode C indicated FL61.

The ac continued to converge until at 1610:40 APR 'A' transmitted *"B737 CS avoiding action turn left heading one nine zero*". At that time the Jaguar was in the 3 o'clock position of the B737 at a range of 6.2nm, at FL60, whilst the B737 was passing FL74. The pilot acknowledged this and then APR 'A' instructed him to stop his descent at FL60 before passing TI on the Jaguar. The pilot reported that they had the traffic on TCAS. Analysis of the radar recording shows that although the crew of the B737 stopped their descent at FL60, the same level as that of the Jaguar, they did not change their track and so the two ac continued to converge. At 1611:15, APR 'A' transmitted "*B737 C/S turn left long way round onto three six zero*" to which the crew replied "*Yeah we are turning left now*".

At that time the two ac were still converging at the same level and were 2.7nm apart. Separation continued to reduce until 1611:27, when the Jaguar can be seen to be turning right in the 3 o'clock position of the B737 at a range of 2.1nm with only 100ft vertical separation. Shortly afterwards the B737 can be seen to turn left and lateral separation begins to increase. The pilot then advised APR 'A': "*Just for your info Ma'am it's when we locking on the glide of course the localiser sorry it takes quite a while for us to initiate a turn we have to disengage everything*".

APR 'A' explained that she had combined the APR and LARS positions at a quiet time as traffic did not warrant the continued operation of two separate positions. She added that APR 'B' was very recently qualified and it was felt in her opinion that the handover was a contributory factor. The conflicting traffic which at the time of the handover was at least 15nm away from the B737 was not specifically pointed out to APR 'A'. MATS Part 1, Section 8, Chapter 1, page 2, (Handing over an operational position) para 4.2 states: '*Controllers taking-over should be alert to the possibility of errors and omissions in the information being provided and must verify the data transferred to them by a thorough check of the radar display, flight progress strips and any other relevant information. Only when they are completely satisfied that they have a total awareness of the situation should they indicate to the controller handing over that they are ready to accept responsibility for the operation of the position*'. From this it is clear that APR 'A' was responsible for ensuring she had a complete understanding of the traffic situation, including any relevant traffic visible on radar but not in communication with the unit, before accepting operational control of the position.

APR 'A' advised that she had not seen the Jaguar on the radar display until it was only some 8 miles from the B737 even though when she made her first transmission on the frequency the Jaguar was clearly visible 13nm from the B737. The area between Lyneham and Bath is one where the transit of fast jets, both north and southbound, is common place: accordingly, controllers are used to monitoring that area for potential conflictions. At that time, the Jaguar was displaying a Brize Norton squawk but later investigations revealed that it was in the process of being handed over to Boscombe Down. APR 'A' reported that the ATSA was on the telephone to Boscombe Down and that she did not speak to them: however, the unit investigation revealed that APR 'A' herself advised Boscombe that she was taking avoiding action with the B737 against the Jaguar. This was done shortly after the second avoiding action instruction (to turn further left onto 360º), had been passed. Boscombe advised that the Jaguar was still working Brize Norton. Examination of the radar recording shows that the Jaguar did not change from a Brize to a Boscombe squawk until 1611:00, when it was only 4nm from the B737. Bristol does not have a direct line to Brize Norton and so the process of telephoning for coordination is a prolonged affair. APR 'A' advised that in the past a direct line existed but it had been removed due to lack of use.

APR 'A' could not explain why she had instructed the crew of the B737 to stop their descent at FL60, the same level as the Jaguar. At the time the first avoiding action turn was issued, the B737 was passing FL74 and so it would have been possible to instruct the crew to stop their descent at FL70. Whilst accepting that the ac would probably go below that level, a degree of vertical separation was likely to be assured. The radar recording shows that the average rate of descent of the B737 was in the order of 1800 feet per minute.

At around the time APR 'A' took over the operational position, the B737 was leaving CAS. The pilot was not informed of this fact nor was the 'new' level of service agreed between the APR and the pilot. However, in an exchange on the RTF between the two following the Airprox, it is clear that APR 'A' was providing a RAS to the ac. She advised that it was normal to provide either a RAS or a limited RAS to flights routeing through Class G airspace between Lyneham and Bristol and to inform the crew accordingly; however, it is considered that this did not materially affect the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered the action of the four participants in this incident in turn. Members thought that both the Jaguar pilot and the Brize Norton Controller had acted in a proper manner and therefore had not contributed to the circumstances of the occurrence.

Members determined that under the terms of a RAS the Bristol Controller should have avoided or coordinated the Jaguar with her traffic. For some time before the incident the Jaguar could be seen on her radar display tracking

into potential confliction with the B737 so it was felt that she could have taken earlier and more effective avoiding action. This would have prevented any erosion of the separation prescribed in MATS Part 1. Notwithstanding that a less-than-perfect handover might have taken place, it is always incumbent on the controller taking over a position to ensure that he/she is totally happy with the situation before accepting control. If the APR controller was not happy with the handover she should have made this clear at the time and asked for further clarification. By the time avoiding action was given, the ac were 6.2nm apart; the B737 had already been cleared to the level occupied by the Jaguar and it was too late to implement a solely vertical resolution. Further, since the ac were closing at a rate of about 4nm/min (from the radar recording, from 6.2nm to 2.1nm in just under a minute) then if the 5nm minimum separation were to be maintained the B737 pilot would have had to change the ac's flight path to one that was diverging from the Jaguar's track, which at the time was 180º, almost instantaneously. Although instantaneous change is clearly impossible, experts considered the one minute actually taken by the crew to change track was excessive.

The Board was informed by an experienced airline pilot that it was possible that an inappropriate mode selection of the B737 AFCS might have caused the delay in the pilot completely disengaging the system which would have lead to a slow initiation of the avoiding action turn given by the controller. Another expert reminded Members that ILS approaches should not be commenced until an ac is inside the protected range/alt of the ILS system; it appeared that in this case the B737 might possibly have exceeded these parameters.

Notwithstanding the lapses by the controller the Board agreed that they had not led to there being any erosion of safety nor risk of collision. Further, although the B737 crew's avoiding action turn had been late, it had not been the cause of the incident but had contributed by further eroding the separation between the ac.

PART C: ASSESSMENT OF CAUSE AND RISK

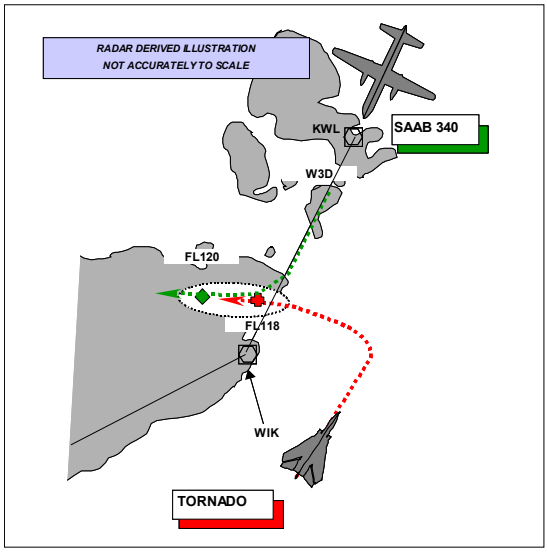
Cause: The Bristol APR controller did not achieve the separation required under a RAS.

Degree of Risk: C.

Contributory Factors: The B737 pilot's delay in initiating the avoiding action turn.

AIRPROX REPORT NO 072/05

Date/Time:	18 May 1344	
Position:	5834N 00302W (5nm NNE Wick)	
Airspace:	ADR W3D	(Class: F)
	Reporting Ac	*Reported Ac*
Type:	Saab 340	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL120	10000ft (QNH 1018mb)
Weather	VMC CLAC	VMC
Visibility:	40km	20nm
Reported Separation:	0ft V/5nm H	1500ft V/1nm H
Recorded Separation:	200ft V/1.8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340 PILOT reports flying a scheduled passenger flight from Kirkwall to Inverness. He was heading 210° at 240kt in the cruise at FL120 in ADR W3D when Scottish advised him of fast traffic approaching from the SE. He saw the contacts on the ACAS at a distance of 12nm. Scottish advised a right turn through 40° onto 270° and in the turn one fast jet was seen taking avoiding action by turning right to the N. Eight to ten sec after he was established on HDG 270° an ACAS RA climb was activated by what he thought was probably a different and unseen ac. He initiated an immediate climb to FL130 and advised Scottish of his ACAS climb. He did not see any other ac but assessed that the one which he saw in the turn was 5nm away and assessed the risk as being high.

THE TORNADO F3 PILOT reports flying an air defence sortie on a NOTAMed exercise in the N of Scotland. The controlling AWACS declared the Saab 340 as a 'BOGEY' and the Tornado formation vectored to visually identify the ac (VID) at 1343·26. Exercise F16 ac were in the vicinity about 1.5nm away. [UKAB Note (1): The radar recording shows a contact presumed to be the F16, 10nm NE tracking about 120°]. The Tornados positively identified the Saab 340 as a civilian ac and not exercise traffic then hauled off to the left and low and, at time 1344·18Z, advised all exercise ac that a civilian non-exercise ac was transiting through the exercise area.

ScOACC TACTICAL AND PLANNER reports that the Saab 340 was southbound on W3D at FL120, approximately 5nm N of Wick when two squawks, 4741 and 4740, were observed approaching it from the SE. The ac were displaying Mode C of FL110 and FL105 and TI was given to the Saab 340 pilot. The Saab pilot reported visual contact and avoiding action was given by turning the ac right onto a heading of 270°. The turn initially improved the situation and the two military ac were seen to turn NE away from the Saab: however, almost immediately the military ac turned back towards the Saab and climbed to the same level. Further TI was given and the Saab pilot again reported visual. The ac were right behind the Saab now and about 2nm in trail and at this point the Saab pilot advised that he was executing a TCAS climb to FL130. The conflict was resolved as the two military ac remained at or below FL120, a short while later turning away to the S. Since the risk of conflict had then passed the Saab was instructed to descend to FL120 and to resume own navigation for BONBY. The ac was then transferred to Lossiemouth Radar at which point the pilot advised that he would be taking reporting action.

ATSI reports that the Saab 340 was en route from Kirkwall to Inverness on ADR W3D and in receipt of a RAS from the ScACC Moray controller. Two military targets were observed operating 5nm N of WIK. The Controller passed TI to the Saab pilot followed by an avoiding action turn onto 270º. Although the Saab pilot complied with this the military targets then closed on the ac. The controller subsequently gave updated TI to the Saab pilot who stated that he had been visual with one of the ac but had now lost that contact, so the controller twice more gave updated TI. Immediately after this, the pilot stated that he was executing a TCAS climb; the possibility of any further action was therefore removed from the controller. Radar analysis by the unit indicated that the closest distance was 1.8nm/200ft when one of the military ac passed behind and under the Saab.

Under the terms of RAS, there is a requirement for ATC to attempt to provide a minimum separation of 5nm/3000ft between participating ac against unverified traffic.

The ScACC Moray sector controller provided detailed TI and an early avoiding turn to the civil flight, keeping it informed of the developing situation and fully meeting the requirements of Radar Advisory Service. However, despite the ScACC controller's best efforts, due to the manoeuvres and speed of the military traffic, it was not possible to provide the required separation.

E3D STANEVAL comments that their report is based on radar tracings and interviews only since the Mission Audio Recorder on the E-3D was unserviceable for the duration of the mission. At the time of the incident 2 ac squawking 4740 and 4741 respectively closed inside the standard separation required of the third non-participating civil ac which was squawking 5411. The E-3D radar tracings showed that the three ac came within 1.8nm laterally and 500ft vertically of each other. After a short period of flying in close proximity all three ac resumed their original courses.

The exercise in which the ac were participating was carefully planned and pre-notified to all airspace users. It was an intense event within class G/B airspace where air-to-air as well as air-to-ground participating ac form large packages, known as Composite Air Operations (COMAOs), strike a simulated target while achieving mutual support. Several fighters acting as enemy attempt to hinder the mission and oppose these COMAOs. Such an exercise proves to be the most complex type of mission for an E-3D crew to support as it is called upon to detect, track and identify all the ac from the COMAO, the 'enemy' ac and any civilian traffic in the vicinity.

On this occasion, the radar tracings show that the Saab 340 departed Kirkwall Airfield and was detected almost immediately by the E-3D as it was climbing through 100ft approximately 25nm from the incident. The Saab flew perpendicular to the flow of the exercise which was E-W oriented at FL120, but was tracked by the E-3D's surveillance team as an unknown evaluated contact (UEC). It is unclear why this occurred as the ac was squawking a UK Domestic squawk. During an intense exercise such as this, crewmembers cannot discuss each tracked ac but must trust 'the air picture' as they see it. Whilst the controller in question stated that he passed TI, his screen [Mentor] could not recall the specific details of what was passed. The Fighter Allocator stated that he recalls the F3 pilot requesting a 'DECLARE' (enquiry as to the ID of a specified track, target or correlated group) to which the controller responded with BOGEY (a radar or visual contact whose identity is unknown). This fact is consistent with the identification given to the track by the Surveillance Team. Upon receiving the response BOGEY the Rules of Engagement normally in force during such an exercise allow the fighter and his wingman to perform an intercept to visually identify this unknown contact, in this case the Saab. Had the ac been given a different identity such as friendly it is highly unlikely that the controller would have responded with BOGEY but rather with 'friendly – non-player'.

This exercise series is extremely important not only for the participating fast jet crews but also for the E-3D crews controlling the 'air war'. Due to the air-to-air and air-to-ground elements of the exercise it is not feasible to operate solely within segregated airspace and as such, the exercise area is within Class G/B airspace shared with other users. HQ 3 Gp considers that the single biggest factor in this incident was the identity that was given to the Saab flight; had the ac been identified as civilian traffic the incident would not have happened. This however, is not always easy as with some IFF equipment it is not possible to squawk Mode 1 and Mode 3 simultaneously which makes it difficult for a surveillance team to differentiate between military 'enemies' and civilian non-players without knowing the 'enemy' Mode 3 in advance; this would negate the training value of the exercise. Crews therefore have to rely on track behaviour or the specific Mode 3 code (exercise or domestic) as the only discriminatory factors between military 'enemies' and civilian non-players; this is a difficult but not unachievable task in such a complex and busy exercise.

The station has highlighted this incident to all crews and initiated follow-up action in an attempt to prevent a recurrence.

HQ STC comments that the error by the Surveillance team in classifying the Saab resulted in the F3s treating it as exercise 'enemy' traffic and carrying out a VID profile. Unfortunately, this resulted in a RA for the Saab crew due to the range between the ac before the F3s cleared away. As the profile suggests, the F3s were visual with the Saab throughout and maintained adequate visual separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. In response to a written query received before the meeting, the Board was given an extract of the Exercise NOTAM.

The Board noted the thorough investigation carried out by the E3D STANEVAL and commended their openness which revealed that, in essence, this incident had resulted from an error by the AWACS controllers. Although Members accepted that there were technical complications, they thought that since the Saab had clearly been operating on an ADR and had displayed a non-exercise ScACC squawk, it should have been immediately apparent to both the AWACS controllers and the Tornado crews that the ac was not an exercise participant and therefore should not have been the recipient of an intercept or VID.

Although the ScACC controller had not been able to achieve the separation required by MATS Part 1, he had done the best that he could in the time available, turning the Saab off the ADR and away from the F3s. Notwithstanding the errors in classifying the 'target' ac, the F3 crews had been in good visual contact with it throughout. Immediately it was identified as a 'non player' the Tornados had turned away; unfortunately this was not before their flight profile had generated a TCAS RA in the Saab. Since the F3 crews were continuously visual with the Saab, the Board concluded that there had been no risk of a collision.

Specialist pilot Members pointed out that even a timely and correct reaction to a TCAS RA could endanger the cabin occupants. One such incident that had been before the Board had resulted in a broken limb. The Board equally recognised the operational imperatives that require VIDs to be conducted in all weather conditions and that exercise procedures must reflect those used operationally. Members considered however that VIDs should if possible be carried out without generating a TCAS RA whilst also satisfying operational or exercise imperatives. The Board therefore considered that the MoD should review VID procedures taking into account their influence on ACAS equipment. One ATC Member also suggested that a conspicuity squawk for fighter ac conducting VIDs could enable controllers to provide the ac being identified with some information or prior warning of the event.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an error of classification of the SF340 by the AWACS Controllers, the Tornado flew close enough to the SF340 to cause a TCAS RA.

Degree of Risk: C.

Recommendation: The MoD should review VID procedures taking into account their influence on ACAS equipment.

Post Meeting Note (1): After the meeting a copy of the ACN was obtained. This gave extensive detail of the Exercise and was addressed to all ATC agencies and the airline involved. Other than informing all interested parties the ACN did not reveal any other factors affecting the Airprox incident.

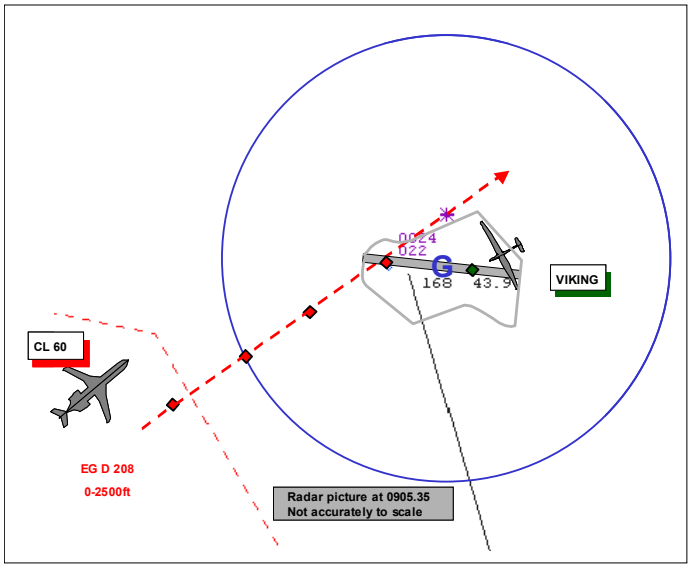
Post Meeting Note (2): The following Safety Recommendation was made as a result of Airprox 047/02:

The MoD considers a review of the rules for Visual Identification by military air defence ac in UK airspace'.

This resulted in major revision to TI 4/84, released in February 2005. The focus of the revised procedures appears to have been on 'Targets of Opportunity' rather than VID. The revision to the TI did not prevent the Saab in this incident from receiving a TCAS RA since the 'Minimum ID Range' criteria to ascertain that an ac is military are contained only in Part 3 Chapter 6, 'Targets of Opportunity Programme'. In this Airprox, since the AWACS classified the Saab as a 'bogey' it was not a 'Target of Opportunity' and therefore the 3nm minimum closure range did not apply.

AIRPROX REPORT NO 073/05

Date/Time:	21 May 0905 (Saturday)	
Position:	5233N 00051E (1nm SW Watton Airfield - elev 207ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Viking Glider	CL60
Operator:	HQ PTC	Civ Comm
Alt/FL:	1400ft (QFE 1002 mb)	2000ft (N/K)
Weather	VMC CLBC	VMC
Visibility:	25km	>5nm
Reported Separation:	50ft V/150ft H	NR
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIKING T MK 1 GLIDER PILOT reports flying a local training flight from Watton Airfield with a trainee in the front seat. After releasing the cable at 1600ft he turned to the S looking for lift and he was soon established in a thermal with a good climb, turning to the right. While passing through a heading of 240° at 1400ft [agl, equivalent to 1607ft amsl] and at 50kt, the trainee alerted him to another ac in their 2 o'clock: after becoming visual with it, he rolled to wings level to gain maximum separation. No avoiding action appeared to be taken by the other ac that resulted in it passing within 150ft to his starboard side. The other ac, grey in colour, had 2 rear mounted turbo fan engines, winglets and was flying with undercarriage lowered in a NE direction. He radioed Watton Radio on the local frequency to inform them, by which time the other ac had flown directly over the launch point and departed to the NE. He assessed the risk as being high.

THE CL60 PILOT provided a brief report. He reports flying a calibration sortie at Lakenheath in contact with Lakenheath GCA. During the sortie he saw a glider about ¼nm away while he was in a left turn at 200kt that was taking him clear of it. He assessed the risk as being low.

THE GLIDING CLUB Duty Instructor reports that at about 0900 a small business jet ac flew close to Watton Airfield, slightly to the SE of their operating area. It had its landing gear down and appeared to be transiting in a NE direction. At 0907 the same ac transited directly over Watton Airfield from a SW direction heading NE. [See UKAB Note (2)]. A Viking pilot who was airborne at the time called on the radio to bring this to his attention. The DI immediately ceased gliding operations and requested that the Viking pilot return to base which he did. The Viking pilot, on his return, reported that the jet had been in close proximity to him (150ft H/50ft V). The DI rang Norwich Airport ATC who informed him that the ac was not in contact with them but was showing a calibration flight squawk. Five minutes later they informed him that RAF Lakenheath was controlling the ac. The DI called Lakenheath RAPCON (Radar Approach Control) who confirmed that the ac was a CL60 Challenger and had been calibrating the approach to RAF Lakenheath. When he informed the RAPCON controller that they were operating at Watton and had experienced an Airprox with the ac he declined to give any further details.

Shortly after, the RAPCON supervisor called to inform him that the ac would be operating later in the day and if he had any problems to contact the USAF Airfield Operations Flight Commander. He informed the Supervisor of his intention to start operating again and passed their operating frequency, requesting that they keep ac well clear of Watton.

HQ AIR CADETS comments that this Airprox is also the subject of a reported infringement of the Watton Volunteer Gliding School (VGS) published gliding location. There appears to have been a breakdown by the Lakenheath controllers in that they controlled the CL60 in such a way that it came into confliction with the gliding site and an

airborne glider. Whether the RAPCON were not aware of the gliding activity at Watton or simply overlooked them is not known. However, the ac was 'controlled' through Watton's overhead, at a height and in a direction that made conflicts probable. The VGS have now instituted a system whereby they will contact Lakenheath at the start and completion of each day's activities.

UKAB Note (1): Watton is promulgated in the UK AIP Mil at Vol 3 1-2-5-4 and the as a glider site to be avoided by 2nm, operating up to 3000ft at weekends and public holidays and other times by NOTAM and also as a warning at UK AIP at ENR 5-5-2-1.

UKAB Note (2): The radar replay shows the CL60 pass directly over Watton airfield at 0905.30 heading NE at F022 (~2000ft amsl or ~1800ft agl) and disappear out of the picture to the NE. The recording ends at 0911.30 and the CL60 does not show again.

MIL ATC OPS reports that a CL60 was undertaking a scheduled flight check at Lakenheath under a RIS from Lakenheath Approach Control (APP) at 2000ft QNH 1005mb. After one approach, the CL60 declared a problem and requested to hold to the SW of Lakenheath in an attempt to rectify the problem. APP suggested that the CL60 crew should hold to the NE of Lakenheath as no traffic was observed in that area. The CLK60 crew agreed and routed the ac to the NE. The aircraft's holding pattern was in an area about 8-18nm NE of Lakenheath. APP subsequently, received notification that the CL60 had flown close to some gliders operating from Watton Airfield.

The holding pattern that the CL60 crew flew routed it (on at least one occasion) directly overhead Watton Airfield at 2000ft taking it directly through the active glider site and into confliction with a glider. Although APP could not see any conflicting traffic on radar a warning should have been given to the CL60 crew regarding the active glider site.

HQ PTC comments that this was a clear infringement of the Glider Site and we are disappointed that the RAPCON apparently did nothing to warn the pilot of the CL60. However, the combination of unusual circumstances is such that there is unlikely to be an identical repetition of the event. Moreover, the VGS and the RAPCON have introduced measures that should prevent any similar event from occurring.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that the circumstances surrounding this incident were complex; however, despite several other factors the ac involved was a civilian ac operating under the UK AIP, not its military equivalent. That being the case, there was no mandatory avoidance of the Watton Gliding site; the site was however promulgated as operating up to 3000ft (as at Note (2)) and Members determined that if the pilot opted to operate in that area and at that altitude, it was incumbent on him to take notice of any pertinent restrictions and warnings. Although there was no actual obligation for Lakenheath RAPCON to notify the CL60 pilot of any airspace restrictions, having quite understandably suggested that he may wish to operate there because it was less busy than the area the pilot requested, ATC specialists considered that it would have been appropriate, particularly since the pilot was not UK based, to provide him with warning of hazards including active glider sites. Lakenheath ATC should have been aware of the much-increased level of GA and gliding activity which takes place at weekends and that it may be a hazard to an ac operating at 2000ft. It was accepted however, that there are many glider sites and ATZs in the area and the ultimate responsibility for avoiding them and for collision avoidance in Class G airspace lies with the ac captain. One Member suggested that if holding is required to rectify a fault then perhaps flying at a slightly higher level (weather permitting) would have kept the CL60 clear of most ATZs, MATZs and glider sites.

Due to the apparent discrepancy in the descriptions of the sighting between the 2 pilots, Members thought that the CL60 pilot had most probably seen a different glider and therefore had not seen the reporting ac since he had only mentioned one in his report. Further there was no 'left turn' by the CL60 evident on the radar recording until well after the event.

It was also suggested by a gliding expert that a pilot from the USA may not be familiar with the hazards associated with winch launched gliders since the majority of gliders there are launched by areotow which is much more akin

to normal ac operations. Winch cables are very dangerous to other ac therefore all locations operating them are promulgated as hazards in the UK AIP. Winch wirestrikes are not normally survivable by the crews of either ac involved.

In this case however even, allowing that the CL60 had overflown the launch site, the glider involved had not been on a launch but was soaring in the local area. His student had alerted the instructor to the intruder in sufficient time to allow him to take action to ensure that any risk of collision was eliminated.

The Board welcomed the proposed telephone dialogue between the two locations to notify one another of their operations and were surprised that it had not occurred previously.

PART C: ASSESSMENT OF CAUSE AND RISK

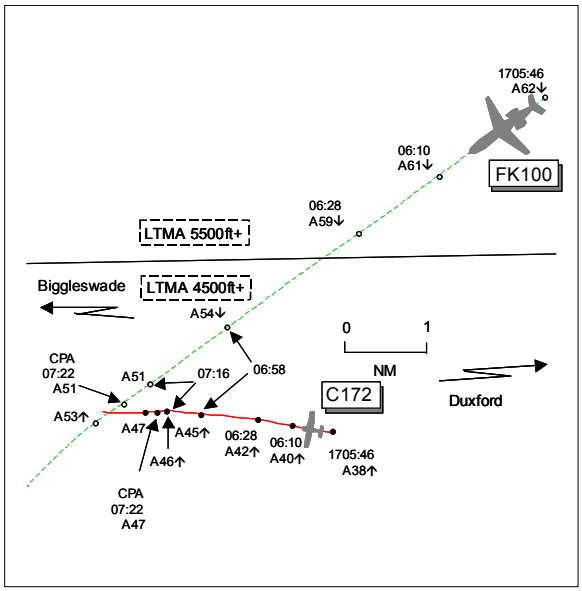
Cause: The CL60 flew over a notified and active glider site.

Degree of Risk: C.

AIRPROX REPORT No 074/05

AIRPROX REPORT NO 074/05

Date/Time:	29 May 1707 (Sunday)	
Position:	5204N 00007W (15nm NE Luton)	
Airspace:	LTMA	(Class: A)
Reporter:	LTCC LUTON APR	
	First Ac	*Second Ac*
Type:	FK100	C172
Operator:	CAT	Civ Pte
Alt/FL:	↓5000ft (QNH)	FL43 (SAS)
Weather	VMC CLBC	VMC CLBC
Visibility:	10km	10km
Reported Separation:	400ft V/1nm H	200ft V/0·5nm H
Recorded Separation:	400ft V/0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTCC LUTON APPROACH RADAR CONTROLLER reports that the FK100 was transferred to his frequency from Essex Radar at 5000ft. He observed an ac squawking 7000 approximately 3nm ahead of the FK100 which was at 4500ft and believed to be outside CAS. He asked Essex Radar to watch both ac but the FK100 had already left their frequency. As the FK100 crew made contact with him, he observed the other ac climb to 4700ft which would have taken it inside CAS. He instructed the FK100 to climb to 5500ft as avoiding action – the pilot reported he was already climbing, presumably due to an RA. He attempted to track the unknown ac but lost radar contact at approximately 50nm W of Luton.

THE FK100 PILOT reports inbound to Luton heading 240° at 220kt cleared to 5000ft and in communication with Luton Radar on 129·55MHz squawking 3014 with Mode C. Levelling at 5000ft a TCAS TA was received followed by RA 'climb'. Flying 1000ft below cloud the traffic was sighted, a white single engine Cessna in a climb heading approx 250°. The TCAS guidance was followed, 10sec elapsing between first sighting and the CPA as the Cessna passed 400ft below and 1nm clear to his L. He assessed that flight safety was never affected.

THE C172 PILOT reports en route from Duxford to Haverfordwest heading 290° at 100kt and in communication with Duxford Information on 122·07MHz squawking [no Code given] with Mode C. The ac was coloured white/ green with strobe and nav lights switched on. About 2nm NE of Biggleswade, he thought, cruising at FL43 1000ft below cloud, an airliner appeared 0·5nm to his R and crossed about 0·5nm in front, well clear, travelling much faster than his ac, about 200ft above. He assessed the risk of collision as low.

UKAB Note (1): The London QNH was 1019mb - FL43 equates to 4480ft QNH.

ATSI reports that the FK100 was inbound to Luton and being vectored, initially by the Stansted INT controller, towards the Luton Gate. STCA activated at 1705:45, in respect of an unknown ac (the C172) operating below CAS. Shortly after this, at 1706:10, the crew were instructed to descend to 5000ft, the agreed level for transfer from Stansted INT to Luton INT. At that time the unknown ac was in the 11 o'clock position of the FK100 at a range of 3·6nm. The FK100 was passing 6100ft and the unverified Mode C readout of the other ac indicated 4000ft. The STCA warning ceased at 1706:13. At 1706:30, the Stansted INT controller instructed the FK100 crew to contact the Luton INT controller. By now the unknown ac had commenced a slow climb and was in the 11 o'clock position of the FK100, range 2·6nm and passing 4200ft as the FK100 was descending through 5900ft. STCA activated again, low severity, at 1706:59, and the Luton INT controller advised the Stansted INT to watch the two ac as the unknown was now indicating 4500ft, the base of CAS. The Stansted INT replied that he had just transferred the FK100 to the Luton INT's frequency. The FK100 crew reported on the Luton INT's frequency and the controller immediately passed an avoiding action instruction to climb to 5500ft. Whilst this instruction was being passed

(1707:16), STCA changed from a white (low severity) alert to a red (high severity) one. The FK100 crew reported receiving a TCAS RA climb. The Mode C of the unknown ac increased to 4700ft before eventually reducing again to 4100ft with separation reducing to a minimum (1707:22) of 0·4 nm and 400ft as the FK100 passed in front of the unknown ac. No ATC causal factors disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear that the intended track of the C172 placed the flight initially under the LTMA where the base level was defined as an altitude. The UK AIP (ENR 1-7-1) recommends that when flying below TMAs and CTAs below the Transition Altitude (TA), pilots should use the QNH of an adjacent aerodrome. In this case, the TA beneath the LTMA is 6000ft so it would have been advisable for the C172 pilot to fly at an altitude. Later, when clear of the LTMA, he could then have adjusted his level to cruise at a FL in compliance with the Quadrantal Rule (noting that in the open FIR the TA is 3000ft). The FK100's cleared level of 5000ft was in accordance with ATC SOPs, 500ft above the base level of the LTMA, where other ac operating below CAS should be below 4500ft. Although FL43 should have placed the C172 just below the base level of the LTMA, the radar recording revealed the unverified Mode C reaching a maximum altitude of 4700ft before descending back to below 4500ft. Verified Mode C allows a tolerance of ±200ft. However, the height readout displayed had triggered 2 safety nets, TCAS and STCA, as the separation between the subject ac had reduced below both set system parameters. The descending FK100 crew had received a TCAS TA then RA 'climb' as they levelled at 5000ft and, whilst following the guidance, visually acquired the C172 ahead and below and watched it pass clear about 1nm to their L and 400ft below. The Luton controller had seen the potential confliction and given the FK100 crew an 'avoiding action' climb, on initial contact, which was about the time the crew were reacting to the TCAS RA. The C172 pilot had seen the FK100 about 0·5nm to his R as it then quickly crossed 0·5nm ahead and an estimated 200ft above but, unbeknown to him, this was only after the deteriorating situation had already been seen and acted on. Taking all of these elements into account, the Board agreed that this Airprox had resulted from a conflict at the base of the LTMA which had been resolved by the Luton APR and the FK100 crew responding to the TCAS RA which quickly and effectively removed any risk of collision.

