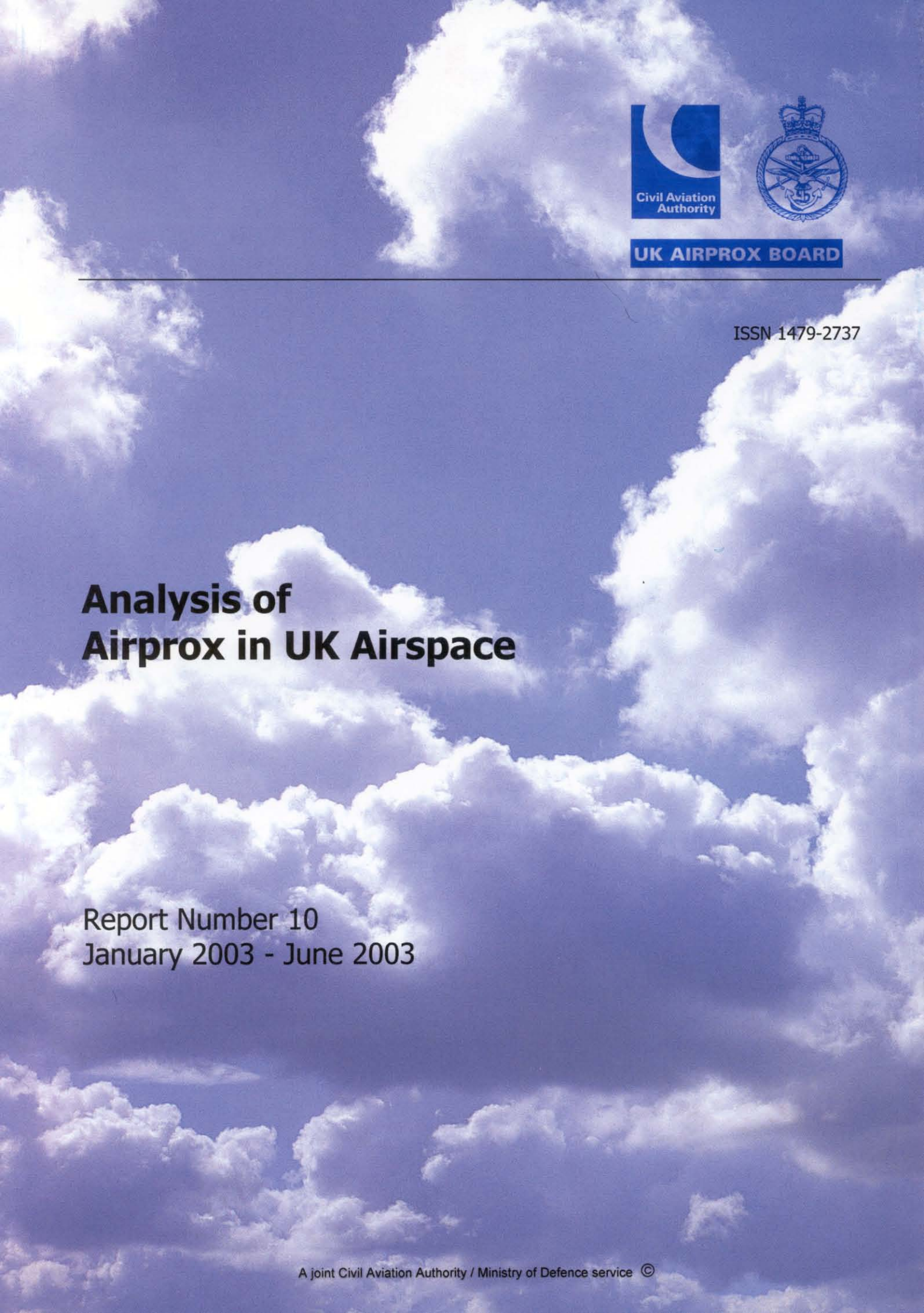

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Analysis of Airprox in UK Airspace

Report Number 10
January 2003 - June 2003

Report by the UK Airprox Board,

‘Analysis of Airprox in UK Airspace’

(January 2003 to June 2003)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

If you fly aeroplanes, or control them, then this book is for you. It is the tenth in the series but its purpose remains unchanged – to promote air safety awareness and understanding, by sharing widely the lessons to be learned from unexpected encounters. For the process to work effectively, this document must be made freely available to aviators and controllers in their work place and not locked away in a manager's office.

This volume covers the first six months of 2003 and contains findings on all of the 85 Airprox filed in that period, within UK airspace. A breakdown of Risk results is shown below, set against like results since 2000, to permit comparisons to be made.

(January to June)

	2000	**2001**	**2002**	**2003**	
Risk Category A	14	16	7	6	*(Collision risk)*
Risk Category B	20	23	27	29	*(Safety not assured)*
Risk Category C	61	57	57	49	*(No collision risk)*
Risk Category D	0	5	1	1	*(Insufficient information available)*
Totals:	95	101	92	85	

Inspection reveals that when six-month periods are compared, last year's count of 85 incidents undercut like totals recorded in each of the previous three years. Similarly, there was also a reduction in the number of Risk A returns, which once again did not involve any CAT aircraft. Turning to *risk-bearing* results (Risk A + Risk B) these remained consistent apart from the rise to 39 cases seen in 2001. All of these figures, however, need to be taken for what they are at this stage - a 'snapshot' only of the wider picture. Once full end-of-year figures for 2003 are to hand, more meaningful comparisons can be made with what has gone before and pertinent longer-term trends can then be identified. For more information on Airprox statistics, including the outcome of related Recommendations, visit the UKAB web site at www.ukab.org.uk.

Meanwhile, there are many valuable lessons to be learned by reading about the unhappy situations that others have found themselves in, starting on page 18. Their honesty in reporting what happened to them should be used by colleagues to help avoid similar predicaments in future.

Gordon McRobbie

Gordon McRobbie
Director, UKAB

CONTENTS

INTRODUCTION

UKAB COMPOSITION

The UKAB acts as an independent organisation but is sponsored jointly by the Civil Aviation Authority (CAA) and the Ministry of Defence (MOD) to assess all Airprox reported within UK airspace. Eight civilian and six military members form the Board, which is Chaired by the Director UKAB; he reports directly to the Chairman CAA and Chief of the Air Staff, Royal Air Force. UKAB members are all 'unpaid volunteers' - pilots and air traffic controllers - who devote their expertise, experience and aviation 'know how' in a combined approach that covers the following disciplines:

- Air Traffic Terminal Control, Area Control and Airfield Control
- Commercial Air Transport flying (CAT)
- General Aviation (GA) flying, both fixed wing and rotary
- Military flying by the RN, Army and the RAF, plus UK-based USAF aircraft

UKAB's ROLE

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

- Acting as the reporting point for all Airprox in UK airspace, this triggers an investigation process into each incident that is carried out by the Safety Regulation Group (SRG) of the CAA and/or Military HQs
- Determining what happened and why - analysis of the main causal factors
- Assessment of risk levels involved
- Making recommendations where appropriate to prevent incident recurrence
- Publishing and distributing full reports twice a year so that lessons can be learned

STATUS OF UKAB REPORTS

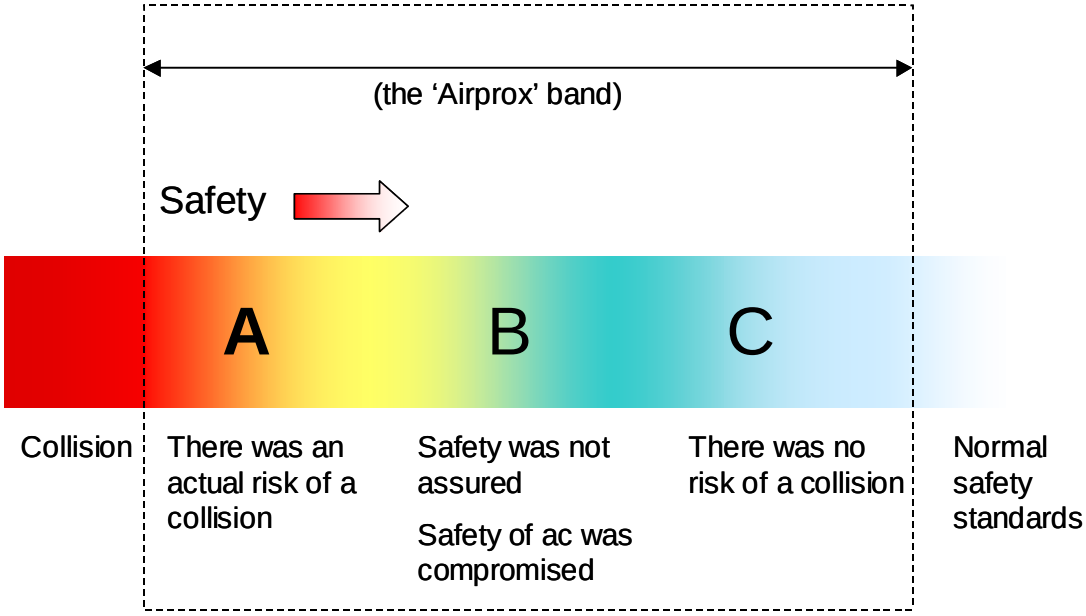
The sole objective of the United Kingdom Airprox Board shall be to assess reported Airprox in the interests of enhancing flight safety. It is not the purpose of the Board to apportion blame or liability. To encourage an open and honest reporting environment names of companies and individuals are not published in 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

A pictorial representation of the Airprox band is shown below:



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

STATISTICS

THE UKAB DATA SET

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

CAT	Scheduled/Non-Scheduled passenger flights in Airliners and Helicopters Cargo flights
GA	Executive and Company aircraft (hired for specific reward) Private and Flying Club aircraft Gliders, sport aviation and airships Aerial work
Military	Aircraft flown by the RN, Army and RAF plus foreign military aircraft (UK airspace) Defence Procurement Agency aircraft - formerly MOD (PE)

Notes:

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

(2) GA flying hours are based on aircraft with less than 5700 kg maximum take-off weight authorised; they include Microlights and Gliders, but exclude Gyroplanes and balloons. The British Gliding Association and the Registration Department of the CAA supply GA data.

(3) Should figures be updated, new values are shown to promote the integrity of the information presented.

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

HALF YEAR COMPARISONS 2002 and 2003

A total of 85 Airprox were reported between January and June 2003, which is 7 fewer than in the same period in 2002. This slight drop in numbers made little difference to the percentage split between civil and military encounters, as can be seen from Fig 1 and Fig 2. While Mil~Mil conflicts reduced by 4%, those for Civ~Civ edged up 1% and Civ~Mil by 3%. Precise details are set out in Tables 1 and 2.

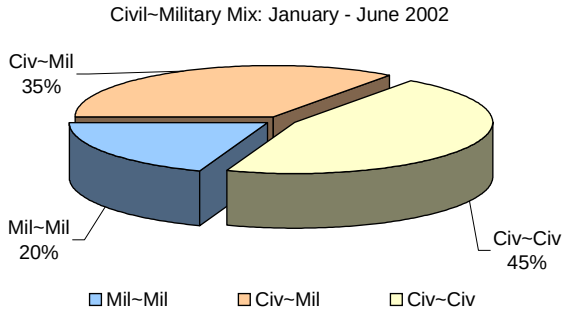


Figure 1

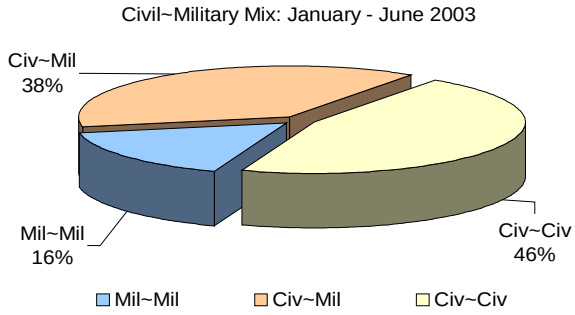


Figure 2

2002	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	3	4	3	2	4	18
Civ~Mil	2	1	7	6	10	6	32
Civ~Civ	1	3	4	7	11	16	42
Totals	5	7	15	16	23	26	92

Table 1

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	2	1	1	1	4	5	14
Civ~Mil	2	2	7	4	7	10	32
Civ~Civ	3	6	3	7	6	14	39
Totals	7	9	11	12	17	29	85

Table 2

The pie chart at Fig 3 shows how the various user groups interacted during the first six months of 2002. Fig 4 shows the same period in 2003, for comparison.

Although CAT~CAT conflicts reduced by 6% in 2003, CAT~GA meetings went up by 9%, while CAT~Military Airprox rose also by 4%. The end result of these changes was a relative increase in CAT involvement by 5%, bearing in mind the 'pie' was smaller - down from 92 to 85.

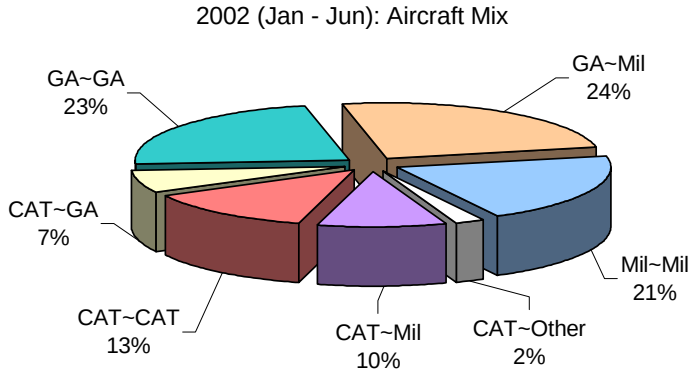


Figure 3

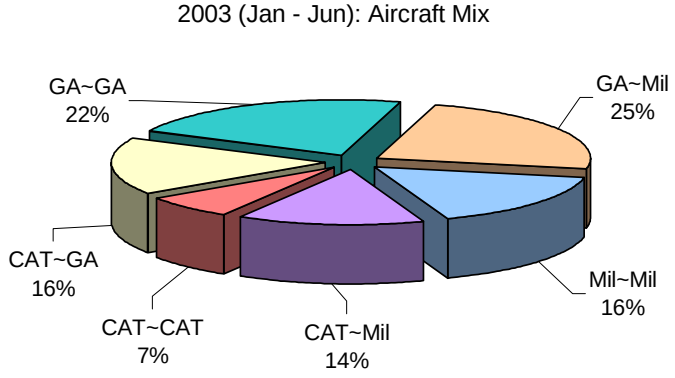


Figure 4

The overall rise of 9% for GA pilot involvement can be attributed primarily to the conflicts with CAT aircraft, already mentioned above.

Fewer Mil~Mil encounters in 2003 were offset by minor changes elsewhere, mainly involving CAT aircraft. The final outcome, however, was an overall involvement level of 55%, which is unchanged on the position for 2002.

WHO MET WITH WHOM?

Jan to Jun 2003	CAT Helicopter	CAT Passenger	GA (Hire & Reward)	GA Company Ac	GA Glider	GA Helicopter	GA Private or Club	GA Training	Untraced GA Ac	Military Fixed Wing	Military Glider	Weather Balloon	Unknown	Totals
CAT Cargo			1											1
CAT Helicopter										1				1
CAT Passenger		6	3				5	2		8			1	25
GA (Hire & Reward)						1	1			2				4
GA Company Ac		1												1
GA Glider				1	1								1	3
GA Helicopter						2	2			2				6
GA Private or Club						1	2		1	5				9
GA Training	1		1			1	2	2		2				9
Military Fixed Wing		3	1			1	2	1		10		1		19
Military Glider							2			1				3
Military helicopter								1		2	1			4
Totals	1	10	6	1	1	6	16	6	1	33	1	1	2	85

Figure 5

Fig 5 provides more insight into involvement in the 85 conflicts reported. Pilots who filed Airprox were flying the aircraft types depicted in the *yellow* column, while aircraft in the *green* row reflect the 'other party'. The highest number of encounters (42) were experienced by pilots of military fixed wing aircraft. Next came CAT pilots (32 conflicts), while in third place were GA pilots flying Private or Club aircraft (23 incidents).

AIRSPACE IN WHICH THE CONFLICTS TOOK PLACE - JANUARY TO JUNE 2003

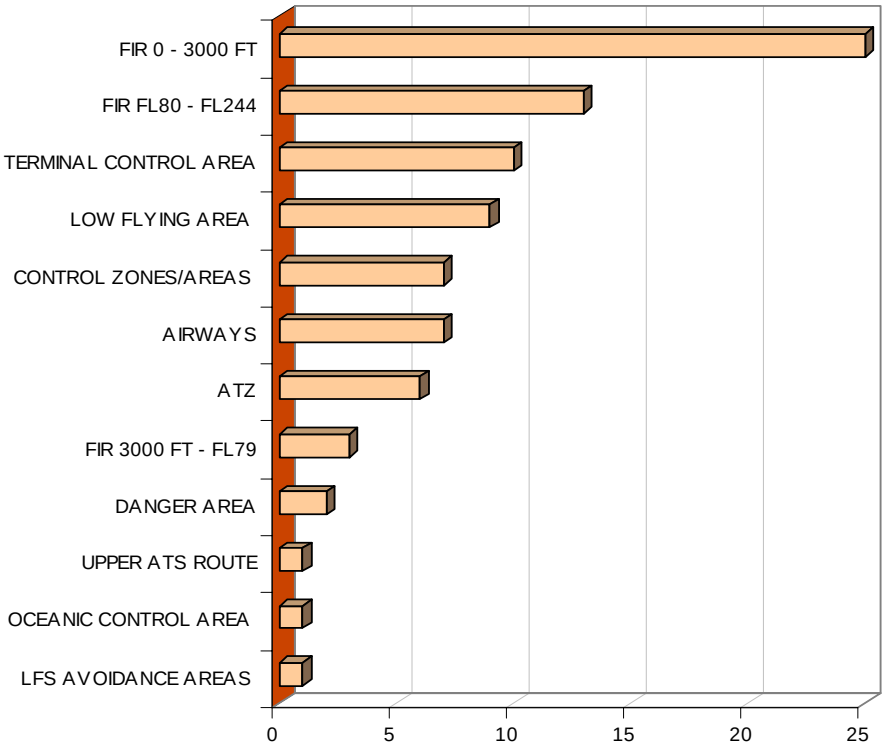


Figure 6

Fig 6 (left) shows the types of airspace in which the 85 encounters occurred.

60% of cases happened in Class G - in the open FIR - and half of those numbers were concentrated below 3,000 ft.

For Airprox inside regulated areas, examples in TCAs were the most prolific at 12% of the 85 total figure. Conflictions in Airways and in Control Zones/Areas came next, each accounting for 8% of total numbers. ATZs were the scene of 7%, leaving 5% distributed as shown.

CAT: Risk Results

Risk results for CAT aircraft are charted (right), with more detail set out in Table 3 & Table 4 below. Data, from 2002 is also included for comparison.

Comparisons with each 'All Airprox' profile, show CAT profiles as more consistent. Notably, most CAT incidents once again turned out to have no collision risk and there were no examples of Risk A.

Risk B numbers moved up by 3 counts, but there were no Risk D cases.

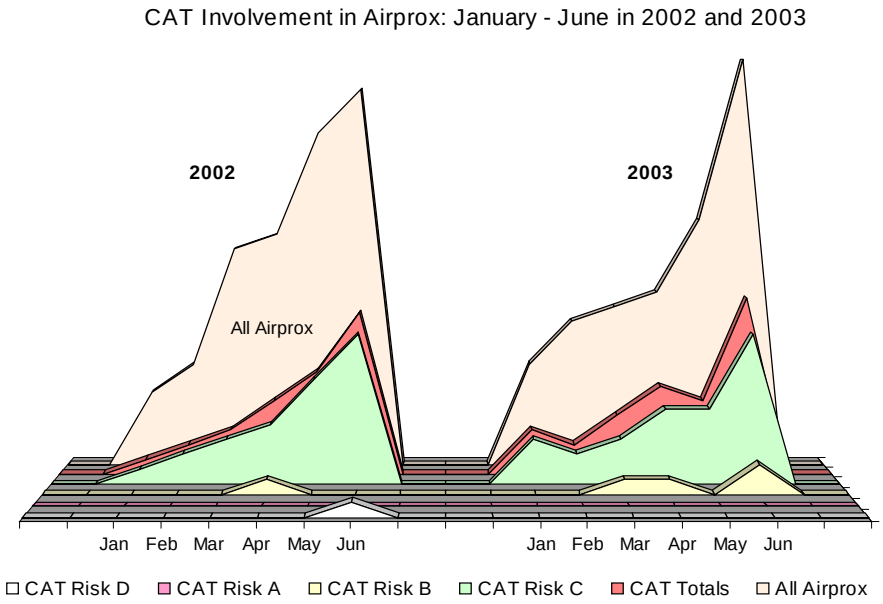


Figure 7: CAT results compared - January to June 2002 and 2003

2002	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	0	0	0	1	0	0	1
Risk C	1	2	3	4	7	10	27
Risk D	0	0	0	0	0	1	1
Totals	1	2	3	5	7	11	29

Table 3: CAT Risk results January to June 2002

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	0	0	1	1	0	2	4
Risk C	3	2	3	5	5	10	28
Risk D	0	0	0	0	0	0	0
Totals	3	2	4	6	5	12	32

Table 4: CAT Risk results January to June 2003

CAT: Causal Factors

There were 73 different reasons behind the 32 encounters involving CAT aircraft. Most of these were attributable to pilots or controllers, but not all. Just under one third of the causes identified were 'one-off' examples only. These have been excluded from *Table 5* below, which shows how many times each of the remaining reasons applied in situations. Note that one Airprox can have several causal factors, so there is no direct equation between cause results and risk results.

Ser.	Cause	Totals	Attributed to
1	DID NOT SEPARATE/POOR JUDGEMENT	9	CONTROLLER
2	PENETRATION OF CAS/SRZ/ATZ WITHOUT CLEARANCE	9	PILOT
3	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	5	PILOT
4	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	4	PILOT
5	COLLAPSED-SECTOR WORKING(BANDBOXING)/HIGH WORKLOAD	4	CONTROLLER
6	DID NOT SEE SEE CONFLICTING TRAFFIC	3	PILOT
7	UNDETECTED READBACK ERROR	3	CONTROLLER
8	DISTRACTION / DID NOT MONITOR	2	CONTROLLER
9	DID NOT ADHERE TO PRESC'D PROCED'S/OPERAT INSTR'S	2	CONTROLLER
10	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	2	CONTROLLER
11	FIR CONFLICT	2	OTHER
12	INADEQUATE SUPERVISION	2	CONTROLLER
13	RT TECHNIQUE/ RT CLIPPING	2	CONTROLLER
14	MISREADING INSTRUMENTS/FAULTY NAVIGATION	2	PILOT

Table 5

GENERAL AVIATION (GA) SECTION

GA: Risk Results

Fig 8 (right), together with the data set out in Tables 6 & 7 (below), show GA Airprox numbers set against 'All Airprox' figures - and the GA Risk results that emerged during the two like periods. Although numbers were similar last year to those in the previous year, results were better. The Risk B-to-Risk C ratio was more balanced, with fewer of the former and more of the latter - a good trend.

Once again there were no examples of Risk D situations, however the tally for Risk A returns moved up by one.

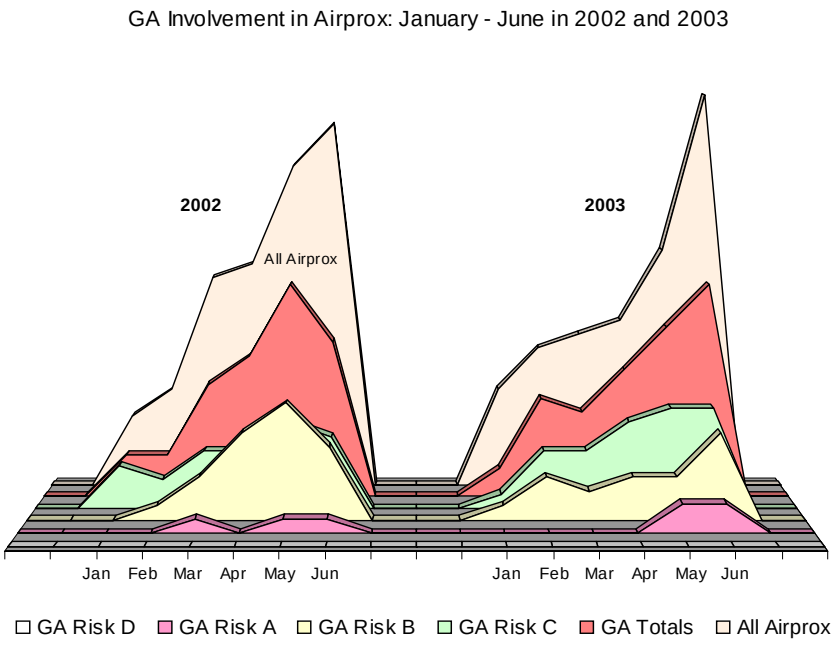


Figure 8: GA results compared - January to June 2002 and 2003

2002	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	0	1	1	3
Risk B	0	1	3	6	8	5	23
Risk C	3	2	4	4	6	5	24
Risk D	0	0	0	0	0	0	0
Totals	3	3	8	10	15	11	50

Table 6: GA Risk results January to June 2002

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	2	2	4
Risk B	1	3	2	3	3	6	18
Risk C	1	4	4	6	7	7	29
Risk D	0	0	0	0	0	0	0
Totals	2	7	6	9	12	15	**51**

Table 7: GA Risk results January to June 2003

GA: Causal Factors

Fig 9 (below) shows the top reasons behind Airprox involving GA pilots - and who was attributable. Difficulties in seeing the other aircraft still features prominently and will continue to do so until Collision Warning Systems are introduced more widely than at present.

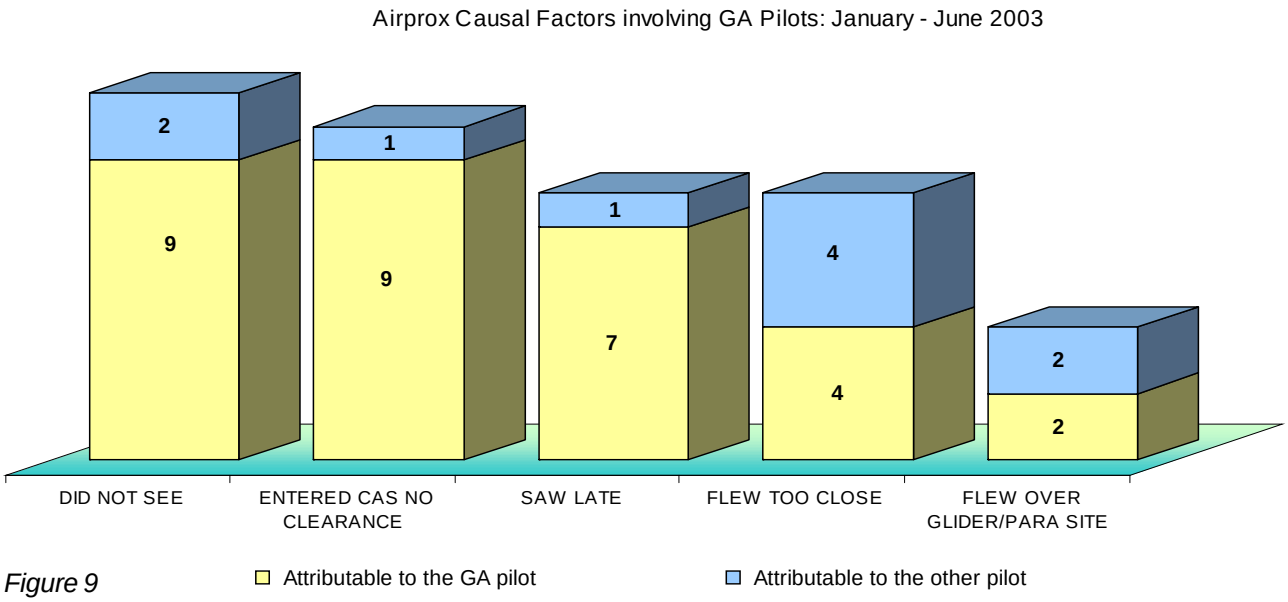


Figure 9

MILITARY SECTION

Military: Risk Results

Fig 10 (right), and the data set out in Tables 8 & 9 (below), show for comparison Military Airprox numbers against the total picture of 'All Airprox'.

The Military total of 46 was down on the previous period, echoed also by the number of Risk A examples, which fell from 7 to 4. However, what was not as good this time round was the ratio between Risk B and Risk C scores - there were too many Risk B results and not enough Risk C scores to maintain the previously established balance. One Risk D example completed the picture.

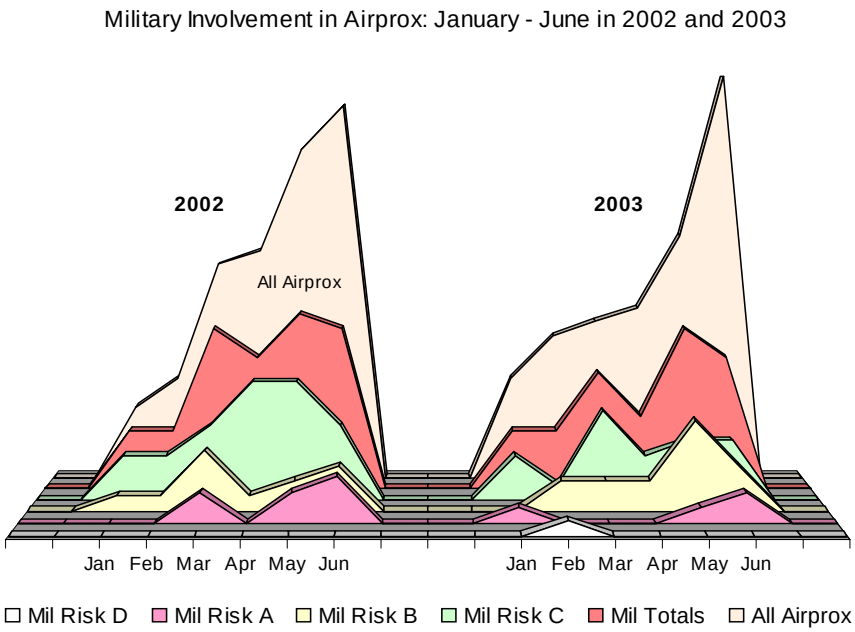


Figure 10: Military results compared - January to June 2002 and 2003

2002	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	2	0	2	3	7
Risk B	1	1	4	1	2	3	12
Risk C	3	3	5	8	8	5	32
Risk D	0	0	0	0	0	0	0
Totals	4	4	11	9	12	11	51

Table 8: Military Risk results January to June 2002

2003	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	1	0	0	0	1	2	4
Risk B	0	2	2	2	6	5	17
Risk C	3	1	6	3	4	7	24
Risk D	0	1	0	0	0	0	1
Totals	4	4	8	5	11	14	46

Table 9: Military Risk results January to June 2003

Military: Causal Factors

Fig 11 shows the top reasons behind Airprox involving Military pilots - and who the outcome was attributable to. As for GA pilots, Military pilots experienced difficulties in seeing the other aircraft, a situation that is unlikely to improve until Collision Warning Systems, however modest, are introduced.

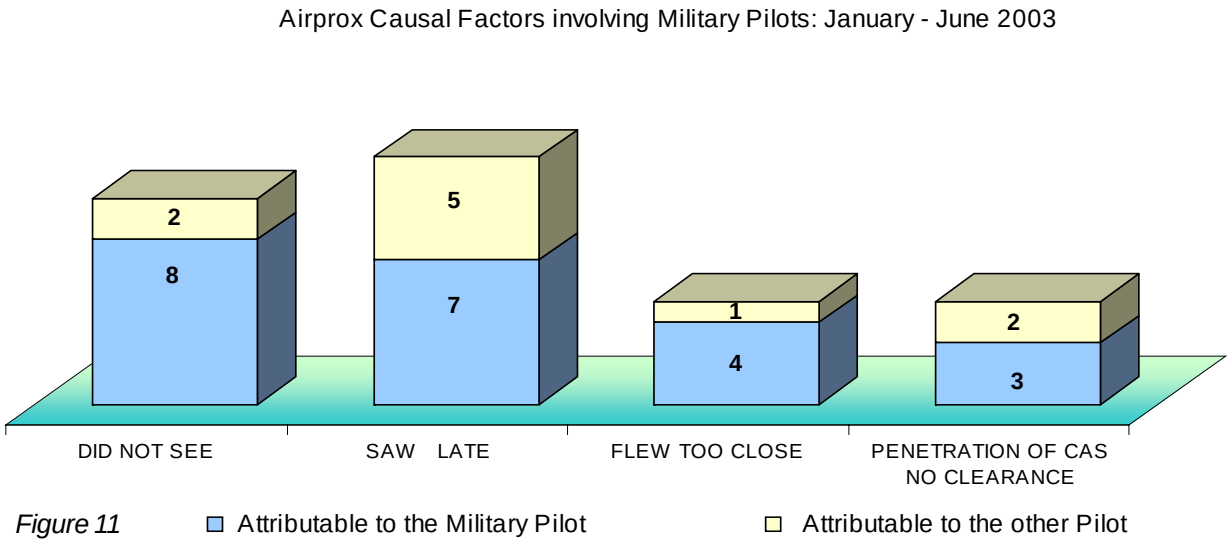


Figure 11

UKAB RECOMMENDATIONS

Recommendations are made when the Board believes that attention needs to be drawn to particular safety matters, e.g. where Risk A and/or Risk B incidents are repeated, or where improved practices may prove beneficial. Subsequent 'acceptance' or 'non acceptance' is a matter for the organisation concerned to decide, based on its own professional judgement.

The information that follows updates Recommendations published previously and lists new ones.

Airprox 30/02 on 1 Apr 02: involving an A320 and a PA34 Risk C

RECOMMENDATION: That the CAA asks NATS to review the efficacy of the London FIS as currently provided.

CAA/NATS ACTION: The CAA accepts this Recommendation. NATS has carried out a review into the efficacy of the London FIS as currently provided. A copy of the report, which contained 10 recommendations, was submitted to the CAA for consideration. The recommendations, together with a number of additional actions called for by the CAA, have now been addressed to the satisfaction of the CAA.

STATUS – ACCEPTED - CLOSED

Airprox 47/02 on 22 Apr 02: involving a DHC8 and a SHAR Risk C

RECOMMENDATIONS:

1. The MOD considers a review of the rules for Visual Identification by military air defence ac in UK airspace.

2. The RN considers feasibility of including an independent air safety cell ashore for each RN AD exercise at sea, within UK airspace.

MOD ACTION:

1. The MOD accepts this Recommendation and a review of the rules is underway.

2. The RN cannot undertake to provide an independent air safety cell for every air defence exercise, but will examine the feasibility of increased liaison with adjacent aerodromes prior to more complex exercises that occur in the open FIR.

STATUS – 1. ACCEPTED – OPEN
2. PARTIAL ACCEPTANCE - CLOSED

Airprox 117/02 on 15 Jul 02: involving a Robin DR36 and a Hercules Risk B

RECOMMENDATIONS:

1. That the MOD reviews the existing regulations within JSP 318 Joint Regulations Section 3 - 05111 (and its subsequent replacement) to ensure they are in accord with that promulgated within the ANO and UK AIP.

2. That the MOD defines more clearly within RAF FLIPs, the R/T frequencies used at UK civil and military airfields by participants of activities which occur outside of the applicable ATSU's hours of watch.

MOD ACTION:

1. The MOD accepts this Recommendation. Woodvale ATC will follow the procedures set out in JSP552 paragraph 801.105 if closure is initiated during published opening hours. The Woodvale BINA entry has been updated and now states the out-of-hours frequency to be used; the corresponding UK AIP entry has also been updated.

2. The MOD accepts this Recommendation. Under certain conditions there is a requirement to remain clear of ATZs. The guidelines presented in military documentation are specific, compliment with civilian documentation and remove any uncertainty that may have previously existed.

STATUS – 1. – ACCEPTED – CLOSED

2. – ACCEPTED – CLOSED

Airprox 225/02 on 28 Oct 02: involving an SF34, a Ka13 Glider and a ASW19 Glider Risk C

RECOMMENDATION: That the City of Derry and the Ulster Gliding Club reviews jointly their operating procedures.

ACTION: The City of Derry and the Ulster Gliding Club are considering this Recommendation.

STATUS – OPEN

Airprox 9/03 on 15 Feb 03: involving an SZD Bocian, an Ask21 Glider and an F900 Risk B

RECOMMENDATIONS:

1. The CAA asks NATS to review the revised MATS Part 2 for Farnborough, to bring it into line with the UK AIP at ENR 5-5-1-4.

2. The CAA asks NATS to introduce, jointly with MOD, written procedures to ensure segregation between Farnborough and Odiham traffic.

ACTION:

1. The CAA accepts this Recommendation. The Farnborough MATS Part 2 has been revised, to bring it in line with the UK AIP at ENR 5-5-1-4, by the issue of Supplementary Instruction 28/2003 on 12 December 2003.

2. Due to the nature of the airspace involved it is not considered feasible to design procedures that will ensure segregation between Farnborough and Odiham traffic. Nevertheless, an updated Memorandum of Understanding between Farnborough and Odiham was signed on the 1 December 2003 and, in addition, a Letter of Agreement (LoA), between Farnborough and the gliding clubs operating from Odiham at weekends, has been agreed. This LoA has been signed by NATS and is awaiting signature by the appropriate parties at Odiham. Collectively, it is considered that these measures will assist in the segregation of Farnborough and Odiham traffic.

STATUS – 1. – ACCEPTED – CLOSED
2. – PARTIAL ACCEPTANCE – CLOSED PENDING LoA SIGNATURE

Airprox 29/03 on 27 Mar 03: involving a formation of F3s x 5 and a Tornado GR4 Risk C

RECOMMENDATION: That the MOD considers introducing accurate timing information on its ATC voice communication recording equipment.

MOD ACTION: The MOD accepts this Recommendation. New procedures have been introduced to ensure that checks are carried out on timing equipment and that the results are logged; where errors exceeding 2 seconds are found, the clock is to be zeroed. Further trials are underway, that also embrace Radar data recording devices, to assess degradation over an extended period. Results will help inform the purchase of future equipment.

STATUS – ACCEPTED - CLOSED

Airprox 74/03 on 9 Jun 03: involving a B757 and a Learjet 35 Risk C

RECOMMENDATIONS: That the CAA considers:

1. Providing an update on the review into terminology used by civil controllers when effecting avoiding action.

2. Advising if there are other factors, which may inhibit civil controllers from using the terminology 'avoiding action'.

CAA ACTION:

1. The CAA accepts this Recommendation. The CAA review into the phraseology used by civil controllers when effecting avoiding action is ongoing. A hazard analysis, using a 'Defence Standard' process, covering the current phraseology and two options for change, is also underway. Details of the actions arising from this exercise should be available by the end of March 2004.

2. The CAA accepts this Recommendation. The CAA understands that there are many factors that may inhibit certain controllers from using the terminology 'avoiding action'. The CAA has, for a number of years, actively campaigned to overcome any reluctance and, from the evidence available, this has

been successful. However, the phrase 'avoiding action' does continue to be omitted on occasions. Often, this is simply a case of forgetting in the heat of the moment but there are numerous other reasons. The use of the words 'avoiding action' does not dictate whether, or not, an MOR must be filed. This depends on the circumstances surrounding an incident and the cases when an MOR must be filed are described in CAP382, 'The Mandatory Occurrence Reporting Scheme', which also emphasises that the overall objective of occurrence reporting " ... is to use the reported information to improve the level of flight safety and not to attribute blame".

STATUS – 1. ACCEPTED - OPEN
2. ACCEPTED - CLOSED

Airprox 80/03 on 19 Jun 03: involving a B747- 300 and an Airbus A340- 300 Risk C

RECOMMENDATION: That the CAA considers the introduction of more effective and faster communication between controllers and pilots in the Shanwick Oceanic Area of responsibility.

CAA ACTION: The CAA continues to consider and, in conjunction with NATS, will encourage the introduction of a more effective and faster means of communication between controllers and pilots in the Shanwick Oceanic Area of responsibility. However, such steps must take account of our international obligations, which means that, in addition to taking into account technological advances and limitations, it is necessary to consider international agreements covering the whole ICAO North Atlantic Region. Consideration must also be given to existing arrangements between the UK and Republic of Ireland governments, whereby the Shanwick air traffic controllers are stationed in the UK and the communicators in the Republic. Trials using Datalink are being undertaken jointly by NATS and a number of international air carriers, as a necessary first step towards the phased introduction of Controller Pilot Data-Link Communications (CPDLC) into Oceanic airspace. However, even if these trials are successful, CPDLC is unlikely to completely replace the Shanwick air-ground communication system in the short to medium term.

STATUS – ACCEPTED - CLOSED

Airprox 81/03 on 15 Jun 03: involving a YAK52 and an Untraced light aircraft Risk B

RECOMMENDATION: That the CAA considers a review of arrangements to ensure that when 'Permission to Display' documentation is issued, this also results in a NOTAM being promulgated, where appropriate.

CAA ACTION: The CAA is processing this Recommendation.

STATUS – OPEN

GLOSSARY OF ABBREVIATIONS

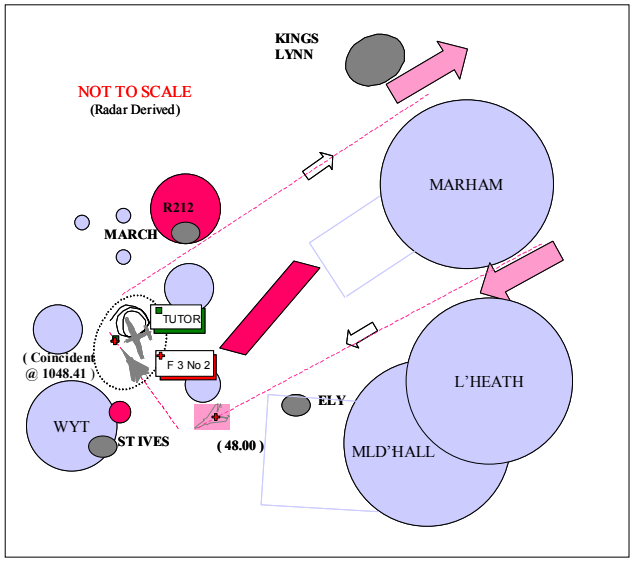
AAA	Airfield Avoidance Area
AAI	Angle of Approach Indicator
aal	Above aerodrome level
ac	Aircraft
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACN	Airspace Co-ordination Notice
ACR	Aerodrome Control Radar
A/D	Aerodrome
ADA	Advisory Area
ADC	Aerodrome Control(ler)
ADF	Automatic Direction Finding Equipment
ADNC	Air Defence Notification Centre
ADR	Advisory Route
AEF	Air Experience Flight
AEW	Airborne Early Warning
AFIS(O)	Aerodrome Flight Information Service (Officer)
agl	Above Ground Level
AGI	Air Ground Incident
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
amsl	Above mean sea level
ALFENS	Automated Low Flying Enquiry & Notification System
AOB	Angle of Bank
A/P	Autopilot
APP	Approach Control(ler)
ARA	Airspace Restricted Area
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
AWY	Airway
Bdry	Boundary
BGA	British Gliding Association
BHAB	British Helicopter Advisory Board
BHPA	British Hang Gliding and Paragliding Association
BINA ERS	British Isles/N America En Route Supplement
BMAA	British Microlight Aircraft Association
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
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
CPA	Closest Point Of Approach
CMATZ	Combined MATZ
CPA	Closest Point of Approach
C/S	Callsign
CTA	Control Area
CTR/CTZ	Control Zone
CWS	Collision Warning System
DAAvn	Director Army Aviation
DAT	Defence Air Traffic
D & D	Distress & Diversion Cell
DF	Direction Finding (Finder)
DFTI	Distance from Touchdown Indicator
DH	Decision Height
DI	Direction Indicator
DME	Distance Measuring Equipment
DFDR	Digital Flight Data Recorder
DUA	Dedicated User Area
EAT	Expected Approach Time
ERS	En Route Supplement
est	estimated
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
FW	Fixed Wing

GAT	General Air Traffic
GCA	Ground Controlled Approach
GCI	Ground Controlled Interception
GMC	Ground Movement Controller
GP	Glide Path
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
iaw	In accordance with
ICF	Initial Contact Frequency
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IICL	Intermittently In Cloud
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
JOI	Joint Operating Instruction
JSP	Joint Services Publication
KHz	Kilohertz
KLWD	In Cloud
kt	Knots
Km	Kilometres
L	Left
LACC	London Area Control Centre (Swanwick)
LARS	Lower Airspace Radar Service
LAS	Lower Airspace Service
LATCC(Mil)	London Air Traffic Control Centre (Military) (West Drayton)
LFA	Low Flying Area
LFBC	Low Flying Booking Cell
LFC	Low Flying Chart
LFS	Low Flying System
LHS	Left-hand side
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
MEDA	Military Emergency Diversion Airfield
MHz	Megahertz
MOD	Ministry of Defence
MRSA	Mandatory Radar Service Area (Military Area)
MSA	Minimum Safe Altitude
MSD	Minimum Separation Distance
MTA	Military Training Area
MTRA	Military Temporary Reserved Airspace
NATS	National Air Traffic Services
NDB	Non - Directional Beacon
nm	Nautical Mile(s)
NK	Not Known
NOTAM	Notice to Airmen
NR	Not Recorded
NVG	Night Vision Goggles
OAC	Oceanic Area Control
OACC	Oceanic Area Control Centre
OAT	Operational Air Traffic
ODL	Opposite Direction Level
OHD	Overhead
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
PIC	Pilot in Command
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
QSY	Frequency change
QTE	True bearing
RA	Resolution Advisory (TCAS)
RAF	Royal Air Force
RAS	Radar Advisory Service
RHS	Right Hand Side
RIS	Radar Information Service
RNAS	Royal Naval Air Station
ROC	Rate of Climb
ROD	Rate of Descent
RPS	Regional Pressure Setting
RSO	Range Safety Officer
RT	Radio Telephony
RTB	Return to base
RVSM	Reduced Vertical Separation Minimum
RW	Runway
RVR	Runway Visual Range
SAP	Simulated Attack Profile
SC	Sector Controller
ScATCC(Mil)	Scottish Air Traffic Control Centre (Military) (Prestwick)
SCH	Set Clearance Height

ScOACC	Scottish and Oceanic Area Control Centre
SOC	Sector Operations Centre
SID	Standard Instrument Departure
SIF	Selective Identification Feature
SMF	Separation Monitoring Function
SPS	Standard Pressure Setting (1013mb)
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)
TANS	Tactical Air Navigation System
TBC	Tactical Booking Cell
TC	Terminal Control
TCAS	Traffic Alert & Collision Avoidance System
TDA/TRA	Temporary Danger or Restricted Area
TFR	Terrain Following Radar
TMA	Terminal Control Area
TRUCE	Training in Unusual Circumstances and Emergencies
UAR	Upper Air Route
UDF	Ultra High Frequency Direction Finder
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)
USL	Underslung Load
U/T	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

AIRPROX REPORT NO 1/03

Date/Time:	16 Jan 1048	
Position:	5225N 0030W (5·2nm NE Wyton - elev 135 ft)	
Airspace:	UKLFS	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Grob Tutor	Tornado F3
Operator:	HQ PTC	HQ STC
Alt/FL:	500ft↑ (RPS 1021mb)	500ft (Rad Alt)
Weather	VMC	VMC
Visibility:	10km	20km
Reported Separation:	50ft V, 150ft H	30ft V, 100ft H
Recorded Separation:	Contacts Merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB TUTOR PILOT reports that he was flying a white ac with a blue stripe in civil markings with HISLs on SSR 7000C; TCAS was not fitted. He was conducting an Air Experience sortie from RAF Wyton in good VMC, in bright sunshine, late in the morning. While on the overshoot from a PFL at a location 030° from WYT at 5.2nm (*in the UKLFS*) on climbing away at 500ft AGL, heading 250° at 80kt he experienced severe buffet. He then sighted a Tornado F3 on a diverging heading at similar level. In his right at 2 o'clock at a range of 0·75nm he sighted 2 other Tornados in the same formation. The ac had passed overhead from his 7 o'clock (into sun) position.

THE TORNADO F3 PILOT reports that he was no 2 in a formation of 4 Tornado F3s conducting a low-level navex in the UKLFS as part of a short notice addition to their operational work-up. This was conducted in 10 miles trail at 500ft msd by day in preparation for flying the route at night on NVGs. The no 2 pilot was concentrating on looking for navigational features that would show up well at night as well as looking out. While heading 335° at 430kt he saw a Tutor at approximately 200m in his right quarter-light on a 90° aspect at about 500ft AGL. He assessed that the Tutor had been behind his G-meter for the few seconds before it bloomed. He pulled up and passed in front of the Tutor by approximately 100ft and 30ft above its flightpath. His navigator did not see the Tutor. They were receiving a FIS from Marham at the time *(IAW the requirements of the UK Mil AIP for ac transiting the Marham / Lakenheath gap)*. The Tutor's heading was approximately 90° to theirs and they would not have expected to see the Tutor on their radar (*Pulse Doppler*) in that regime. He opined that in these circumstances, and without a Collision Avoidance System, lookout and luck were the only factors preventing a collision. He accepted that his lookout was deficient at that moment.

THE TORNADO F3 UNIT comments that the Tutor is difficult to see, particularly when crew concentration is directed towards the ground rather than searching for other ac. Route study is an unusual activity for F3s and this must serve as a salutary lesson that we must not neglect the basics, whatever the mission.

MIL ATC OPS reports that the Tornado was part of a formation of 4 Tornados that were in contact with Marham Zone (Zone). The leader reported that the formation would be *"…conducting a low level route at 500 ft entering at Blakeney (Point) and we will be passing just S of the MATZ 500ft and returning from W to E just to the N of the MATZ also at 500ft".*

ZONE confirmed that he had *"copied the details"* and asked the ac to *"..report coasting in at Blakeney Point"*. The formation was flying in 10nm trail. ZONE passed the QFE as 1023 and instructed C/S 1 to *"…report … S abeam Marham … FIS not above 500ft* ". At 1048:43, C/S 2 reported:*".just had an air miss on the .. W side 5 miles N of St Ives with a Tutor"*. This was acknowledged by ZONE followed by C/S 2 advising C/S 4 to climb to 1000ft to avoid the confliction.

Analysis of the Debden Radar video recording shows the formation transiting to the S of Marham with the leader 10nm ahead of C/S 2. Leader turns to the NE of St Ives (2.5nm SE Wyton) while the Tutor is 4nm NE of Wyton. Leader passes just to the W of the Tutor indicating 1000ft below and departs to the NE without incident. At 1047:51 number 2 turns on to a NW heading 3nm NE of St Ives. On rollout the Tutor is still manoeuvring to the NE of Wyton (in the Tornado's 1230 position 5nm) and is now indicating 700ft descending. The 2 contacts merge at 1048:41. The no 3 and 4 Tornados follow a similar track after the incident with the formation departing the Marham frequency at 1100:18.

Under FIS a controller will issue a warning to a pilot when he *"……suspects, from whatever source, that a flight is in dangerous proximity to another ac".* The Marham Watchman radar was on maintenance at the time of the incident and the SSR is located at Honington, consequently the Tutor was not visible to ZONE. Similarly, the Tornados were only painting intermittently and, at the time of the incident were not showing at all on radar. The formation elected to remain with ZONE, having initially been instructed to *"...report going on route"* whilst still S of Marham, in anticipation of their return transit through the Northern gap. It is evident that, where information was available to ZONE, he endeavoured to advise the formation of possible conflictions, consequently it appears as though ZONE discharged his duties correctly in accordance with JSP 318A Para 235.125.

HQ STC comments that sighting the Tutor, as it climbed into the flight-path of the F3, would have been difficult given its small size and being 'camouflaged in white paint'. It is recommended that all light training ac used by the RAF be painted in a conspicuity colour scheme.

HQ PTC comments that this was without a doubt the closest of encounters. Whether the F3's pull-up materially affected the event must be arguable, at that sort of acquisition range. But the fact that the Tutor felt "severe buffet" must prove that this was very nearly a collision. No number of pious exhortations too "lookout" are any substitute for a CWS in such circumstances.

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 that there were no ATC aspects to this Airprox with Marham Zone having discharged their duties correctly.

As far as can be determined, the crews of both ac involved complied with all procedures correctly. Both were performing high workload tasks at the time of the Airprox and had probably allowed their routine lookout to lapse while devoting their attention to other aspects of their mission. During this lapse the ac closed to a proximity where an actual risk of collision existed.

While acknowledging that it may be desirable to improve the conspicuity of all military training ac, HQ PTC stated, that for technical reasons it was not possible to paint the Grob Tutor without weakening its structure, as it was constructed from GRP and paints were not compatible. High visibility adhesive markings have been tried, but were found to be ineffective.

PART C: ASSESSMENT OF CAUSE AND RISK

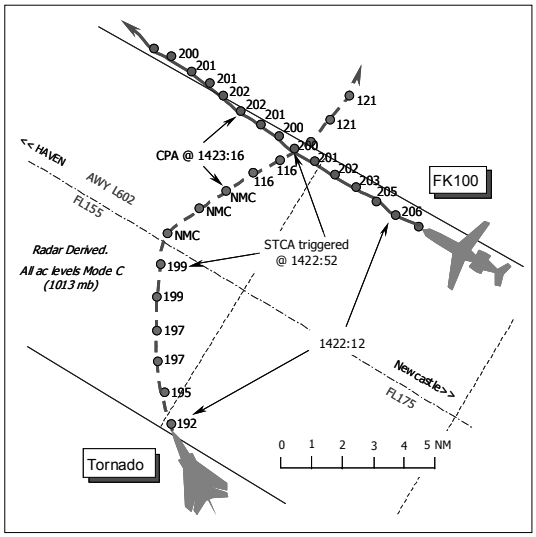
Cause: A non-sighting by the Grob pilot and an effective non-sighting by the Tornado crew.

Degree of Risk: A.

AIRPROX REPORT NO 2/03

Date/Time: 16 Jan 1423
Position: 5527N 0238W (11nm E of HAVEN)
Airspace: Airway L602 (Class: A)
Reporter: ScACC TALLA Sector

	First Aircraft	*Second Aircraft*
Type:	FK100	Tornado GR4
Operator:	CAT	HQ STC
Alt/FL:	FL200	NR
Weather	VMC CLAC	NK
Visibility:	50km	
Reported Separation:	NR	NR
Recorded Separation:	2·7nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ScACC TALLA SECTOR TACTICAL CONTROLLER (TAC) reports that the FK100 was being vectored on the N side of L602 toward HAVEN against two outbound ac on the S side, as co-ordinated with the TAY Sector. Unknown military traffic was observed within the lateral boundary of EGD510 – Spadeadam Range - operating at FL195. The unknown traffic turned onto a northerly heading toward the airway about 15nm SE of HAVEN climbing to FL200. This traffic conflicted with the FK100 at FL200 resulting in a TCAS climb being generated. Traffic information was passed and horizontal separation was eroded to 3nm.