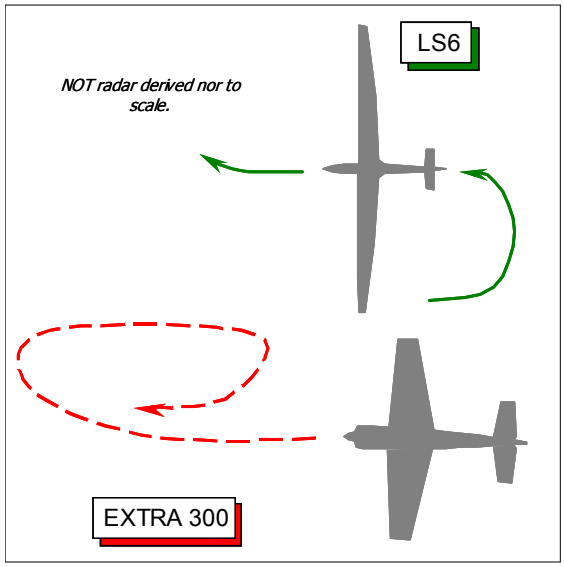
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict at the base of the LTMA resolved by the Luton APR and the FK100 crew responding to TCAS.

Degree of Risk: C.

AIRPROX REPORT NO 075/05

Date/Time:	31 May 1103	
Position:	5143N 00202W (4½nm N of Kemble)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	LS6 Glider	Extra 300
Operator:	Civ Pte	Civ Pte
Alt/FL:	2300ft (QNH)	2000ft (1026mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	30km	>10km
Reported Separation:	800ft	>1000ft
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LS6 GLIDER PILOT reports, with an accompanying data logger trace, that whilst en route to East Anglia at an altitude of 2300ft, she stopped to circle to the L in the weak lift overhead Cirencester Park (51° 43"N, 002° 02"W), some 800ft below the cloudbase in clear air with an in-flight visibility of 30km. After completing a L turn passing 270°, she saw a powered ac which at first she thought might have been a Jet Provost because of its shape against the light. This ac was climbing vertically some 800m away off to the SW, perhaps at the western edge of the woods. Having completed that manoeuvre, the other ac – the Extra 300 - was now about 400m to the S flying E towards the town of Cirencester and below her glider, when she realised it was not a jet but a single-engine monoplane with prominent broad red and white stripes on the wings. She turned to the N to present as big a shape to the other pilot as feasible to aid conspicuity but as it passed abeam it pulled into another loop. As she believed that the Extra pilot had not seen her glider she turned away more to the N. When she next saw the ac it was to the S inverted above her, 10° from the vertical as it rolled off the top in her direction and dived whereupon she feared that it might hit her tail. She increased speed to more than 120kt to get out of the way, but the next time she saw the Extra, it was alongside some 300m away to the S and she was not outstripping it. When she saw it again, it was continuing to do aerobatics in the area she had first seen it.

Assessing the risk as *"very high if the other pilot had not seen her glider"*, at no time during this episode did the pilot of the other ac give any indication that her glider had been seen nor did she see anything that appeared to be avoiding action. She knew that the cloud base was 3100ft amsl and when the other ac was above her, it was clear of cloud, so the furthest it could have been from her vertically above was 800ft but it looked a lot closer than that and she said it was *"very frightening"*.

THE EXTRA 300 PILOT reports that his ac has red/white striped upper surfaces and the HISLs were on whilst conducting aerobatics some 4nm N of Kemble. He was not in receipt of an ATS whilst operating under VFR, in VMC about 1500ft below the cloud base and with a flight visibility of >10km. The SSR including Mode C was selected off.

Whilst initiating a looping manoeuvre with a climbing flight path through 2000ft heading NW at 170kt the glider was first seen in a slight L banked attitude 1nm away at R 1 o'clock, high. To avoid the glider he continued the loop but applied bank so that the canopy was towards the glider so as to remain in sight as he rolled over the top and behind to position on L side of glider more than 1000ft away. As he did so, the glider continued turning L so he remained on the inside of the turn for the full 360° of the turn. He waggled and selected smoke 'on' to indicate that he had seen the glider and to increase his conspicuity. The glider then departed to the W at about 160kt.

He stressed that at no stage did he get closer than 1000ft and it was more likely it was 1500ft. Visual with the glider at all times he assessed the risk as "nil".

UKAB Note (1): The Clee Hill Radar recording does not illustrate this Airprox clearly as primary radar contacts which might be associated with the reported track of the glider and the Extra pilot's reported aerobatic manoeuvres are only shown occasionally. Although the glider pilot provided a copy of the GPS data log, which illustrated the glider's track made good, the radar recording did not display the Extra's track sufficiently to enable the two to be compared and thereby enable the geometry of this encounter some 4½nm N of Kemble to be established with any certainty.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although the glider pilot had provided a comprehensive report together with an accompanying data-logger trace, it was explained that it was not practicable in this instance to relate this data to the occasional and intermittent radar data available on the Extra as its pilot conducted his manoeuvres. Consequently, it was not feasible to replicate with absolute certainty the geometry of this encounter independently nor the minimum separation that pertained here. Nevertheless, it was clear that the Extra pilot had detected the presence of the glider during his manoeuvres at some stage and broken off into the inside of the glider's turn. Whether he had done this before or after the glider pilot had seen the Extra was not entirely obvious but he had apparently tried to indicate this sighting to the glider pilot by selecting smoke 'on'. This was evidently to no avail, as the smoke was not apparently seen by the other pilot. The Chairman pointed out that it was most important to clear one's flight path when performing aerobatics, as it very difficult for other pilots to determine your trajectory and where you will go next, as others plainly have no insight into the sequence of the manoeuvres being executed. Therefore it is quite difficult for other pilots to predict where the 'empty' airspace will be in which to fly in order to give the aerobatic ac as wide a berth as feasible if it is not immediately apparent that the pilot executing the aerobatics has seen them beforehand. Hence the importance of the wing waggle or smoke acknowledgement. But then this might also be missed or misinterpreted as has happened here and it was clear from the glider pilot's report that she was very concerned. The Extra pilot himself reports he flew no closer than 1000ft which, in the Board's view, was still relatively close if it is not immediately apparent that the other pilot has seen you beforehand. Therefore, the Board concluded that this Airprox had resulted because the Extra 300 pilot flew his aerobatic manoeuvres close enough to the glider to cause its pilot concern. Because both pilots had seen each other's ac no risk of a collision had existed.

Whilst not intrinsic to the cause or risk in the circumstances reported here, as neither pilot was in receipt of an ATS, the Extra 300 pilot had reported that though SSR including Mode C was fitted and available it was selected 'off'. This was not always advantageous in busy airspace where an ATSU might be attempting to provide a radar service to other pilots. Controller Members stressed the importance of squawking the aerobatics conspicuity code of A7004 together with Mode C to assist in the provision of comprehensive traffic information and collision avoidance to other ac in the vicinity. Moreover the lack of SSR data also renders ac not squawking invisible to TCAS thereby preventing this extremely efficient and reliable equipment from acting to forestall collisions when necessary. With the aim of improving flight safety for all concerned the ATSI Advisor offered to approach the editor of the GASIL with a view to promulgating the foregoing amongst the GA community.

PART C: ASSESSMENT OF CAUSE AND RISK

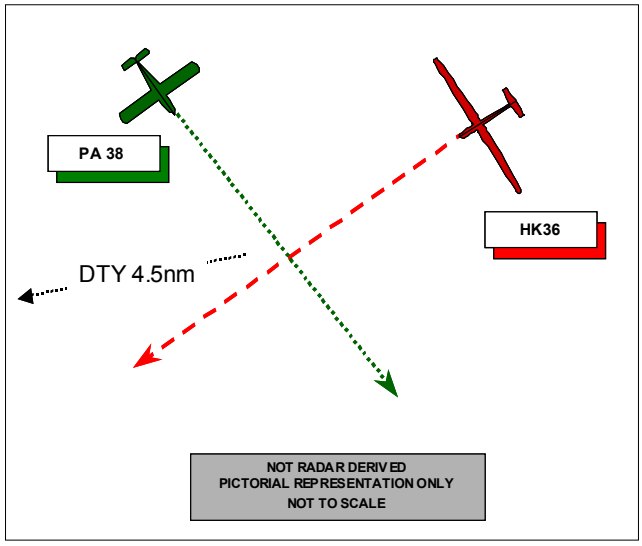
Cause: The Extra 300 pilot flew his aerobatic manoeuvres close enough to the glider to cause its pilot concern.

Degree of Risk: C.

[Post Meeting Note: Through the good offices of ATSI, the editor of the GASIL agreed to include an article in a future edition of this publication regarding the use of A7004 by pilots carrying out aerobatics.]

AIRPROX REPORT NO 076/05

Date/Time:	31 May 1500	
Position:	5213N 00100W	(4.5nm NE DTY)
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA38	HK36
Operator:	Civ Trg	Civ Trg
Alt/FL:	2100ft (QFE 1011mb)	approx 2500ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	20nm	20nm
Reported Separation:	0 V/50m H	0m V/ 50m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA38 PILOT reports that he was an instructor flying solo in a white and blue ac with strobes selected 'on' on a local training flight under VFR and in contact with Turweston Radio in good weather with only some scattered cloud above. At the time of the incident he was heading Southerly at 90kt and although the sun was to his front, it was not a factor. Following a check ride in the PA38 which he had not flown for some time, he went for a short local NAVEX, planning to rejoin Turweston for R/W 27 on Right Base. In the event, he actually joined downwind as there was another ac in the circuit preparing to go solo and he did not want to complicate the situation. A short time before rejoining, while maintaining straight and level, he completed a visual sweep then briefly checked his map which confirmed that he had Towcester and Silverstone identified. As he looked up, a white HK36 Super Dimona or similar flashed across his nose, left to right at exactly the same level and less than 50m away, essentially filling the windscreen. It was climbing slowly and heading WNW and continued to climb through about 2000ft, heading in the general direction of Coventry. He tracked it for at least 5min as he returned to Turweston and it did not appear to alter course or height. After landing he confirmed the ac type from a website. The other ac may previously have been hidden by the wing or canopy/door frame but he believes he would have seen it if it had been at the same altitude, so he thought that it was nearing the top of a climb. He had no time to take any avoiding action and assessed the risk of collision as being very high (only luck prevented a collision).

THE HK36 PILOT reports that he was an instructor flying a training sortie from Enstone with a student pilot in a white ac with the strobe switched on, VMC in good weather and excellent visibility. At the time of the incident he was heading 235° at 90kt and level at about 2500ft on the QNH. Both he and his student were carrying out normal lookout when he saw another ac about 100m away in his 3 o'clock converging at approximately the same speed and height. Since there was no relative motion, he did not see the other ac until late. The other ac passed 50m behind him but he did not have sufficient time to take any avoiding action and assessed the collision risk as being high.

UKAB Note (1): The PA38 was flying at a reported height of 2100ft on the Turweston QFE of 1011mb; this equates to 2548ft amsl. (The terrain SE of DTY is just over 400ft). The HK36 was flying at a reported alt of 2500ft amsl (the QNH in the area of the incident was 1025mb).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted solely of reports from the pilots of both ac.

Members considered that this incident had shown again that even in very good weather and visibility, the lack of any relative motion of a directly-conflicting ac could make the sighting of it very difficult. In addition, both ac involved were white which afforded poor contrast against a similar background. Although it may not have directly

contributed to this incident, a Member with extensive experience of GA pointed out that areas of Class G airspace close to commonly used Nav beacons are frequently very congested.

Despite that this incident had essentially been a straightforward sighting issue, since neither pilot had seen the opposing ac in time to react and avoid it, the Board considered that there had been an actual risk that they could have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

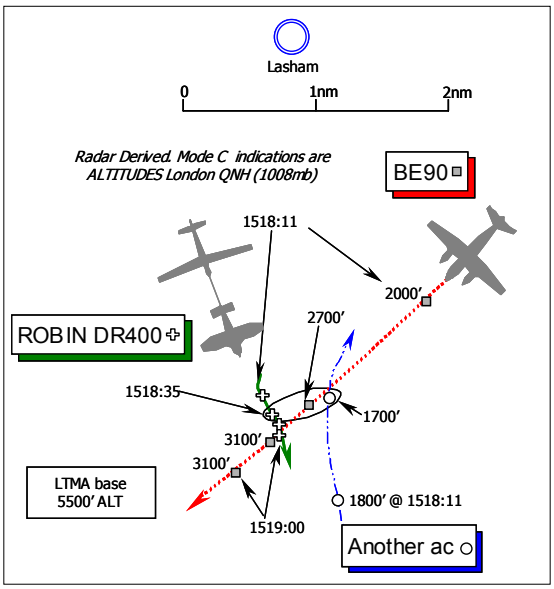
Cause: Effective non-sightings by both pilots.

Degree of Risk: A.

AIRPROX REPORT No 077/05

AIRPROX REPORT NO 077/05

Date/Time:	27 May 1518	
Position:	5108N 00102W (3nm S of Lasham - elev 618ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Robin DR 400	Beech C90
Operator:	Civ Club	Civ Pvt
Alt/FL:	2450ft↑	3000ft
	QFE	(N/K)
Weather	VMC NR	NK CAVOK
Visibility:	20km	>10km
Reported Separation:		
	<200ft V	NR
Recorded Separation:		
	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBIN DR 400 PILOT reports his ac has a black/yellow colour-scheme and the HISLs and landing light were on whilst conducting aerotows from Lasham glider site in VMC. He was in communication with Lasham RADIO A/G Station on 131·025MHz and thus not in receipt of any ATS whilst operating under VFR. SSR is not fitted.

With a glider under tow, heading 170° climbing straight ahead through 2450ft Lasham QFE at 60kt, a dark coloured light twin-engined ac – possibly a Beech – was sighted 500m away to port as it approached on a westerly heading. He reduced his RoC to avoid the other ac which passed directly overhead, less than 200ft above his tug/glider combination climbing through 2500ft, with a *"fairly high"* risk of a collision. He opined that the other ac appeared to have departed from Farnborough.

[UKAB Note (1): The UK AIP at ENR 5-5-1-3, promulgates Lasham Glider launching site as active during daylight hours for winch and aerotow launches which may attain a height of 3000ft agl above the site elevation of 618ft amsl. Lasham is not a licensed aerodrome nor does it have an ATZ; the Class G airspace above the glider site is just within the boundary of Odiham MATZ sfc to 3000ft above the Odiham elevation of 405ft.]

THE BEECH 90-1 PILOT provided a brief report stating his ac has a blue colour-scheme and the HISLs were on whilst flying VFR from Farnborough to Bournemouth in CAVOK weather.

Flying under a RIS from Farnborough ATC heading SW at 190kt, cruising level at 3000ft a low-wing ac was seen but he did not specify where or the range. He stated that he was unaware of any Airprox.

ATSI reports that the BE90 departed Farnborough to Bournemouth. The initial clearance issued was to depart on track to the SAM, VFR, not above 2000ft Farnborough QNH (1008mb) squawking A0424 and to remain outside CAS. This was correctly acknowledged by the BE90 pilot who was transferred from TOWER to RADAR shortly before 1515:30.

[UKAB Note (2): The Farnborough RTF transcript gives only 30sec and 1min time injects. Farnborough RADAR advised the BE90 pilot the flight was identified under a RIS on initial contact. A little later, the APR enquired of the BE90 pilot *"..are you looking to maintain 2000 feet or are you requesting higher?"* Whereupon the BE90 pilot replied *"like 3000 if I could if..SOLENT will accept me at 3*[000]".

Analysis of the radar recording shows some primary returns in the vicinity of Lasham and, shortly after 1517, the controller transmitted "*(call sign) there's traffic in your slightly right of your 12 o'clock 2 miles southbound no height*" [which was not the subject Robin DR400]. The BE90 pilot reported visual with this traffic and, just before 1517:30,

was advised to change frequency to SOLENT RADAR. No mention was made on the RT by the pilot to either Farnborough or Solent that an Airprox had occurred.

[UKAB Note (3): The Heathrow Radar recording shows the BE90 - identified from the allocated Farnborough squawk - passing abeam Lasham on a SW'ly course in a level cruise at an altitude of 2000ft London QNH (1008mb) as several primary contacts are shown to the S of Lasham. A primary contact - which in all probability is the Robin DR400 (no SSR fitted) flown by the reporting pilot - is later shown on a steady track of about 170° to the S of Lasham. Another ac is shown flying a northerly course at an indicated 1800ft London QNH (1008mb) unverified Mode C. The BE90 indicates a climb initially through 2200ft before at 1518:35 it is shown climbing through 2700ft London QNH as it converges on a steady course with the Robin, now in its R 1 o'clock at a range about 0·27nm and leaving the other ac astern. The Airprox apparently occurs in between radar sweeps as the BE90's contact crosses the Robin from L – R, after which the BE90 is shown levelling at 3100ft London QNH; this would equate broadly with the reported height of the Robin at 2450ft above Lasham's elevation of 618ft.]

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was explained to the Board that the traffic information provided by Farnborough RADAR to the BE90 pilot shortly after 1517 apparently did not refer to the subject DR400 tug & glider combination. This call seemed to refer to another southbound ac which was shown on the radar recording to the SE of Lasham (not illustrated on the diagram). The illustrated primary contact, which was believed to be the Robin DR400, was later shown on a steady track of about 170° to the S of Lasham and was also somewhat intermittent on the Heathrow recording until 1518:11. Consequently, the non-SSR equipped DR400 tug with its glider under tow might not have been apparent to the Farnborough controller before he instructed the BE90 pilot to switch to SOLENT RADAR just before 1517:30, about 1min before the Airprox occurred when the BE90 had some 4nm to run to the location of the Airprox. To some pilot Members it seemed that overall safety in this vicinity would benefit significantly if the aerotow glider-launching ac, operating from one of the busiest glider launching locations in the UK, were fitted with an SSR transponder and Mode C. Controller Members agreed and it was clear that this important aid to radar conspicuity would facilitate more useful traffic information to ac transiting through this busy airspace, thereby enabling Farnborough ATC to provide a more comprehensive warning about ac executing aerotows in this very busy sector of the 'Open FIR' beneath the LTMA. The Board's gliding Member concurred and elected to research this topic with Lasham.

From the Robin tug pilot's perspective, Members thought that he would have been fully engaged in his task, which imposes a high workload, and might well be why he only spotted the BE90 when it was some 500m away and closing rapidly from his port side. An ac with a glider under tow has the 'right-of-way' under the 'Rules of the Air' but the Board recognised that 'The Rules' can only work if the pilot of the other ac has seen your ac in time to take the appropriate action. However, from the account provided by the DR400 pilot, in the Board's opinion, it was still a late spot by the tug pilot which it was agreed was part of the cause. Given the distances involved and the responsibilities placed upon the BE90 pilot by the 'Rules of the Air' as the 'giving-way' ac in this situation, it seemed inconceivable that if the BE90 pilot had indeed spotted the aerotow combination he would have intentionally flown so close to these two ac. The brief account from the BE90 pilot had not contained any reference to sighting the actual Robin DR400 tug and glider combination piloted by the reporting pilot and it seemed plain to pilot Members that he had not actually seen it. The Board was briefed that there was also another ac in the close vicinity (shown on the diagram as "another ac"), which had altered course to pass astern of the BE90 as the latter was climbing from 2000ft QNH. Whilst somewhat speculative it might have been that the BE90 pilot had been distracted by this other ac whilst also changing frequency to SOLENT Radar as it was during this period that the Airprox occurred, just as he was also levelling at 3100ft QNH. The Board concluded that the other part of the cause was a non-sighting of the Robin DR400 tug and glider combination by the BE90 pilot.

Turning to risk, the Board recognised that the restricted ability of the DR400 pilot to manoeuvre his combination out of the way of the BE90 whilst the glider was under tow was a significant factor here. The reporting pilot's account had related that he reduced his rate of climb during this close quarters situation in order to avoid the BE90 which passed <200ft above his Robin DR400 tug and glider combination. Whilst the DR400 pilot's late sighting did not allow a great deal of time for him to manoeuvre out of the way, his avoiding action in this situation had ensured that these ac did not collide. The radar recording reflected that the BE90 had levelled at an indicated

AIRPROX REPORT No 077/05

3100ft London QNH verified Mode C - and potentially less than 50ft above the DR400 pilot's equivalent altitude of 3068ft. With only one of the pilots involved apparently aware of the other's ac at these close quarters the Board concluded that the safety of the ac involved had indeed been compromised.

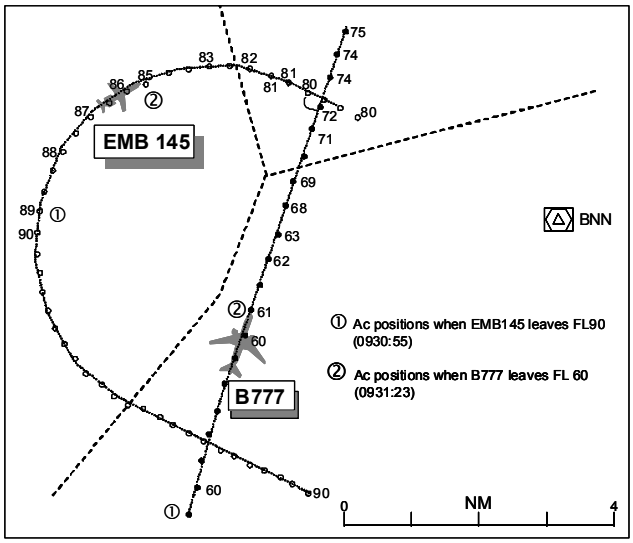
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the BE90 pilot and late sighting by the Robin DR400 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 078/05

Date/Time:	28 May 0932 (Saturday)	
Position:	5154 N 0039 W (4nm NW Bovingdon VOR)	
Airspace:	LTMA	Class: A
	Reporting Ac	*Reported Ac*
Type:	EMB 145	B777-200
Operator:	CAT	CAT
Alt/FL:	FL83	7200ft
	(SPS 1013 mb)	(SPS 29.92in)
Weather	VMC CLAC	VMC
Visibility:	>10km	CAVU
Reported Separation:		
	<700ft	Approx 500ft V
Recorded Separation:		
	0·18nm H 750ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB 145 PILOT reports heading 119° at 210kt inbound in the Bovingdon hold and descending as cleared to FL80. Passing 2nm from the fix he received a TCAS TA followed about 3 seconds later by an RA "monitor vertical speed" showing the red arc at more than 900ft/min. His FO was visual with the other ac from the TA caution. The controller was busy and gave avoiding action 5-10 secs after the conflict cleared; he had no chance to advise the controller of the situation due to RT traffic. This could have been more serious but he had elected to descend slowly in the hold and minimum separation on TCAS was 700ft. He estimated that with a normal rate of descent the separation would have been about 460ft and considered the risk of collision was high.

THE B777 PILOT reports that after departure from LHR he was flying an assigned heading which he could not remember, climbing to FL80. He saw an ac approaching from above and to the left and reduced his rate of climb. TCAS gave an RA alert and he began levelling off while maintaining visual separation. London Control revised their altitude clearance and apologised. He advised they did get an RA and it was not a problem as they had visual contact with the approaching ac. He believed the other ac came within about 500ft above them.

LTCC NW DEPS reports that she was the NW Deps/BNN Controller. The B777 called on a WOBUN SID, climbing to 6000ft. She then instructed the ac to climb to FL80, believing it to be Minimum Stack Level (MSL). She then noticed the EMB145 in the BNN hold at FL80 and realised MSL was FL70. The B777 was approaching the EMB145 at FL72, so she issued avoiding action and instructed the ac to maintain FL70. The B777 continued climbing to FL75 by which time it was clear of the EMB145.

LTCC INTERMEDIATE DIRECTOR NORTH reports that the EMB145 was in the BNN hold and the outbound [B777] was seen to be climbing through FL70 and increasing. The EMB145 was given avoiding action and TI.

ATSI reports that the NW DEPS Sector Controller had taken over five minutes before the incident occurred and described her workload as light. The first call she made was to respond to the B777's initial call on the frequency. The pilot reported passing 2100ft and was instructed to squawk ident and to maintain 6000ft on reaching. Subsequently, the flight was placed on a tactical radar heading of 015°. At 0931, she instructed the B777 to climb to FL80 which she believed was the MSL and, consequently, was separated from traffic holding at BNN under the control of Heathrow Approach.

In accordance with procedures for level allocation at BNN, as stated in the LTCC MATS Part 2, Pages NEW 3.2 and HRW 4.4, the MSL is allocated to TC NW DEPS. On this occasion, the London QNH was 1013mb and the MSL was FL70. The table on Page ANX Annex L of the LTCC MATS Part 2 shows that MSL is FL70 when the QNH is from 1013mb to 1031mb and FL80 between 996mb and 1012mb. The SC explained, at interview, that

previously during that shift she had been operating on the TC NE Sector. Just before being relieved from that sector the London QNH had risen to 1013mb. In accordance with local procedures, she had been informed by Heathrow, via the Co-ordinator, that the MSL had changed from FL80 to FL70. She said that she handed over the sector shortly afterwards. Controllers at LTCC work to a checklist (published in MATS Part 2, Page GEN 2.20) whereby the pressure (high-low-MSL) is the first item mentioned. Presumably this information was passed on to the oncoming controller although she could not remember that she had registered the change. Additionally, when subsequently she returned to take over the NW DEPS Sector, she agreed she would have received a handover from the off-going controller which would have included the same information about the pressure. She recalled that she took over from a mentor who was accompanied by an inexperienced trainee. She commented that she was sure that if the trainee, who had given the handover, had omitted the information about the MSL, the mentor would have corrected the deficiency. Inexplicably, even though she would have been informed on two occasions that the MSL was FL70, she was still under the mistaken impression that the MSL was FL80. Consequently, this was the level to which she instructed the B777 to climb. She commented that, additionally, the MSL is shown in a small window on the radar display and flashes red whenever there is a change. This, also, did not alert her to the current level.

The radar recording at 0931:00, as the clearance for the B777 to climb to FL80 was issued, shows the flight at 6000ft. 5nm NW of the B777 is the EMB145, in the hold at BNN and descending through FL88, in accordance with local procedures, to FL80 i.e. 1000ft above MSL, under the control of the Heathrow Intermediate (INT) Director (DIR) North. The NW DEPS SC said that, when she looked at the radar display, just before clearing the B777 to climb, she was aware that the EMB145 was showing a Mode C reading of FL90 in the BNN hold and this had reinforced her belief that the MSL was FL80.

The SC said that she noticed the confliction between the subject ac as the B777 was passing FL72, just, she thought, before STCA activated. (Radar recordings of the event show a low severity alert occurred at 0931:46, as the B777 was passing FL69, on a conflicting track with the EMB145 which was 1·3nm away and 1200ft above.) She immediately passed avoiding action to the B777, including a right turn heading 045° with a clearance to maintain FL70 but unfortunately she used the wrong callsign (same airline) and no reply was received. She said she could not think of any explanation for using an incorrect callsign but, not receiving a response, she realised that she had addressed the call wrongly. She reiterated the call about ten seconds later, using the correct callsign, *"avoiding action turn right heading zero four five degrees maintain flight level seven zero"*. The pilot read back the heading instruction although somewhat hesitantly. By this time, as the two ac had passed and their tracks were diverging and there was no other conflicting traffic at BNN, the B777 was recleared to FL80. The SC was immediately relieved from the sector.

Meanwhile, the INT DIR N was alerted to the situation when STCA activated. When he realised that the B777 had climbed through the MSL, he passed avoiding action instructions to the EMB145 *"avoiding action turn right immediately heading one eight zero degrees traffic underneath you northbound maintaining seven four and climbing"*. The pilot replied reporting that he had just had a TCAS RA. By this time the two ac had passed and the pilot was instructed to continue heading 180°, to expect routeing back to BNN shortly.

Radar recordings reveal that the STCA changed to a high severity alert at 0931:58. At this time the two flights had passed and were 0·3nm apart, the EMB145 was maintaining FL80 and the B777 was at FL74. Thereafter, the EMB145 maintained FL80, whilst the B777 climbed to FL76 before commencing a descent when it was 3·4nm away from the EMB145.

UKAB Note: By interpolation, minimum separation shown on the radar recordings occurs as the B777 passes 0·18nm (370 yd) ahead of the EMB145 and 750ft beneath it.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The requirement to check the MSL consciously is a fundamental part of the controller's task. It was therefore doubly strange to Members that the NW DEPS controller had not assimilated the MSL which had not changed since the end of her previous duty. Since the change which did occur had not taken place during her current duty, she would not have had the benefit of an alert from the red flashing window on the radar screen. She herself had

agreed that the current MSL must have been mentioned in the handover. Even if it had not, and she had not at the time queried this, it was clear that she had a perception(albeit an incorrect perception) that she knew what the MSL was because she did not look to check what it was when she used it for the first time for the B777's climb. Humans can make this sort of error when actions become too familiar and automatic rather than conscious and considered. Members agreed that the cause of the Airprox was that the LTCC NW DEPS did not assimilate the correct MSL and climbed the B777 into conflict with the EMB145. The Board was advised that a 3 month trial had started at LTCC of the use of engraved MSL designators for use in the displays of TC North controllers in an effort to reduce the incidence of events such as this Airprox.

While Members agreed that neither controller was able to intervene in time to affect the outcome, the Board considered that TCAS and the pilots' sightings of the other ac had ensured that there was no risk of the ac actually colliding. Regarding the controllers' interventions, controller Members of the Board said that in the circumstances vertical avoidance, rather than heading changes, would have been more appropriate and much more likely to have been actioned in time to have been effective.

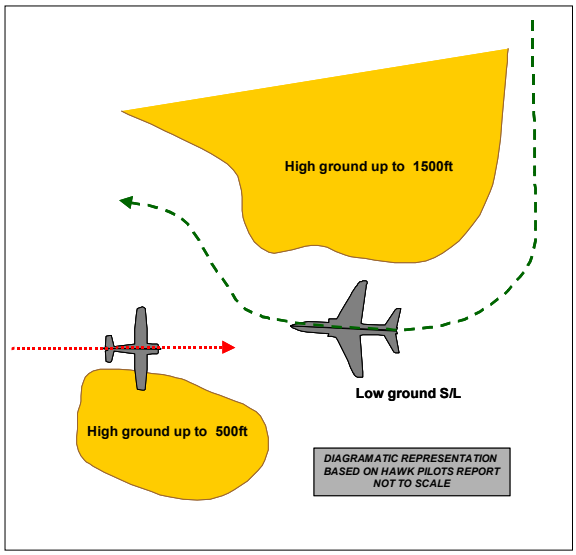
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC NW DEPS did not assimilate the correct MSL and climbed the B777 into conflict with the EMB-145.

Degree of Risk: C.

AIRPROX REPORT NO 080/05

Date/Time:	6 Jun 1115	
Position:	5256N 00404W (24nm SE Valley)	
Airspace:	UKDLFS/Lon FIR (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Hawk	C172
Operator:	HQ PTC	NR
Alt/FL:	500ft	NR
	(RPS 1021mb)	NR
Weather	VMC CAVOK	VMC
Visibility:	15km	NR
Reported Separation:		
	0ft V/250ft H	NR
Recorded Separation:		
	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a singleton instructional sortie with a student pilot in the front seat with HISLs and nose light switched on, in good weather conditions in the UKDLFS. On rolling out of a 420kt 4G right turn from a heading of 170° at 4-500ft agl, a white and blue Cessna 172 was sighted in their left 11 o'clock, on a collision course, also at 4-500ft agl. The instructor immediately initiated a right banked 6.5G climbing turn to ensure separation; the other ac did not appear to take any avoiding action. He assessed the risk of collision as being medium.

He reported the incident to RAF Valley on first contact with them immediately after the incident.

THE C172 was traced by RAC. The ac was flown by a professional pilot whose company was engaged in photographic work but he did not respond to several requests from the UKAB to provide a report.

THE HAWK STATION comments that the Hawk was carrying out a routine singleton low level instructional sortie in Wales in accordance with Hawk SOPs. The light level was good, although flat, and the visibility was assessed to be in excess of 10km. There are two possible explanations as to why the Cessna was not seen earlier. Firstly, in the moments prior to the Airprox, it is possible that the Cessna had been obscured by a hill. The Hawk entered a turn around the hill and on rolling out the pilot immediately carried out a belly-check that revealed the Cessna and the instructor took immediate avoiding action. Although the turn itself was safe, the proximity of the manoeuvre to the hill placed the ac belly up into a piece of airspace that had not been visually cleared. Secondly, and the most likely, the Cessna was in front of a wooded background, in flat light conditions, and was simply not able to be detected with a standard lookout scan.

This Airprox serves as a reminder of the dangers inherent when operating at low level and emphasises the need for good lookout and thorough clearing of one's flightpath.

HQ PTC concurred the Station comments.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted solely of a report from the Hawk pilot and its operating authorities.

The Board observed that the decision of the Cessna pilot not to cooperate and submit a report had prevented a full investigation into this incident to the detriment of all involved. Although both ac had equal right to operate at about 500ft agl in Class G airspace, Members could only speculate as regards the reason why the Cessna pilot

elected to be at this level. All other things being equal, Members considered that it would have been very much safer for the Cessna to fly above the 250-2000ft band used by military ac.

It not being clear whether the Cessna had been actively involved on a task at the time of the incident or was merely in transit, a specialist Advisor observed that, if the former, the CANP system was put in place to offer a degree of protection to ac involved in tasks which make them vulnerable to a collision with low flying military ac. [There is no record of a CANP being submitted]

Members considered that this incident had been a conflict in the UK Day Low Flying System/FIR and that the quick and decisive avoiding action taken by the Hawk instructor from the rear seat had prevented there being any actual risk that the ac would have collided. Due to the proximity of the two ac as reported by the Hawk pilot, safety had not been assured.