THE FK100 PILOT reports that he was inbound to Edinburgh from Amsterdam, routeing L602 at FL200 under a RCS from Scottish CONTROL. About 30nm DME from NEWCASTLE, heading 300º at 300kt a TCAS TA was received, closely followed by a *"Climb"* RA. The autopilot was disconnected and the RA followed, but no visual contact was made with the conflicting ac. The pilot did not provide any estimate of separation or assess the risk.

THE TORNADO GR4 crew was detached to an operational theatre following this occurrence and was unable to comply with the normal reporting process. Neither member could recall any detail of the event that might assist in the investigation of this Airprox when they returned to their Unit.

ScACC ATCI reports that the FK100 crew first contacted the TALLA TAC at 1421:52, [passing FL210] in a descent to FL180 heading 300º under a RCS and requested if they could *"…keep high speed",* which was approved. At 1422:12, the GR4 - squawking A2611 [notified as assigned to Spadeadam and annotated as unverified Mode C] - crossed the southern boundary of L602 heading NW, indicating FL192 climbing. The base of the airway at this point is FL175 but steps down to FL155 just to the NW. At 1422:26, TAC provided other GAT [not the FK100] southeast bound on the southern edge of L602 with traffic information on the GR4, which was crossing R - L 3nm ahead climbing through FL196, whereupon the other airliner crew reported visual contact. At 1422:37, when at FL201, the subject FK100 crew was inadvertently instructed by TAC to stop *"climb"* at FL200. However, as the ac was descending, not climbing, the pilot replied that he would level at FL200. At this point the GR4 was 7nm SW indicating FL197 climbing. STCA was triggered at 1422:52, when the GR4 was 5½nm SW of the FK100 indicating FL199. This coincided with TAC instructing the FK100 crew to descend to FL160 and to expedite their descent. However, the crew responded, *"TCAS climb"*, which the controller acknowledged. The GR4 was now indicating

FL194 in a descent 5nm SW of the FK100, that was at FL200. At 1423:05, the FK100 crew was given traffic information on the Tornado and the pilot replied that he was *"out of the TCAS climb"* and could descend. After several radar sweeps without displaying Mode C, the GR4 indicated it was passing below FL117 in a descent.

TAC's workload was high with a number of flights receiving vectoring instructions. The FK100 crew was following vectors to remain on the N side of L602 to maintain separation from southeast bound GAT being vectored along the S side of the airway. EGD510 was notified as active up to 18,000ft and the GR4 had been operating in this area prior to the incident. A Memorandum of Understanding (ENC-10) exists between NATS and Spadeadam Range about sharing a portion of another airway but Spadeadam does not have an agreement to operate within L602. No prior co-ordination was carried out by Spadeadam in respect of this flight. TAC instructed the FK100 crew to 'stop climb' when the GR4 was 7½nm away on a converging heading, 15sec before the STCA triggered. The FK100 crew was however in the descent passing FL201, and the pilot acknowledged with *"…level off at 200"*. No traffic information was passed at this point. Options were limited as the FK100 crew was tracking along the northern boundary of L602. A R turn (away from the intruder) would have taken it outside Class A CAS into Class G. Whereas a L turn would have brought the civil and military targets closer together, and as the GR4's height readout was unverified, a level change could not guarantee separation.

When both ac were 6nm apart and converging with an indicated level difference of 100ft, TAC instructed the FK100 crew to expedite descent to FL160. His transmission began with an instruction to turn but this was quickly converted into a descent instruction. Coincident with this descent instruction, the radar recording indicates that the GR4 initiated a fast descent before Mode C readouts disappeared for several further sweeps. Radar shows that the FK100 ascended only 200ft during the RA manoeuvre above the level assigned by TAC, advising just before he did so that he was *"out of the TCAS climb"*, probably as a result of the GR4's steep descent. When the GR4 turned NE bound 4·3nm from the FK100 and without Mode C, the TALLA STRATEGIC controller cut in on the RT to pass traffic information, urgently stating *"*[C/S] *traffic now in your left hand side, 3 miles same level heading north".* No avoiding action phraseology was used by either controller at any point. The SMF was not triggered.

ATSI endorsed the ScACC ATCI report.

MIL ATC OPS reports that the Spadeadam RT transcript timings appear to be approximately 1min 47sec ahead of the radar timings (based on the first transmission of traffic information passed about the southeast bound GAT in the airway). Consequently, the timings herein have been correlated to that of the radar recording, which is accurate. The Tornado GR4 was handed over to the Spadeadam ZONE from London MILITARY to operate in a block FL150-FL200 and the ATS was confirmed as a RIS. Traffic information was passed on co-ordinated traffic climbing to FL140 and the established lower limit of FL150 reiterated to the GR4 crew. When this co-ordinated traffic cleared the area at about 1419:19, the Tornado crew was advised *"…you're now clear of that traffic, if you maintain northerly track you're clear to manoeuvre as required"*. Later the lower restriction was rescinded and the crew advised they could operate *"…low level if you wish"*. At about 1421:01, the GR4 crew was advised *"…loss of radar contact"* and the service downgraded to a *"…FIS only".* However at about 1422:21, civilian traffic [not the FK100] was called to the GR4 crew*"…left 11 o'clock range 5 miles on the airway indicating FL205 climbing"* that was acknowledged. Just after completing a landline call from LATCC (Mil), ZONE transmitted at 1422:58, *"…immediate descent the base of the airway is 155"*. This call was acknowledged by the GR4 crew and immediately followed, at 1423:09, with *"*[C/S] *avoiding action descend there's traffic in your right one o'clock on the airway range 4 miles indicating FL200"* – the FK100 - to which the crew reported *"…visual, descending"*.

UKAB Note (1): Analysis of the Great Dun Fell radar video recording shows the Tornado flying parallel to the southern boundary of L602 with no Mode C (NMC) shown from 1421:00 until 1421:41, when FL140 is briefly indicated (probably as the GR4 bottomed-out after a rapid descent). At 1422:12, the GR4 is shown crossing the southern boundary of L602 into Class A airspace, tracking NW, indicating FL192 in the climb, with the FK100 shown on the opposite side

of the airway passing through FL206 in descent. At this point there is civil traffic at L - 10 o'clock 7½nm tracking SE indicating FL204 – the GAT first reported by ZONE. The Tornado continued to climb slowly on the northwesterly heading and at 1422:21, has GAT at L 10 o'clock - 5nm and further civil traffic R 2 o'clock - 9nm – the FK100. The GR4 steadies on a northerly heading at 1422:35, indicating FL197 in a slow climb. At 1422:52, the Tornado's Mode C indicates FL199 with the FK100 R 2 o'clock - 5nm now level at FL200. The GR4's Mode C 'drops out' on the next sweep and at 1423:08, the jet turns hard R to pass astern of the FK100 that is 3½nm NE climbing through FL201, probably in response to the TCAS RA reported. The Tornado steadies NE at 1423:16, and the FK100 reaches FL202 the maximum attained during the RA, before the GR4's Mode C reappears indicating FL116 about 10sec later. At 1423:41, the Tornado clears N of the northern boundary of L602 indicating FL113. At the CPA the minimum horizontal separation at 1423:16, was 2·7nm as the jet passes S of and behind the FK100. At this point there was probably more than 1000ft vertical separation, though the lack of a continuous Mode C readout prevents the actual distance from being determined.

The ZONE controller reports that both primary and secondary radar returns from the GR4 disappeared from his display, therefore, he downgraded the service to a FIS. Adjusting the RT timings to coincide with the radar this exchange took place at 1421:01, when the Tornado was outside CAS. ZONE added that shortly afterwards he saw a secondary radar return from the Tornado about 1nm outside CAS with the ac appearing to parallel the airway on a northwesterly track. At this point he passed traffic information about GAT on L602 tracking SE - at about 1422:21. Correlating this with the radar recording, places the Tornado just inside the lateral limits of the airway. However, the Tornado was displayed for no more than 2 sweeps and then disappeared, only to reappear again about 5nm from the last sighting now inside CAS. ZONE's subsequent actions imply that on the first occasion at 1422:21, no Mode C information was displayed by the GR4 to indicate it was inside CAS and on the second, Mode C was shown, especially as prompt avoiding action to descend out of the airway was given. Whereupon ZONE then spotted the FK100 to the NE of the GR4 at a similar level, whence he re-emphasised the avoiding action and passed traffic information.

Spadeadam reports that normally 2 primary and secondary radars are available; one each at Berry Hill (situated on RAF Spadeadam) and also 12nm to the north at Deadwater Fell, but the latter were out of service. The Unit reports that ac under their control routinely perform high-energy manoeuvres to evade the [electronic] threats presented against them by equipment at Spadeadam. Therefore, it is normal for Mode C to become intermittent when rapid rates of climb/ descent are initiated. The Unit goes on to say that controllers will pass warnings of the proximity of CAS if the ac is heading towards it. On this occasion an indirect warning of the proximity of CAS was passed during the traffic information given at 1422:21, about the southeast bound airliner. Given the intermittent nature of the primary and SSR data displayed to the controller and the ATS the GR4 crew was receiving, ZONE did all that he could to avert a conflict.

HQ STC comments that the Tornado crew was flying a high-workload training sortie in preparation for forthcoming operations. This training is conducted in VMC and thus allowed the GR4 pilot to 'see and avoid' the FK100, albeit after the jet had entered the airway without clearance. The nature of the medium-level sortie (which is not practised routinely), possibly high levels of intra-cockpit chat and aural warnings from the ac's radar warning receiver, most probably sapped the crew's capacity. Though this is supposition in the absence of a report from the crew, the indications of distraction in the cockpit and falling capacity are apparent, however, the need to remain clear of L602 still remained an overriding consideration.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the FK100 pilot, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Exceptionally, the Board assessed this report in the absence of an input from the GR4 crew and it was recognised that information on one aspect of this encounter was missing. However, members

agreed that there was sufficient recorded RT and radar data available, coupled with the comprehensive reports that had been provided, on which to base an opinion of the cause and risk inherent in this encounter.

It appeared to the Board that the GR4 crew had been working at the limit of their capacity in this tense training environment and members agreed with the STC view that this had prevented the GR4 crew from paying more attention to the proximity of the airway. The provision of a RIS from Spadeadam may have lulled them into a false sense of security (thinking that the ATSU would provide a heads-up if they got too close to the boundary of L602), but the nature of their sortie and the high energy manoeuvres flown, denied the controller the benefit of Mode C data at the critical moment. When they were told that ZONE had lost radar contact with them, the GR4 crew should have taken this into account in their general airmanship and ensured that they remained well clear of CAS. The Board concluded unanimously that this Airprox was caused by the Tornado GR4 crew, who made an unauthorised penetration of Class A CAS.

Turning to risk, it was evident that the rapid climb of the jet had confounded the Spadeadam SSR Mode C until the jet had crossed the southern boundary of L602, hence the change of ATS to a FIS. Nonetheless, as soon as he had spotted that the jet was inside CAS, ZONE had promptly provided a warning to the crew firstly about the other airliner in the vicinity, then the airway and ultimately about the FK100. This enabled the GR4 crew to acquire the FK100 – according to the RT transcript - turn away from it and descend very rapidly out of CAS. Thus horizontal separation was not eroded below 2·7nm. From the FK100 crew's perspective they received traffic information, which, although it did not enable them to sight the jet, was important nonetheless. By the time the STCA was triggered resolution of the conflict was already being effected. The very brief FK100 TCAS RA played its part too, however, it was clear that the crew's excursion above their assigned level was much reduced as a result of the jet's very rapid descent. In the Board's view, all these factors entirely removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class A CAS by the Tornado GR4 crew.

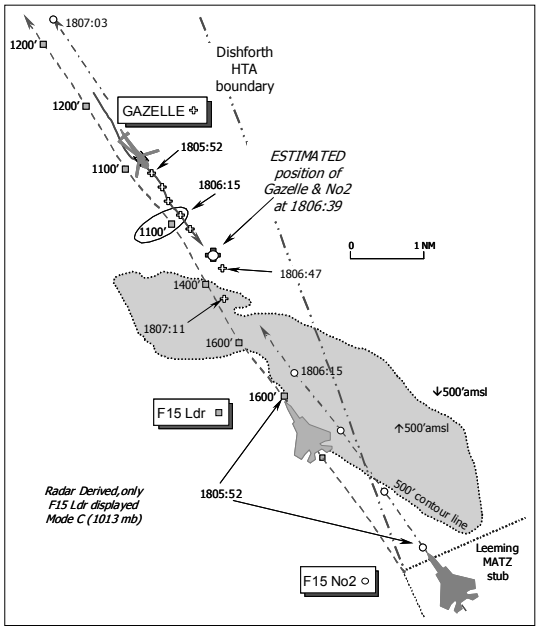
Degree of Risk: C.

AIRPROX REPORT NO 3/03

Date/Time:	16 Jan 1806	Night
Position:	5430N 0146W (12nm W of Teesside)	
Airspace:	UKNLFS	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Gazelle AH1	F15E pair
Operator:	HQ JHC	Foreign Mil
Alt/FL:	220ft (agl)	1000ft (agl)
Weather	VMC CLOC	VMC Haze
Visibility:	10km+(44mlux)	Unrestricted

Reported Separation:
75ft V/300m H Not seen

Recorded Separation:
v F15 Ldr - 330m
v F15 No2 - NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GAZELLE PILOT reports that the navigation lights were burning on steady bright and the upper anti-collision beacon was on, whilst conducting a dual NVG sortie at night, within the Dishforth Helicopter Training Area (HTA). A squawk of A7000 was selected, but Mode C is not fitted. They were 'listening out' on the LFS UHF frequency of 300·8MHz and also the Teesside VHF frequency of 118·85MHz, but were not in receipt of an ATS.

Flying at 220ft agl, approaching a turning point [about 12nm W of Teesside] at 100kt, some lights were acquired of what appeared to be a fast moving ac at 12 o'clock about 500m away, heading towards his helicopter and crossing obliquely from L – R, he thought. There was no time to react due to its speed and this ac – the No1 - passed down their starboard side about 300m away, some 75ft above his helicopter on a steady course throughout. It was readily apparent that it was a military ac as they could see clearly through NVG the configuration of cockpit and intakes of an F15 jet. He and his co-pilot immediately started to look for another ac on a similar track that could be in formation with the first. Looking in the likely direction that a wingman might approach from, the horizon was "littered" with lights, none of which appeared to be ac lights or strobes; there were no lights above the horizon. Within 2-4sec of the first jet passing they spotted a set of lights that might possibly be a second ac, but these were not "strobing", they were on the horizon and blended in with the background lights remaining at the same height to his helicopter and at the same aspect as they strengthened in intensity and separated horizontally. He very quickly descended below their authorised minima to avoid what rapidly became apparent was a second F15, which passed about 100ft above his helicopter. From initial realisation that it was a second jet, to the ac passing directly overhead was about 2-4sec - it first appeared as a single light and then became four separate lights (2 on the leading edge of each wing) with 2 lights passing either side of his helicopter overhead. Similarly, this second jet did not alter its course at all. No HISLs were observed on either F15.

He added that the lead F15 flew too close - but safely passed his helicopter and no collision would have occurred. The second jet would definitely have collided with his Gazelle if he had not taken avoiding action. He was unable to communicate with these pilots on the LFS frequency - an Airprox message was broadcast on

the same frequency – but he was unable to establish 2-way communications with Teesside because of their height. He reported the Airprox by telephone on returning to Dishforth.

THE F15E PILOT reports, nearly two months after the event, that he was leading a flight of two F15E ac on a night low-level sortie in 2nm trail formation whilst executing a cloud break. He was in receipt of a RIS from Leeming, he thought, and the allocated squawk was selected with Mode C.

The ac camouflage scheme is light grey, but the position lights and red anti-collision beacons were on whilst flying at 1000ft agl, heading 330° at 450 kt some 1500ft below cloud; the visibility was "unrestricted". The Gazelle helicopter flown by the reporting pilot was not seen at all.

UKAB Note (1): The F-15 does not have HISLs. Seen from ahead, in addition to red/green navigation lights at the wing tips, a red light is positioned on the leading edge of each wing at the wing shoulders fairly close to the fuselage. Under the centre of the fuselage, roughly in line with the lower edges of the intakes, there is a red rotating beacon - but not as bright as a HISL. Each fin has a rearwards facing white light at its tip; these would probably not be visible to the naked eye from an ac within 10-20º either side of the nose, but might be through NVGs.

MIL ATC OPS reports that as the F15 pilot's report was not received by this HQ until 10 Mar 03, [the day it was signaled by AIS (Mil)]. Consequently the Leeming RT recordings were not impounded and are not available. SATCO Leeming has interviewed personnel who were on watch but, unsurprisingly, none can recollect the incident.

The applicable fps for this flight reveals that the F15s were in receipt of a RIS, however, the flight appears to have left the Leeming frequency at 1758. Though the radar recording shows the F15s on a Leeming assigned and verified squawk, it is not unusual for pilots to leave a frequency but still retain that unit's squawk, even if told otherwise. Furthermore, the reported position and altitude of the Gazelle suggest that a radar return would not have been visible to the Leeming controller. We conclude, therefore, that there are no contributory Military ATC factors to this Airprox.

HQ JHC comments that the Dishforth HTA is activated to provide separation between rotary and fixed wing ac at night. It would appear from the position reported by the Gazelle pilot, that this Airprox occurred within the Dishforth HTA; the procedures are there to ensure safe separation and in this instance it appears that a collision might have occurred were it not for the prompt actions of the Gazelle crew. This, however, added a further flight safety concern – by descending below authorized minima, the Gazelle risked impact with the ground or an obstacle; however, this risk was appropriate given the potential threat of a mid-air collision.

UKAB Note (2): The Great Dun Fell radar recording does not illustrate this Airprox clearly, though the sequence of events is broadly as described by the Gazelle pilot. At 1805:52, the Gazelle is shown tracking steadily SE (without Mode C) as the F15 pair approached the vicinity from the SE through the Leeming MATZ. Only the lead F15 displayed A0410 (a verified code allocated to Leeming) with Mode C; the No2 is shown as a primary contact only. The F15 leader crossed the area of the 500ft contour at 1600ft Mode C (1013mb), which given a Teesside actual QNH (the closest available at the time) of 1016mb equates to an altitude of about 1690ft - some 1190 ft agl. The lead F15 descended to 1100ft (1013mb) - about 1190ft QNH - at a height of about 940ft agl where the ground elevation is 250ft and passed 0·18nm (330m) directly abeam the Gazelle 'starboard to starboard' at 1806:15, in the position reported, which lies within the lateral confines of the Dishforth HTA. The lead F15 maintained its course and cleared to the NW. Meanwhile, the No2 F15 is shown 2·63nm in trail and on a constant bearing dead ahead of the helicopter on a reciprocal heading, but radar contact is then lost and the No2 is not shown again until 1807:03. Radar contact on the helicopter is also lost for two sweeps before it is shown directly on the F15's projected track at 1806:47, after the Airprox had occurred. Projection of the No2's course at an equivalent speed between the radar returns, suggests that the tracks merged and the No2 F15 overflew the Gazelle at about 1806:39. However, the absence of recorded radar data prohibits confirmation of the minimum separation at that point. It is not feasible to ascertain whether the No2 descended below 1000ft agl, thereby penetrating the vertical limit of the HTA.

UKAB Note (3): The UK Mil AIP Vol III entry applicable to the Dishforth HTA states: *"….the Dishforth HTA is activated for RW use on Tue, Wed and Thu nights only* [this Airprox occurred on a Thursday]. *The area has been established to facilitate intensive helicopter ops, which can be expected within this area up to 750ftMSD. Therefore, FW ac are to overfly the area above 1000ft MSD."*

The Co-ordinates of the DISHFORTH HTA are N54 09 W001 30 to N54 18 W002 00 to N54 34 W002 29 to N54 40 W002 19 to N54 42 W002 12 to N54 39 W001 51 to N54 26 W001 42 to N54 21 W001 39 anti-clockwise around Leeming/ Topcliffe/Dishforth MATZ to origin.

UKAB Note (4): An analysis of the night low-flying bookings was conducted by HQ STC Ops LF staff for this Airprox investigation. It was concluded that Dishforth had correctly activated the HTA and the F15 flight had correctly booked into LFS night sector 4A, which surrounds this part of the HTA.

HQ 3AF comments that the F-15 leader and his No2 were flying at 1000ft Rad Alt and, in the case of the leader, radar recordings largely substantiate the claim. Although the Gazelle pilot estimated that the lead F-15 passed 75ft above and to starboard of him, the radar recording indicates that vertical separation of 700ft was nearer the mark. It seems probable that the second F-15, which was formating on the lead ac, overflew the Gazelle by a similar margin; indeed, had the margin been only 100ft, as estimated, the noise and turbulence created by the passage of an F-15 at 450kt would have been considerable. The formation leader was aware that the Dishforth HTA was active, had it not been he would have been flying at 500ft agl.

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 ATC and operating authorities.

The HQ DAAvn pilot member explained that the Gazelle crew's perception of the event – in terms of the minimum vertical separation that pertained – had evidently been distorted by the NVG in use at the time. Though the reporting Gazelle pilot had suggested that the jets passed 75ft above his helicopter, the radar recording confirmed this was not the case with the lead F15 and that the NVG had deceived him. The radar showed the lead F15 passed the helicopter at 1100ft Mode C (1013mb) – at least 940ft agl where the ground elevation is 250ft in the vicinity of the Airprox location. Given that the F15 pilots were flying by reference to their Rad Alt at 1000ft, pilot members agreed that when set to fly automatically at this height, any deviation by the F15E would be minimal. Though this could not be independently compared to the height of the Gazelle that was not fitted with Mode C, comparison with its pilot's reported transit height of 220ft agl suggested that vertical separation in the order of 720ft had existed, significantly higher than the helicopter pilot thought. However, it was not possible to determine the height of the No2 F15E at all. Members speculated that the No2 should have been following his lead and would have no reason to fly lower – again with the benefit of the ac's 'automatics' – than 1000ft agl and whilst this could not be ruled out it would have been extremely unlikely. The HQ3AF advisor reinforced this point and stressed that the F15 crews were aware of the activation of the HTA and had no reason to fly below 1000ft agl. The HQ STC pilot member explained that night flying with NVGs is very difficult and demands rigorous training and continual practice. One of the disadvantages is that all depth perception is lost and extraneous lights can cause confusing visual illusions that can easily deceive. Although such illusions are explained during training a mistaken impression of this nature was entirely feasible and understandable. The Gazelle crew were the only witnesses to the event as the F15 pilots had not seen the helicopter at all, nevertheless, members realised that an F15's wake turbulence/jet blast a mere 75ft above a Gazelle would have had a dramatic effect on the helicopter and no such disturbance had been reported. Thus with no information to the contrary, this led the Board to conclude that this Airprox had resulted because the NVGs had given the Gazelle crew a mistaken impression of the vertical separation at the time and, consequently, there was no risk of a collision in the circumstances reported here.

It was pointed out by the HQ DAAvn member that rotary wing night flying activity in this vicinity is likely to increase significantly with the arrival of

Apache ac at Dishforth. With this in mind, the HQ STC member voiced concern over the established vertical separation between fixed wing ac flying above the HTA - above 1000ft msd - and rotary wing ac - below 750ft msd - within the HTA. In his view the nominal 'buffer' of 250ft was insufficient and he elected to review this in concert with HQ STC Ops LF staff outwith the meeting.

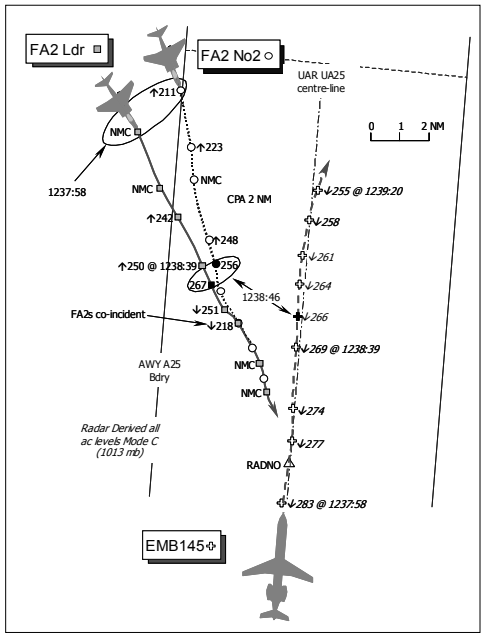
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A mistaken impression of the vertical separation by the Gazelle crew, whilst using NVG.

Degree of Risk: C.

AIRPROX REPORT NO 4/03

Date/Time:	15 Jan 1238	
Position:	5220N 0314W (6nm N of RADNO)	
Airspace:	UAR-UA25	(Class: B)
	Reporting Aircraft	*Reported Aircraft*
Type:	EMB 145	SHAR FA2 x2
Operator:	CAT	HQ STC
Alt/FL:	FL280↓	25000ft
Weather	VMC	VMC
Visibility:	NR	>10km
Reported Separation:		
	2nm	Not seen
Recorded Separation:		
	2·84nm H/100ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB 145 PILOT reports he was inbound to Leeds/Bradford, northbound on UA25 at 300kt. He was in receipt of a RCS from London CONTROL, who had cleared them to descend from FL320 to FL200. They were passing about FL280 when the controller instructed them to stop descent at FL250 because of unidentified military traffic. Almost simultaneously they received a TA and TCAS showed 2 targets, one of which was at 11 o'clock 3-4 miles 5000ft below his ac, but the 2 targets quickly merged together making the relative altitude indications unreadable. The controller advised that he was unaware of the other ac's intentions, to alert them, it seemed to the possibility of conflict, but it was only a matter of 20-30 sec after the initial warning that the controller instructed them to turn 50º R onto a heading of 040º for avoiding action. He then spotted 2 Harriers that he estimated were less than 2nm away at the same level that rolled and initiated a rapid descent. Soon afterwards the controller advised that contact had been made with them through another radar unit and they were then cleared to continue on their filed route.

He assessed the risk as *"medium"* and added that as there was 5000ft separation when they received the initial TCAS TA he estimated that the Harriers RoC was in excess of 5000 ft/min. Thus, he believed, this conflict could not have been resolved by a TCAS climb RA.

THE SEA HARRIER FA2 (SHAR) PILOT reports he was leading a pair of light grey camouflaged

FA2s in fighting wing/loose echelon port, returning to Yeovilton on completion of a low-level fighter affiliation sortie. Neither HISLs nor TCAS are fitted. Heading 160° at 400kt, his No2 advised that he had fuel indication problems so they expedited the climb and he elected to chop from the exercise AWACS frequency to the LATCC (Mil) ICF as he believed that it would facilitate a faster climb and recovery. Once they had checked in on the frequency he followed all the instructions issued by London MILITARY and he advised the controller that he required a fuel priority climb to FL300 and direct track to base. The recovery was carried out without further incident and neither he nor his No2 saw another ac – either visually or on AI radar - at any time. He did not assess the risk.

THE LACC SECTOR 5/8 TACTICAL CONTROLLER (TAC) reports that the EMB145 was northbound on UA25 and descent clearance to FL200 was given in accordance with the standing agreement with MACC when N of BRECON (BCN). As the ac descended through FL280, 2 unidentified ac were observed on radar just entering CAS heading about 140º in a rapid climb on a conflicting course. Traffic information was given to the EMB145 crew who reported the ac were showing on TCAS. The unknown military jets maintained their course and continued to climb, so avoiding action was given to the EMB145 crew to turn R onto 040º. The military ac passed astern of the EMB145, which was subsequently transferred to MACC.

THE LACC SECTOR 5/8 PLANNER CONTROLLER reports that he saw two military ac heading toward RADNO climbing and confirmed that TAC was aware of them. He continued to monitor the situation, advised TAC of the intruder's levels when avoiding action was given and informed the Local Area Supervisor of the occurrence.

LACC reports that the Airprox occurred N of RADNO on UA25 in Class B airspace. The EMB145 crew had started their descent, as cleared, to FL200 some 14nm N of BCN. As the ac passed FL280, TAC noticed two background contacts W of A25 squawking A1301/2 - the FA2s - climbing rapidly on a conflicting south-easterly track. These ac were unknown to the sector controllers, but as a precaution TAC elected to stop the EMB145's descent at FL250 at 1238:10. Shortly afterwards TAC issued traffic information to the crew *"…got some unidentified military traffic just in your 10 o'clock this time he's indicating FL240…"*, to which they responded at 1238:30, *"yeah that's…on our TCAS it might give us an RA shortly".* The unknown ac were still climbing rapidly and exceeded the cleared level of the EMB145, so TAC advised *"…he's indicating 253 in the climb"* before he was forced to issue an avoiding action R turn onto 040º at 1238:40, which was acknowledged by the crew. TAC then advised that the *"traffics in your 9 o'clock indicating FL264"*, whereupon the crew advised at 1238:50, *"…yeah they're in sight…looks like military traffic…2 fast jets".*

During the incident TAC had 'hooked' the Track Data Block (TDB) of the leading FA2, which produced a solid black TDB, thereby obliterating the level information on the second jet and obscuring the TDB of the EMB145. The PLANNER saw the developing situation and used his display to provide TAC with verbal level information on both of the military ac. The A1301/2 squawks were seen to change to A3311 and descended almost as quickly as they had climbed, before the EMB145 crew was instructed at 1239:00, that the en route descent could be continued and to turn back onto N. STCA had been activated, but TAC had already responded and tried to preserve separation; SMF was not triggered as the specific parameters were only breached for one radar sweep.

ATSI endorsed the LACC report.

MIL ATC OPS reports that just before 1238, the LATCC (Mil) ALLOCATOR (West) advised the Tactical SUPERVISOR (West) via intercom, that an incident was occurring *"one three zero two and zero one squawk just infringing controlled airspace"*. At 1238:21, the 2 SHAR FA2 pilots (SHAR), 'checked-in' on a free-call to the ICF. Immediately at 1238:36, ALLOCATOR transmitted *"…avoiding action traffic believed to be you has traffic right 1 o'clock - descend FL 100 - expedite descent traffic now left 11 o'clock 3 miles crossing right left indicating FL270"*. The lead SHAR pilot promptly reported *"…in descent to one hundred"*. Thereafter the FA2 pair was identified and a transit level for Yeovilton determined.

The regulation extant within JSP 318A [now superseded by MARDS] details the methods available to pilots of military ac who require to cross airways/UARs. This states that *"…the initial call for service requesting radar control through the airway is to be made to the appropriate ATCRU at least 5 minutes before entry".* This obviously did not occur on this occasion and, because of this, the controller could not comply with the basic procedures for the provision of a RCS, nor could standard separation be achieved against the EMB145. The ALLOCATOR should, nevertheless, be commended for his situational awareness and prompt response to the difficult scenario that confronted him at very short notice.

UKAB Note (1): Because of the heading and disposition of the FA2 pair, the Burrington Radar recording shows that the No2, squawking A1302, first entered CAS as the ac crossed the western boundary of airway A25 at 1237:58, climbing through FL211 Mode C. The No2 is to port of the leader at 8 o'clock - 2nm as the pair converge on a gentle closing heading. The lead ac did not enter Class A airspace until 1238:25, indicating FL242, with his wingman still at 8 o'clock after closing to 1nm, but no Mode C (NMC) is evident. At that stage the EMB145 is in the No2's 12 o'clock - 9nm descending through FL274. At 1238:39, just after avoiding action was transmitted independently by both the ALLOCATOR and TAC, the lead and No2 had closed to within 1nm of each other, indicating FL250 & FL248 respectively, with the airliner in the lead FA2's L 10 o'clock - 6½nm, descending through FL269. At 1238:46, the horizontal separation between the EMB145 and lead FA2 was 3·04nm as the fighter ascended through the level of the airliner to FL267 - 100ft above the EMB145 shown descending through FL266 - with the No2 at FL256. Minimum horizontal separation of 2·84nm occurred at 1238:55, but by then the leader had commenced a descent through FL251, just as the pair was 'close aboard' some 1300ft below the level of the EMB145, passing FL264. A rapid descent by the jets is evident as the lead FA2 is shown at FL218 on the next sweep, 4300ft below the airliner, with the No2 now trailing again. However, NMC is evident from the pair thereafter as they pass astern of the airliner. The avoiding action R turn issued by TAC to the EMB145 crew is not readily apparent on the radar recording for some 30 sec, until the ac is shown passing FL258 at 1239:12.

THE SEA HARRIER FA2 PILOT'S UNIT comments that the FA2 pair had just completed a "bounce" and were commencing a re-join and climb out from low level, when the No2 FA2 reported his fuel was indicating below the pre-briefed minima for their return to base. This immediately concerned the leader who believed his No2 should have significantly more fuel than indicated, leading him to believe that the No2 ac might have a possible fuel leak. His priority was to climb expeditiously to their ac's optimum cruise level - FL300 - and head for Yeovilton. As the leader was working two frequencies - the GR4s/ No2 on one box and the AWACS on the other, his workload and frequency loading were high, in particular with his No2 (a junior pilot who had just joined from the training squadron) who gave a running commentary on his fluctuating fuel indications. With the busy RT scenario and realising from his navigational equipment that they were approaching A25, the FA2 leader elected to free-call London MILITARY, whereupon the FA2 pilots immediately received avoiding action. They complied instantly, rolling and descending at the maximum rate attainable, but neither pilot saw the other ac.

It is fair to assume that the FA2 leader misinterpreted the information displayed to him on his navigational equipment and thereby miscalculated the distance to run to CAS. Thus he free-called LATCC (Mil) too late and inadvertently penetrated A25 before he was established under a RCS. Both FA2 pilots were flying in VMC throughout, with AI radars selected "on". However, in their urgency to climb, both might have left their AI radars in 'scan down' mode, hence the conflicting EMB145 would not necessarily have been detected.

Squadron personnel have been re-briefed on the necessity of calling the appropriate ATCRU in good time if they require to penetrate CAS. Moreover, if they are in doubt regarding a potential emergency, they are to squawk emergency 3/A 7700, thereby ensuring that controllers are aware of their predicament.

HQ STC comments that this Command is concerned at the less than fulsome information provided by the FA2 pilot. Full, open and honest reports are required from all personnel involved in aviation if safety lessons are to be learnt for the benefit of the community as a whole. Omitting to

recount the avoiding action he was given and the rapid descent required, is not in the spirit of aviation safety. In this Airprox the FA2 leader did not prioritise his actions appropriately and thus did not negotiate entry into CAS in a timely manner (entering A25 and subsequently climbing through FL245 into Class B airspace). If his wingman's fuel problem was serious, then the leader should have been considering a diversion and not simply a RTB.

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 military fast-jet pilot members concurred with the Command's view that the No2 FA2's reported fuel indication problems were a serious matter and an immediate diversion to the nearest suitable aerodrome would have been entirely appropriate and better airmanship. As it was, the leader elected to carry on and expedite a climb having been told that his No2 did not have the pre-briefed fuel to return to base. In his haste he apparently misread the ac's navigational equipment such that the formation entered Class A CAS before contacting LATCC (Mil). The Board agreed that the outcome was indicative of a hasty decision, promoted by the pressure of the situation and the desire 'to get home' all of which led to actions that were not prioritised appropriately. This and the rapid descent that followed probably prevented adept use of the AI radar - the only form of CWS available; though the FA2 pilots had not seen the airliner at all, their heading was set to pass astern of the EMB145.

The Board agreed that the FA2 pilot's Unit had correctly identified two important lessons for all aircrew within this occurrence and worth amplifying here. Firstly, that earlier contact with an ATCRU – in this case LATCC (Mil) - would invariably result in suitable assistance being made available to penetrate CAS in a more orderly manner. Nevertheless, in view of the alleged fuel difficulties encountered by his wingman, some members wondered whether in this situation it would have been more appropriate for the leader to call Distress & Diversion Section (D&D) on GUARD rather than the ALLOCATOR on the ICF. The D&D Section emergency controller's sole function is to assist aircrew – military and civilian alike - in the safe resolution of emergency incidents and diversion scenarios. Pilots should not hesitate to call on GUARD (243·00 or 121·5MHz as appropriate) in situations such as that related here by the FA2 lead pilot. In addition to radar, UDF and several other aids are uniquely available to assist the D&D controller on the dedicated frequency, whereas the LATCC (Mil) ICF can be a very busy frequency with lots of free-calls. Undoubtedly, the alert ALLOCATOR who had demonstrated good awareness, astutely deduced what was happening and immediately issued avoiding action as soon as the FA2 leader called. The Board commended the controller for his immediate grasp of the situation and the adept application of an avoiding action descent (though some thought that a descent down to FL100 was excessive). It achieved the aim and galvanised the FA2 leader into instant action and a very rapid descent, which quickly resolved the immediate problem.

Turning to the FA2 Unit's second point, in situations such as these the Board strongly endorsed the immediate selection of 3/A 7700. In this way the aircrew's predicament could have been instantly broadcast and displayed to all radar controllers who had SSR available to them and were controlling ac in the vicinity. Moreover, it would have aided early location of the emergency ac and facilitated priority handling by D&D, thus enabling expeditious resolution of the situation – in the Board's view crews should not hesitate to use the promulgated emergency transponder selections if appropriate.

Taking all this into account the Board concluded unanimously that this avoidable Airprox had resulted because the FA2 formation leader had led his formation into CAS without clearance and thereby into conflict with the EMB145, which he did not see.

It was evident that the LACC 5/8 TAC, assisted by his PLANNER had seen what was happening simultaneously and tried to turn the EMB145 away from the jets as they climbed rapidly toward the airliner. It was unclear why the airliner had not responded expeditiously to the avoiding action issued by TAC, as the ac's R turn was wide and

not readily apparent on radar until after the FA2 pair was passing well astern of the airliner. Possibly the EMB145 crew had sighted both of the FA2s at that juncture and saw that they would pass behind. Nevertheless, the Board understood the concerns expressed by the reporting pilot that if a climb RA had been generated (which was not the case here) the EMB145's maximum ROC attainable could not have resolved the conflict. As it was, another safety net – the avoiding action issued by the ALLOCATOR - had come into play and for one reason or another horizontal separation was not eroded less than 2·84nm. Consequently, the members agreed unanimously that no risk of a collision had existed in these circumstances.

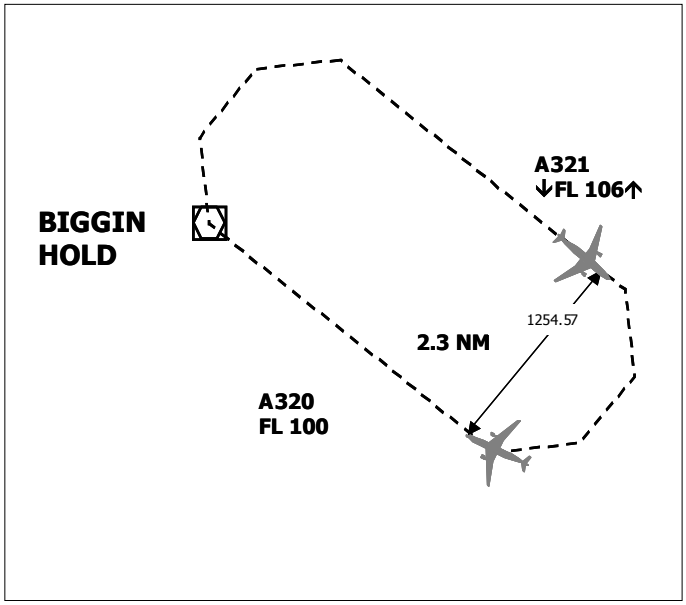
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FA2 formation leader led the formation into controlled airspace without clearance and into conflict with the EMB145, which he did not see.

Degree of Risk: C.

AIRPROX REPORT NO 5/03

Date/Time:	19 Jan 1256 (Sunday)	
Position:	5135N 0010E (Biggin Hold)	
Airspace:	Lon TCA	(Class: A)
	Reporting Aircraft	*Reporting Aircraft*
Type:	A320	A321
Operator:	CAT	CAT
Alt/FL:	FL100	↓FL106
Weather	VMC	VMC
Visibility:	>20k	20k
Reported Separation:	500ft V, 1.5nm H	800ft V, 2nm H
Recorded Separation:	600ft V 2.3nm H	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports heading 220° at 215kt in the Biggin Hold at his cleared level of FL100 when the A321 came on Heathrow Director frequency of 134.97 at FL110 and was cleared also to descend to FL100. TCAS indicated an ac descending close behind him. ATC were informed and a climb instruction was issued to the A321. He reported the minimum separation as being 1.5nm and >500ft.

THE A321 PILOT reports heading as required by the hold at 220kt when separation was lost in the Biggin Hold. Vertical separation reduced to 800ft and he reported the conflict to ATC. He confirmed his position with ATC and returned to FL110. No TCAS warning was triggered and the A320 was clearly visible throughout the incident.

THE HEATHROW INTERMEDIATE DIRECTOR SOUTH (Mentor) reports that he was monitoring a controller under training (u/t) on INT DIR S. The A320 was established in the Biggin Hold at FL100. The controller instructed the A321, when it reported on frequency at FL110, to continue holding and descend to FL100. The monitoring controller immediately told the controller u/t that this was incorrect and in the same transmission he told the A321 to return to FL110. A few moments later the A320 queried the descent of an ac behind him. The monitoring controller then instructed the A321 to stop descent and climb back to FL110, giving traffic information. The monitoring controller checked his report for accuracy with the RT recording.

ATSI reports that a Field Investigation was not carried out in respect of this Airprox, however, an analysis was compiled by reference to reports, radar and RTF recordings.

A Mentor and Trainee were operating the Heathrow INT DIR S position. The Trainee had only commenced operating the RTF some 5 minutes prior to the Airprox. Earlier, he had been plugged in listening to the Mentor. Traffic levels were described as 'low'.

At 1250:56, an A320 (destination Heathrow), was instructed by the trainee to descend to FL100. It was already established in the Biggin Hold and delays were reported to be 5-10 minutes. An A321 from Geneva, also destined for Heathrow, called Director at 1254.21, and reported at FL110 in the Biggin Hold. The ac was instructed to "*continue in the Biggin Hold, delays 5-10 minutes, descend FL100, (*long pause as Mentor corrected*), correction, maintain FL110*." Part of the callsign could then be heard and this was taken as acknowledgement. It is evident that in the pause between the words "*one hundred*" and "*correction*", the A321 pilot commenced the read back to the instruction to descend FL100. This readback transmission was almost totally blocked, except for the last 4 figures, albeit there was no characteristic squeal on the RTF recording, suggesting a simultaneous transmission. Believing that the A321 pilot had acknowledged the corrected level to fly at, neither the mentor nor the trainee requested confirmation of the full read back. Later, the A321 pilot confirmed on the RT that he had believed the clearance to be to FL100. The situation in the holding area as the instruction passed to A321 to descend was given, was that the A320 was turning right at the end of the outbound leg of the hold, maintaining FL100. The A321 was 2.2nm behind, approximately half way along the same leg of the holding pattern. At 1254.57, as the A321 commenced descent, the A320 called to report, "..*the aircraft behind is only 700ft above, is that correct ?*" STCA activated white. The Mentor did not reply but gave an immediate climb instruction to the A321. The ac acknowledged, "*climbing FL110, about to say the same thing.*" Only the A320 received a TCAS Traffic Alert. Minimum separation in the hold was vertical 600ft with distance in trail 2.3nm. The Mentor believed that he had taken appropriate action to correct the trainee error and that the A321 pilot had read back the transmitted correction.

The Mentor did correct four successive trainee RTF errors including the wrong clearance to FL100 and it was unfortunate therefore that the key readback from the A321 pilot was blocked by the continuous ground transmission. LTCC Telecommunications Engineering Investigations have advised that neither ac nor controller would be aware that transmissions were being blocked due to offset frequency use.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Mentor, also alerted by the A320 pilot, spotted and corrected the u/t controller's error in clearing the A321 down to an occupied level and passed a correction as soon as he could (in the same transmission).

Unfortunately, the A321 heard the clearance to descend (but not the correction), read it back and acted on it. Hearing what proved to be a partially blocked transmission, the controller(s) believed erroneously that they had received a correct readback in acknowledgement of the mentor's correction to the descent clearance. This was not the case and had caused the Airprox.

The A320, pilot however, also spotted the ATC error quickly and queried it, resulting in the controller giving an instruction to the A321 pilot to climb.

Since the radar replay showed a minimum of 2.3nm lateral separation and 600ft vertical in a situation where there was no overtake and no TCAS warnings, members considered that there was no risk of collision.

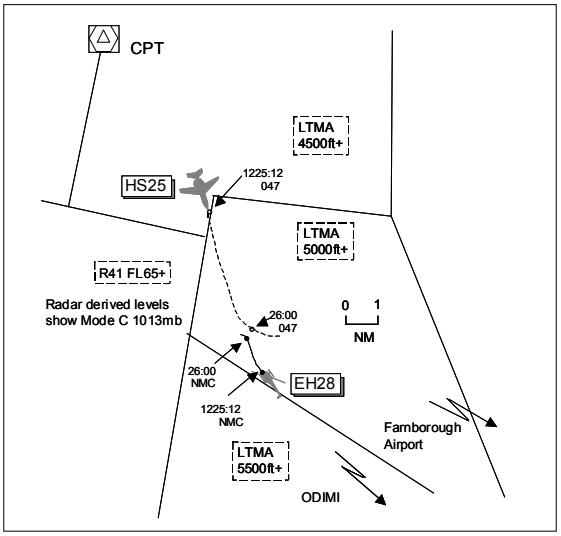
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The INT DIR S (Mentor) did not obtain a complete and correct readback from the A321 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 6/03

Date/Time:	31 Jan 1226	
Position:	5121N 0105W (9nm SE CPT)	
Airspace:	LTMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	HS25	EH28
Operator:	Civ Pte	Civ Pte
Alt/FL:	5000ft (QNH 1023mb)	5000ft (QNH 1023mb)
Weather	VMC CAVOK	VMC CLNC
Visibility:	40km	50nm
Reported Separation:	nil V 400-500m H,	<100ft V 0·5nm H
Recorded Separation:	0·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HS25 PILOT reports heading 165° at 220kt inbound to Farnborough squawking an assigned code with Mode C and in receipt of a RCS from London on 134·12MHz. The visibility was 40km in CAVOK, the ac was coloured white/silver and his nav, strobe and landing lights were all switched on. TCAS was not fitted to the ac. After passing CPT at 5000ft QNH, he was issued an immediate avoiding action L turn owing to traffic dead ahead. The PNF saw the conflicting ac, a helicopter, at the same altitude in his 12 o'clock range 1·5-2nm. The dark coloured helicopter had only shown a small target aspect in the head-on geometry of the encounter. The hard L turn executed allowed him to achieve about 400m separation as the helicopter passed to his R, at the same altitude as his ac and it did not appear to take any avoiding action. He reported the Airprox to Farnborough ATC when he was transferred to their frequency and he assessed the risk of collision as high.

THE EH28 PILOT reports heading 340° at 70kt en route from Goodwood to Wolverhampton squawking an assigned code, Mode C was u/s and he was receiving a FIS, he thought, from Farnborough on 125·25MHz. The visibility was >50nm with no cloud in VMC, the helicopter was coloured black with yellow stripes and his anti-collision light was switched on. About 8nm SE of CPT cruising at 5000ft QNH 1023mb, the radar controller told him *"traffic in your 12 o'clock at your altitude"*. After about 30sec he saw the traffic, a white twin-engined executive jet, straight ahead 0·75nm away at the same level or slightly above, initiating an avoiding action turn to its port. Accordingly, no avoiding action was either

initiated or required, the jet passed 0·5nm away to his R <100ft above and he assessed the risk of collision as medium.

ATSI reports that the Farnborough controller was operating LARS and Approach in band-boxed mode. She described the workload as moderate and another controller had been available if it had been considered necessary to split the position.

The EH28 established communication with Farnborough, at 1159, prior to the subject controller taking over the position. The pilot reported en route from Goodwood to Barton, via Wolverhampton, climbing to 5000ft QNH and heading towards Compton (CPT). Once identified, the pilot was informed that he was receiving *"a limited Radar Information Service due atmospheric clutter on radar with traffic information only on squawking aircraft"*. The controller suggested that the pilot should *"stop off at four thousand four hundred feet beneath the base of controlled airspace"*. The pilot replied that he was descending to 4400ft (he was actually in Class A airspace of Airway R8 at the time). Approximately three minutes later, the pilot was informed that he could climb back to 5000ft but *"on your present track you may need to descend again to four thousand five hundred in about er twenty miles there's a bit of airspace near Compton that's at that level"*. After the pilot responded, saying he was climbing to 5000ft, the controller replied *"Roger and I'll keep you advised"*.

The subject controller took over the LARS/ Approach position at 1212. She had been informed, during the handover, that the EH28 was maintaining 5000ft QNH, although there was no Mode C showing on the radar display (it was unserviceable) and was being provided with a Limited RIS; the relevant information was annotated on its fps. She was not aware that the previous controller had found it necessary to warn its pilot about the presence of CAS. On a number of occasions, following the handover, she provided the EH28 pilot with TI about radar contacts, believed to be gliders, in his vicinity. He did not always respond immediately to her transmissions, making it necessary to have them repeated.

The controller said that, when she took over the position, there was a pending live fps on the HS25, an inbound ac from Warton via airways, showing an estimate. LTCC records reveal that the SW Sector ATSA, in accordance with agreed procedures, had passed Farnborough an inbound estimate on this flight at 1201. The ac, routeing via CPT, was subject to a 'Silent Handover' from LTCC to Farnborough. The Farnborough MATS Part 2 describes this procedure and the elements pertinent to this incident are:

"TC OCK is responsible for ensuring LF radar has received an inbound estimate; A/c will be instructed to leave CAS descending to 5,000 ft (Heathrow QNH) on their own navigation towards 'ODIMI' (CPT R150 D18.6); A/c will be transferred to Farnborough App frequency, free of TC conflicting traffic and whenever possible within CAS; Transfer of communication and control is passing 6,000 ft. If this is not possible and alternative co-ordination is not achieved TC will terminate radar service when a/c leaves CAS and instruct pilot to resume own navigation towards 'ODIMI' and freecall Farnborough Radar; It is the responsibility of Farnborough Approach Radar to suspend the Silent Handover procedure when necessary. This may be due to an excess number of inbounds or conflicting traffic in the FIR".

The controller said that she had noticed the HS25 on her radar display, when it was 20-25nm away from Farnborough. She had then been busy dealing with a CAT B (higher priority) flight, which had wished to operate close to Farnborough. After this, she noticed that the HS25 was S of CPT, level at 5000ft, within Class A airspace of the London TMA where the base is 4500ft. It was shortly to cross the boundary, where the base changes to 5000ft, and opposite direction to the EH28. She immediately asked the pilot of the EH28 if he was *"still at five thousand feet"*. There was a delay, whilst the message had to be repeated, before the pilot confirmed he was maintaining 5000ft. She then passed the pilot the following message: *"traffic twelve o'clock four miles opposite direction also at five thousand feet can you take up a westerly track?"* The radar timed at 1225:12, when this message was passed, shows the HS25 at 5000ft QNH 1023mb (FL047), just crossing the boundary of the London TMA, where the base changes from 4500ft to 5000ft. The EH28, identified by its 0431 squawk, is in the HS25's 12 o'clock, 4·8nm away, with no Mode C displayed. At the same time the controller telephoned LTCC to request that the HS25 be

issued with an avoiding action L turn because the traffic in his twelve o'clock was at 5000ft. This action was agreed by the TC South Co-ordinator. The pilot of the EH28 asked if he should descend to 4500ft. The controller replied *"turn left immediately traffic twelve o'clock one mile at five thousand feet turn left immediately avoiding action"*. The pilot reported visual with an executive jet opposite direction.

On receipt of the telephone call from Farnborough, the Co-ordinator informed the TC Ockham SC of the situation. He immediately issued the pilot of the HS25 an avoiding action turn heading 020° and passed information on traffic at twelve o'clock 2nm, height unknown, opposite direction. Receiving no reply, the avoiding action instructions were repeated, this time with a heading of 070° and traffic information was updated as twelve o'clock half a mile, turning west. The pilot replied in mid turn, with the traffic in sight. The radar recording shows that the two ac passed 0·4nm apart 1226:00, at the same reported altitude.

It was noted that neither controller used the 'new phraseology' when passing avoiding action instructions. The Farnborough Controller commented that, in the circumstances, she considered that it was better to pass the avoiding action instructions as soon as possible, rather than having to repeat the ac's c/s, thereby delaying the issue of the executive instruction. In accordance with MATS Part 1, under a RIS, no avoiding action should be offered. However, at 5000ft, the EH28 was in CAS and the service being provided would have changed to a RCS. Consequently, the issuing of avoiding action instructions is considered to have been appropriate. The LTCC Deputy Watch Manager commented, in his report, that the TC SC was aware of the 'new' phraseology but *'without thinking had reverted to the old'*.

The Farnborough controller believed that the suspension of the Silent Handover procedure, owing to conflicting traffic in the FIR, did not apply to a single ac, as here, but used in circumstances where a number of ac would be present in the airspace, e.g. a gliding competition taking place at Lasham. This interpretation was confirmed as unit policy by the Manager ATC. The controller considered that, in her experience, TC controllers do not always transfer ac early enough. During this incident, TC were still working the HS25 when it was S of CPT and already level at 5000ft, the base of CAS. LTCC Operations have reported that a notice is to be issued shortly encouraging TC SCs, whenever possible, to transfer ac inbound to Farnborough, at, or before, they reach 6000ft. The Farnborough controller commented that, had the HS25 been transferred earlier, she would have been able to take more timely action to resolve the situation. The MATS Part 1, Section 1, Chapter 6, Page 4, states that: *"Except when aircraft are leaving controlled airspace by descent, controllers should not normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace"*. It could be argued that, although TC are expected to clear ac to leave CAS by descent, it often results in them levelling off at the base of CAS for several miles, thereby negating the provision of 500ft separation from FIR traffic.