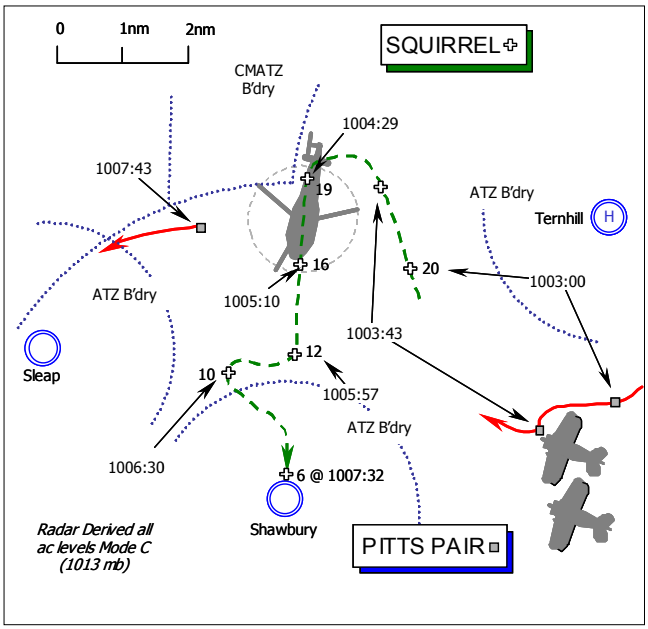
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the UKDLFS/FIR resolved by the Hawk QFI.

Degree of Risk: B.

AIRPROX REPORT NO 081/05

Date/Time:	3 Jun 1005	
Position:	5351N 00240W (3nm N Shawbury - elev 249ft)	
Airspace:	Shawbury MATZ	(Class: G)
Reporter:	Shawbury ATC	
	First Ac	*Second Ac*
Type:	Squirrel HT Mk1	Pitts S2A x2
Operator:	HQ PTC	Civ Pte
Alt/FL:	<1000ft QFE (997mb)	1500ft (NR)
Weather	VMC NR	NK NR
Visibility:	NR	NR
Reported Separation:	Not seen	NR
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHAWBURY LARS/LFA9 CONTROLLER No1 reports that the lead pilot of a formation of 2 Pitts ac first called some 10nm NE of Ternhill routeing to Sleap aerodrome (5nm NW of Shawbury) at 1500ft QFE. The ac were non-squawking. When the Pitts leader reported descending to 1200ft he instructed him to remain N of the Ternhill ATZ and advised the Ternhill ADC of the position of the traffic. As the formation entered the MATZ they were still heading directly towards Ternhill so the leader was advised again to remain clear of the Ternhill ATZ, at which point they took up a southerly heading remaining just outside the ATZ boundary, which was the situation when he handed over the control position.

THE SHAWBURY LARS/LFA9 CONTROLLER No2 reports that when he assumed control of both the LARS and LFA9 positions he had to monitor 3 separate frequencies. Traffic intensity was initially "moderate" but increased quickly on all frequencies - on the LARS position alone there were 4 RIS tracks and 2 or 3 ac under FIS. The other two channels for LFA9 [Studs 4 and 5] were also busy. The Pitts formation, although not formally identified and carrying no transponder equipment, appeared to have ignored the previous controller's instruction to route to the N of the Ternhill ATZ and were following a southwesterly heading and presumed to be at their notified height of 1200ft Shawbury QFE. Weather in the area was poor and many ac were having difficulty in maintaining VMC, with heavy showers prevalent. Although he was distracted with providing radar services to other higher priority flights, he was aware that the Pitts formation had turned onto a westerly heading which would have taken them into the Shawbury ATZ to the N of Shawbury but clear of the instrument traffic making an approach to RW18 at Shawbury. As the formation approached the ATZ, he opened the landline to the Shawbury ADC to advise of the ATZ crossers, when he observed that the formation had suddenly turned onto a northerly heading thereby putting them in direct confliction with rotary-wing traffic – the Squirrel - flying an instrument approach. He immediately abandoned the landline call and forcefully instructed the formation to make a rapid turn to the NE (radar heading 040°) to effect separation - to all intents an avoiding action turn - albeit to a flight under a FIS. As soon as he had judged the Pitts formation to be clear of the instrument traffic, which had been broken off from the approach and was joining visually, he instructed the pilot to take up a southwesterly track direct to Sleap (250°), their destination airfield. The lead pilot then informed him that the formation had climbed to 3500ft, although he had not been informed of his intention to do so beforehand.

THE SQUIRREL HT Mk1 PILOT reports some 2 months after the occurrence that he was inbound on an instrument approach to RW18 at Shawbury. He was in receipt of a RIS from Shawbury TALKDOWN on 356·975MHz and squawking the assigned code with Mode C. The HISLs were on. Descending through 1000ft Shawbury QFE approaching 2nm FINALS in VMC he recalled being broken off from the radar approach and then

continuing visually inbound. He did not see the other ac and only became aware of the Airprox after landing: consequently, he was unable to provide any further detail.

THE PITTS S2A PILOT reports he was leading a 2-ship formation of Pitts ac inbound to Sleap aerodrome VFR. His wingman was maintaining a loose formation in echelon to port, but also had radio selection problems so he was in RT contact with Shawbury whilst also relaying messages to the second ac's pilot. His ac has a yellow/red colour-scheme and although SSR is fitted, it was inoperable.

Flying in a level cruise at 1500ft toward Sleap from Trent VOR he contacted Shawbury ATC for "penetration clearance" of the MATZ. On initial contact it was explained to the controller that they were a 2-ship formation and they initially wanted to keep clear [of Shawbury] by routeing around to the N via Stoke, but in his reply the controller was a little ambiguous. After clarification ATC requested them to keep clear of Shawbury by flying to the S. They encountered heavy shower clouds along their route and to maintain VMC had to position around them. Whilst manoeuvring, the controller advised them of another ac: he did not see the ac himself even after he looked again because to keep clear of weather he had to keep changing his heading, but his wingman had seen the helicopter and reported it was "safely clear behind". Eventually they turned onto a more northerly heading and it was then that the controller requested confirmation of their heading and said that they were "interfering" with instrument traffic, which was the first that the controller had advised of any potential conflict. Therefore, he elected to climb up above the MATZ immediately and take up a direct track to Sleap. He stressed that at no time had he considered their flight to be in direct conflict with other traffic and took the earliest opportunity to fly out of the MATZ, maintaining good VMC at all times.

UKAB Note (1): The UK AIP at ENR 2-2-2-4 notifies the Ternhill ATZ as a radius of 2nm centred on RW05/23, extending from the surface to 2000ft above the aerodrome elevation of 272ft amsl. The Shawbury ATZ is also notified as a radius of 2nm centred on RW18/36, extending from the surface to 2000ft above the aerodrome elevation of 249ft amsl.

UKAB Note (2): The UK AIP at ENR 2-2-3-3 notifies Shawbury ATC as the controlling aerodrome for the Shawbury/Ternhill Combined MATZ (CMATZ). Ternhill MATZ has a non-standard 2nm stub and the CMATZ extends from the surface to 3000ft above the highest aerodrome elevation, that being Ternhill at 272ft amsl.

UKAB Note (3): The 0950UTC Shawbury Weather was: Surface Wind: 190/7kt; Visibility 25km in Rain Showers; Cloud: FEW @ 1500ft; SCT @ 3700ft; QNH1006mb; QFE997mb. BARNSLEY RPS: 1001mb.

MIL ATC OPS reports that a formation of 2 Pitts ac was inbound to Sleap airfield via the Trent VOR. The Pitts pair [Pitts Ldr & Pitts (B)] freecalled Shawbury ZONE at 0953:55, stating "[Pitts formation C/S] *formation of 2 inbound to Sleap currently 1500ft 1005* [mb] *over Stoke…22 miles to run about*". ZONE confirmed the type of service the formation required and applied a FIS at 0954:22, giving the Shawbury QFE as 997mb. At 0954:53, an internal transmission was heard between the 2 Pitts pilots stating "*and for* [Pitts B C/S] *looks like I am going to have to deviate to the right to stay out of weather in front of me*" with a response "*Stick with me* [Pilots name] *we are going a bit lower over here mate".* At 0955:24, ZONE allocated the Pitts Ldr a squawk of A0241, whereupon the pilot reported, "*negative squawk*". ZONE requested at 0956:18, "[Pitts formation C/S] *if you can maintain clear of Ternhill to the north*" and the Pitts Ldr acknowledged "*Roger, wilco".* At 0956:25, ZONE reiterated the Shawbury QFE (997mb) and asked the Pitts formation to fly at 1500ft. Pitts Ldr reported "*we've got a bit of weather coming through here, we're at 1200ft at the moment".* ZONE restated at 0956:37, "[Pitts formation C/S] *roger maintain clear of Ternhill to the north*". The Pitts Ldr acknowledged this call with *"Roger maintain clear of the North…*[Pitts formation C/S]". At 0959:17, Pitts Ldr reported "*Shawbury* [Pitts formation C/S] *is at the edge of the MATZ now at 1500ft".* ZONE again reiterated "[Pitts formation C/S] *"maintain clear of the Ternhill MATZ to the north".* Pitts Ldr crew questioned "*Roger, you want me to maintain clear of your MATZ to the north, over";* ZONE confirmed *"maintain clear of Ternhill ATZ to the north".* At 1003:15 ZONE transmitted "[Pitts formation C/S] *caution traffic believed to be you has Shawbury rotary just 9 o'clock about ¼ of a mile left to right indicating 1000ft*" so the Pitts Ldr reported *"..looking"*. At 1005:10, ZONE transmitted to the Pitts Formation "*Make a turn onto heading 040° to remain clear of Shawbury's instrument approach direction onto runway 18, 040 now*". Pitts Ldr acknowledged the call. At 1005:35, Pitts Formation Ldr reported at 2000ft to ZONE who immediately responded "*Pitts Formation C/S, I did say right 040°, you are now interfering with our instrument approach recovery traffic at a ½ R - L*." Again the Pitts Ldr acknowledged the call. At 1006:40, the Pitts formation was put onto a heading for Sleap airfield after which Pitts Ldr reported the formation was flying at 3500ft. The transit then continued without further incident.

Simultaneously, the Squirrel helicopter was flying within the radar training circuit (RTC) at 1500ft Shawbury QFE (997mb). As the Squirrel was approaching 3nm FINALS and passing around 1000ft, the PAR Controller observed conflicting traffic indicating a similar level on his radar. The Squirrel crew were broken off from the radar approach and passed an avoiding action turn onto W. The Squirrel crew took the turn but then elected to continue the approach visually.

Analysis of the Clee Hill Radar recording shows a non-squawking contact - the Pitts Formation - 8nm NE of Shawbury tracking SW. The Squirrel is 3nm NE of Shawbury in a left turn to track N, squawking A0222 and indicating 2100ft Mode C (1013mb). At 1002:20 the Pitts Formation turns L onto S and disappears from radar for approximately 30sec, reappearing on a southwesterly heading. At 1003:00, the Pitts Formation adjusts to a westerly heading and then back onto SW at 1003:43 disappearing from radar at 1004:00, 4nm ENE of Shawbury. At this time, the Squirrel is 5½nm NNE of Shawbury in a L turn onto S to commence a descent on the PAR. At 1005:57, the Squirrel is shown in a hard R turn onto W and then at 1006:30 in a L turn to SE before resuming a southerly heading at 1007:16. The Airprox is not shown on the radar recording.

The Pitts formation was inbound to Sleap airfield from the NE. The formation was placed under a FIS but not 'identified' by ZONE on radar. The formation reported overhead Stoke with about 22nm to run to Sleap. Direct routeing from Stoke to Sleap would have taken the Pitts formation just to the N of Ternhill: taking this into account, ZONE asked the formation to route to the N of Ternhill ATZ, which would have deconflicted the Pitts formation with the Cct at Ternhill. However, it would appear from the radar recording that the Pitts formation actually routed S of Ternhill and then onto a westerly heading and into conflict with the Shawbury RTC. ZONE was now aware of the position of the Pitts formation and he assessed that at that stage on their present heading the formation would constitute no hazard to the Squirrel, which was 9nm N of Shawbury. However, the Pitts formation initiated a R turn onto N putting them into direct confliction with the Squirrel. Although the Pitts formation was under a FIS, ZONE put the formation into a R turn to take them away from the Squirrel. Simultaneously, PAR broke the Squirrel off from the radar approach and initiated an avoiding action turn to the R as soon as the controller was aware of the Pitts formation's position. The Squirrel pilot took the turn and when clear of the Pitts ac elected to continue the approach visually.

HQ PTC comments that there seems to have been a misunderstanding between the Pitts formation and Shawbury ATC about whether the formation should pass to the N or S of Ternhill – ATC said "maintain clear of Ternhill to the North" and yet the Pitts pilot thought he should "keep clear of Shawbury by flying to the South". Thus, the seeds were sown for the Pitts pair to transit close to the ATZ boundaries, in showery weather and through the radar circuit being flown by the Squirrel causing it to be broken off its radar approach at 2nm FINALS. It is unclear from the radar picture exactly what track the Pitts flew but had they remained to the N as requested this Airprox would not have occurred.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In a GA Member's view, the Pitts formation transit through the busy CMATZ of Shawbury and Ternhill had not been as smooth as it should have been because there was evidently an element of potential confusion, both in the routeing messages passed by the controllers and also in the acknowledgements from the lead Pitts pilot. ZONE had asked the formation to route to the N of Ternhill ATZ with the intention of deconflicting the Pitts formation from the visual cct at Ternhill and the radar training circuit at Shawbury. Controller Members pointed out the potential for ambiguity in some of the transmissions because, at 0956:18, ZONE had said to the Pitts formation leader "…*if you can maintain clear of Ternhill to the north*". In the Members' opinion, that transmission had not expressed clearly the ZONE controller's intention. One Member suggested that this transmission could be interpreted as a request for the formation to pass to the S of the aerodrome thereby leaving *"…Ternhill to the north"*. Furthermore, this transmission was answered by the Pitts Ldr as "*Roger, wilco"* which would not have revealed any error of interpretation by the pilot at the time: a read-back would have done so. Less than 20sec later ZONE had transmitted again "[Pitts formation C/S] *roger maintain clear of Ternhill to the north*" which the Pitts Ldr acknowledged with *"Roger maintain clear of the north…*[Pitts formation C/S]". This again could be an indication of a misinterpreted transmission. The Board noted that further questioning by the Pitts Ldr after he reported at the edge of the MATZ elicited further confirmation of what ZONE was asking him to do albeit that the controller

inadvertently mentioned the "*..MATZ..".* ZONE later confirmed once again *"maintain clear of Ternhill ATZ to the north".* Nevertheless, it was evident from the Pitts pilot's account that he understood from all of this that ZONE wanted him to route in a different direction and he reported that ATC had requested them to keep clear of Shawbury by flying to the S which was evidently not what ZONE was trying to say. The Board recognised that both of the ZONE controllers involved were doing their best to keep the Pitts formation out of the way of both Ternhill visual cct traffic and Shawbury's instrument pattern and merely trying to assist the Pitts pilots' safe passage. The STC Member observed that military controllers do normally exhibit considerable flexibility in assisting pilots along their way. However, here they had been frustrated in this task by the Pitts Ldr's inadvertent misunderstanding of the instructions transmitted. It seemed to the Board that this was the only plausible explanation behind the Pitts formation inexplicably deviating from their relatively direct route to Sleap around to the S of Ternhill, which is where the radar recording shows that they flew their rather circuitous track up until the point that they temporarily faded from recorded coverage.

The lack of SSR undoubtedly did not make the formation of small ac as conspicuous on radar as Member's would ideally wish. It was unclear if the No2 Pitts ac had SSR fitted and a fast jet pilot Member observed that it was common practise that if the lead ac's SSR was u/s then the No2 would normally transpond the assigned squawk, thereby allowing the formation to be seen more easily with all the additional safety benefits that this entails. There seemed little that the Squirrel pilot could have done to affect the outcome of this Airprox as he merely complied with the ATC instructions given. Nevertheless, the Mil ATC Ops Advisor explained that having misunderstood their routeing instructions the Pitts formation ended up flying close to the approach to RW18 when the subject Squirrel was executing a PAR. Having flown into such proximity it was evident that the PAR controller acted correctly when he spotted the Pitts formation on his display and passed avoiding action instructions to the Squirrel pilot to turn away from them. Despite the RIS that pertained here, in pursuance of their prime objective of preventing collisions, it is accepted that controllers may pass avoiding action instructions if the circumstances warrant. Similarly the ZONE controller was clearly concerned about the proximity of the formation and also issued avoiding action under the FIS of a R turn onto 040° away from the helicopter. Unbeknown to ZONE before he transmitted his avoiding action, it was not until after this transmission that it became apparent that the Pitts formation had climbed further to 2000ft QFE. Controller Members agreed that it was not unreasonable for controllers to proffer avoiding action in these circumstances when concerned for the safety of ac under their control. The Board concluded, therefore, that this Airprox had occurred because the lead pilot of the Pitts formation had misunderstood the Shawbury controllers' routeing instructions and had flown close enough to the Squirrel to cause ATC concern for its safety.

Since neither pilot saw the other's ac there was plainly no information available on the minimum separation within their respective reports. Similarly, whilst assessing the risk inherent in this encounter within the MATZ, it was unfortunate that no supporting recorded SSR data was available to enable the vertical separation to be determined accurately or at what point the Pitts formation had climbed. The Pitts may have been climbing up as the helicopter descended in the vicinity because the lead Pitts pilot later reported they were at 2000ft after the avoiding action instruction was issued by ZONE. However, the Mil ATC Ops Advisor explained to the Board that for the primary contact of the Pitts formation to appear on the PAR display it was probable that the formation was flying at a similar height, in relatively close proximity to that of the Squirrel, but it was not feasible to quantify this with any degree of certainty. Unfortunately primary radar data from the PAR is not recorded either. Consequently, there was nothing to show how close the formation had come to the Squirrel. Some Members concluded from all of this that safety was not assured. However, this was a minority view, others stressing that the Pitts Ldr had reaffirmed that they had maintained good VMC throughout. Moreover, the No2 Pitts pilot had apparently seen the helicopter and reported it was safely clear behind. It was also apparent from the RT recording that when the lead Pitts pilot became aware of the Squirrel from the traffic information and avoiding action provided by ZONE he quickly climbed his formation out of the MATZ to 3500ft. This led the Members to conclude, by a clear majority, that there had been no risk of a collision in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The lead pilot of the Pitts formation misunderstood the Shawbury controllers' routeing instructions and flew close enough to the Squirrel to cause ATC concern for its safety.

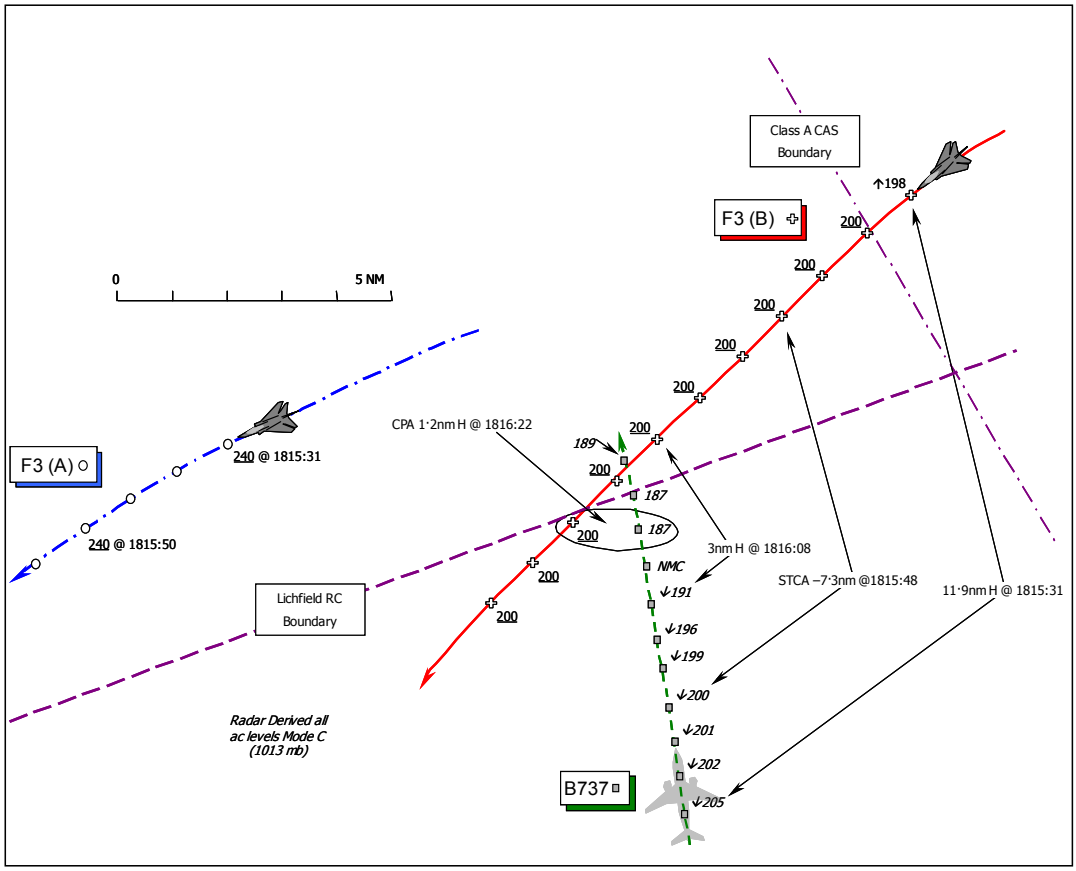
Degree of Risk: C.

AIRPROX REPORT No 082/05

AIRPROX REPORT NO 082/05

Date/Time: 7 Jun 1816
Position: 5245N 00110W (7½nm SE of Nottingham/E Midlands)
Airspace: Daventry CTA (Class: A)

	Reporting Ac	*Reported Ac*
Type:	B737-300	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	↓FL200	FL200
Weather	VMC CLBL	VMC CLOC
Visibility:	>10km	>10km
Reported Separation:	600ft V/2nm H	"several nm"
Recorded Separation:	Nil V @ 7·8nm H 1·2nm Min H @ 1300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports he was descending en-route, under IFR but in VMC, some 5000ft and 5nm clear of cloud in between layers and in receipt of a RCS from Manchester CONTROL. The assigned squawk of A5511 was selected with Mode C and TCAS is fitted.

Approaching a position 113° TNT VOR 30nm DME, heading 355° at 420kt descending to their cleared level of FL200, they were transferred from 127·87MHz to 134·42MHz when passing FL210. Whilst switching frequency, TCAS enunciated a TCAS TA on traffic ahead and above them and the first call that they made on the new

frequency was to inform the next SC that they were in a TCAS descent as the TA rapidly changed to a DESCEND RA. They descended some 1500ft below their cleared level - from FL200 to FL185 - before receiving CLEAR OF CONFLICT whence MACC informed them that an unknown ac had infringed their Sector. The intruder ac was seen – a Tornado jet - at FL200 and at the closest point passed through their 12 o'clock at a range of 2nm with vertical separation of about 600ft. He stressed that the MACC frequency was *"overloaded"* with no discernable breaks in controller transmissions. The risk was assessed as *"low"* because TCAS intervened otherwise it would have been *"high"*.

THE PILOT OF THE NO2 TORNADO F3 (F3B) reports his ac has an air defence grey camouflage scheme; the HISLs and all external ac lighting were on. They were flying in VMC with an in-flight visibility greater than 10km whilst departing from Coningsby as the second of 2 Tornado jet fighters on a live QRA 'Scramble': he was not flying in close formation with his leader who was some distance ahead but in contact on the same Ground Controlled Intercept (GCI) RT frequency. A squawk [Air Policing - Air Defence Priority Flight (ADPF)] was selected with Mode C, TCAS is not fitted.

Before departure they had been given a "clearance" by Coningsby TOWER – and previously by CRC Boulmer via telebrief - to climb to FL200 on a heading of 240°. They attempted to 'check-in' with Swanwick (Mil) [LJAO CENTRAL] as soon as they were airborne but did not achieve RT contact with the controller so immediately checked-in with CRC Boulmer who began to transmit operational instructions and vectoring information concerning their intercept mission. Owing to the difficulties in achieving radio contact with Swanwick and allied with the pressure of the 'live' scramble, he was unaware of a confliction with any civil traffic at the time. Once Boulmer had stopped transmitting, the lead F3 crew – F3A - who was at that point some 10nm ahead of them and in RT contact with Swanwick (Mil), relayed on the GCI frequency an avoiding action instruction to them from the Swanwick (Mil) Controller. They checked-in again with LJAO Swanwick (Mil) whereupon the controller informed them that no further avoiding action was required and placed them under, he thought, a RAS. During the period of the whole intercept, both controllers – LJAO CENTRAL on the MAIN UHF and CRC Boulmer GCI on AUX UHF - were continually stepping on each other on the different frequencies so it became very difficult to determine which unit was transmitting. Consequently, with this constant RT 'chatter' the cockpit workload became "very high" and some RT calls might have been inadvertently missed. His first knowledge of the conflict was when the lead crew, who was 2-way with Swanwick (Mil), relayed instructions to him on the GCI frequency. The B737 was sighted several miles away but although he could tell that they were not in confliction because of their speed of 450kt coupled with the vector he was unable to judge the vertical differential. Thus he assessed the risk as *"nil.. in VMC with a clear lookout"*.

THE PILOT OF THE LEAD TORNADO F3 (F3A) reports that he was 'scrambled' from Coningsby and in 2-way RT communication with LJAO, with F3B some 10nm in trail. He became aware that LJAO was passing avoiding action to the crew of F3B but suspected that they were not yet on the LJAO frequency. Accordingly, he relayed the avoiding action information to F3B on the GCI frequency as soon as there was an opportunity to do so.

MACC SOUTH EAST RADAR CONTROLLER (SE RADAR) reports that the B737 was in the vicinity of LESTA tracking northbound at FL200 under a RCS. The B737 crew checked in on frequency and stated that they were descending in response to a TCAS RA. Just to the E of the B737 was an unknown ac squawking F3B's callsign [converted by the SSR code/callsign distribution system (CCDS)] tracking SW at high speed also indicating FL200. STCA immediately started to flash red. Separation was already lost and due to the relatively high speed of the other ac – F3B - any avoiding action would have been ineffectual. He passed traffic information to the B737 pilot who stated that he was visual with the conflicting ac but he continued to pass further traffic information until the confliction had passed. The pilot of the B737 identified the conflicting traffic as a military Tornado jet.

THE MACC STAFA SECTOR CO-ORDINATOR (STAFA COORD) reports that the B737's first call on frequency was to report a TCAS RA against an unknown ac – F3B - in the B737's 2 o'clock at a range of about 5nm. Both ac were indicating level at FL200 on Mode C. The B737 crew took the TCAS descent and the radar returns were seen to merge with a few hundred feet of vertical separation. The incident happened so fast that there was no time to give traffic information in advance or to judge the separation.

THE LJAO CENTRAL CONTROLLER (LJAO) reports that he received a prenote for a Tornado - F3A - being scrambled from Coningsby who informed him that the ac would depart climbing to FL240 and squawking an assigned squawk. Coningsby asked him if he wanted the landline left open for a handover: he declined and asked them to transfer the ac to him as soon as it was airborne [on a free-call]. He was also expecting a second

interceptor – F3B. The crew of F3A called him as soon as they were airborne. Once he had radar contact he identified F3A and instructed him to climb to FL200. This was the level, passed to him by the LJAO SUPERVISOR (LJAO SUP) from the CRC Master Controller (CRC MC) at Boulmer, at which the F3's would transit CAS. However, the crew of F3A then requested FL240 so he instructed the crew to climb to FL240 – at the time the LJAO SUP was on the landline to the CRC MC who agreed that the F3s could transit at FL240. He was then informed by the LJAO SUP that the 2 fighter ac were cleared through DAVENTRY's airspace at FL240 and noticed that the second fighter - F3B - was airborne and about 15nm 'in trail' of F3A. The subject B737 was observed proceeding N close to the eastern edge of DAVENTRY's airspace at about FL230 descending, but he judged that the airliner would not affect F3A - which was levelling off at FL240 - and should not affect F3B, the ac climbing at this point. As the contact which he believed was F3B passed Cranwell he noticed that the ac had levelled at FL200. The crew had not yet called him to 'check-in' so it was neither identified nor under any form of ATS. The B737 was approaching FL200 in descent and when F3B was approximately 10-12nm away he transmitted avoiding action [blind] to F3B, instructing the crew to turn L onto heading 150° [although they had still not reported on the frequency] but received no response. He passed further avoiding action to F3B but again with no response from the crew. Both ac were indicating FL200, the B737 then descending to FL193 when the ac were less than 2nm apart. The crew of F3A informed him that they were very busy talking on 2 boxes and had relayed the avoiding action to F3B. However, the B737 was clear to the N by the time that the crew of F3B called him for the first time, whereupon he instructed them to climb to FL240 and maintain a heading of 200°.

THE LJAO SUPERVISOR (LJAO SUP) reports that in accordance with SOPs he agreed departure details for both F3A and F3B with the CRC which was that both ac were to be level at FL200 and to call on a specified frequency. He co-ordinated with the DAVENTRY Sector face to face and advised his LJAO CENTRAL controller that the two ADPF Tornados were cleared into CAS at FL200. Subsequently, he was advised by the CRC that FL240 was now required so he co-ordinated this again 'face to face' with the DAVENTRY PLANNER. F3A (now level at FL240) was co-ordinated at FL240 as was F3B (still climbing). There was conflicting traffic – the B737 - but this ac had now been transferred to MACC. With F3B climbing to FL240 this was not considered to be a factor. Unknown to him F3B had not made contact with LJAO CENTRAL and had levelled at FL200: he realised this upon arriving back at the LJAO console so he immediately informed the DAVENTRY planner and called the CRC to insist that F3B was transferred to the LJAO frequency. The LJAO controller gave avoiding action 'blind' but the ac was not on frequency whereupon F3B entered CAS not under service from LJAO and at a level contrary to that agreed w

THE CRC BOULMER MASTER CONTROLLER (MC) reports that a pair of ac was scrambled from Coningsby to intercept an ac [UKAB Note: not the subject B737] in the airways complex. The scramble message, issued by the Master Controller on a direct line to the aircrew directed the fighters to vector 250°, climb 'as required' and to call LJAO. The lead Tornado – F3A - proceeded toward the airways complex. The second ac – F3B - got airborne in 10-15 mile trail and proceeded on a similar track. After the scramble message had been passed to the ac, a level of FL200 had been agreed as the transit level and he - the MC - directed the Fighter Allocator (FA) to advise Coningsby ATC of this on the assumption that they would apply this level before handover to LJAO. During one of a number of phone calls to the LJAO SUP, the need to transit the ac at FL240 was raised and the MC indicated this was not an issue and he was happy that they proceed at such a level. He does not believe that he requested this level change but he did indicate that it would not present a problem. The lead F3A had already entered CAS and the MC had not at any time applied a radar service nor taken any action to accept responsibility for the flight safety of the ac. No indication was received from LJAO that F3B had not called them up as directed. Equally, the crew of F3B themselves had neither indicated that they were not in receipt of a radar service nor that they had not gained 2-way communication with LJAO while operating in CAS. It was therefore only after the Airprox had occurred that the MC became aware that F3B was not in RT contact with the LJAO Controller at the time of the incident.

THE CRC BOULMER FIGHTER ALLOCATOR (FA) reports that as the two jets were brought to cockpit readiness he contacted the LJAO SUP to brief them and get ADPF status for the F3 pair. He also requested a frequency from Swanwick for the ATS if they were to launch on a westerly heading as they would very quickly enter CAS. Subsequently they were ordered to launch and the MC ordered that the F3 pair contact LJAO at Swanwick (Mil) for an ATS and Boulmer on their second radio for tactical control. The FA informed the FC that Swanwick would be providing the air traffic service and that he would be providing tactical control. As they got airborne he – the FA - called both LJAO and Coningsby ATC to request that the two ac were climbed to FL200 initially. Both crews checked in and were requested to pass operational information. The controller then started to pass tactical information. Subsequently, LJAO informed the FA that F3B had not checked in on the LJAO frequency and was inside CAS without speaking to LJAO.

THE CRC BOULMER WEAPONS CONTROLLER (FC) reports that he was providing tactical direction to the pair of F3s who had been 'scrambled'. Both ac checked in with the FC as expected, no service being offered because they should have been receiving a service from LJAO. The FC proceeded to carry out further immediate actions before providing mission information and "Alpha control". After F3B had penetrated Class A airspace, in 14nm trail of F3A, the latter's crew called F3B and told them to call on the LJAO frequency as the LJAO controller was trying to give the crew of F3B avoiding action.