The UK AIP, at ENR 1-6-3-2, states that: *"If a pilot wishes to enter regulated airspace, even though he may be in receipt of a LARS beforehand, he remains responsible for obtaining the required clearances before entry"*. It is possible that the pilot believed that, when the Farnborough controller advised him of CAS ahead at his altitude, and said *"I'll keep you advised"* he was expecting to be instructed to descend when appropriate. The RT recording reveals that the pilot of the EH28 missed a number of calls addressed to him by Farnborough, not least when the controller was trying to ascertain his current altitude, prior to the Airprox. This delayed the resolution of 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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members initially discussed the merits of Silent Handover procedure, with ATCOs agreeing that its intention was to reduce workload/co-ordination between participating parties, with ac leaving CAS

in the descent to 5000ft altitude. Owing to the complexity of the LTMA base levels in the area surrounding Farnborough, the position of inbound ac will at times vary between being in, at the base level of or below CAS. Also, Farnborough inbound traffic from the N conflicts with Heathrow SID traffic climbing to 6000ft which can then lead to a late transfer to Farnborough ATC. Moving on, it was clear that at the time of the Airprox, the EH28 pilot, without changing his altitude, had just entered CAS by flying at the base level, without clearance and that this had been a part cause. The onus lay the EH28 pilot to remain outside CAS, although members could understand and had sympathy with the helicopter pilot's 'mind set' at the time; the previous Farnborough ATCO had invited him to climb back up to 5000ft and had told him that he would be kept advised of the CAS ahead and if he needed to descend. The Farnborough LARS/APP was the only person who could have known that the EH28 was in confliction, as the TC controller would have assumed legitimately that the EH28 squawk with NMC was outside CAS. With prior knowledge of the impending inbound HS25 subject to the Silent Handover procedure, the need to separate the subject ac should have been paramount to the LARS/APP with various options open to her to resolve the situation. Firstly, she could have carried out co-ordination with TC to modify the inbound clearance on the HS25 by passing TI and asking TC to vector the HS25 clear of the traffic or by changing the level of the inbound traffic, although it was recognised that this was a difficult option owing to traffic congestion in LTMA. Secondly, she could have taken positive steps to ensure that the EH28 was flying below the HS25's level or clear of its intended track. However, the Farnborough LARS/APR had allowed the EH28 to fly into conflict with the HS25 and this had also been a part cause.

Although she noticed the confliction late, the Farnborough LARS/APP had acted quickly, ascertaining/confirming the EH28's level and then issuing TI and an avoiding action L turn. She also had warned the TC controller of the conflicting helicopter who passed an avoiding action L turn to the HS25. The HS25 crew saw the EH28 visually 1·5-2nm ahead and their avoiding action hard L turn enabled them to achieve a reported 400m separation as the helicopter passed to their R at the same level. After receiving TI, the EH28 pilot saw the HS25 at a range of about 0·75nm already in an avoiding action L turn away, at about the same level, and watched it pass 0·5nm to his R with no need to take avoiding action. These actions combined were enough to persuade the Board that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

a. The EH28 pilot flew at the base of CAS without clearance.

b. The Farnborough LARS/APP allowed the EH28 to fly into conflict with the HS25.

Degree of Risk: C.

AIRPROX REPORT NO 7/03

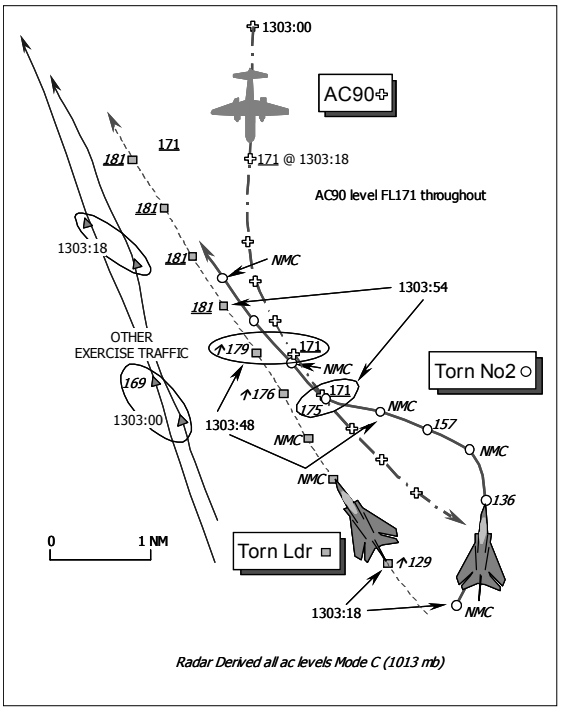
Date/Time:	3 Feb 1303	
Position:	5220N 0010E (8nm N Cambridge)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	AC90	Tornado x2
Operator:	Civ Pte	Foreign Mil
Alt/FL:	FL170	15500ft (QNH)
Weather	VMC CLOC	VMC NR
Visibility:	30nm	10km+

Reported Separation:

Torn Ldr: 800m H,300ft V	1500ft V
Torn No2: nil H,400ft V	

Recorded Separation:

v Torn Ldr	0·4nm H
v Torn No2	nil H, 400ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AC90 PILOT reports that his ac has a white & green colour scheme and the two white HISLs and anti-collision beacon were on whilst in transit from Perth to Southend at 300kt, in good VMC. He was in receipt of a RAS from London MILITARY and was squawking the assigned code with Mode C; a 'Skywatch' traffic avoidance system is fitted. A descent from his cruising level of FL235 down to FL60 was requested, but the controller requested that he level off at FL170 and head 140º direct to BARKWAY to avoid a military exercise that was taking place. On reaching FL170, some 12000ft clear of cloud, the controller passed traffic information on an ac crossing from L to R, [shown as other exercise traffic] which he spotted straight away. About 20sec later a second fast moving military ac [the Tornado Leader] was suddenly spotted at 2 o'clock about 600m away, but he was unable to take avoiding action before it passed down his starboard side about 800m away and 300ft above him. As this ac passed he spotted a third fast moving military ac [the No2 Tornado] on the nose, but it was difficult to determine in which direction it was headed. When this traffic came within 600m he received a traffic alert from the Skywatch, which showed the ac was 400ft above his level. "At the very last second" he determined it was in an 80º climbing turn in front of his ac. Due to the rate of closure he was unable to take avoiding action, as he could not determine the direction the ac was taking. When he queried this with London MILITARY the controller stated that nothing was shown on their radar and he asked if these ac were transponder equipped. He advised the controller that he would be filing an Airprox and assessed the risk as high.

He was concerned that the controller had neither advised him of this pair of jets nor given avoiding action. Furthermore, he wondered why the Controller stated that nothing was shown on radar other than the first ac, [the other exercise traffic] which crossed 3-4nm away.

The Skywatch was only able to pick up the third ac, which was on the nose 400ft above and did not show there was other ac at any other time. He added that Skywatch has only one aerial, which is fitted to the ac's cabin roof and that the Autopilot was engaged during the occurrence.

AIRPROX REPORT No 7/03

THE TORNADO PA200 PILOT reports he was leading a pair of Tornado jets on a Tactical Leadership Programme sortie from Florennes whilst conducting a simulated attack near Peterborough. Heading N, out of the sun, at 450kt the two jets were climbing through an altitude of 15500ft to achieve their desired attack altitude when he spotted a twin engined ac about 2nm away. Their 'lift vector' was already taking his ac clear of the twin, which passed about 1500ft below them with "no risk" of a collision.

MIL ATC OPS reports that the AC90 was routeing W of the Wash Danger Areas, with the intention of joining CAS at ADNAM inbound to Southend. The pilot was in receipt of a RAS from LATCC (Mil) Controller 12 (CON 12) who instructed the pilot to descend to FL80 and at 1255, advised *"limited traffic information from the left as you transit close to an active danger area standard separation may not be achieved"*. Additionally, the pilot's routeing took the ac through an area where a large number of ac were operating VFR on a military exercise - The Tactical Leadership Programme (TLP) – as revealed by their exercise squawks. Consequently, CON 12 identified that a CAS join at BARKWAY would give the best chance of maintaining separation against this VFR traffic. Following initial liaison with ESSEX RADAR just before 1256, the AC90 pilot was instructed by CON12 to *"…route direct BARKWAY…"* adding *"…I'm just giving you a re-route there's a high intensity exercise in your 12 o'clock with approximately 13 aircraft manoeuvring"*, which was acknowledged *"…that's copied".*

An estimate for BARKWAY of 1308 was given by the AC90 pilot and at 1300:07, CON12 instructed the AC90 pilot to *"…turn right forty degrees to avoid exercise traffic".* At 1300:43, avoiding action was transmitted against other traffic*"…avoiding action turn hard right heading 270 traffic south 5 miles tracking north indicating FL155, 2 aircraft".* Further avoiding action was issued 1 min later at 1301:45, *"…avoiding action stop decent FL170"*, although no traffic information was passed the AC90 pilot acknowledged the instruction, followed at 1302:19, by *"….turn left heading 180"*. At 1302:51, traffic information was passed on other exercise traffic*"…left 11 o'clock 7 miles crossing left right indicating FL155 climbing",* which was avoided but standard separation was not maintained. The AC90 pilot reported at 1303:09, *"….visual with traffic down the right hand side",* [the 'other exercise traffic' not the subject Tornados] which was confirmed by CON12 as *"…passing FL160 now".* The AC90 pilot was instructed to *"…continue left turn heading 140 to allow descent"*, which was acknowledged by the pilot at 1303:25, who reported 23sec later at 1303:48, *"….just had further traffic six hundred feet above"* to which CON12 reported *"…nothing seen on radar"*. The pilot added at 1303:57, *"….just had one down our right hand side 400 feet* [the subject Tornado Leader] *and one above* [the No2 Tornado] *climbing 200 feet above"* that was acknowledged by CON12. Whereupon the AC90 pilot queried if the traffic had been squawking to which the controller replied, *"….there is no traffic shown on radar"*. There then followed a dialogue between the pilot and CON12 to determine why the conflicting traffic was not showing on radar and why they were not squawking, which the controller apparently found quite confusing. The AC90 pilot then reaffirmed:

"..when I spoke to you and confirmed the first visual [not the subject Tornados] *…an aircraft about 4 miles away* [unreadable word] *you said travelling left to right we had him visually and then 2 minutes later we had one down our right hand side approximately 400 feet above which we were visual he was turning away* [the lead Tornado] *and then we had the second* [No2 Tornado] *aircraft go over the nose of* [his] *aircraft I would say 4 - 5 hundred feet above he was in a climbing turn."*

CON12 then confirmed that she *"…did have one aircraft at FL 130", whereupon* the AC90 was transferred to ESSEX RADAR and the pilot advised to telephone after landing.

[UKAB Note: Analysis of the Debden radar recording shows the AC90 tracking S before turning onto 270º at 1301:09, as 2 contacts are avoided to the SE by 5nm indicating FL155. One of these contacts continues to track towards the AC90 until 1301:46, when it turns away to the NE. The L turn onto S is shown at 1302:45, when there is other TLP exercise traffic SW – 7nm tracking NW indicating FL137 Mode C climbing. This traffic, upon which avoiding action was issued, subsequently passed down the AC90's starboard side at a range of 1½nm indicating slightly below after ascending to FL175. At this time – 1303:18, the Lead Tornado squawking A4720 - an unverified TLP assigned squawk - is in the AC90's

L 11 o'clock, indicating FL129 Mode C. The No2 Tornado is shown astern of the lead jet by about ½nm but only squawking intermittently and turned R away from the leader; a squawk is shown briefly indicating FL136. At this point the leading ac's Mode C is not shown. The No2 turned back towards the lead ac at 1303:36, but again neither ac's Mode C is shown. At 1303:42, the No2 indicated FL157. The lead ac's SSR label overlaps that of the AC90 on the next sweep at 1303:48; the minimum horizontal separation was 0·4nm as the lead Tornado passed to starboard after it had climbed through the AC90's level, which maintained FL171 throughout. The No2 Tornado's contact merged with that of the AC90 at 1303:54, the No2 indicated FL175 unverified Mode C - some 400 ft above the AC90 - as it over flew the latter.]

CON12 had worked hard to ensure that the AC90 routed through the clearest piece of airspace available. This had necessitated a re-route to join CAS at a different point and several avoiding action turns. Given the nature of the Tornado formation's exercise the possibility of a rapid climb should have been considered by CON12. This inexperienced controller was working under a high workload and therefore did not appreciate the potential threat. Moreover, the Tornado commenced a rapid climb, showing only intermittent SSR, less than 5nm from the AC90 and standard separation was very rapidly eroded. It is doubtful, therefore, that CON 12 could have offered any useful avoiding action. After limiting the traffic information as the AC90 transited close to an active danger area it is disappointing that CON12 did not limit traffic information from all around due to high traffic density at the same time she warned of exercise traffic in the AC90's 12 o'clock. This may have alerted the AC90 pilot to the possibility that standard separation might not be maintained. Although JSP 318A 235.140.4c. states that *"…when a controller cannot provide separation for traffic every effort should be made to, at least, pass traffic information…"*, on this occasion CON 12 did not see the jet climb through the AC90's level and by the time the AC90 pilot questioned this the Tornado had already turned away, hence CON12's bewilderment. Although CON 12 might not have limited the RAS and a more experienced controller may have passed traffic information, even when more than the required vertical separation existed, it is unlikely that either would have prevented this occurrence.

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 that the inexperienced CON12 was very busy and was doing her best to provide an effective RAS within extremely busy airspace at the time. A military controller member explained that the TLP involved very high intensity exercises that were known to produce complicated traffic scenarios with multiple tracks operating autonomously not in receipt of an ATS. Here the Tornados were operating as part of an exercise and were legitimately flying VFR in Class G airspace. CON12 had spotted the TLP elements flowing through the vicinity and endeavoured to reroute the AC90 to a clearer part of the sky whilst still trying to provide as expeditious a routeing as feasible in the circumstances. Noting the Mil ATC Ops comment about the lack of an appropriate limitation to the RAS in an area of high traffic density, some controller members agreed that this should have been given so that the AC90 pilot could have taken this into account within his general airmanship. Nevertheless, other members wondered about the usefulness of these statements and thought it would have provided little practical benefit unless the controller had explained in far more detail the nature of the predicament, which all took time. The military area radar member stressed that controllers should always make the nature of the limitation plain so that pilots were in no doubt about the problem. Nonetheless, pilot members still found this somewhat perplexing and questioned what benefits accrued from a limited RAS, where even with the best of intentions, standard separation could not be provided. A civilian ATCO member explained that it is very difficult to achieve standard separation in such circumstances within Class G airspace, in his opinion downgrading the service to a RIS would have been preferable and indeed, that is all that civilian controllers at ScACC will provide in the 'Open FIR'. Nonetheless, it was unfortunate that having avoided one area of dense traffic, further TLP traffic – including the reported Tornado pair - ended up in the same location as the AC90. The Board noted that whilst

manoeuvring the AC90 under her control, CON12 provided avoiding action against 'other exercise traffic' but had been unable to effect standard horizontal or vertical separation against some of the waves of fast jet ac flowing through the area that were conducting rapid climbs as part of the exercise profile. This was the case with the first ac that the AC90 had reported spotting earlier and also with the subject Tornados. It appeared that CON12 was relying on prescribed vertical separation of 3000ft against the subject Tornado pair's unverified Mode C. More than 3000ft vertical separation was evident on the radar recording at 1303:18, just 36sec before the Airprox occurred and members believed she had not expected the jets to climb subsequently. As the Mil ATC Ops report had shown, CON12 was oblivious to the pair's rapid climb, which the radar did not display continuously. After 1303:18, NMC was apparent from the lead Tornado until it was shown 500ft above the AC90 approaching the starboard beam, whereas only two returns showed from the No2's Mode C as it climbed rapidly toward the AC90. Members agreed that with the scant Mode C data displayed in this short period, it would have taken a very sharp controller indeed to detect the Tornado's climb when also confronted with SSR label overlap. Whether a more experienced controller would have acted differently was open to speculation. While it was clear that CON12 had not issued avoiding action against the pair, in the circumstances, this was not unreasonable; the Board took the view that the Airprox had been caused by the Tornados' rapid climb, which took them into conflict with the AC90.

Turning to risk, a number of factors were pertinent. It was clear that the lead Tornado pilot had eventually seen the AC90, where fortuitously the controller's instruction to turn onto 140º had provided a modicum of horizontal separation - 0·4nm. Also the AC90's 'Skywatch' had forewarned the pilot of the jet's presence. Members believed that the AC90 pilot would have been unable to spot either Tornado any earlier as they climbed up under his nose at the same time as he turned L, somewhat 'belly-up' to the lead jet. Fast jet pilot members opined that the delaying dog-leg flown by the No2 required a high AOB L turn, followed by a R turn at a similar bank angle, thereby placing him astern of this leader at the right tactical spacing. This would have required concentration by the pilot formating on his leader, to the detriment of all round scan, which suggested to some experienced fast jet members that he might not have seen the AC90 at all. Others speculated that if the No2 pilot had actually seen the AC90 then he flew too close – but without a report from the No2 this remained conjecture. The Tornado leader reported that he had spotted the AC90 and believed that he passed 1500ft above the latter. But this was not the case as the radar recording showed that the lead ac was only 500ft above the AC90 when it passed 0·4nm away on the starboard beam. The radar recording also revealed that the No2 had climbed through the AC90's level whilst flying the delaying dogleg to achieve appropriate spacing on his leader and had only achieved 400ft separation above the AC90 when the contacts merged. Weighing all of these points the Board agreed unanimously that at these distances the safety of the subject ac had indeed been compromised.

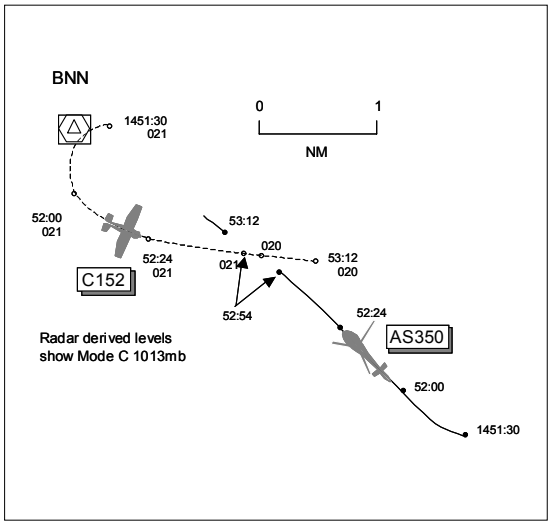
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A rapid climb by both Tornados took them into conflict with the AC90.

Degree of Risk: B.

AIRPROX REPORT NO 8/03

Date/Time:	7 Feb 1453	
Position:	5142N 0031W (2nm SE BNN)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C152	AS350
Operator:	Civ Trg	Civ Pte
Alt/FL:	2300ft (QNH 1019mb)	
Weather	IMC IICL	NK
Visibility:	3000m	NK
Reported Separation:	50ft V NK H	NK
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying a local dual 'instrument appreciation' sortie from Denham and receiving a RIS from Northolt on 126·45MHz. Flying about 2nm S of BNN VOR, in and out of broken cloud, level at 2300ft QNH 1019mb at 85kt, ATC warned him of unknown traffic. Turning L onto 090º to avoid, he 'popped' out of cloud into a gap and, on looking to his R, he was surprised to see a conflicting ac, a dark blue coloured twin/ single squirrel helicopter, in his 2-3 o'clock very close and 50ft below; it was then seen to turn L to avoid him. As he was already turning L and heading away from the helicopter, no further avoiding action was required, and it was seen to pass very close to his R and behind about 50ft below. He assessed the risk of collision as high. Although the TI passed had been timely, no height information had been given, as the other ac did not have Mode C selected, which would have helped with his collision avoidance manoeuvre.

THE AS350 PILOT was contacted several months post incident and could not recall any incident occurring in the vicinity of BNN VOR. He regularly operates from a private location near Watford and was fully aware of his obligations (see and avoid) when flying under VFR in this very busy area of airspace. He expressed concern at the lack of provision of ATC service in the area between the Luton and Heathrow CTRs.

MIL ATC OPS reports the C152 freecalled Northolt Approach (APP) at 1422:18 *" out of Denham for exercise in the local training area …requesting Radar Information Service"*. A squawk was allocated however this took sometime to be displayed, consequently the ac was not formally identified until 1424:48 and placed under a RIS. At 1433:55 and 1447:56 TI was passed to the C152 pilot on two different radar returns in the area. APP was relieved by another controller before more TI was passed at 1452:25 *"…traffic south west three miles tracking north west no height information"* followed by, at 1454:39, *"…further traffic to the east two miles tracking west no height information"*. At 1454:47 the C152 pilot requested *"…descent to two thousand one hundred feet"* which was approved and at 1455:02 the pilot reported *"…victor mike now like to down grade to flight information service…"*. Two min later the C152 pilot called *"…back to Denham…"* but no mention of an occurrence was made on the Northolt frequency.

Analysis of the Heathrow radar recording at 1451:30 shows the C152 in a LH turn rolling out on a SE heading at 1452. The reported conflicting helicopter is SE of it, just over 3nm away, on a reciprocal track, both ac continue to close.

APP was unaware of the Airprox until several hours after the event and, other than recalling the

provision of RIS, remembered nothing unusual about the flight. With the benefit of the radar replay and RT transcript, it is evident that although TI on the conflicting helicopter was passed, the position was inaccurate. Consequently, by tracking SE, the C152 pilot probably thought he was tracking away from the traffic that had been reported to him as *"…traffic south west three miles tracking north west…"* whereas he was heading towards it. There was no conflicting traffic in the reported position and reference to SW by APP was incorrect. Nevertheless, under the rules for RIS *"The pilot is wholly responsible for maintaining separation from other ac whether or not the controller has passed traffic information"*. However, on this occasion he was probably not helped by the incorrect call. Additionally, as the two ac remained on a constant converging course, and without the benefit of SSR on the helicopter, it could be argued that APP should have re-called the traffic in accordance with the rules of RIS. This would have, most likely, corrected the original position report and provided enough information for the C152 pilot to sight the confliction. In mitigation, the controller had only just taken over the position with a student and, quite probably, did not assimilate the incorrect position as passed by the student controller.

UKAB Note: Analysis of the Heathrow radar recording shows the C152 indicating FL021 (2280ft QNH 1019mb) and a primary only return, believed to be the conflicting AS350 helicopter converging from the SE of BNN VOR until 1452:54, when the helicopter fades from radar in the C152's 1 o'clock range 0·33nm. The C152 continues on a steady easterly track, indicating FL020 (2180ft QNH) on the next sweep 4 sec later, which is maintained, until the helicopter reappears on radar at 1453:12, 1·5nm SE of BNN, 0·8nm to the WNW of the C152.

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 and operating authorities.

Members agreed that the C152 pilot's election to operate under a RIS was inappropriate when flying in IMC – under a RIS the pilot remains responsible for maintaining separation from all other traffic, something he could hardly discharge if flying in cloud. It was noted that he was already established in a L turn when warning was given of traffic to the SW – information that proved to be inaccurate, but he thought he was flying away from it. Subsequently, he had been surprised, as he broke cloud, by the sudden appearance of the AS350 coming towards him. The brief information supplied by the AS350 pilot, admittedly several months post incident, did not elucidate on his cockpit viewpoint except that nothing memorable had occurred near to BNN. It was therefore not possible to know whether the apparent turn executed by the AS350 pilot, observed by the C152 pilot, had been to avoid the Cessna or had been purely co-incidental for some other reason. On the limited information available, members believed that the Airprox had been caused by a very late sighting by the C152 pilot and an apparent non-sighting by the AS350 pilot. The helicopter pilot's comments, with reference to lack of provision of ATC service, were noted. However, irrespective of his experiences on previous flights, without calling and requesting an air traffic service from Northolt or Luton on each occasion, the pilot would not know if a service would be offered/available. The C152 pilot had been able to arrange a RIS. Also noteworthy was that the AS350 was not squawking although it was not known if the equipment had been unserviceable. It is recommended that an ac's transponder is switched on, with the conspicuity code selected with Mode C, if carried, thereby presenting ATC at SSR equipped airfields with an enhanced radar picture and better situational awareness of the traffic situation.

Turning to risk, the reporting C152 pilot had seen the helicopter late in his 2-3 o'clock position, very close and 50ft below. The geometry of the encounter had fortunately meant that his flight path was already taking his ac away from the helicopter, which was seen to pass behind and below. However, the Board agreed that the ac had passed in such close proximity to such an extent that safety had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

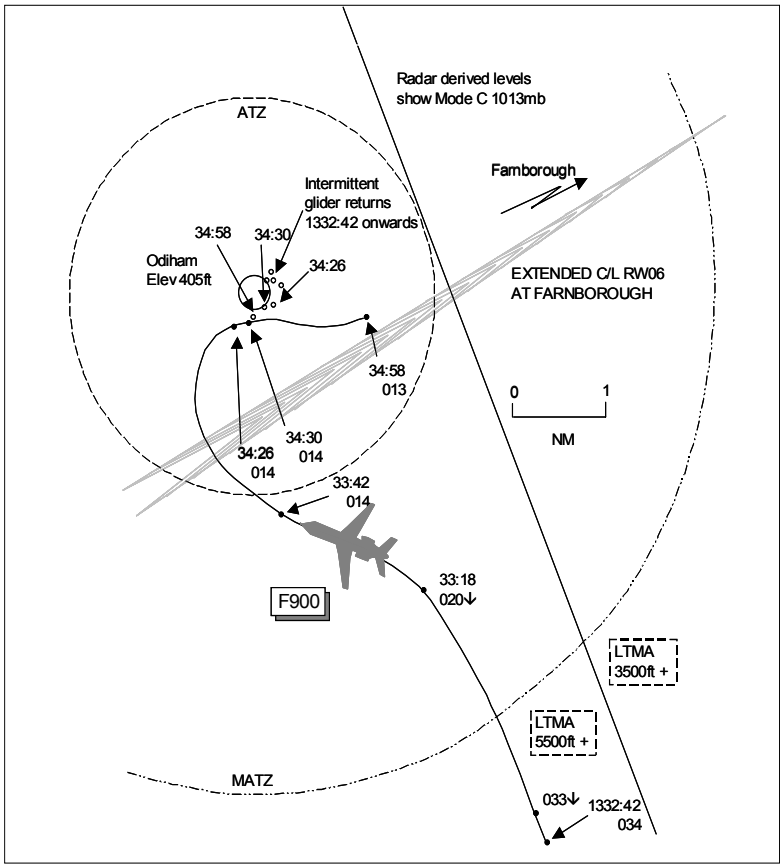
Cause: A very late sighting by the C152 pilot and an apparent non-sighting by the AS350 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 9/03

Date/Time: 15 Feb 1335 (Saturday)
Position: 5114N 0057W (O/H Odiham Airfield - elev 405ft)
Airspace: FIR/ATZ (Class: G)

	1st Reporting Aircraft	*2nd Reporting Aircraft*	*Reported Aircraft*
Type:	SZD Bocian	ASK21	F900
Operator:	Civ Pte	Civ Pte	Civ Comm
Alt/FL:	2000ft↑ (QFE)	1200ft↑ (QFE)	2000ft (QNH 1035mb)
Weather	VMC CLBC	VMC CLBC	VMC CLBC
Visibility:	>10km	NK	10km
Reported Separation:	250ft V 100m H	300ft V	200ft V 0·25nm H/300ft V 0·5nm H
Recorded Separation:	NR		



AIRPROX REPORT No 9/03

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SZD BOCIAN PILOT reports flying a dual instructional sortie climbing in a thermal within the aerodrome boundary at Odiham at 45kt and he was listening out with Odiham Base on 129·97MHz. The visibility was 10km below a 2300ft cloudbase and the glider was coloured white with 8ft wide red bands displayed on both wings. At 2000ft QFE in a R turn, he saw a light coloured executive jet break cloud 300-400m away slightly R of his nose flying in the opposite direction. There was no time to react, his R turn was taking him away from the 'head on' situation and the jet then passed about 100m to his L, 250ft below, within a few seconds, heading towards Farnborough. He was also concerned that winch operations were in progress with cables up to 2500ft.

THE ASK21 PILOT reports flying a dual instructor-training sortie from Odiham seated in the front seat and was listening out with Odiham Base. After a normal winch launch and release at 1350ft QFE, the operating pilot turned the glider R to enter and gain height in a thermal that was being utilised by a Bocian glider circling at 2000ft. On finding lift, he noted his position as over the perimeter track on the S side of the aerodrome adjacent to the S Hangar. Continuing the R turn in the same direction as the other glider now at 1200ft agl, he looked L and up and sighted a jet ac, possibly an HS25, as it passed 300ft above his glider tracking 100º towards Farnborough, flying directly along the C/L of RW10. The glider's R turn took it away from the jet's flight path and he pointed out the ac to the handling pilot. The SZD Bocian pilot then called on the radio, requesting a height check, as the jet had just passed below his ac. After landing, both he and the Capt of the Bocian glider reported the Airprox to the CFI who then reported the incident to Farnborough ATC and RAF Odiham Operations Controller.

UKAB Note (1): During a subsequent telephone conversation with both glider pilots, they confirmed that the Duty Instructor (DI) for the reporting acs' gliding club attended an Ops Brief on the morning of the incident and that Farnborough ATC were informed of both gliding clubs' activities.

THE FALCON 900 PILOT reports inbound to Farnborough IFR from France descending to 2000ft QNH 1035mb and in receipt of a RAS from Farnborough squawking 0664 with Mode C. He had been given late descent clearance from 4000ft and a R turn from heading 340º towards Farnborough. Flying at <250kt, he was told to tighten the turn and after leaving cloud, he saw two gliders about 1nm ahead. He tightened the turn, electing to avoid the gliders visually by flying between them. About 10sec elapsed before he passed 200ft below and 0·25nm to the R of the first and 300ft above and 0·5nm to the L of the second. He thought there had been no risk and apologised for flying so close to them but there had been no other choice with such short notice. At 2000ft he was 200ft below cloud and the visibility was >10km.

THE FARNBOROUGH APPROACH RADAR CONTROLLER reports that following a late transfer of the Falcon 900 from LTCC because of conflicting traffic, the ac called about 10nm SW of Farnborough (12nm from touchdown) heading N at 4000ft QNH. Owing to CAS to the E, she turned the F900 L onto 340º and descended it to 2000ft and asked the pilot if 12nm was sufficient to lose height. Further, she informed him that he was outside CAS under a limited RAS owing to poor radar performance and that there was a possibility of late warning of conflicting traffic. The radar circular polarisation circuit was in operation and this made it difficult to differentiate between anomalous propagation from weather clutter showing on the display and possible ac returns. The Falcon 900 was turned further L onto heading 300º for a short while, to allow for height loss, and TI was passed on manoeuvring traffic 3nm to its NW, before it was turned R onto 050º to close the ILS LLZ at 7nm. The pilot was asked to make a good rate of turn as the surface wind was easterly 10-15kt and the stronger upper wind from the SE would make it harder for the ac to establish on the ILS from the R. It had not been possible to take the ac any further W owing to Lasham gliding activity. Further TI was passed to the F900, on traffic which appeared 2nm to its N tracking SW, before it was turned further R onto 070º as it appeared to be going through the LLZ without capturing it. As this new heading was still

insufficient, she instructed the F900 to turn R onto 090º and updated the TI, as the unknown ac was 1·5nm to its N heading SW; the pilot reported the traffic in sight and that it was a glider. The F900 was cleared to descend on the ILS and was transferred to Farnborough TOWER without reporting an Airprox or expressing concern about the observed glider. She believed that the Falcon had passed 0·7nm SW and S of the Odiham O/H and that the turns she had given prevented the F900 passing closer than 1·5nm from the observed unknown traffic on radar.

UKAB Note (2): Met Office archive data show the Farnborough METAR EGLF 150203 1320Z 07011KT 9999 BKN023 04/M01 Q1035

ATSI reports the Airprox occurred within Class G airspace of the Odiham ATZ (notified H24), outside the promulgated hours of operation of the airfield. Consequently, ATC at Odiham was not manned. In accordance with the procedures in force at the time, Farnborough ATC was the controlling authority for the Odiham ATZ. The Farnborough MATS Part 2 states *"Due to the requirements of Rule 39 and the penetration of H24 ATZs when either unit do not require to use their respective ATZ it will be delegated to the other unit. When either unit is notified as closed then the other will be notified as the controlling authority for the purposes of Rule 39. Letters of Agreement have been agreed between Farnborough Gliding Club, Kestrel Gliding Club and 618 VGS, whereby these agencies will ring the ATC Watch Manager at Farnborough to inform them of the commencement and completion of flying when RAF Odiham is closed. In the event that Odiham has no notified flying, aircraft inbound to Farnborough using Runway 07 (now 06) may penetrate the Odiham ATZ not below a height of 1000ft (this provides separation from the model flyers)."*

On this occasion, it is understood that Farnborough had been informed of Odiham glider operations in accordance with the LOA. The F900 was inbound to Farnborough's ILS RW06 under a limited RAS being provided by Farnborough Radar. The pilot was informed that it was limited *"in area of poor radar performance possible late warning of traffic"*. Whilst vectoring the F900, the controller passed TI on contacts, believed to be gliders, at a distance of 3nm and 2nm (subsequently updated to 1·5nm) respectively, with the pilot reporting visual with the latter. The final approach path, for ac established on the LLZ, passes through the SE portion of the Odiham ATZ. However, because the F900 went through the LLZ and had to establish from the N, its track took it over Odiham airfield, where it conflicted with the reporting gliders. The pilot had not been warned of the possible sudden appearance of gliders launched from that airfield.

Weekend gliding at Odiham has taken place for a number of years. It appears that the problems between Farnborough/Odiham have arisen since the introduction of an ILS to Farnborough's RW06, previously ac were positioned visually for final to the E of Odiham. Although no mention is made in the Farnborough MATS Part 2, it is understood that this procedure is now being used, whenever possible, when gliding is taking place, to prevent such an occurrence in future. Since this incident, Farnborough ATC has published a revised MATS Part 2. The following extracts are relevant to Odiham gliding operations: *"Gliding operations may take place at Odiham at any time. The approved maximum launch height from winch or auto tow is 400ft above the upper limit of the Odiham ATZ (i.e. 2800ft QNH). There is no agreed limit for aero-tows. Radar controllers must bear this in mind when vectoring aircraft on to final approach to Runway 06 and departing on Runway 24. When Odiham ATC is closed, the senior Gliding Instructor will ensure that the WM/DWM at Farnborough is informed whenever gliding commences, the number of gliders and when gliding ceases. The WM/DWM may request that the gliders avoid operating in certain areas (e.g. on the final approach to Runway 06 and (if so equipped) squawk a discrete code for monitoring purposes."*

MIL ATC OPS reports that RAF Odiham's hours of operation are 0800 - 1700 local, Mon - Fri and as notified for night and weekend flying. On the day of the incident (a Saturday) there was no station flying at RAF Odiham and ATC was not manned. The ATZ at Odiham is notified as H24 and therefore should be avoided unless specific clearance to enter the area can be obtained. Because of the close proximity of Farnborough, a Memorandum of Understanding (MOU) exists between the 2 units to allow for use of this otherwise sterile area. Similarly, because Kestrel Gliding Club, Farnborough Gliding Club and 618 VGS all operate out of RAF Odiham outside the

aerodrome's published hours, Letters of Agreement (LoA) have been established with Farnborough to allow for their operation.

The MOU states at para 3.3 that *"….when either Unit does not require the use of its ATZ, it may delegate the airspace to the other Unit".* When Odiham is not active this allows Farnborough to transit traffic through the Odiham ATZ not below a height of 1000 ft. The MOU goes on the say that LoAs have been established *"…whereby Farnborough ATC will be notified when gliding operations commence and cease outside Odiham ATC's operating hours".* Both the LoA for Kestrel Gliding Club and 618 VGS became effective on 29 May 2001 and detail the same requirement that:

"Prior to the commencement of gliding operations at RAF Odiham, during periods when the airfield is closed, the Duty Instructor is to telephone the ATC Watch Manager at Farnborough ATC with details of the planned flying programme…."

This order supersedes the order contained in the Kestrel Gliding Club Flying Orders dated Jun 98 which states that the Duty Instructor (DI) is to *"…ask the Duty Ops Controller to inform ATC Farnborough of the gliding activity"*. Both The Kestrel Gliding Club and 618 VGS DIs attended an Ops brief that morning and, in accordance with the LoA, should subsequently have informed Farnborough ATC of their respective gliding activity.

An informal meeting between representatives of both gliding clubs concerned, RAF Odiham ATC and Farnborough ATC has been held in order to clarify the position and orders relating to gliding activity at weekends. The recent installation of an ILS to RW 06 at Farnborough, and the pressure of noise complaints, may be contributory to this incident as the procedures for glider activity and Farnborough ATC notification have been in place for some time and have, up until now, operated without incident.

UKAB Note (3): The UK AIP at ENR 5-5-1-4, promulgates Odiham as a Glider Launching Site centred 511403N 0005634W for winch and aerotow launches where cables may be encountered to 2500ft agl, during daylight hours; site elevation is 405ft amsl.

UKAB Note (4): The UK AIP at ENR 2-2-2-4, promulgates Odiham ATZ as a circle radius 2nm centred on the longest RW (10/28) position 511403N 0005634W to 2000ft agl, aerodrome elevation 405ft.

UKAB Note (5): Analysis of the Heathrow radar recording at 1332:42 shows the F900 6·3nm SSE of Odiham tracking 340º (a Farnborough assigned radar heading) commencing descent from FL034 (4060ft QNH 1035mb). 3 primary only returns are seen to the N and W of Odiham with one further contact O/H Odiham manoeuvring, believed to be the reporting Bocian glider. At 1333:18 the F900 is descending through FL020 (2660ft QNH) in a L turn, following another ATC vector, rolling out onto a track of 300º 12 sec later. The F900 levels at FL014 (2060ft QNH) shortly thereafter, 2·2nm S of Odiham; a R turn is then commenced towards Farnborough and it enters the Odiham ATZ. At 1334:26 the F900 is passing 080º 0·33nm SW of Odiham with the Bocian glider 0·5nm to its ENE tracking SW at a reported height of 2000ft QFE (2405ft QNH). 4 sec later the glider fades from radar in the F900's 11 o'clock range 0·25nm, reappearing at 1334:58 0·25nm S of Odiham, 0·85nm behind the F900, which is now indicating FL013 (1960ft QNH). The ASK21 glider, at a reported height of 1200ft QFE (1605ft QNH), reported by both crews as passing below and S of the F900 is not seen on recorded radar.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both gliders and the F900 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.

Although the F900 had called Farnborough late, the APR had decided to make its routeing a direct approach onto the ILS LLZ. Expeditious as this was, the optimum descent profile required more track distance than existed here to ensure that the ac's height and speed would be stabilised for its approach and landing. Other options were available at the onset, including a turn to the R to track E of Odiham or even an orbit to increase the Falcon's track distance, once the Falcon had descended below the LTMA. The APR's plan had

lead her into a position which denied fall-back contingencies so, when the F900 flew through the LLZ, the only option was to recover the situation by instructing the pilot to 'tighten the turn'. Farnborough procedures allowed ac under their control to operate through the Odiham ATZ, even though gliding was in progress. Subsequently, when the ac flew through the LLZ, its flight path took it N of the extended C/L, through the Odiham O/H and into conflict with the gliders; this had caused the Airprox. The RAS had been limited, owing to poor radar performance, and TI on the unknown traffic was passed as possible gliding activity. However, the APR did not 'spell out' the gliding operations at Odiham (winch and aerotow launches) to the Falcon crew. Members expressed concern that the revised MATS Part 2 entry with reference to the glider operating altitude did not align with the AIP entry. Furthermore, the MATS Part 2 entry only informs the controller to 'bear in mind' the gliding activity without setting out any procedures to segregate Farnborough/ Odiham traffic in these situations. The Board agreed that this situation needed to be addressed and recommended that a review of procedures be carried out.

The Bocian pilot had seen the Falcon 900 about 300-400m ahead and 250ft below, his turn was taking him away from its flight path, and he watched it pass 100m to his L, below. The ASK glider pilot had seen the F900 to his L and 300ft above and had watched it pass clear. The APR had passed TI to the Falcon crew on a single radar contact adjacent to Odiham but poor radar performance had made her task more difficult. The F900 pilot had seen two gliders 1nm ahead after breaking cloud and, after he had tightened his turn, he had elected to fly between them (maintaining visual separation) passing 200ft below and 0·25nm S of the Bocian and 300ft above and 0·5nm N of the ASK. Some members felt that the geometry of the encounter and visual sightings by all parties had effectively removed any risk of collision. Others thought differently. Although not unanimous, a majority of members believed that the Falcon crew's options had been limited, once sighting the gliders late, and this, combined with the ac's passage O/H the glider site below the max cable release height, led the Board to conclude that ac safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Vectoring of the F900 by the Farnborough APR resulted in a confliction with both gliders, overhead the gliding site.

Degree of Risk: B.

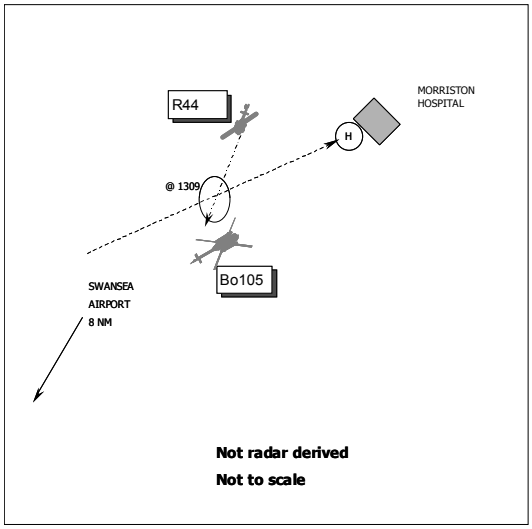
Recommendations:

a. The CAA asks NATS to review the revised MATS Part 2 for Farnborough, to bring it into line with the UK AIP at ENR 5-5-1-4.

b. The CAA asks NATS to introduce, jointly with MOD, written procedures to ensure segregation between Farnborough and Odiham traffic.

AIRPROX REPORT NO 10/03

Date/Time:	15 Feb 1309 (Saturday)	
Position:	5141N 0356W (8nm NE Swansea)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Bo105	R44
Operator:	Civ Com	Civ Pte
Alt/FL:	600ft (QNH 1036mb)	800ft (N/K)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	30km	Excellent
Reported Separation:	75ft V 50m H	0.75nm
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo 105 PILOT reports that he departed from Swansea Airport in a red air ambulance ac to an incident. Following the incident he was on final approach to the Morriston Hospital Swansea helipad in 30km visibility, heading out of sun, in a wire dense environment with strobes and landing lights on and in receipt of a FIS from Swansea with SSR and Mode C selected.

As he was descending through 600ft Swansea QNH (1036mb) heading 060° at 60kt he told the front-seat paramedic to note the wires in his 11 o'clock, as they would be a factor in their subsequent departure. As he moved to his left they both saw a R44 coming towards them, 75m ahead and 75ft below them. He told Swansea ATC to note the time as he was declaring an Airprox, as he turned right to avoid the R44. During the touchdown ATC stated they were not aware of any ac in the vicinity. The R44 pilot then transmitted to ATC stating that he believed himself to be the reported ac and that he had just lifted off from 'a private site'. The Bo105 pilot also stated that he was perturbed that a local ac was flying so close to a known local feature, downwind at approx 150ft agl, between 2 sets of 200ft+ power cables, at what appeared to be fast cruising speed. He assessed the risk of collision as high. He added that the hospital helipad had over 500 movements per year and he thought that it warranted highlighting on the aeronautical charts.

THE R44 PILOT reports that he was flying a navy blue R44 from a private site routeing to another private site to the E of Swansea Airport in excellent visibility and was about to request an FIS from Swansea. Shortly after lift-off he was heading SE at an altitude of 800ft and 80kt when, at a range of ¾nm, he saw the Bo105 and turned to the right. The Bo105 then saw him and turned to the left. He had just had a "violent sneeze" and stated that he should have seen the Bo105 earlier. He assessed the risk of collision as low.

THE SWANSEA ATCO reports that the Bo105 was en-route to Morriston Hospital from an incident when he reported an Airprox with an R44, which the pilot recognised as being an ac that, until recently, had been based at Swansea. Straight away the R44 pilot called and informed Swansea that he had just lifted off from a private site and was routeing to another private site to the E of the airfield. Both pilots were informed of each other's intentions and traffic information was given.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Discussion by the Board centred on the apparent divergence between the reports of the 2 pilots involved. Since no radar or other information was available both reports were given equal weighting. It was noted however that the Bo105 pilot had a good visual reference, namely the power lines, with which to judge the height of the R44; it was probable therefore that his estimate was reasonably accurate. The R44 pilot however, had just lifted off from an unspecified location and said he was in the initial climb, although this appeared not to be the case to the Bo105 pilot who was concentrating on his landing approach.

Since no radar or other supporting information was available, the members were unable to resolve the discrepancy in the reported separation. However, since both pilots saw one another and the R44 pilot was able to take effective, albeit in the opinion of the Bo105 pilot insufficient, avoiding action the Board determined that there was no risk of collision.

Although the Helipad at Morriston Hospital is notified in the Military Helicopter Landing Sites (Hospitals United Kingdom) booklet, it is not marked on CAA VFR maps. The CAA Chart Editor advises that cases for highlighting individual HLSs on CAA 1:250000 or 1:500000 scale VFR maps will be considered by CAA DAP (Aeronautical Charts and Data Section).

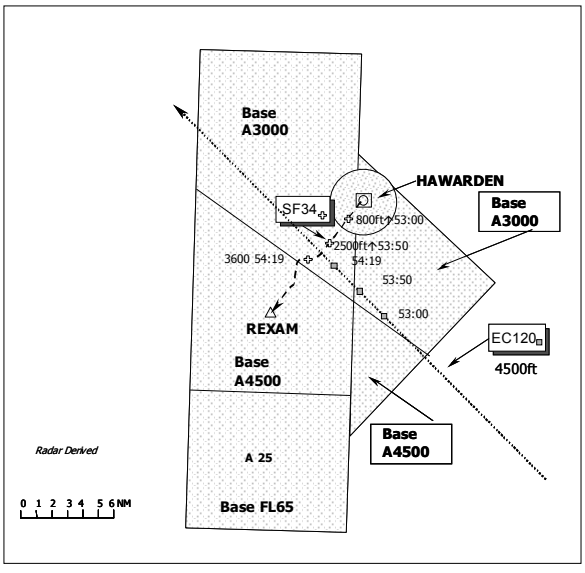
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace, near a known HLS, while the Bo105 pilot was on the approach to land.

Degree of Risk: C.

AIRPROX REPORT NO 11/03

Date/Time:	19 Feb 1254	
Position:	5306N 0306W (5nm SW Hawarden)	
Airspace:	A25	(Class: A)
Reporter:	Hawarden ADC	
	First Aircraft	*Second Aircraft*
Type:	SF 34	EC120
Operator:	Civ Comm	Civ Exec
Alt/FL:	4500ft (QNH ???? mb)	FL45
Weather	VMC HAZE	VMC NIL
Visibility:	8000M	100k
Reported Separation:	2.5nm H 600ft V	
Recorded Separation:	2.2nm H 500ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWARDEN ADC reports that the weather at 1250z was VMC with a visibility of 8000m in light haze. The SF34 was cleared outbound via REXAM to Bristol Filton climbing to FL60 and

squawking 5415C. An unknown 7000C Squawk, was observed at FL46 hdg NW by APR and ADC (via ATM) approx 8nm SW of the airfield. The SF34 was advised of the contact's details and given an avoiding hdg. The SF34 acknowledged and advised he had the ac on TCAS but did not turn. A position update was passed to the SF34 pilot who acknowledged it and asked for confirmation of the avoiding hdg which was reaffirmed as 270º; the ac then commenced a turn. Further traffic info was given to the SF34 who at approx 1257z departed the frequency. APR simultaneously ascertained the ident of the conflictor as being an EC120 from Cranfield to Ronaldsway, Isle of Man. This ac contacted Liverpool during the relevant period who initiated an immediate descent to avoid the SF34 and traffic from London Area also joining at REXAM.

THE SF 34 PILOT reports that shortly after IFR departure from RW23 at Hawarden to join airways he was given traffic information by Hawarden ADC on unknown traffic squawking 7000 moving left to right which he subsequently observed on TCAS. ATC advised a radar heading of 270º and after observing the traffic closing he decided to commence a turn. Since they both climbed and turned away he was clear of the traffic and after approx 30sec they resumed own navigation to Rexam and were handed over to Manchester Radar.

THE EC120 PILOT reports that he was flying VFR from Cranfield to Ronaldsway. The visibility was excellent above a haze layer and there was no significant cloud. He was heading 325° at FL45/ 4500ft and 120kt squawking 7000C and was attempting to call Liverpool APP. By the time two-way communications had been established he had entered CAS (Transponder on Mode C). The EC120 pilot believed that the controller had him on Radar and the fixed wing had him on TCAS. Liverpool APP gave him an avoiding action to the fixed wing and he descended below 3000ft, clear of CAS.

MIL ATC OPS reports that the EC120 had been working RAF Shawbury Zone Controller (ZONE) prior to the incident and had been in receipt of a FIS, routeing from Cranfield to Ronaldsway. Zone reports in his Air(C) that he *"….sent the ac en-route, approximately 3nm North of Whitchurch , it was well clear of controlled airspace but took a considerable time to change from the Shawbury FIS squawk.."*. Since notification of Shawbury's possible involvement was not received until 24 Mar 03 RT recordings were not available.

JSP 318 para 235.125 details the conditions for FIS. The document also states at 235.130.1b(ii) that a FIS *"…cannot be provided as a separate service in airspace within which Radar Control or Procedural Service is mandatory"*. This ac therefore, should not have entered CAS without ensuring an up grade in service to that relevant for the type of airspace. Nevertheless, as the ac had been sent en-route sometime previous to the incident, notwithstanding the failure to change squawk promptly, there appears to be no Mil ATC involvement in this occurrence.

ATSI reports that the Hawarden ADC, who reported the Airprox, described his workload as 'moderate' at the time of the incident and the APP was 'busy'. Following taxy clearance, an airways joining clearance was received and was passed as "*climb on track REXAM FL70 further with radar FL130 squawk 5415. When advised Manchester 128.05*." The SF34 was instructed to enter backtrack, while its release was requested from Manchester by the ADC. On receiving approval, the ADC advised the APP who warned of a 7000 squawk near the town of Wrexham apparently inside CAS, otherwise there was nothing to affect. The radar recording shows this unidentified ac to be at 4700ft.

The ADC said that he could see the unknown ac on the ATM and cleared the SF34 for take-off, with the intention of passing traffic information and instructions once the ac was airborne. At the time the radar recording shows that the ac squawking 7000 was heading NW indicating 4600ft, just about to enter Class A CAS S of NOKIN, where the base is 3000ft. ADC commented that radar returns tend to be intermittent in that area since a feed from the radar at Warton is used. Although generally giving good coverage, there is a known fade area to the SE of Hawarden. (This is being addressed with the introduction of surveillance radar on the airfield; the equipment is in situ but is not yet in use). The ADC confirmed that the unknown ac's radar return was intermittent but he was able to pass traffic information to the pilot of SF34 "…*there is traffic S of you range 4 miles indicating 4600ft unverified and it's crossing you from left to right. If you require a heading it's right heading 270°".* The pilot replied *"we have him on*

TCAS". The ADC responded "*Okay the heading is still good 270° report if you're taking up that heading or continuing on climb*". The radar photograph, timed at 1253:00, shows the SF34 passing 800ft. The 7000 squawk, with an unverified readout of 4600ft, is in its 10 o'clock position at a range of 5.9nm. The ADC said that because the pilot had reported having the unknown ac on TCAS and having been issued with what he regarded as an avoiding action turn, he had assessed that there was no risk of collision.

The ADC said that he thought that it had been preferable to use the ATM to pass avoiding action instructions and traffic information rather than to transfer him to the APP. He reasoned that, not only might the pilot take time to make the transfer, when it was imperative that information was passed straight away, with the additional risk of him selecting the wrong frequency, but also he could hear that the APR Controller was busy telephoning adjacent units to attempt to establish the identity of the unknown ac. In any case, he thought his colleague would probably only take the same action as he had already taken.

At 1253:45, the pilot of the SF34 asked if the avoiding heading was 270°. This was confirmed, the controller adding: "*It's still a good heading the ac is now 2 miles SW (actually SE) of you still indicating 4500ft on a NW track unverified*". The pilot reported turning right onto a heading of 270° and was advised that he was in the other ac's twelve o'clock. About 30 seconds later the pilot asked for confirmation that the ac was behind his flight at the same altitude. This was confirmed and the SF34 pilot was instructed to resume its own navigation towards REXAM, the unknown ac now being 2nm miles behind and going away. The flight was then transferred to Manchester. The radar recording of the event shows the minimum separation was 500ft vertical and 2.2nm horizontal, by which time the tracks of the subject ac were diverging. The SF34 commenced the right turn onto heading 270° as the EC120 was passing 2.5nm behind it.

As a result of the APP's enquiries it was established that the unknown ac was an EC120. Shawbury advised that the helicopter had been in communication with them and had been transferred to Liverpool at the pilot's request establishing communication at 1253, reporting overhead REXAM at 4500 ft and requesting a FIS. The radar recording reveals that the helicopter was about 7nm east of REXAM at the time i.e. within CAS. (The base of Airway A25 in the helicopter's **reported** position of REXAM is 4500 ft.) Liverpool instructed the EC120 pilot to remain clear of CAS. Shortly afterwards the helicopter was identified in CAS and was instructed to descend immediately because of conflicting traffic at 5nm. By this time the EC120 had passed behind the SF34.

The MATS Part 1, Section 1, Chapter 5, Page 13, defines unknown ac and the action to be taken by controllers to avoid such flights. "A radar return which cannot be associated with an ac known by the radar controller to be operating within the airspace concerned shall be considered to represent an unknown ac." The action to be taken by the controller in Class A Airspace is "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." The same publication, Section 2, Chapter 1, Page12, states that an ATM "must not be used as a surveillance radar to provide approach radar services". It describes the basic uses of the ATM, adding other functions when approved by the CAA and detailed in MATS Part 2. The Hawarden MATS Part 2 did not permit the use of the ATM beyond the basic uses as specified in MATS Part 1. Additionally, Section 2, Chapter 1, Page 1, states that: "An ADC shall not provide approach radar control services whilst engaged on aerodrome control duties". In accordance with MATS Part 1, avoiding action instructions and TI should undoubtedly have been passed to the SF34 in respect of the unknown ac. It was, therefore, the responsibility of the APR Controller to take such action. However, in the event, whilst not condoning the action taken by the ADC, i.e. the unauthorised use of the ATM, it did resolve the confliction and would probably not have differed from that which would have been taken by the APR Controller. It is understood that local procedures are being reviewed with the intention that departing IFR flights, such as those enroute to REXAM, will be routinely transferred to APP as soon as airborne. This is dependant on staffing considerations.

Following local discussions with RAF Shawbury, ATC at that unit will in future transfer ac approaching the Hawarden area from the S to Hawarden Approach in preference to Liverpool.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board concurred the very comprehensive ATSI report. In particular the members considered that the EC120 pilot seemed oblivious to the very complex CAS structure in the area of Hawarden and of the correct procedures for transiting such airspace. They agreed that the unauthorised penetration of A25 and the associated 'fillet' was a major factor in the occurrence. That said, clearly there was a breakdown in the normal safety nets in Hawarden ATC. Even though Manchester may not have been aware of the presence of the intruder when they released the SF34, Hawarden ATC was. Nevertheless they neither alerted Manchester nor did they delay take off clearance for the SF34 until the intruder ceased to pose a confliction threat. This breakdown in communication formed a second part to the reason behind the incident.

Although the avoiding action passed by the ADC was effective, it was not in accordance with current directives regarding the use of ATM equipment. Members considered that it would have been better practice for the APP Controller to handle the departing ac leaving the ADC to try to identify the intruder. However, since the SF34 did successfully take the avoiding action offered by the ADC, albeit not on the first occasion, 2.2nm horizontal and 500ft vertical separation was achieved therefore there was no danger of collision.

The Board welcomed the review of local procedures being conducted by Hawarden.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

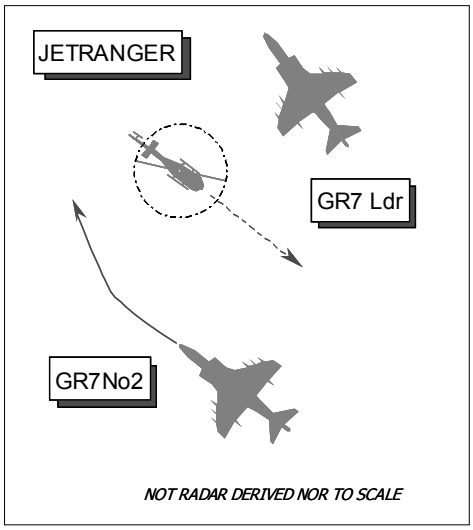
a. Unauthorised penetration of Class A airspace by the EC120 pilot, who flew into conflict with the SF34, which he did not see.

b. The Hawarden ATC team cleared the SF34 for take off into conflict with the EC120, which had penetrated CAS.

Degree of Risk: C.

AIRPROX REPORT NO 12/03

Date/Time:	25 Feb 1443	
Position:	5232N 0329W (Clatter - Wales)	
Airspace:	UKDLFS	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	JetRanger	Harrier x 2
Operator:	Civ Comm	HQ STC
Alt/FL:	600ft agl	350ft Rad Alt
Weather	VMC CLBC	VMC HAZE
Visibility:	10km	8km
Reported Separation:	100m H, 50ft V	500ft H, 50ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETRANGER PILOT reports his ac has a silver colour scheme and the HISL and landing lamp were on. He was operating in an area of poor RT reception and thus was not in receipt of an ATS, but was squawking the assigned PINS squawk of A0036 with Mode C; TCAS is not fitted. His inspection flight had been notified under the Pipeline Inspection Notification System (PINS).

Flying 2000ft below cloud with an in-flight visibility of 10km, whilst conducting the pipeline inspection, he was heading 130° at 100kt down a valley at 600ft agl, when his observer warned him of 2 ac approaching from ahead. He spotted two jets, which he identified as Harriers about ½ nm away. To avoid them both, he descended his helicopter whilst maintaining his heading. One Harrier passed 100m to port and about 50ft above his JetRanger. The second Harrier, which had initially turned towards his helicopter before pulling up was about 3sec behind the first and passed 100m to starboard and also about 50ft above him. He assessed the risk as low due to his avoiding action descent.

THE HARRIER GR7 PILOT, a staff QWI, provided a very comprehensive and frank report that was compiled in difficult circumstances. He reports he was flying as the No2 of a 2-ship GR7 formation; the lead pilot was an experienced fast jet pilot 'converting' to type. The ac was camouflage grey but the HISL was on. They were not in receipt of an ATS and were operating autonomously on the LFS frequency of 300·8MHz. A squawk of A7001 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

The sortie was a simulated attack profile (SAP) planned through LFA7 against 2 targets and involved the formation flying a mixture of 1-2nm line abreast or swept arrow formation, with a displacement of about 1nm offset to port astern of his No1. All essential items were briefed including the NOTAM'd PINS flight in the areas; the briefed MSD for the sortie was 250ft and the weather was approx 8km visibility with no cloud below 10000ft. As the formation entered the A470 valley W of Newtown in transit, heading 310° at 440kt, he 'collapsed' from line abreast into swept arrow and followed the lead ac through the low ground in order to avoid a simulated low altitude SAM threat by maintaining terrain masking. Whilst in a very gentle right hand turn at 350ft Rad Alt he spotted a grey helicopter to his R - at 2o'clock about 1000ft away - and very slightly below his height. He immediately rolled to wings level and pulled into a 4½g climb in order to maximise separation from the helicopter and also to indicate that he had seen it. At the closest point the JetRanger passed 500ft to starboard and about 50ft below his jet, in between the two Harriers after his

avoiding action manoeuvre. Although his manoeuvre increased vertical separation he believed that if he had continued his R turn his jet would still have passed well clear of the JetRanger. Nevertheless, he could not be certain about how close the helicopter passed to the lead Harrier, though his immediate assessment was that the JetRanger had passed in between and below, which he warned his No1 about via RT as he over-banked to the R to keep it in view. He commented that they had come close but not too close and elected to continue the sortie.

On returning to his base he immediately plotted the Airprox location, which was close to a factory helicopter landing site and so he endeavoured to make contact. During the post sortie debrief, a review of both cockpit and head up display (HUD) video tapes failed to show any sign of the helicopter despite being fairly good quality. Furthermore, it was apparent that the lead pilot had not seen the helicopter at all and was, therefore, unable to contribute to the report.

UKAB Note (1): Though the Harrier pilot believed the helicopter flown by the reporting pilot might have departed from a HLS in the vicinity this was not the case.

UKAB Note (2): This Airprox occurred outwith the coverage of recorded radar.

UKAB Note (3): This Airprox occurred on the boundary between PINS Gas Area E9 & E10. The pm PINS NOTAM for this day – Y0686 - was transmitted 241901Z Feb and notified this area – amongst others - as being active 12-1700UTC.

HQ STC comments that this was a good example of the 'see and avoid' principle working well in the LFS. As the No2 Harrier pilot said, "they had come close but not too close" due to good lookout and timely avoiding action.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, and a report from the appropriate operating authority.

A pilot member briefed the Board that this operator's entire helicopter fleet has now been fitted with the 'Skywatch' traffic avoidance system, which was very encouraging, although this Airprox occurred before this particular ac was so fitted. Notwithstanding any advantage that might accrue from the helicopter pilot's use of the 'Skywatch' equipment, he reports that he had spotted the jets about ½nm away and had sufficient time to effect an avoiding action descent from his reported inspection flight height of 600ft agl – that was within the AIC recommended height band [5-700ft agl] for such flights. This was a 'good spot' by the PINS helicopter pilot - aided by his observer - as the small indistinctive jets heading directly towards him, with only a little crossing movement and single HISLs to advertise their presence, would have been difficult to detect looking down on them against the background terrain. The reported descent to a height 50ft below that of the jets meant the helicopter levelled at around 300ft agl and some wondered at the dynamics involved. A 300ft descent completed in the time period from when the pilot first saw the jets from ½ nm away at a combined closing speed of 540kt would have required a descent rate in the order of 5400ft/min within the available 3·33sec. A helicopter pilot member advised this was not feasible in a controlled manner and at the most some 1500–2000ft/min was probably attainable. At the reported speeds/heights given, even at a 2000ft/min descent a sighting distance of 1·35nm could be calculated. Whereas for a ½nm sighting distance, the helicopter would need to have been at a lower transit height of 411ft to achieve the same vertical separation below the jets. Thus, it was probable that the helicopter pilot might have seen the jets further away, or he might have been flying a little lower than he thought at the time, or a combination of these two conditions may have applied. The Board was unable to resolve this point, but agreed it made little difference to the outcome. Irrespective of the actual geometry, the JetRanger pilot had elected to descend through the two GR7s' height to avoid them and this robust action achieved at least 50 ft of separation beneath the Harriers as they passed either side of the helicopter. The absence of any recorded radar data precluded confirmation of the actual distances here, but the reports from two of the three pilots that actually saw the event were not vastly different – the JetRanger pilot reported 100m [328ft] whereas the No2 GR7 pilot quoted 500ft. Thus for his part the helicopter pilot had seen the jets and avoided them, whereas the lead GR7 pilot had not detected the JetRanger at all,

even though it might have been skylined above him. The JetRanger also went unnoticed to the No2 until he acquired it visually 1000ft away and it might have been the helicopter's rapid descent that drew attention to it, but at the ranges reported he saw it after the helicopter pilot did so. Nonetheless, the equally robust avoiding action taken - immediately rolling wings level and pulling into a 4½g climb - was entirely effective in stopping the separation from reducing still further. The Board agreed that although the lead Harrier pilot was oblivious to the presence of the helicopter, the combined actions taken by the pilots of the JetRanger and No2 GR7 were sufficient to resolve the conflict between them.

Turning to risk, some members thought that with the lead GR7 pilot unsighted, the separation distances given and the quoted closing speed of 540kt, safety might have been compromised. However, given the comments about risk expressed by the pilots themselves, in the end it was agreed that the robust avoiding action taken by both pilots had removed any risk of a collision in the circumstances reported here.

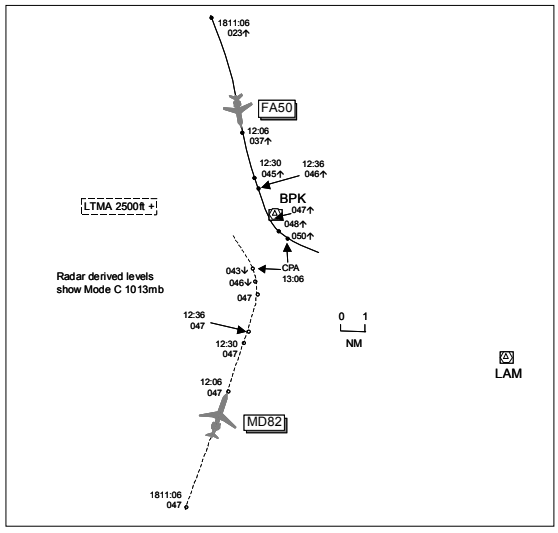
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict between the JetRanger and the Harrier formation, unseen by the Harrier Leader, resolved by the JetRanger pilot and the No 2 Harrier pilot.

Degree of Risk: C.

AIRPROX REPORT NO 13/03

Date/Time:	13 Feb 1813	NIGHT
Position:	5143N 0008W (1·5nm S BPK)	
Airspace:	LTMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	MD82	FA50
Operator:	CAT	Civ Pte
Alt/FL:	5000ft (QNH)	5000ft↑ (QNH)
Weather	VMC NK	VMC NK
Visibility:	NK	NK
Reported Separation:	600ft V 3-5nm H	NK
Recorded Separation:	700ft V 1·85nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MD82 PILOT reports flying outbound from Heathrow following a BPK 5J SID with clearance to climb and maintain 5000ft QNH not 6000ft, the standard initial altitude. Approaching BPK at 300kt, he noticed an ac target on TCAS in his 12 o'clock indicating the same level. Whilst informing the other two crew members (line check flight) about the indication, ATC called *"avoiding action turn left immediately to heading 290 degrees"*. He disconnected the A/P and banked the ac 30º to the L but halfway towards the given heading TCAS commanded *"descend"* at 1500fpm. He followed the TCAS command and at 4400ft *"clear of conflict"* was annunciated and he climbed back to 5000ft. Flight conditions were VMC during the encounter and, as he commenced the avoidance manoeuvre, he had visually acquired the conflicting ac in his 12 o'clock moving to his R, 3-5nm away.

AIRPROX REPORT No 13/03

THE FA50 PILOT reports flying outbound from Luton on initial climb at 250kt in VMC when, near BPK, he complied with a TCAS RA warning during a L turn.

UKAB Note (1): Met Office archive data shows the London QNH as 1026mb.

ATSI reports that the controller was operating the TC NE Sector i.e. NE Deps/Lambourne in bandboxed mode. He was acting as mentor to a trainee who had completed about 100hr training. He described the traffic loading as moderate but, due to the complexity of the task, he considered the workload level was moderate/high. Nevertheless, he judged the sector to be manageable, even with the presence of the trainee. He added that, approximately 10min prior to the incident, with an expected build up of traffic, it had been decided to split the sector within 20min.

The controller, who had been in position with his trainee for50min prior to the incident, explained that there had been a Category B special flight operating to the E of Heathrow for some time. Initially, it had been using higher levels but for about 20min it had been maintaining an altitude of 6000ft. As Heathrow were on easterly operations, this necessitated restricting certain Heathrow SIDs to 5000ft. This restriction applied to the MD82, which, having been cleared on a BPK5J SID, would normally be expected to cross BPK at 6000ft.

The FA50 established communication with the NE Sector at 1809, having departed Luton's RW08 on a Clacton (CLN) 6C SID. The routeing for this SID is: *"Straight ahead to LUT NDB. Turn right onto BPK VOR R339 to BPK VOR, then to CLN VOR"*. The initial cleared altitude is 4000ft with further climb after BPK to 5000ft. The flight was instructed to 'squawk ident' and given no speed restriction but no reference was made to its cleared altitude. The next call on the frequency was from the pilot of the MD82 who reported climbing to 5000ft, in accordance with the agreed action with respect to the presence of the special flight at 6000ft. The trainee instructed the flight to maintain 5000ft on reaching and to 'squawk ident', with no ATC speed restriction. Shortly afterwards the STCA activated with a low severity alert between the MD82 and the Category B special flight. The SC said that, as he was aware that not only had the pilot reported climbing to 5000ft but also his trainee had reiterated the instruction to maintain that altitude on reaching, there would be no separation problem between these two ac.

Thereafter, information was received by the NE Sector that the special flight had finished its detail and was leaving the area. As the Co-ordinator was busy the mentor informed the Group Supervisor accordingly. This action was followed by co-ordination with the NW Sector to climb the FA50 under a northbound ac that was also climbing and which had been transferred to that sector. Once this co-ordination was completed the NE SC discussed the traffic situation with his trainee. Consequently, at 1811, as the conflicting northbound ac had climbed through 5000ft, the trainee instructed the FA50 to climb to that altitude and annotated its fps accordingly. This resulted in the subject ac, which were 21nm apart, routeing to BPK, now having been cleared to the same altitude. The mentor admitted that he did not hear his trainee issue this last instruction to the FA50 or see that the fps was annotated with the revised altitude. Originally, he thought he might not have heard the transmission because he was busy carrying out the previously mentioned co-ordination but that had occurred earlier. He could only surmise that he had been distracted whilst discussing the traffic situation with the trainee. In any case, he had forgotten the presence of the MD82, probably he thought, because its SSR label was overlapping with that of the Category B special flight. Both his and his trainee's attention then turned to the traffic situation elsewhere in the sector.

At 1812:30, the trainee instructed the FA50 to climb to FL150 and to route direct to GABAD. The pilot read back the cleared level but queried the routeing. The mentor commented that he was not surprised that the pilot asked for clarification of the reporting point as, in his opinion, the use of CLN would have been more appropriate. It was whilst the pilot was querying the name of the next reporting point that STCA activated, going straight to a high severity alert. The radar timed at 1812:36, just before STCA activated, shows the subject ac on conflicting, converging tracks 6·1nm apart, the MD82 is maintaining FL047 (5090ft QNH 1026mb), the FA50 is 100ft below but still climbing. The mentor said that he started to move his hand towards the training box to issue avoiding action instructions but, before he could

take control of the RT, his trainee had already commenced issuing appropriate instructions. The MD82 was given an 'avoiding action' L turn heading 290° and the FA50 an 'avoiding action' L turn heading 060°. Although the 'new' avoiding action phraseology was not used both crews responded straight away, with the MD82 reporting a 'TCAS descent'.

UKAB Note (2): The CPA occurred at 1813:06, 1·85nm horizontal and 700ft vertical. By this time the avoiding action turn instructions were taking effect, the MD82 in a L turn descending through FL043 (4690ft QNH 1026mb) passing abeam the FA50 which is climbing through FL050 (5390ft QNH).

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 traffic situation had been non-standard, owing to the Category B flight occupying LTMA airspace, the situation was not uncommon. The FA50 crew did not report their cleared level on initial contact, and this went unchecked by the mentor and trainee. On this occasion, it was felt that the Falcon crew should have been restricted (told to maintain 4000ft) to ensure it remained 1000ft below the MD82 at 5000ft. The TC NE Sector mentor, who had forgotten the presence of the MD82, had, for whatever reason, not monitored his trainee's actions, which resulted in the FA50 climbing into conflict with the MD82. This had caused the Airprox.

The trainee and mentor were warned of the confliction by STCA and had quickly given avoiding action turns to both ac. Meanwhile, the MD82 crew were already aware of the confliction from TCAS and, whilst carrying out the ATC avoiding L turn, had followed the RA *"descend"* command, visually acquiring the FA50 and watching it pass to their R. The FA50 crew had also received and followed an RA alert. All of these actions when combined were enough to convince the Board that any risk of collision had been effectively removed.

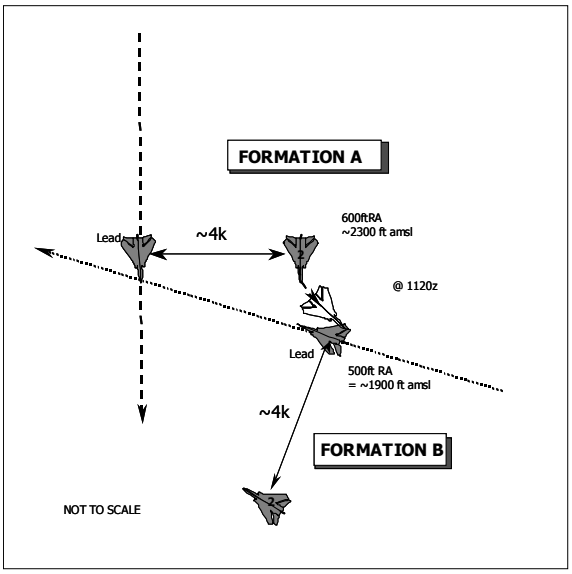
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The TC NE Sector mentor allowed his trainee to climb the FA50 into conflict with the MD82.

Degree of Risk: C.

AIRPROX REPORT NO 14/03

Date/Time:	21 Feb 1120	
Position:	5738N 0435W (30 NM W Lossie)	
Airspace:	UK LFS	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado GR4	Tornado GR4
Operator:	HQ STC	HQ STC
Alt/FL:	600ft (Rad Alt)	500ft (Rad Alt)
Weather	VMC HAZE	VMC
Visibility:	10km+	40km
Reported Separation:	<500 ft H <500ft V 300 m H 500ft V	
Recorded Separation:	No Radar	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT (Formation A) reports that he was leading a 2-ship tactical formation at low-level from N to S in hilly terrain in LFA 14 as a 'battle pair' separated by 4km with lead on right side. The weather was good VMC with a visibility of >10km in light haze into sun. The ac was dark grey with HISLs, anti-collision lights and the nav lights on both ac were on, but TCAS was not fitted. They were heading into sun, at 450 kt, clearing high ground in a left hand descending turn at approx 600ft agl. As the ac recovered to straight and level the no 2 navigator called another Tornado, left 11 o'clock, on the formation tactical frequency. The No 2 pilot looked around the canopy arch and immediately spotted the other ac on a collision course and on seeing the other ac he initiated a hard climbing turn to the left. The No2 pilot considered that there was an actual risk of collision and he pulled up hard to avoid the other ac. On recovery to base 5G had been recorded.

He assessed the risk of collision as high.

THE TORNADO GR4 PILOT (Formation B Leader) reports that he was flying a grey ac with HISLs on leading a tactical formation on a QWI (Qualified Weapons Instructor) instructional sortie. He was heading 290° at 500ft agl and 420kt when the conflicting ac was initially seen in the 2 o'clock position about 500ft high in a left hand turn. The ac remained 500ft above throughout and passed ¾ mile behind. The ac always maintained relative movement in the canopy and maintained height separation and was never considered a collision risk. Both Formation B leader and his No2 called tally with the formation.

UKAB Note (1): Although the conflicting ac passed ¾nm behind, at the closest point it was 300m abeam. (Source: Formation B Lead's F765A diagram).

UKAB Note (2) No ac were observed on radar recording at any time in the area concerned.

STATION COMMENTS. The Airprox occurred 15nm NE of Inverness in a generally hilly area with the odd mountain above 3000ft.

Formation B was heading 290° from the Inverness area and Formation A was heading 175° from the N. Formation A had crested a ridge and No2 banked left on to 150° for a short time to expedite a return to 250ft MSD. As the pilot rolled wings level the navigator saw another Tornado, in the left 11 o'clock, coming towards them on a collision course. He quickly relayed this information to the pilot who looked around the canopy arch, spotted

the Tornado and reacted with a hard pull and then a bank to the left to follow the progress of the conflicting Tornado.

Formation B lead's first sighting of Formation A was after avoidance action was taken. The pilot saw Formation A No2 in his 2 o'clock, 500ft above in a left turn and avoiding action was unnecessary by this time.

This Airprox had the potential to be a mid-air collision. The crews were fortunate that the No2 navigator of Formation A, whose normal area of responsibility for lookout is in the rear hemisphere, spotted the lead ac of Formation B. This pick up was made even more exceptional by the fact that Formation B lead would have appeared stationary against the background terrain.

It is likely that the two formations were hidden from each other by high ground as they both crested separate ridges at about 20 sec to the Airprox and at the time of the Airprox they would have been camouflaged against the terrain behind. However, one of the prime purposes of battle formation is to provide improved lookout in the form of cross-cover between elements of the formations, and it is disappointing that neither formation spotted the other until seconds before the merge. Furthermore, all crews should have been aware of the possible confliction at the out brief by comparing their route with others on Record of Flight (ROF) proforma.

This incident will be publicised at the Stn concerned to remind crews of the importance of effective lookout and careful reference to ROFs.

HQ STC comments that it is disappointing that despite the Stn concerned operating a system for all low-level flights to notify their routes (via ROF proformas) to each other, and a procedure to check and compare routes for possible conflicts, these crews were unaware that they might cross paths. This incident must serve as a reminder for all crews to follow checking procedures assiduously. Crews must also be aware that when terrain masking and contour flying, they are compromising their ability to see and be seen. When approaching high ground it is prudent to 'unmask' early, during training flights, to allow the 'see and avoid' principle to be effective.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted solely of the reports from the pilots of the ac involved and from the operating authority.

The members of the Board agreed with HQ STC's concern that, despite the parent Stn of the ac operating an internal low level flight notification system designed to warn other LFS users of ac routings and a procedure to check the routes for possible conflicts, these crews were unaware that their planned paths would cross. However, they noted that late changes of sortie timing owing to operating factors and ac serviceability necessarily meant that this system was not infallible. They also agreed that, when the LFS is known to be busy, crews could ensure that operational procedures are modified to allow their ac to be visible to other users earlier.

The Board decided that the proximity and the relative flight paths of the conflicting ac were such that although there had clearly been a compromise of safety, the successful avoiding action taken by the No2 pilot of Formation A, generating a miss distance of about 250m laterally and 500ft vertically, had been enough to remove the risk of an actual collision.

Board members welcomed the HQ STC statement that flight safety in peacetime could assume a higher relative importance than the need to 'train as you fight'. Furthermore, they were pleased to learn that the Stn concerned had adopted several publicity and training measures, including a 'Flight Safety Day', to emphasise to crews the importance of Flight Safety.

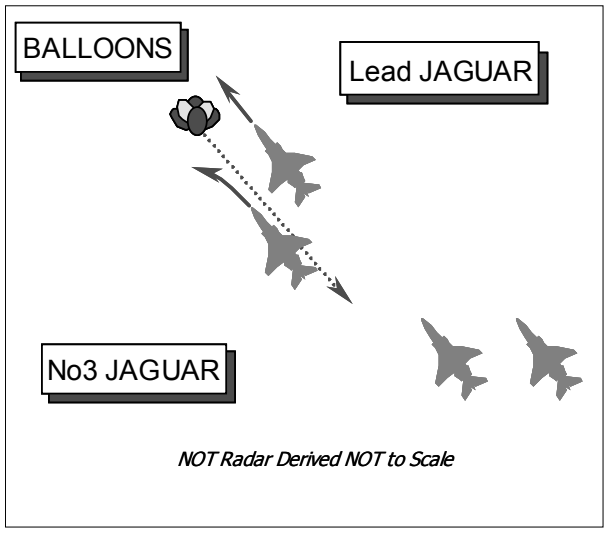
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Terrain masking prevented earlier sightings by all crews in a conflict resolved by the No2 pilot of Formation A.

Degree of Risk: B.

AIRPROX REPORT NO 15/03

Date/Time:	28 Feb 0946	
Position:	5420N 0020E (27nm E of Scarborough)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Jaguar	Untraced Balloons
Operator:	HQ STC	NK
Alt/FL:	FL165	---
Weather	VMC Nil Cloud	---
Visibility:	10km+	---
Reported Separation:		
	Nil	---
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE No3 JAGUAR PILOT reports that he was flying as the left hand rear ac within the leading section of a formation of 4 Jaguars, flying in loose arrow formation at FL165. They were under a RIS from London MILITARY and flying at 450kt in a clear sky, out of sun, with an in-flight visibility of 10km+; his workload was low.

Whilst in transit heading 330°, about 27nm E of Scarborough – he gave a Lat/Long position – a cluster of 5-6 red and yellow balloons was spotted at 12 o'clock about 1 nm ahead at the same level. He broke L to avoid the balloons, which passed 500ft down the starboard side in between his ac and the leader. He immediately transmitted a warning of the danger to the following element, but only one of the other pilots saw them. He assessed the risk of a collision as *"high"*.

He added his ac has a grey camouflage scheme, the HISL was on and the assigned squawk was selected with Mode C.

UKAB Note: The Met Office has advised that the winds in the vicinity of this location were: - at the surface: south westerly - light; 18000ft: S - 15kt, suggesting a probable launch location of Lincolnshire or Nottingham. Furthermore, the Met Office has confirmed that they did not launch these balloons.

AIS MILITARY reports that Airspace Utilisation Section at DAP confirmed that no releases were notified to them for NOTAM action. Despite extensive tracing action, efforts to identify the agency that released the reported balloons in this incident have proved fruitless.

MIL ATC OPS reports that LATCC (Mil) Controller 15 (CON 15) was controlling the Jaguar formation under a RIS when the leader reported that he had *"…passed close to 4 or 5 large red and yellow balloons approximately 20nm north of QM8 at FL165"*. CON 15 reports that no other contacts were seen on radar in the vicinity of the formation. The Great Dun Fell radar recording supports this statement.

The LATCC (Mil) Supervisor ensured that the presence of the balloons was passed on to other units in the area, but ATC could do little else in the circumstances. There are no Military ATC factors within this Airprox.

HQ STC comments that the UKAB has tried before to address the problem of balloon releases, but with no success. Until a method of controlling releases of large objects into the troposphere is in place, aircrew will need to remain ever vigilant to these random hazards.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Jaguar pilot, radar video recordings and reports from the appropriate ATC and operating authorities.

It was explained that no information was readily available relating to the effects, or indeed the feasibility, of a jet ac actually striking a balloon. It was not known if the airflow would or would not displace the balloon and deflect it away preventing it from striking the airframe; as an aside military pilot members related the difficulties of actually engaging the probe with a refuelling basket when Air to Air refuelling with a tanker ac. Additionally, the Board was not aware of any effect that might result if the balloon burst and was ingested in the engines. The lack of any positive information relating to the origin of the balloons had also frustrated further investigation. Consequently, the Board could only conclude, rather unsatisfactorily, that this Airprox had resulted from a conflict with untraced balloons and that insufficient information was available to determine the risk involved.

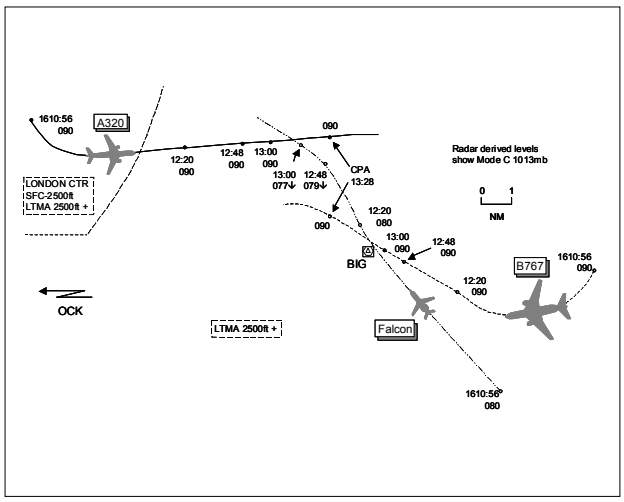
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict with untraced balloons.

Degree of Risk: D.

AIRPROX REPORT NO 16/03

Date/Time:	28 Feb 1613	
Position:	5121N 0001E (2nm NNW BIG)	
Airspace:	LTMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	B767	A320
Operator:	CAT	CAT
Alt/FL:	FL90	FL90
Weather	IMC NK	IMC NK
Visibility:	NK	NK
Reported Separation:		
	nil V 3nm H	nil V >2·5nm H
Recorded Separation:		
	nil V 2·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B767 PILOT reports flying inbound to Heathrow holding at BIG level at FL90 and 220kt in IMC. Heading 303° inbound to the VOR, he noticed another ac on TCAS to his L, the subject A320, which was being vectored towards him at the same level. He called ATC, told them of the conflicting traffic, and was issued an avoiding L turn onto 270º and descent down to FL80, which he complied with. TCAS gave a TA alert as the other ac was 'seen' on TCAS to pass about 3nm away and he assessed the risk as medium/high.

THE A320 PILOT reports following a radar heading from OCK at FL90 and 220kt inbound to Heathrow. It appeared that the controller had omitted to give him further instructions as about 8nm E of the VOR, TCAS gave a TA alert on the subject B767, about 4nm away as its pilot advised ATC of his presence. He was given descent clearance to FL80 which he complied with. He thought there had been no risk (>2·5nm separation indicated) as both ac had received TCAS information on each other and the controller

had reacted immediately to provide adequate vertical and horizontal separation.

ATSI reports that at the time of the Airprox, both ac were in communication with the Heathrow Intermediate South Director (INT DIR S). Both the workload and traffic loading were described as 'busy'.

The A320 established communications with the Heathrow INT DIR S at 1550:05, descending to FL90 and was instructed to take up the hold at Ockham. At that time, the holding delay was in the order of 10 to 15 min. Some 4 min later, the B767 reported on the Director's frequency, descending to FL120 inbound to Biggin. The crew were similarly advised that they could plan on holding for 10 to 15 min.

The B767 was progressively descended in the Biggin hold to FL90. At 1607:15, the Director instructed the A320 to leave the Ockham hold, by turning onto a radar heading of 010º and reduce speed to 220kt. This was designed to sequence the flight behind another ac in the inbound sequence. Meanwhile, a Falcon 2000, critical to subsequent events, was inbound to Northolt and, at the time, was being routed via Biggin at the minimum stack level of FL80.

The A320 was subsequently instructed to turn R onto a heading of 150º and, some 2 min later, L heading 100º. These manoeuvres positioned the ac downwind LH for RW27L at Heathrow. By 16:10:56, the A320 was 12nm NW of Biggin still at FL90, the Falcon 2000 6nm SE of Biggin at FL80, and the B767, commencing a R turn towards the inbound leg of the holding pattern, 7nm E of the Biggin VOR also at FL90. At 1612:20, the Director instructed the crew of the Falcon 2000 to descend to an altitude of 4000ft, which was correctly acknowledged.

At 1613, the crew of the B767 transmitted "*…we're heading towards traffic the same altitude as us*". This was the A320, which was in the B767's one o'clock position at 4·7nm. The Director responded by turning the B767 L onto 270º and instructing the A320 to descend to FL80. Separation reduced to a minimum, at 1613:26, when the horizontal distance between the two ac had reduced to 2·5nm with no vertical separation.

The controller was first made aware of the Falcon 2000 inbound to Northolt when the ac was some 20nm SE of Biggin. He planned to handle it in 'the standard way', which was to take the ac from the hold and, having coordinated with the Intermediate North Director, descend it before handing it over to Northolt Approach. The strip on this ac was placed in his display with the others holding at Biggin. The controller's plan was to position the A320 into the inbound sequence, follow it with another inbound and then position the B767 behind that ac. He explained that normally he would have descended traffic leaving the Ockham hold to the minimum stack level, which on that occasion was FL80, to avoid conflictions with traffic holding at Biggin, but this was not possible on this occasion due to the Falcon 2000 occupying that level.

The controller had been aware of the potential confliction between the A320 and the B767, but he anticipated that the tracks of the Falcon 2000 and the A320 would cross in sufficient time for the A320 to be descended, in order to achieve vertical separation from the B767. Furthermore, it had been his intention to instruct the B767 to leave the Biggin hold on a heading thereby achieving lateral spacing. There had been a strong southwesterly wind blowing and that had, in part, delayed the crossing of the tracks. The controller explained that, around the time he issued a descent clearance to the Falcon 2000, the TMA South Coordinator had come over to him and requested that another flight, maintaining FL120 in the Biggin hold, be given descent as the level was required for other traffic. The controller complied with this request at 1612:45. He reported that this action had distracted him from his plan for resolving the confliction between the A320 and the B767. He had been watching the Mode C of the Falcon 2000, to ascertain when he could descend the A320 to FL80, and recalled that it had been slow to commence descent. It was only 15 seconds after the Falcon 2000 had been given descent clearance that the B767 queried the presence of traffic at his level. The controller advised that he had seen the problem at around the same time as the call from the B767. As the B767 had reported the traffic, the controller did not consider it necessary to pass TI and he believed that his actions in turning the B767 and descending the A320 would probably maintain separation. With hindsight, he thought that it would have been prudent to pass TI and issue

avoiding action instructions to the B767. The controller did comment that the 'new avoiding action phraseology' was, in his opinion, "too much of a mouthful" to enable prompt effective instructions to be passed.

STCA activated at 1613:25, ceased momentarily at 1613:35 before finally stopping at 1613:46. The controller advised that its activation had been too late to be of use in these circumstances.

The controller's workload was described as 'busy' but although there is provision for a Support controller to assist the INT DIR S, the controller explained that the ergonomics of the position layout is such that a Support controller could not readily assist. In his experience the Support position was rarely manned, however, on occasions a controller was used to assist with answering the telephones. The controller advised that, on the day of the Airprox, sufficient staff had been available for this but the option was not used.

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 normal 'modus operandii' for this situation, whereby the OCK traffic (the A320) in the instrument approach sequence would be descended to minimum stack level (MSL) to pass below the BIG holding traffic (the B767) had been interrupted by the presence of the Falcon 2000 into Northolt. To accommodate this interruption the INT DIR S adopted a revised planned course of action, based on assumed ac performance which required close monitoring. Pivotal to the success of his plan was a quick descent by the Falcon occupying the MSL, but instead it was slow to vacate the required level. However, during this busy period, the controller was distracted by the TMA S Co-ordinator, just at the time when he needed to take positive action to ensure the revised plan worked. Although the Falcon had been slow to descend, another option remained of turning the B767 away as a back up. That option was exercised but too late and in the end members agreed that the Heathrow INT DIR S did not ensure standard separation between the B767 and A320 and this had caused the Airprox.

The B767 crew had seen the confliction on TCAS and, after pointing this out to the controller, was issued a L turn away and a subsequent descent. Similarly, the developing conflict was seen in the A320 cockpit by the crew on their TCAS equipment and they were also given a L turn away and descent to avoid. Members noted that these actions resulted in a minor loss of lateral separation and believed that had avoiding action phraseology been used, it may well have prompted a more positive reaction by both crews. The radar recording showed that the A320 had already crossed ahead of the B767 and was diverging when the confliction was declared by the B767 crew. This element combined with the actions taken by all parties persuaded the Board that there had been no risk of collision.

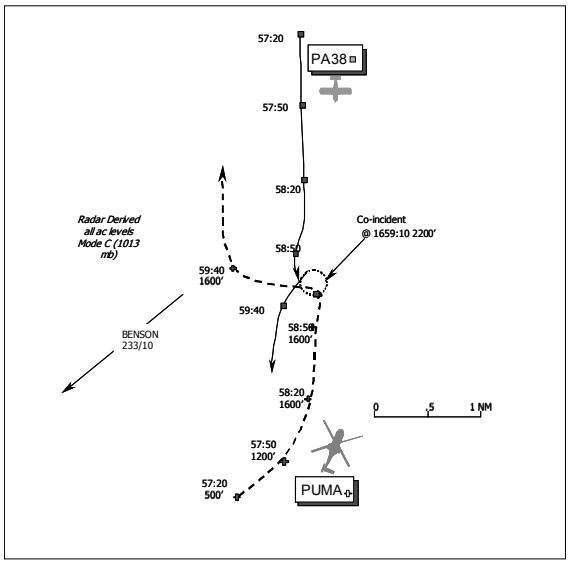
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Heathrow INT DIR S did not ensure standard separation between the A320 and B767.

Degree of Risk: C.

AIRPROX REPORT NO 18/03

Date/Time:	12 Mar 1701	
Position:	5143 N 00053 W (3 NM SE Thame (Stokenchurch))	
Airspace:	Lon FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Puma	PA38
Operator:	JHC	Civ Club
Alt/FL:	2000ft	2000ft
	(1030 RPS)	(QNH ???? mb)
Weather	VMC	VMC
Visibility:	9999	10km +
Reported Separation:		
	0NM H 50ft V	4/500M H 200ftV
Recorded Separation:		
	Contacts merged for 20 Sec	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PUMA PILOT reports that he was conducting an Airtest from RAF Benson in a camouflage green coloured ac with HISLs, Nav Lights and Landing Lights on but TCAS was not fitted. He was in receipt of a FIS from Benson and was squawking. He was about to pull the throttles as part of the test and was heading 012° (out of sun) at 2000ft at 100kt just to the SE of Thame (Benson 050/10) when he saw a white 2-seat trainer, with logo markings on the tail which he recognised, at the same level on an opposite track but with lateral separation. He called the ac to the crew as it was passing down the left hand side. The ac then turned to face them directly at which point he climbed, losing sight from the right hand seat. Under direction from the crewman, they turned left in order that the crewman could remain sighted. The other ac then began climb and tightened its left turn in order to follow, then broke and headed away eastwards.

THE PA38 PILOT reports that he was flying a white and blue PA38 with wing-tip strobes switched on in good VMC with no cloud and visibility in >40km in class G airspace near Chinnor. He is a Flight Examiner and was conducting a Flight Examiner's Test on another pilot.

While straight and level in the cruise at 2000ft QNH heading 180° and 90kt they jointly noted a helicopter at similar level on a reciprocal course at a range of >5nm. They elected as per Rules of the Air, to change heading by 15 degrees to starboard and they remarked that the previous constant bearing was now showing a suitable change such that the helicopter would pass comfortably to their port side. After the helicopter, identified visually to be a military Puma, had passed their 10 o'clock position they turned to port to resume their original track to base. As they began the turn the Puma began a high-rate climb and also turned to port. In order to keep the helicopter in view (airmanship, as the rapid climb and turn put it "above" our window) they continued to turn to port and eventually made a 360 degree turn before resuming original track. The closest range and the most direct angle did not cause concern to the two pilots in the PA38.

The PA38 Examiner stated that he suspected that the Puma pilot might not have seen them until late and possibly made a rapid ascent due to his late sighting. He assessed the risk as nil as they were sighted and avoided the other ac throughout its manoeuvring.

MIL ATC OPS reports that a Puma departed RAF Benson at 1654:43 *"….climbing out to the NE, low level, request flight information…"*. The ac was placed under FIS by the Benson Approach Controller (APP) and instructed to *"…squawk ident.."*. At 1657:28 the Puma was given clearance to *"…climb as required…"*. Nine sec later traffic information (TI) was given on *"…traffic 12 o'clock 2nm, similar level"* followed by further TI on *"….traffic N 3nm tracking S no height"* 24sec after that the Puma pilot acknowledges both calls. A general broadcast is made by APP at 1658:46 advising pressure changes and 1 min 29 sec after this (2 min 24 sec after the TI had been passed) the Puma pilot calls *"…….Airprox….."*. Thereafter details of the encounter are passed on the frequency.

Analysis of the Heathrow radar video recording shows the Puma squawking 7370 entering radar cover at 1657:19. Nine seconds later traffic in its 12 o'clock, 2¼nm indicating slightly above can be seen. The subject PA38 is left 10 o'clock 3½nm, partially obscured by another ac's squawk, however, by the time it is called by APP (24 sec after the first TI is passed) this contact is N at 3 nm. The Puma is seen to commence his avoidance climb at 1659:06 and the contacts merge at 1659:10. It is estimated that the tape transcripts are approximately 9 sec behind the video recording.

Although a FIS was requested by the Puma pilot, and confirmed by APP, it is evident that APP was actually providing a RIS. Under the rules for FIS a controller who *"……suspects, from whatever source, that a flight is in dangerous proximity to another ac, a warning is to be issued to the pilot….* Under RIS however the controller *"….will only update details of conflicting traffic, after the initial warning, at the pilot's request or if the controller considers that the confliction traffic continues to constitute a definite hazard* ". Given the converging course and the lack of Mode C readout it could be said that the PA38 constituted a definite hazard. It must be remembered however, that the Puma actually requested and was in receipt of a FIS, therefore the controller has more than adhered to rules of FIS as stated. This situation appears to fall between 2 guidelines. Under FIS a more general but less accurate warning would, perhaps, have been preferable to prevent the pilot assuming that TI would be updated as required under RIS. Were he unhappy the pilot would always have the option to upgrade the service. Nevertheless, under the agreed FIS, APP passed accurate and timely information, which should have alerted the Puma pilot to the potential confliction.

JHC comments that this incident undoubtedly unnerved the Puma pilot, leading him to file this Airprox. His manoeuvres were entirely appropriate given his desire to maintain visual contact with the other ac. However, given that the PA 38 pilot was visual with the Puma throughout, there would appear to be no risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In the absence of detailed reasoning, the Board could not determine why, having seen the Puma early and taken appropriate initial avoiding action, the PA38 pilot had turned back towards the Puma by as much as he did. They agreed that despite the accurate and timely TI from Benson ATC, the Puma crew had sighted the PA38 comparatively late, during a high workload period when their attention was concentrated on the detail of the Air Test. It was probably during the turn towards him by the PA38 that the Puma captain sighted it and initiated the rapid climb. The Board agreed with JHC that, since the PA38 pilot had the Puma in sight throughout the 360° climbing turn, there was no risk of collision. There was little doubt however, that the PA38 captain flew his ac close enough to the Puma, in the Board's view unnecessarily, to cause the Puma pilot concern.

PART C: ASSESSMENT OF CAUSE AND RISK

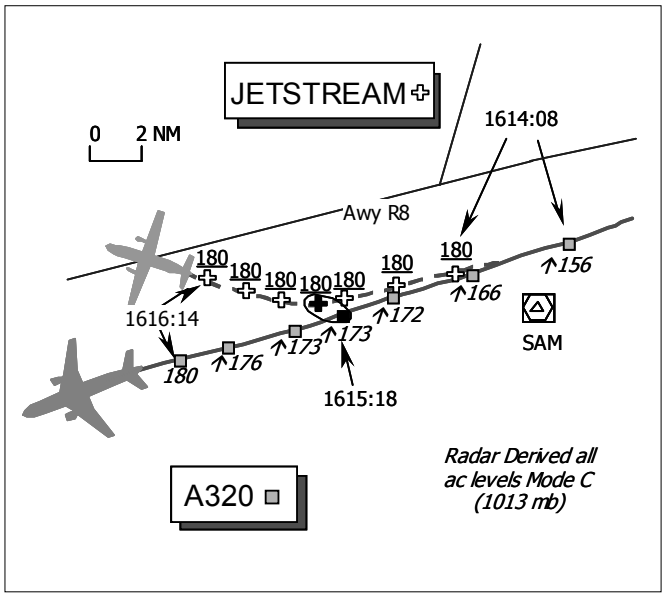
Cause: The PA38 pilot flew close enough to the Puma to cause the Puma pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 19/03

Date/Time: 13 Mar 1615
Position: 5057N 0133W (8nm W of SAM VOR)
Airspace: Airway ROMEO 8 (Class: A)
Reporter: LACC Sector 19

	First Aircraft	*Second Aircraft*
Type:	Jetstream T3	A320
Operator:	RN	CAT
Alt/FL:	FL180	FL170
Weather	VMC NR	VMC NR
Visibility:	NR "into sun	">10km
Reported Separation:	2-3nm/nil V	7-8nm H
Recorded Separation:	0·9nm H/700ft V @ 1615:18 nil V/3·45nm H @ 1616:14	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

T**HE LACC HURN SECTOR TACTICAL CONTROLLER MENTOR (TAC MENTOR)** reports that the HURN Sectors - 19, 20 & 21 - were bandboxed together and he was instructing a trainee as the OJTI. The Jetstream was westbound under a RCS approaching a position about 5nm W of SAM at FL180, when the A320, which was outbound from Heathrow but not on frequency, was seen to climb toward the Jetstream's level. His trainee tried to establish 2-way RT with the A320 crew to issue avoiding action, but to no avail, so his trainee then gave the Jetstream an avoiding action R turn onto a heading of 290°, whilst still trying to establish communication with the A320 crew. He then intervened, instructing the Jetstream crew to turn further R, then issuing traffic information about the A320, whereupon the Jetstream crew sighted the Airbus. STCA was activated and prescribed separation was eroded down to about 700ft/1nm. During this period the PLANNER was endeavouring to contact the LTCC Sector to find out why the A320 had climbed through its level and who was working it.

THE LACC HURN SECTOR 19 TACTICAL CONTROLLER UNDER TRAINING (U/T TAC) reports that the Jetstream was maintaining FL180, when the A320 climbed through the standing agreement level not on frequency. No contact could be made with the A320 crew, so he turned the Jetstream R 30° and gave traffic information before his mentor stepped in and gave further avoiding action.

THE LACC HURN SECTOR 19 PLANNER reports that whilst monitoring the radar it became apparent that the A320 had passed the standing agreement level of FL150 and was climbing into conflict with the Jetstream. He telephoned LTCC SW Sector to ask what was happening, and after some confusion it was apparent that the A320 had incorrectly taken a heading instruction to be a level climb instruction. He advised TC of the avoiding action taken by HURN Sector and TC SW took appropriate action themselves, but separation was eroded nonetheless.

THE LTCC TMA SW CONTROLLER (TC SW) reports that he had not long taken over the band-boxed position when there was a sudden flurry of activity mainly concerning Farnborough & Southampton traffic. During this period he vectored the A320 ac off the SID, and climbed it to FL120, under a Heathrow inbound to resolve a conflict with other traffic inbound to Bournemouth. When clear of these ac, he climbed the Airbus to FL150 before turning the ac R and transferring it

to the LACC HURN Sector. The A320 turned R, but he noticed that he had not crossed through the fps. As the A320's Mode C showed the ac was climbing he thought that he must have transferred the ac. However shortly afterwards he saw the STCA flash white, but took little notice until his CO-ORDINATOR asked him to check if the flight was still on his frequency, which it was. When questioned the A320 crew stated that they were climbing to FL250, whereupon he instructed them to descend to FL170 (Mode C indicated FL173 at the time) before placing the flight on a heading and transferring it to LACC HURN Sector.

THE JETSTREAM T3 PILOT reports his ac has a white & blue livery and the HISL was on whilst in level cruise at FL180 inbound to Yeovilton from Schleswig at 240 kt; TCAS is not fitted. He was under a RCS from London CONTROL approaching SAM VOR heading 240°, when ATC instructed another flight to level at FL170, but the crew did not reply. London CONTROL instructed him to turn R onto 260º and then warned the other crew about his Jetstream at FL180. The A320 then appeared to port at 8 o'clock - 2-3nm away - in a level L turn at his level. He reported visual contact on the Airbus to London CONTROL who then gave him a further R turn onto 340°. He assessed the risk as *"nil"*.

THE A320 PILOT reports his ac has a white/ orange & yellow livery and the HISLs were on whilst outbound for Madrid at 280kt. Their initial clearance from LTCC was to climb to FL120 on a heading of 230°. Approaching SAM VOR, London CONTROL re-cleared them "heading 255 and clear FL250" (sic), which was read back by the 1st Officer. When abeam SAM (that was now to port), passing FL160 he noticed on the "navigation display" the message "reduce range". They did so and saw an ac indicating FL180 on the right side of the plane about 12–15nm away heading towards them, he thought. They decided to stop their climb and levelled at FL172. No TCAS advisories were enunciated nor any RA indicated and when clear of the other traffic he resumed the climb to FL250 - as cleared, he thought. At that moment London CONTROL instructed them to descend immediately to FL170 and turn onto a heading of 185° - their route from SAM to ASPEN was 210º(T) – whereupon the 1st Officer reaffirmed that they had been "cleared to FL250 on heading 255°", but the controller advised this was not so. He queried a new heading instruction of 135º, which was perpendicular to their desired routeing, whereupon London CONTROL passed a new heading of 165º and transferred them to another frequency. At the closest point he assessed from the navigation display that the Jetstream was 7-8nm away and 7-800ft above them and assessed that there was no risk of a collision as they had visual contact. He added that there were many flights on the frequency, but they had the other traffic in sight "at every moment".

LACC reports that the Jetstream was cruising level at FL180, on a radar heading of 260° to track about 3nm inside the northern edge of airway R8, thereby facilitating separation from TC outbound traffic requesting further climb. The Sector staff observed the A320 approaching their Sector anticipating that its crew would shortly switch to their frequency climbing to the standing agreement level of FL150. The attention of the U/T TAC was focused on climbing other traffic occupying FL170, when clear of the Jetstream, but STCA activated as the A320 climbed through FL155, just over 4nm astern of the Jetstream and overtaking at a speed about 200kt faster than the turbo-prop. U/T TAC saw the indicated Mode C of the A320 and checked her paper flight strip (PFS), but the strip had no hand written level change on it (since the flight was not on frequency), however, she momentarily doubted herself and thought that she had cleared the A320 crew to FL170 underneath the Jetstream. This explains her initial call to the A320 crew at 1614:40, to *" just confirm you're stopping climb FL170"*. There was no response to this and two further transmissions which included a left turn onto 200°. As the A320 was still not on RT, U/T TAC instructed the Jetstream crew to turn R heading 290°. The A320 stopped its climb at FL173, which would be consistent with a TCAS RA. Thus, the A320 crew levelled 700ft below the Jetstream for some 30sec whilst passing to port. Horizontal separation was afforded by the 30° R turn, given to the Jetstream crew by U/T TAC, who again tried to contact the A320 crew, this time giving an avoiding action turn instruction 'blind' onto 190°. The TAC MENTOR then stepped in and instructed the A320 crew to squawk ident if they were receiving his transmission; none was seen. Minimum horizontal separation occurred at this point as the A320 passed 0·9nm to port of the Jetstream, 700ft

below it. U/T TAC instructed the Jetstream crew to turn R onto 300° who then reported visual contact behind the traffic.

Co-incident with these RT exchanges the PLANNER had contacted the TC SW CO-ORDINATOR to ascertain if the A320 crew was still on their frequency. Initially the CO-ORDINATOR said that it had already been transferred, but asked the TC SW SC to check again. The PLANNER and TC SW CO-ORDINATOR confirmed the instructions issued to both crews so that separation could be regained. The TAC MENTOR reports that he was satisfied with the actions of his trainee, however, the A320 crew was then seen to be climbing again, so he passed traffic information to the Jetstream crew as the A320 climbed through FL175 in the Jetstream crew's 11 o'clock, instructing them to turn R onto 340° in order to regain prescribed separation more quickly.

LTCC reports that the TC SW SC's traffic loading, complexity and workload were rated as medium to high, with a temporary and short peak in workload caused by Southampton and Farnborough traffic.

The A320 departed Heathrow on a SAM SID and, after being taken off the SID route, had been instructed by TC SW at 1612:00, to "[C/S] *turn right heading 255° climb FL150"*, the standing agreement level. This instruction was promptly, clearly and correctly read back by the crew, *"climbing level 150 right 255* [C/S]". The TC SW SC then continued to deal with other traffic and omitted to transfer the flight to the LACC HURN Sector at this point, although he believed at the time that he had done so. He subsequently noticed that he had not crossed through the fps, but seeing the ac's Mode C climbing through FL150 thought that he must have transferred it, whereas the A320 crew, having correctly read back their cleared level, were climbing to FL250. In so doing, the flight came into conflict with the westbound Jetstream at FL180 under the control of LACC. STCA activated at 1614:05, as the A320 passed FL155. TC SW saw the STCA activation but attached no significance to it, assuming that HURN Sector had climbed the A320 above FL150. Almost a minute later the TC CO-ORDINATOR received a telephone call from the HURN PLANNER asking if the A320 crew was still with TC. He was initially told that the flight had been transferred some time previously but, on checking at 1615:30, TC SW realised that it was still on his frequency. He noted that it was at FL173 and immediately instructed the flight at 1615:40, *"…to turn left now heading of 185° and descend FL170"*. The radar recording shows that the ac maintained FL173 for about 30sec until it was clear of the Jetstream - possibly obeying a TCAS instruction [though the A320 crew report this was not so]. No immediate acknowledgement was received to TC SW's instruction and so he repeated it at 1616:00. The phrase 'avoiding action' was not used since, by then the A320 had passed the Jetstream and separation was increasing. Minimum horizontal separation of 0·9nm was reached at 1615:18, just before TC SW had called the A320's crew to see if they were still on his frequency. By the time TC SW had received an acknowledgement of his heading and level instructions just before 1616:00, the turn given to the Jetstream crew by HURN Sector had taken effect and separation had increased to 2·9nm. However, the A320 crew, did not descend to FL170 as instructed, but climbed still further and reached FL179, before descending slowly back down to FL170. [UKAB Note: The Pease Pottage radar recording shows the A320 ascended to FL180 at 1616:14, at a range of 3·45nm from the Jetstream indicating FL180 Mode C]. By this time it had been established that the A320 crew had been climbing to FL250, apparently having confused their radar heading of 255°. The A320 was then turned onto a heading of 135° and transferred to Hurn Sector.