THE TORNADO F3 PILOT'S UNIT comments that this Airprox appears to have occurred because F3B entered CAS without appropriate clearance. However, to understand fully why this happened, it is necessary to set the incident in context. The incident occurred during an extremely short notice operational QRA scramble. There was a great deal of pressure on the crew to complete their mission as quickly as possible. The crew had attempted to contact LJAO on RT prior to entry into CAS but without achieving RT contact proceeded on the basis of their scramble clearance which they believed would prevent any conflict with other traffic and allow them to prosecute their mission expeditiously. Although the lead crew in F3A was in contact with LJAO, the crew in F3B - through no fault of their own - had not managed to achieve RT contact. The incorrect assumption that F3B could proceed was key to the Airprox but at no time did GCI appear to make the crew aware of the potential conflict before it occurred.

A number of other factors mitigate the crew of F3B's actions. They were at a heightened state of arousal, owing to the urgency of their mission and had difficulty in separating simultaneous instructions from three different sources – ac intercom, CRC and LJAO. This led to a breakdown in situational awareness at a critical stage of the intercept, leading directly to the unexpected confliction with the B737 in the very high cockpit workload that existed at the time of Airprox.

It was suggested to the CRC that there should be a review of the 'Scramble' procedures in order to reduce the risk of recurrence. This would help to establish a degree of protection (and reduce the workload) for crews tasked to carry out what is currently their highest priority peacetime mission.

ATSI reports that in accordance with the Standing Agreement for transfer from the LACC DAVENTRY Sector to MACC SE Sector, the B737 was descending to FL200. On first contact with MACC SE RADAR at 1815:50, the pilot reported a TCAS descent against traffic at 2 o'clock - 5nm away. This traffic - Tornado F3B - was one of a pair of F3s on an Air Defence Priority Flight (ADPF) co-ordinated by LJAO through LACC Sector 28's [DAVENTRY NORTH] airspace at FL240 and above MACC's airspace upper limit of FL195. Consequently, it was unknown traffic to MACC and had not been observed by the SE RADAR controller until the pilot reported a TCAS descent. Traffic information was then passed to the B737 pilot as he descended clear of the Tornado.

Meanwhile, at 1810:45, the LJAO controller had contacted LACC S28/34/27/32 [the bandboxed DAVENTRY SECTOR] to inform the controller "we are scrambling" against emergency traffic and would be coming through the DAVENTRY Sector on an ADPF at FL200 "quite soon". LACC confirm that a CFP at FL200 was never issued. The LJAO controller then advised the DAVENTRY PLANNER face-to-face that the two F3s would be holding in the area of CHASE at FL240, until further notice. At this point LACC erroneously believed that the two fighter ac would be operating as a [close] formation. A Cleared Flight Path (CFP) request at FL240 for the first F3 was received at the PLANNER's position and accepted at 1812. The B737 crew was instructed to expedite through FL230 descending to FL200 and was then transferred to MACC at 1814:25. At 1814:50, a CFP request at FL240 was received concerning the second Tornado - F3B - (this was not accepted until 1817:40) [over 1¼min after the Airprox occurred]. Prior to this at 1815:12, LJAO had telephoned the DAVENTRY Sector with reference to F3B and was informed that the B737 was already working MACC: LJAO replied "we'll just have to get above it". At 1815:55, STCA activated between the subject ac.

The LACC MATS Part 2 describes Air Defence Priority Flights (ADPF) as follows:

"ADPF include intercepting, tanker support and early warning aircraft transiting to their assigned areas. There may be little, if any, warning of their arrival. Civil sector controllers are to give priority to these flights without infringing flight safety. It is understood that deviations from the ADPF's optimum flight profile may be necessary".

Additionally, LACC MATS Part 2, Page SOS 1.5, Para 1.5.3.4 states at: 'Implementation of Air Defence Security Measures – ATC Actions'.

"When notified by the UK Air Defence Authority, via the LJAO Supervisor, that air defence security measures are being implemented in response to..[an]*..incident, the* [LACC] *ATC Watch Supervisor shall instigate…procedures to support this activity."*

The Reference also lists further tasks to be undertaken by the Watch Supervisor.

There is no evidence to suggest that any of this action was carried out. The Planner confirmed that he did not comprehend that the F3s were operating as ADPFs even though LJAO had mentioned it during the initial 'heads up' telephone call. Consequently, neither the Watch Supervisor nor the LAS were advised of the situation until after the reported incident had occurred.

As a result of this incident, the procedures have been reviewed and found to be generally sound. That said, it has been agreed with Swanwick (Mil) that ADPF ac will not be permitted to enter CAS unless a request has been agreed and that two flight levels will be blocked. Additionally, the presentation of the Track Data Blocks (TDBs) on the radar display for ADPF flights will be highlighted to provide a greater awareness than currently. Work on this is ongoing with no implementation date available at present.

MIL ATC OPS reports that 2 F3 ac - F3A & F3B - were scrambled from Coningsby on an operational sortie. F3B contacted the combined Coningsby GROUND/TOWER controller (TWR) at 1808:26, for taxi clearance. TWR asked the departing F3 crews "[F3 A & B C/Ss] *any specific flight level you'd like or straight to 240".* The crew of F3B responded, "[C/S] *I'd like to go to 240 initially*". TWR prenoted the F3s departure to the LJAO controller at Swanwick (Mil) at 1809:36, "*just on my runway at the moment looking for FL240 on a heading 250, if you're happy".* LJAO responded "*Yeah, no problems, what are the callsigns please*". Departure details were then passed on both the F3s as heading 250º and climbing FL240. At 1810:14, TWR asked LJAO "*Do you want to stay on the landline for a proper handover or are you happy with a freecall?"* LJAO replied "*no they can come straight across onto* [a specified frequency]*".* At 1810:33, F3B transferred to the TOWER frequency (the same controller) and was issued clearance to take off at 1810:59. Shortly afterwards, at 1811:23, Boulmer CRC rang TWR to ensure that they were aware of the operational 'scramble'. Boulmer stated "*we're looking to get them* [F3A&B] *at FL200, when you hand them...before you hand them…well on the handover to LJAO*". TWR responded "*Oh right they are at 240 I'll stop this one at 200*" so, at 1811:49, TWR instructed the crew of F3B to "*stop climb FL200*" This was acknowledged by the F3B crew and they reported freecalling Swanwick (Mil) at 1811:59. Nearly 2½min later at 1814:23, LJAO attempted to establish 2-way RT with the crew of F3B but received no response. LJAO transmitted blind to F3B at 1815:58, "[C/S F3B] *Swanwick avoiding action turn left heading 150º traffic 12 o'clock 5 miles crossing left/right*". Further avoiding action was passed 'blind' to F3B by LJAO at 1816:15, "[C/S F3B] *Swanwick avoiding action turn left heading 150º traffic left 11 o'clock 4…2 miles crossing left to right indicating FL190*". At 1816:31, LJAO asked the crew of F3A if they were in contact with F3B, this was confirmed and F3A crew reported *"Affirm just relayed the message to him this time he'll be coming up* [checking-in on this frequency] *we are working two radios and quite busy with Boulmer this time standby".* F3B contacted LJAO at 1816:43, and asked the controller "[C/S F3B] *with you confirm avoiding action"*. LJAO responded "[C/S F3B] *maintain present heading climb FL240 expedite climb"* which the crew of F3B acknowledged and the sortie continued without further incident.

Analysis of the Debden Radar recording shows F3B having departed Coningsby and, at 1814:57, is 11nm NE of LESTA tracking 250º squawking A1326 and climbing through FL165 Mode C. The B737 is 4½nm SSE of LESTA tracking 350º squawking A5511 and indicating FL220 descending. At 1815:22, the horizontal separation between F3B and B737 is 10nm and the former is observed turning left to track 230º. STCA activated at 1815:48: both ac indicated FL200 with 7·3nm horizontal separation evident. The B737 maintains its descent and with F3B still indicating FL200 the airliner is shown in its L 10 o'clock 4·4nm indicating FL196 descending. The next sweep shows 3nm horizontal and 900ft vertical separation between the 2 ac. F3B passes through the B737's 12 o'clock at 1·6nm at 1816:15 but the B737 is not displaying Mode C momentarily and the F3 is still indicating FL200. After this point the separation between the 2 ac increases.

This Airprox occurred during a high pressure, high workload operational sortie. Before the F3s departure from Coningsby, Boulmer CRC - who would ultimately provide tactical control to the F3s during their mission - had contacted LJAO to advise that they would require the F3s at FL200. However, the F3s departed Coningsby 15nm in trail, the crew of F3B having requested FL240 for the transit. F3A departed with no complications in the climb to FL240. However, due to the information later passed from CRC Boulmer to TWR, the Coningsby TWR controller amended F3B's climb-out details to FL200 but did not pass this information on to LJAO. The agreed method for the transfer of control of the F3s between Coningsby and LJAO was a freecall: as such the revised

level that F3B was climbing to [FL200] should have been stipulated on the crew's initial call. However, the crew of F3B did not make immediate RT contact with LJAO and levelled off at FL200. LJAO had obtained a CFP through the DAVENTRY Sector at FL240 for F3A at 1812:55 but the CFP request for F3B was delayed, due to the communication breakdown between LJAO and F3B, until 1814:50, by which time the conflicting B737 had already been transferred to MACC. LJAO made 2 further attempts to establish 2-way RT with the crew of F3B and eventually transmitted avoiding action 'blind' twice but LJAO did not establish effective 2-way communications with the crew of F3B until after the Airprox had occurred.

The change of departure level passed by BOULMER and relayed by CONINGSBY TOWER to F3B coupled with the lack of 2-way communication between LJAO and F3B, due to operational pressure, resulted in the crew of F3B entering CAS without clearance at a level which had not been anticipated by LJAO. Finally, the freecall of F3B from TWR to LJAO resulted in the changed departure level not being highlighted to LJAO. As a result of this Airprox procedures used during this operation have been reviewed and appropriate changes made.

HQ STC comments that there is little to add to the investigation which has not been covered already. The crew were under pressure to complete their operational task and continued as per flight plan, when they could not raise the LJAO controller, unaware that the crew of F3B had negotiated a different level. The change in procedures should ensure that this type of occurrence should not reoccur.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was reassured to learn that considerable action had been taken following this Airprox and a thorough review of procedures had taken place. It was evident from the very comprehensive reports provided by all concerned that this Airprox had occurred during a high pressure/high workload scenario and the F3 Station's comments on this aspect were well founded.

It was pointed out that the period within which the relevant co-ordination took place between the appropriate agencies - CRC Boulmer, Coningsby, LJAO and LACC - was of a relatively short order but did not include MACC. The final level agreed for the F3s to cross through CAS, at FL240, was well above MACC's airspace boundary of FL195 and they would, therefore, have little involvement in the co-ordination of a CFP above that level. It was explained that when crews are scrambled the intent is to launch as soon as possible which was why F3A - the No2 in the formation - preceded the departure of the leader, F3B. Consequently, with a request from F3B as the formation leader to climb to FL240 there was no reason to involve the MACC STAFA COORD/SE RADAR in the short time frame available. Civilian controller Members were surprised that the LACC & MACC Supervisors had not taken a more pro-active stance here and were apparently 'out-of-the-loop' but the compressed timescales had it seems precluded detailed co-ordination. Nonetheless, the ATSI report had made it plain that this aspect had been examined. Although MACC were unaware of the ADPF scramble of the F3s, the B737 was descending to a level below the CFP, which LJAO had arranged with LACC within the DAVENTRY Sector, and had been transferred by DAVENTRY Sector to SE RADAR.

From the B737 crew's perspective, they had no input to the cause of this Airprox. However, they did have a significant effect on the outcome by their prompt compliance with the TCAS RA. It was evident from the B737 pilot's report that the first he was aware of F3B was when TCAS enunciated a TA that was rapidly followed by an RA commanding a descent below their assigned level of FL200. Similarly, it was evident that MACC had not detected the presence of F3B until their attention was drawn to it by the B737 crew's TCAS report. It was explained that work was in hand, expected to be completed by January 2006, to make ADPF flights more conspicuous to ACCs thereby highlighting the nature of the sortie more clearly to Sector Controllers.

The Mil ATC Area controller Member stressed the importance of facilitating direct routeing for ADPF flights. Here, he explained, these two fighters were arguably the most important ac in UK airspace, in practice afforded 'Category A' flight priority handling so as to expedite the crew's critical mission. Clearly LJAO were endeavouring to do just that and had established a CFP at the formation leader's requested level of FL240 where the two F3 ac as DAT (Defence Air Traffic) had precedence over virtually all other traffic. Consequently, the Member contended that the Station's assertion that the crew of F3B entered CAS without a clearance was not appropriate insofar as

a clearance was hardly a pre-requisite in this instance. However, the situation has now changed and the Board was briefed that a re-write of the relevant SOPs has resulted in a significant change of emphasis within these procedures in that crews engaged on an ADPF now require a specific clearance before entry into CAS. It was explained that this should not hamper the tactical freedom of AD crews unduly, whilst enhancing safety for all concerned.

The apparent anomaly between the initial request for a CFP at FL200 made by LJAO and LACC's assertion that a CFP was never issued at FL200 was mentioned. It was suggested that events were proceeding at such a pace in this tense 'operational atmosphere' that the initial information provided was overtaken by events and agreement to the CFP at FL240 following the formation leader's request was obtained very rapidly due to the prompt agreement of the DAVENTRY Sector. The Mil ATC Area controller Member complimented the LACC DAVENTRY Sector staff here for their excellent co-operation, clearly doing their best to assist their military colleagues in this difficult scenario.

It was evident from the Boulmer MC's report that the flight level attained at this stage of the sortie was not critical and he had readily acquiesced to the level finally obtained for the CFP. It seemed that the message to Coningsby TOWER from the FA at CRC Boulmer, which resulted in TOWER passing the message to the crew of F3B to stop the climb at FL200, whilst critical to the subsequent outcome of events was apparently the result of redundant information being passed 'around-the-loop'. This was a salutary lesson to all concerned of the effects of well meaning but redundant information exchange. Not that the FA nor the ADC necessarily realised at the time, but it was clear to the Board that the change of departure level passed by BOULMER and relayed by Coningsby TOWER to the crew of F3B in the 'heat of the moment' was the fundamental catalyst to this Airprox. Such a level had not been anticipated by LJAO who, although aware of F3B crew's stop-off at FL200 from the Mode C indication, remained unaware of the reason behind it because a handover had been dispensed with at their request. Consequently, the Tornado crews were switched directly from TOWER to the LJAO controller – effectively bypassing the Coningsby DEPARTURES controller - in order to expedite the mission, which some Members thought unwise. The Board agreed that this in itself could have been resolved if the crew had called LJAO immediately but as had been made clear, due to operational pressure the lead crew in F3B did not achieve 2-way RT contact with LJAO until after they had penetrated CAS and not until after the Airprox had occurred. Moreover, this was at the very flight level to which the B737 had been descended to comply with the standing agreement prior to transfer to MACC, leaving FL240 available for the ADPF flight. The irony of this was not lost on the Members who agreed unanimously that this Airprox had resulted because of confusion over the required level, when F3B entered CAS at a level not expected by LJAO and flew into conflict with the B737.

The Air Defence Advisor to the Board commented that at no time did the FC pass traffic information or attempt to resolve the confliction with the B737 because it was not apparent to him that the crew of F3B were not in communication with LJAO and were thus not under a radar service from ATC at the time. The Mil ATC Ops report had clearly shown that the LJAO controller had tried his best to effect avoiding action against the B737 but he was unable to implement this in time because the crew of F3B was not responding to his transmissions. However, TCAS initiated an RA and the B737 crew's prompt reaction had ensured that they were 900ft below F3B before the fighter passed 3nm clear ahead and had achieved 1300ft vertical separation at the closest point of 1·2nm. The Board agreed unanimously that these factors, coupled with the fighter crew's visual sighting of the airliner, ensured that any risk of a collision had been removed entirely in these circumstances.

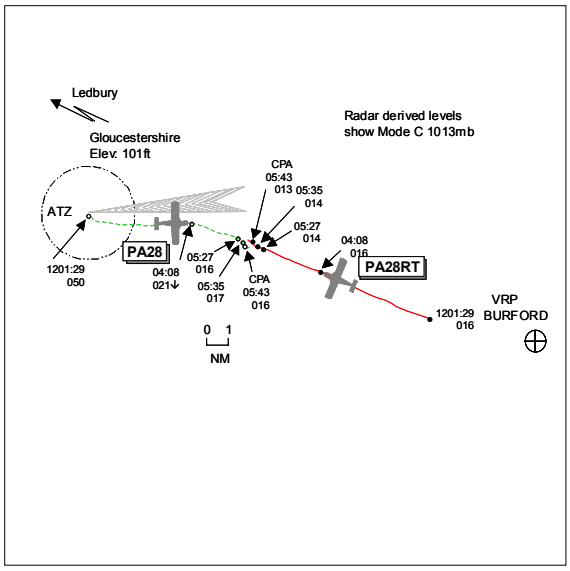
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: After confusion over the required level, F3B entered CAS at a level not expected by LJAO and flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 083/05

Date/Time:	8 Jun 1206	
Position:	5152N 00158W (7nm ESE Gloucestershire Airport - elev 101ft)	
Airspace:	LFIR	(Class:G)
	Reporting Ac	*Reported Ac*
Type:	PA28	PA28RT
Operator:	Civ Trg	Civ Trg
Alt/FL:	2300ft (QNH 1037mb)	2000ft (RPS 1033mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	30nm	25km
Reported Separation:	50ft V/200m H	Nil V/200yd H
Recorded Separation:	300ft V/0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports inbound to Gloucestershire from Manchester IFR on a dual training sortie and in receipt of a RIS, he thought, from Gloucester Approach on 128·55MHz squawking 7000 with Mode C. The visibility was 30nm, he was flying 500ft below cloud in VMC and the ac was coloured white and blue; no lighting was mentioned. About 6nm ESE of Gloucestershire heading 095° at 2300ft QNH 1037mb and 110kt flying an NDB/DME approach to RW27, he saw a PA28 1nm straight ahead flying in the opposite direction at the same level. He immediately took avoiding action, a steep turn to starboard, whilst the path of the other ac remained unchanged as it passed 50ft below and 200m to his L with a high risk of collision.

THE PA28RT PILOT reports flying a local dual training sortie from Wolverhampton with a CPL student. He had just changed frequency from Brize Norton to Gloucestershire who provided a FIS on 128·55MHz. He was squawking 7000 with Mode C, the visibility was 25km 1000ft below cloud in VMC and the ac was coloured white/ orange with strobe lights switched on. Approximately 10nm E of Gloucestershire heading 290° at 120kt and 2000ft RPS 1033mb, both he and the student first saw a white-coloured PA28 200yd to their L at the same level. It was flying level and turning R away from him before eventually passing behind. Although this had been a late sighting, he assessed the risk of collision as low.

GLOUCESTERSHIRE APPROACH CONTROLLER reports that at 1201 the PA28 pilot reported beacon outbound on Gloucestershire's RW27 NDB DME procedure. At 1206 the PA28 pilot was passed radar-derived TI on a contact believed to be 12 o'clock at 1nm and the pilot replied taking avoiding action to the R.

ATSI reports that the Airprox occurred in Class G airspace whilst the PA28 was operating under IFR and the PA28RT VFR. The former was in receipt of an Approach Control service from Gloucester Approach and the latter a FIS. The PA28 pilot was cleared for an NDB DME approach to RW27 at 1200:30 and reported beacon outbound at 1201:30. Just over 2min later (after 1204) the PA28RT pilot made his initial call on the frequency reporting *"we've just left Burford and we are going to Ledbury Town before returning to Wolverhampton currently at two thousand feet on one zero two seven requesting a Flight Information Service"*. The controller confirmed a FIS, passed the Cotswold RPS and instructed the pilot to report passing overhead. Burford is a VRP situated 20nm ESE of Gloucestershire Airport and Ledbury is a town 13nm NW of the airport. On a direct track, an ac would pass 4nm NE and through the approach path at about 7nm.

MATS Part 1 states, Section 1, Chapter 1, Page 2 under the heading of FIS, *'…controllers will, subject to workload, provide pilots with information concerning collision hazards to aircraft operating in Class C, D, E, F or G airspace when self evident information from any source indicates that a risk of collision may exist. It is accepted that this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for*

its accuracy'. Additionally, although primarily addressing inbound VFR flights, the MATS Part 1, Section 3, Chapter 1, Page 5, states: *'A particular watch should be kept for situations where a VFR flight may approach the aerodrome in a sector in which other aircraft are letting down on an instrument approach aid'*. On this occasion no TI was passed to either flight. However, approximately 1·5min after the PA28RTs initial call (1205:30), the controller, although not providing a radar service to either flight, used radar derived information to warn the PA28 pilot *"not identified believed to have traffic twelve o'clock one mile opposite direction no height information"*. The pilot replied *"taking avoiding action to the right he's dead in front same altitude"*. No comment was made on the frequency about the encounter by the pilot of the PA28RT who, subsequently, reported passing a couple of miles abeam the airfield to the NE. In the period leading up to the Airprox the RT was moderately busy, with a number of ac joining/ leaving the frequency. In the period between PA28RT pilot acknowledging his service and the PA28 pilot being given TI, one ac called giving a position report but it is not known if any telephone calls were made within this period, which would have added to the workload.

It should have been apparent to the controller, from the position information received from both pilots, that a potential confliction existed between the two flights and, arguably, he could have issued TI. However, there was less than 1min between the PA28RT pilot responding on the frequency and TI being transmitted to the PA28. Twenty seconds of that time was taken up by another ac. In the event, the controller was able to pass TI, using a radar-derived source, albeit only to the PA28 pilot and at a late stage.

UKAB Note (1): The Airprox is clearly shown on the Clee Hill radar recording. The PA28's descent in the NDB procedure from FL050 commences shortly after the pilot reports 'beacon outbound' at 1201:30. The PA28RT at that time is seen on a Brize squawk 15·5nm ESE of Gloucestershire tracking 295° indicating FL016 (2300ft QNH 1037mb). At 1204:08 the PA28RT's squawk changes to 7000 still showing FL016 (2300ft QNH) as the pilot makes his initial call to Gloucestershire with the PA28 in its 12 o'clock range 6·5nm descending through FL021 (2800ft QNH). Later at 1205:27 just as the controller passes TI to the PA28 pilot, the PA28 is steady tracking 110° level at FL016 (2300ft QNH) with the PA28RT in his 12 o'clock range 1·2nm indicating FL014 (2100ft QNH). The next radar sweep 8sec later shows the PA28 in a R turn at FL017 0·7nm WNW of the PA28RT showing FL014. The CPA occurs on the next sweep at 1205:43, the subject ac passing port to port, separated by 300ft and 0·3nm.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Although the PA28 pilot was flying an NDB instrument approach procedure under IFR, this was in Class G airspace where both crews had equal responsibility for maintaining their own separation from other traffic through 'see and avoid'. The PA28RT pilot had made his initial call on the Gloucestershire frequency, about 2min after the PA28 pilot had reported 'beacon outbound', and so he was unaware of the potential confliction from the RT transmissions. An earlier call at Burford would have allowed the PA28RT pilot more time to build up a mental traffic picture from the RT exchanges. One Member thought that the position report given *"...just left Burford..."* was too imprecise which could have led other parties to assume that the ac was a lot further away from Gloucestershire than it actually was. Also, this transmission/report should have alerted the IFR PA28 pilot of the potential confliction whilst he was flying the outbound track of the procedure. Members agreed that it should have been apparent to the Gloucestershire APP that the two ac were potentially coming into conflict and that early TI to one or both flights would have given the pilots a better 'heads up' on the situation. That said, it was accepted that there may not have been time to pass TI any earlier owing to controller workload. However, the radar derived TI passed by the APP enabled the PA28 pilot to see the approaching PA28RT albeit late, 1nm ahead at the same level, but in time for the pilot to take avoiding action, passing 200m clear to its L and 50ft above it. The PA28RT pilot only saw the other PA28 as it passed down his LHS by 200yd, effectively a non-sighting, being too late for him to take any action. The Board unanimously agreed that the actions taken by the PA28 pilot were enough to ensure the ac were not going collide. However, the geometry of the encounter - both ac head on with only one effective sighting – led to the ac passing in such close proximity to the extent that safety had not been assured during the encounter.

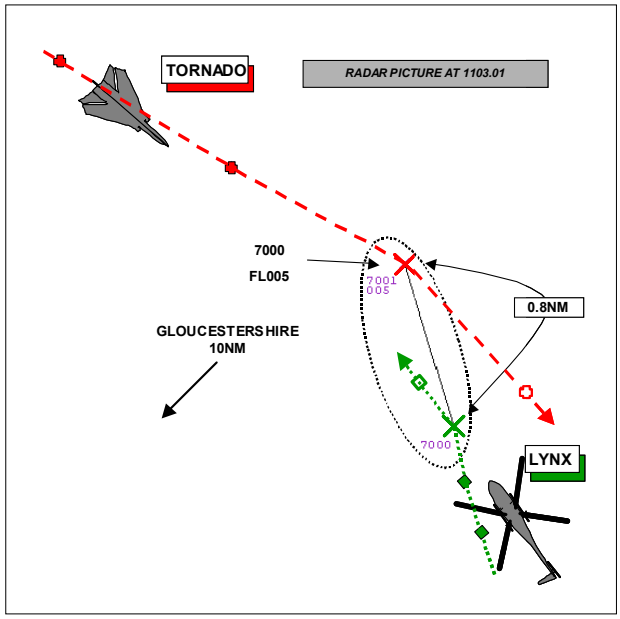
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sighting by the PA28 pilot and an effective non-sighting by the PA28RT pilot.

Degree of Risk: B.

AIRPROX REPORT NO 084/05

Date/Time:	10 Jun 1102	
Position:	5157N 00157W (10nm NE Gloucestershire Airport - elev 101ft)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Lynx AH7	Tornado GR1
Operator:	HQ DAAvn	DPA
Alt/FL:	1100ft (RPS 1020mb)	NR (Rad Alt)
Weather	VMC CLOC	VMC CLBC
Visibility:	20km	8km
Reported Separation:	NR V/400m H	Not seen
Recorded Separation:	NR V/ >0.8nm H (as ac passes thru 12o'clock)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX AH7 PILOT reports flying with another QHI from Middle Wallop with HISLs selected on, squawking 7000 (NMC) and in receipt of a FIS from Gloucestershire. While heading 345° at about 1100ft amsl (200ft Rad Alt) he saw a red white and blue Tornado in a right turn, 600m away in his 12 o'clock. As the other ac was turning away from him he did not take any avoiding action and assessed the risk of collision as being very high.

THE TORNADO PILOT reports flying a red white and blue ac with HISLs and anti collision beacons switched on, on a singleton training flight in good weather in the UKDLFS and squawking 7001 with Mode C. On completion of the mission ATC advised him that he had been involved in an Airprox somewhere to the N of Gloucester Airport with a military helicopter. He did not see any military helicopters in the area and could not offer any further comment.

THE TORNADO STATION comments that they find it difficult to make relevant comment given the paucity of information available. It appears that the Airprox occurred in Class G airspace N of Gloucester. However, without more precise details it is difficult to reconstruct events. The Station can confirm from the records of the appropriate Sqn that this was a properly briefed and authorised Tornado low level continuation-training mission. It is their view that this incident was a normal operating hazard of low level VFR flight: however, without further details they are unable to comment on the level of collision risk that existed.

ATSI reports that the Gloucester RTF tape confirms that the Lynx pilot requested a FIS and this service was agreed by APR; the Tornado was not in communication with Gloucester.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies and radar photographs/video recordings.

The Board agreed with the Tornado Station that there was not enough information provided by the reporting pilot, and this despite several attempts by the Secretariat to gain amplification, to investigate and form conclusions on this incident with any degree of certainty. However, since the only source of information, namely the reporting pilot's report, stated that no avoiding action was required, the Board concluded that there had been no risk of collision and that this incident had been a confliction in the LFS.

Although in this case probably not germane to the incident, it was observed that the Lynx pilot reported that his ac's Mode C was switched off. This was considered unwise since it denied potentially important information both to any controllers observing the ac on radar and/or to any ACAS-equipped ac.

PART C: ASSESSMENT OF CAUSE AND RISK

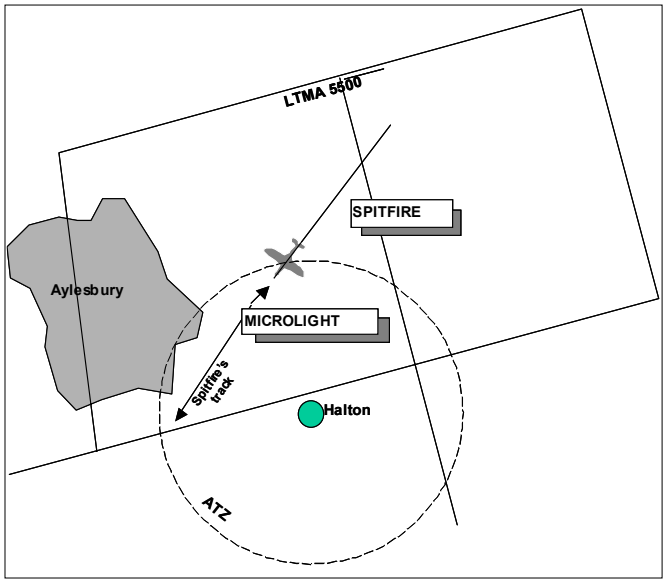
Cause: Conflict in the UKDLFS.

Degree of Risk: C.

AIRPROX REPORT No 085/05

AIRPROX REPORT NO 085/05

Date/Time:	9 Jun 1532	
Position:	5149N 00106W (1·9nm NNW of Halton - elev 370ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Microlight	Spitfire
Operator:	Civ Club	Civ Pte
Alt/FL:	1000ft (QFE 1016mb)	1800ft (QNH)
Weather	VMC CLBC	VMC CAVOK
Visibility:	15nm	>10km
Reported Separation:	50ft V/500ft H	150ft below
Recorded Separation:	returns merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MICROLIGHT PILOT reports heading 020° downwind for RW 20 RH, at 60kt, 1000ft QFE in the Halton circuit; his student had control. He saw an ac 1nm ahead, believed to be a Spitfire with a large radiator under one wing and a small radiator under its other wing, travelling from NE straight and level towards Benson, through the Halton Zone at high speed, with no notice. It passed 50ft above and 500ft to the side as he took control and dived at 30°. Without his avoiding action there would have been a risk of collision. At about 2min before the Airprox he heard on Halton frequency 130·425 "Can you see me (name)?" and 5min after the Airprox "Well clear of Halton Zone now".

THE SPITFIRE PILOT reports flying at 180kt and 1800ft QNH. About 2nm E of Aylesbury he saw a microlight 1nm (20sec) ahead and waggled his ac's wings as he passed 150ft under it. [UKAB Note 1: In a conversation with UKAB, the Spitfire pilot was adamant that the microlight he saw passed above him - he passed under the one he saw, and he saw no other. This means he did not see the reporting pilot's machine: the one he saw was not necessarily in the Halton ATZ, but was somewhere in the area.] The owner of his ac was filming at Halton and he called him on Halton's frequency but got no reply. He did not call to cross the ATZ because he was aiming to pass between Aylesbury and the ATZ. Due to late contact with the microlight no avoiding action was taken as collision was not a factor. Both ac were in Class G airspace.

UKAB Note 2: Radar recordings show a primary only contact tracking SW to pass 1·4nm NW of Halton at a groundspeed of 220kt. This track can be followed from take-off to destination and return and conforms to the Spitfire operator's track description. At the same time a very slow moving primary contact is tracking head on to it. The contacts merge at 1532:27 at a position 1·87nm 348° from Halton. The town of Aylesbury extends under the NW side of the Halton ATZ: therefore any ac aiming to clear the built up area to the SE, below 2370ft QNH, will track through the ATZ.

HQ PTC Comments that although the microlight club operates within civil regulations it operates from an airfield on MOD land and iaw the RAF Halton Flying Order Book. We therefore have a continuing interest and concern about the number of Airprox, which occur within the ATZ. The Spitfire pilot's disregard of the ATZ amounts to a contempt of the ANO and we feel that the time is probably overdue for the CAA to exercise their powers.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Whilst there appeared to be nothing to have prevented the Spitfire pilot from overflying the Halton ATZ, he had decided to avoid it laterally. Such action requires careful map study: the CAA 1:500,000 topo has the words INTENSE GLIDING over the edge of the zone adjacent to the conurbation of Aylesbury which make it difficult but not impossible to detect that avoiding the latter (below 2370ft QNH) will lead to infringement of the former. Intending to avoid the ATZ, the pilot presumably did not see the need to discharge his responsibilities under Rule 39 as set out in the UK AIP at ENR 1-4-11 para 2.7.2.3 to obtain information from the air/ground radio station before transiting the ATZ; to advise position and height to the A/G station on entering the zone and to advise prior to leaving it.

The Board was advised that Halton's was a busy zone: apart from RAF ac, there were gliding, light ac and microlight operations from the airfield, all of which made it a hazardous place to transit without warning. Members concluded that the cause of the incident was the Spitfire pilot's transit of the ATZ without complying with Rule 39. It was possible that the vertical separation between the ac was more than estimated by the microlight pilot because he was at 1000ft QFE and the Spitfire was at some 1430ft agl (depending on the QNH set). However, because the Spitfire pilot appeared not to have had the reporting microlight in sight, the Board concluded that the safety of the ac had not been assured.