ATSI endorsed the LTCC/LACC reports, but observed that it was strange that the A320 crew thought they were cleared to FL250 when the heading given – 255° - ended in a 5 as recommended to overcome this sort of problem. Nevertheless, it is unfortunate that TC SW did not realise immediately that the flight had not been transferred to LACC, thereby delaying remedial action. Even the activation of STCA did not alert him to the problem because he assumed that LACC had cleared the flight above the standing agreement level of FL150. When STCA activated at LACC, the U/T TAC was initially unsure of the situation, believing that she might have cleared the flight to FL170 beneath the Jetstream, although the PFS had no hand written level annotated to indicate this. Although a blind call was made to the A320 issuing an 'avoiding action' turn, the phrase was not used when the JS31 was instructed to turn. As the A320 was approaching

from astern, earlier traffic information would have alerted the Jetstream crew to the situation.

THE JETSTREAM PILOT's UNIT comments that the Jetstream T3 crew were under radar control and flying in accordance with ATC instructions. They first became aware of the developing situation by ATC transmissions to another flight to level at FL170. They were then given an avoiding action turn and shortly afterwards acquired the conflicting traffic visually about 2-3 miles away, at the same level but turning away. Risk of collision was assessed as low but clearly, standard separation for flights operating in Class A CAS had not been achieved.

CinC FLEET comments that that this is a clear case of the A320 crew not adhering to ATC instructions passed which, coupled with a momentary lapse in concentration resulted in the Airbus climbing to the Jetstream's level. It should be noted that the potential confliction was resolved, but the A320 crew was, nevertheless, somewhat tardy in their response to the instructions to descend.

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.

Pilot members were quick to point out that this Airprox had resulted from a 'level-bust' by the A320 crew. For reasons unexplained here, despite the 1st Officer correctly reading back the cleared level of FL150, both A320 crew members subsequently convinced themselves, erroneously, that they had been instructed to climb to FL250 and attempted to do so. This was intrinsically a CRM issue, because both pilots in the A320 should have been working closely to ensure that intra-cockpit errors of this nature did not occur. The Board noted the comments by ATSI about use of the 5° within the heading to prevent confusion between heading and level instructions; it was evident that the instructions to the A320 crew were absolutely clear and had been correctly read back, but the crew's subsequent cockpit actions had allowed a fundamental mistake to be introduced, which the Board agreed unanimously was the fundamental cause here. Suggestions within the LACC and LTCC reports that a TCAS RA had been enunciated had not been confirmed by the A320 crew's report. On the contrary, the A320 pilot reported that the Jetstream had been spotted at range and he levelled off beneath it to afford his own visual separation, which pilot members agreed would have forestalled an RA. A CAT pilot member explained that TCAS had not been required to intervene here because, effectively, it saw no threat. Evidently the A320 crew had not realised that the Jetstream was also flying a westerly heading and it was their relative speed differential in overtaking the turbo-prop that made it appear as though it was flying toward them. However, after passing the Jetstream they re-established a climb without any mention on RT to TC SW. It was not until after the A320 had overtaken the Jetstream that the controller had realised that he had not switched the A320 to LACC and the ac was still on his frequency. The A320 crew, though replying immediately, did not acknowledge or comply with this instruction at once and were apparently somewhat perplexed. Thus more than 20sec elapsed before TC SW was able to obtain an acknowledgement from the crew and before he could arrest their further unauthorised climb. This delay in acceptance of the controller's instructions by the A320 crew was also considered by the members to be intrinsic to the cause.

The LACC HURN Sector controllers detected the crew's error when the A320's Mode C showed the ac was being climbed above the standing agreement level. The Board commended the U/T TAC HURN controller for turning the Jetstream R as the A320 closed astern, when the trainee realised that he could not communicate with the A320. This positive action was a good decision and it was unfortunate that HURN was not able to contact the A320 crew on their frequency and issue appropriate instructions because TC SW was late in switching the flight across to LACC. Some civilian controller members were also concerned that the TC SW controller had not realised that the A320 was still on his frequency whilst outside his area of responsibility. Whilst not fundamental to the cause, his inadvertent omission had delayed resolution of the conflict, and was thus a contributory factor to the eventual outcome. However, much discussion ensued

about an apparent reluctance amongst civilian controllers to use the current avoiding action phraseology; whichever sequence of words were used - be it old or new - the Board was in no doubt that use of the phrase *"avoiding action"* would grab a pilot's attention far more quickly than a routine unheralded instruction. Civilian controller members explained that NATS had probably done all it could with its TRUCE initiative [TRaining in Unusual Circumstances and Emergencies] to give controllers more practice in its use, but many members realised that civilian controllers were still reticent to use the term, even when it was entirely warranted. For those civilian controllers that routinely provided an ATS outside CAS it was not a dilemma and military controllers used it all the time, but its use within a CAS environment engendered in some a stigma of failure that was extremely hard to eradicate. One controller member thought that the increasing tendency by passengers to resort to the law influenced some controllers unduly and that injuries sustained by passengers in the cabin resulting from robust avoiding action instructions might lead to litigation. This view did not draw strong support - but it was plausible nonetheless. Some were afraid of the 'paperwork' that always followed, but it had been explained before that there was no insistence by NATS that reports were rendered if this all-important attention-getting phrase was used. However, the company did need the fullest information so that incidents could be investigated thoroughly and lessons learned – but it was certainly not the basis for any punitive action and controllers needed to understand this. The Chairman took pains to explain that its use should not be seen as a failure by the controller, more an accepted method of grasping a pilot's attention instantly to a situation that if it was not corrected promptly could deteriorate quickly into something much more serious. The Board agreed that controllers should be encouraged by Unit management to use this phrase – where appropriate – with impunity.

Turning to risk, it was fortunate that visual acquisition by the A320 crew of the Jetstream had ensured that the former's climb above their assigned level was arrested and did not allow the conflict to deteriorate still further. Vertical separation was only eroded to 700ft but members appreciated that TCAS would have intervened if they had got closer. The Jetstream crew was unable to see the A320 until it overtook them to port. However, by that stage the combination of the initial avoiding action turn issued by the U/T TAC - then increased on the instructions of the Mentor - had turned the slower turbo-prop out of the A320's flightpath. Though the A320 climbed still further to the same level as the Jetstream, this had not occurred until the horizontal separation had increased to 3·45nm and the latter was drawing astern of the jet. The Board concluded therefore, that no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

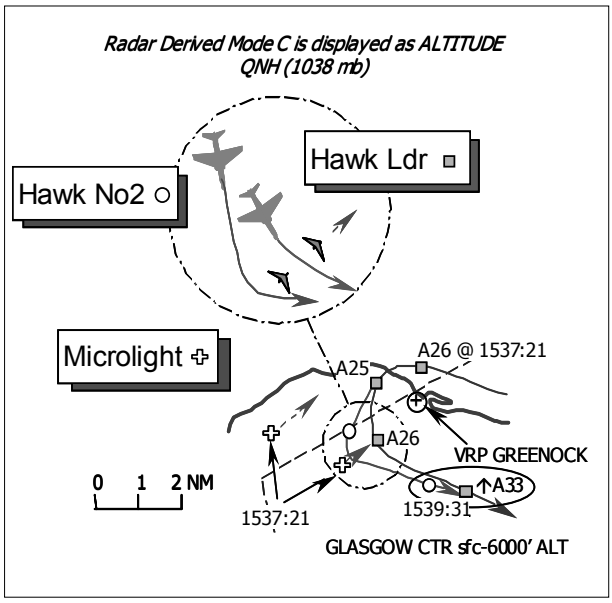
Cause: The A320 crew climbed through their cleared level and were slow to follow corrective instructions.

Degree of Risk: C.

Contributory Factor: Late transfer of the A320 from LTCC SW to LACC HURN Sector delayed resolution of the conflict.

AIRPROX REPORT NO 21/03

Date/Time:	13 Mar 1538	
Position:	5555N 0448W (1½nm SW of GREENOCK VRP)	
Airspace:	Glasgow CTR/FIR (Class: D/G)	
	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk x2	Untraced Microlight pair
Operator:	HQ PTC	NR
Alt/FL:	2500ft (QNH 1038mb)	NR
Weather	VMC CLBC	NR
Visibility:	30km+	NR
Reported Separation:	150-200m, nil V	NR
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT provided a very comprehensive and frank report, stating that he was flying as the No2 of a pair of Hawks inbound to Glasgow; he was in the front seat [the PF] with the captain [the PNF] QFI occupying the rear seat. The ac has a high conspicuity black colour scheme and the HISL was on.

On completion of their sortie, a radar to visual recovery to Glasgow was initiated with Glasgow APPROACH (APP) on 119·1MHz, who instructed them to proceed to and hold at GREENOCK VRP – situated on the northern boundary of the Glasgow CTR - at 2500ft Glasgow QNH (1038mb) prior to a visual recovery to RW05. They entered the CTR, VFR and APP continued to provide traffic information. Changing into fighting wing formation – swept 60º at 150-200m spacing – they headed towards Greenock and began holding in a left hand orbit overhead Garvel docks. During the orbit at 2500ft QNH – some 1000ft below cloud - APP advised them about a radar contact - possibly spurious – to the SW of their position. His leader then spotted a microlight at the same altitude heading about 060º towards them, at which point the lead eased the turn to ensure safe separation astern. Turning through SE at 300kt, simultaneously both he and the PNF spotted a second microlight about ½nm in trail astern of the first. He called to his leader to break R, [this was not reflected in the APP RT transcript but may have been transmitted intra formation on UHF] and as he did so he manoeuvred his jet aggressively to the R. Once he was sure that he was safely deconflicted from both microlights - and his leader, if the latter broke out to the R - he rolled out of the turn to stay visual with both the trailing microlight and the No1 Hawk. The lead jet passed about 5-600m astern of the leading microlight in between the two. Once he had assured himself that he was clear of the trailing microlight and not wishing to move too far from his leader whilst within the CTZ, he initiated a L turn passing about 150-200m astern of the second microlight. As they passed he could see that the microlight pilot was wearing a red jacket with a white helmet, on which the clear visor was visible. Both he and the PNF assessed that if they had remained in fighting wing formation with his leader they would have collided with the trailing microlight that his leader had not seen.

He reported the incident to APP immediately afterwards, they were then cleared to proceed to L base for RW05. After landing at Glasgow he telephoned the approach controller to discuss the incident and it was agreed that reporting action would be taken.

UKAB Note (1): Despite extensive tracing action AIS (Mil) report they were unable to identify the reported microlights that therefore, remain untraced.

THE GLASGOW APPROACH RADAR CONTROLLER (APP) reports that he was providing a RIS to the Hawk ac inbound to Glasgow. About 5min before the incident, his colleague manning RADAR1 passed possible traffic information to him on a contact he had observed SW of the Airprox location, which looked like possible weather clutter. He was unaware of the situation until one of the Hawk pilots warned the other and took avoiding action on the microlights.

The Hawk pilot later telephoned and explained that each Hawk had a close shave with the microlights. Though they tried to track what was believed to be the two microlights routeing to the NE, with one contact inside the CTR boundary, they were unable to identify them and contact was lost some 15nm N of Glasgow. They checked with both SCOTTISH INFORMATION and Prestwick ATC, but they had not spoken to the microlight pilots.

ATSI reports that there are no apparent ATC causal factors within this Airprox, which occurred close to the boundary of the Glasgow CTR. The Hawk pair was approaching Glasgow for a VFR self-positioning arrival, under a RIS initially from Glasgow APP and was instructed to hold at the Greenock VRP, initially, to accommodate a runway change. The pair was then informed of a radar contact observed by the controller on his display at 1537:20, *"…there's unknown traffic believed to be about 2 miles to the west of you might be an aircraft might just be a spurious return tracking toward you no height or type information"*, which the Hawk leader acknowledged. But the controller was unsure whether it was an ac contact or a spurious return. Later at 1539:10, the No2 Hawk pilot transmitted "…[C/S] *1 your now between two microlights"* and then added *"…one in your left now behind the microlight at my height heading east"* warning the other about the presence of the second microlight. Immediately thereafter the formation reported climbing to 3000ft QNH to avoid them.

UKAB Note (2): This Airprox is not shown on the ScATCC radar recording. The Hawk pair, identified from the leader's assigned squawk, is shown as they turn L about the VRP at 1537:21, indicating 2600ft ALT. Simultaneously, two primary radar contacts are shown briefly for two sweeps - which may or may not be the reported microlights, but the location is consistent with the NE'ly track reported by the No2 Hawk pilot but they are not shown again. The Airprox occurs just after 1538:37, whence the No2 Hawk is shown breaking away to starboard from the lead ac – indicating 2500ft ALT and apparently turning to pass astern of the trailing microlight at the boundary of the Glasgow CTR [sfc-6000ft ALT] and FIR. The lack of any further contact on the microlights prohibits determination of the minimum separation that pertained. The larger scale illustration within the diagram shown here, is derived from the No2 Hawk pilot's report and is neither based on radar data nor to scale.

HQ PTC comments that although the microlights have remained untraced, we have a very accurate appreciation from the 2 Hawk pilots of the hazard they posed. Manoeuvring a formation to maintain a compact VRP hold in CAS does not need an event like this to intervene. Had they not received the prompt from Glasgow ATC and had they felt that they had the protection of CAS about them, it could have been worse.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Hawk pilot, transcripts of the relevant RT frequencies, radar video recordings, a report from the air traffic controller involved and reports from the appropriate ATC and operating authorities.

There was no doubt that the microlights concerned had entered the Glasgow CTR, as reported by the Hawk pilot and observed on radar by APP, but it was unfortunate that the microlights had not been identified. Therefore, only the Hawk pilot's perspective was available for the Board's assessment. Controller members were keenly aware that the poor primary radar signature of microlight type ac hinders early detection by ATC radars and thus may inhibit warnings from controllers to other pilots of their presence, as they might not be plainly visible on radar displays. Thus pilots must recognise that the provision of traffic information, or avoiding action where

appropriate, cannot be assured against this type of ac. The salutary lesson is that pilots must remain ever vigilant for airspace infringements such as occurred here. A particular lesson for these microlight pilots is to navigate accurately when in the vicinity of CAS boundaries and call the appropriate controlling authority in good time to arrange for a clearance to enter in accordance with normal practice. In this instance APP was initially unsure if the primary contact was another ac or just weather clutter. Alas, the former proved to be the case, but fortunately the controller had wisely provided a warning to the Hawk pilots on the very sparse information available from his display.

The lead Hawk pilot had stipulated on RT that they would operate VFR whilst conducting a visual approach to Glasgow and, since the GREENOCK VRP is situated on the boundary of the CTR, that meant the jets were both inside and outside of CAS as they orbited this point. Whilst within the known traffic environment of the Class D CTR, the Hawk pilots were responsible for their own lookout and separation from all V/IFR traffic that they were advised about by APP. However, the small cross-sectional area of the microlight ac, approaching head-on with little relative motion to draw attention to them, did not help visual acquisition by the jet pilots. The Board agreed unanimously that the Airprox had resulted because the untraced microlight pilots flew into CAS without clearance, which resulted in a conflict near the CTR boundary.

Turning to risk, it was clear that the leader only saw the first microlight, before the No2 reporting pilot suddenly spotted the second and turned away. Notwithstanding the Hawk pilot's assertion that if he had not broken away from his leader a collision would have ensued, he did actually see the second microlight and had sufficient time to warn the leader and turn away from it robustly. This action achieved only 150-200m separation and averted an actual possibility of collision, leaving the Board to agree that the safety of the ac involved had been compromised significantly inside CAS.

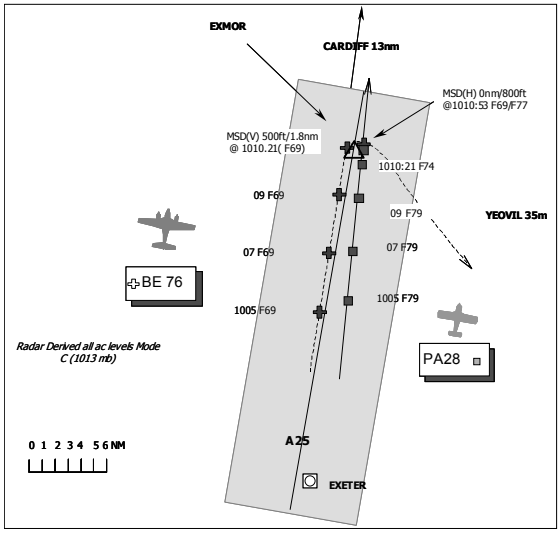
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The microlight pilots flew into CAS without clearance, which resulted in a conflict near the CTR boundary.

Degree of Risk: B.

AIRPROX REPORT NO 22/03

Date/Time:	13 Mar 1015	
Position:	5110N 0321W (EXMOR)	
Airspace:	A25	(Class: A)
Reporter:	Cardiff	
	First Aircraft	*Second Aircraft*
Type:	PA28	BE76
Operator:	Civ Trg	Civ Trg
Alt/FL:	FL80	FL70
Weather	VMC above cloud	VMC above cloud
Visibility:	>10k	>10k
Reported Separation:		
	NK	1nm H 1000ft V
Recorded Separation:		
	1.8nm H 500ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CARDIFF RADAR CONTROLLER reports that a PA 28 was on a training flight from Exeter to train at Cardiff then return to Exeter. He was under radar control in A25 at EXMOR at FL80. Simultaneously a BE76 *(from the same operator with a similar callsign)* was routing Exeter to Exeter via EXMOR to Yeovil for training; it was also in A25 under radar control at FL70. It was not unusual to have more than one company callsign operating on the frequency, especially with training flights, flying in A25. He believed that the BE76 *(the lower ac)* called for descent, as it was common for ac training at Yeovil to leave controlled airspace at EXMOR descending to FL55.

At the time the workload was very high but they were unable to split the radar frequency owing to ATCO staff shortage. The PA28 pilot reported at EXMOR and then he noticed the PA28 had descended and was showing FL75. Immediately he contacted the PA28 pilot and instructed him to climb back to FL80 which, after querying, he did. Traffic information was then passed and one of the pilots reported visual with the other ac.

THE PA28 PILOT reports heading 360° at FL80 and 120kt in good VMC above cloud under Radar Control from Cardiff. He requested descent from Cardiff, forgetting that another ac from the same company had been closing from astern. Descent clearance was afforded by the controller (presumably confusing two similar call signs) but the error was appreciated soon afterwards by all concerned.

THE BE76 PILOT reports heading 010° at FL70 and 140kt in good VMC above cloud under Radar Control from Cardiff in A25. Cardiff confused him with a PA28 at FL80, with a similar callsign, and cleared the PA 28 to descend to FL50, through his level. The instructions were quickly changed and the PA28 was told to climb back to FL80. Shortly thereafter he left A25 by turning towards Yeovil and descending to FL55. He sighted the other ac at 2nm and assessed the risk as being slight.

THE NATS UNIT INVESTIGATION reported that a PA28 overhead EXMOR requested descent from FL80, which was cleared. At the same time a BE76 was at EXMOR at FL70. There was confusion as to which ac was at which level. The controller realised his error and stopped the PA28's descent, at which time standard separation had been lost, prior to its restoration.

ATSI reports that both ac were conducting training flights, originating and terminating at Exeter. The PA28 had planned to route via Cardiff for instrument approach training, while the BE76 had planned to turn at EXMOR and route to Yeovil before returning to Exeter. At the time of the

Airprox, both ac were in communication with the Cardiff APP.

The PA28 established communications with the controller, at 0958:30, and reported level at FL80. The pilot advised that he had booked a radar vectored ILS approach at Cardiff but, if possible, would like to join the hold and carry out an NDB approach. The controller instructed the PA28 pilot to maintain FL80 and route direct to the 'CDF'. This was read back by the pilot as "*Roger direct CDF oh sorry via EXMOR CDF*". At that time, the PA28 was approximately 3nm N of Exeter and tracking along the centreline of airway A25.

At 1004:45, the BE76 pilot established contact with APP and reported at FL70 routeing EXMOR - YVL. At that time, the ac was approximately 13nm S of EXMOR and 1.5nm SW of the PA28 following the same track. The controller instructed the BE76 pilot to report turning at EXMOR. Several minutes later the PA28 pilot requested clearance to descend, but the transmission crossed with one from another ac. The controller correctly identified this and replied to one ac before asking the other station to transmit again. The PA28 pilot then transmitted "*Approach XXXX at FL80 request descent*".

The controller responded by transmitting the ac's callsign to which the PA28 repeated the request for descent. At approximately 1009:20, when the PA28 was 2.5nm SSE of EXMOR and with the BE76 in its 10 o'clock position at a range of 2.5nm, still maintaining FL70, the controller instructed the PA28 to descend from FL80 to FL55. Some 20 seconds later, the BE76 pilot advised turning overhead EXMOR and also requested a descent. The controller replied "(*BE76) c/s maintain FL80 and route direct to the er sorry*" followed by "(*BE76) c/s you maintain FL70*". At that time, the BE76 was commencing a right turn at EXMOR, maintaining FL70, whilst the PA28 was 2.2nm SE of the BE76 passing FL76 descending.

The controller could then see his error and instructed the PA28 to "*…stop descent now climb FL80 please*". The pilot replied "*say again..*" which he did and acknowledged. APP then transmitted "*I see you just at EXMOR there is company traffic just at EXMOR now FL70 I thought it was the BE76 that was descending*". The crew of the BE76 reported visual with the other traffic. This was at the point when separation was at a minimum, with the PA28 passing FL74 and the BE76, at FL69, range 1.8nm flying across its nose from left to right in the turn towards the SE. Lateral separation continued to reduce whilst vertical increased until, at 10:11:59, the PA28 levelled at FL80 and standard separation was restored.

The nominal arrangement for manning Cardiff APP is to have both the Radar 1 and Radar 2 positions open from 0900 – 1800 (local). However, it was not unusual for controllers to bandbox these positions if they assess that both current and forecast traffic will permit this. On this occasion, due to staff sickness, only the Radar 1 position could be manned. This meant that all traffic, (IFR, VFR and LARS), would be handled by one controller. An ATSA is provided who, on the day of the Airprox, was sitting to the right of the controller.

The controller recalled that the estimates on the 2 subject ac had been received some 10 minutes or more prior to them contacting him. He had noticed the similarity in callsigns but not marked his flight progress strips to highlight this. With the benefit of hindsight, he believed that when the PA28 requested descent from FL80 he had not fully assimilated its flight details. He explained that it was common practice for training flights to route N to EXMOR, often at FL80, and then request descent prior to turning right and leaving controlled airspace en route to Yeovil. FL55 was a typical level, as well as being the correct Quadrantal, to which the ac would descend. The controller believed that, when the PA28 pilot requested descent from FL80, he mentally transposed the ac and thought that the PA28 was the lower and inbound to Yeovil. He reported that the strips were arranged correctly in level order, with the PA28 above the BE76, and he had marked the descent clearance on the correct flight progress strip, however, the labels on his radar display were overlapping thus making it difficult to read the data. He went on to explain that, although it is possible to rotate labels, in his view the procedure to be followed is not 'user friendly' and so it was not his normal operating practice to do this.

The controller believes that he transposed the 2 ac in his mind. This incident further demonstrates that the practice of relying on memory alone, rather than an up to date mental picture based on

frequent checks of the radar and strip displays, leads to mistakes. The lesson on this occasion centred on the SSR labels overlapping, at which point it was particularly important that careful attention be given to the flight progress strip display.

Use of the words "avoiding action" when instructing the PA28 to stop it's descent and climb to FL80, may have elicited a more immediate response. Similarly, the passing of traffic information in the approved format would have helped ensure the crews knew exactly what the traffic situation was.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered, in detail, the probable sequence of events that apparently resulted in the Controller transposing the 2 ac in his mind and descending the PA28 through the BE76's level, so causing the conflict. The overlapping Track Data Blocks (TDBs) was undoubtedly a factor. Although the precise method of rotating TDBs on this equipment was not known to the Board, they were informed that on older radars it could be time consuming and was often required in moments of already high workload; on newer equipment however, it can be achieved by a single key stroke. In this instance the Board believed that the Controller should have reverted to checking the Flight Progress Strips that were known to portray the situation accurately. The high workload promoted by staff illness at the beginning of the shift, had also played a part. Although the opportunity existed to reduce the load by refusing lower priority training traffic, the Controller chose not to do so. Familiarity may also have contributed but the Board believed that the Controller should have been alert to this possibility.

Although all agreed that this was a potentially serious breach of ATC procedure, some members questioned whether there had been an actual compromise of safety; the majority however, thought that there had. Clearly, however, there had been no risk of collision.

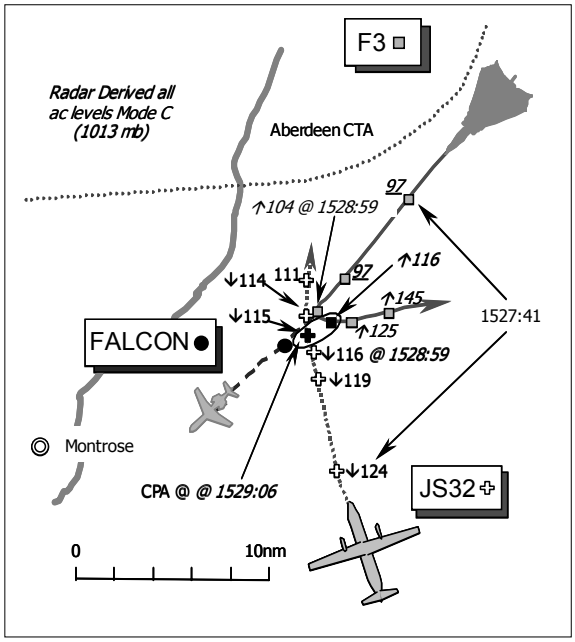
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Cardiff Radar Controller cleared the PA28 to descend through the level already occupied by the BE76.

Degree of Risk: C

AIRPROX REPORT NO 23/03

Date/Time:	17 Mar 1529	
Position:	5649N 0205W (23nm S of Aberdeen)	
Airspace:	Scottish FIR	(Class: G)
Reporter:	Aberdeen APR	
	First Aircraft	*Second Aircraft*
Type:	Jetstream 32	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	↓FL110	FL100↑
Weather	VMC NR	VMC NR
Visibility:	NR	15nm
Reported Separation:		
	APR:	700ft V, 1½nm H
	4-500ft V, ½nm H	Not Seen
Recorded Separation:		
	100ft V @ 1·16nm	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ABERDEEN APPROACH RADAR CONTROLLER (APR) MENTOR reports that he was instructing a trainee controller who was working the Jetstream inbound to Aberdeen, IFR, under a RAS at FL110, squawking A4377 with Mode C. Earlier, the Jetstream had been co-ordinated by the ScACC TAY SC with CRC Buchan, against 2 military ac under Buchan's control. TAY SC had passed on the co-ordination to Aberdeen, which was that the military jets would not fly above FL100 S of Aberdeen. As the Jetstream had received the Aberdeen weather information & runway in use, the trainee confirmed with the crew that the descending Jetstream would level off at FL110. The Jetstream and military traffic closed to a range of a couple of miles, whence the two military ac split, one flying SW not above FL100, but he noted that the other ac - squawking A1511 - had started to climb when it was first observed passing FL104. Avoiding action was given straight away to the Jetstream crew, whereupon the military ac squawking A1511 turned eastbound away from the Jetstream and continued climbing. The Jetstream crew reported visual contact with another ac.

THE ABERDEEN APPROACH RADAR CONTROLLER (APR) TRAINEE reports that the Jetstream was transferred from ScACC TAY Sector with co-ordination against a 1511 squawk crossing right to left about 20nm away. The Jetstream was descending to maintain FL110 and the crossing military traffic was maintaining FL100 till clear, and then the co-ordination would cease. When the 1511 squawk was in the Jetstream's 1 o'clock - 3nm, it was noticed that the 1511 squawk was climbing through FL104. An immediate avoiding action R turn onto a heading of 030º (about a 50º turn) was issued to the Jetstream crew to avoid the traffic and pass behind. The A1511 squawk then split, one ac proceeded E and continued its climb, the other changed on to a Leuchars' squawk and headed W at FL100. The Jetstream pilot reported he was visual with the jets but a left turn of about 40º was given to enable the Jetstream to get clear of the conflict and continue inbound to Aberdeen.

THE ScACC TAY SECTOR CONTROLLER reports that he was about to transfer the Jetstream to Aberdeen when he observed traffic

to the NE of the Jetstream on an air defence SSR code. Co-ordination was initiated with Buchan and it was agreed that the military ac would not climb above FL100, thereby maintaining standard separation beneath the JS32. Before transferring the flight he telephoned the Aberdeen APR and passed on the co-ordination agreed. He also informed the Jetstream crew that there would be two military jets crossing beneath them that had been co-ordinated, and then transferred the flight.

THE JETSTREAM 32 PILOT, the PNF, reports that he thought they were northbound in the vicinity of St Abbs Head, en route to Aberdeen from Teesside at 180kt in level cruise at FL165, he thought. His co pilot was the PF and they were under a RIS from Scottish, he thought on 124·5MHz [it was Aberdeen]; TCAS is not fitted. ATC advised of traffic co-ordinated 1000ft below them, but a few minutes later the controller passed avoiding action of right turn as this traffic had climbed above their co-ordinated level and was converging with his Jetstream. He believed that a few seconds before this call they had observed an ac converging on, he thought, their left, about 500ft below his ac and climbing slowly. As they started the avoiding action turn it became evident that the other ac had levelled and would pass safely ahead and below. Although difficult to judge, he remembered it as dark in colour and similar in appearance to a Rockwell B1 [the Falcon has dark navy blue livery] and estimated that at the closest point it about ½nm ahead and 4-500ft below them. He added that though this encounter was closer than he would have liked, they were not concerned for their safety at any time. Even without the avoiding action turn, which was discontinued after about 20º, there was *"no real"* risk of a collision and he elected not to initiate an Airprox report.

THE TORNADO F3 PILOT provided a candid account, reporting that he was escorting a DA-20 into Leuchars at 290kt following an exercise Air Defence Priority QRA scramble and was in receipt of an Air Defence Information Service he thought [it was actually an ADAS - an advisory service - broadly equating to a RAS] from CRC Buchan. The assigned squawk of A1511 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted. About 25nm S of Aberdeen, heading 205° (into sun) he accepted the CRC controller's instruction not to fly above FL100 because of co-ordinated traffic, which was acknowledged. About 2–3 min later, after discussion with the intercepted DA-20 crew on RT, he was ordered to terminate the exercise. The DA-20 was cleared to contact Leuchars APPROACH and he was instructed to haul off, the next phase of the mission being an RV with a tanker to the E at FL200 for AAR. There had been no update on the co-ordinated traffic for at least 3min and once clear of the DA20 he began a climb, both he and his navigator were maintaining a good visual search and a clear flight path at all times with excellent in-flight visibility. The Jetstream was not seen. Upon landing he was informed of a possible Airprox.

He added that he had mistakenly assumed that the 'capping' at FL100 only applied for the duration of the AD phase of the exercise. Therefore, when the exercise was terminated they cleared their flight path visually and he manoeuvred the ac to achieve the next sortie objective. He opined that, in future, he will ensure that he adheres to control instructions until they are specifically rescinded.

THE TORNADO F3 PILOT'S STATIO comments that the final paragraph says it all. The crew have learnt a valuable lesson.

UKAB Note: The Allanshill Radar recording shows the F3 squawking A1511 passing S of the Aberdeen CTA boundary on a SW track and level at FL97 at 1527:41, 1 min after traffic information was passed to the F3 crew by the WC about the Jetstream that is shown descending through FL124 as the subject ac close. About 11 sec after the F3 crew was instructed to haul off to the E, at 1528:59, the jet is shown in a hard L turn climbing through FL104, contrary to the agreed co-ordination, as the Jetstream descends through FL116 2nm to the S. The CPA of 1·16nm occurs at 1529:06, as the F3 heads eastbound climbing through FL116 Mode C, some 100ft above the Jetstream descending through FL115 and after the jet has climbed through the latter's level. The next sweep 5sec later shows the jet passing FL125, 1100ft above the Jetstream that is descending through FL114. The Falcon, which was not evident till after the Airprox has occurred, then opens SW toward Leuchars without Mode C. The avoiding action instruction transmitted by the APR trainee at 1529:10, *"…avoiding action turn right heading 030° traffic 12 o'clock a range of 2 miles"* was immediately acknowledged by the

Jetstream crew thus, *"…right 030° got the traffic in sight is he just passing 12 o'clock right to left"?* The APR trainee responded at 1529:20, *"affirm he's in a turn now if you continue back onto 340° he appears to be turning onto a eastbound track"*, which the Jetstream crew acknowledged.

ATSI reports that ATC did more than was required to try and ensure separation was achieved between the subject ac. Notably, the TAY SC was providing the JS32 with a RIS when the controller co-ordinated a course of action with Neatishead to provide 1000ft separation from military traffic. Additionally, the JS32 was given traffic information (all that was required under a RIS). Appropriate co-ordination took place with Aberdeen reference the military traffic. On contacting Aberdeen the flight was provided with a RAS. As soon as it was realised that the military traffic was climbing above the co-coordinated FL100, an avoiding action turn (although not using the correct phraseology) and traffic information was issued. The pilot reported visual contact.

ASACS SSU comments that at the time of the Airprox CRC Buchan was undergoing a NATO Operational Assessment (Op Assess); one of the scenarios for that assessment was a launch of the Leuchars QRA against an intruder ac simulated by the DA20. The Op Assess required realistic responses at CRC Buchan and the F3 was launched with Air Defence Priority Flight (ADPF) Status to intercept and identify the DA20. The F3 was receiving an ADAS (5K) from Buchan and subsequently intercepted the DA20. Once the intruder was identified, the F3 crew was instructed to intervene and escort the DA20 to Leuchars. Unusually, for this type of exercise, the DA20 was on the WC's frequency as the weather at Leuchars was deteriorating. The WC detected the subject Jetstream and co-ordinated with the ScACC TAY SC for the turboprop to remain at FL110 until clear to the N. The WC passed the coordination to the F3 crew at 1526:53, "[C/S] *you have a stranger* [bearing & range] *190/20 left right heading north-west he's…in the descent stopping at FL110 you are co-ordinated not above FL100 acknowledge"*. The F3 crew acknowledged the restriction at 1526:53, "*FL100* [both acs' C/Ss]"; at this stage the F3/DA20 combine and the Jetstream were converging about 19nm apart. At 1528:39, the exercise was terminated and 9sec later the F3 crew was instructed to 'haul off' to the E; this was acknowledged by the crew who then suffered an 'open mike' RT problem for about 1min, preventing 2-way communication by the WC. It was during this period that the F3 crew climbed above their co-ordinated level and the Airprox occurred. There were several other peripheral factors that might potentially have influenced the outcome of this Airprox. The NATS Perwinnes Hill Radar was not available to the CRC at the time and the Buchan T92 was used by the WC as the nearest available ASACS source. The Mode C data from the T92 radar was garbling, whilst the F3 was manoeuvring, therefore, the WC did not detect the climb initiated by the F3 at a range of 5nm from the Jetstream. Additionally, the Op Assess was being closely monitored by NATO personnel, which would have placed more than usual pressure on the CRC personnel involved. Several officers from other NATO Nations were scrutinizing the WC, who was a SNCO, so he was under pressure. Finally, although the workload was not unusually high, the WC was potentially distracted by the requirement to receive instructions from the FIGHTER ALLOCATOR and liaise with the FIGHTER MARSHAL who was controlling the tanker. However, none of these factors influenced the cause of the Airprox.

HQ STC concurs with the Tornado F3 pilot's station, that this was an honest mistake by the crew, who forgot that the co-ordination restriction still applied. The crew has acknowledged their mistake in a forthright manner, and hopefully all aviators can reflect on how easy it is to forget instructions when superseded by changing circumstances.

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, Air Defence and ac operating authority.

Co-ordination had been conscientiously effected between the ScACC TAY SC, Aberdeen APR and CRC Buchan, to ensure that 1000ft separation existed between the Falcon/F3 combine – that had been accorded priority status - and the Jetstream descending to FL110 above them. The

Board recognised that the TAY SC had passed this to both the Jetstream pilot and the Aberdeen APR team and that the Buchan controller had passed this on correctly to the F3 crew, who had duly acknowledged the instruction. It was clear that in the dynamic environment of the exercise scenario the F3 crew had not realised that they were required to maintain FL100 and made a false assumption that since there had been no update on the co-ordinated traffic, they were at liberty to commence a climb when instructed to 'haul off' by Buchan. This resulted in the F3 crew breaching the co-ordination agreement and climbing into conflict with the Jetstream that was descending to FL110, which the crew did not see at all. Whilst commending the F3 crew for their laudably frank account, members concluded unanimously that this was the fundamental cause of the Airprox.

It was unclear to the Board from the information available whether the Jetstream crew had seen the F3 or the Falcon. The Jetstream pilot's report was inaccurate in a number of areas; the incident occurred well to the N of St Abbs, whilst in descent and under a RAS from Aberdeen not ScACC as he thought. The JS32 pilot had reported that a few seconds before avoiding action was passed he had observed an ac **converging** on their left, about 500ft below his ac and climbing slowly before it levelled and was seen to pass safely ahead and below. Whereas the Falcon crossed ahead from R – L at least 1000ft below the descending Jetstream and steadily opened to port after the Airprox had occurred. Moreover, the F3 had not – according to the radar recording – ever crossed through the 12 o'clock of the turboprop, but had remained to starboard of the airliner throughout whilst the jet climbed rapidly through its level. The description of the other ac did not help either - similar in appearance to a Rockwell B1 - as both the F3 and the DA20 were dark in colour and the Rockwell B1 has some similarities to both ac silhouettes. On balance, the Board concluded that the Jetstream crew had probably been distracted when they spotted the dark blue Falcon below them as it opened toward Leuchars and thus they had probably not seen the F3. Although the Jetstream crew had started the avoiding action R turn before electing to roll out of it, the Board noted that the instruction had been issued at 1529:10, moments after the CPA had occurred and barely 11sec before the first possible indication to the Aberdeen APR that the F3 was climbing when the fighter's Mode C indicated it was passing through FL104. The Board agreed that the APR had taken action as soon as practically possible, but the avoiding action R turn was thwarted by the F3's turn to the east thereby bringing the two ac potentially closer together. All this happened very quickly as the subject ac closed at a speed in the order of 480kt – some 8nm/min - but the Board agreed the APR could have done nothing else to prevent the incident. Furthermore, it was evident that the WC was unable to intervene because he had not detected the climb due to the garbled SSR data and would have been unable to do so if he had, because of the 'open mic' at the time. Controller members observed that it would have been wise to have given the F3 crew a reminder to maintain FL100 before instructing them to haul off – this was with the clarity of hindsight - but it would have been good practice nonetheless and worth repeating here.

Turning L, belly-up, and blind to the other ac, it was unsurprising, some thought, that the F3 crew had not seen the Jetstream just over 1nm away. A fast-jet pilot member suggested that the F3 crew had not seen it before they began turning because it was so far away and that the airspace into which they were about to fly was cleared visually, hence, there was no risk of a collision. However, this was a solitary view. Members observed that all the safety nets that had been put in place had been progressively breached, the established IFR separation eroded and even see and avoid had not worked here. The minimum separation recorded was 1·16nm while the F3 was in a climbing turn eastbound, unaware of the Jetstream. By that stage it had already climbed through the turboprop's level and tracks were diverging. Taking all these factors into account the Board concluded that safety had indeed been compromised.

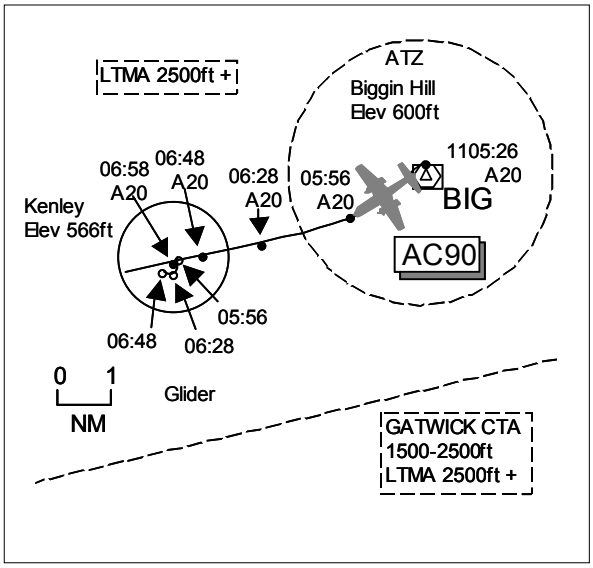
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F3 crew breached co-ordination and climbed through the level of the Jetstream, which they did not see.

Degree of Risk: B.

AIRPROX REPORT NO 24/03

Date/Time:	27 Jan 1107	
Position:	5118N 0006W (O/H Kenley G/S - elev 566 ft)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	KA8	AC90
Operator:	Civ Club	Civ Exec
Alt/FL:	1100ft (QFE)	2200ft (QNH)
Weather	VMC NK	VMC CLBC
Visibility:	>50km	>10km
Reported Separation:	200ft V 200yd H	not seen
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE KA8 PILOT reports having completed a winch launch to 1150ft agl from Kenley heading approx 200º, he turned R at the upwind end of the RW after cable release intending to track along the N-S ridge to the W of the aerodrome. He was heading approx W, making good a NW track at 40kt. The visibility was excellent, >50km in VMC, the ac was coloured orange/white and carried no radio. Just N and W of the Kenley cross RW intersection, whilst inside the perimeter track of the aerodrome at 1100ft QFE, he heard a powered ac closing rapidly from his R quarter. Shortly thereafter, he saw a large high winged twin turbo prop ac on a crossing/overtaking track to his R about 200yd away heading W 200ft above. The other ac did not appear to have altered course and had continued on a steady westerly track, perhaps descending slightly. After the conflicting ac had passed, he maintained his track for about 2min and then returned to the Kenley cct and landed. The incident was observed to have occurred when both ac were within the Kenley aerodrome boundary.

UKAB Note (1): Owing to problems with the local postal service, the KA8 pilot's report was received at the UKAB almost two months after the incident occurred. Further delay to the tracing action ensued, owing to the incorrect time being reported, which led to the reported pilot completing his report 2·5 months post incident. Radar data was subsequently obtained from the NATS archive but RT recordings and ATCO reports were not available.

THE AC90 PILOT reports heading 270° at 210kt en route to Fairoaks at 2200ft QNH, he thought, and was in receipt of LARS from Thames Radar on Box 1 and talking to Biggin APP on Box 2. He did not see the reporting glider but gave a brief account of his flight. The visibility was >10km in VMC, the ac was coloured white/blue and he was squawking an assigned code with Mode C; TCAS was not fitted. After turning over BIG towards Fairoaks, he had endeavoured to pass to the N of Kenley, both pilots were maintaining a good lookout for gliding activity. On passing just to the N of Kenley, the only traffic he saw was a glider on the RW about to depart. He believed that no TI was received from Thames Radar whilst transiting through the area before changing to Fairoaks ATC approaching OCK.

UKAB Note (2): Met office archive data shows the QNH to 1029mb.

UKAB Note (3): The UK AIP at ENR 5-5-1-3, promulgates Kenley as a Glider Launching Site centred 511820N 0000537W for winch launches

where cables maybe encountered to 1700ft agl, during daylight hours; site elevation 566ft amsl.

UKAB Note (4): Analysis of the Gatwick, Pease Pottage and Debden radar recordings at 1105:26 shows the AC90 O/H BIG tracking 240º squawking 7061 indicating 2000ft QNH 1029mb. 30 sec later the AC90 commences a R turn, rolling out onto a 260º track shortly thereafter, 2nm SW of BIG as a primary only return appears O/H Kenley, believed to be the KA8 glider, tracking 200º 3nm ahead of the AC90. At 1106:28, the glider is seen to commence a R turn before fading at 1106:48 tracking 290º in the AC90's 11 o'clock range 0·8nm. The AC90 is seen to pass directly O/H Kenley at 1106:58 indicating 2000ft QNH (1434ft Kenley QFE) but KA8 glider, flying at a reported height of 1100ft QFE, is not seen on any further radar sweeps.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members were critical of the airmanship displayed by the AC90 pilot. It seemed that he had tracked between BIG and OCK VORs without taking due regard of the gliding activity and without any intention of avoiding the site by an adequate margin. The radar recording had shown the AC90's track as passing O/H Kenley, a gliding site promulgated in the AIP and depicted on aeronautical charts. Although gliders are likely to be encountered anywhere in the FIR, it was more likely to occur within the airspace close to the launch site. Routeing around was particularly important to avoid any launching glider and, more importantly, the attached cable. The Board agreed that the AC90 pilot had caused the Airprox by flying O/H Kenley.

The KA8 pilot had released the cable shortly before the incident and, after having turned R into the O/H, had been surprised, firstly to hear, and then see, the AC90 approaching from his R, as it overtook/crossed R to L 200yd away and 200ft above. Although the geometry had meant that the ac were not going to collide, the Board were clear that the passage of the AC90 through the Kenley O/H, below the max winch cable release height and without seeing the KA8 glider had meant that the safety of ac had not been assured.

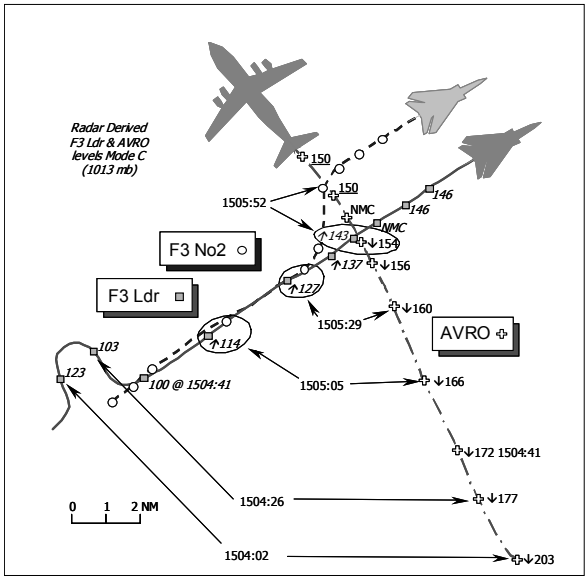
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The AC90 pilot overflew Kenley, a notified Glider Site, below the maximum winch cable release height, into conflict with the KA8 glider, which he did not see.

Degree of Risk: B

AIRPROX REPORT NO 25/03

Date/Time:	26 Mar 1505	
Position:	5430N 0100W (SID E of Leeming)	
Airspace:	Vale of York AIAA (Class: G)	
	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado F3x2	AVRO RJ
Operator:	HQ STC	CAT
Alt/FL:	FL135↑	↓FL150
Weather	VMC CLAH	VMC NR
Visibility:	Unlimited	NR
Reported Separation:	1000ft V, 100ft H	nil V, 2nm H
Recorded Separation:	F3 Ldr V AVRO 400ft V/contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports he was leading a pair of camouflage grey F3 ac departing from Leeming on a SID EAST in good VMC, 10,000ft above Haze where the sky was clear and the visibility unlimited; HISLs were on. The pair was under a RIS from Leeming APPROACH (APP), the lead ac only squawking A6152 with Mode C and they were 'cleared' to climb to FL150; TCAS is not fitted. Heading 060° at 350kt the formation commenced weapons checks passing FL90 whilst maintaining the climb on a parallel course to the Leeming 060R. After these checks were completed they formed into 'Battle' formation with the No2 on the port beam at 1½nm displacement and a handover to London MILITARY was effected by APP, who instructed them to contact London (Mil) on 313·00MHz. They checked in twice on the RT with London MILITARY, he believed, but despite being in 2-way RT contact with his wingman, nothing was heard from the controller. [UKAB Note (1): The controller had not selected 'transmit' on that frequency. The reporting lead pilot said he made 2 calls, but only one clear transmission to the controller is evident on the RT transcript. A second call might have occurred 19sec after the first, partially masked by an untransmitted instruction from the controller.] Climbing through FL135 he called his No2 back to the APP frequency, then after a look left at his wingman and briefly 'heads-in' to check that the correct frequency was selected, he looked out to the right and saw a white Avro RJ (BAe146), 1000-1500ft away to starboard, on a conflicting heading as it passed about 1000-1500ft above his jet within 100ft horizontally. No avoiding action was taken as the airliner had already overflown his jet but he warned his wingman of the conflicting traffic and then reported an Airprox to APP. At no point had this Avro been called to them by ATC. As both ac were on a *"collision course"* - with no relative movement - visual contact was made very late as the airliner *"bloomed"* into view. He estimated that the Avro was at FL150 - the same level that his pair had been 'cleared' to by APP - and assessed the risk as *"high"*.

THE AVRO RJ (BAE 146) PILOT reports that his ac has a white livery and he was in an en route descent at 400kt,, whilst in receipt of a RAS from London MILITARY, squawking the assigned code of A3771 with Mode C. They were instructed to descend to FL80, and then their 'cleared' level was raised successively to FL130 and then FL150. The 'fighter' was first seen below his ac and the minimum separation was about 2nm when at the same level. He was told that the fighter ac was manoeuvring and he expected the jet pilot to have them in sight; he assessed that the risk was *"medium"*.

AIRPROX REPORT No 25/03

MIL ATC OPS reports that the F3 pair departed from Leeming climbing to FL150 under a RIS from APP that had been *"limited from all around working SSR only"*. The APP controller reports that she had seen the Avro on a slowly converging track wearing a LATCC (Mil) squawk at 30nm, but considered it was too far away to make traffic information useful. At 1504:02, [UKAB Note (2): When the lead F3 was at a range of about 15nm from the Avro] APP commenced a handover on the F3s to LATCC (Mil) Controller 15 (CON15), on conclusion of which at 1504:26, CON15 passed the contact frequency of 313·00MHz, which was read back correctly by APP. Ten sec later APP instructed the lead F3 pilot to *"…contact London Mil 313·0",* which again the pilot read back correctly at 1504:41, "[C/S] *to 313·0 thanks,* [C/S] *313·0, mains go"*.

Nineteen sec later the pair 'checked in' on the frequency and at 1505:03, the lead pilot called CON 15 "*London* [C/S] *1 & 2 passing FL120 for 150",* to which CON15 responded "[C/S] *identified climbing FL150 radar information, traffic right 2 o'clock 5 miles crossing right left indicating FL165 descending"* - the Avro. Unfortunately, CON 15 transmitted this message on VHF (by mistake) which went unheard by the F3s. Immediately thereafter, Controller 2 (CON2), who was controlling the Avro, called on the landline for co-ordination, requesting CON15 to stop the F3s' climb at FL140. At 1505:22, still unaware that he had not selected UHF, CON15 transmitted to the lead F3 *"…for co-ordination...can you stop climb init…".* [UKAB Note (3): When the lead F3 pilot might have called again but more probably when the controller realised that transmit was not selected] before he then continued and repeated "[C/S] *London Mil identified stop climb initially FL140 for co-ordination…."*. Both of these calls went out on VHF, and were again unheard by the F3s.

The F3 pair 'checked back in' on the APP frequency and at 1505:32, called APP. However, APP was in the middle of a handover relaying traffic information to another flight and was not able to answer the lead F3 pilot immediately. APP responded 13 sec later at 1505:45, "[C/S] *pass message"*, whereupon the leader retorted immediately *"Roger,* [C/S] *back with you, tally over the top actually"*. APP advised, *"let me check affirm believed traffic passed behind now indicating FL150"*, and it was confirmed by the lead F3 pilot they had *"..just missed a high wing heavy"* – the Avro. APP queried whether they were *"…unable to contact London"* to which the Leader responded *"definitely".* Following CON15's landline call to APP, 3sec later at 1506:08, the F3 pair was again instructed at 1506:14, to call London MILITARY on the same frequency. Whereupon the leader queried if CON15 had heard them on RT the first time. It was confirmed that he had, advising APP that *"yes…I had the wrong frequency* [selected] *I had two frequencies".*

Meanwhile CON2 was controlling the Avro, in descent to FL100, under a RAS. At 1501:50, traffic information was passed to the Avro crew about other traffic, *"…indicating FL90 if not sighted stop descent FL120",* which the pilot elected to do. Traffic information was transmitted about the F3s at 1504:45, *"..pop up traffic left 10 o'clock 10 miles left right indicating FL100 climbing a pair if not sighted stop descent FL150"*, once again the pilot elected to stop descent. It was at this point at 1505:18, that CON2 contacted CON15 and requested that he *"…stop climb FL140 please"*. CON15 advised that he had *"…just got them on frequency so standby"* and endeavoured to contact the F3 leader. At 1505:36, CON 15 advised that his ac were *"not answering…"* whereupon at 1505:48, CON2 transmitted to the Avro crew *"….avoiding action turn left heading 320 traffic left 10 o'clock 3 miles left right indicating FL145 climbing"*.

[UKAB Note (4): The Great Dun Fell radar recording shows the lead F3 and No2 splitting for their weapons checks and manoeuvring at 1504:02, for a short period before steadying on a north-easterly track. At 1504:41, the No2 F3 – is shown as a primary radar contact only - running ahead of the lead ac indicating FL100, just before traffic information was passed to the Avro crew by CON2. The Avro was descending on a steady track of 335° through FL172 at this point and subsequently converged with the F3 pair on a steady relative bearing. The No2 split out from the lead F3 – climbing through FL127 at 1505:29, as the Avro passed FL160. The climbing lead F3 and descending Avro contacts merge moments after 1505:52, when 1100ft of vertical separation was evident, as the No2 moved into 'Battle' 2nm to port of his leader. The avoiding action 15° L turn passed by CON2 is just evident. Thereafter the Avro leveled at FL150 and opened astern of the

F3 pair that maintained a steady course at FL146 some 400ft below the airliner.]

A number of factors eventually resulted in this Airprox. The F3s appear to have manoeuvred during the period of the handover conversation, [whilst weapons checks were completed] without warning APP in contravention of JSP 318A 235.115 [now superseded by JSP552], which states that crews operating under a RIS *"…must advise the controller before changing…route"*. This manoeuvring might have led both APP and CON15 into believing that the F3s would be no factor to the Avro and might be why the traffic was not called during the handover. A period of 22sec elapsed before the lead F3 called CON15 and a further 29sec passed before the pair recalled APP. CON15 did not have the frequency of 313·00MHz selected to transmit to the lead F3 crew in anticipation of their call, which was undoubtedly an error. Apparently the crew made only one call and returned to APP's frequency after a short period; [UKAB Note (5): the reporting lead F3 pilot might well have called twice]. The traffic information passed was accurate at the time but if CON15 had spotted his frequency selection error earlier the Avro could still have been called again. Whilst flights are between ATC frequencies they are not in receipt of an ATS and the onus is on the crew to see and avoid.

The manoeuvre performed by the F3s whilst 15nm NW of the Avro may also have misled CON2, who when providing a RAS, was seeking to achieve standard separation against the F3s. The Processed Radar Display System (PRDS) at LATCC (Mil) allows the level to which the flight has been instructed to climb/descend - the 'Cleared Flight Level' (CFL) - to be displayed to other LATCC (Mil) controllers on the radar display. This CFL is shown in the second line of the SSR label next to the actual Mode C, thereby facilitating 'silent' co-ordination and reducing landline communications. At some point during, or just after the handover [probably no earlier than 1504:30], a CFL of FL150 was shown on the F3s' SSR data block - the same level the Avro was ultimately descending to - and which would also have been displayed as a CFL in the Avro's SSR data block. This CFL was then altered when CON15's Assistant input FL140 on PRDS as the CFL for the F3s in anticipation of the requested co-ordination, despite no acknowledgement being received from the lead crew. It would have been prudent for CON2 either to stop the Avro's descent at FL160 or to execute a meaningful turn to produce time and space for co-ordination [UKAB Note (5): that CON2 initiated moments before 1505:18]. Either way CON2 should have issued avoiding action to the Avro crew earlier whilst seeking to achieve standard separation against the observed F3s. SOPS at LATCC (Mil) have since been amended so that CFLs are not altered on the PRDS until confirmation of compliance with the instruction has been given by the respective pilots.

THE TORNADO F3 PILOT'S STATION comments that the F3 pair was on a promulgated SID and the ATC handover to London Mil had been concluded. Although APP was aware, at the time of handover, of the airliner's radar contact that subsequently passed close to the pair, it was considered that a warning call was not to be required because of the range. It should be noted that the airspace in this vicinity has many radar contacts that pass close to the SID track; calling all of them would further complicate the RT and raise nugatory traffic warnings with calls on ac that are yet to become a factor. Having investigated our procedures overall and the events in this case in particular, there is nothing that the unit could have reasonably done to ensure that this Airprox did not occur.

HQ STC comments that it is most likely that the Avro pilot was visual with the No2 F3, which was flying 2nm – in line abreast to the N of his leader – therefore, the Avro pilot did not see the lead F3 which flew underneath him. The F3s advised they were contacting London Mil at 1504:41. At 1505:03, the F3s called London Mil who replied at 1505:06, and included traffic information, but unfortunately transmit was switched off on that frequency so no transmission was made. CON15 did not realise that the transmission had not gone out and was busy with other calls until transmitting to the F3s at 1505:22 instructing them to stop climb at FL140. At this point it appears that CON15 realised that she was not transmitting; it is also possible that her long transmission masked a call from the F3 leader. A simple switching error by the London Mil Controller prevented the F3s from receiving the warning that was given by CON15. However, the F3 took 19sec before calling CON15, (perhaps because they were using a second radio to complete intra-formation checks). With no additional calls from the F3

formation recorded afterwards, this implies a very unfortunate sequence of double transmissions, or possible mistaken transmissions on the intra-flight radio.

The 'weapons check' manoeuvring and associated cockpit tasks, might well have distracted the crews from their primary task of visual lookout, However, the F3s were flying under VFR in Class G airspace where the responsibility lay with the F3 crews to see and avoid. There is no guarantee that all traffic will be called by the controller under a RIS; it was the responsibility of the aircrew to maintain an assiduous visual lookout.

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 and operating authorities.

The Board commended the F3 leader for his frank and comprehensive account and the HQ STC member explained that each F3 crew in turn would have been busy 'head-in' the cockpit for short bursts whilst completing their weapons checks. Such activity was a routine element at the start of any AD sortie. Though it would have been helpful if the F3 leader had advised APP at the commencement of these checks, the formation had not changed their actual route [ie their mean line of advance] and the Board was not convinced that this should have confused APP at all – though it might have perplexed CON2 for a short while. Nevertheless, this Airprox occurred over 1min 20sec after the pair had steadied NE bound and after these checks were completed, where there remained a clear compunction on the F3 formation to effect a comprehensive lookout. Unfortunately, both crews were completely unaware of the airliner until the leader spotted it late on the starboard beam. The HQ STC AD member stressed that the F3 crews should have seen the Avro earlier, but the omission of traffic information by APP before handing over the pair to CON15 gave some controller members considerable cause for concern when there was evidently ample opportunity to do this. Furthermore, CON15 had accepted the handover from APP without questioning whether the Avro had been called to the F3 pilots or pointing out the confliction to APP before the handover was concluded. At that stage the separation between the formation and the airliner was about 15nm and closing. Notwithstanding Mil ATC Ops's comment that no ATS applied whilst switching between ATSUs, the underlying principle of a controller to controller radar handover is to achieve a seamless transfer of control between ATSUs, with the objective under the RIS that pertained here of passing comprehensive and pertinent traffic information. In this transfer period out of RT contact the subject ac closed from a range of 15nm to just under 7nm. Civilian controller members were concerned that during the handover neither APP nor CON15 had thought that traffic information should have been issued to the F3 crews before the transfer of communication. Here was a salutary lesson; the Board was in no doubt that if traffic information had been transmitted the F3 leader would have spotted the airliner and an Airprox would not have ensued. Moreover, CON15 was subsequently concerned enough about the airliner to ensure that traffic information was issued immediately the F3s called on RT, but unfortunately the controller's attempt to warn the F3 pair was thwarted by his fundamental RT switch selection error - a simple and unfortunate mistake that members agreed unanimously was part of the cause. The Board was briefed that when controlling on two frequencies the Unit SOP is that both are normally cross-coupled together and one not merely switched to 'receive only' unless controlling an Air test for example, where a quiet frequency might be necessary. Thus, denied traffic information from either APP or CON15 the F3 crews climbed into conflict, unaware of the airliner closing from the south. Here the No2 opening simultaneously into 'battle' to port of the lead ac did not help, but the wingman should have had ample opportunity to spot the Avro that was closing on a steady relative bearing, but with little relative movement to draw attention to it. Nevertheless, in the 'see & avoid' environment of the FIR with visibility reported as unlimited, the HQ STC member believed that these AD crews should have spotted the Avro earlier than they did; the Board agreed that this late sighting was also a part of the cause.

Board members noted from the Mil ATC Ops report that the system of displayed CFLs used for

'silent co-ordination' should have acted also as a warning to both CON15 and CON2 that their ac were ascending/descending to the same level. Evidently it was CON2 that initiated co-ordination in the first instance, who in the provision of a RAS to the Avro crew was seeking to achieve 5nm horizontal radar separation, or, 1000ft co-ordinated vertical separation against CON15's traffic with the pilot's concurrence under the RIS. The erroneous input of FL140 as the cleared level by CON15's Assistant may have misled CON2 here, but this was a good lesson in the difficulties of attempting co-ordination at close ranges - CON2 had initiated this action barely 32sec before the contacts merged. The CFL 'system' had now been reviewed and appropriate changes wrought, nonetheless, some members thought that if the RT switch selection error had not occurred the F3's climb might have been arrested in time to allow the plan to work. However, the Board agreed that stopping the Avro's descent at FL160 would have been a more practicable and preferable option in these circumstances. Nevertheless, fate intervened and here was another salutary lesson for controllers and pilots alike on what can occur when least expected; controllers must not assume that co-ordination will always be forthcoming. There was general agreement that CON2 had left co-ordination late and thus when the plan to resolve the confliction in the vertical plane was thwarted, CON2 was obliged to issue an avoiding action turn that could not have prevented separation from being eroded. The 15° turn was insufficient to effect the outcome here and controller members agreed that an earlier more positive avoiding action turn was warranted. Thus with the best of intentions, in a busy traffic environment, CON2 had been unable to achieve the requisite separation between the Avro and the observed F3s that the former's crew could reasonably expect under a RAS, which the Board agreed was the other part of the cause. Members were reassured to learn that LATCC (Mil) had acted promptly to promulgate the significant lessons learned from this occurrence.

Though the Avro crew had reported the minimum horizontal separation was about 2nm, this might well have been against the No2 as the radar recording showed the contacts of the lead jet and the airliner merged as the vertical separation dropped below 1100ft as they climbed and descended toward each other. Some members suggested, therefore, that the Avro crew might not have seen the lead F3 pass beneath their airliner at all, which was a possibility. Nevertheless, neither ac's crew thought that more robust avoiding action was warranted and though vertical separation had been eroded down to 400ft, this was evidently after the lead crew had spotted the airliner and the tracks had crossed. The Board concluded, therefore, that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

a. The Avro crew was not afforded the separation expected under the RAS.

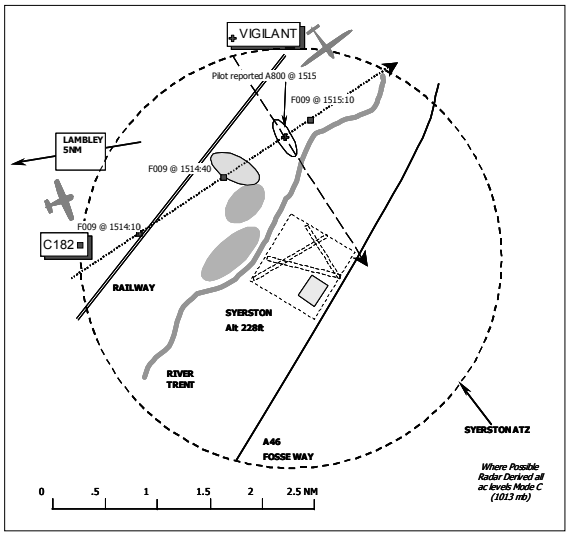
b. CON15 made a switch selection error that prevented traffic information about the Avro being transmitted to the F3s.

c. Late sighting by the F3 formation.

Degree of Risk: C.

AIRPROX REPORT NO 26/03

Date/Time:	30 Mar 1515 (Sunday)	
Position:	5403N 0056W (Syerston)	
Airspace:	Syerston ATZ	(Class: G)
	Reporting Aircraft	*Reporting Aircraft*
Type:	Vigilant T1 Glider	C182
Operator:	HQ PTC	Civ Pte
Alt/FL:	800ft (QFE 1012 mb)	(N/K)
Weather	VMC HAZE	VMC HAZE
Visibility:	5km into Sun	
Reported Separation:	50ft V 200m H	c200ft V ~1/4nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT T1 (MOTOR) GLIDER PILOT reports that he was flying a local sortie with HISL on heading 160° at 70kt and was rejoining the circuit for runway 34 at Syerston, on an extended downwind leg, descending to 800ft (circuit height) on a QFE of 1012mb. He scanned right into the crosswind leg of the circuit (which was into sun) and observed the Cessna, pointing directly towards him, slightly below, heading NE following the Nottingham – Newark railway line. He initiated a slight climb to increase separation further and the Cessna continued up the railway on an undeviating track, at about 750ft AGL. His estimate of separation was 50ftV and 200m H which closed rapidly as the C182 passed below.

THE C182 PILOT reports that he was flying solo from Lambley (5nm W Syerston) to South Scarle (10nm NE Syerston) on a Northerly heading at 120kt in a Blue and White ac, with wing strobes switched on. Due to the late notice he was unable to recall much detail about the incident but did remember seeing a motor glider about ¼nm away but considered that avoiding action was not necessary.

THE STATION COMMENTS that this would appear to be a straightforward case of a light ac track-following with insufficient associated lookout. The day was saved by an aware Vigilant pilot.

Although Airproxes are reasonably rare at Syerston, infringements are all too familiar. The adjacent A46 trunk road, river Trent and now the railway line allow pilots to adopt the "easy" nav technique.

AIS (MIL) reports that the radar replay does not record the Airprox, despite both ac painting shortly before the incident. Although the Vigilant is SSR equipped, the pilot informed them that it is standard procedure to switch it off when joining the circuit. They believe that the Airprox occurred shortly after the Vigilant had switched the SSR off.

HQ PTC comments that the Syerston ATZ is over-endowed with line features and staff there fear that this will not be the last such intrusion. Educational publicity about Syerston has been tried through the medium of GASIL in the past but this pilot could not have been more local. We shall discuss with ACCGS what further measures they might take.

UKAB Note (1): The Syerston ATZ is class G airspace of 2nm radius centred on the mid point of 07/25 up to 2000ft agl. Permission to enter is available 0830-SS from Syerston Radio.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

The limited information available to the UKAB consisted of reports from the pilots of both ac and a radar video recording. Although limited, this was sufficient to conduct the investigation with a high degree of certainty.

It was clear from the radar replay that the C182 entered the Syerston ATZ without permission and tracked about 1¼nm NW of the airfield datum. Although the actual Airprox was not recorded, the Board agreed that it had occurred at the position stated by the Vigilant pilot. Moreover the precise miss-distance could not be determined, but it was clear that the Vigilant pilot saw the C182 in time to take effective avoiding action; this was confirmed by the C182 pilot's estimation that he required no action. In the opinion of the Board, there was therefore no risk of collision.

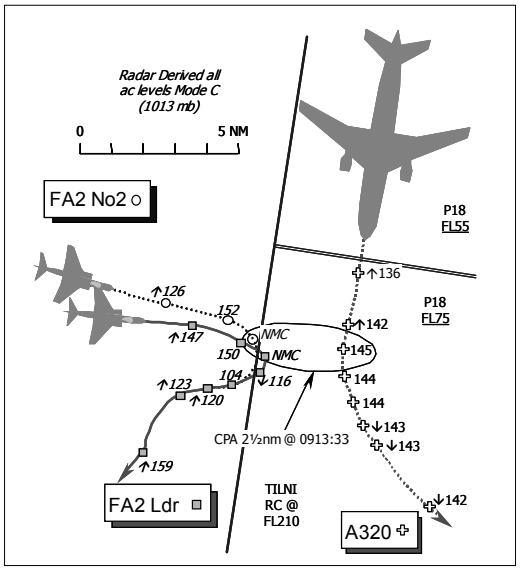
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of the Syerston ATZ, in hazy conditions, by the C182 pilot, who flew into conflict with the Vigilant.

Degree of Risk: C

AIRPROX REPORT NO 28/03

Date/Time:	31 Mar 0913	
Position:	5440N 0200W (7nm NW of TILNI)	
Airspace:	Airway P18	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	A320	Sea Harrier FA2x2
Operator:	CAT	HQ STC
Alt/FL:	FL147↑	↑FL190
Weather	NR	VMC nil Cloud
Visibility:	10km+	10km+
Reported Separation:	200ft V/2nm H	Not seen
Recorded Separation:	2.5mn H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports that he was routeing airway PAPA18 to POLE HILL outbound to London-Heathrow and was in receipt of a RCS from MACC on 125·95MHz. Heading 200° approaching a point W of TILNI at 280kt, climbing through FL147 for their cleared level of FL190, TCAS enunciated a TA on 2 contacts that appeared <1000ft above his ac off the starboard wing within 2·5nm - at no stage did they get an RA. MACC passed avoiding action of a turn onto a heading of 080º and to maintain FL140 after he had initiated an avoiding action L turn himself, during which the AoB reached 40º) generating a 'bank angle' warning. At the closest point the two other ac passed within 2-2·5nm from R – L astern and 200ft above his A320. He assessed the risk as *"medium"*.

THE SEA HARRIER FA2 PILOT reports he was leading a pair of FA2s. The ac has a grey camouflage scheme and the HISL was on, whilst holding S of Spadeadam EWTR – EGD510 - at

350kt. He was under a RIS from Spadeadam on 369·15MHz and squawking the assigned code of A2611 with Mode C; his ac's AI radar was unserviceable and TCAS is not fitted.

Heading 150° about 5nm E of EGD407 (Warcop) – into sun, he was informed by Spadeadam ATC that he was approaching CAS and a hard turn onto W was advised. He initiated a very hard descending R turn onto 270º(T) that took about 2-3sec for the manoeuvre. After landing, he was advised that an Airprox had been filed. The A320 flown by the reporting pilot was not seen at all. He added that the navigation screen in the cockpit indicated that he was close to, but not in controlled airspace during the manoeuvre.

THE MACC NORTH RADAR CONTROLLER reports he was operating with the NORTH UPPER & LOWER Sectors combined. The A320 was southbound on PAPA18 under a RCS, positioned on the W side of the airway approaching TILNI. Just before the Airprox, his attention was focused on traffic in the DENBY area inbound to Leeds Bradford airport and a photo survey ac, when his CO-ORDINATOR drew his attention to traffic heading towards TILNI in conflict with the A320. The ac was squawking A2611 about 1nm from the western airway boundary. Two SSR labels were garbling so no initial Mode C readout could be seen until the ac showed FL150 against the A320 climbing through FL139. Avoiding action and traffic information were passed to the A320 crew – though the heading given - 080º - had to be repeated before the airliner turned L; the crew was also instructed to maintain FL140. The A320 pilot stated he had been visual with the conflicting traffic before he had been passed the avoiding action. Standard separation minima were eroded to 2nm/500ft and STCA was triggered.

MIL ATC OPS reports that the Spadeadam RT tape transcripts are about 20sec behind the radar recording timebase, therefore, all timings within this report have been correlated to that of the radar recording. The formation of 2 Sea Harrier FA2s (SHARs), was identified and placed under a RIS by Spadeadam ZONE at 0851:41, for their exercise. At 0907:13, the SHAR leader informed ZONE that the formation was on the last run and on completion would require a handover to London MILITARY to operate in AARA 6A [E of P18] at FL190 and nearly a minute later, ZONE prenoted LATCC (Mil). The formation called terminating the exercise and ZONE provided traffic information on yet another FA2 pair joining independently "[C/S] *heads up, 3 and 4 are about 15 miles S of you, tracking inbound…17000ft"*, which was acknowledged. LJAO NW then called to hand over the second pair of SHARs, No3 & 4, under a RIS at 0911:20. ZONE confirmed with the No1 & 2 that they were joining in formation and informed them of *"…3 and 4…above you at 17, heading in"*. At 0911:58, ZONE told the No1 & 2 to *"…remain clear of P18, the airway, and once identified, commence your climb FL 190"*. The No1 SHAR pilot then queried at 0912:06, *"Just confirm…we're clear to route direct now"* to AARA6, which ZONE responded, *"negative, I'll have to get you in the climb towards FL190 before I can get you across the airway"*. Immediately after the leader acknowledged this transmission, the second pair called ZONE at 0912:17. Whereupon the controller passed appropriate flight information in the intervening period till 0913:30, when ZONE transmitted *"…1 and 2, avoiding action, turn hard right onto W, you're clipping the airway there is traffic E of you, 2 miles, heading S... similar level"*, to which the lead acknowledged *"…hard turn due west"* and complied, reporting steady on W 6sec later. About a min later at 0914:34, ZONE transmitted *"I see you turning back towards the airway, can you orbit right please, I'll hand you over to London"*. The formation was then handed over to LATCC Mil without further incident.

ZONE was controlling the SHARs under a RIS and on completion of their manoeuvring specifically told them to remain clear of CAS; hence the onus of responsibility was placed on the pilots not to infringe P18. The controller reported that he was aware of the A320 in the airway and did not call this traffic to the pair as he expected them to remain clear of CAS. He had planned to handover the SHAR pair to London Radar approaching FL190, clear of the A320 for the airways crossing. It was the responsibility of the SHAR pilots to remain clear of CAS. Nevertheless, with the major airspace changes that occurred 11 days before the Airprox and the proximity of the SHARs to P18 the controller might have anticipated a potential problem. In hindsight, an initial turn to keep the SHAR pair clear of the airway with traffic information on the A320 would have kept the pilots informed and thus aware of the situation. Prior to the Airprox, LJAO had tried to hand over the second formation, but these ac were outside ZONE's

radar cover. ZONE then used unclear phraseology when explaining the plan to the SHAR pilots - *"…once identified, commence your climb FL190…I'll have to get you in the climb towards 190 before I can get you across the airway."* In mitigation, immediately after this transmission, the second formation freecalled ZONE which resulted in a distraction away from the first SHAR pair. As soon as ZONE witnessed the No1&2 SHARs enter CAS, they were given an avoiding action instruction to turn onto W, which they executed immediately. From the radar replay it can be seen that there was very little space for the ac to manoeuvre before approaching P18; indeed on their track, it was evident that they were always going to conflict with the A320 if they entered CAS. Although the No1 & 2 SHAR should not have entered CAS, in hindsight, it would have been prudent for ZONE to have co-ordinated the traffic or routed the SHARs clear.

[UKAB Note (1): Analysis of the Great Dun Fell radar recording shows the No1 & 2 SHARs –- squawking A2611 and 2612 respectively - manoeuvring W of the western boundary of P18 above D407. At 0911:28, the A320, squawking A5137, is shown 10nm N of the northern edge of the TILNI Radar Corridor climbing through FL100. At 0912:44, the pair turn towards P18 on an easterly heading to join up, climbing through FL100 - above the A320. Just W of the western boundary of Class A airspace, the No1 indicates FL150 Mode C as the A320 climbs through FL142 some 800ft beneath the lead SHAR and 1000ft beneath the No2. The pair crossed 0·2nm inside P18, whilst turning sharply R about onto W and where minimum horizontal separation was 2·5nm between the No1 and the A320 - indicating FL145 Mode C; NMC is indicated by both FA2s. The pair was clear to the W of the western boundary of P18 by 0913:48, the No1 FA2 indicating a descent to FL104, apparently as the No2 joins close aboard in formation. At the same time the A320 is shown turning slowly SE and descending.]

ATSI reports that the A320 was operating on an IFR FPL to London Heathrow. It had been placed on a radar heading to position it about 2·5nm from the western edge of Airway P18. The flight was being provided with an Area Control Service by the MACC SC, operating in a 'bandboxed' configuration as 'NORTH RADAR' in which the NORTH LOWER Sector had been combined with the NORTH UPPER Sector. Given the traffic level (assessed as light) and the workload (assessed as moderate) the decision to bandbox the sector was appropriate. At 0911:40, the A320 pilot established communications with NORTH RADAR and was instructed to continue on the radar heading and climb to FL190. The SC then turned his attention to other flights within his area of responsibility. About 1min later, the SC was alerted, first by the CO-ORDINATOR and then by STCA, to two fast moving ac squawking Spadeadam SSR codes, tracking eastbound, the lead ac being about 1·5nm from the western boundary of the airway. The Mode C readouts were initially not discernible due to label overlap. MATS Part 1, Section 1 Chap 5, page 13, describes the action to be taken by controllers in relation to 'Unknown Aircraft' in Class A Airspace: it states *"Neither avoiding action nor traffic information shall be passed unless radar derived or other information indicates that an aircraft is lost, has experienced a radio failure, or has made an unauthorised penetration of the airspace."* The SC perceived an imminent penetration of the airway and threat to the safety of his traffic and issued avoiding action instructions to the A320. While stipulating the 'correct' direction of turn and giving accurate traffic information, it was most unfortunate that the heading issued was wholly inappropriate. At 0913:21, he transmitted, " [C/S] *avoiding action turn left on to a heading of 260 degrees stop the climb flight level 140 traffic in your half past 2 range of 4 miles showing flight level 150".* The pilot read back the level of FL140 but sought confirmation of the heading. The controller repeated the direction of the turn (left) and this time issued a heading of 080º and updated the traffic information with *"…traffic 3 o'clock 2 miles turning away from yourself heading south".* The pilot read back the heading correctly adding that he was *"…visual with that traffic..".* An examination of the Claxby Radar recording less than a minute before the controller intervened shows the two FA2 ac manoeuvring to the W of the airway. At 0912:32, a L turn was quickly reversed and 15sec later the jets were established on an easterly track towards the airway. Both were climbing, the leader passing FL124 and 5nm from the boundary at a ground speed in the region of 360kt. At the commencement of the SC's avoiding action transmission just before 0913:30, the lead ac, now at FL150, was about to cross the boundary of CAS and 4nm from the A320, which was climbing through FL141. By the end of the transmission

the lead FA2 was 0·2nm inside P18 and 2·7nm from the A320 that was climbing through FL144. Both FA2s subsequently executed a tight R turn and descended, during which the leader penetrated the airway in the order of 0·2nm. Unfortunately, neither of the pair's Mode C height readout was displayed from the point they commenced the turn until they were established on a reciprocal track. Consequently, while minimum horizontal separation was recorded as 2·5nm, minimum vertical separation could not be positively determined. Whilst the initial avoiding action heading issued by the SC was 180° out from that which he had intended, this was not thought to have materially affected the outcome.

THE SEA HARRIER FA2 PILOT'S STATION comments that the No1 & 2 SHARs were engaged in an exercise at Spadeadam range that involved high-energy evasive manoeuvres throughout a height band from low level to 18,000ft, with the No2 ac keeping station on the lead SHAR, but at times displaced by 1–2nm. Prior to the Airprox, the pair had just completed their last high-energy manoeuvre and was climbing out, looking for a handover to LATCC for CAS transit to join with their tanker in AARA6a. Whilst in receipt of RIS and flying in VMC, the lead pilot was working Spadeadam on one radio and communicating with his No2 on the second radio; the No2 was attempting to join with the lead ac for the airways crossing and was passing heading information to the leader to expedite the join. The lead pilot was aware of the proximity of the airway from his navigational equipment, however, he was relying on a series of waypoints to mark the edge of the airway as opposed to a line. The lead pilot was also becoming concerned over their fuel state and was simultaneously questioning his No2 on the situation; cockpit workload was therefore relatively high. Whilst awaiting the handover to London Radar, the No1 & 2 took up a right hand orbit climbing to FL190. The lead FA2 pilot believed he was close to, but not inside CAS, however the avoiding action turn onto W to remain clear of CAS was immediately complied with by both pilots when passed by ZONE with, additionally, a descent. The lead pilot did not recall any traffic information being passed before, during, or after the avoiding action turn, he remained therefore, unaware of any conflicting traffic that could explain why neither pilot saw the Airbus. Furthermore, the AI radar of the lead ac was unserviceable and the No2 pilot would have been concentrating on joining and formating on his leader.

It would appear that this Airprox took place in, or adjacent to, the boundary of CAS, when the formation leader of a pair of FA2s, under high cockpit workload conditions, was commencing a hold awaiting handover. The limitations of the 'presentation' of the FA2's navigational equipment possibly impeded the pilot in establishing the exact boundary of CAS. Squadron pilots have been re-briefed on the need to be extra vigilant when operating close to the edge of CAS and the limitations of their navigational equipment.

HQ STC comments that the SHAR pilots did not leave enough margin for error in their navigation, and in their haste to proceed with their mission, inadvertently infringed CAS. The new airways structure to the E of Spadeadam has created a tight manoeuvring area, where pilots will need to exercise extra care with navigation to avoid infringements.

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 CinC Fleet member briefed the Board that proactive measures had been taken by the FA2 pilot's station to highlight this occurrence to all jet pilots on the unit. However, it was stressed that the inadequacies of the SHAR FA2's navigation fit (that does not have a moving map display) had not helped here. Marking the CAS boundary line as a series of waypoints to assist the pilot, was not an easy method to ensure CAS avoidance. Unfortunately, given the envisaged service life of the FA2, it was not anticipated that an improved technical solution would be forthcoming. Given the limitations of the navigation display, pilots should allow a larger margin for error when setting up orbits, as had been the case in this incident.

The Board recognised that the Spadeadam ZONE controller had done his best to prevent this unintentional incursion into PAPA18; ZONE had already warned the FA2 pair to remain clear of

CAS and it was fortunate that ZONE spotted the conflict and immediately issued avoiding action to the lead FA2 pilot, even though only a RIS pertained. This timely decision by ZONE had prevented the situation from deteriorating further and the Board commended the controller for his prompt and positive action. The FA2 leader's immediate compliance with this instruction and the traffic information given ensured that the pair not only rapidly turned away from the A320 but also entered a very fast descent of the leader's own volition. This coupled with the A320 crew's L turn in compliance with the NORTH RADAR SC's avoiding action turn ensured that separation was very quickly restored and undoubtedly precluded an RA. The FA2's speed, coupled with the proximity of their operating area being relatively close to the airway boundary, had not given the SC much of an opportunity to provide an earlier warning to the A320 crew. Here again members agreed that TCAS had proved its worth and provided that invaluable 'heads-up' to the A320 crew, by detecting the presence of the small jets and forewarning them of the developing situation. Thus the A320 crew were in a position to react quickly and positively, though it was noted the SC had given an erroneous heading, which the Board agreed had not materially affected the outcome.

The Board agreed unanimously that this Airprox had resulted from an unintentional entry into Class A controlled airspace by the SHAR FA2 pair, which had flown into conflict with the A320. Although the FA2 pilots had not spotted the A320, the combination of the immediate corrective action taken by all concerned had ensured that no risk of a collision had existed in the circumstances reported here.

As an aside the NATS Ltd advisor commented that a workshop had been held in September 2003 to define a more formalised framework for incident investigation between the MoD and NATS. The Protocol records the understanding reached for flight safety co-operation and the exchange of flight safety information, which had now been forwarded for signature.

PART C: ASSESSMENT OF CAUSE AND RISK

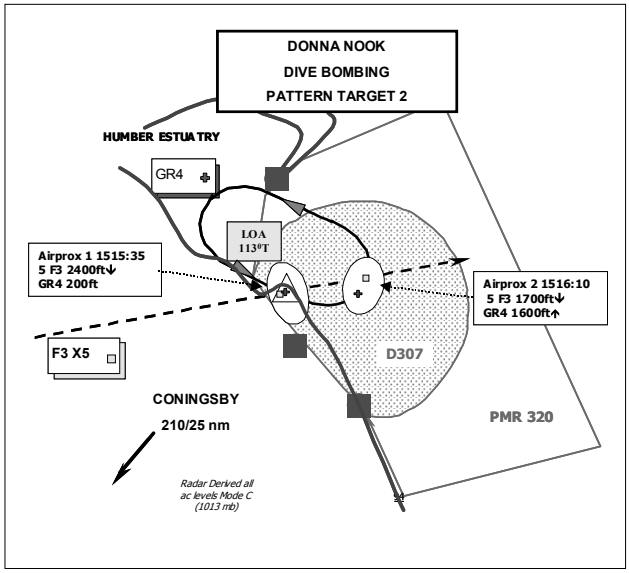
Cause: Unintentional entry into Class A controlled airspace by the SHAR FA2 pair, which flew into conflict with the A320.

Degree of Risk: C.

AIRPROX REPORT NO 29/03

Date/Time: 27 Mar 1515
Position: 5330N 0010E (Donna Nook Range)
Airspace: D307/PMR320

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado F3x5	Tornado GR4
Operator:	HQ STC	HQ STC
Alt/FL:	2000ft (QFE 1018 mb)	2500ft (Rad Alt)
Weather	VMC HAZE	VMC HAZE
Visibility:	8KM	5KM
Reported Separation:	0ft V ½ nm H	0ft V 1 nm H
Recorded Separation:	1: 2200ft V 0H 2: 100ft V 1nm H	



AIRPROX REPORT No 29/03

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 FORMATION LEAD PILOT reports that he was leading a formation of 11 ac, which were planned to conduct an airfield attack prior to forming up as a Diamond 9 for a flypast at their home base. They were correctly booked into the relevant LFA and had pre-booked the 1515-30 slot at Donna Nook Air Weapons Range (AWR) to allow the formation to join-up.

While heading E towards the AWR the lead crew had a radar, subsequently visual, contact with a Tornado GR4 in the Range. Home base ATC was questioned regarding the GR4 as the formation had been briefed that they had booked the Range Danger Area. After flying through the base airfield as pairs, the formation began to form up as a Diamond 9. Instead of heading towards the Range the leader elected to turn S away from it. ATC then informed the leader that they had called the Range, it was 'cold' and the formation was cleared to enter, the leader then changed course and headed into the Range. A radar contact was then seen to approach the formation from the N. Visual contact confirmed that it was a GR4 and it was seen to carry out a strafing run. Coningsby ATC was again questioned. The GR4 was seen to climb and turn left towards the formation, which consisted of 5 ac in close formation with another 4 ac also in close formation joining. The leader assessed there to be a confliction and began bunting. The GR4 passed within ½nm at the same height behind the 5ac and 1000ft below the 4ac joining.

THE TORNADO F3 STATION comments this incident raises questions that must be addressed by ATC. There certainly appeared to have been a communication breakdown between ATC and the AWR that may have had very serious consequences and may also demonstrate a weakness in procedures.

THE TORNADO GR4 PILOT reports that he was flying a singleton sortie in a booked slot on Donna Nook AWR. He was flying a dive pattern pass towards the end of his booked range slot. He requested a further pass but was informed that a formation of 9 F3s had the next slot and would arrive shortly. He completed his attack and whilst turning downwind on to 293° at about 450kt, he was startled to see a formation of 5 x F3s within the AWR at a similar level, crossing his nose, left to right, at approximately one nm and at a similar altitude. He did not need to take evasive action. Shortly after, the RSO informed him of the traffic, albeit too late. Had he turned downwind earlier the outcome could have been much more severe. He assessed that there was a possibility of a collision.

THE TORNADO GR4 STATION comments the Flight Safety Officer stated that he studied the Tornado GR4 video of the occurrence and could only assume that there had been a breakdown in communication between Coningsby ATC, Donna Nook AWR, the F3 formation and the GR4. The GR4 was approaching the end of the booked slot. The pilot had been cleared for the pass he was completing at the time of the occurrence. The pilot was expecting the F3s to enter the range area, however, he was completely surprised by the silent method of their arrival. It would seem quite fortuitous that the GR4 pilot turned the ac when he did. This incident highlights the importance of good communication between the various agencies in an area used by many fast jet ac.

MIL ATC OPS comments that timings in this report are corrected to UTC. Donna Nook's tape transcripts appear to be 15 seconds ahead of the radar recording and Coningsby is 2 minutes 29 seconds ahead.

The Donna Nook Range Controller (RCO) reports that an inquiry was made by the F3 Sqn concerned on 25 Mar 03 *"…regarding range bookings on Thursday 27 and Friday 28 Mar at 1000z as there will be a formation flypast at RAF Coningsby."* The RCO said he was advised that *"…the aircraft would be forming up at a position to the SW of Donna Nook…..and there was a possibility of them drifting towards the range airspace."* The F3 Sqn was informed *"…the range had bookings at that time on both days"* so the situation was left that the range would be contacted again on the morning of the 27th to *"….re-assess the situation."* Subsequently HQ STC, Op Supt 3 advised the RCO *"….the 1515z slot on Thu 27 Mar was now booked out to*

Coningsby 56 Sqn". No mention was made of the ac carrying out non-standard range procedures.

At Coningsby the F3 Sqn Flypast Co-ordinator spoke to the Coningsby morning Supervisor (SUP) at 1307:27. ATC advised the Co-ordinator that ATC were aware that the Sqn would be *"…… doing an airfield attack and then a 9 ship fly past"* but nothing more than that. This caused some consternation to the F3 Co-ordinator. Thereafter a hurried briefing of the attacks and fly past followed; no mention was made of using Donna Nook and the formation join up position appeared to be *"……about 040 degrees-ish 12 miles…."* . (The NOTAM detailed the formate position as 5316N 0E/W)

At 1503:50 Coningsby Departures (DEP) contacted the Donna Nook RCO by landline to ask if they were *"…expecting any range traffic in the next 30 minutes?"*. The RCO at Donna Nook confirmed that they had traffic until 1515. Thereafter TI was passed on the F3 formation and, at 1504:27, the RCO was advised *"…..well they're airborne for the airfield attack and they're trying to turn onto a southerly track this time, to run back into Coningsby for minute 10, before repositioning back into the north east area for reposition for the diamond nine……but I'll keep you informed"*. The Donna Nook RCO said that the landline between Donna Nook and Coningsby was of poor quality and speech was difficult to hear. Coningsby APP reports that the formation of F3s was split into 2 sections. The lead element were *"…identified and placed under RIS.."*, the second element, lead by callsign 6, was identified *"….but not formally place under a service to minimise RT…"*. Having completed an airfield attack the 2 elements flew NE to form up as a diamond nine flypast. At 1512:54 the lead formation element asked for confirmation that Donna Nook was cold. APP confirmed it was *"….open and hot"* but undertook to get more information. APP contacted the Donna Nook RCO by landline at 1513:40 and asked *"…can we use your range please at 2000' our QFE 1018, eleven F3s?"*. The range was confirmed as available at 1513:49 and this was relayed to the F3 formation. Traffic was called by APP at 1514:49 *"….traffic north 5 mile, southbound fast moving indicating slightly above".* This was acknowledged and then TI was updated as *"…now slightly below".* At 1515:08 the formation leader asked APP *"…are you talking to Donna Nook?"* to which APP replies *"….we just got off the phone to them, the ac still appears to be in the pattern still squawking range"*. The F3 formation reported *"…..just going underneath us now…"* at 1515:16 followed by *"…that guy IS on the range"* at 1515:41. After a further exchange of calls via RT and landline, the Tornado GR4's departure from the Range was confirmed.

Towards the end of his allocated Range slot at 1514: 02, the GR4 pilot requested *"…20 dive on the 113 is that acceptable?"* to which the RCO responds *"…..probably get 1 more pass in …….then you'll have to depart…we have the slot booked for…flyby a/c at Coningsby….we've just had a call"*. This was acknowledged by the GR4 pilot who completed his target run before asking, at 1515:37, *"…turning downwind are we going to get another pass in do you think?".* The RC responded (1516:03) *"…if you could depart to the east I've got 11 F3s approaching to come into the range now from the west"* however the GR4 pilot advised *"I know - they've just flashed through our nose at about a mile"* (1516:10).

Analysis of the Claxby Radar video recording shows the GR4 operating in and just to the N of the range (Danger Area) in a left-hand racetrack. The formation is seen to the SW in 2 elements approximately 6nm in trail. The GR4 is seen to commence a left turn from his final run at 1513:22 so by the time the formation had been advised the range was *"….now yours…."* (1513:56) the GR4 was in a wide left hand orbit turning back into the range. At 1514:15 the formation lead element were 8nm from the range heading towards it. The TI passed to the formation at 1514:41 correlates with the radar information, however the GR4 indicates slightly below and not above, as passed and subsequently corrected by APP. The lead section entered the range at 1515:21.

The Donna Nook Unit report states that *"……it is standard operating procedure for traffic entering an Air Weapon Range's Danger Area to contact the range concerned via RT in order to receive a positive clearance to enter. It is also standard operating procedure for the departing a/c ….to remain on the range, continuing their range detail, until the oncoming traffic…..establishes contact on RT"*. The RCO has no radar to assist him and, although he had agreed the range would be available he took this to mean *"…that the aircraft would eventually contact the range by RT prior to*

entry". It appears therefore, that the RCO, and GR4 crew, were expecting normal range procedures to apply and were acting accordingly. It is evident also that the RCO had the barest details on the whole evolution.

The NOTAM issued, one of several to cover alternative dates, did not mention the use of Donna Nook Range for the formation flypast. Indeed the position reported for the formation join was 5316N 0E/W - approximately 6nm south of Louth, therefore the GR4 pilot also had no information that Donna Nook would operate other than normally. With the landline communications being so poor it is unlikely that Coningsby ATC could have undertaken any effective operational/ tactical brief using that medium. Similarly, Coningsby ATC also received the minimum of information on the flypast and said that *"…no ATC personnel were involved or consulted during the planning process or briefed in detail of the Sqn intentions"*. DEP, acting as assistant controller to APP, said he had observed the formation's initial departure continue *"…further northeast than expected….and could see that Donna Nook had traffic…….called them [Donna Nook]….with traffic information".* During this conversation DEP discovered that the formation were booked onto the range in 10 min time.

A number of factors led to this incident. Both units were operating with minimum information on the evolution and had to be reactive in their actions. APP demonstrated good awareness in spotting that the ac in the Range was not departing but turning back into it and he passed TI accordingly. However, this was late because of intermittent radar contact, which exacerbated the situation. The RCO and the GR4 were expecting normal range procedures, which failed to materialize. Consequently, the GR4 turned downwind anticipating a further pass instead of departing the area. Without the benefit of radar the RCO did the best he could with the limited information available. Poor landline communications and scant information accentuated the problems.

UKAB Note (1): Accurate investigation of this occurrence has been severely hampered by the major inaccuracy in timing from the Coningsby, and to a lesser extent Donna Nook, RT and Land Line recordings. Even following a second full check and attempt to correlate the timings, there are probably still be some minor timing inaccuracies in this report. It has been assumed throughout that only the timing on the radar recording and the GR4's video/CVR are accurate. From the GR4 CVR's record of transmissions to Donna Nook it can be deduced that the Range RT timings are 14sec ahead of the GR4 and therefore UTC. Although there are at least 2 transmissions where the timing can be correlated between Donna Nook and Coningsby, there are also discrepancies that cannot readily be explained. These however do not materially affect the outcome of the investigation.

UKAB Note (2): The radar recording shows the F3 formation entering D307 at about 15:15:21UTC at 2100ft while the GR4 was carrying out an attack run. At 1515:35UTC (which we know to be accurate) the lead element of the F3 formation flew directly above, or very close behind, the GR4 that was just recovering after releasing his practice bomb. At that stage the F3s show as being at 2400ft climbing slowly with the GR4 starting to climb having bottomed out of his dive at 200ft. The F3s continued on heading, climbing to 2600ft before descending through the GR4 pilot's nose at 2000ft co-alt at 1516.05UTC as he climbed to the downwind leg. The cockpit voice recording shows that he saw the F3 formation pass from left to right through his nose at about 1nm, remarked to his navigator and about 20sec later to the Range Controller.

UKAB Note (3): JSP 318 05106 Para 2 and the UK AIP Mil 1-1-7 cover general regulations regarding the flying of Military ac in Danger Areas (DA) and HQ Strike Command Air Weapons Range Orders, which are applicable to all STC ac (and others using STC Ranges) flying in Air Weapons Ranges. It is a mandatory requirement '*unless authorised to enter* ***by the controlling authority*** *scheduled DAs are to be avoided during the 'published opening hours'*. Authority to penetrate Donna Nook (D307) during the published hours of activation rests solely with the '**controlling authority',** i.e. the Donna Nook Range Controller. The Mil AIP states that *'Aircrews are to obtain a positive RT clearance* ***from the appropriate controlling authority*** *before penetrating a DA'*. From the transcript at no time did the leader of the F3 formation call or attempt to call Donna Nook requesting clearance to enter the Range. There are no exceptions published to this regulation, even for pre-booked traffic.

HQ STC comments that this Airprox resulted from a lack of awareness of the Orders pertaining to the use of Weapon Range and Danger Area airspace. These orders are in RAF Air Publication 3204 'Air Weapons Ranges', which is held by all RAF fast-jet Sqns, and all Sqn aircrew sign as having read and understood these orders (iaw Ch11 para2). AP3204 states on page 2-A-1 that *'military pilots are not permitted to enter DA airspace without clearance.'* At Chapter 8 –'RT and Control Procedures' para 3 reads: *Mandatory. The following occurrences are to be requested or reported: a. Joining the range pattern.* Para 5. *Examples of Mandatory RT Phraseology. a. Joining. AC requesting joining clearance are to state: Callsign of range, Callsign of AC, Number of AC, POB, ETA, Targets, Line of Attack, Events.* These orders were not complied with by the F3 formation, which led them to enter the danger area without clearance from the Range Control Officer, and thus to fly into conflict with the GR4.

However, it is accepted that the lack of compliance with orders was not intentional, and it will be instructional for others to know how this oversight occurred.

APP asked Donna:*'Can we use your range?'*

Donna replied:*'Yes you have our range booked from quarter-past 'til on the half hour'*.

APP:'*Thanks, so can we use it from now?'*

Donna:'*Yes'*.

APP then tells the F3s:'*The range is now yours. Donna Nook range is now yours.'*

In this conversation Donna confirms that CGY can use the range. However there is no confirmation that normal joining procedures are waived, or that CGY can bring the traffic through on their frequency without speaking to Donna. (It is an accepted practice for AWR controllers to give permission to ATC agencies to cross transit traffic through their Ranges on the ATC frequency. However this must be positively agreed and not just assumed).

The use of the words *'the range is now yours'* was not a good choice of phrase, however it was not a clearance to ignore normal range entry procedures. Essentially the F3s 'assumed' that Coningsby ATC had co-ordinated their entry to the range without the need for RT, however this requirement was not briefed or agreed. Indeed no written or verbal briefing by the F3s, of their wish to enter the range without RT, was made to Donna Nook, STC Ops Spt3 or the ATC controllers. A verbal request to ATC to use a single frequency for air traffic was agreed, but no mention of extending this agreement to Donna Nook was made. No written plan was circulated that could allow other parties to understand or question the F3s' requirements. All communication with outside agencies was made via short telephone and RT calls, with the inevitable result of a poor understanding of intentions, poor situational awareness and incorrect assumptions being made. The essential lessons re-learnt in this incident are the need for detailed (written) planning, and formal communication to all affected agencies when attempting an unusual event. Furthermore, for all participants in aviation, the maxims of 'don't wait to be told – ask!' and 'don't assume – check!' apply as ever. The need to improve human resource and communication skill training is highlighted by 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 photographs/video recordings, a HUD recording from the GR4, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Due note was taken of the major timing inaccuracies in the information provided by both Coningsby and Donna Nook's tape transcripts. This was an issue common to other MOD units and Members felt that something needed to be done to improve matters.

The Board considered that a major factor contributing to this Airprox had been inadequate planning and communication by the F3 formation of their intentions to the other agencies involved. Members concurred the HQ STC view that an essential part of planning a major and unusual event, is to produce a detailed written plan and circulate it well in advance, to all participants, including outside agencies. The absence here of

in-depth planning resulted in a major lack of understanding of the aspirations of the formation and a major breakdown in communication between key players, namely the formation leader, Coningsby ATC and the Donna Nook RCO. The result of this breakdown was that the RCO expected normal joining procedures to apply while the formation leader believed that they had been waived.

Members also considered that the phraseology used by the Donna Nook Controller had been an equally important factor. The message that he passed to Coningsby ATC, who relayed it to the F3 formation leader, led them both to believe that the formation was cleared to enter the range. The Controller however, expected the regulation requiring all ac to make a joining call unless positively cleared otherwise, to remain extant. What he had meant to convey to the Coningsby Controller was that the range was available to the formation and that he would, as is normal practice, instruct the GR4 to depart on receipt of a joining call from the F3s.

Members found the instructions for military ac entering Danger Areas contained in JSP550/2, the Mil AIP and AP 3204, unclear and ambiguous regarding third party clearance of ac into an AWR; they do not cover the precise circumstances of this incident since they are aimed at ac entering a range for the purpose of conducting air weaponry not merely to prevent other ac from using the airspace. Notwithstanding this, if the F3 formation leader had called the Range the chain would have been broken and the incident would not have occurred. This omission had caused the outcome.

The Board nevertheless noted that the ac had been well separated on both occasions when their paths crossed - about 2000ft on the first and 1nm on the second. With such separation and since the F3 formation leader had been aware of the position of the GR4 on both occasions, Members concluded there had been no risk of the ac colliding.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In not establishing communication with Donna Nook AWR contrary to the the instructions in AP 3204, the F3 formation leader joined the Range without positive clearance and flew into conflict with the GR4.

Contributory Factors: Inadequate planning and communication by the F3 formation.

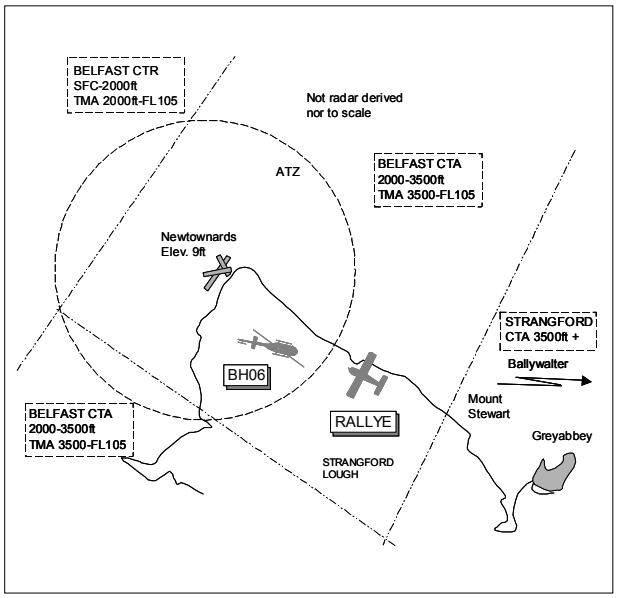
Degree of Risk: C

Recommendation:

That the MOD considers introducing accurate timing information on its ATC voice communication recording equipment.

AIRPROX REPORT NO 30/03

Date/Time:	22 Mar 1705 (Saturday)	
Position:	5434N 0540W (1nm SE Newtownards A/D - elev 9ft)	
Airspace:	ATZ	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	BH06 JetRanger	Rallye110
Operator:	Civ Trg	Civ Pte
Alt/FL:	1000ft (QFE 1020mb)	1200-1500ft (QNH)
Weather	VMC HZBC	VMC HZBC
Visibility:	4000m	1-2nm
Reported Separation:	nil V 100ft H	200-400ft V 0·25-0·33nm H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BH06 JETRANGER PILOT reports flying a dual training flight (operators proficiency check) with another Captain as the PF whilst he conducted the flight check (training Captain) from Newtownards; they were in communication with Newtownards RADIO on 128·3MHz squawking 7000 with Mode C. The visibility was 4000m in haze, 2000ft below cloud in VMC and the ac was coloured red/white/grey, anti-collision and nav lights were switched on. The RW in use was RW22 LH with a cct height of 1000ft for fixed wing ac and helicopters and 700ft for microlights; 2 Grob motor gliders were in the cct. He lifted off parallel to the RW, climbed to 500ft and turned L onto the crosswind leg, levelling at 1000ft. During this climb, he heard a pilot call on frequency (the Rallye 110 c/s) asking for airfield information which was passed by the A/G operator but this was not read back. About 1nm SE of the airfield whilst turning L from heading 130° at 80kt onto the D/W leg, he saw a fixed wing light ac 200ft ahead at the same level heading approx 330° towards the airfield. He took control of the helicopter and executed a R turn to avoid the ac which passed 100ft down his port side. After rolling out of the turn, he noticed the ac approach the SE airfield boundary and then carry out a 180° turn to the R to pass back through the D/W leg whilst continuing on a track to vacate the cct. He made a broadcast on the frequency stating that an unknown ac had entered the cct pattern and he believed it to be the Rallye ac that had called earlier; no response was received from this transmission. Shortly thereafter, the A/G operator asked the Rallye pilot for his position which was given as 2nm S of the airfield. The airfield information was passed again and, following advice to join O/H for RW22, a broken transmission was heard but no positive readback of the information. The Rallye was then observed to carry out a standard overhead join. As it established into the cct pattern, he made an air to air broadcast to the Rallye pilot stating that he had entered the cct perpendicular to the D/W leg at cct height and that an Airprox would be filed owing to the avoiding action that had been necessary to avoid him; no reply was heard. He assessed the risk of collision as high.

THE RALLYE110 PILOT reports eight months after the incident that he was flying solo inbound to Newtownards from Carlisle and in communication with Newtownards RADIO on 128·3MHz squawking 7000; Mode C was u/s. The visibility was generally 5nm, 100-200ft below cloud, reducing to 1-2nm in haze layers in VMC and the ac was coloured orange/white. Earlier, he had descended from 3500ft to about 1600ft on the

Belfast/City QNH to remain below CAS and had coasted in about 2nm S of Ballywalter before crossing over to Strangford Lough just N of Greyabbey. He switched on his landing, nav and spotlight to ensure max visibility, owing to haze layers and the setting sun (15-20º above horizon), for his approach to the airfield. He closed his flight plan with Belfast/City Approach, changed frequency to Newtownards and called for airfield information when he was passing Mount Stewart. His initial and subsequent call went unanswered so he entered a rate 1 RH orbit, which kept him between a house on the headland and Mount Stewart, at ranges 2-4nm respectively, SE of the airfield. Three orbits were completed whilst he checked the frequency, headset jacks/plugs and his handheld standby radio; his level fluctuated between 1200-1500ft (Belfast QNH) to remain below haze/thin cloudbanks and above cct height. During the 4th orbit, two-way communication was established on the 3rd or 4th attempt however, the reply received was in a broad Irish accent which he could not understand. On finishing that orbit passing through heading 320º at 60kt, he saw a JetRanger helicopter in his 11 o'clock range 0·75-1nm away in level flight, 0·25-0·33nm offset and 200-400ft below. He judged there was no risk of collision so he continued his turn, whilst increasing his bank-angle and 'waggling' his wings to increase his relative movement and visible area to the other pilot; the helicopter was seen to continue on a diverging straight track down his LH side. His initial thought was that Belfast Approach had not informed him of any other cross country traffic in the area as he had not heard any departing cct traffic on the Newtownards Radio frequency. The helicopter pilot called him and after a brief exchange of information, when he confirmed that he had seen the BH06 and after passing him his ac registration, the JetRanger pilot stated that an Airprox would be filed. During the subsequent join, his approach calls were lost by Newtownards whilst he descended through a thin haze/cloudbank at 1000ft but he received all airfield and cct information satisfactorily and continued to land. After landing, the A/G operator was able to receive his transmissions. Later he informed the CFI that the JetRanger pilot had claimed that he had infringed the ATZ and would be submitting an Airprox report. The CFI told him that the airfield was temporarily below its licensed operating minima and was accordingly officially closed with an inactive ATZ at the time.

UKAB Note (1): During a subsequent telephone conversation with the CFI at Newtownards, he confirmed that he had spoken to the Rallye110 pilot and informed him that the airfield had been closing at the time of the incident. It transpired that the aerodrome normally closed at 1700, not 1730 as promulgated in the UK AIP, unless flying commitments required otherwise and the CFI agreed to review the UK AIP entry to reflect flying activities at the aerodrome.

UKAB Note (2): Met Office archive data shows the Belfast/City METAR EGAC 1650Z 17006KT 5000 HZ FU FEW020 10/06 Q1020=

UKAB Note (3): The UK AIP at AD2-EGAD-1-2 promulgates the Newtownards ATZ as a circle radius 2nm centred on RW04/22 position 543452N 0054131W from sfc to 2000ft above aerodrome elevation of 9ft, active in Winter 0900-1730 with A/G service available during those hours.

UKAB Note (4): 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.

Without the benefit of a radar recording, members could not reconcile the disparate accounts reported by both pilots on the position and geometry of the incident. Although the CFI had confirmed that the airfield was in the process of closing, the ATZ was active at the time with the A/G operator talking to both of the pilots involved. The BH06 Training Capt, a locally based pilot, said that as he turned DW within the ATZ he saw the Rallye. The Rallye pilot, however, had reported holding clear, outside the ATZ at 2-4nm distance and between 1200-1500ft. Members believed that the Rallye pilot should have ensured that he remained well clear of the ATZ laterally or vertically whilst attempting to sort out his radio problems. Moreover, if he had approached for a standard overhead join, normally at 2000ft subject to CAS limitations, this would have taken him above the established cct traffic, although members recognised that attaining this altitude may have been precluded because of the

prevailing weather conditions. There was insufficient information to confirm that the Rallye pilot had not integrated safely into the cct, therefore members could only surmise that this had been a conflict near the boundary of the Newtownards ATZ.