Post Meeting Note: The *General Aviation Safety Information Leaflet*, September 2005 edition (GASIL 2005/03), published by the General Aviation Department of the CAA, contains an article 'Airproxes over the Chilterns' which reflects the Board's concerns about the concentration of traffic in the Halton area and the number of Airprox. The article gives useful information about transiting ATZs such as that at Halton.

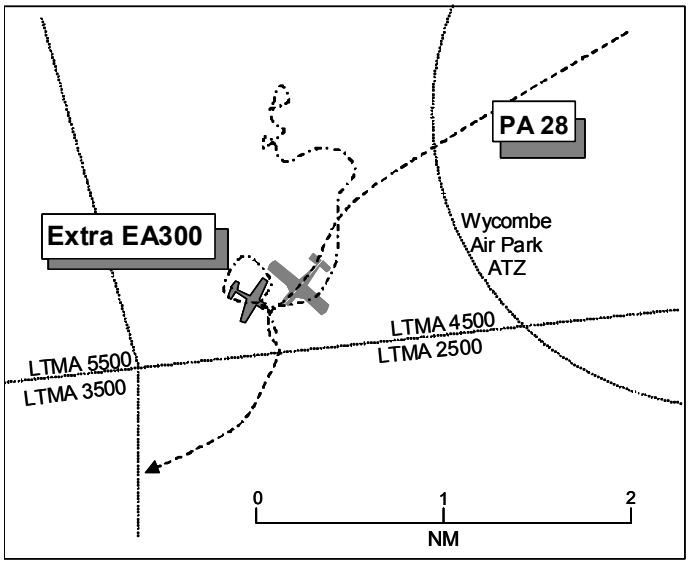
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Spitfire entered Halton ATZ without obtaining information from Halton A/G to enable the transit to be effected safely in accordance with the AIP.

Degree of Risk: B.

AIRPROX REPORT NO 086/05

Date/Time:	14 Jun 1028	
Position:	5135N 0054W (7½nm ESE Benson - elev 226ft)	
Airspace:	FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA28	Extra 300
Operator:	Civ Pte	Civ Trg
Alt/FL:	2300ft (QFE 1002mb)	2400ft (QNH)
Weather	VMC CLOC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	Within 100ft V & H 100ft /100m	
Recorded Separation:	NK	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports heading about 260° at 110kt, receiving a radar service from Benson on 120·9MHz and squawking as requested. She was flying at 2300ft and first saw a high wing ac 400-500ft above and to starboard, tracking towards her port side but above with adequate separation. A second ac was to their starboard side at a similar level to them but tracking parallel. She then saw the higher ac at her 11 o'clock tracking away and still high. The similar-level ac radioed that he was going to orbit. She looked again for the higher ac which had banked to the right and was now in her 1 o'clock and had changed attitude to nose down and turning. The ac seemed to be rapidly descending towards her; as it was slightly to her right she initiated a steep turn to the left and felt that had she not taken avoiding action a collision may have occurred. The ac passed within 100ft above and to the right. As she banked she vaguely remembered seeing the descending ac also pull out and turn to its left. She was only aware at the time that she and the similar-level ac were talking to Benson. She was not aware of the third ac in radio contact.

THE EXTRA 300 PILOT reports heading about SSE at speeds around 150kt on aerobatic/GH training in an area immediately SE of Stokenchurch Mast. He was on the Waltham Radio frequency of 122·6MHz; IFF was fitted to his ac but was switched off. He had seen and avoided numerous light ac during the sortie; the closest approach he was aware of (he presumed it was the reported incident) was when he descended to stay below the TMA on return to White Waltham. Manoeuvring allowed him to see the ac below and 400m in his 11 o'clock position. He altered course to increase the miss distance to 100m and 100ft; the other ac subsequently also changed heading. The risk of collision was obviated by his own manoeuvring to clear the blind spot forward and below.

MIL ATC OPS reports that the PA28 free called Benson Zone (ZON) at 1025:51 reporting "*PA28 outbound from Denham, en route to Perranporth, just passed Wycombe this time, 2200ft, 1010 and we request MATZ penetration and flight information [service], PA28 C/S*". ZON placed the PA28 under a FIS after passing TI to another ac on frequency. At 1027:32, the PA28 crew were advised by ZON "*PA28 C/S, for Benson MATZ transit set Benson QFE 1002, adjust 2100ft".* The PA28 crew gave an incorrect readback of the QFE which was adjusted by ZON. At 1027:56 , ZON passed TI to the PA28 crew "*PA28 C/S, traffic 12 o'clock 0·5nm, manoeuvring, no height*" . Some 40 secs later the PA28 crew reported "*PA28 C/S, we'd like to report an Airprox for that please"* and continued to pass details on the other ac involved.

Although ZON only had 2 ac on frequency when the PA28 crew free called for a FIS, ZON was in the process of passing TI to another ac. He allocated priorities correctly and passed TI to the PA28 crew at the earliest opportunity. Unfortunately this was when the 2 ac involved in the Airprox were 0·5nm separated.

UKAB Note: Radar recordings show the PA28, identified by its Benson squawk, tracking 240° at 2300ft Mode C with a primary-only return manoeuvring ahead and about 0·5nm right of its track which is presumed to be the track of the Extra. The other ac mentioned by the reporting pilot and working Benson ATC is closing from the N and carries out a starboard orbit during the period of the Airprox. The Extra carries out a left and then a right turn and then left again to cross the PA28's track about 0·5nm ahead and parallel to the PA28's track and to the left of it. The Extra then turns right and the PA28 turns about 30° left. The Extra then starts manoeuvring again and closes sharply on the PA28 which also turns sharply onto S. The Extra's return is not shown for the next few radar sweeps and reappears manoeuvring to the right of and behind the departing PA28. The vertical miss distance is not shown because the Extra is not squawking and the horizontal miss distance is too small to measure accurately. After the incident the Extra reappears to the S and tracks S for 2 minutes before resuming its manoeuvring.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that although under a FIS, the PA28 pilot received radar-derived traffic information which was not required as part of the contracted service. However, it concerned traffic that the PA28 pilot had already seen and was trying to avoid - the Extra, whose manoeuvring made it hard to assess an appropriate avoiding action. At the last moment it became clear to her what was required and the Board considered that the PA28 pilot's actions did not contribute to the cause. Members agreed that the Extra pilot, while carrying out aerobatics, had a responsibility to ensure that the airspace into which he intended to manoeuvre was clear and that the cause of the Airprox was that he did not do so in a timely manner, his late sighting causing him to fly close enough to the PA28 to cause its pilot concern for the safety of her ac. The Board assessed that because of the limited time for avoiding action and the proximity of the ac, safety had not been assured.

Members also noted that while the Extra was transponder-equipped, its pilot had chosen not to use it. Although this did not affect this Airprox, the Board was aware of many cases where incidents had been avoided because an ac was squawking and had been seen on radar and/or detected by another ac's ACAS equipment. The aerobatic squawk (1004) was particularly useful for controllers, especially when an ac is not receiving an air traffic service.

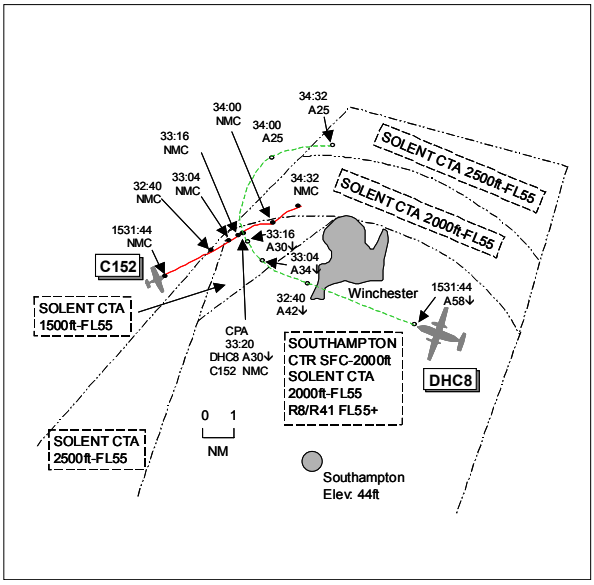
PART C: ASSESSMENT OF CAUSE AND RISK

Cause Following a late sighting the Extra 300 pilot flew very close to the PA28 causing its pilot concern.

Degree of Risk: B.

AIRPROX REPORT NO 088/05

Date/Time:	19 Jun 1533 (Sunday)	
Position:	5104N 00125W (8nm NNW Southampton - elev 44ft)	
Airspace:	Solent CTA	(Class: D)
	Reporting Ac	*Reported Ac*
Type:	DHC8	C152
Operator:	CAT	Civ Pte
Alt/FL:	2700ft↓ (QNH 1016mb)	3500ft (QNH 1015mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>10km	20km
Reported Separation:	300ft V/Nil H	Not seen
Recorded Separation:	contacts merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports inbound to Southampton IFR and in receipt of a RAS from Solent Radar on 120·22MHz squawking an assigned code with Mode C. The flight was approaching Southampton from the NE and at approximately 15nm and FL70 in CAVOK, good visual contact was established with the airfield and a visual approach requested. The controller advised that they were to stay with his vectors for the moment but could expect a visual approach. Various vectors and descent instructions were then issued by the controller.

Just to the NW of the extended centreline for RW20, at approximately 7 DME descending through altitude 2700ft to 2500ft at 200kt turning clockwise through 330° onto a radar heading of 040° a TA alert was generated by TCAS. About 5sec later a Cessna-type monoplane was spotted approximately 400m in front and 300ft above which passed directly overhead on a heading of 060°-090°. No avoiding action was taken as collision was not a factor but at the time the crew's focus had been inside the cockpit as the A/P captured and levelled-off at 2500ft. He advised Solent Radar of the traffic: the controller was quite shocked and, seemingly unaware of the traffic, transmitted blind to try and identify it. An uneventful visual approach followed shortly afterwards, landing on RW20. No RA was generated by TCAS as the Cessna was Mode A only. Had they not been anticipating a visual approach, a lesser rate of descent would have been initiated resulting in a greater collision risk. Limited SSR at Southampton, as per NOTAM B1062/05, may have been a factor.

UKAB Note (1): NOTAM B1062/05 was valid from 1220Z 28/05/05 until 2359Z 30/06/05 and stated:-Solent Radar limited SSR. ATS outside CAS may be limited at times. Training traffic will be limited, with no holding available.

THE C152 PILOT reports en route from Lands End to Blackbushe VFR in CAVOK conditions squawking with Mode C, he thought. The visibility was 20km and the ac was coloured white with his anti-collision switched on. He was handed to Farnborough by London Information (124·6MHz) approximately 10 minutes (estimated) before he was advised that he was in Solent Airspace (CTA) at 3500ft QNH 1015mb heading 072° at 90kt. An instruction to turn L immediately was complied with and very shortly after this he was instructed to resume own navigation. Farnborough ATC did not inform him of an Airprox, no TI was passed and no traffic was seen. He was told about the incident by the flying club at Blackbushe.

UKAB Note (1): The C152 operator was contacted post incident and confirmed that Mode C was found to be u/s on the ac.

THE SOLENT APR reports that the DHC8 was being vectored for an ILS approach onto RW20 having been given a stepped descent through FL60 and FL50 to maintain separation from opposing transit traffic. The DHC8's crew had previously reported visual with the airport but traffic precluded him from clearing the flight for a visual

approach. He vectored the DHC8 onto heading 290° to take it through final approach 4nm N of the airfield with the intention of turning into a RH cct and further descent was given, initially to 3000ft then to 2500ft. As the DHC8 was turned R onto heading 040° the crew reported being overflown by traffic 300-400ft above them and being described as a high winged light ac. An unknown primary return was seen in the area where the base of CAS is 1500ft. Blind calls were made on the frequency to ascertain if the unknown traffic was listening out on his frequency but no reply was heard. The DHC8 was vectored to complete the approach, also avoiding further unknown traffic manoeuvring on a 9nm final. Not long after the DHC8 established on the ILS and being cleared for the approach, the unknown ac involved in the incident was observed to squawk a Farnborough SSR code and this enabled Farnborough ATC to give him the ac's identity and level.

ATSI reports that the DHC8 flight contacted Solent Approach at 1528:10 and reported inbound to the SAM FL80. The controller acknowledged this and instructed the crew to maintain FL80. Shortly afterwards, when the DHC8 was 14nm NE of Southampton, the controller instructed the crew to fly a heading of 200° and on that heading to descend to FL60. The crew reported that they were visual and happy to self-position on a L base: however, the controller could not permit this due to traffic beneath them at FL50. The crew were then instructed to turn R onto a heading of 290° (1530:30) and the controller explained that he would take the flight through the C/L for RW20 for a RH cct and then a visual approach may be possible.

At that time the DHC8 was 10nm NE of the airport whilst the subject C152 was 14nm W of the DHC8, outside CAS, squawking 7000 with NMC. The controller instructed the DHC8 crew to descend to FL50 and then to 3000ft (1531:44). The DHC8 was passing 5800ft 5·5nm NNE of the airport with the C152 in its 12 o'clock at a range of 7·7nm but still outside of the Solent CTA. As the DHC8 passed N abeam Southampton airport further descent to 2500ft was approved. At 1532:40, as the DHC8 was passing 4200ft, the controller instructed the crew to turn R heading 040°. The C152 was now in the 12 o'clock position of the DHC8 at a range of 3·3 nm, the DHC8 within Solent's CAS and the C152 just on the boundary of the Solent CTA where the base is 2500ft.

At 1533:05, the controller transmitted "*(DHC8 c/s) keep that right turn going now onto a heading of one one zero degrees that'll be for base*" and the crew replied "*And (DHC8 c/s) there's traffic going above us I reckon about three four hundred feet*". As the DHC8 was making its R turn the C152 was converging with it and now was within Solent's CAS. The controller instructed the DHC8 crew to continue their R turn onto 080° and the crew responded by saying that they had "*..nearly got the registration..*". The C152 was crossing from L to R ahead of the DHC8 and, at 1533:16, was in the 11 o'clock position of the DHC8 at a range of 0·3nm tracking NE. The DHC8 passed underneath the C152 and then continued its R turn eventually rolling out heading 080°, level at 2500ft, approximately 2·3nm N of the C152.

At 1534:30, the C152 pilot contacted Farnborough Radar and requested a FIS, stating that he was N abeam Winchester heading 050° and maintaining 3500ft. The Farnborough controller instructed the pilot to squawk 0443 and that he would provide a FIS. At 1535:20, the squawk is visible on the radar in a position 9nm N of Southampton airport, within the Solent CTA, and in the 5 o'clock position of the DHC8 at a range of 3·2nm. The Farnborough controller asked the C152 pilot to report his altitude, to which he replied "….*three thousand five hundred feet..*". The Farnborough controller informed the pilot he was inside Solent's airspace and to turn L immediately. At this point, the Solent controller telephoned Farnborough to enquire what the ac was doing and the Farnborough controller advised that the C152 was turning L onto N.

The C152 eventually left CAS at 1537:24 and the DHC8 was vectored for a visual final to RW20 at Southampton. When asked by the Solent controller, the DHC8 pilot confirmed that he wished to file an Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that NOTAM B1062/05 related to the Pease Pottage SSR outage and that the Heathrow SSR feed was in use at the time which gave reduced coverage to the S and W of Southampton.

Members noted that the DHC8, its crew having been given a R turn onto 040°, had left CAS after the Airprox. Members commented that had the C152 been flying close to the boundary but outside of the CTA, the subject ac may have passed in close proximity anyway. Notwithstanding, the incident occurred in the portion of Class D CAS,

base 1500ft, where the Solent APR could assume that the unknown primary radar return was flying below CAS and therefore deemed to be separated from his traffic inside. Therefore, the Board were in no doubt that the cause of the Airprox was that the C152 pilot entered Class D airspace without clearance and flew into conflict with the DHC8 which he did not see.

Looking at risk, TCAS has given a TA alert to the DHC8 crew and had led visual acquisition of the C152, ahead and above, whilst they were in descent. Although this had the potential for being a more serious encounter, the flight paths flown by both ac - in particular the descent profile selected by the DHC8 crew - had fortuitously led to the DHC8 being 300-400ft below the C152 when it was sighted 400m ahead by which time any risk of collision had been removed.

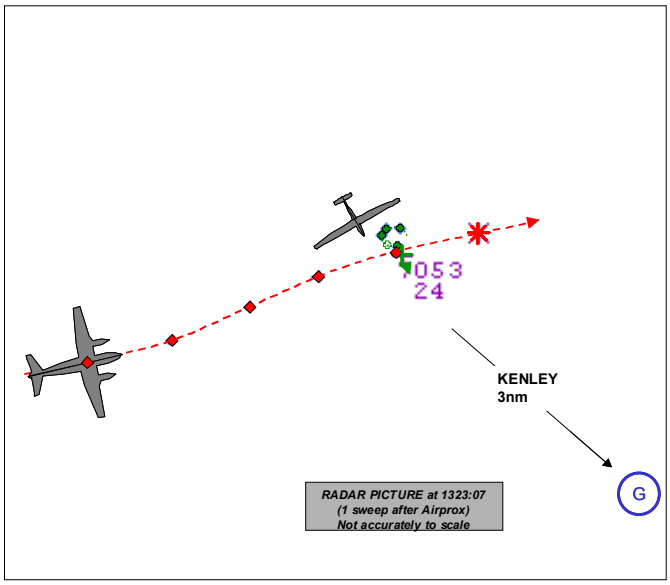
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C152 pilot entered Class D airspace without clearance and flew into conflict with the DHC8 which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 089/05

Date/Time:	17 Jun 1323	
Position:	5118N 00005W (3nm WNW Kenley - elev 566ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Viking Glider	BE200
Operator:	HQ PTC	Civ Comm
Alt/FL:	1520ft agl (QFE NR)	2400ft (QNH 1027 mb)
Weather	VMC CLBC	VMC CAVOK
Visibility:	>10km	>10km
Reported Separation:	50ft V/Nil H	200ft V/0 H
Recorded Separation:	Contacts merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB VIKING PILOT reports flying a day-glo and white glider on an instructor check sortie in an area of good lift near Kenley and in radio contact with them. One minute after establishing in a thermal at 1520ft (Kenley QFE) and in a 30-40° LH turn at 55kt, 3nm WNW of Kenley he saw a BE200 heading directly towards them at the same height. When it was about 50-75ft away it executed an avoiding manoeuvre by climbing and turning left, passing about 50ft over their glider. Due to the late sighting, possibly due to their thermalling turn, they did not have time to take any avoiding action and they assessed the collision risk as being high. They reported the incident to Kenley Radio who passed the details to Thames Radar.

THE BE200 PILOT reports flying a VFR positioning flight from Exeter to London City in a Blue ac with HISLs and strobes switched on but no TCAS fitted. At the time of the incident he was squawking as directed and in receipt of a RIS from Thames Radar and was on a Radar Heading of 090° at 230kt and 2400ft on the London QNH. His track took him approximately 3nm N of the Kenley Gliding Site. Thames Radar then began radar vectoring him for an instrument approach at City, with an initial Radar Heading of about 040°. Immediately on rolling out on this heading a glider was sighted about 1nm ahead and slightly below so he resumed a heading of 090° to ensure adequate separation behind the glider. However, the glider turned left onto a S heading and the pilot had obviously not sighted them, the glider passing directly under them about 200ft below. They had the glider in sight throughout and, although it passed directly under their ac, the risk of collision was assessed as nil. Having made the heading change further avoiding action was not possible due to the TMA above and as the risk of collision was nil, climbing into it was considered to be both unnecessary and considerably more hazardous.

UKAB Note (1): The recording of the Heathrow radar shows both ac throughout.

ATSI reports that the BE200 pilot contacted Thames Radar at 1320:30 when it was approximately overhead Epsom at 2400ft. The controller was busy and so he requested the crew to standby before, at 1321:50, requesting the pilot to pass his details; this was done and a 7053 squawk was allocated. The controller then told the BE200 pilot that he was now in receipt of a RIS: however he did not inform the pilot that he was identified nor did he advise him of his position (which was 5nm W of Kenley). This is a requirement in MATS Part 1, Section 1, Chapter 5, page 9 Table 5. There were at least 2 primary contacts operating in the vicinity, one of which was in the BE200's 12 o'clock position at a range of 2.8nm, but the controller did not pass any TI to the pilot. Ten sec later the controller instructed the crew to turn left heading 040º and advised them to expect vectoring for an ILS approach to RW28 at London City. Twenty sec later the pilot advised that he was "*..coming onto a heading now trying to miss a glider*". The controller replied "*Okay that's fine it's Kenley to the southeast of you then…*". At the time the BE200 was 2nm NW of Kenley.

The UK AIP notifies Kenley as a gliding site, active from sunrise to sunset up to an altitude of 2286ft. MATS Part 1, Section 1, Chapter 3, page 3 para 1.5 (Radar Information Service) states that a RIS is an air traffic radar service in which the controller shall inform the pilot of the bearing, distance and, if known, the level of the conflicting traffic. In this case the glider was clearly visible on radar and in conflict with the BE200, however, the controller did not comply with the requirements of MATS Part 1 as no traffic information was passed. The unit's MATS Part 2, page THS-58, does state that controllers should, whenever possible, avoid routeing any flight below altitude 2500ft within 2nm of Kenley and this was complied with.

HQ PTC comments that although this was perceived as being a close call from the glider pilot's perspective it seems that the BE200 pilot had enough time take a reasoned best course of action within his limited scope. We shall leave comment on the ATC aspects to others. This was clearly no infringement of the gliding site itself and the present satisfactory liaison with Biggin Hill was not a factor.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In this incident both pilots had been operating legitimately, VFR in Class G airspace, and therefore had an equal and shared responsibility for collision avoidance. The area in which the incident took place is very congested due to lateral and vertical airspace restrictions and several busy major and minor airfields located in the vicinity. The Beech pilot had been operating under a RIS (unlimited) from Thames Radar and Members considered that he could have expected information on all other traffic to affect him that could be seen on the radar. This view was reinforced since the Beech had been placed on a (conflicting) Radar Heading by the Thames Controller. The Board was told by a Member very familiar with ATC operations in that area that it can be very busy with non-squawking traffic and that glider tracks are generally difficult to predict; however, the majority view was that at the very least a general warning of 'glider activity' would have alerted the Beech pilot to the conflict at an earlier stage thus facilitating an increased avoidance distance. Notwithstanding, the Beech pilot had seen the glider and in sufficient time to take avoiding action that he reported as suppressing any risk. Further, in order to achieve this separation he did not have to make use of the vertical plane which would have resulted in a risk by penetrating the CAS above. Although the glider pilot had seen the Beech late, he verified that by that time it was already visibly taking avoiding action. Further, the position of the glider's left-hand orbit would have made it difficult for the pilot to see the fast approaching Beech much earlier. Effective lookout by glider pilots orbiting at relatively slow speed in a thermal can be very difficult; nonetheless it is most important that they are aware of this and develop techniques to overcome it. Although Members debated whether or not the prime cause had been a sighting issue the Board concluded that this had been an FIR conflict that attracted no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace.

Degree of Risk: C.

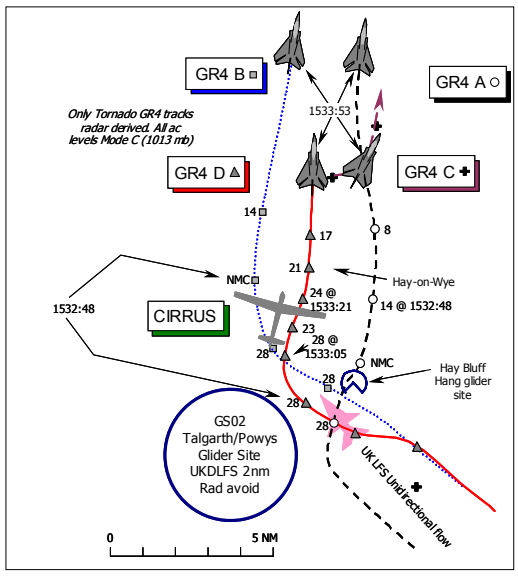
Contributory Factor: Late sighting of the BE200 by the glider pilot.

AIRPROX REPORT NO 090/05

Date/Time: 20 Jun 1533
Position: 5203N 00308W (5nm NNE of Talgarth - elev 970ft)
Airspace: FIR/LFS - LFA7 (Class: G)

	Reporting Ac	*Reported Ac*
Type:	Cirrus Glider	Tornado GR4
Operator:	Civ Club	HQ STC
Alt/FL:	4000-4200ft (SAS)	2500-3500ft (agl)
Weather	VMC CLOC	VMC CAVOK
Visibility:	30km	20km+

Reported Separation:
"slightly below"/300m H nil V/½nm H
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CIRRUS GLIDER PILOT provided a very comprehensive account reporting that he had departed from Talgarth Glider Site and was soaring locally in his white glider whilst listening out on the glider frequency of 130·1MHz. After leaving a thermal near Hay-on-Wye, he was flying in level cruise at 4000-4200ft (1013mb) on a course of 015° (T) at 55kt some 500ft below about 1 okta of Cu with an in-flight visibility of 30km. Another unknown glider (not from Talgarth) was about 500m ahead flying 300ft below his glider on a similar course. About 5nm from Talgarth he thought he heard a jet noise so closed his vents to get a better idea of direction, but although he was keeping a continuous lookout he could not see the other ac. The noise ceased for a few seconds then started to build up over the next 5sec to an extremely high level but he could still not see the ac. A Tornado jet then appeared from behind his glider 300m away under his right wing flying on a parallel course and slightly below him. Concerned that there would be a second Tornado no avoiding action was taken and he maintained his course. The jet he saw overtook his glider approximately 300m to starboard and once it had opened to around ½km the Tornado turned 30° L and crossed ahead. The noise level was frightening especially as he could not see the ac to begin with. Fearing a collision he had started to feel for his strap release and opined it was "too close", adding that if he had started a turn the clearance could have quickly reduced and the Tornado's change of course must have put it close to the second glider ahead. He assessed the risk as "medium".

THE TORNADO GR4 PILOT reports that his ac has a grey camouflage scheme but the HISLs were on whilst flying within the rear element as the No4 of a 4-ship formation of similar jets undertaking low-level evasion training against another Tornado 'bounce' ac. They were listening out on the LFS common UHF and squawking A7001 with Mode C whilst operating VFR in CAVOK weather.

Whilst heading N at 420kt approaching a position of about 52° 09N 003° 07W, his navigator had recently reminded him of the proximity of Talgarth aerodrome and other avoids in the area when the Nos 1 & 2 - who were flying about 3nm ahead of the rear element - alerted Nos 3 & 4 to the presence of paragliding activity along the track and instructed them to climb whilst also terminating the evasion training. The rear element (Nos 3 & 4) climbed to approx 2500-3500ft agl over undulating terrain and were concentrating on locating the paragliders below, when he – the pilot of the No4 - noticed a white glider, flying at the same height in his 9 o'clock about ½nm away with a L-R crossing angle, converging with his ac. However, due to the speed differential it was immediately obvious that the glider would pass behind his jet and that there was *"no"* risk of collision. Therefore he took no avoiding action as he flew past at a minimum range of ½nm: nonetheless, he did waggle the wings of his Tornado to acknowledge that he had seen the glider.

THE TORNADO PILOT'S STATION comments that the mission was planned, briefed and authorised in accordance with current regulations. The formation crews were also aware of the published gliding and hang

gliding sites at Talgarth and Hay Bluff and had briefed the importance of a good lookout. The sortie was conducted in Class G airspace where the "see & avoid" principle applies and the crews were working hard to achieve their training objectives. The Head-Up-Display (HUD) recordings were unhelpful as no gliders appeared within the HUD cameras' fields of view.

UKAB Note (1): The recording of the Clee Hill Radar does not illustrate this Airprox clearly as the Cirrus glider flown by the reporting pilot is not shown at all. It is also difficult to correlate the GPS trace and barograph trace provided by the reporting pilot: his narrative refers to sighting a single Tornado but hearing two whilst the radar recording shows the Tornado GR4 formation. Not all of the elements of the 4-ship formation are discernable on the recording throughout the period: three jets are shown squawking A7001 with Mode C displayed but the fourth ac in the formation – presumed here to be GR4 C – is shown as an intermittent primary contact only. Moreover it is not possible to determine the individual identity of the ac in the front and rear elements with absolute certainty as the ac perform various 'shackle' manoeuvres [tactical formation turns] just before the Airprox as they process northbound between Talgarth and Hay Bluff in conformity with the established UKDLFS unidirectional flow. Just after the reported Airprox location the formation 'shackles' and turns westbound. Nonetheless, from the reported GPS position of the glider over a period of 4min it would appear that the glider may have indeed been 'bracketed' just before 1532:48, by GR4 A to the E and GR4 B to the W and later at 1533:21, overtaken by GR4 D to the east at 23-2400ft indicated Mode C (1013mb) [virtually the same value as an altitude RPS (1012mb)] which was part of the rear element flying behind the lead pair and might well be the No4 ac flown by the Tornado pilot who provided the report. This was possibly the single Tornado jet that was spotted by the glider pilot. The position of GR4 C is less certain from the occasional primary 'paints' but it is not inconceivable that it was this ac that was that seen by the glider pilot or, alternatively the rear element may have 'bracketed' the glider again with GR4 C to the west: but that is pure speculation. Therefore, it is not feasible to determine independently the actual separation that pertained here.

Note (2): Meteorological Office archive data reveals the Cotswold RPS for the period 1500 - 1600UTC was 1012mb.

HQ STC comments that the glider pilot appears to have heard the first two Tornados, initially, then the much closer pass of one of the rear pair. Although their concern was for hang glider conflictions below, the crews continued their all-round lookout and the glider was spotted, albeit close.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of the ac involved, radar video recordings and a report from the appropriate operating authority.

As the fundamental principle for separation in the FIR is that of 'see and avoid' and given the nature of this encounter just above the military LFS in Class G airspace, the Board's gliding Member was keen to improve the understanding of all the various operations that take place in this area for the benefit of all airspace users. It was explained that gliders can transit more than 200km along ridges in this area in winds from SW to NE: additionally, 'wave' flying is prevalent in almost any wind direction but more so with a wind from W through to N. Therefore, merely avoiding sites by a few miles without understanding where gliders will be flying is inadvisable. That said, there are only some days where the widely dissimilar aspects of military flying and gliding/paragliding operations becomes significant, so in the Member's view identifying when this might happen and planning accordingly would be advantageous. Whilst all wind directions produce good conditions in this area, strong easterlies make launching from Talgarth itself difficult. Nevertheless, other glider sites will still have gliders using the system when those at Talgarth are grounded. Therefore, it was clear to Members that gliders could be encountered at any time throughout the vicinity of the Black Mountains.

The Military low-flying Advisor briefed the Board that as a result of a liaison visit by the MOD's Regional Community Relations Officer for Wales to the Glider Club, the entry for the Talgarth Glider Site [LFA 7 - GS02] in the Mil AIP Vol 3 Part 1 was amended to reflect that a considerable amount of soaring takes place in the wider Black Mountains area on most weekdays. After being contacted by the Club in August 2005, Mil LF Ops agreed to provide a facility whereby the Club could notify the Low Flying Booking Cell (LFBC) of their intended operating area(s) on the day of flight, based on the prevailing weather. In turn the LFBC would promulgate a Y Series NOTAM warning military users of the UKLFS of this activity and initially passing the details as a 'Late Warning' [not an avoidance]. This system would provide a limited warning to military users of the UKLFS even though gliding

and military flying could clearly take place well above 2000ft agl. Whilst to date [Nov 2005] the LFBC has not received details of the normal operating areas used by the Club nor has the Club asked for a NOTAM of their activity to be promulgated, LF Ops Sqn has now undertaken to liaise with the BGA to investigate how wider utility might be made of this sort of gliding notification with the aim of improving flight safety for all concerned.

The Board recognised that the establishment of the LFS avoidance areas that encompass glider sites was to enable a safe margin to be afforded against launching and recovering gliders. The HQ STC fast–jet pilot Member said that as gliders can be encountered many miles from their launch site the importance of the principle of 'see and avoid' in the 'Open FIR' cannot be over-emphasised so anything that glider pilots can do to make themselves more conspicuous would be highly advantageous. Here it was clear that the Tornado leader had spotted para-gliding activities along their route, curtailed the evasion training, warned the succeeding elements and wisely instructed the formation to climb up out of the LFS in order to reduce the potential for a close encounter with a para-glider. Unfortunately, this also resulted in the formation climbing up to the very level where the glider involved in this particular Airprox was operating. Evidently, the glider pilot was not best placed to spot other ac overtaking from astern but it was clear from the established LFS flow-system that in general terms this would be the direction from which low-level fast-jets would approach the area. It was also well known that white gliders are notoriously difficult to spot, when viewed from an ac at the same level, because of their very small aspect from astern or ahead. The gliding Member opined that moving gliders about in order to spot a jet approaching at 420kts is somewhat unrealistic and in practice, any jet-noise heard is probably from an ac that has already passed by the glider. Clearly the glider pilot's account only made reference to seeing one of the four jets but the Board agreed that it was not feasible to determine exactly which of the jets it was. From the available data it seemed that the other 3 jets had been very close by, but whilst it was not certain that the No 4 Tornado pilot had seen the actual glider flown by the reporting pilot, or vice versa, it seemed most probable. The Board agreed, therefore, that this Airprox had resulted from a conflict in Class G airspace. That a glider did not appear in the field-of-view of the 4 Tornado HUD cameras added credence to the view that this was not a risk-bearing encounter. Furthermore, from the data available because no avoiding action had been necessary at the distances reported, in the Board's view, no risk of a collision had existed.

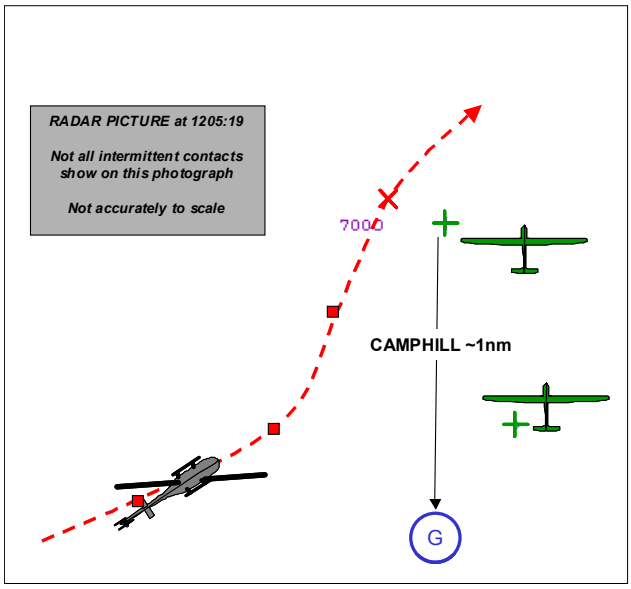
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace.

Degree of Risk: C.

AIRPROX REPORT NO 091/05

Date/Time:	21 Jun 1205	
Position:	5318N 00144W (1.4nm N of Camphill Gliding Site - elev 1350ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	DG300 Glider	Untraced helicopter
Operator:	Civ Pte	NK
Alt/FL:	2000ft amsl (700agl)	NK
Weather	VMC CLBC	NK
Visibility:	15nm	NK
Reported Separation:	10ft V/50-100m H	NK
Recorded Separation:	Not determined	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DG300 GLIDER PILOT reports flying a white glider soaring on a ridge just to the N of Camphill, heading N at 50kt and 700ft agl, when he heard an engine close by and then saw a helicopter about 50/100m away just off his port wingtip. The ac was a single rotor 4/6-seat helicopter and was white and red in colour. He turned a little (about 20°) right to increase the clearance since a larger turn might have put him in the path of another glider overtaking on the inside of the ridge i.e. on his RHS. The helicopter then turned about 30° to the right when it was about 200m ahead and flew across his flight path. He did not see the helicopter earlier because it had approached from his rear. Its course was about 030° towards Barnsley and it was seen by other glider pilots to be flying parallel to the ridge and to his left, in an overtaking position. The same helicopter returned close to the gliding site later in the afternoon but the time was not recorded.

The site and its launching altitude are clearly marked on the CAA ½ million VFR chart but in his experience this is frequently ignored regularly by both civil and military ac.

UKAB Note (1): Despite extensive tracing action that identified the departure and arrival location near Derby, the helicopter could not be traced.

UKAB Note (2): Although it is probable that the event was recorded on radar as shown above, neither the reporting glider nor the helicopter could be positively identified. There were several intermittent primary returns in the vicinity at the time, any one of which could have been the reporting glider. A contact squawking 7000NMC can be seen passing through the area shortly after 1205.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of a report from the glider pilot and a radar video recording. Since the information available was less than optimum, the confidence level in the reconstruction of events and any conclusions is not high.

The radar recording shows a NMC contact, presumed to be the helicopter flying fairly close to - but not over - the glider site and also close to an intermittent primary contact which was thought to be the glider, while the other glider mentioned in the pilot's report was probably the other, also intermittent, contact to the S. Members emphasised that the promulgation of a glider site in the UK AIP does not offer any mandatory protection from other traffic, merely a warning of the danger associated with **launching gliders**. In this case the glider was not launching and had been ridge soaring a short distance to the N of the glider site in the open FIR where glider pilots have an equal lookout and avoidance responsibility to that of all other users. Members assumed that since the helicopter pilot

had not filed, he had not seen the glider or, if he saw it, he did not did not consider it to be a hazard. Since the radar shows the contact assumed to be the helicopter pass very close to one of the two other contacts, probably the reporting ac, the former was most likely the case. Although the Rules of the Air for collision avoidance cover overtaking situations and stipulate that powered ac should give way to sailplanes, these Rules are only effective where the pilot concerned sees the opposing traffic. Assuming that one has right of way and that the other pilot will therefore give way can be a hazardous course of action.

Although in this case the Board thought that the helicopter pilot had not seen the glider, his ac had approached the glider from a position where it would not have been totally unsighted to the glider pilot and therefore he did have an opportunity to see it a little earlier, perhaps by manoeuvring his ac.

If the helicopter pilot had not seen the glider and the glider pilot did not see the helicopter until it had effectively overtaken him, Members considered that although there was no risk of collision because the ac tracks had been slightly separated laterally, safety had not been assured.

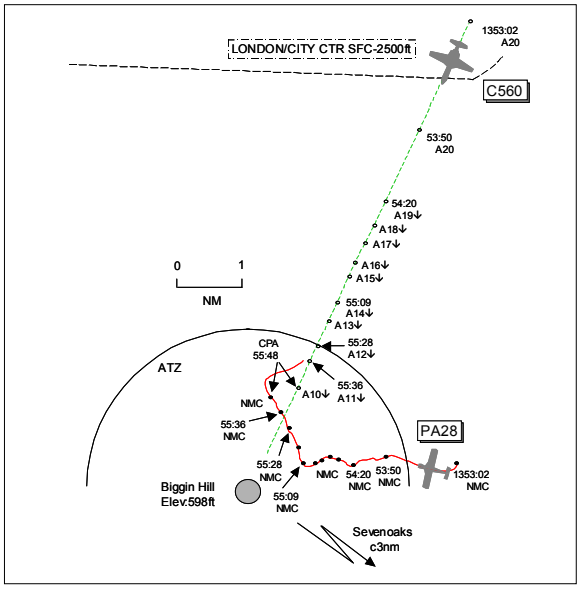
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Presumed non-sighting by the helicopter pilot and late sighting by the glider pilot.

Degree of Risk: B.

AIRPROX REPORT NO 092/05

Date/Time:	16 June 1356	
Position:	5122N 00003E (1·5nm FIN APP RW21 Biggin Hill - elev 598ft)	
Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C560	PA28
Operator:	Civ Exec	Civ Pte
Alt/FL:	400ft agl (QNH 1020mb)	300ft (QFE)
Weather	IMC KLWD	VMC HAZE
Visibility:	3500m	3000m
Reported Separation:	10-100ft V	Not seen
Recorded Separation:	0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C560 PILOT reports the flight was a positioning flight from Luton to Biggin Hill flown at 2400ft 'radar to radar'. A standard 'Mike' departure was flown from Luton towards Brookmans Park, then Lambourne VOR with a handover to Thames Radar. On first contact with Thames Radar they were asked to continue towards LAM 'VOR' and leave it heading 160°, thereafter further radar headings to vector them onto Biggin Hill's LLZ for RW21. In-flight conditions en-route were IMC. They intercepted the LLZ at approximately 8nm, which they 'called', and they were then cleared to descend with the ILS and handed over to Biggin Hill Approach on 129·4MHz. On contact with Biggin Hill they were cleared to *"continue approach, number two"* and *"call at 4nm"*. They then became aware of a TCAS contact (no altitude read out) in their 11 o'clock position at 2-3nm. This immediately caused them some concern (they were still IMC). Their first reaction was for the PNF to ask the controller the nature of this traffic whose response was *"VFR traffic believed to be 2nm to the east"*. As this TCAS contact continued to move W towards the RW21 ILS FAT, they became increasingly concerned and the PNF again asked the controller to confirm the ac's group; (i.e. they hoped it was a 'rotary' holding to the E with ground contact). Whilst still in IMC and becoming increasingly concerned at the developing situation, they were 'cleared to land'. The TCAS contact continued to move towards the FAT of RW21 ILS. By now the stress level in their cockpit was rising and palpable. Thoughts of executing a 'missed approach' crossed their minds or turning W, away from the TCAS contact. Fortunately (perhaps?) they continued on the RW21 ILS. At 400ft agl the PNF called *"visual with the (approach) lights"* and at this stage both contacts had merged on TCAS, the other contact then turned amber, followed by an aural *"Traffic, traffic"*. By now they were expecting something dire to occur, as they both thought that the other ac could be below them, as possibly he had suddenly become visual with the RW and turned towards it. The other ac could not be seen and stress levels were escalating as their uncertainty of the location of the VFR traffic increased. The next aural alert was *"Too low, flaps…too low, flaps"* and they realised they had 'approach' only set, which restricted their vision over their ac's nose, so the PF called for full flap and checked gear down/locked (3x greens). Then an aural alert of *"Glideslope, glideslope"* was annunciated so the PF adjusted their approach path and an uneventful landing was carried out, although the PNF forgot to deploy speed brakes on touch down, probably due to preoccupation with the previous few minutes' events. In fact the 'pre landing' checklist was not actioned at all. As they continued taxying towards their parking area the controller was again confirming the 'lost' ac's QDM as 210°, as she had done when their two TCAS contacts merged. In their opinion, the risk of the two ac colliding was extremely high and they survived this event owing to luck!

THE PA28 PILOT reports returning to Biggin Hill from Duxford and in communication with Biggin APPROACH/ TOWER on 129·4MHz squawking 7000 with Mode C off. The visibility was 3000m whilst flying 50ft below cloud in VMC and the ac was coloured white/red with strobe and landing lights switched on. He was informed of the Airprox by the ac operator 1 week post incident and that the incident occurred to the SE of Biggin aerodrome within the ATZ. At the time he believed he was heading virtually NW at 80kt and 300ft QFE, holding for landing. He

never saw the other ac apparently involved and was not aware of it save for RT transmissions. He regretted any action on his part which may have led to the report from the other ac.

THE BIGGIN HILL APP/ADC reports that the PA28 pilot called inbound from Duxford from the NE at an altitude of 1000ft QNH. He did not have the Wx for Biggin Hill so this was passed to him and his intentions requested. The pilot elected to make a visual join and he was told to remain E of final approach RW21 and report field in sight. When he was asked what his flight conditions were he replied VFR cloud SCT 600ft and that he was routeing to Sevenoaks to join from that direction. Another ac, AC3, was inbound on the ILS followed by the subject C560. AC3 was cleared to land and the C560 was transferred to Biggin Hill frequency at 7nm and the crew were told to continue approach No 2. The C560 pilot then advised that he had a target on TCAS and asked if ATC had a helicopter training on the airfield. She advised the C560 crew that there was an ac vacating the RW and 1 ac (the PA28) joining VFR from the E. The ATM confirmed that there was a 7000 contact tracking towards the field from the E. She then asked the PA28 pilot his range which was 2nm and whether he had the field in sight which he did not. She then passed him a QDM (263°) but went back and told him to hold E of the field and to remain clear of final approach RW21. Having checked that AC3 had vacated the RW she then cleared the C560 to land. After landing, the C560 informed her that he believed that the PA28 had passed underneath him on short finals which she acknowledged. She then went back to the PA28 to ask him to transmit for a D/F reading (this was a QDM of 210°) and she asked him if he had ground contact which he did. She then asked him 2 or 3 times if he could accept radar vectors to the final approach RW21 but he said that he was receiving her transmissions strength 2. She called another ac to check her readability and this was reported as fine. She then gave the PA28 pilot 2 or 3 more QDM's, which indicated he was moving further to the W of final approach. The PA28 pilot then reported field in sight and was cleared to land but made a heavy landing so the club was advised to check the ac before it flew again.

UKAB Note (1): Met Office archive data shows the Biggin Hill METAR as EGKB1350 20012 3000 HZ SCT003 BKN005 16/14 Q1020=

ATSI reports that the controller described her workload as light at the time of the Airprox, with only the subject ac and 2 others on the frequency. She was performing the combined duties of ADC and APP, the standard method of operation at Biggin Hill for a weekday.

The PA28 pilot established communication with Biggin Approach at 1338, reporting approaching the Dartford River Crossing at 1000ft, inbound to land. The ADC/APP passed the weather and confirmed that the pilot wished to make a visual approach. He was requested to report the airport in sight for landing RW21. Some 4min later, at the controller's request for a range check, the pilot of the PA28 reported at 9·8nm and routeing towards Sevenoaks for rejoin i.e. towards the SE of the airport. The pilot declared he was flying VFR with scattered cloud at 600ft. At 1349:30, the PA28 pilot called at 6·5nm, now heading 240°, and was instructed to report the airfield in sight and to *"join deadside runway two one righthand the QFE is one zero zero one. Remain to the east of the final approach for runway 21"*. The controller explained that she had already been informed about the C560 by Thames Radar and intended this instruction to ensure that the two ac were deconflicted. The pilot acknowledged the instruction to report the field in sight for RW21 but did not read back to remain E of the final approach.

The C560 pilot made his initial call on the Biggin frequency at 1353, reporting established at 7·5nm. The flight was instructed to continue approach No 2 and report at 4nm. (There was one ac ahead on short final.) At 1353:50, the pilot of the PA28 was asked if he had the airport in sight. He replied that he did not and was at a range of 2nm on the deadside. The controller passed him a QDM of 263°, which was acknowledged correctly.

The pilot of the C560 reported on final at 1·5nm at 1354:20 although the radar recordings show that it was actually at about 4·5nm at the time. The pilot commented that he had a target on TCAS at about 3nm and wondered if it was a training helicopter. He was informed that one ac had just vacated the RW and *"I've got one aircraft joining VFR from the east of the field"*. The pilot said that the target seen on TCAS was now at 11 o'clock, range 2nm. The APP/ADC commented that she could not believe that this TCAS return referred to the PA28 as she believed it was further to the E of the airfield. Consequently, she informed the pilot (1355:00) about the only other traffic she had, which was holding on the taxiway. The C560 was cleared to land at 1355:07.

The pilot of the PA28 was again asked if he had the airport in sight. Replying negative he was instructed to *"hold to the east of the field remain east of the final approach for runway 21"*. At the time that the pilot responded *"hold*

to the east of the field", at 1355:28, the radar shows it tracking NNW, close to the final approach path, NE of the airport, 1·5nm distance from the C560.

Acting on the assumption that the PA28 would be remaining to the E, although this was not positively established, the controller passed TI to the C560 pilot about a Cherokee believed to be 2nm E of the airport. However, at the time (1355:36), radar recordings reveal that it was actually in its twelve o'clock at a range of 1·1nm. No further transmissions were made to, or received from, the C560 until after it had landed. By the time the controller asked the pilot of the PA28 if he could accept radar vectors (from Thames Radar) the two ac had passed 0·4nm apart (1355:48), with the C560 at an altitude of 1000ft at the time.

The Biggin Hill Visual Control Room (VCR) is equipped with an Aerodrome Traffic Monitor (ATM). One of the main reasons for its introduction was to monitor IFR inbounds being positioned onto the ILS by Thames Radar. When ADC and APP is combined, use is made of the monitor which is situated to the R of the control position, which, in turn, faces E. A local Supplementary Instruction (SI 01/2004) states, in accordance with MATS Part 1 procedures, that one of the uses of the ATM is to: *'Provide information to aircraft on the position of other aircraft in the circuit or carrying out an instrument approach'*. It *'must not be used as a surveillance radar to provide Approach Radar services'*. The controller commented that there had only been minimal training before it had been introduced some 6 months earlier and there was still doubt on the unit as to how it could be used. Nevertheless, she did not consider that this issue materially affected the outcome of this occurrence (see last para). The procedures for the use of the ATM are being addressed locally, in consultation with CAA/SRG. The ADC/APP commented that she had noted a radar return, squawking 7000, which she believed to be the PA28, as the ac transited towards Sevenoaks. The ac appeared to be following the route as reported by its pilot. Although the weather was marginal for VFR flight, the controller believed that the best course of action was to allow the PA28 to proceed towards the airfield to acquire it visually. It would then be able to position appropriately into the cct behind the C560. The fact that the pilot appeared to be routeing as intended and it was locally based reinforced this plan. She did consider holding it away from the airfield but decided against this course of action because of high ground and a mast 9nm to the E of the airfield (1310ft amsl). Additionally, she did not want it to route into the RH cct low level from the deadside, in case the C560 carried out a go around. Consequently, as the PA28 approached the airfield from the E, the pilot was instructed to remain to the E of the RW21 final approach. When the pilot reported at 2nm, he was given a QDM of 263° (1354:10). The controller said that she was somewhat confused about the pilot of the C560's comments about the target he could see on TCAS in his 11 o'clock position. Although she mentioned that there was VFR traffic joining from the E, she did not believe that this was the target referred to as, in her assessment, it would not have been in its 11 o'clock position and that was why she reported the position of the other traffic on the airfield. She explained that she did not look at the ATM at this time, as it is standard practice to look out of the VCR to try and acquire the C560 visually and also to check that the RW was clear. As the pilot of the PA28 was still not visual with the airfield, she reinforced her instruction for it to hold to the E of the RW21 approach still believing it to be to the E of the airfield. For this reason she informed the pilot of the C560, after he had been cleared to land, that the VFR inbound was believed to be 2nm E of the airfield. She said that she first sighted the C560 when it was on about a 1nm final but did not see the PA28 as it passed through the approach track. The PA28 pilot was, subsequently, given further QDMs, as it routed to the NW of the airfield. The pilot reported the airfield in sight at 1359:40 and was cleared to land.

The APP/ADC stated that, although there were issues about the use of the ATM, it did not affect her handling of the incident. She confirmed that if she had seen on the ATM that the two flights were in confliction she would have used the information to resolve the situation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear to all that weather conditions were marginal for the PA28 pilot to fly under VFR, with a low cloud base and poor visibility. Undoubtedly, the PA28 pilot's ability to navigate whilst maintaining VMC clear of cloud and in sight of the surface would have been hampered. Pilot Members thought that the PA28 pilot should have told the APP/ADC if he was experiencing difficulty in complying with ATC instructions, having been told to remain E of the final approach, as the controller was not aware of his predicament. The RT calls and ATM had reinforced her 'mindset' as the PA28 approached the aerodrome stating that he was VFR and his given ranges, when requested, had correlated to the ac return displayed on the ATM. The PA28 pilot's last range of 2nm and QDM of 263° placed

the ac to the E in the expected sector, and this may have 'lulled' the controller into a false sense of security that all was well as she then turned her attention to other traffic.

The C560 crew had reported on final and, seeing a target ahead on TCAS, asked if it was a training helicopter. The APP/ADC replied that traffic had vacated the RW and that she had an ac, the subject PA28, joining VFR from the E. The C560 crew had then informed her that the TCAS traffic was 2nm away and, still in the belief that the PA28 was further to the E, the controller had replied that the only other traffic was holding on the taxiway and cleared the C560 to land. The proximity of the 'TCAS traffic' to the aerodrome, inside the ATZ, should have alerted her to the possibility of there being either unknown traffic in the cct area or for her to establish precisely the position of all known traffic under her control. Members thought that the controller should have monitored the ATM more closely especially as the weather conditions would have precluded her seeing any traffic visually until it was very close to the aerodrome. In the elapsed time since the PA28 pilot had reported at 2nm and clearing the C560 to land, the PA28 should have already reported visual and been nearly overhead the aerodrome. The PA28 had, however, turned away from the aerodrome onto a NW'ly track, which would have been evident from the ATM, and it was agreed that the controller had not made sufficient use of the ATM which had contributed to the incident. She then asked the PA28 pilot if he was visual with the aerodrome and as the reply was negative she told him to hold E of the aerodrome, repeating the instruction to hold E of the RW21 final approach. However, the PA28 pilot did not comply with these clear instructions and flew into conflict with the C560 on an ILS approach which caused the Airprox.

Pilot Members wondered if the C560 crew should have executed a go-around as the pre-landing checks had not been completed owing to their preoccupation with the TCAS traffic. The C560 crew were in the invidious position of flying in cloud with a TA alert on conflicting traffic which ATC could not positively identify but did know about VFR traffic approaching from the E. Notwithstanding the recommendations issued for TCAS – not to manoeuvre solely on the basis of a TA – on this occasion a go-around would have been justified. Unfortunately, although the PA28 was fitted with Mode C, the pilot had not selected it to 'on' so the TCAS equipped C560 would only receive a TA alert - TCAS assumes the 'intruder' to be co-altitude but does not give an RA resolution. Had the PA28 pilot selected Mode C on, the C560 crew would have been aware of the level of the PA28 and able to take early action to resolve the situation. Members agreed that the lack of Mode C on the PA28 had also contributed to the Airprox.

Looking at risk, it was clear that this encounter had had the potential for turning into a serious incident as only the TCAS 'safety net' had worked. The C560 crew were unable to visually acquire the PA28 when TCAS indicated a potential confliction and, after watching the 'intruder' converge from the L, did not see it when breaking out of cloud although TCAS indicated merged contacts. The PA28 pilot was flying just below the cloud base and did not see the C560 as his track took him across the final approach ahead of it and it passed behind. The radar recording had revealed the conflicting PA28 crossing on a NW track 1·1nm ahead of the C560 after which their tracks slowly diverge, the CPA of 0·4nm occurring as the PA28 passes to the R of the C560. This was enough to persuade the Board that, although the subject ac had passed with neither crews seeing each other, there had been no actual risk of collision owing the flight paths of both ac but that safety had been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot did not comply with clear instructions from ATC and flew into conflict with the C560 on ILS approach.

Degree of Risk: B.

Contributory Factors:

a. The PA28 was not squawking Mode C.

b. Insufficient use of the ATM by the Biggin Hill APP/ADC.

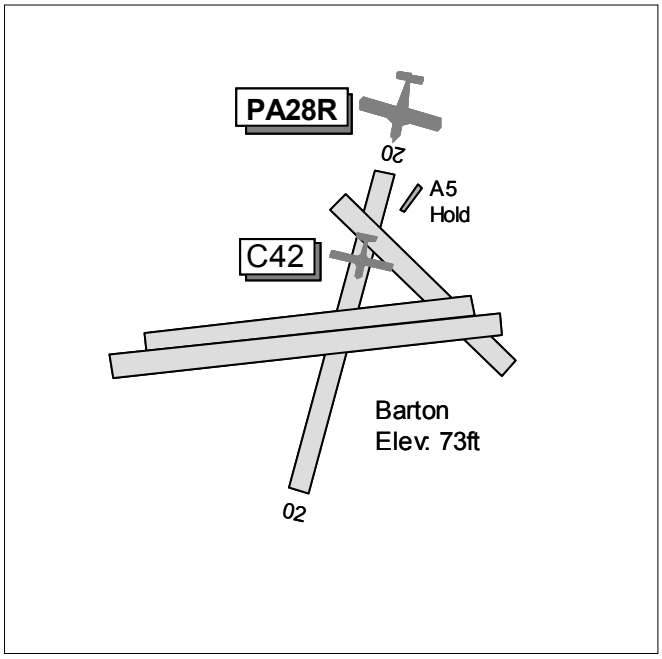
AIRPROX REPORT No 093/05

AIRPROX REPORT NO 093/05

Date/Time: 19 Jun 0911 (Sunday)
Position: 5327N 00223W (O/H RW20 at Manchester Barton - elev 73ft)
Airspace: ATZ (Class: G)
Reporter: Manchester Barton AFISO

	First Ac	*Second Ac*
Type:	Ikarus C42 M/Light	PA28R
Operator:	Civ Trg	Civ Club
Alt/FL:	10ft↑ (N/K)	100ft (QFE 1014mb)
Weather	VMC CLOC	VMC IN HAZE
Visibility:	10km	5-7km

Reported Separation:
20ft eyewitness
seen 150-200ft V/100m H50-100ftV
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BARTON AFISO reports the C42 pilot reported on final RW20 for a touch and go. The PA28R pilot also reported on final for RW20 with the intention of making a go-around owing to the C42 ahead. This was acknowledged by the AFISO who observed the PA28R continue down the approach at high speed, below the 200ft go-around height, and closing in on the Ikarus C42 which was beginning to climb out from its touch and go. The PA28R was seen to move slightly to its R onto the live side of the cct. The pilot of another M/Light, AC3, which was holding short of RW20 at Hold A5, told the C42 pilot that he had another ac directly above his C42 and to keep it low. This was followed by calls from himself also advising the C42 pilot to keep it low owing to the traffic in very close proximity. The C42 was seen to nosedive to approx 15ft agl and fly low along the RW until the pilot was told that the other ac was well clear and above him. He then called the PA28R pilot advising that all go-arounds must be made onto the deadside of the cct. Later, the PA28R pilot apologised to the Duty Aerodrome Officer and admitted to be suffering from 'brain overload' at the time of the incident.

The Barton METAR unofficial observation shows 18005KT 7000 HZ NSC.

THE IKARUS C42 M/LIGHT PILOT reports flying a local dual instructional cct sortie from Barton and in receipt of an AFIS from Barton on 122·7MHz. He had called 'finals for a touch and go' which was acknowledged by the AFISO and another ac's pilot was heard to report 'final contact one ahead, will make this a go-around'. After completing the touch and go, he heard a voice over the radio say *"*(pilot's first name) *there's an aircraft above you"* followed by the AFISOs voice saying *"*(pilot's first name) *keep it low, keep it low"*. He flew the ac close to the ground (stopping his climb) at 65kt and flew out past the RW end at a height of about 20ft. The AFISO then said he could climb as the other ac had moved to his R (liveside) and was above him. He then saw the other ac for the first time, about 30sec after the Airprox, in his 2 o'clock range 100m about 150-200ft above and climbing. An eyewitness had reported that the other ac had passed about 20ft above his ac and he believed the risk of collision had been high.

THE PA28R PILOT reports flying solo on a local sortie from Barton and in receipt of an FIS from Barton on 122·7MHz. Heading 200° at 70kt he was visual with a C42 on finals in front which was performing a touch and go. He was intending to perform a full stop landing but as the C42 was not clear of the RW in time he called a 'go-around' but was somewhat late in executing the manoeuvre. He commenced a climb from about 50-100ft at 70kt and moved to the starboard side of the other ac to remain visual with it, which he did at all times, although this manoeuvre was non-procedural. He assessed the risk of collision as low. He has since refreshed his knowledge

of the go-around procedure at Barton. Also he has contacted the pilot of the C42 and the AFISO to discuss the incident and learn from the experience.

ATSI had no comment to make.

UKAB Note (1): The Barton RT transcript reveals the following exchanges:-

1010:29 C42 *"C42 c/s final touch and go".*

1010:30 FISO *"C42 c/s touch and go at your discretion one eight zero five knots".*

1010:34 C42 *"C42 c/s."*

1010:38 PA28R *"PA28R c/s final contact with the traffic ahead er I'll make a go-around".*

1010:42 FISO *"PA28R c/s that's understood"*.

1010:45 AC3 *"AC3 c/s ready for departure contact two on final".*

1011:03 AC3 *"Aircraft right above you (C42 pilot's first name)".*

1011:04 FISO *"(C42 pilot's first name) keep it low keep it low".*

1011:13 ???? clipped transmission.

1011:14 FISO *"PA28R c/s can I suggest further go-arounds are done on the deadside of the field so that would be to your left you've just gone over an aircraft".*

1011:21 PA28R *"PA28R c/s sorry"*.

1011:23 AC3 *"????? (C42 pilot's first name)"* (???? simultaneous transmission).

1011:26 FISO *"AC3 c/s runway two zero take off at your discretion wind two one zero five knots"*

1011:32 AC3 *"AC3 c/s".*

1011:40 FISO *"C42 c/s pilot's first name that aircraft's now on your right it's clear of you".*

1011:43 C42 *"????"* (???? Unreadable)

1011:44 FISO *"Affirm it's on your right hand side probably in your two or three o'clock".*

UKAB Note (2): The UK AIP at AD 2 EGCB para 2.22 Flight Procedures states: *Circuit directions RWs 14,20,27L,27R – RH.* Also Fixed Wing procedures include: *Go-Around Procedures, i) Above 200ft – if safe, manoeuvre the aircraft to the deadside of the aerodrome keeping any other aircraft in sight and climb on runway heading, parallel to the runway in use, to circuit height. ii) Below 200ft – Climb straight ahead, unless avoiding action must be taken, to circuit height. In all cases, do not climb above 500ft until you have passed the upwind numbers of the runway in use.* iii) *Aircraft should not continue approach below 200ft if the runway is occupied.*

UKAB Note (3): The Airprox occurred outside recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, reports from the aerodrome flight information officer involved and reports from the appropriate ATC authorities.

Members could add little to this report. The PA28R pilot had continued his approach below 200ft but had been slow in carrying out a go-around with the RW obstructed by the Ikarus C42. Members empathised with the PA28R

pilot's actions – a R turn onto the live side of the cct was contrary to the procedures but with the pilot seated on the LHS of the ac, he was better placed to see and continue to monitor the flight path of the C42 climbing below him above the RW. However, the PA28R pilot had commenced the go-around late and flew into conflict with the C42 which caused the Airprox.

The C42 pilot had received good information/advice from 2 separate sources (AC3 and AFISO) and acted upon it by flying low until the PA28R came into view above and to his R. The PA28R pilot had maintained visual contact with the C42 throughout and was always in a position to adjust his flight path, if necessary, to avoid it. Although the subject ac had passed closer than normal, these combined actions were enough to persuade the Board that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following a late go-around, the PA28R pilot flew into conflict with the C42 Microlight.

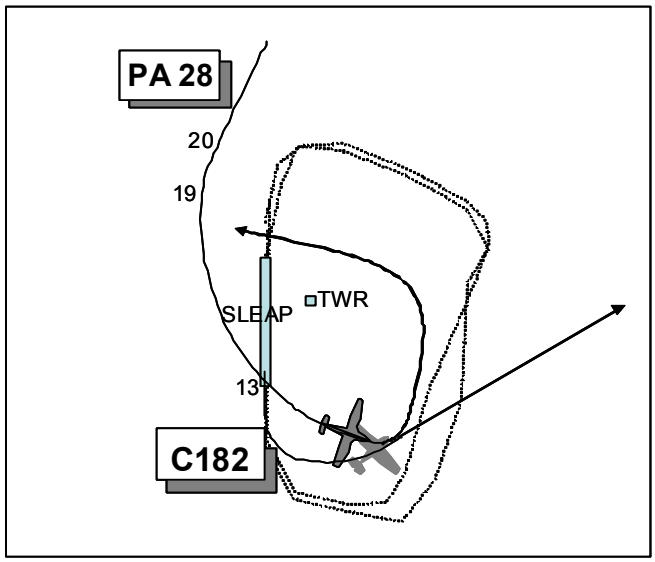
Degree of Risk: C.

AIRPROX REPORT NO 094/05

Date/Time: 18 Jun 1223 (Saturday)
Position: 5249 N 0246 W (Sleap Airfield - elev 275ft)

Airspace:	ATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	C182	PA28R-200
Operator:	Civ Pte	Civ Pte
Alt/FL:	1100ft (QNH 1023mb)	1000ft (QFE 1016mb)
Weather	VMC	VMC CLBC
Visibility:	>50km	10nm

Reported Separation:
20ft V/approx 40ft H NK
Recorded Separation:
NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C182 PILOT reports flying in the Sleap circuit, having taken off to depart for Tatenhill. A visiting PA28 from Barton flew over the control tower and carried out a steep descending LH turn on the live side of the active RW (18) as witnessed by two pilots from Shobdon, who where about to depart from Sleap. He saw it less than 50ft away just before it passed about 50ft in front and 20ft above. There was no time for avoiding action and the risk of collision was very high.

THE PA28 PILOT reports heading 095° at 115kt, he arrived at Sleap Airfield (2000ft on QFE 1016) to the W of the active RW 18 LH and commenced a descent on the dead side; upon reaching 1000ft QFE, he crossed the 36 numbers to become circuit established cross wind. Just before crossing 36 numbers, his passenger (in the RHS) commented that he observed an ac taking off from RW 18L. Moments later, this ac did not reappear on his passenger's side of the ac, which would have been the normal extension of a take off run (straight ahead to clear the circuit). They then heard a comment on Sleap Radio from an outbound ac asking the Tower to obtain the registration of another ac in the circuit. Once he had landed and booked in, he visited the Tower and asked the radio operator which ac the comment related to. The operator replied it was his ac; he asked whether the radio operator had witnessed any event, the reply was no and that the request had come from a departing ac based at Sleap. He was then informed that the procedure at Sleap was for departing ac to continue along the RW heading for 2 miles before turning on route.

He could only conclude that, because the ac was not seen passing under the PA28 along the RW heading by his passenger, that it had become airborne quickly, turned E at the end of the RW (36 numbers) and climbed within the circuit.