Turning to risk, the Rallye pilot said he saw the JetRanger over 0·75nm away and continued turning R, as the helicopter passed clear to his L by 0·25-0·33nm and 200-400ft below. The BH06 Training Capt was undoubtedly surprised to see a conflicting ac approaching head-on as he turned onto the DW leg. On seeing it, albeit late, 200ft ahead at the same level, he took control from the PF and reversed the turn back to the R to avoid the other ac by 100ft at the same level. Although members were unable to resolve the reported separation discrepancies, they were sure that both pilots were describing the same encounter and it was clear that the BH06 Training Capt's actions, in taking control, had been sufficient to avoid an actual collision. However, these actions - taken at such a late stage by the BH06 Capt - persuaded the Board that safety had not been assured during the encounter.

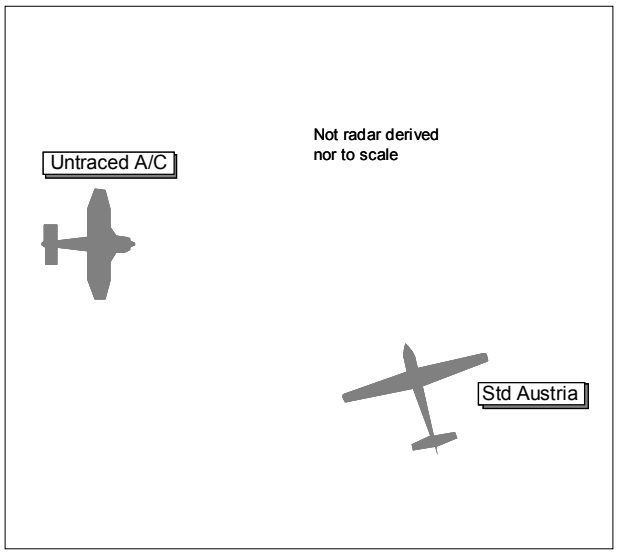
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict near the boundary of the Newtownards ATZ.

Degree of Risk: B

AIRPROX REPORT NO 31/03

Date/Time:	30 Mar 1208 (Sunday)	
Position:	5346N 0105W (1·2nm N of Burn G/S - elev 20ft)	
Airspace:	FIR/AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Std Austria Glider	Untraced
Operator:	Civ Pte	NK
Alt/FL:	1300ft (QFE 1016mb)	(NK)
Weather	VMC CLBC	NK
Visibility:	>30nm	
Reported Separation:	300-400ft V	
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE STANDARD AUSTRIA GLIDER PILOT reports flying a solo local sortie from Burn, non-radio. The visibility was >30nm 1800ft below cloud in VMC and the ac was coloured white overall with orange/red markings. Having climbed slowly with two other gliders, he decided to set course towards an area of sky which appeared more conducive for soaring. He levelled the wings and set course heading 340° at 50kt and 1300ft QFE 1016mb. Whilst scanning, he noticed a blue/white low wing single engine ac, possibly a Robin, in his 10 o'clock range 700-900yd on a crossing track L to R at about the same level. A quick waggle of the wings elicited no response from the other ac's pilot and he felt that continuing on his present track would have resulted in a very near miss. He decided to maintain a view of the conflicting ac, rather than turn L or R, so he

accelerated to 65-70kt, using a positive forward stick movement, and flew 300-400ft directly beneath the other ac. The other ac did not alter course nor did its pilot indicate that he had seen his glider. He assessed the risk of collision as high if he had not taken action. The position of the Airprox was later identified from his data log,

which was attached to the CA1094 report form, and was calculated as 1·2nm due N of Burn glider site.

UKAB Note (1): Despite extensive tracing action, the identity of the reported ac went unresolved. Analysis of the Claxby radar recording was inconclusive with intermittent primary radar returns (gliders) showing in the Burn area but without any conflicting ac showing in transit through the reported area N of Burn. Procedural tracing action with reference to adjacent airfield movement logs did not produce any possible ac that correlated to the description supplied by the reporting pilot.

UKAB Note (2): The UK AIP at ENR 5-5-1-1, promulgates Burn as a Glider Launching Site centred 534445N 0010504W for winch and aerotow launches where cables maybe encountered to 2000ft agl, during daylight hours; site elevation 20ft amsl.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the Standard Austria glider pilot including his data log recording and radar video recordings.

It was unfortunate that the reported ac went untraced and that recorded radar had not shown the incident. Therefore, it was solely on the information supplied by the Austria pilot that members assessed the Airprox. The glider had just left the glider site area and had encountered a light ac transiting just to the N of the Burn site tracking E. This confliction had occurred in Class G airspace where both pilots were responsible for 'see and avoid'. Although the glider pilot had right of way, under the Rules of the Air, any resolution before tracks crossed depended, in the first instance, on the light ac's pilot seeing the other ac in time to take appropriate action. After sighting the crossing light ac about 700-900yd away flying at the same level, the Austria pilot had tried to make his ac more conspicuous by carrying out a 'wing-waggle', which appeared to have gone unnoticed to the other pilot. The Austria pilot had then, commendably, taken action by descending his glider to pass 300-400ft clear below the other ac, which had resolved the confliction. This positive avoiding action had allowed the glider pilot to maintain visual contact with the conflicting ac throughout the incident, which led the Board to conclude that the safety of both ac had been assured.

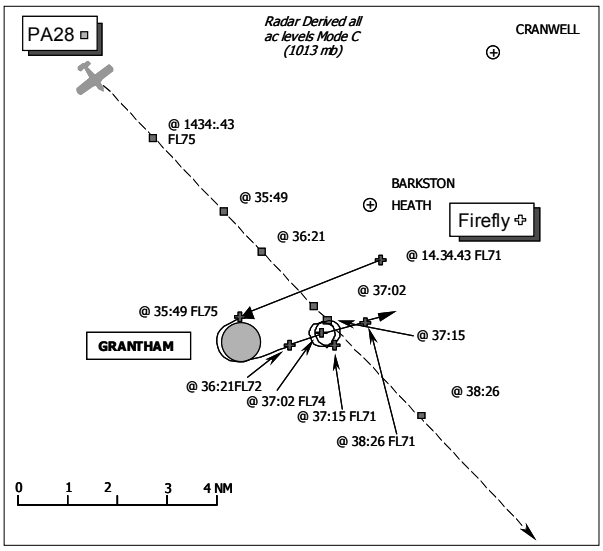
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict with an untraced ac near a notified Glider Site, resolved by the Austria pilot.

Degree of Risk: C

AIRPROX REPORT NO 32/03

Date/Time:	4 Apr 1437	
Position:	5257N 0033 W (Grantham Lincs)	
Airspace:	Lincs AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	PA28-161	Firefly 260
Operator:	Civ Pte	HQ PTC
Alt/FL:	FL75	FL75
Weather	VMC	VMC
Visibility:	30km	10km+
Reported Separation:	0 V < 1nm H	100ft V 1nm H
Recorded Separation:	100ft V 0.75nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28-161 PILOT reports that he was flying a white ac with a gold and purple stripe, with strobes and the beacon switched on, on a sortie from Kirknewton (5nm S of Edinburgh) to Cambridge. He was in receipt of a RIS from Waddington Zone squawking 3606; Mode C was not fitted. Weather was good VMC above cloud with visibility reported as 30km with the sun in the 3 o'clock position. At 1435, while overhead Grantham level at FL75 heading 150° at 125kt he was alerted to another ac by ATC, although they did not have its height. However, he saw it in his 2 o'clock position, closing rapidly, at the same height on a collision course. Almost at once the other pilot commenced a sharp climb and which he initially thought was avoiding action. However, the manoeuvre turned out to be the first of two loops. The other ac closed rapidly, and in view of his much higher speed and highly unpredictable course, the safest way to proceed was to commence a sharp descent to just above the tops of the clouds. He assessed the risk of collision as medium.

He added that his passenger thought that she had seen the other ac emerge from cloud in a climb shortly before they were warned of its presence by ATC, although he did not see this himself.

UKAB Note(1): This incident occurred inside the Lincs AIAA. The PA 28 pilot complied with the UK AIP advice to seek a Radar Service when transiting this area.

THE FIREFLY 260 PILOT reports that he was flying a yellow and black ac on a JEFTS sortie from Barkston Heath in good VMC with a visibility in excess of 10km above a haze layer up to 2500ft. He was not in receipt of an Air Traffic service but was squawking 2642C. While heading 003° at 140kt at approx 1440 and about FL75 but manoeuvring close to the Barkston overhead *(inside the Lincolnshire AIAA),* he saw a white ac with dark red stripes in his 9 o'clock position 1000ft below and no closer than 1nm distant. The other ac was in a descent and he avoided it by turning away to the right. He stated that there was no risk of collision.

UKAB Note (2): From the Firefly pilot's reported time and the fact that the PA 28 did not descend until after the Airprox had occurred (RT Transcript), it would appear that the Firefly pilot's first sighting of the PA 28 may have been shortly after the event.

MIL ATC OPS reports that the PA28 pilot called RAF Waddington Zone (ZONE) at 1419:55, 10nm N of Gamston, and requested a RIS. The pilot stated he was passing FL60 for 75 and ZONE instructed him to *"squawk 3606…identified RIS…climb report level FL75. Limited traffic*

information (TI) from all around, holding you in secondary radar only", which was acknowledged and the pilot stated he would report at FL75. No relevant conversation is recorded on the transcript until 1435:49, when ZONE passed TI *"traffic right, 2 o'clock, range 4nm, manoeuvring, indicating FL75 climbing"*. Twenty seconds later, the pilot of the PA28 replied *" we're leaving err…he's seen us first"* (believed to be referring to the aerobatic ac). ZONE then updated TI, *"C/S, previously reported traffic now right, one o'clock, range 2nm, manoeuvring, indicating slightly below, descending".* The PA28 replied *"we're watching him, he's…doing aerobatics. I think we are going to descend to FL55 for clearance".* At 1437:16 ZONE proceeded to handover the PA28 to Cottesmore Approach, *"descending out of FL75 for FL55…to avoid the traffic just N of him by one mile, which is aerobating apparently. He was visual with it".* A minute later, before he transferred to the Cottesmore frequency, the PA28 pilot advised *"I'm considering filing a near miss with that aerobating ac. ".*

Analysis of the Claxby Radar video recording shows the PA28, 7nm NW of Barkston Heath tracking SE squawking 3606 (no Mode C) at 1434:43 as the Firefly can be seen manoeuvring 2nm S Barkston Heath on a 2642 squawk, indicating 071 Mode C. At 1435:49 the PA28 is 3½nm W Barkston Heath maintaining a SE track whilst the Firefly is 4nm S of the PA28 tracking WSW indicating 075 Mode C. At 1436:21 the Firefly completes a left turn onto E indicating 072 Mode C as the PA28 converges 3nm from the N. Maintaining a SE track, at 1437:02, the PA28 and the Firefly converge. The latter ac climbs passing 074 Mode C, then rapidly descends to 071 Mode C and 13 seconds later, 4nm S Barkston Heath, the 2 contacts close to less than one nm separation before diverging on a 90° angle.

In accordance with JSP 552 paras 235.115 and 135, ZONE, *(JSP 318A valid at time of incident)* using SSR only, correctly placed the PA28 under a limited RIS, and passed accurate and timely TI on the 2642 squawk, later traced to be a Barkston Heath-based Firefly. Under the rules of RIS *"the controller will only update details of conflicting traffic…if the controller considers that the conflicting traffic continues to constitute a definite hazard".* ZONE updated the TI and although the pilot of the PA28 intimated that he was visual with the Firefly after the first TI, the controller proceeded to update the TI as the 2 contacts converged which evoked a decision from the PA28 pilot to descend away from the manoeuvring Firefly.

HQ PTC comments that this encounter should not have surprised the PA28 too greatly within the Lincs AIAA. Waddington Zone acted properly within the terms of a RIS to advise the PA28 of the Firefly's presence and he was able to see and avoid it. We have been assured that the Firefly pilot, who was instructing a trainee instructor, carried out all the appropriate checks and clearing turns before entering his aeros and that he was at all times clear of cloud iaw the VFR.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members commended the PA28 pilot who was properly in receipt of a RIS, as recommended in the UK AIP for transits of the Lincolnshire AIAA, but the Board concurred the PTC observation; he should not have been surprised to encounter an ac conducting high energy manoeuvres in that vicinity as that is one of the main purposes of the AIAA. Nonetheless the PA28 pilot's airmanship had been sound in requiring assistance to transit a very congested AIAA. Good TI from Waddington Zone allowed the PA28 pilot to acquire the Firefly visually and to ensure lateral separation of ¾nm was maintained prior to his decision to descend. Military controllers advised that they do not routinely use the aerobatics squawk (7004) favouring instead the dedicated Lincs AIAA squawk (2641/2) that provides them with more useful information. Members accepted the HQ PTC assurance that the Firefly pilot conducted clearing turns and checks prior to starting his aerobatics but these had not disclosed the PA28 which was not seen until after his series of loops had been flown.

The Board emphasised the importance of clearing the airspace prior to conducting any manoeuvres which involve rapid changes of flightpath since

once started these changes require the pilot to divert much of his attention away from all-round lookout during the period of the manoeuvre.

The radar replay verified the aircrew estimates of the miss distance of about 1nm and furthermore the PA28 pilot remained visual with the Firefly throughout and was always in a position to turn further away if need be. The Board concluded therefore that no risk of collision had existed.

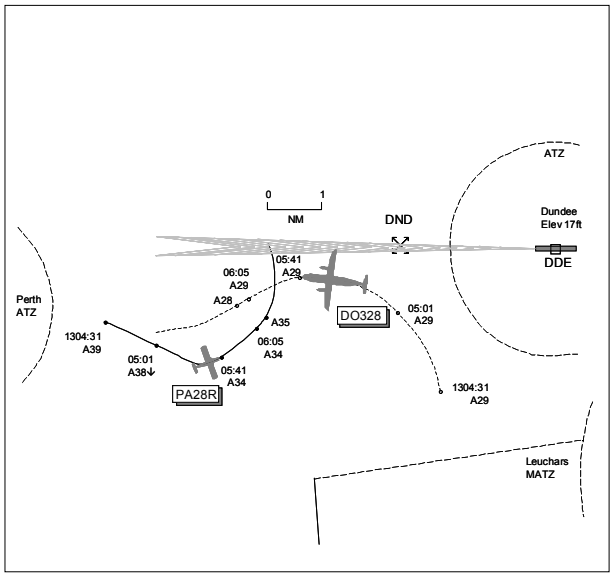
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the Lincolnshire AIAA resolved by the PA28 pilot.

Degree of Risk: C

AIRPROX REPORT NO 33/03

Date/Time:	14 Apr 1306	
Position:	5626N 0312W (3nm WSW DND NDB)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	DO328	PA28R
Operator:	CAT	Civ Trg
Alt/FL:	3000ft↓ (QNH 1015mb)	3500ft (QNH 1015mb)
Weather	IMC HZBL	VMC CLAH
Visibility:	6km	8km
Reported Separation:	300ft V nil H	1000ft V 2nm H
Recorded Separation:	500ft V 0·56nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DO328 PILOT reports flying inbound to Dundee at 3000ft QNH 1015mb and in receipt of an ATS from Dundee APPROACH on 122·9MHz squawking an assigned code with Mode C. The visibility was 6km in haze when flying in between cloud layers (±500ft) and his navigation, landing, taxy, anti-collision and strobe lights were all switched on. Whilst turning onto the outbound leg of the ILS/DME procedure for RW10 at 180kt, he received a TCAS TA *"traffic"* alert on an ac at range 5nm. This was followed by an RA *"descend, descend now"*, which he complied with, TCAS indicated that the traffic passed 300ft above his ac, which was never seen visually; this occurred at about 6nm DME. TCAS then gave a *"monitor vertical speed"* quickly followed by *"clear of conflict"*. He expressed concern about the TCAS descent guidance given, whilst flying in IMC towards high ground, and went on to say that he had delayed his descent from 3000ft at the DND NDB owing to the TCAS alert but in normal circumstances the descent profile would have been similar, in accordance with the letdown procedure. After landing, the Dundee controller informed him that the other ac, a PA28R, had been operating in VMC from Perth but its pilot had not called on the Dundee frequency. He believed that VMC was not prevalent at the time of the encounter and thought that the PA28R pilot had shown poor airmanship by not calling on the Dundee frequency when flying near to the Dundee instrument letdown procedure. At the end of the day, he felt that the safety of his ac had been compromised during this incident.

AIRPROX REPORT No 33/03

THE PA28R PILOT reports flying a dual local CPL training flight from Perth and he was in receipt of a FIS from Perth on 119·8MHz on Box 1 and listening out on Box 2 (his normal habit) on the Dundee frequency 122·9MHz squawking 7000 with Mode C. The ac was coloured white/blue and the strobe and landing lights were switched on. After operating about 10nm W of Perth at 5000ft working Scottish on 119·87MHz for 30 min, he contacted Perth and descended to 4000ft tracking toward PTH VOR from the SW. The IF screens were up as the visibility was good (8km down sun) 1000ft above a haze layer in VMC. He reported O/H the VOR at 4000ft QNH and started tracking SE and then, as he commenced descent to 3500ft at 120kt, he heard the DO328 pilot call on his Box 2 *"beacon outbound"* over the DND beacon, 11nm E of Perth. He mentioned to his student that they must keep an eye out for this ac which would be descending from 3000ft to 2200ft in the approach procedure. Screen 2 (L quarter) was removed and the student spotted the DO328 first, some distance away, estimated 2nm, descending on his port side 1000ft below. The Dornier pilot was then heard to transmit that he had another ac on TCAS and was initiating descent but he assumed that it was not his ac being mentioned as he was well above the DO328 and well to the S of the Dundee procedure. ATC were then heard to inform the Dornier pilot that Leuchars had 'pop up' traffic in his vicinity. After watching the Dornier perform its base leg turn, he turned back towards the N and operated for another 20min before landing back at Perth subsequently contacting Dundee ATC by telephone, at their request. He did not consider that there was any collision risk and, because he was operating close to the PTH VOR, he had remained in contact with Perth. He was fully aware that the Dundee procedure passes close to Perth (mentioned on the Dundee approach plate) and that the airspace was Class G. The Dornier was descending into sun and their crew gave no indication of seeing another ac.

UKAB Note (1): The PA28R pilot was contacted by the UKAB Secretariat post incident to discuss his completed CA1094 report and he was made aware of the Dornier pilot's perspective of the incident. Although not obliged to call Dundee, he was advised that making RT contact with Dundee ATC in future would eliminate a pop up traffic/ surprise element scenario. He was also made aware of the problems that can occur when visually manoeuvring (see and avoid) under VFR in Class G airspace when a squawking ac is adjacent to and pointing at another ac that is TCAS equipped.

UKAB Note (2): The UK AIP at AD2 8-1 to 8-4 EGPN Instrument Approach Charts promulgates in the notes section that *"The eastern edge of the Perth ATZ lies 9·5nm west of THR RW10. To prevent confliction with possible VFR traffic in the Perth ATZ, pilots should not extend their outbound leg of the base turn beyond the prescribed procedural distances or timings."* Also the DND NDB (L) is 2·6nm from the THR RW10 and the DDE DME is situated on the aerodrome, zero ranged to THR RW10.

UKAB Note (3): Met Office archive data shows the Dundee METAR as EGPN 1250Z 07013KT 9000 SCT080 10/07 Q1015=

THE DUNDEE APP CONTROLLER reports the DO328 was inbound on handover from Leuchars, unable to accept a visual approach, so he was cleared for an ILS/DME approach to RW10 but on leaving the DND NDB, the pilot reported receiving a TCAS RA. He was advised that there was no known traffic, no other ac on frequency or expected, and to manoeuvre as required. Upon asking Leuchars RADAR, he was told traffic 'popped up' after RT transfer from them. Further tracing action revealed the reported PA28R at 3400ft near DND, with the Perth A/G operator saying that the PA28R pilot had indicated changing to Dundee 122·9MHZ at 1305UTC; the pilot had not reported in on frequency but subsequently had informed him that he had been listening to the exchange between himself and the DO328 pilot.

ATSI comments that the Dundee APP cleared the DO328 for the ILS DME procedure RW 10 not knowing about the presence of the PA28R. There are no procedures with regard to Perth in the Dundee MATS Part 2 but there is an LOA regarding Dundee/Leuchars. Leuchars transfer IFR inbounds to Dundee as soon as it is clear of known traffic, but not later than the NDB (L) 'DND'. Perth said that the PA28R pilot reported changing to Dundee at 1305, having routed into the Perth overhead at 3500-4000ft, but it did not call; at this time comment about conflicting traffic was made to Dundee by the DO328 pilot.

UKAB Note (4): Analysis of the Dundee RT transcript shows the DO328 pilot's initial call to APP timed at 1304:50 as *"…just approaching the beacon at three thousand er we're a bit slow to get the visual there so we're gonna do the procedure"*. After being cleared for the procedure and reporting beacon outbound at 1305:25, the pilot transmits just before 1305:40 *"…we've got traffic pop up just on the outbound leg traffic"* with TCAS *"traffic"* heard in the background. Dundee ATC replies *"roger no known traffic er for Dundee"* to which the pilot responds *"roger he's indicating four hundred foot below us closing"* immediately corrected by *"above us rather descend"* with TCAS *"descend"* heard in the background. Shortly after 1306:00, ATC asks *" DO328 c/s do you have contact with the traffic"* to which he responds (1306:10) *"negative we've got a ????? ????? we've just had a TCAS er advisory we're just er outbound now"*, the ???? is an unintelligible automated voice from TCAS heard in the background.

UKAB Note (5): The Lowther Hill radar recording at 1304:31 shows the DO328 3·4nm SW of Dundee in a L turn indicating level at 2900ft QNH 1015mb with the PA28R 2·8nm SE of Perth tracking 110° indicating 3900ft QNH; 30sec the PA28R is seen commencing a descent. At 1305:41 the PA28R is seen 4nm SW of the DND NDB tracking 050º, having executed a L turn, indicating level at 3400ft QNH with the DO328 just to the L of its 12o'clock range 2·1nm still turning L passing through 270º indicating 2900ft QNH. The CPA occurs shortly after 1306:05 as the subject ac pass abeam, the PA28R at 3400ft 0·56nm SE of and 500ft above the DO328 which is now steady tracking 245º. Six sec later, after the ac have passed, the PA28R is indicating 3500ft QNH whilst the Dornier is indicating 2800ft, which is maintained for 30sec, before further descent is seen on Mode C.

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 that there were two quite different views of this incident from each cockpit. The PA28R pilot had good situational awareness and was taking due regard of his need to 'see and avoid' under VFR in Class G airspace. Although familiar with the surrounding airspace, it would have been prudent for the PA28R pilot to contact Dundee to inform them of his intentions when he had flown away from the Perth VOR towards the DND procedure let-down area. This simple act could have allayed the Dornier pilot's understandable concerns and removed the 'surprise' element of the encounter when he received a TCAS TA and subsequent RA alert. However, not all ac carry radio equipment and commercial pilots must be aware that whilst carrying out IFR procedures in Class G airspace incidents such as this will occur. Members agreed that both parties had been going about their lawful business despite the resulting conflict that transpired between the Perth and Dundee ATZs in the FIR.

Turning to risk, the PA28R pilot had noted the Dornier pilot's 'beacon outbound' transmission and had visually acquired the DO328 about 2nm away looking downsun, watching it pass an estimated 1000ft below to his L. However, the geometry of his flight path in his descent to 3500ft and turn towards the Dornier had triggered the TCAS warnings. The DO328 pilot had initially delayed his descent, which normally would have commenced at about that stage, but his compliance with the guidance combined with the PA28R levelling off, had quickly caused the TCAS command changes. TCAS had indicated a 300ft vertical separation distance although the recorded radar had shown it was never less than 500ft vertically and a lateral displacement of 0·56nm at the CPA. Moreover, as the PA28R had remained visually unsighted to the Dornier crew - understandable when looking into hazy sunshine – the TCAS information may on its own have suggested a closer encounter than existed at the time. Armed with the benefit of full information, denied to the Dornier crew at the time, the Board agreed that despite the indications there had been no risk of collision.

AIRPROX REPORT No 34/03

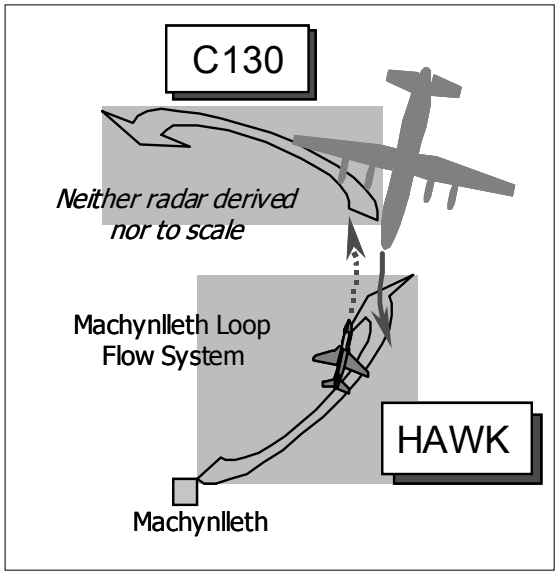
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR.

Degree of Risk: C

AIRPROX REPORT NO 34/03

Date/Time:	15 Apr 1244	
Position:	5240N 0342W (6nm NE of Machynlleth)	
Airspace:	UKDLFS - LFA7	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk	C130K
Operator:	HQ PTC	HQ STC
Alt/FL:	250ft (agl)	250ft (agl)
Weather	VMC CAVOK	VMC NR
Visibility:	10km+	10km+
Reported Separation:	200yd H, 300ft V	450m H,500ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT, a QFI instructing a student from the rear seat, reports that his ac has a high conspicuity black colour scheme; the HISL and the nose landing light were both on during this instructional low level navigation sortie within LFA7 at 420kt. They were listening out on the LFS common frequency of 300·8MHz, the low-level conspicuity squawk of A7001 was selected with Mode C but neither TCAS nor any other form of CWS is fitted.

Heading 050º(M) away from Machynlleth, in the south-eastern section of the Machynlleth loop at 300ft agl, a turn onto 010º was executed whereupon his student spotted a low flying Hercules ac, just before he did, at a range of about 1nm flying a reciprocal heading clockwise around the Machynlleth loop at a similar height. The front seat student PF immediately initiated a gentle bunt together with a L turn to avoid the Hercules, whose crew also appeared to start a gentle climb and L turn. The Hercules ac passed down the starboard side about 200yd away and 300ft above his jet.

He assessed that the risk of a collision was *"nil",* but added visual acquisition of the Hercules ac was prevented by terrain masking until they were heading 010º.

THE C130K PILOT provided a frank and honest report, stating that his ac has a grey/green camouflage scheme, but the HISLs were on whilst flying a low-level navigational sortie in LFA7 at 210kt. They were not in receipt of an ATS but A7001 was selected with Mode C; neither TCAS nor any other form of CWS is fitted.

Heading 195° down the E side of the Machynlleth loop in a clockwise direction a Hawk's nose light

was spotted some 6-7nm away to the S. The C130 was climbed to a height of 750ft agl to avoid the Hawk, which passed about 500ft below, and 450m to starboard with no risk of a collision. The C130's wings were waggled in recognition.

A navigational error caused the crew to fly in the wrong direction against the LFS flow arrow, which resulted in the 'head to head' encounter. Despite being in the wrong place, he did not feel that either ac was in danger and there was no risk of collision because of their early visual pick-up of the Hawk, but he accepted full responsibility for the navigational *"faux pas"*.

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

UKAB Note (2): The UK MIL Aeronautical Planning Document at Vol. 3 Part 1 Pg. 1-2-7-2 (LFA 7) specifies that the Machynlleth Loop deconfliction measures apply to the valleys bounded by promulgated co-ordinates, which are to be flown in an anti-clockwise direction only. This restriction applies only to ac flying in the valleys.

THE HAWK PILOT'S STATION COMMENTS that the appearance of the Hercules on a reciprocal heading and at a similar height was an unwelcome surprise to the Hawk crew. However, in this instance the crews saw the other ac in sufficient time to take avoiding action. It is difficult to fathom why the Hercules pilot had not taken earlier avoiding action when the Hawk was first seen at a range of 6-7nm. At a closing speed of about 630kt, the Hercules crew had over 30sec between first sighting and when the Hawk passed.

THE C130 PILOT'S STATION COMMENTS that the ac captain has reported a navigational error, this will have been de-briefed post-flight and lessons learned. Errors of this sort are not unusual, albeit undesirable and embarrassing and it is to reduce them that flying at low level is practised continuously. Nevertheless, the principle of 'see and be seen' stands and I am confident that the crew was acting on this. The Hawk was sighted and avoided in good time, minimizing the risk of collision.

HQ PTC comments that this would have been a fairly routine encounter in the LFS, resolved reasonably by both pilots - had the C130 not been flying against the flow arrow. The Hawk was engaged in an early valley-flying exercise so the instructional load was high. The student saw the C130 marginally first and bunted and turned but the instructor believes that they would have been masked by terrain at the range reported by the C130 pilot.

HQ STC comments that the C130, with its multi-crew flight deck, should have been able to pinpoint its position more accurately within the UKLFS. To fast jet crew, clockwise rotation around the Machynlleth loop is taboo. Thus the Hercules would have been the very last thing the crew of the Hawk would have expected to see. Fortunately, 'see and avoid' prevailed and separation was maintained.

Whether TCAS or a CWS would have worked in the steep sided and winding valleys of the Machynelleth loop and resolved the conflict, or given a faster warning to either of the crews is open to debate.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended the C130K captain for his laudably honest account. It was evident that a navigational error by the crew had resulted in the C130 flying the wrong way around the Machynlleth Loop, against the specified deconfliction measures promulgated for military crews flying through this location. Thus the C130's flight path conflicted with that of the Hawk, which was following the established directional flow. Pilot members noted that the Hawk crew was unable to acquire the camouflaged C130 before the alert student pilot sighted it 1nm away, because the terrain masked its presence from their perspective. This appeared at odds with the report from the C130 crew who spotted the small training jet's headlight at 6-7nm. Nevertheless, the C130 crew had seen the Hawk at a range that enabled them to take effective avoiding action and climb no less than 300ft above the Hawk, according to the latter's pilot. Similarly, the Hawk crew had also taken effective avoiding action. The Board agreed unanimously that the cause of

this Airprox was that the route flown by the C130 crew did not comply with the promulgated deconfliction measures, which resulted in a conflict that was resolved by both crews. Although the differing perception of the separation that pertained could not be resolved without recorded radar data, the Board concluded that the combined avoiding action by both ac crews had effectively removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

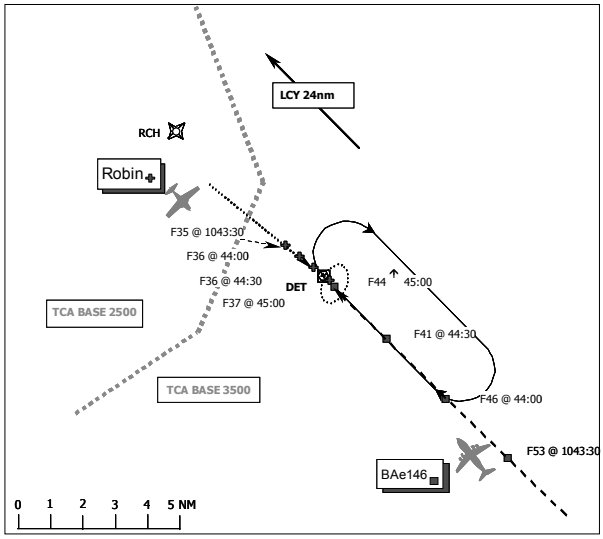
Cause: The route flown by the C130 crew did not comply with the promulgated deconfliction measures, which resulted in a conflict that was resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT NO 35/03

Date/Time: 14 Apr 1045
Position 5121N 0036E (3nm SE DET)
Airspace: London TCA (Class: A)

	Reporting Aircraft	*Reported Aircraft*
Type:	BAE146-200	Robin DR500
Operator:	CAT	Civ Trg
Alt/FL:	4000ft (QNH 1012mb)	FL39
Weather	VMC HAZE	VMC
Visibility:	5km	
Reported Separation:	200Ft V 0 H	NK
Recorded Separation:	0 H 700ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAE146 PILOT reports heading 315° at 4000ft on the QNH of 1012 and 250 kt inbound to Detling VOR from Paris for an approach to London City Airport. He was under the control of Thames Radar in marginal VMC with a visibility of 5000m in light haze below cloud. He saw 2 ac ahead and below him on the TCAS and watched the first one pass below (500 to 1000ft) on the left side, then immediately he had a TCAS RA "climb", very probably for the second ac. The second ac was identified by the First Officer at 1km on the nose as a white Robin DR 400 with blue leading edges in level flight 200ft below (confirmed on TCAS) with no horizontal separation. He climbed to 4400ft before descending back to 4000ft.

THE ROBIN DR500 PILOT reports that he did not consider that this incident constituted an Airprox and declined to provide details required in a CA1094. However, he agreed that there had been

The sortie was an IMC rating renewal revision accompanied by a QFI with the pilot operating as P1. Take off from Rochester was at approximately 0944Z for a 1¼hour sortie consisting initially of GH followed by NDB/VOR holds at RCH and DET. During the flight, he could not recall the time, he flew a simulated Southend NDB/DME procedural approach to Rochester RWY 20, changing from the QNH of 1014 to the airfield QFE. Following a go-around he tracked on the assigned radial towards DET, intending to

climb, not above 3500ft, when clear of the LTMA 2500ft restriction.

During the climb the instructor suggested that the pilot lift the "Foggles" to look at a BAe 146 above and in the 12 o'clock. They both watched the passage of this ac and considered the separation to be normal. Both pilots regularly operate from Rochester and are familiar with the visual appearance of separation of London City inbounds. They considered that no avoiding action was necessary and they observed none by the 146. However, after refitting the "Foggles" and continuing the climb he glanced towards the transponder and found it reading FL39 and initiated an immediate descent. He subsequently realised that both altimeters had been left to the Rochester QFE setting.

UKAB Note (1): Rochester is 436ft AMSL resulting in a QFE calculated as 1000mb.

On his return to Rochester he asked the AFISO if Thames Radar had made enquiries regarding his entry into the London TMA and was advised that no call had been received. Had any enquires been made he intended to explain the circumstances of the incident to Thames Radar.

THE THAMES RADAR CONTROLLER reports that at about 1042 a BAe 146 from Paris called on frequency descending to 4000ft (QNH) inbound to DET VOR. He was cleared outbound DET heading 300° for vectoring for an ILS RW 10 at London City. At 1044 the BAe 146 pilot called a TCAS climb and was observed reaching 4400ft when a 7000 Squawk emerged just behind, indicating 3800ft. This was the first time that the Controller had observed the other ac. The pilot of BAe 146 reported returning to 4000ft shortly afterwards.

The pilot reported to Thames that as he started to climb, the ac was sighted and identified as a DR400 (he thought) with white wings with blue leading edges. The pilot also said that the TA messages prior to the RA reported that the ac was 200ft below and that he flew directly above the intruder with 500ft separation. Shortly after, the pilot announced that he wished to file an Airprox and the controller agreed to speak to him on the telephone after landing. During the conversation the information was confirmed and the pilot said that prior to the occurrence several TAs were received on another 7000 squawk with no Mode C that was sighted approximately 1000ft below and so he was surprised when the events leading up to the Airprox unfolded. They agreed that the pilot would file an Airprox (pilot) report and that the controller would file an Air Traffic Occurrence report.

UKAB Note(2): The Pease Pottage radar replay clearly shows the ac approaching one another on reciprocal headings about ½nm SE of DET with the BAe 146 climbing through FL44 (presumably following his TCAS RA) with the Robin passing directly below at F37.

ATSI reports that a BAe146-200 was inbound to London City and the pilot contacted Thames Radar, reporting approaching DET at 4000ft, the controller instructed the pilot to leave DET heading 300º. At the time there were several ac squawking 7000 in the area, including the DR500, which was approximately 7.5nm in the 12 o'clock position of the BAe146 flying in the opposite direction to it indicating 3700ft. The radar equipment at Thames Radar is not fitted with STCA so no 'alerting facility' was available.

The controller was engaged in vectoring a number of ac and he did not notice the Mode C of the 7000 squawk initially. Shortly afterwards the pilot of the BAe146 reported a TCAS climb against 'a DR400'. The controller reported that he then saw a 7000 squawk emerging from the return of the BAe146 with an unverified Mode C readout of 3800ft

MATS Part 1, Section 1, Chapter 6, Page 4, para 9 states that 'controllers should not normally allocate a level to an ac which provides less than 500ft vertical separation above the base of a control area'. In this instance, the base of the LTMA SE of DET is 3500ft therefore, the allocated level of 4000ft complied with this requirement.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was informed that owing to its relocation from Heathrow to the London Terminal Control Centre at West Drayton, Thames Radar now has STCA.

The Board considered the DR500 pilot's refusal to submit a CA1094 most disappointing and not in keeping with the current open reporting ethos in the UK.

The Board was also informed that the single most common cause of GA pilots failing Instrument Rating Tests is forgetting to reset their altimeters from QFE to QNH following a go-around. This is widely publicised and in this incident should have been well known to, and specifically checked by, the QFI. Members therefore considered that he should have picked up the omission at a much earlier stage and told the handling pilot to rectify it, thereby preventing the infringement of CAS and consequently the Airprox. This in itself may not have prevented the TCAS RA as they had apparently planned to fly to just below the base of the London TMA. Members pointed out that, although this is technically quite legal; it is poor airmanship; where possible, pilots should apply a 500ft buffer, as is the case above the base of CAS.

Members believed that the reason the Robin crew "considered the separation to be normal" could be explained as follows: the 146 captain had already taken effective avoiding action by climbing to FL44, as a result of the TCAS RA, by the time that they saw the conflicting ac. Although the BAe 146 pilot estimated the vertical miss-distance as being 200ft, this probably increased after the Robin disappeared out of his view below the nose and was actually greater as the 2ac crossed about 10sec later with the 146 in a climb and the Robin having commenced his descent. The Board concluded that by following the TCAS recommended avoiding action in a timely manner the 146 captain had prevented a close encounter. This had been watched by the Robin crew and therefore there was no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class A airspace by the Robin crew who flew into conflict with the BAe146.

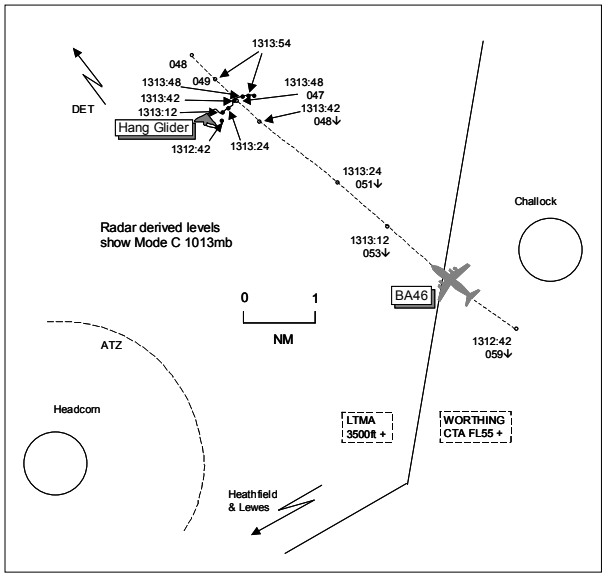
Degree of Risk: C

AIRPROX REPORT NO 36/03

Date/Time:	22 Apr 1314	
Position:	5114N 0043E (5nm SE DET)	
Airspace:	LTMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	BA46	Hang Glider/ M'light
Operator:	CAT	NK
Alt/FL:	↓4000ft (QNH 1016mb)	NK
Weather	VMC CAVOK	NK
Visibility:	NK	

Reported Separation:
100ft V

Recorded Separation:
0·125nm



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA46 PILOT reports inbound to London City descending at 250kt from 5000ft to 4000ft, v/s 1000fpm, in accordance with his ATC clearance from Thames Radar on 132·7MHz. Approx 3nm before DET VOR descending through 4300ft QNH, he thought, he saw a hang glider in his 12 o'clock position about 500m ahead on a collision course. He disconnected the A/P and pulled up to avoid the traffic, climbing to 4800ft before descending back down to 4000ft; the hang glider passed 100ft below his ac. The Thames Radar controller was informed at the time and the incident was discussed again after landing; he assessed the risk of collision as high.

THE THAMES RADAR CONTROLLER reports that the BA46 was instructed to leave DET on a radar heading descending to 4000ft QNH 1016mb and to expect vectors to the ILS RW28 at London City. A short time later, the pilot reported that he passed a hang glider, about 100ft below him, which was 'very very close'. He told the pilot that there was no known traffic in that area and that no traffic was observed on radar. The pilot reported the confliction had passed and that he was descending again to 4000ft. The TC Low SC was contacted and he said that he could see a primary radar return in the area and would track it for as long as possible. Later, the crew of the BA46 telephoned to confirm that an Airprox would be filed and passed a description of the reported hang glider (blue or black in colour, pilot in a horizontal position, no engine or markings observed).

AIS MIL reports that, in conjunction with the BHPA, tracing action did not reveal the identity of the reported hang glider.

THE BHPA comments that unless the engine can be heard or the particular ac's flight characteristics observed, it can be impossible for people who fly paragliders or hang gliders to ascertain if it is powered unless it is viewed from less than 200m. Past experience of Airprox incidents has shown that combinations of the following have been confused with each other on more than one occasion and by very experienced aircrew: hang glider (hg), paraglider (pg), powered hang glider (phg), powered paraglider (ppg), parachute and microlight. Additionally, it is around 20 years since other than a training, non-soaring, hang glider with anything other than a white main surface has been manufactured – the BA46 crew reported a blue/black ac. A hg of such age is unlikely to be still airworthy and a hg pilot of sufficient skill to fly into the Airprox position would not be flying such an old, low performance ac when a far more modern and capable machine can be bought relatively cheaply or borrowed. Microlights continued to be manufactured with coloured main surfaces long after the practice was discontinued in hg manufacturing. The BHPA believes that the reported ac was not a hg.

It was noted that from the reporting pilot's stated miss distance, there had probably been little time, if any, to take any avoiding action. The particular day in question had some of the best possible soaring weather conditions and a number of hang gliders and paragliders had flown from two sites in the Lewes area. The routeings followed by all was along the sea breeze front that set up along a line approx Lewes-Heathfield-Challock. The pilot of an all white coloured hang glider reported that he landed at 1530L (1430UTC) in a field between Sittingbourne and Faversham. Although unsure of the exact timings, he would have flown through the Airprox area but was flying at all times below 3500ft and certainly had not seen any airliners, much less one passing 100ft above.

ATSI comments that there were no apparent ATC causal factors. The Thames Radar Controller reported that he could not see a radar contact in the vicinity of the BA46 when its pilot advised of a confliction with a hang glider. Even if it had been visible on the radar display there was no reason for the controller to believe it was in CAS, where the base was 3500ft, in accordance with MATS Part1 Section 1 Chap 5 Pg 13 Action to be taken by controllers to avoid unknown ac.

UKAB Note (1): The RT transcript at 1313:40 reveals the BA46 pilot transmitting *"radar BA46 c/s er present altitude five thousand feet we just passed a er hang glider"*. The Thames controller replies *"BA46 c/s roger I have no information on that aircraft there's no radar contact at the moment er how close was he?"*. The BA46 pilot

answers *"er very very close within a hundred feet we would say below us"*.

UKAB Note (2): Analysis of the Pease Pottage radar recording at 1312:42 shows the BA46 11nm SE of DET tracking 310º indicating FL059 (6000ft QNH 1016mb) descending with a primary only return, believed to be the hang glider/microlight just L of his 12 o'clock range 5nm in a RH orbit passing heading 180º. The hang glider/microlight rolls out and continues on a generally NE track at 1313:12 with the BA46 2·85nm to its SE converging. At 1313:42 the hang glider/microlight is crossing through the BA46's 12 o'clock range 0·45nm as the latter is descending through FL048 (4900ft QNH); the CPA occurs 6sec later, the BA46 indicating FL047 (4800ft QNH) as the hang glider/microlight passes on the BA46's RHS range 0·125nm (230m). The next radar sweep at 1313:54 shows the BA46 indicating FL049 (5000ft QNH), +200ft, which accords with the reporting pilot's avoiding action manoeuvre.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the BA46, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Irrespective of the doubt concerning the type of the untraced (hang glider or microlight) ac, members were clear that this Airprox had been caused by the unauthorised penetration of the LTMA (Class A airspace) by its pilot. The Thames Radar controller was unaware of the confliction until being informed immediately thereafter. Fortunately the BA46 crew had seen the hang glider/microlight about 500m ahead and had pulled up to avoid it, estimating that it passed 100ft below their ac. Members commended the crew's visual 'pick up' of the conflicting traffic which undoubtedly had caused surprise and concern in the cockpit. The radar recording shows the BA46 indicating FL048 (4900ft QNH) descending with the hang glider/microlight crossing through its 12 o'clock range 0·45nm; the next radar sweep shows the BA46 stopping its descent at FL047 (4800ft QNH) with the hang glider/microlight displaced 0·125nm on its RHS. The BA46 crew's avoiding action climb is seen after the ac have passed, 6sec later. Although the geometry of the encounter had revealed that the subject ac were not going to collide, they had passed in such close proximity, in Class A airspace, to the extent that the Board agreed that safety had not been assured.

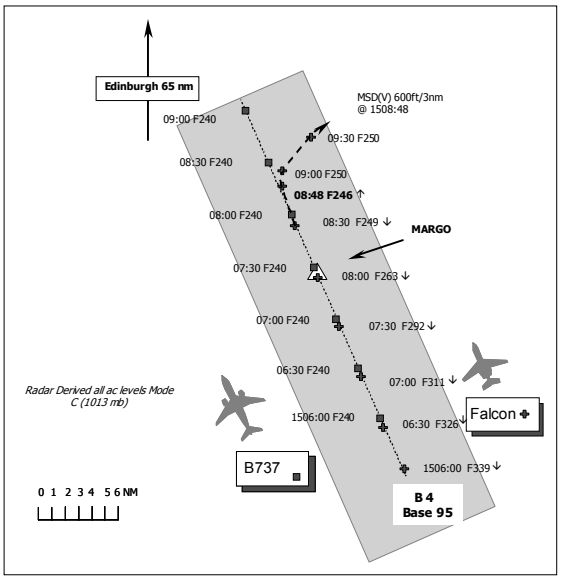
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class A airspace by an untraced hang glider or Microlight.

Degree of Risk: B

AIRPROX REPORT NO 37/03

Date/Time:	22 Apr 1509	
Position:	5450N 0248W (10nm S Carlisle)	
Airspace:	UIR/Airway B4	(Class: A/B)
Reporter:	ScACC	
	First Aircraft	*Second Aircraft*
Type:	Falcon10	B737-500
Operator:	Civ Exec	CAT
Alt/FL:	FL246	FL240
Weather	VMC CAVOK	NK
Visibility:	Unlimited	NK
Reported Separation:	NK	NK
Recorded Separation:	600ftV c3nmH	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

SCACC reports that a Falcon 10 and a B737 were inbound to Edinburgh from Vitoria (Spain) and Isle of Man respectively on airways 10nm S Carlisle. The Falcon was given descent to FL250 on top of the B737 at FL240. The controller saw the Falcon 10 descend below FL250 with Mode C indicating FL248↓ so he instructed his trainee to give avoiding action to the Falcon, which he did. They noted that the Falcon had descended to FL246 before climbing back up to FL250. Avoiding action was not given to the B737 due to time constraints and the prompt reactions of the Falcon pilot.

THE FALCON 10 PILOT reports that he entered UK airspace at SALCO at FL380 and was routeing via B4 to Edinburgh. Between NOKIN and RIBEL, he checked the TAF for Edinburgh to determine the runway in use. Since the wind was almost calm and 06 had been in use when they departed earlier in the day they inserted this in the FMS and calculated the top of descent as being at 95nm to go.

Approaching RIBEL, London cleared him to descend to be level at FL260 by MARGO. Since they were still 140nm from Edinburgh, well before his calculated descent point, he started to descend initially at 2000ft/min. Between RIBEL and MARGO he asked London Control to confirm the runway in use at Edinburgh to which London replied, "Stand by". He then saw that they were too high, and he increased the rate of descend to 3000ft/min; checking the distance and height again he noted that they were still too high to be level at MARGO at FL260, so he increased the rate of descent to 6000ft/min.

At 9nm before MARGO at FL300 London informed him that the runway in use at Edinburgh was 24.

At 3nm to run London told him to contact Scottish but on changing frequency there was another ac talking to Scottish. As they were approaching FL260 the co-pilot was inserting the data for runway 24 at Edinburgh. At 0·3nm to MARGO while descending at 6000 ft/min, the co-pilot requested further descent and FL250 direct EDN was approved. They crossed MARGO at FL260 setting heading 350º at 450kt and reduced the rate of descent on the vertical speed mode of the Flight Director to 500ft/min. While descending through FL255 they called approaching FL250 and were told to maintain FL250 for about 15nm.

At FL251 the Captain noted that the altitude select mode of the Flight Director had not captured the selected altitude of FL250. The rate of descent was approx 3000ft/min and he tried to maintain

FL250 with the pitch control so that he did not alarm the passengers. It was not effective and as the ac continued descending through FL249 he took control manually. The ac descended to FL246 and he recovered immediately to FL250.

When they passed through FL248 he was given avoiding action by Scottish of a right turn heading 090º, which he executed immediately and as they passed 010º they were stabilized back at FL250 but continued the turn. Scottish then cleared him to resume heading and after 3 minutes they were cleared for further descent and 3 minutes after that Scottish control passed him to another Scottish frequency but before leaving he was told that he had passed 3nm from the other traffic. TCAS was not fitted.

THE B737 PILOT reports that he was not informed of the incident at the time by ATC. A TCAS 'RA' was not received but he cannot remember if they had a 'TA' as these are now an everyday event.

UKAB Note (1): The minimum separation calculated from the Radar Recording was 600ft V and ~3nm Lateral but diverging.

ATSI reports that the tape transcript confirms that the pilot of the FA10 was cleared, and read back correctly, descent to FL250. The trainee, at the instigation of the mentor, issued 'avoiding action' to the FA10 pilot although not using the new phraseology, and traffic information was passed. No instruction/information was passed to the B735 as the FA10 quickly climbed back to FL250, thereby restoring separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered that for whatever reason, the FA10 crew had not monitored correctly their ac descent, relative to their cleared level, or controlled their ac to maintain these clearances. While the Board accepted the explanation regarding autopilot, they believed that its performance limits might have been exceeded by the crew's inputs and expectations. Notwithstanding this, the crew had a responsibility to adhere to their cleared levels and when they were faced with a situation when the autopilot could not cope they could have taken control manually at an earlier stage thereby preventing them from descending through their clearance. As a last resort they could have called SCACC and informed them that they were about to descend below their cleared FL, possibly allowing the controller to implement avoiding action earlier and thereby to maintain standard separation. But for the very prompt avoiding action taken by the Mentor Controller and his trainee, and its equally prompt implementation by the FA10 crew, this incident could have been much more serious. Although the SCACC Controller did not use the new avoiding action phraseology, this did not affect the timeliness of the pilot's response.

As it was, however, the Board noted that the minimum separation was about 3nm and 600ft, achieved at a time when the ac were diverging and they concluded from this that there had been no risk of collision.

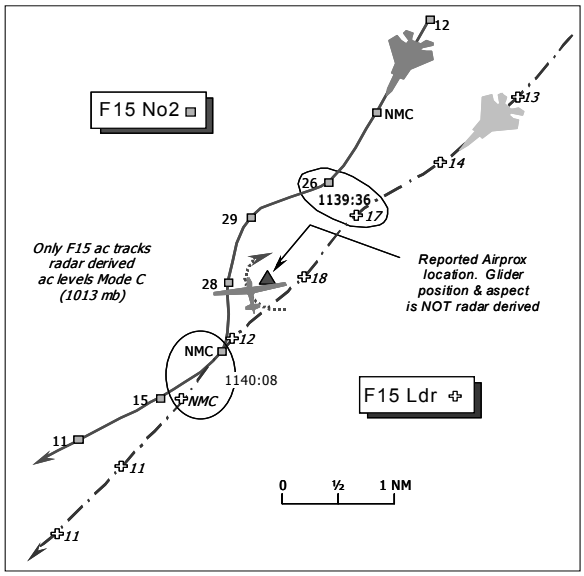
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FA10 crew did not control their ac to maintain their cleared level.

Degree of Risk: C

AIRPROX REPORT NO 38/03

Date/Time:	23 Apr 1139	
Position:	5141 N 0213 W (Minchinhampton Common)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	K8 Glider	F15E x 2
Operator:	Civ Club	Foreign Mil
Alt/FL:	2400ft (QFE)	NK (Rad Alt)
Weather	VMC Haze	VMC Slight Haze
Visibility:	9-10nm	15km
Reported Separation:	Not quantified	500ft H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K8 GLIDER PILOT reports that her glider has a blue fuselage & tailplane with white wings. After departing from Aston Down Glider Launch site 20min previously she was thermalling in a R turn above Minchinhampton Common (3nm SW of Aston Down) at 45kt. Visibility was fairly good, she could see the nearside of Kemble to the E and past Nympsfield to the W before the haze degraded the visibility further. Whilst climbing R through a height of about 2400ft (Aston Down QFE) looking towards the W, a twin engine jet with a dark grey underside passed close by flying from N to S in a banked R turn. The jet's engine noise was heard as it flew past and she continued her R turn initially to avoid it as this was in the opposite direction to the jet, before resuming straight and level to look out for any other ac, but she saw none. She was unsure of the minimum separation, but it "filled ¼ of the canopy" as it passed by on the [port] beam at the same height. The risk was not assessed.

THE F15E PILOT reports that he was flying as the wingman of a flight of two grey F15E ac. They were not in receipt of an ATS, but squawking A7000 with Mode C. Heading 210° at 450kt, in the vicinity of Nailsworth he thought at 1000ft Rad Alt, he had banked R to check something to starboard just as his leader called to them to 'break' right. He pulled his jet into a R turn and then rolled back out of the turn but he never saw the glider at all. His leader had spotted the white & blue glider travelling E to W climbing up towards them and added that the glider had turned right at the same time - towards the wingman's tail and passed about 500ft away horizontally either at the same level or below his No2 with a *"moderate"* risk of a collision.