UKAB Note: Radar Recordings show ac around Sleap flying circuits of varying shapes (as shown on the diagram. The PA28 closes from the NNE at 2000ft and begins a descent on the dead side, passing over the upwind end of RW18 at 1300ft Mode C (1295ft agl) on a SE track in a left turn towards a downwind position. Another return is seen departing from the end of the runway and turning well inside the pattern flown by other circuit traffic and climbing. It turns continuously with no crosswind leg and coincides with the joining PA28 as shown in the diagram, at the reported Airprox time. Mode Cs of both ac are intermittent but are 100ft apart as the ac diverge. The surface wind at the time was 160/10. The C182 continues in a NE direction to intercept a direct track to Tatenhill and the PA28 continues a left turn back onto the dead side.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that integrating a joining ac safely into a visual circuit pattern is a task requiring especial care. While it is always the responsibility of the joining pilot to ensure that (s)he does not conflict with other traffic, this is doubly hard to achieve if circuit traffic does not conform to normal patterns. The radar recording of traffic at Sleap indicated that circuit flying discipline may have relaxed to the point where it is difficult to predict where other ac will be at any given point. It was clear that the departing Cessna pilot had turned fairly early onto his outbound track, but not before the end of the runway, and as he could probably see there was no conflicting downwind traffic to prevent him doing so, the Board could see why he may have done as he did. However, Members agreed that the joining PA28 pilot should not have continued joining when the Cessna did not reappear where expected. Members noted that the PA28 pilot appeared to have flown his dead side descent fairly close to the runway, not completing his descent to 1000ft before crossing the upwind end of the runway: both of these factors will make it harder to see and assess existing circuit traffic. The cause of the Airprox was therefore that the PA28 pilot did not integrate his ac safely into the circuit pattern and flew into conflict with the C182.

Since the PA28 pilot did not see the Cessna at the point of the Airprox and the Cessna pilot only saw the PA28 as it was passing, with no time for avoiding action, the Board assessed that there had been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot did not integrate his ac safely into the circuit pattern and flew into conflict with the C182.

Degree of Risk: A.

AIRPROX REPORT NO 095/05

Date/Time:	22 Jun 1500	
Position:	5146N 00403W (10nm N Swansea)	
Airspace:	LFA 7/London FIR (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	Tornado	Zodiac
Operator:	HQ STC	Civ Pte
Alt/FL:	695ft (Rad Alt)	1200ft (AMSL)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	>30km	>10km
Reported Separation:	20ft V/Nil H	Not seen
Recorded Separation:	20-40ft V about 10m H	

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO PILOT reports leading a pair of Tornados on a low level tactical sortie in Wales. They were not in receipt of an ATS, were squawking 7001 and the HISLs were on. The formation was heading 080° at 420kt after departing from Pembrey AWR and he looked in the cockpit momentarily to select fuel transfer from the wing tanks. On looking up again he saw a yellow low wing light ac 200m ahead which appeared to be in a LH turn passing through approximately 240°. He saw the ac too late to take any avoiding action, passing 20-40ft below it, assessing the risk as being high. The number 2 ac was to the S of the Leader: its pilot did not see the conflicting ac.

UKAB Note (1): The unit provided a HUD video of the incident that verified the pilot's description of events and the reported separation. The other ac can first be identified on the video 3 sec before the ac cross. The CPA occurred on the frame after the one shown above.

UKAB Note (2): The voice track of the HUD also shows that immediately before the incident the Leader had called the formation over to a Swanwick Mil UHF frequency, presumably in anticipation of a climbout from low level.

THE ZODIAC PILOT reports flying a local sortie from Swansea and in receipt of a FIS from them but with his transponder switched off. He was in the area where the Tornado reported that the incident had occurred but he did not see the ac and was not aware that an Airprox taken place. He saw one fast moving jet at a distance of at least 2nm moving away from him on a course that would not have conflicted with his track. He saw no other ac, felt no turbulence and heard no engine noise. Had the other ac been as close as has been suggested he thought that would have felt something and more probably have lost control of his ac. He was in contact with Swansea Radio at all times and did not hear any other traffic on the frequency and was not warned of any by Swansea nor was any TI passed on him.

THE TORNADO STATION comments that the formation was flying in good weather conditions with the sun behind them. The HUD video shows clearly how alarmingly close the two ac passed. The Zodiac appears to be in a turning manoeuvre, with some left bank applied, so it would seem reasonable to surmise that its pilot would have been unable to see the lead Tornado therefore it is likely that the ac he reported seeing was the No2. From first appearing on the video the Zodiac takes about 3 sec to pass overhead, much the same time required by the Tornado pilot to complete his fuel management activity. Fortunately there had been some vertical separation but nonetheless they consider that the risk of collision was high.

HQ STC concurred the Station comments.

AIRPROX REPORT No 095/05

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, radar photographs/video recordings and reports from the Tornado operating authority.

The Board noted that in this incident both ac had been operating legitimately in the Class G airspace of the FIR/ UKDLFS and therefore both pilots had an equal and shared responsibility to see and avoid other traffic. This incident again and very dramatically showed, as witnessed by the HUD video, that conflicting ac with little or no relative motion until the last moment are very difficult to acquire visually. Further, by the simple geometry, if there is no relative motion from one cockpit then the same applies from the other ac. In this case it is probable that the Zodiac had been obscured from the Tornado navigator's position by the canopy arch or framework and the crew may have been preoccupied for a few critical seconds with the frequency change, preparing for the formation climbout and selecting fuel flow from the wing tanks. The Board was informed that further detailed analysis of the HUD had been carried out and it showed that the Zodiac was first discernable (i.e. it was not possible to see the ac sooner than this) below the horizon and emerging from the dark terrain in the background, 2.6 sec before it crossed in front of the Tornado. When the crew resumed their routine lookout it was already too late to take any avoiding action.

Apart from the lack of any relative motion, it was more difficult to determine why the Zodiac pilot had not seen the Tornado which would have been just above the horizon from his viewpoint. The rate of closure would have been the same giving him only a few seconds when the ac would have been visible to him. Further, he may have been preoccupied with the second ac which was further away and not a major threat.

Notwithstanding the significant factors above, the Board considered that in this case since neither pilot/crew had seen the opposing ac in time to react, the ac flightpaths had clearly been in confliction and only good fortune had prevented a mid-air collision. It follows therefore, that there had been an actual risk of collision.

Although not contributing to the circumstances of the incident, the Board also considered why the Zodiac pilot had not been aware of the Tornado even after they had passed. Members considered that this was most likely because the Tornado had passed a few yards behind and below him. While the Zodiac pilot may have heard a noise or felt a buffet, since he had not seen the Tornado which was in his blind area he may not have associated them as coming from another ac.

The Board was informed by a Military specialist that, although there are some exceptions, it is not normally possible for fast jet ac to call adjacent civil airfields when operating in the UKLFS due to the speed of flight, conflicting operational priorities regarding the use of the (often single) radio and crew workload.

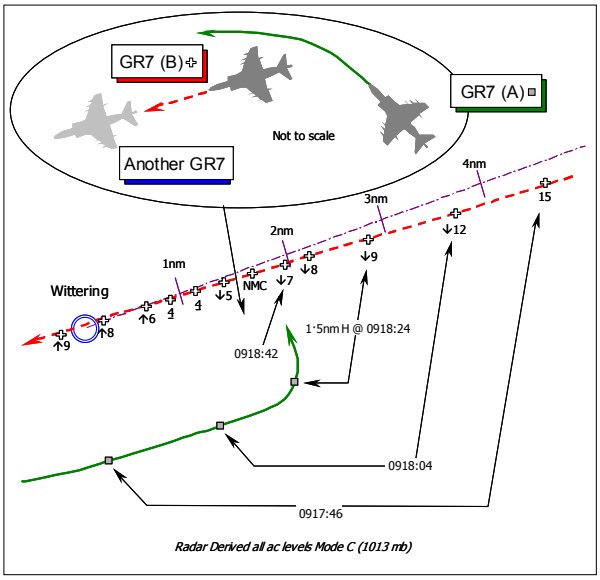
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Zodiac pilot and an effective non-sighting by the Tornado crew.

Degree of Risk: A.

AIRPROX REPORT NO 097/05

Date/Time:	20 Jun 0918	
Position:	5237N 00026W (1½nm Finals RW26 Wittering - elev 273ft)	
Airspace:	Wittering MATZ	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Harrier GR7	Harrier GR7
Operator:	HQ STC	HQ STC
Alt/FL:	500ft (QFE 1006mb)	500ft (QFE 1006mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	NR	10km+
Reported Separation:	<100ft V/nil H	100ft V/50-100ft H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

HARRIER GR7 PILOT (A) reports he had returned to base as the No4 of a '4-ship' formation of GR7 ac following a range detail and was flying independently under VFR in VMC in the Wittering aerodrome cct under the control of Wittering TOWER on 357·15MHz. His ac has a grey camouflage scheme, but the HISLs were on. Neither TCAS nor any other form of CWS is fitted. SSR was selected 'off' in the cct.

He was aware that there were 6 ac - including his own - either in the cct or flying a radar pattern and he had completed a couple of circuits when, significantly, communications on the TOWER frequency - Stud 2 - became unreadable. As he was downwind at 170kt, he elected to follow the ac in front around in the cct whilst waiting for comms to be re-established. Half way around finals, turning L through 320°, he looked R to see another Harrier 500ft away at his 01:30 position, in the (instrument) approach and closing slightly below his ac. Using a very aggressive pitch manoeuvre in order to avoid a collision, he applied full power and pulled "to the buffet" as the other ac passed 100ft directly beneath his jet with an *"extremely high"* risk of a collision.

HARRIER GR7 PILOT (B) reports he was the leader of the '4-ship' formation that had returned from the range to base at Wittering. Upon recovery, the other ac of his formation remained in the cct and he departed into the radar pattern for a PAR to RW26 in his two-tone grey camouflaged ac; the HISLs were on.

At about 2nm finals under a RIS from TALKDOWN whilst on his radar approach he could see an ac landing ahead of him ['Another GR7' on the diagram – not GR7 (A)] and the controller advised that his clearance was delayed. At a range of, he thought, 1½nm from touchdown he was instructed by TALKDOWN "if visual to contact the TOWER" so he changed to Wittering TOWER on Stud 2, called "finals gear down" but received no response. He made a further call changing his 'intentions' from the approach to 'OVERSHOOT', and was told to contact Wittering GROUND on Stud 1. Whilst descending through 500ft QFE (1006mb) heading 255° at 175kt and making his call to GROUND, he became "aware" of an ac "very close" in his L 8 o'clock position at a range of about 150-200ft appearing to climb above him. No avoiding action was taken - the other ac [GR7 (A)] was seen late and it was not on a collision course – but he estimated it passed 100ft above and 50-100ft behind at the closest point whilst crossing astern from L-R with a *"high"* risk of collision.

THE WITTERING TOWER CONTROLLER (ADC) reports that he had been controlling for about 90min when the 4-ship Harrier formation [including the subject ac] called to join the visual cct for RW26. He was waiting for one of the Harriers to call finals when the ATCO i/c told him that she thought that Stud 2 – the TOWER frequency - had dropped out again [become unserviceable] because there had been no inputs from the 4 ac in the cct for some time. At this point the RUNWAY controller called on the landline from the RW caravan to inform him that an ac on finals was calling on the squadron private frequency for a clearance to land. He selected the appropriate

frequency - Stud 16 - and instructed the ac with gear down that he was "clear to land". However, the RUNWAY controller had already decided that the ac was too close to FINALS and fired off a RED Very cartridge, setting fire to the grass in the process. The ATCO i/c decided that the best option was to switch the aerodrome control frequency to Stud 1 - normally GROUND - so the ADC broadcast on both Stud 2 and the squadron private frequency for all circuiting ac to change to Stud 1. He started to get 8nm and 4nm PAR clearance calls from 2 TALKDOWN positions and some of the ac in the visual cct started to get their callsigns mixed up – for example GR7 (A) was apparently in the visual circuit and on radar at the same time - so it was at this point that he did not feel in 'control' of the situation although the ATCO i/c was doing her best to help. Whilst [in hindsight] he should have broken off the PAR traffic at 2nm - GR7 (B), he passed an instruction of "if visual continue with TOWER" to TALKDOWN. Unfortunately he inadvertently added that the pilot should call TOWER on Stud 2 – the normal TOWER frequency - instead of Stud 1 GROUND, the revised channel temporarily in use.

THE WITTERING ATCO I/C reports that when it became apparent that Stud 2 – TOWER frequency - was intermittently u/s she asked the ADC to confirm whether he had established RT with all the cct ac which he confirmed he had. After a couple of seconds delay, she became concerned that the ADC had not established satisfactory RT comms with any ac and instructed GROUND to make a broadcast on Stud 16 – the squadron private frequency - for all ac to 'come up' on Stud 1 GROUND. Although there were 2 radar approaches during the incident, she does not recall where those ac were in relation to the visual cct. Through the use of the GROUND frequency she tried to assist the ADC but in her opinion believed that the situation had become "flight safety critical" so she instructed the ADC to orbit all ac at cct height in order to re-establish [positive] 'control'. One of the pilots - now believed to be the pilot of the reporting Harrier, GR7 (A) - informed TOWER he had come very close to an ac on a radar approach. At this stage she took over the TOWER control position and instructed all ac to orbit at cct height then to report DOWNWIND with intentions. The reporting pilot made 2 broadcasts for 'all players to land' which subsequently they did.

HARRIER GR7 PILOTS' STATION comments that a contributory factor appears to have been an insidious fault with the Wittering TOWER Frequency, Stud 2, whose transmitter was intermittently failing to transmit. This unserviceability, which was not evident to the controllers at the time, prevented useable transmissions on Stud 2. Although this intermittent fault had previously manifested itself, it had not been fully identified nor diagnosed at the time of the Airprox.

There are Human Factor aspects to a number of the decisions leading up to this Airprox. These include the decision to continue using a suspect TOWER frequency in the most complex of local aerodrome cct environments; the decision(s) to continue to fly approaches to the RW despite lack of proper 2-way RT (reinforced by having had to do so on the day before) and the reluctance by all the 'players' to go to GUARD [243·0MHz] once a problem became apparent. Clearly, these are all easy judgements to make with hindsight and it is possible that little could have been done to avoid this Airprox. However, following an initial look, it is believed that the factors contributing to this incident probably extend beyond those detailed above or have been captured on the recording tapes of the event.

This incident has been extensively discussed and debriefed at Wittering and all players are aware that there were other, probably better, options available to them at the time. Whilst content that different actions would be taken in future, lessons from this incident will be publicised for all to share.

UKAB Note (1): The UK Mil AIP at AD2 EGXT – 1 – 9 states that the visual cct height for RW26 is 1200ft QFE (day), with at 4(b): *"No deadside"*.

UKAB Note (2): The UK Mil AIP at AD2 EGXT – 1 – 7 quotes the Wittering MATZ as a portion of the Cottesmore/ Wittering Combined MATZ radius of 5nm centred on RW08/26, extending from the surface to 3000ft above the Cottesmore aerodrome elevation of 461ft amsl.

MIL ATC OPS reports that after the formation of 4 Harriers joined the visual circuit for RW26 at Wittering, GR7s (A) & (B) requested to depart the visual cct separately for radar approaches. GR7 (A) changed to Wittering DIRECTOR from the downwind position at 0908:00 and GR7 (B) climbed out and changed to DIRECTOR at 0908:41. GR7 (A) completed his PAR after receiving a clearance to ROLL ['touch and go'] from the Aerodrome Controller (ADC) at 4nm from touchdown. At 0914:40, the ADC broadcast "*Harrier 4 miles ROLL"* indicating to visual cct traffic that GR7 (A) had been issued a clearance to roll on the main – RW26. At 0916:11, GR7 (A) called the ADC whilst short finals "*request..ROLL*", whereupon the controller confirmed that GR7 (A) was cleared to

ROLL and informed the pilot about GR7 (B) that was inbound on a PAR at 8nm to ROLL on RW26 and join the visual cct. However, the pilot of GR7 (A) neither acknowledged this clearance nor the traffic information about the reported GR7 (B). At this stage it became apparent to the ADC that the primary TOWER frequency [the transmitter, according to the Station's report] had failed so the ADC transmitted on the squadron private frequency, known to be monitored by the GR7 pilots, "*aircraft on Stud 2* [TOWER] *can you report on Stud 1* [the GROUND frequency]", which the ADC uses in the event of a primary TOWER frequency failure. At around this time it would appear that the ADC was transmitting on both the TOWER frequency (Stud 2) and the GROUND frequency (Stud 1). When at 0917:25, the ADC received a request from the PAR controller for the clearance for GR7 (B) to ROLL at 4nm from touchdown, the ADC instructed PAR to 'CONTINUE the approach' and call for clearance [which was delayed] by 2nm. An 'All Stations Broadcast' was made on GROUND Stud 1 "*Harrier* [GR7 (B)] *4 miles continuing to 2"*. Later, as GR7 (B) approached 2nm, PAR again requested the clearance and was told by the ADC on the on-channel intercom, "*GR7 (B) if visual continue with Tower Stud 2"* [which was the incorrect frequency as it was known to be u/s]. This incorrect instruction was readback accurately by the PAR controller. Eventually, GR7 (B) contacted the ADC on GROUND Stud 1 at 0918:32, reporting, "*GROUND* [GR7 (B)] *is ¼ of a mile FINAL gear down to OVERSHOOT"*. The ADC instantly instructed GR7 (B) to "*go around*". Almost immediately at 0918:42, the pilot of GR7 (A) contacted the ADC to report, "*I don't know whether it's me or you but the radios are wacky again and I've nearly hit that jet on radar".* ADC acknowledged the call and instructed all aerodrome cct traffic on his frequencies to orbit at cct height.

At the time of the Airprox the ADC reports his workload as *"high"* with the additional complication of a radio frequency failure. The visual cct at Wittering is an extremely complicated aerodrome pattern involving dual RW operations [notified with no DEADSIDE], here on RW26 operating a left hand pattern at 1200ft QFE (1006mb). GR7 (A)'s instrument approach continued normally until short finals when the pilot contacted ADC on Stud 2 to verify the clearance to ROLL (although it had already been given at 4 miles through PAR). ADC confirmed GR7 (A) was clear to ROLL and added supplementary information that the reported Harrier - GR7 (B) - was at 8nm on radar to ROLL and join the visual cct. The pilot of GR7 (A) neither acknowledged the clearance nor the traffic information [as none is apparent on the RT recording]. However, it was at this stage that the ADC's TOWER frequency failed and the ADC commenced transmitting on the GR7 squadron frequency (which is continually monitored in the Harrier's cockpit), "*all stations all stations come up Stud 1, I say again come up stud 1*". PAR contacted the ADC again, when GR7 (B) was at 4 miles on the approach, requesting a clearance but due to the proximity of GR7 (A) ahead, the ADC was unable to issue a clearance and instructed PAR to continue GR7 (B) to 2nm. ADC carried out an 'All Stations Broadcast' on the back-up GROUND frequency "*Harr, 4 miles continuing to 2*". PAR again attempted to obtain a clearance for GR7 (B) at 2¼nm but this was refused by the ADC so the GR7 (B) pilot was instructed by PAR to continue with TOWER on Stud 2: this was the incorrect frequency as ADC was now operating on Stud 1 GROUND. GR7 (B) contacted the ADC, on Stud 1 GROUND, at ¼nm FINALS to be sent 'AROUND' by the controller.

[UKAB Note (3): Analysis of the Debden Radar recording is inconclusive as the Airprox is not illustrated clearly. At 0917:46, the recording shows 4 ac in the Wittering circuit, 2 squawking and 2 only as primary returns. At this time GR7 (B) is passing 4·5nm FINALS to RW26 squawking A3755 and descending through 1500ft Mode C (1013mb), closing from slightly L of the extended centre-line, whilst GR7 (A) with SSR selected off is S of Wittering on the DOWNWIND leg. GR7 (A) is shown in a L turn onto FINALS at 0918:24 whilst GR7 (B) is approaching 2½nm from touchdown indicating 900ft Mode C (1013mb) descending, some 1½nm NE of GR7 (A). The primary contact of GR7 (A) then disappears from radar: thus the Airprox is not shown. However, GR7 (B) maintains its course passing the reported Airprox location at 1½nm from touchdown still descending through 500ft before levelling at 400ft Mode C (1013mb) and then overshooting from inside 1nm. An indicated 500ft Mode C (1013mb) would equate broadly to 290ft QFE (1006mb), but given the general tolerances applicable to Mode C of +/- 200ft at these levels this might not be exactly indicative of the ac's height, compared to that reported by the pilot of 500ft at the time of the Airprox.]

Both of the subject GR7 pilots had executed radar approaches with GR7 (A) being positioned some 8nm ahead of GR7 (B) in the sequence. GR7 (A) completed the approach and changed to the ADC's TOWER frequency at short finals to receive confirmation of the clearance to use the runway, but the pilot of GR7 (A) did not acknowledge this clearance or the traffic information about (B). After completing the roll into the visual circuit, GR7 (A) then continued around the pattern to FINALS with no RT contact with the ADC [apparent from the RT transcript]. Consequently, with no traffic information the pilot would have been unaware of GR7 (B). The pilot of GR7 (B) had received 2 delayed clearances whilst executing his radar approach and consequently received no cct information at all about the number of ac in the visual cct. This information would normally be passed in conjunction with a

clearance to use the runway. In addition, the ADC gave an incorrect frequency in the clearance for GR7 (B) on which to contact the ADC that caused a delay in establishing 2-way RT communication. However, the ADC was operating under a high workload situation whilst attempting to facilitate a cct frequency change. GR7 (A) made no transmissions to the ADC to report his position nor pass intentions whilst continuing to fly in the visual cct to RW26, whilst the ADC was concentrating on other matters and did not observe GR7 (A) turning onto FINALS. At the time of the Airprox, although Wittering had the standard RT Communication Failure procedure for the visual cct this was not complied with.

HQ STC comments that following the failure of the RT it was not the wisest course of action for the pilot of GR7 (A) to continue to fly the cct pattern when he had no contact with ATC. A much wiser action, in hindsight, may have been to orbit at cct height until order was restored.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Within the comprehensive reports provided, comment had been made about the apparent lack of RT calls from the pilot of GR7 (A) who made no transmissions to the ADC to report his position nor pass intentions whilst continuing to fly in the visual cct to RW26 whilst apparently following the ac ahead. But it was pointed out that this could have been the result of an intermittent ATC receiver fault whereby no transmissions would have been recorded. Furthermore, the pilot of GR7 (A) might not have heard the initial call to switch to Stud 1. The Station's point about the use of GUARD was well made, but whilst it was not clear whether it was also a receiver as well as a transmitter fault, the loss of the TOWER Stud 2 radio at this juncture was evidently very significant. Although it is still sound airmanship for pilots to make blind calls so that other pilots in the cct are aware of their intentions, it transpired that the nature of the Stud 2 unserviceabilty was such that it rendered the frequency unusable. So although a standby radio operable on the TOWER frequency was immediately available to the ADC when he detected his RT difficulties, it was not possible to use it because of the interference caused on the Stud 2 frequency. As it was, the TOWER radio failure was a significant element in this Airprox and apparently prevented the pilot of GR7 (A) from being given traffic information about GR7 (B) approaching the cct on PAR.

Pilot Members – military and civilian – stressed that this Airprox involving ac flying in the visual cct inevitably revolved around pilot lookout. Nevertheless, military controller Members also pointed out that the ADC was responsible for integrating the instrument and visual cct traffic and had clearly issued instructions to PAR to allow the approach of GR7 (B) to be 'continued' in toward the aerodrome cct. The ADC himself had recognised, in hindsight, that this was unwise and the Board agreed this was a significant contributory factor to this Airprox. It would plainly have been preferable to have broken-off the PAR traffic earlier but, having done so eventually, the wrong frequency was issued by the ADC in the 'heat of the moment'. It was in this 'high-pressure' scenario that the approaching GR7 (B) got too close, its pilot unaware of the cct state before RT contact was established. Furthermore, although there was clearly a lot happening no warning was issued from the ADC to the pilot of GR7 (B) about the close proximity of GR7 (A) that should have been plainly visible from the Tower. It was evident from the comprehensive accounts provided that an element of confusion existed here and it was understandable that the ATCO i/c should have been so concerned. Members agreed with the Command's view that pilots might also have realised from the cockpit what was going on and climbed to cct height to wait there until the situation was sorted out. It is in situations such as these that pilots must revert 'back to basics' which, when tempered with good airmanship, must be the 'golden rule'. Here, pilot Members emphasised that when operating in the cct it is incumbent on pilots to clear the airspace in which they will fly beforehand. Thus although apparently denied traffic information about GR7 (B), the pilot of GR7 (A) should have checked the approach before he turned inbound onto FINALS for RW26. Whilst evidently GR7 (B) was there to be seen as the jet approached short finals, that the pilot of GR7 (A) did not detect it beforehand was fundamental to the cause for if he had done so it is probable that the Airprox would not have occurred. The Board agreed that this Airprox had resulted because, following a TOWER radio failure, the pilot of GR7 (A) had turned finals into conflict with GR7 (B) which had not been seen by him beforehand.

Turning to risk, the pilot of GR7 (B) had not spotted GR7 (A) until it was seen late - effectively after the event - as he became "aware" the jet was "very close" in his L 8 o'clock position at a range of about 150-200ft with a *"high"* risk of collision. From the other cockpit the reporting pilot of GR7 (A) applied full power and used a very aggressive

pitch manoeuvre – "pulling to the buffet" - in order to avoid a collision as GR7 (B) passed 100ft directly beneath his jet with, in his view, an *"extremely high"* risk of a collision. Nevertheless, in the Board's opinion this avoiding action - whilst extremely robust – effectively removed the actual risk of collision and enabled him to steer clear of the other jet. But from both pilots' accounts it was a close call nonetheless, leading the Members to conclude that the safety of the ac involved had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

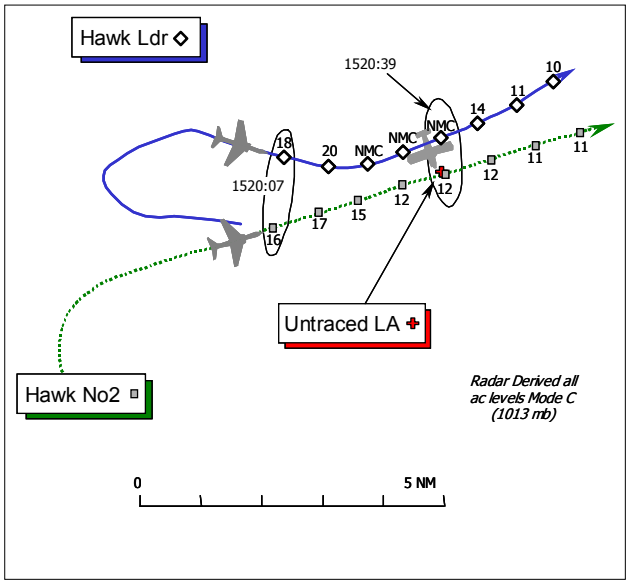
Cause: Following a TOWER radio failure, the pilot of GR7 (A) turned finals into conflict with GR7 (B).

Degree of Risk: B.

Contributory Factor: The pilot of GR 7(B) was permitted by the ADC to continue his approach into the aerodrome cct.

AIRPROX REPORT NO 100/05

Date/Time:	30 Jun 1520	
Position:	5200N 00222W (3nm SE of Ledbury)	
Airspace:	UKDLFS	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	Hawk T1A	Untraced Light ac
Operator:	HQ PTC	NK
Alt/FL:	2000ft (RPS 998mb)	NK
Weather	VMC CLBC	NK
Visibility:	20nm+	NK
Reported Separation:	20ft V/100ftH	NK
Recorded Separation:	Contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T1A PILOT, a QFI instructing a student, provided a very frank report stating that he was flying as the No2 of a two-ac 'Battle' formation conducting a low-level training sortie. The ac had a black colour-scheme, the HISLs and nose/landing light were on. A squawk of A7001 was selected with Mode C, neither TCAS nor any other form of CWS being fitted. They were flying VFR in VMC, some 2000ft clear below cloud with an in-flight visibility of 20nm+ but not in receipt of an ATS.

In the vicinity of Ledbury in LFA 4, whilst "resetting" for a low-level practise attack back to the IP heading 070° at 360kt, they were flying straight and level at an altitude of about 2000ft RPS (998mb), he thought. During his lookout scan after checking his spacing on the lead Hawk a white single engine low-wing light ac (LA) was spotted late, on the nose crossing L – R at a range of about 100ft. He pulled hard into a *"max rate"* climb and passed some 20ft above the LA whose pilot did not appear to react at all. In assessing the inherent risk of a collision he reported *"inevitable without evasive action"*.

He added that the LA was possibly a Piper Warrior with two people in the cockpit - he could see that the RHS was occupied.

THE RADAR ANALYSIS CELL (RAC) reports that a replay of the Clee Hill Radar recording shows the Hawk pair in the reported Airprox location and a single pop-up primary contact is displayed very briefly. Unexpectedly at this level, the radar did not display the LA either before or after the event. Extensive tracing action has revealed no clues whatsoever to the identity of the reported LA which consequently remains untraced.

UKAB Note: The Clee Hill radar recording shows the Hawk pair manoeuvring in the area reported and executing a second egress manoeuvre 'off target': the data provided by the recording is somewhat confusing and does not illustrate the Airprox clearly. The pair roll-out ENE'ly forming into 'Battle' formation from 1520:07. The contact, which is believed to be the No2, descends steadily to an indicated 1200ft Mode C (1013mb) [an altitude of about 750ft RPS (998mb)] straight and level. At 1520:39, a solitary pop-up primary contact without any supporting SSR is shown, for one sweep only, virtually co-incident with the No2 Hawk's SSR return: this might well be the reported LA or it may be a spurious return. The No2's Mode C shows no indication which could be associated with the reported avoiding action *"max rate"* climb but meanwhile the lead Hawk indicates no Mode C and then a steady descent. Due to its exceedingly sparse nature, it is difficult to place any confidence in the recorded primary radar data. It is also feasible that the identity of the two jets has been reversed and that the avoiding action is in fact occurring whilst NMC is shown, but if that is so then the untraced LA is not shown at all and the single return is indeed spurious.

HQ PTC comments that even without any corroboration from the LA pilot, it is evident that this was worryingly close. The only real solution to such encounters is a sophisticated technical one.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Hawk QFI, radar video recordings, and reports from the appropriate operating authority.

It is most unfortunate that despite their best efforts the lack of suitable radar data had prevented the RAC from being able to identify the reported LA. Thus the Board could only assess this Airprox on the information contained in the Hawk QFI's report coupled with the scant radar data available. Whilst not an ideal situation, Members believed there was sufficient information upon which to base their assessment of cause and risk.

It was apparent that this Airprox in the 'see and avoid' environment of Class G airspace was fundamentally a lookout issue. Although the pilot of the untraced LA was theoretically required to give way in this situation under the 'Rules of the Air', 'the rules' can only work if the other pilot has sighted your ac in time to take avoiding action. In this case it was not possible to determine if the other pilot had sighted the fast moving jets at all but it seemed to Members that, in all probability, the Hawks had not been spotted which was thus part of the cause. Furthermore, the white coloured LA had evidently defeated the lookout scan of both Hawk crews until the No2 QFI spotted it at the very last moment. The Board agreed that this very late sighting by the No2 Hawk pilot was the other part of the cause.

Regarding the inherent risk, it was not feasible to determine with any certainty the horizontal separation that pertained here because of the paucity of recorded radar data. Neither could the vertical separation be determined because no report was available from the pilot of the LA and neither was the LA transponding Mode C. Nevertheless, there was no reason to doubt the veracity of the Hawk QFI's report and it was fortunate that the Hawk pilot had sighted the untraced LA in time to take avoiding action. That the QFI was able to effect this change to his flightpath and achieve a mere 20ft of vertical separation at the critical moment suggested to Members that this was only just attainable in the time available. The Board agreed that at the distances quoted by the QFI, an actual risk of a collision had existed at these close quarters.

PART C: ASSESSMENT OF CAUSE AND RISK

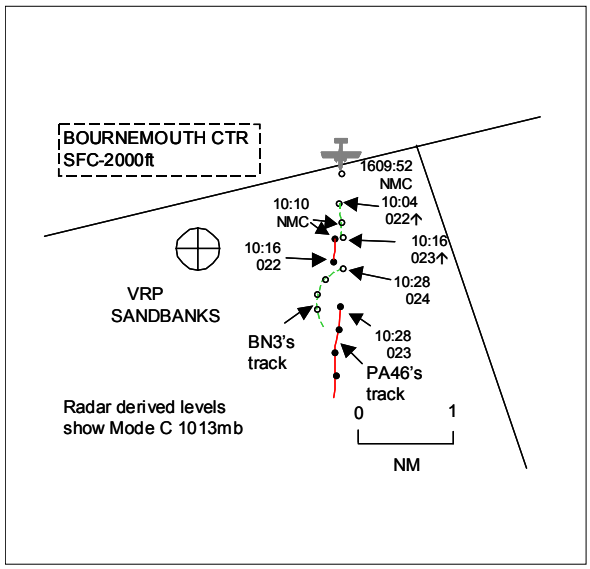
Cause: A very late sighting by the Hawk pilot and probably a non-sighting by the untraced light ac pilot.

Degree of Risk: A.

AIRPROX REPORT No 102/05

AIRPROX REPORT NO 102/05

Date/Time:	29 Jun 1610	
Position:	5042N 00154W (5nm SSW Bournemouth Airport - elev 38ft)	
Airspace:	Bournemouth CTR (Class: D)	
	Reporting Ac	*Reported Ac*
Type:	BN3 Trislander	PA46
Operator:	CAT	Civ Pte
Alt/FL:	1500ft↑ (QNH)	2000ft (QNH)
Weather	VMC CLBC	VMC CAVOK
Visibility:	25km	>40nm
Reported Separation:	Nil V/100ft H	>300ft H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BN3 TRISLANDER PILOT reports outbound from Bournemouth to Alderney VFR and in receipt of a RIS, he thought, from Bournemouth on 119·47MHz squawking 7371 with Mode C; TCAS is not fitted to the ac. The visibility was 35km and he was flying 2000ft below cloud in VMC. The ac was coloured blue/white/yellow with strobe lights switched on. About 5nm SW of Bournemouth heading 195° climbing at 100kt through 1500ft QNH, he was informed by ATC of traffic passing on his R. The other ac, a PA46 Malibu coloured blue/white, was first seen in his 4 o'clock with about 100ft lateral separation at the same level also climbing. No avoiding action was necessary as the other ac was only close for a very short time and overtaking at about 30kt faster, its pilot appearing to be waving and waggling his wings. The PA46 then moved directly in front of his ac which was very disconcerting owing to his poor forward view whilst in a nose-high climbing attitude. Since he was unaware of how close the other ac was he believed the risk was high should he have turned.

THE PA46 PILOT reports outbound from Bournemouth to Guernsey VFR and in receipt of an FIS from Bournemouth on 119·47MHz squawking 7000 with Mode C. The visibility was >40nm in CAVOK and the ac was coloured white/blue with strobe lights switched on. Heading 185° at 160kt and cruising at 2000ft, he thought, he informed ATC of his intentions to overtake the BN3 which was communicated to its pilot. He had seen the BN3 continuously after departure and passed >300ft horizontally on its RHS at the same level with no risk of collision.

THE BOURNEMOUTH APR reports carrying out OJTI supervising a trainee. The BN3 pilot called him on a VFR departure requesting a RIS once outside CAS and was told to report leaving CAS and issued with a squawk. Shortly thereafter, the PA46 pilot called on a VFR departure and reported that he had the Trislander in sight and would pass down its RHS. The BN3 pilot was then passed further TI on the PA46, having previously been given TI by the ADC. The BN3 pilot reported that he considered the PA46 was too close and that he wished to file an Airprox.

UKAB Note (1): The Bournemouth QNH was 1007mb.

ATSI reports that the BN3 had departed on a VFR clearance from Bournemouth to Alderney and requested a RIS when outside CAS. Shortly afterwards the PA46, also operating under VFR but from Bournemouth to Guernsey, reported on frequency "*...just coasting out*". The Bournemouth controller asked the PA46 to confirm that he had the Trislander in sight which the pilot confirmed by stating "*Fully visual going to go down his right-hand side*". The controller advised the BN3 pilot of this and requested him to report passing 3000ft. Shortly afterwards, the BN3 pilot informed the controller that the PA46 was a little bit close and that he would be filing an Airprox. The Airprox occurred approximately 4nm SW of Bournemouth within the Class D CTR. The MATS Part 1 requires that TI only

be passed between VFR flights in such circumstances. This was done and therefore there are no ATC casual factors disclosed.

UKAB Note (2): Owing to Pease Pottage radar being out of service, Jersey recorded radar was analysed which only shows the subject ac after the PA46 has overtaken the BN3. The BN3 first appears on radar at 1609:52 leaving CAS 5nm SSW of Bournemouth on a 7371 squawk tracking 180° showing NMC but fades for 1 sweep before it reappears at 1610:04 indicating FL022 (2380ft QNH 1007mb). Six seconds later a 7000 squawk appears, which is believed to the PA46, just R of the BN3s 12 o'clock range 0·2nm, with both subject ac showing NMC. The next radar sweep at 1610:16 shows the PA46 at FL022 in the BN3s 1 o'clock range 0·3nm at FL023. Another radar fade occurs on the next sweep with both ac showing further 6sec later at 1610:28, the BN3 having turned R onto a SW'ly track climbing through FL024 (2580ft QNH) with the PA46 to it's S range 0·4nm showing FL023 (2480ft QNH). Thereafter the PA46 pulls ahead of the BN3 with +50kt groundspeed overtake indicated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add nothing to the report. At the end of the day, the PA46 pilot had seen the BN3 Trislander ahead and whilst overtaking flew sufficiently close to cause its pilot concern which had caused the generation of the Airprox report. The Class D airspace minimum requirements were fulfilled by ATC, by passing TI to both crews who were flying VFR – pilots are responsible for ensuring their own separation. From the BN3 cockpit, the pilot was then concerned that the PA46 had moved in front. However the Board agreed that owing to the 50kt overtake speed, the PA46 had rapidly pulled away from the BN3 to the extent that safety had been assured during the encounter.

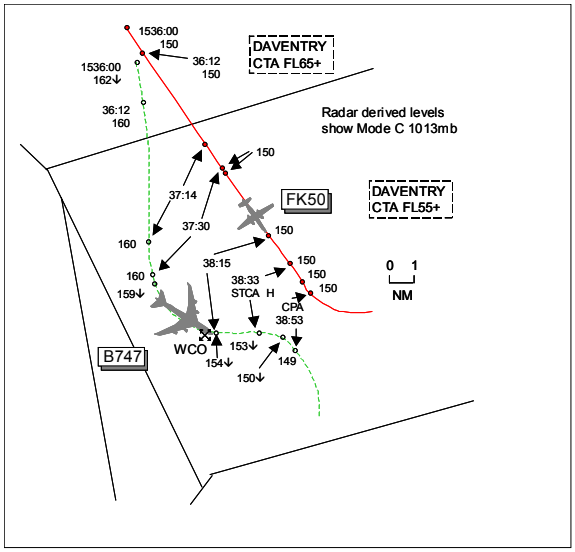
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Whilst overtaking, the PA46 pilot flew sufficiently close to the BN3 Trislander to cause its pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 103/05

Date/Time:	30 Jun 1539	
Position:	5152N 00153W (3nm E WCO)	
Airspace:	Daventry CTA	(Class: A)
	Reporting Ac	*Reported Ac*
Type:	B747-400F	FK50
Operator:	CAT	CAT
Alt/FL:	FL150	FL150
Weather	VMC NR	VMC CLOC
Visibility:	NR	NR
Reported Separation:	Nil V/2nm H	Nil V/2·5nm H
Recorded Separation:	Nil V/2·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B747 PILOT reports inbound to Stansted in descent on a LOREL 3F STAR but following radar vectors from London ATC, owing to heavy traffic, on 133·07MHz. About 23nm E of BOMBO after levelling at FL150 at 250kt, the flight was given a radar heading of 105°, he thought, and transferred to London on 119·77MHz. An ac was noticed on TCAS, closing from behind them to their L at the same level, which rapidly became a TA. The new controller called them saying *"B747 c/s avoiding action turn right now onto 180°"*. On receipt of these instructions, the Capt took control from the FO and disconnected the A/P and initiated a rapid turn to the R. Once established in the turn, he handed control back to the FO who re-engaged the A/P when the TA alert ceased. He did not visually acquire the other ac but estimated it passed 2nm clear on his LHS at the same level.

THE FK50 PILOT reports cruising at FL150 in good VMC when ATC turned a B747 onto a conflicting heading. The crew had seen the B747 for a few minutes prior to this as it was first descended to a level 1000ft above and then, once clear of them, to the same level. The controller then turned them onto an E'ly heading and the B747 onto a S'ly track. The B747 passed 2·5nm clear ahead and to their R at the same level with a low risk of collision.

THE LTCC COWLY SC reports the FK50 was cruising at FL150 on heading 135° whilst the B747 was initially heading 155° descending to FL160 on top of the FK50. The B747 was given 2 further R turns to keep it clear of another ac on a crossing track (SW to NE) at FL160 which was also turned R. He believed that the FK50 was no longer on his frequency so the fps was crossed through. Once the B747 had over-run the FK50, it was turned L onto heading 135° and descended to FL150. He forgot about the FK50 when he turned the B747 further L onto 090° towards BKY. The NW DEPS SC noticed the turn and called a warning but he had already transferred the B747 to his sector. The N Coordinator asked him to turn the FK50 but he believed the flight had been transferred. He called 'avoiding action' to the FK50 which was acknowledged.

THE LTCC NW DEPS reports being aware that the Sector was busy and that the COWLY SC had a lot of traffic to present to his Sector and the BNN SC. He noticed that the B747 had commenced a L turn bringing it into conflict with the FK50 which was about 3nm on its LHS – neither ac were on his frequency. He shouted to the COWLY SC and then he received a call from the B747 flight to which he then gave an avoiding action turn and TI. As a result of this he had to turn another ac as well and a Heathrow inbound ac had to be expeditiously descended by the BNN SC.

ATSI reports that at the time of the Airprox, the B747 flight was in communication with the North West Departures (NW DEPS) SC whilst the FK50 flight was in communication with the COWLY SC. At the time, the latter was performing the duties of both the Midlands Coordinator and the COWLY SC. He described both the workload and traffic loading as being 'quiet before quickly becoming very busy and complex'. A number of issues regarding recency and competence were raised and these are discussed later in the report.

The Midlands Sector complex normally comprises of three positions: COWLY SC, WELIN SC and the Midlands Coordinator. The subject SC had occupied the Coordinator position for some 30 minutes when it was agreed that traffic was very light. Following a conversation between himself and the incumbent COWLY SC it was decided to bandbox the two positions. As the COWLY SC had been on an operational position for slightly longer than the Coordinator, it was agreed that the Coordinator would remain on the sector whilst the SC would take a fatigue break.

As the two positions were combined, the outgoing SC was informed, by the Group Supervisor, that the Traffic Load Prediction Device (TLPD) indicated that the sector would become busy again. This was communicated to the COWLY SC, now operating the two functions of SC and Coordinator, but the decision of the 2 controllers was to leave the position bandboxed for the time being.

The FK50 flight established communications with the COWLY sector at 1525:00, when it was 20nm N of Birmingham Airport, and reported level at FL150 and heading 155°. The controller acknowledged the call. It was at this time that the subject SC took over the operational control of the position providing both the Coordinator and Sector controller functions. At 1530:30, the B747 crew contacted the SC and reported heading 155° and maintaining a speed of 330kt. The ac was in the decent to FL200: however, the crew did not advise the SC of their cleared level. The SC instructed the pilot to continue on the heading and maintain the speed for the moment. The ac, which was 12nm NE of Birmingham when its pilot called, had been requested to maintain this higher speed by the previous sector so that it would be better positioned within the inbound stream of ac routeing into the COWLY sector.

At the same time, there was northbound traffic (a JS41) at FL160, which the SC had to integrate with his London TMA inbounds which were required to descend to FL150 before transfer to the next sector. At 1533:10, the SC instructed the crew of the B747 to descend to FL160 and to reduce speed back to standard. At this time the B747 was in the 7 o'clock position of the FK50, at a range of 5nm and passing FL204. At 1534:30, the crew of the B747 were instructed to turn R onto a heading of 175°, which would assist in positioning the ac in the inbound sequence, and also to keep it clear of the northbound JS41 at FL160, which was some 30nm S of it. The SC then transmitted *"FK50 c/s turn left heading one three five degrees heading to London one one nine seven seven*". Immediately after finishing this transmission the SC took a telephone call, directed to the Coordinator, and so was not actively listening for the read back. As it happened, there was no read back of the instruction from the FK50. The SC had 'crossed out' his fps thereby confirming in his own mind that the ac had been handed over. He did, however, retain the fps in his data display as was his normal practice.

The pilot of the B747 requested further descent, at 1535:50, but the SC advised that there was traffic underneath which was, in fact, the FK50. As the B747 levelled at FL160, the SC requested (1536:00) that the speed be reduced to 250kt and the crew to turn the ac R onto 185°. The B747 was now 2nm S of the FK50 which was still tracking 150° as had been previously assigned. Observing that the B747 was now in the 2 o'clock position of the FK50 at a range of 4nm, he instructed the crew to turn L heading 135° in order to parallel, he thought, the two ac. This was correctly acknowledged and at 1537:15, the SC instructed the B747 to descend to FL150. Separation was now assured against the northbound JS41, at FL160, and so the SC instructed the B747 (1537:30) to turn L onto 085° to track towards BKY. Having received an acknowledgment from the crew, the SC then instructed them to contact the next sector and report their radar heading: however, he did not cross out the fps.

At 1538:15, when the B747 flight makes its first call on the NW DEPS frequency, the radar shows the FK50 maintaining FL150 and still heading 150° whilst the B747 is in its 2 o'clock position, passing FL154 at a range of 4·7nm with the latter in its L turn onto 085°. STCA activated at low severity at 1538:17 and changed to high severity at 1538:33. The NW DEPS controller immediately issued avoiding action to the B747 and TI, and shouted to the COWLY SC to alert him to the problem. In this conversation he told the SC that the FK50 was not on the NW DEPS frequency. The SC saw the conflict and so passed an avoiding action turn to the B747: however, the ac was no longer on his frequency. He then called the FK50 and issued an avoiding action turn onto 090° and the crew responded. The 2 ac continue to converge until the turns take effect and separation reduced to a minimum of 2·5nm and 100ft at 1538:53. At 1539:35, the COWLY SC instructed the crew to change frequency to the NW DEPS sector.

The SC explained that the decision to combine the COWLY SC and Coordinator positions had been taken after the 2 incumbents had discussed the matter. Although the Group Supervisor had advised that TLPD information indicated that it would get busy, the subject SC was content that he could call a controller back in sufficient time

should the need to split the positions arise. In the unit's MATS Part 2, GEN 9.3 it states in the list of the responsibilities of the TC Group Supervisor:

Deploy staff on a tactical basis to achieve optimum service provision; consult with the Traffic Manager on group staffing requirement and any need for additional or amended flow measure.

Ensure efficient deployment of allocated staff to appropriate positions in accordance with current staffing agreements and strategic flow plans.

On page GEN 9.4, one of the responsibilities of the Coordinator is:

Alert the Group Supervisor when there may be a requirement to split sector positions, vary standing agreements, or tactically reduce the number of aircraft entering the sector(s).

It is clear that the Group Supervisor made the SC aware of the potential level of traffic likely to enter the sector, nevertheless, the SC went ahead and bandboxed the 2 positions. He explained that, initially, the sector was not busy but at approximately the same time as he instructed the B747 to descend to FL160 (1533:10) he felt that the traffic situation was getting complex. A request had been made in respect of a flight from Coventry to Norwich which had occupied his attention. He had formulated his plan and was content that it would resolve the developing conflictions and achieve the requirements of the sector. When he instructed the crew of the FK50 to change frequency, he expected the next sector to have promptly descended the ac and so it would remain vertically separated from the B747. At the time, there was another ac on frequency from the same company which was also inbound to London City. The SC instructed the crew of that ac to change frequency at 1535:40 and this was correctly read back. As this ac was subsequently cleared to descend, by the next sector, it is possible that this reinforced, in the SC's mind that both ac were in contact with the NW DEPS Sector.

The SC explained that he had not 'crossed over' the tracks of the two subject ac earlier, owing to the presence of other traffic. He had waited until there was a gap in the sequence so that he could then position the ac in the best position prior to transferring them to the next sector. He added that it was not uncommon for him to include a heading change with an instruction to change frequency provided the heading change was not 'for separation purposes'. In this particular case, he had vertical separation established between the ac and so the instruction to the FK50 to turn L from 150° onto 135° was to 'tidy up' the sequence and vector the ac towards BPK. Later, when he descended the B747 to FL150 he had not noticed that the FK50 was still tracking approximately 150°. He re-checked the radar before instructing the B747 to change frequency but, again, had not detected the fact that the FK50 had neither turned towards BPK nor descended out of FL150.

It was only after the NW DEPS shouted a warning that the COWLY SC became aware of the problem. STCA activated shortly after this and so the COWLY SC tried to call both ac in an attempt to pass avoiding action. He advised that he had practised avoiding action scenarios in his TRUCE exercises.

The COWLY SC then explained that he was concerned about the amount of time he spent carrying out radar duties. As a controller with non-operational responsibilities, he was tasked to carry out between 10hr and 12hr of duties per month. These were frequently on an 'ad hoc' basis and could be on occasions when the traffic was not at its peak. This, he felt, was an unsatisfactory state of affairs and he had, subsequent to this Airprox, taken steps to increase the number of hours he spent undertaking radar duties.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor clarified the situation regarding the Midlands Sector that pertained at the time of the Airprox. As the Coordinator position was closed, the Coordinator's duties were being shared between the COWLY and WELIN SCs and this was not uncommon. The Group Supervisor's (GS's) workstation was some distance from the Sector and facing away from it but the GS had fulfilled his responsibilities in informing the COWLY SC that the TLPD indicated that the Sector would become busy. However, GSs are not normally valid on all positions for which they are responsible and usually take advice about sector manning from the SCs in position. Moving on to

controller recency/currency for those with non-operational responsibilities, the NATS Advisor explained that hours tasked for 'on watch' duties were a minimum number and more could be carried out if needed. A review is being carried out by NATS regarding the rostering of these controllers in light of the points raised by the COWLY SC during this Airprox. Also, action has been taken reminding GSs of their responsibilities for sector manning.

Members could add little to the comprehensive ATSI report. The COWLY SC had actioned his plan but had missed the fact that the FK50 crew had not replied/responded to his transmission. He had then assumed that the FK50 had left his frequency and would be vectored by the next SC. The COWLY SC then continued with his plan by turning the B747 onto heading 135° and, when laterally separated, had descended it to the same level as the FK50, not noticing that the FK50 had continued on its previously assigned heading 155° and at FL150. Then, as separation was assured from another N'bound ac at FL160, he had vectored the B747 towards BKY, again without assimilating either from his radar display or from his fps board that the FK50 was potentially in confliction. This had placed the B747 into conflict with the FK50 and had caused the Airprox.

Fortunately both flight crews were aware of each other's presence. The FK50 crew had seen the B747 well before the Airprox and had watched the B747 descend to the same level and turn towards them before following the SC's 'avoiding action' L turn onto E. The B747 crew had seen the FK50 on TCAS and followed the NW DEPS 'avoiding action' turn onto 180° as a TA alert was received. The COWLY SC had been alerted to the deteriorating situation by the NW DEPS SC as STCA activated and he had unsuccessfully attempted to turn the B747 R (the flight had been transferred to the NW DEPS Sector) before turning the FK50 L away. Although untidy, all of these elements when combined were enough to persuade the Board that safety had been assured during the encounter.

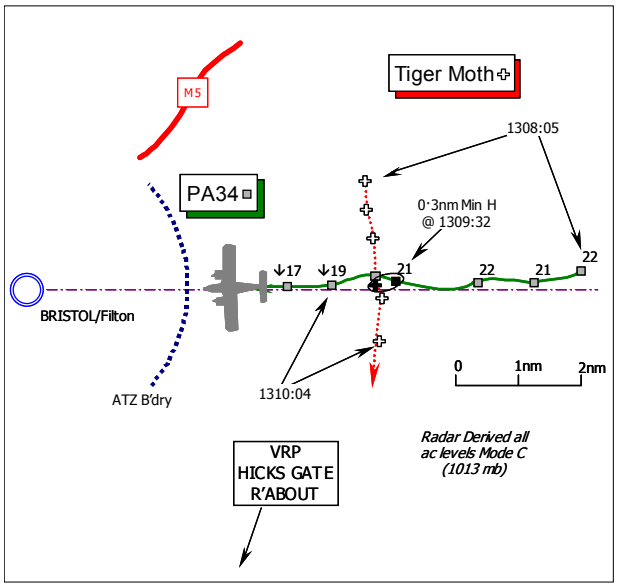
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC COWLY SC/Coordinator vectored the B747 into conflict with the FK50.

Degree of Risk: C.

AIRPROX REPORT NO 123/05

Date/Time:	29 Jun 1309	
Position:	5031N 00226W (5½nm E Bristol/Filton - elev 226ft)	
Airspace:	London FIR	(Class: G)
	Reporting Ac	*Reported Ac*
Type:	PA34	DH Tiger Moth
Operator:	Civ Trg	Civ Pte
Alt/FL:	2000ft (QNH 1007mb)	2000ft (QNH 1007mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	15km
Reported Separation:	Nil V/~100m H	~200ft V
Recorded Separation:	0·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA34 PILOT, a flying instructor, provided a very comprehensive account reporting that he was instructing a student on an instrument rating training flight and was executing an IFR approach into Bristol/Filton. The student was seated in the LHS with screens obscuring his pupil's external view but the screens were angled such that he, as the safety pilot, had an adequate view from the RHS. They were in receipt of a RIS from Filton APPROACH (APR) on 122·72MHz, flying in VMC some 1000ft clear below cloud with an in-flight visibility of 10km+. A Filton assigned squawk of A4250 was selected with Mode C: TCAS is not fitted. His ac has a white/blue colour-scheme and the wing-tip and fin HISLs plus the landing lights were all on.

Whilst in the descent from the airway and in receipt of radar vectors under the RIS to the ILS for RW27, Filton APR had advised them of a radar contact 10nm away of unknown height and informed them that they would be turned onto an 8nm FINAL to avoid the contact [but not the Tiger Moth]. They were turned onto BASE LEG heading 180° at 8nm and then given a heading to intercept the LLZ. Having established on the LLZ approaching the glide path level at 2000ft Filton QNH (1007mb) heading 270° at 100kt, the student configured the ac for landing. During this phase of the approach he had been watching his student's actions whilst also maintaining a lookout. As they were approaching the descent point for the glide path, he looked to his R and spotted a Tiger Moth in level flight at the same altitude about 20-30° starboard of the nose and crossing their flight path from R - L. Immediately, he took control of the ac and made a level R turn behind the Tiger Moth which passed about 100m away to port at the closest point. As he turned back towards the LLZ to complete the approach the DME indicated 4nm, whereupon he made a call to APP advising them about the other ac and of his actions.

If the pilot of the Tiger Moth had seen his ac he may have made the assumption that he had the 'right-of-way' since he was on the R of his PA34. The PA34 pilot opined that he was in the 'giving-way' ac that needed to turn and had done so. Whilst he accepts that the instrument approach at Filton lies within Class G airspace, he estimated that the Tiger Moth crossed the approach in the vicinity of the Final Approach Fix (FAF) at 4·5nm DME. However, the pilot of the Tiger Moth was not in contact with Filton, which would lead him to believe that the Tiger Moth pilot was not fully aware of his position relative to Filton and their instrument approaches. He assessed the risk as *"medium".*

THE DE HAVILLAND DH82A TIGER MOTH PILOT provided a very comprehensive account reporting that he was flying from Gloucestershire Airport to Sheepwash at 70kt in VMC and the Airprox occurred on the first leg of his flight from Gloucestershire, to the Hicks Gate Roundabout VRP [some 6¼nm SSW of the Airprox position]. His ac has a black fuselage with silver wings: no lighting is fitted. He was not in communication with any ATSU [although a VHF radio is fitted] whilst flying VFR some 1000ft clear below and 10nm clear of cloud, with an in-flight visibility of 15km; SSR is not fitted.

He took off from Gloucestershire at 1245UTC but about 15min after take off he encountered a light rain shower over Wootton-under-Edge. He diverted a few miles to the E of his plotted course to avoid this shower. In addition to the spatial displacement, this weather diversion created an uncertainty of some 1-2mins in his timing log which added to the general uncertainty of the prevailing tail/headwind component which can only be reliably established upon timing the first leg of the route. As he approached the "eastern extension of the Filton RW27 centre-line" heading 190° at about 1308UTC, he noticed a distinctive roundabout some miles ahead. This immediately gave rise to some concern as he expected to traverse the Hicks Gate Roundabout VRP, where the 1500ft shelf of the Bristol Class D CTA commences, and thus was concerned that he might be about to inadvertently enter CAS. It was during the very short process of relating and confirming ground features to his 1:500,000 chart that he passed through the extended centre-line to Filton's RW27. Looking around, he only spotted the white ac in his 5 o'clock after it had passed about 200ft below his Tiger Moth and after it had crossed obliquely astern from L-R. He assessed the risk as *"low because presumably the other pilot took avoiding action"*.

He added that the first roundabout he had seen is a very distinctive feature from the air but is not plotted on the 1:500,000 chart. After he consulted road maps it transpired that this roundabout is the similarly distinctive A420 intersection of the A4174 which is about 3nm N of the Hicks Gate Roundabout VRP at the intersection of the A4 and same A4174. Subsequently, he passed over the Hicks Gate Roundabout VRP at 1314. He stressed that he only noticed the other ac after it had passed and had not spotted it beforehand because of the sudden necessity to confirm his position on his map.

[UKAB Note (1): The 1250UTC Filton Wx was: 180/06kt; >10km; showers in the vicinity; Cloud: SCT @ 2500ft, BKN @ 3800ft; QNH 1007mb.]

[UKAB Note (2): In a subsequent telephone conversation the Tiger Moth pilot confirmed that his aeroplane is fitted with a VHF radio but due to the noise difficulties associated with open cockpits he had elected not to use it on this occasion. He opined frankly that as a result of this Airprox he would in future consider its use more often when planning flights that might include a transit through instrument approaches to aerodromes.]

THE FILTON APPROACH RADAR CONTROLLER (APR) - **MENTOR AND TRAINEE** - provided a combined report stating that the PA34 was operating under IFR and being vectored for an ILS approach to RW27 at Filton as part of an instrument training flight. [The ATS provided was indicated, on the APR report, as variously Advisory, Radar & RIS]. As the PA34 established at 7nm, the pilot reported taking avoiding action on a Tiger Moth which had flown through the RW27 centre-line from N to S at the same altitude of 2000ft Filton QNH (1008mb). This Tiger Moth was not visible on the radar display and its pilot was not in RTF contact with Filton ATC. Traffic information had previously been passed on an unknown southbound contact, which had subsequently faded some 5nm NE of Filton. TOWER was advised but nothing was sighted. The pilot of the PA34 later decided to file an Airprox.

[UKAB Note (3): The Clee Hill radar recording shows the PA34 transiting down-wind on a heading of about 110° prior to being turned onto a BASE LEG for the LLZ. At 1305:01, whilst descending through FL42 Mode C, the PA34 flies directly over the primary return of the Tiger Moth which is crossing from L-R some 6·7nm NE of Filton. Subsequently, the PA34 turns onto the LLZ and levels at 2200ft Mode C (1013mb) at 1308:05, at a range of 9nm from the aerodrome. Meanwhile the Tiger Moth continues on a steady course southbound and crosses through the RW27 approach (which is marked on the applicable CAA VFR 1:500,000 chart) at a range of 5½nm E of Filton. The PA34 continues inbound for RW27 and at 1309:32, is shown turning R at 2100ft Mode C (1013mb) in conformity with the avoiding action turn reported by the pilot with a horizontal separation of about 0·3nm. The Tiger Moth maintains its course leaving the PA34 0·3nm astern as the latter turns back towards the RW27 LLZ.]

ATSI reports that the PA34 crew contacted Filton at 1302, on handover from Bristol/Lulsgate, descending to FL45 on a heading of 110°. The flight was instructed, by the APR [a trainee with a mentor] to continue on the heading for vectoring to the ILS RW27. No mention was made of the radar service which would be provided although both the PA34 pilot and the APR Controller later reported it as a RIS (MATS Part 1, Section 1, Paragraph 1.5 refers). Further descent to 2000ft [Filton QNH 1008mb] was issued at 1304:30 when the PA34 was 6nm NNE of Filton. Some 30sec later, traffic information was passed *"keep a look out for unknown traffic one mile twelve o'clock left to right .. slow moving believed to be low level but..no height readout"*. The radar recordings reveal that this was the ac subsequently involved in the Airprox. Thereafter, the PA34 was vectored onto the LLZ, avoiding unknown traffic to the E of Filton, with information being issued about this traffic. At 1309 the PA34 pilot, having reported

established on the LLZ was cleared to descend on the ILS. Shortly afterwards, the pilot reported needing to turn R to avoid a Tiger Moth in front of him (later transmitting it was less than ½nm ahead).

The radar recording of the Clee Hill Radar shows a primary return, believed to be the Tiger Moth: however, this radar source is not available to the Filton APR Controller. It was reported that, having issued traffic information to the PA34 pilot about the unknown ac, the latter did not show on the Filton radar display, probably as a result of tangential fade [UKAB Note (3): a known limitation with some SREs fitted with moving target indicator (MTI)]. Consequently, it was not possible to update the traffic information when the PA34 was established on the ILS. There is no reason to believe that the APR would not have passed traffic information to the PA34 crew if the Tiger Moth had been visible on their radar display. He had already warned the PA34 crew about its presence earlier and had also passed information on another unknown ac [that referred to by the PA34 pilot] shortly before the Airprox occurred. There were only two other flights on the frequency at the time, both receiving a FIS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

A GA pilot Member suggested that this Airprox had its origins at the pre-flight planning stage. It should have been readily evident to the Tiger Moth pilot that his planned route crossed through the instrument approach to RW27 at Filton which is clearly marked on the applicable CAA VFR charts. The PTC pilot Member commented that the Tiger Moth pilot's plan, whilst entirely reasonable, warranted early RT contact with Filton ATC for effective execution: the Tiger Moth pilot himself had subsequently agreed. The Tiger Moth pilot's laudably frank account had clearly shown that he was aware that he was approaching the RW27 centreline and this should have provided ample warning that ac conducting IFR approaches could potentially be encountered when crossing through this sector, prompting enhanced lookout for any approaching traffic. Whilst recognising entirely the Tiger Moth pilot's legitimate right of passage through Class G airspace here, where RT contact was not in any way mandatory, communication with Filton ATC was seen by the Board to be an essential prerequisite to good airmanship whilst transiting through the aerodrome's final approach sector. Notwithstanding the difficulties reported of hearing the radio in open cockpits of vintage ac, RT contact would clearly have allowed ATC to be informed of the ac's presence thereby facilitating the passing of traffic information to inbound pilots about the Tiger Moth and 'vice versa'. This might potentially avert such incidents as occurred here, especially as no SSR transponder was fitted to alert ATC. This Airprox was perhaps a salutary example of the difficulties of detecting wood & fabric covered ac by radar because this, coupled with the potential for loss of contact due to 'tangential fade', effectively rendered the Tiger Moth 'invisible' to the APR at the critical moment. The APR was therefore inhibited from providing a suitable warning to the PA34 crew. Therefore, it was plain to the Members that the reporting of this incident had resulted in a valuable lesson for all concerned. It was also clear that the crux of this Airprox was one of lookout where 'see and avoid' prevails in the Open FIR.

Another GA Member highlighted the practical difficulties of lookout both from the Tiger Moth biplane - where the upper wing would have hindered lookout ahead & above - and also from the PA34 with the IF screens erected, but which if positioned correctly should not have impeded the instructor's lookout to starboard. Nevertheless, pilots should take account of this and move their ac if necessary to check obscured areas. Some Members suggested that the cause of this Airprox was that the Tiger Moth pilot had been too pre-occupied by navigational matters as he flew through the final approach to Filton just at the level where IFR traffic could be encountered. Moreover, this was in the vicinity of the FAF where crews would be busy initiating their descent on the glidepath. All things being equal this was not an ideal place to fly through an 'approach' if there was no good reason to do so.

From the Tiger Moth pilot's perspective he had not detected the presence of the PA34 until after it had passed astern and therefore had no influence over the outcome of this close quarters encounter. Nevertheless, the reporting PA34 pilot himself had highlighted that under the 'Rules of the Air' the Tiger Moth pilot had 'Right-of-Way', placing the instructor in a difficult situation whilst flying an IFR approach under 'simulated IMC' conditions. The 'Rules' can only work if ac are seen in good time and it was fortunate that the PA34 safety pilot had spotted the Tiger Moth when he did, turning to avoid it and thereby resolving the conflict. But it was evident that both ac were there to be seen in the prevailing weather and each pilot could potentially have spotted each other's ac a lot sooner than they did. The Board agreed, therefore, that this Airprox had resulted from a non-sighting by the Tiger Moth pilot and a late sighting by the PA34 safety pilot.

The prompt avoiding action taken by the PA34 instructor when he spotted the Tiger Moth was effective: the recorded radar data had shown the horizontal separation achieved was about 0·3nm. But as the biplane was not fitted with SSR it was not feasible to determine the vertical separation that pertained here with any certainty. About 200ft vertical separation - at most - was reported by the Tiger Moth pilot and the PA34 pilot - who probably had the better view initially - reported that both ac were at the same altitude. These factors, coupled with the non-sighting by the Tiger Moth pilot and late sighting from the PA34 led the Board to conclude that the safety of the ac involved had been compromised in the circumstances reported.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tiger Moth pilot and a late sighting by the PA34 safety pilot.

Degree of Risk: B.