UKAB Note (1): The UK AIP at ENR 5-5-1-1 notifies Aston Down as Glider Launching Site for aerotow and winch launches, where cable launched gliders may ascend to 3000ft above the site elevation of 600ft amsl.

UKAB Note (2): The UK Mil AIP at Vol III Pt 1–2-2-5 ENR 5-5-1-1 notifies that Aston Down Glider Launching Site - GS10 located at 51° 42'·43N 002° 07'·82W – is to be avoided by 1·5nm below 2000ft msd. Furthermore, military LFS flow regulations are applicable in the vicinity and the gap formed between the town of Stroud and Aston Down glider site avoidance area is to be flown by military crews in a southwesterly direction.

UKAB Note (3): The Meteorological Office archive data for the period gives a Lyneham QNH at 1150UTC (the closest available) of 1017mb; the Cotswold RPS for the period 1100 - 1200 UTC was 1013mb. The actual Aston Down QFE was

not reported but should have been about 997mb based on the Lyneham QNH.

UKAB Note (4): The Clee Hill radar recording does not illustrate this Airprox as only the flight of two F15Es are shown; the glider is not evident at all. However, at 1139:36 the Lead F15E and wingman are shown approaching the reported Airprox location at 1700ft and 2600ft Mode C (1013mb) respectively. The reported avoiding action R break by the unsighted wingman is shown, as the ac ascends 300ft whilst approaching the Airprox location about 3nm SW of Aston Down. The No2 F15 indicated 2600ft Mode C (1013mb) at this point, which would equate to an altitude of about 2720ft amsl (1017mb). A rapid 600ft descent is also evident by the flight leader as the ac passes abeam the Airprox location, between successive radar returns, descending from 1800ft down to 1200ft Mode C (1013mb) equating to altitude of 1920 – 1320ft (1017mb).

HQ 3AF comments that the flight leader's workload was moderately high immediately prior to the Airprox as he was transiting a particularly congested piece of airspace, by virtue of the number of avoidance areas, prior to entering LFA 2. He saw the subject glider visually, a small contact turning towards his formation, and his immediate reaction ensured that his No 2 avoided it by the maximum possible margin. It is of note that, at the acs' relative heights in this Airprox, the F-15E radar would have been unable to distinguish a non-squawking glider flying at 45kt from ground clutter.

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.

The Board noted that this Airprox had occurred in the vicinity of a military LFS 'flowed gap' (applicable only to military crews) and the F15 flight's route had been constrained by compliance with this flow regulation through the area. It was unclear if the glider pilot was aware of this mandated flow here, as it is not shown on CAA VFR charts. [These flows are only promulgated to civilian pilots within the UK AIP at ENR 6-5-2-1 on a 1:1,000,000 chart] Knowledge of this flow might have been advantageous here; if the K8 pilot had been aware of it, this might have focused her lookout to the NE and enabled here to spot the F15 pair earlier than she did. This led the Board to revisit the issue of the depiction of this important 'flowed gap' information on CAA VFR charts – the subject of recommendations by the UKAB and the AAIB in the past to the Directorate of Airspace Policy (DAP) – that have been repeatedly rejected. It was still a hot topic, so the Chairman recounted the Board's efforts on this issue, which to date have been fruitless. The members reaffirmed unanimously that, in their view, the information on military LFS flow arrows should not be denied to civilian pilots and should be included on CAA VFR 1:250,000 Topographical Air Charts.

It was clear to members that although the glider pilot had spotted the No2 at a late stage as it flew past - probably after the jet pilot had effected the R 'break' - she had not seen the leading F15 at all. Similarly, the No2 F15 pilot was unsighted on the glider and it was only the alert leader's prompt call to his wingman, which enabled the latter to turn blind away from the glider, whilst the leader also descended himself, to avoid the K8. The F15E radar was evidently defeated by the small reflective area of the slow glider obscured in ground clutter here, so did not provide a warning to the jet pilots and the HQ 3 AF advisor emphasised that this was a good 'spot' by the F15 leader. Though the K8 glider was not evident at all on recorded radar data, the F15 flight's avoiding action was; this married closely with the pilots' reports, enabling the Board to conclude that this Airprox had resulted from a conflict in the FIR, which had been resolved by the actions of the F15 flight leader who had called the 'break'.

Whilst assessing the risk, the absence of recorded radar data precluded determination of the minimum separation that pertained, but it was in some members' view a close call. The leader's estimate of 500ft horizontal separation between the unsighted No2 and the glider during the avoiding action 'break' weighed heavily as the only quantifiable figure available. This coupled with the fact that the glider pilot was unaware of the lead jet at the time, led the Board to conclude, by a very narrow margin, that the safety of the subject ac had not been assured.

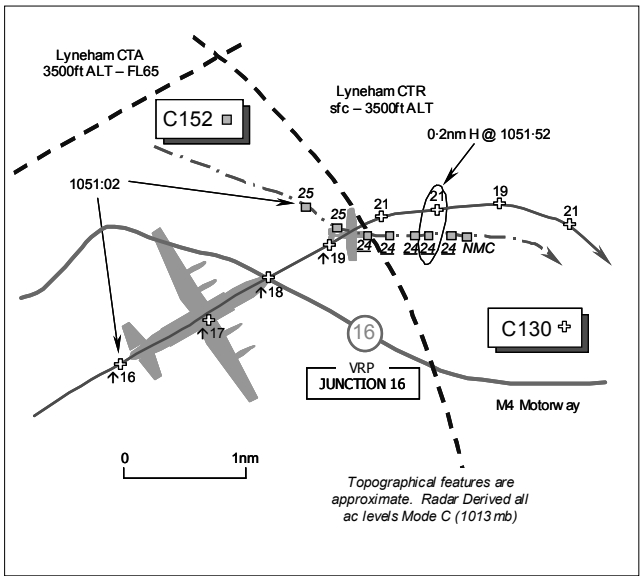
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the F15E flight leader.

Degree of Risk: B

AIRPROX REPORT NO 39/03

Date/Time:	23 Apr 1051	
Position:	5133N 0150W (1nm NNE of JUNCTION 16 VRP)	
Airspace:	Lyneham CTR	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	C130K	C152
Operator:	HQ STC	Civ Club
Alt/FL:	↑2000ft (QFE)	2000ft (QFE)
Weather	VMC NR	VMC Sky Clear
Visibility:	>10km	10km
Reported Separation:	100m H/200ft V	NR
Recorded Separation:	0·2nm H/300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C130K PILOT reports his ac has a grey camouflage scheme, but the HISL was on whilst departing IFR at 170kt on an ALPHA SID from RW06 at Lyneham. They were in receipt of a RIS, he thought, from Lyneham APPROACH [UKAB Note (1): He was actually in receipt of an ATC service from ZONE that was bandboxed in with DIRECTOR] and squawking the assigned code with Mode C, but neither TCAS nor any other form of CWS is fitted.

When he contacted ZONE after take-off, he was *"cleared"* to continue climbing to 2000ft QFE (999mb) and turn R from a heading of 064° onto S upon passing 1500ft QFE. The initial lookout into the R turn revealed nothing, the turning height was set and only subsequently did a further lookout reveal a Cessna at 2 o'clock about 100m away at a similar height on a collision course. To avoid the Cessna he immediately reduced power on all engines and dived to the L, before reversing the turn to remain visual with the other ac. He assessed the risk of a collision as *"medium to high"* and reported that the C152 had been on a parallel course, in the 5 o'clock position relative to the C-130.

THE CESSNA C152 PILOT reports his ac has a white colour scheme with red/blue flashes/stripes and chequers; the anti-collision beacon was on. He was flying from Shobdon to Shoreham in a clear sky at 85kt and in receipt of a *"FIS – Radar"*, he thought, from Lyneham on 123·4MHz and squawking A4530 with Mode C. [UKAB Note (2): He had originally been in receipt of a FIS before he entered the CTR, a formal CTR entry clearance was not issued by ZONE, who did not change the type of ATS either].

Flying his planned track of 140º to GOODWOOD VOR he was heading about 130°(M) to allow for the wind, but in flat smooth air with no turbulence.

He obtained *"permission to penetrate the Lyneham airspace"* at 2000ft QFE (999mb) and was flying straight and level at the exact height with the QFE set as instructed. ZONE then said as he was heading toward the Brize/Fairford Temporary Restricted Area (TRA) that had been established, so he was then directed to head towards Junction 16 of the M4. He was not sure where Junction 16 was, so he requested a heading to clear the TRA and was instructed to head 150°; when he reached the M4 he was told to remain north of it. This he did immediately and followed the M4 remaining on the north side heading about 100°. Around this time, ZONE said to look out for an ac about 4nm away in his 2 o'clock, but he could not see the other ac and reported this to ZONE. Shortly afterwards he heard ZONE telling another pilot about his Cessna, 500ft above the other pilot's ac but no reply was heard. Then he saw a Hercules ac ahead and about 500ft below, which had overtaken him below his Cessna. The Hercules flew on for some distance, he thought, climbed and then turned to the R; no avoiding action was required. He reported visual contact with the Hercules, advised the controller that he had been "undertaken" and thought no more about it. He cleared the CTR and was instructed to resume his own navigation. No comment was made of an Airprox until he was requested by Shoreham ATC to telephone Lyneham ATC after landing, when he was advised that the C130 pilot had filed an Airprox.

[UKAB Note (3): The Clee Hill Radar recording shows the C152 approaching the Junction 16 VRP on a SE heading at 1050:30, squawking A4530 at 2500ft Mode C (1013mb), [2080ft QFE (999mb)] as the Hercules can be seen climbing out from Lyneham squawking A4527. When the C152 passed N abeam the Junction 16 VRP indicating 2400ft Mode C [1980ft QFE (999mb)], the Hercules is shown converging from the light ac's 5 o'clock, on RW track, passing 1800ft Mode C [1380ft QFE (999mb)] in the climb. At 1051:52, the Hercules is shown indicating 2100ft Mode C overtaking the C152, displaced 0·2nm on the latter's port beam some 300ft below it - before then turning ahead of the C152 onto a southerly heading to pass beneath traffic in the Lyneham hold.]

MIL ATC OPS reports that the timings in the Lyneham RT tape transcripts are about 50sec ahead of the radar video recording timebase, therefore all timing in this report have been correlated as closely as possible to that of the radar recording, which is accurate.

The C152 pilot called Lyneham ZONE on VHF at 1037:45, whilst in transit from Shobden to Shoreham, routeing NE of Kemble. He was flying at 2500ft RPS (1014mb) and ZONE instructed him to squawk A4530 with 'ident' and placed the flight under a FIS. The pilot's routeing was confirmed as a transit between Kemble and S Cerney, to the S of the Fairford Temporary Restricted Area (TRA).

When approaching a position abeam Kemble, ZONE instructed the C152 pilot to *"fly on the Lyneham QFE 999"* and later to *"…fly at 2000ft"* which was acknowledged. At 1045:16, ZONE warned the C152 to remain outside the Fairford TRA whereupon he queried, *"could you indicate …which way I should turn or am I all right"*. At 1045:28, ZONE advised the C152 pilot to *"…maintain that track for the moment. I will keep you advised"*. One minute later at 1046:29, ZONE instructed the pilot to *"…route towards Junction 16 on the M4"*. Immediately afterwards, ZONE called APPROACH (APP) on the landline to co-ordinate the C152's CTR crossing and requested clearance for a *"VFR zone transit, 2000ft Lyneham QFE, N to S…routeing E of junction 16"*, which after being pointed out, APP approved thus *"2000ft Lyneham QFE approved"*. Meanwhile, during this co-ordination, the C152 pilot queried, *"that is turn right* [C/S] *yes?"* ZONE repeated, "[C/S] *route via Junction 16 on the M4"* emphasising the number. The C152 pilot was still unsure of the position of Junction 16, and further transmissions ensued as to which way he should fly. At 1046:47, ZONE reaffirmed, *"…you are to route to the east of Junction 16 if you head toward to the east of Junction 16 this time you will stay outside the Fairford MATZ you are to transit at 2000ft Lyneham QFE 999 maintaining VMC"*, to which the C152 pilot read back, *"…999 2000ft maintaining VMC"* adding that he was *"…still not sure where Junction 16 is…".* ZONE suggested a heading of 150° for the C152 to fly towards Junction 16, which would also keep the ac outside the Fairford MATZ. At 1048:22, APP advised ZONE that the C130K, had been released and to manoeuvre initially not above 2500ft against traffic in the Lyneham hold adding *"…if you can come S".* At 1049:40, ZONE passed traffic

information to the C152 pilot about the C130, *"…traffic shortly departing Lyneham will be climbing out of Lyneham turning to the south. Report visual with that traffic"*. Later at 1051:00, ZONE gave the second transmission of traffic information to the C152 pilot *"…that traffic, climbing out in your right…4 o'clock range of 2 miles maintaining a northerly correction north easterly track…C130…are you visual?"* The pilot replied that he was not visual with the C130 and ZONE queried again *"..confirm you are visual?"* Just then at 1051:26, the Hercules crew called DIRECTOR (which was bandboxed with ZONE on UHF), *"…airborne on the Alpha, approaching 1500ft".* ZONE identified the C130 and instructed the crew to *"…climb report level 2000ft initially on passing 1500ft turn right heading 180",* which was readback correctly. ZONE then passed traffic information to the C130 crew about the C152 at 1051:49,*"…you have got VFR zone transit traffic he is currently in your present position 500ft above following the M4, routing to the E"*. At 1051:57, the Hercules crew reported *"just going down the right hand side, visual"* and queried the height of the C152. ZONE answered, *"my apologies he may well be at 2000ft he was instructed to up to 2500ft".* The Hercules crew stated *"we have…just passed a Cessna at 1500 ft he was just about 400ft on the right hand side of our wing tip"* later adding *"…there's no way he was at… 2000ft".* Meanwhile at the same time on VHF the C152 pilot confirmed he was *"visual now I have been undertaken".* The C130 crew then advised ZONE that they would be filing an Airprox because they *"ended up turning into him".*

The rules for controlling flights in Class D airspace are laid out within JSP552, 235A.100.7a, which states that the *"responsibility for the separation of VFR flights from IFR flights…rests entirely with the VFR pilot. Nevertheless, controllers are to provide VFR pilots with sufficient information ...to enable them to achieve their own separation"*. ZONE complied with this but his intent was to do more than merely issue traffic information. He had a duty of care to carry out an action should the VFR traffic not be visual with the IFR traffic but made an error regarding the height of the VFR traffic. In accordance with Lyneham SOPs, the controller correctly instructed the C152 pilot to fly on Lyneham QFE *"at 2000ft"* and had obtained approval from APP for the CTR transit. ZONE also had other ac on both VHF and UHF before the Hercules crew called and he continued to transmit on both frequencies [UKAB Note (4): Hence the C152 pilot comment that he did not hear any pilots' replies]. The controller at that point had followed the rules and indeed provided the C152 with traffic information on the departing Hercules with the intention of enabling him to achieve his own separation. ZONE updated the traffic information when the Hercules was 2nm away and asked the C152 pilot if he was visual twice. The Hercules crew then called ZONE departing Lyneham on a SID (runway track to 1500ft, Lyneham QFE, until instructed otherwise by ZONE); had ZONE not passed a change of instructions to the Hercules crew, then 500ft separation between the VFR transit and IFR departing traffic would have existed. Information from the FPS showed ambiguity as to the level of the C152. Although 2000ft had been written and underscored (to denote the ac had levelled), the initial height of 2500ft had not been crossed out and at a quick glance this might have led ZONE to assume that the C152 was still at 2500ft. Additionally, the radar replay shows the C152 indicated 2500ft Mode C (the difference between the Lyneham QFE and the SPS was 420ft), when ZONE provided traffic information to the Hercules on the C152 at 1051:29, he transmitted *"currently in your present position, 500ft above"* [UKAB Note (5): Based on correlated timings, the C130 was indicating about 1800ft Mode C at that point]. If the C130's climb had been stopped at 1500ft QFE, then 500ft separation would have existed below the C152. However, on first contact with the Hercules crew, ZONE first instructed them to *"…climb report level 2000 ft initially on passing 1500ft turn right heading 180"* before passing traffic information about the C152, *"…you have got VFR zone transit traffic he is currently in your present position 500ft above following the M4, routing to the E"*, whereupon the Hercules crew reported visual contact with the light ac passing down the starboard side. When the Hercules pilot queried the height of the transit C152, ZONE replied *"apologies, he may well be at 2000ft, he was instructed to up to 2500ft"*. ZONE had not instructed the C152 to fly above 2000ft despite telling the Hercules pilot that he had done so. The C152 pilot flying under VFR through the CTR was responsible for avoiding the departing IFR C130. However, the situation could have been avoided if ZONE had not climbed the Hercules to the same height as the VFR traffic before the C130 crew reported visual. Appropriate action has been taken.

THE C130 PILOT'S STATION comments that notwithstanding the responsibilities of a pilot transiting Class D airspace under VFR conditions, it seems likely that the actions of the controller concerned did not reduce the likelihood of an Airprox occurring.

A review of procedures in military Class D CAS is being conducted by HQSTC (ATC), which may include ensuring separation is 'built in' to CTR transit clearances. This would ensure such occurrences would not be repeated in the future.

HQ STC comments that this Airprox has highlighted contradictions within JSP 552. At 235A.100.1 it states that in Class D airspace '*pilots must … comply with ATC instructions when flying in such airspace*'. The Cessna was flying at the specified height – *2000ft*, and on the assigned route towards Junction 16 on the M4 mandated by ZONE. However at 235A.100.7.a. it states that '*Responsibility for the separation of VFR flights from IFR flights and other VFR flights rests entirely with the VFR pilot'.* If the C152 pilot was to take avoiding action, he would be breaking the rule that compelled compliance with ATC's instructions. The Hercules was flying IFR on a SID, and subsequently climbed, on ZONE's instructions, to the same height as the Cessna. JSP552 235A.100.7.b states that '*standard vertical* (1000ft) *and prescribed horizontal separation is to be applied to IFR flights*'. It does not say that this refers only to IFR v IFR flights, and must therefore be considered as appling to IFR v <u>all</u> other flights. However this is contradicted in 235A.100.3, *'ATC meets its responsibilities for preventing collisions between aircraft by separating IFR flights from other IFR flights and passing sufficient information to pilots operating under VFR to enable them to see and avoid all other aircraft'.* (These contradictions have been highlighted at the HQSTC ATC working group on 29 Oct).

The C152 pilot was following ATC instructions when ATC alerted him to the traffic climbing behind him at 2nm. It was impossible for the C152 pilot to sight the Hercules, overtaking from behind and below his fuselage, thus the controller did not, indeed **could not** due to the relative aspects, provide the pilot with '*sufficient information*' to enable him '*to see and avoid*', or to achieve his own separation. It is also reasonable for the C152 to expect ATC to be maintaining some separation between ac following their instructions, and for the pilot to not expect ATC to vector ac into conflict. Here the policy expounded at 101.100.1.a(i), and in the introduction to JSP552 on page P-vii –'*The regulations herein…do not, however, absolve any person from using their best judgement to ensure the safety of aircraft and personnel'* apply. Lyneham ATC did not use best judgement in engineering this conflict, and important lessons have been learnt.

STC Flight Safety assess that this Airprox resulted from the errors of the ZONE controller. It appears from the transcripts that ZONE had become confused as to the height of the Cessna, perhaps due to the displayed Mode C being set to the SAS - 1013mb - and thus inadvertently cleared the Hercules to climb into conflict with the C152 indicating 2500ft Mode C. There is a question of co-ordination within ATC? Did the other controllers ask ZONE if he was ready to handle the Hercules? Did the other controllers look at the situation and question ZONE as to whether the Hercules should be released into direct conflict with the C152? These questions should be explored during ATC CRM training sessions.

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 and operating authorities.

A GA pilot member observed that the Junction 16 VRP is clearly shown on CAA VFR charts and although the C152 pilot had not stated which chart he was using at the time, he should have been able to locate the VRP and thus navigate toward it when instructed to do so by ZONE. Nevertheless, it was evident to the Board that this was not a contributory factor insofar as ZONE eventually proffered a heading for the pilot to steer and the radar recording showed he had remained N of the M4 as instructed. The radar recording also revealed that the Cessna pilot had flown within 80ft of his assigned height of 2000ft QFE, thus although ZONE had neither confirmed the flight rules applicable, nor transmitted a full CTR crossing clearance, the C152 pilot had done all that ZONE had instructed him to do after asking

permission to enter CAS. The Board was in no doubt about the responsibilities for traffic avoidance respectively between the C152 pilot and ATC. ZONE had passed a warning to the Cessna pilot about the C130 just as the heavy transport ac was about to depart - *"…traffic shortly departing Lyneham will be climbing out of Lyneham turning to the south".* Nevertheless, members agreed that this was insufficient traffic information to enable the C152 pilot to acquire the C130, and was, potentially, misleading. This message did not paint the complete picture as there was no indication here that the C130 would indeed fly N of the aerodrome or conflict with the C152 some 10nm to the NE of Lyneham. Even when passed more specific information later at 1051:00, less than 1min before the CPA - *"…climbing out in your right…4 o'clock range of 2 miles maintaining a...north easterly track…C130…",* the Board agreed that the C152 pilot was not in a good position either to spot the Hercules across the cockpit abaft the starboard beam and below his ac, or afford it appropriate visual separation, which, strictly speaking he was obliged to do. Nevertheless, it was plain to the members that the C130, flying at twice the C152's speed, would eventually overtake the LA from astern as the former departed on the SID and pilot members thought that the C152 pilot had little probability of seeing the Hercules until it had flown forward of the port mainplane – as subsequently proved to be the case. Thus the C152 pilot could not have avoided the Hercules by a greater margin and ZONE needed to take further positive action to ensure the safety of these ac.

Until the C130 crew called ZONE they were complying with the SID that required a climb to 1500ft QFE – this would have afforded barely 500ft separation beneath the C152, at 2000ft QFE, if the controller had done nothing else, but this was not in accord with the provisions of extant military ATS regulations. However, for whatever reason, ZONE elected to climb the C130 to the same height as the C152. The Mil ATC Ops investigation had not shown conclusively why ZONE had done this; whether the controller had misread the FPS, misinterpreted the displayed Mode C or, possibly, thought that he had instructed the C152 to fly at a height of 2500ft remained a matter of conjecture. Conjecture or not, controller members were in no doubt that this instruction to the C130 crew to climb was the fundamental cause of the Airprox as noted in the Mil ATC Ops report. Moreover, ZONE did not provide the C130's crew with any traffic information on the light ac until they were actually overtaking it merely 3sec before the CPA; some members also observed that ZONE would have been unable to proffer avoiding action at this close range if the C130 crew had asked for it after receiving traffic information. Thus the traffic information given to both pilots was not as helpful as intended and 'best practice' compelled the provision of separation between these two flights under these circumstances. The Board agreed that this Airprox happened because Lyneham ZONE climbed the C130 into conflict with the C152, compounded by the late transmission of traffic information to the C130 crew about the light ac.

The location of this Airprox within the Lyneham Class D CTR weighed heavily with the Board in their assessment of risk. There was a reasonable expectation on the part of the C130 crew that they would be able to effect their IFR departure without flying into conflict with CTR transit traffic inside CAS. However they were evidently unaware of the presence of the C152 when it had crossed ahead - through their nose from L-R - some 400ft above them. It was not until they were about to turn R that the C152 was spotted late to starboard – without the benefit of traffic information at that stage - which prompted the pilot to take robust avoiding action. Conversely, the unsighted C152 pilot would have been unable to influence the outcome once the C130 was astern and had closed to within 0·2 nm some 300ft below at twice the Cessna's speed. The combination of these factors led the Board to conclude that the safety of these two ac had indeed been compromised in the circumstances reported here.

The Board noted that considerable internal discussion had taken place within HQ STC about this occurrence. Members agreed that this Airprox was a salutary example of the difficulties that can ensue when controlling a mix of VFR and IFR traffic in close proximity, where good judgement over and above the pure application of the rules was intrinsic to the provision of a sound ATC service – this was worthy of further amplification during CRM training and a lesson to all concerned.

AIRPROX REPORT No 40/03

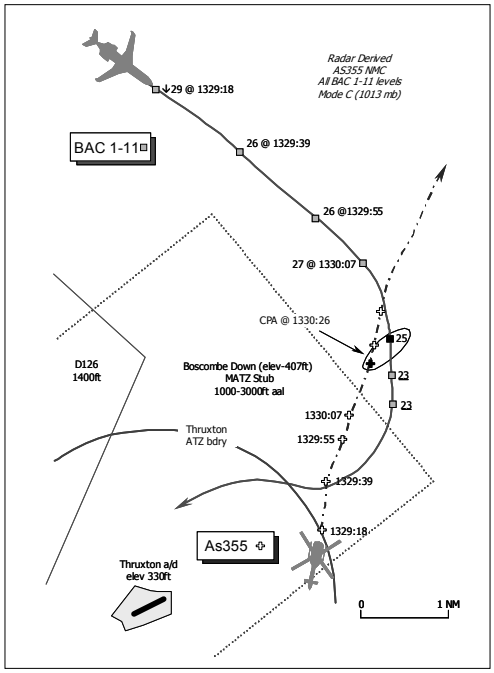
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Lyneham ZONE climbed the C130 into conflict with the C152, compounded by late traffic information to the C130 crew.

Degree of Risk: B.

AIRPROX REPORT NO 40/03

Date/Time:	25 Apr 1330	
Position:	5115N 0132W (10½nm NE of Boscombe Down - elev: 407ft)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	BAC1-11	AS355
Operator:	DPA	Civ Comm
Alt/FL:	2000ft (QFE 994mb)	2500ft (QNH)
Weather	VMC CLBL	VMC CLBC
Visibility:	10km	>5nm
Reported Separation:	½nm H, nil V	½nm H, nil V
Recorded Separation:	0·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAC1-11 PILOT reports his ac has a red/ white & blue livery, but a HISL is not fitted. They were flying in the ILS pattern at 180kt and commencing an approach to RW23 at Boscombe Down, clear below cloud with an in-flight visibility of 10km between layers. Boscombe DIRECTOR (DIR) was providing a RIS on 291·65MHz and they were squawking A2621 with Mode C, but neither TCAS nor any other form of CWS is fitted.

Turning onto the ILS localiser in VMC about 9nm NE of the aerodrome, he thought, [it was an 11nm R base leg] at 2000ft Boscombe QFE (994mb), DIR called a contact ahead which had just appeared on radar but with no Mode C altitude indication. During their visual search, they did not locate the contact – a black helicopter - until a very late stage. When first sighted the helicopter was in their 12:30 position about 1nm away and appeared to be flying towards his ac at the same height on a non-deviating flight path. They immediately initiated a level hard L turn away from the helicopter, whereupon the helicopter subsequently commenced a left turn away from his jet and passed about 1000m away to starboard with a medium risk of a collision.

THE A355 PILOT reports he had departed from Thruxton on an instrument trip, initially in simulated conditions, and was flying 500ft below broken cloud in good horizontal visibility of >5nm. He was switching to Boscombe ZONE on 126·7MHz, whilst tracking the 220R to the CPT VOR level at 2500ft QNH, heading 040° at 110kt,

in order to clear the Middle Wallop MATZ before turning toward Bournemouth. The BAC1-11 was spotted at 11 o'clock about 1nm away and appeared to be descending through 3000ft on a reciprocal course. To avoid the descending BAC1-11 he turned L, as did the other pilot and the jet passed ½ nm away to starboard with a medium risk of collision.

He eventfully obtained an ATS from Boscombe ZONE who instructed him to squawk A2651, which was selected with Mode C; neither TCAS nor any other form of CWS is fitted.

[UKAB Note (1): It is evident that though the helicopter was fitted with Mode C, it was not selected whilst in communication with ZONE. The AS355's Mode C was subsequently selected and displayed when the crew switched to Bournemouth ATC.]

MIL ATC OPS reports that the Boscombe Down RT transcript was found to be 1min ahead of the radar recording, consequently all timing herein have been corrected to UTC and correlated with the radar data. TheBAC1-11 was being vectored for an ILS approach under a RIS from DIR, who was working 2 ac in the instrument pattern to RW23. Handed over at FL45, the BAC1-11 crew was instructed to descend to 2000ft Boscombe QFE (994mb) at 1327:57, and other control tasks completed. At 1328:41, traffic information was passed on unrelated pop up traffic to which the BAC1-11 pilot responded, *"…looking"*. Further traffic – the subject AS355 - was called by DIR at 1329:38, *"…traffic right 1 o'clock 5 miles right left no height"*, once again the pilot responded, *"…looking".* DIR instructed the BAC1-11 pilot at 1329:56, to *"…turn right heading 220 report localizer established…"*, the heading was repeated correctly by the BAC1-11 pilot after which, at 1330:12, DIR recalled the conflicting traffic *"…previously reported traffic, south-west 2 miles northeast bound no height"*. Again this was acknowledged by the BAC1-11 pilot. At 1330:34, a right turn onto 250º for the localizer was given, followed by a further turn onto 280º. Traffic information was passed at 1331:54, on traffic believed to be in the Thruxton visual Cct and the flight eventually transferred to TALKDOWN at 1332:14, for monitoring of the ILS approach. On completion of the procedure the BAC1-11 pilot recalled DIR and advised that *"…the reason why we, er, turned left was on the contact that you called to us, it was a helicopter…we had to take avoiding action on him……we're going to file an Airprox on that"*. The pilot went on to explain that it was *"……a late spot by us on him…just prior to achieving the localizer which is why we turned left and…went through the localizer before we turned right again.".* The remainder of the sortie was completed without incident.

Meanwhile at 1330:00, the AS355 pilot free-called Boscombe ZONE requesting a RIS. The pilot advised ZONE at 1330:07, *"…a Twin Squirrel out of Thruxton routeing to Bournemouth…presently at 2500ft at Andover…we would like to route the 220 radial from COMPTON through the…Middle Wallop MATZ"*. ZONE instructed the pilot to squawk A2651 at 1330:32; the flight was identified and placed under a RIS at 1330:56, flying at 2500ft PORTLAND RPS (1002mb).

Analysis of the Pease Pottage radar recording shows the BAC1-11 routeing north and east around the Salisbury Plain danger areas. At 1329:18 a pop-up, non-squawking contact – the AS355 - is observed, about 8nm to the northeast of Boscombe Down aerodrome, which takes up a north-north easterly track. The BAC1-11 and the As355's primary contact merge at 1330:26, 4nm NE of Thruxton just outside the Boscombe Down MATZ stub. The Mode A squawk allocated by ZONE is subsequently displayed by the AS355 on the radar recording at 1330:39, 13sec after the Airprox occurred.

[UKAB Note (2): The Airprox occurs moments after 1330:26, as the ac pass starboard to starboard with a track separation of 0·2nm at the CPA. It is not possible to determine the vertical separation, as the AS355 is not displaying Mode C at this point. However, the BAC1-11 was shown in descent passing 2500ft Mode C (1013mb) which equates to about 2300ft QNH].

The Letter of Agreement between MOD Boscombe Down and Western Air (Thruxton) Ltd stipulates that ac departing Thruxton *"……are to free-call the Boscombe Zone Controller before climbing above 800ft Thruxton QFE or are to climb when clear of the CMATZ to avoid confliction with traffic in the Boscombe Down and Middle Wallop instrument patterns"*. The Airprox occurred on the very edge of the Boscombe Down MATZ, however, the AS335 pilot in his initial call to ZONE

at 1330:07, reported being level at 2500ft, having already climbed into the MATZ stub.

It is evident that the AS355 was detected by the Boscombe SRE before it became visible on the Pease Pottage Radar, thus DIR was able to see the confliction and pass traffic information under the RIS, which was provided satisfactorily. Meanwhile, the AS335 pilot who was in the process of passing his routeing details to ZONE at 1330:07, was not identified nor under an ATS at the time the Airprox occurred. Consequently, there appear to be no contributory Military ATC factors within this Airprox.

THE BAC1-11 PILOT'S UNIT comments that the Letter of Agreement (LOA) between Boscombe Down and Thruxton is a vital component of their operations, defining procedures to ensure separation between ac departing from or recovering to Boscombe Down and flights operating in the vicinity of Thruxton.

This Airprox occurred marginally outside the Combined MATZ. However, had the spirit of the LOA been followed and the AS355 crew established RT contact with Boscombe ZONE prior to commencing climb above the height specified in the LOA, this incident could probably have been avoided. As it was, DIR called the conflicting traffic twice to the BAC1-11 crew, who gained visual contact in sufficient time to take effective avoiding action, albeit at a very late stage. Thus, in this case the risk of collision was removed, and this, of course, is the purpose of a RIS. However, the incident occurred at a particularly busy stage of flight in a complex ATC environment as the BAC1-11 was establishing on the ILS localiser. Distraction or less appropriate cockpit management could have produced a different outcome.

Boscombe Down is arranging a large scale briefing for the local General Aviation community to cover these and associated issues. The aim is to create a forum in which we can educate others on Boscombe Down flying operations and enter a wider dialogue to understand and attempt to resolve conflicting requirements within the local airspace.

[UKAB Note (3): The UK AIP at AD2-EGHO-1-3-2.22 Flight Procedures, promulgates that *"Outbound departing ac should free-call Boscombe Down before climbing through 800ft Thruxton QFE or 1100ft ALT, or climb when clear of the CMATZ."*

DPA comments that this was a late sighting that allowed the crew of the BAC1-11 sufficient time to take appropriate, and effective, avoiding action. It demonstrates the value of an effective RIS, on the part of ATC, and of correct monitoring and thence action, on the part of the BAC1-11 crew.

The main concern is that the AS355 appeared to be operating, at a height commensurate with a normal 3° approach glide path on, or close to, the extended centreline of the main instrument runway at a complex and busy airfield like Boscombe Down – all before contacting Boscombe Down ATC.

It is to be hoped, therefore, that this Airprox will serve as a timely reminder that flight close to the centrelines of instrument runways, be they civil or military, requires some thought as to an appropriate operating height and the need for effective communication with ATC at the aerodrome involved.

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.

Members echoed the sage advice from DPA and agreed that when operating in the vicinity of the approach path to a unit's main instrument runway, pilots should seek an ATS from that ATSU in good time. The AS355 pilot had reported that he was level at 2500ft QNH when he free-called Boscombe ZONE but only after he had climbed up on a NNE'ly course through the MATZ stub. In doing so he had neither complied with the advice in the AIP, nor the procedures specified in the LOA and he had positioned his ac where it was likely to encounter other traffic on the approach to RW23 at Boscombe Down. Helicopter pilot members believed that though these procedures in Class G airspace were not mandatory the

AS355 crew had exhibited poor airmanship by not adhering too them. Colleagues agreed adding that compliance with established procedures by all concerned was an essential key to the safe integration of dissimilar traffic patterns in the vicinity of these busy aerodromes. If the AS355 crew had called ZONE before climbing above the 800ft Thruxton QFE specified in LOA, a different outcome could have been achieved. ZONE could have informed the DIR who could have then taken this into account whilst vectoring the BAC1-11. Alternatively the AS355's climb could have been co-ordinated beneath the jet. The provision of a RIS - essentially a VFR service to help pilots spot and then avoid other ac - to traffic conducting an instrument approach and the difficulties that can ensue had been discussed before at length yet remained a matter of concern to pilots and controllers. Here it was evident that any action to forestall a confliction between these two ac was prevented by the AS355 crew's late call and inhibited also by the lack of Mode C derived altitude information. Although the operation of the helicopter's transponder was not mandatory in this airspace, switching it to ON when clearing the Thruxton aerodrome pattern might have revealed the ac's presence earlier. Simultaneously selecting Mode C earlier would also have been very helpful and the traffic information given to the BAC1-11 crew could then have been much more comprehensive, not least by revealing to both DIR and in turn the latter's crew, that the AS355 was almost co-altitude with the jet, making sighting and avoidance all the more imperative. The UK AIP at ENR 1-6-2-1, advises that civil pilots *"should"* select Mode C simultaneously with Mode A, which the Board endorsed most strongly. Furthermore, pilots added that without Mode C TCAS was rendered ineffective (though not carried here by the BAC1-11). The Board concluded unanimously that this Airprox had had resulted from a conflict on the Approach to RW23 at Boscombe Down.

Fortunately, the DIR's traffic information on the unknown (at that stage) contact had enabled the BAC1-11 crew to sight the helicopter and take effective avoiding action, albeit at a late stage. Similarly, the AS355 crew had spotted the jet just as it crossed ahead of them descending to their level. The combination of both crews' avoiding action had resulted in 0·2nm separation as the ac passed abeam one another, thereby removing the risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict on the approach to RW23 at Boscombe Down.

Degree of Risk: C.

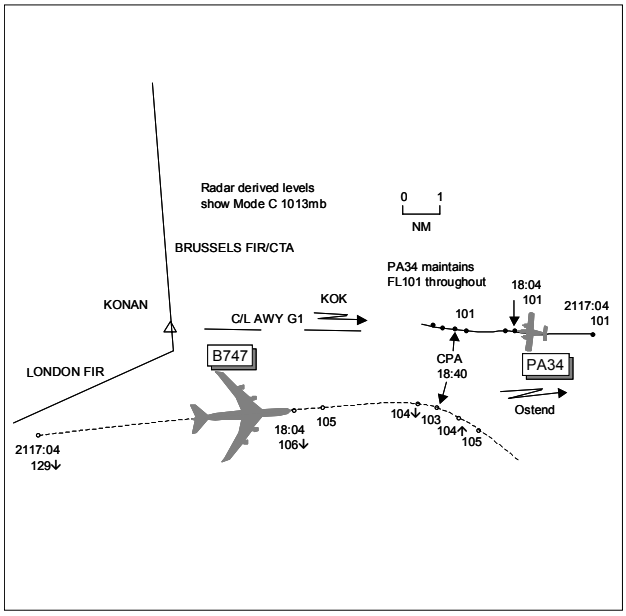
Contributory Factors: The AS355 crew did not:

a. Comply with the LOA or advice contained in the UK AIP.

b. Did not transpond on Mode A/C.

AIRPROX REPORT NO 41/03

Date/Time:	26 Apr 2119 (Saturday) NIGHT	
Position:	5107N 0211E (7nm ESE KONAN)	
Airspace:	AWY/CTA G1	(Class: A)
Reporter:	LACC S15-21T	
	First Aircraft	*Second Aircraft*
Type:	B747-100	PA34
Operator:	CAT	Civ Comm
Alt/FL:	↓FL60	FL100
Weather	IMC KLWD	VMC CLAC
Visibility:	NK	>10km
Reported Separation:	400ft V 2nm H	200ft V 2nm H
Recorded Separation:	200ft V 2·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LACC S15-17T (OFFGOING MENTOR CONTROLLER) reports that prior to bandboxing S15-17 with S18-21, the B747 (which entered the sector above FL250) was originally coordinated out of the sector with Brussels at FL110 owing to opposite direction traffic, the subject PA34, which was co-ordinated in at FL100. Later the B747 was subsequently re-coordinated at FL60 into Ostend Approach, the trainee cleared it to FL80 and the mentor did not correct the trainee against the inbound PA34. The sector was then bandboxed and the traffic situation was handed over; the B747 was descending through FL220 at the time.

THE LACC S15-21T CONTROLLER reports that having just bandboxed S18-21 with S15-17 the radar was set up to view these sectors. The B747 was already descending to FL80 through westbound PA34 traffic at FL100 but he had not noticed this during the handover. He then told his student to descend the B747 further to FL60 and transfer it to Ostend Approach at which time the PA34 was outside of his radar picture within Brussels airspace.

THE B747 PILOT reports inbound to Ostend from the USA at 250kt descending to FL60 in cloud in IMC and in receipt of an ATS service from Ostend APPROACH. London Control had issued descent clearance to FL60, prior to transfer, which was stated as their cleared level on initial contact with Ostend. A few moments later, the controller told them to turn immediately and they saw traffic on TCAS at FL100 ahead, on their projected track. The AP was disconnected and a R turn was commenced, during which a TA alert was received whilst they levelled at FL105. The other traffic was not seen visually but indicated on TCAS passing 2nm clear to their L and 400ft below and after clearing the traffic they returned onto their original course. The incident was discussed with the Ostend Approach controller and the LACC Supervisor after landing who apprised them of the incident details.

THE PA34 PILOT reports heading 280° at 160kt and FL100 inbound to Gatwick and in receipt of a RCS from London. The visibility was >10km, 2000ft above cloud, in VMC and his nav and anti-collision lights were switched on; TCAS was not fitted. Approaching KONAN he noticed another ac, the subject B747, in his 11 o'clock about 10km away, above and it appeared to be descending. The ac was watched as it passed about 2nm clear on his LH side and 200ft above, no TI was passed nor any mention made by ATC until he changed frequency. He believed that there had been no

risk of collision but standard separation had not been provided during the encounter.

ATSI reports that the incident occurred about 18min after the commencement of the night shift and shortly after sectors 15-21 were bandboxed together. Prior to this, sectors 15-17 (Dover) and 18-21 (Worthing) were split, with both Tactical positions being operated with a trainee and a mentor. The B747 en route from Newark to Ostend and the PA34 inbound to Gatwick from Luxembourg were under the control of the Dover Sector.

The Dover (DVR) Sector mentor described the workload as 'low to moderate' prior to handing over the position. The Worthing (WOR) Sector mentor reported his workload as 'low to medium'. Both controllers commented that it is standard practice to bandbox these sectors as soon as practical after the commencement of the night shift, in order to release sufficient resources to accommodate the requisite operational relief breaks.

Both controllers explained that they were conversant with their respective trainee's performance, having been involved with their previous training, although, in the case of the DVR mentor, she had only monitored her trainee on a couple of occasions. Both trainees were reported to be making good progress although their experience levels were different. The DVR Sector trainee was relatively inexperienced having completed only about 50 hours training, whereas the trainee operating when the sectors were bandboxed had a total of 180-200 hours training. However, the latter, although in position on the combined sector, was only designated as a trainee on the WOR Sector. He had not carried out a Swanwick Validity Course for the DVR Sector. His mentor explained that it is an individual mentor's decision whether to monitor a trainee on a sector for which he had not been allocated and of which, consequently, he had little or no experience. He added that he would expect that the trainee would act only as his 'mouthpiece' for the sector he was not familiar with.

When the controllers arrived for the night duty they took over the DVR and WOR Sectors respectively. Both sectors were in position on the same 'banana' and because each of the incoming controllers had a trainee, this resulted in 8 people being present at the workstation. The DVR sector mentor said that, in view of the restricted space, she stood behind her trainee. The WOR Sector mentor reported that he sat behind his trainee initially, moving to his R after the bandboxing of the sectors had taken place.

The B747 established communication with the DVR Sector at 2108, reporting passing FL295, descending to FL250 and routeing direct to KOKSY (KOK). The trainee instructed the flight to fly a heading of 105°, to separate it from other flights outbound through Dover (DVR), prior to issuing it with descent into Ostend. At the time, the B747's Exit Flight Level (XFL) i.e. the level at which the ac was offered/co-ordinated out of the sector, was FL110 but, subsequently, following a request from Brussels ACC to the sector Planner, this was amended to FL60, with transfer direct to Ostend. The ac's Paper Flight Strip (PFS) was annotated accordingly, in green ink, by the Planner and was pointed out to the Tactical Controller but no reference was made by him of the potential confliction with the PA34.

After the PA34 made its initial, and only, call on the frequency at 2111 prior to the incident, reporting at KOK at FL100, the trainee passed its routeing as DVR, LARCK for Gatwick. Shortly thereafter, the trainee instructed the B747 to descend to FL80 initially, with the intention of ensuring that the flight would remain within the CAS of the Worthing Control Area, where the base is FL75, before issuing further descent to FL60 as appropriate. This instruction did not take the PA34, opposite direction at FL100, into account. The mentor commented that she had heard her trainee issue the descent instruction to the B747 but could not explain why she had not realised the potential confliction with the PA34. She could only surmise that, initially, she had dismissed any possibility of a confliction as the B747 was accepted out at FL110 and the PA34 in at FL100. The change to the B747's level had, inexplicably, not registered as a problem at the time. She commented that descent was issued when the ac were some distance apart, radar recordings show the distance between the subject ac was 69nm at the time. Additionally, as the PFS for the two ac were produced for different designators they were, consequently, not positioned in the same Paper Flight Strip Board (PFSB), thereby reducing the possibility of noting the confliction from that display. At 2114, the

WOR Sector accepted control of the DVR Sector. The off-going Tactical Controller explained that she allowed her trainee to carry out the handover to the receiving sector's trainee, believing that the full traffic situation was handed over, including the details of the subject ac. She recollected observing that the B747 was passing about FL220 at the time of the handover.

The WOR Sector mentor stated that, prior to accepting bandboxing with the DVR Sector, he had set up the radar display to cover the combined sectors. He was aware that the off-going trainee was carrying out the handover of the DVR Sector to his trainee but admitted that it is not his policy to listen to the handover in such circumstances. He explained that he preferred to familiarise himself with the traffic situation by observation of the PFSB and the radar display, reasoning that the handing-over mentor would be listening to the handover and correcting any errors or omissions, made by her trainee. From previous experience, this is not a standard method of operation during a handover. The MATS Part 1, Section 8, Chapter 1, Page 2, states that, despite the responsibility for the accuracy of the hand-over remaining with the person vacating an operational position: *"Controllers taking-over should be alert to the possibility of errors and omissions in the information being provided and must verify the data transferred to them by a thorough check of the radar display, flight progress strips and any other relevant information. Only when they are completely satisfied that they have a total awareness of the situation, should they indicate to the controller handing-over that they are ready to accept responsibility for the operational position"*. The WOR Tactical Controller confirmed that he was aware of the presence of the subject ac but could not explain why he had not realised the potential confliction. He commented that he did not realise that the PA34 had established communication with the sector. However, the related PFS shows a tick had been annotated alongside its SSR Code, a recognised method of indicating that communication had been established. He added that he would not have expected an ac on that routeing to call so early. The DVR Controller had made the same comment during her interview. However, the LACC Manual of Air Traffic Services (MATS) Part 2, Page Dvr-18, states that the Transfer of Communication, for ac routeing westbound on Airway G1 at FL245-, is *"At or after passing KOK"* and Transfer of Control is *"KONAN"*. His trainee commented in his report that he had not been advised of the confliction between the B747 and the PA34. Bandboxing of the sectors took place at 2114. The 'slave' recording of the position reveals that, at 2115:08, a window, used to amend the radar background, was displayed. This showed as a large rectangular box, positioned to the east side of the radar display, covering the KONAN to KOK area i.e. over the top of the PA34's SSR label. This box disappeared some 8sec later. The mentor thought that this might explain why the confliction was not apparent from the radar display when, during this period, the trainee, not prompted by his mentor but of his own volition, instructed the B747 to resume its own navigation to KOK and to contact Ostend Approach. No acknowledgement of this call was received from the pilot. The mentor was aware that, in accordance with its XFL, the flight needed to be given descent to FL60 before transfer to Ostend took place. Consequently, he prompted his trainee to instruct the B747 to descend to FL60. This instruction was passed to its pilot at 2115:49. The radar shows that when this descent clearance was issued, the subject ac were on reciprocal tracks, 27nm apart, with the B747 passing FL161. The flight was then told to resume its own navigation direct to KOK and transferred to Ostend Approach. The mentor said that he still had not realised the confliction between the two ac and he, and his trainee, then turned their attention to the busy traffic situation in the WOR section of the combined sectors. He said that he first became aware that the subject ac were in confliction when he noticed the Brussels ACC direct-line ringing. He automatically looked towards the KONAN area on his radar display and noticed that the Short Term Conflict Alert (STCA) was activating between the B747 and the PA34. He did not take any action because he believed that, not only had the former been transferred but also that the latter had still not established communication with the sector. In any case, by this time, they were passing abeam each other. Radar recordings of the position reveal that STCA activated at 2118:03. At this time, LTCC recordings reveal that the subject ac were 6·2nm apart, with the B747 500ft above the PA34. The two flights subsequently passed at 2118:40 2·1nm apart horizontally to the E of KONAN, by which time the B747 was 200ft higher than the PA34. As KONAN is situated on the boundary of UK/Belgium

Airspace, this resulted in the incident occurring in Belgian Airspace. It is understood that Ostend Approach issued an avoiding action turn to the B747.

It is unfortunate that neither the off-going DVR Sector Planner, nor the Planner for the bandboxed DVR/WOR Sectors, were able to alert their respective Tactical Controllers to the potential confliction between the subject ac. The LACC MATS Part 2, Page Mops-4, states that: *"The Planner will support the Tactical by:- Routinely scanning radar for potential conflicts- Considering Tactical workload-Monitoring RTF when workload permits"*. However, the DVR Planner did comply with the procedure in respect of the B747's change to its XFL. This is stated in the LACC MATS Part 2, Page Gen-20, under the heading of *"Exit Flight Level Revisions after Co-ordination has been achieved with an Adjacent Sector/Centre"* i.e. *"Any revisions to the Exit Flight Level coordination are to be written on the appropriate Tactical's PFS and the Tactical is to be made aware of the revision"*.

Although it may have provided a distraction by hiding the SSR label of the PA34 at a critical time, the display of the radar background window was not considered to be a fundamental issue in this occurrence. However, if a window is showing on the radar display, it hides any ac returns that may be positioned underneath it. This means that if STCA activates in such an area, it will not display on the radar screen. The only indication that STCA has activated is by means of an Alert Indicator, located at the right hand side of the Main Display border. This turns to a steady orange colour on activation of STCA within the displayed range of the radar display. Both controllers commented that, in their opinion, this Alert Indicator box did not provide an acceptable alert. Not only did it illuminate an estimated 80% of the time during normal operations but also if the Tactical Controller was sitting or standing to one side of the radar display e.g. whilst monitoring a trainee, it was not necessarily in line of sight. There is a similar method of indicating when an emergency code appears. Although it is realised that the activation of STCA did not correspond, on this occasion, with the display of a large window, it does not preclude such an event happening in future. The suppression of any safety net, which might otherwise alert a controller to a potential confliction, may well prevent or delay the possibility of appropriate and timely remedial action being taken. Consequently, a recommendation, to address this situation, is made below.

ATSI RECOMMENDATIONS

It is recommended that NATS Management review the activation process of STCA on the Tactical Controller position at LACC. Not only should this consider the appropriateness and positioning of the 'Alert Indicator' but also investigate the possibility of the 'flashing SSR labels', associated with STCA activation, being able to show through any displayed window on the radar display. If this is discovered not to be feasible, it is suggested that a system similar to that in use at LTCC be considered. This unit's equipment displays information on the ac concerned i.e. their callsigns and respective levels, in a box at the edge of the screen, this being in addition to their actual SSR labels flashing.

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.

Members commended ATSI for their detailed report which had clearly set out the chain of events that led to the Airprox. Initially the subject ac were separated, the B747 co-ordinated out of the Sector at FL110 and the PA34 co-ordinated in at FL100. However, after the S15-18P DVR had amended the B747's XFL to FL60 and after the PA34 had called on frequency, the S15-18T trainee had issued descent clearance to the B747 to FL80. This did not take the PA34 into account and although the S15-18T DVR Mentor had been aware of the PA34's presence, she had allowed her trainee to issue the descent instruction to the B747, which was a part cause of the Airprox. Following on, neither the offgoing S15-18T DVR Mentor nor the accepting S19-21T WOR Mentor, nor both trainees, noticed the developing confliction during the handover carried out to bandbox both Sectors. Members expressed grave concern over the conduct of handover,

which was certainly inadequate, with a few members believing it to be 'unprofessional', and contrary to MATS Part1. All agreed that the way in which the handover was conducted was a second part cause of the Airprox. The accepting S19-21T WOR Mentor had, by his own admission, not listened to the trainee-to-trainee exchange, and he had subsequently not realised the confliction even though the appropriate PFSs were in the PFSB and both ac were visible on the radar display. Whether the S15-18P DVR or later the S15-21P DVR/WOR should have noticed the confliction was discussed but their support to the Tactical controllers was always subject to workload and in addition to the Planner completing his primary coordination tasks. Also debated was the apparent haste to 'bandbox' the Sector, very soon after a shift/Watch change, which seemed to be regarded as 'standard practice'. Member controllers were cognisant of the need to comply with ATCOs' regulation of hours but bandboxing would normally only take place after agreement with the Local Area Supervisor and Traffic Manager using the TLPD (Traffic Load Prediction Device).

As the confliction continued to develop it went unnoticed to the S15-21 DVR/WOR team until alerted to it by a Brussels ACC telephone call and then STCA activation. By that stage, the B747 had been transferred to Ostend and the S15-21T believed, erroneously, that the PA34 was not on his frequency, and that it was apparently too late to take action as the ac were already passing abeam each other. The B747 crew were issued an avoiding turn by the Ostend APR, who had noticed the confliction, whilst TCAS indicated the conflicting PA34 ahead and gave a TA to the B747 crew as they levelled at FL105. Although not sighted visually, the B747 crew monitored the PA34's passage on the TCAS display which indicated it passed 2nm clear to their L and 400ft below. For his part the PA34 pilot had seen the approaching descending B747 10km ahead and watched it pass 2nm to his L and 200ft above. Although these elements were singularly untidy, when combined they were enough to persuade the Board that safety had been assured during the encounter.

Although not a fundamental issue in this Airprox, members endorsed the ATSI recommendation to NATS to review STCA activation at LACC, an extremely useful 'safety net' tool to controllers.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

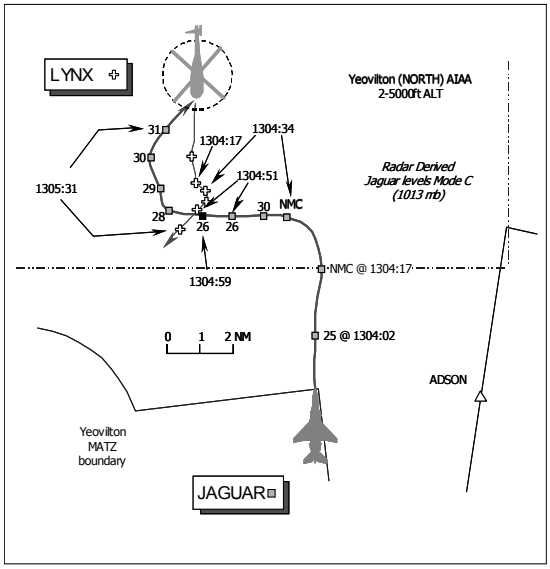
a. The S15-18T DVR Mentor allowed her trainee to descend the B747 through the level occupied by the PA34.

b. The developing conflict went undetected during a handover that was both inadequate and contrary to MATS Part 1.

Degree of Risk: C

AIRPROX REPORT NO 42/03

Date/Time:	1 May 1305	
Position:	5108N 0229W (10nm NE of Yeovilton - elev 75ft)	
Airspace:	Yeovilton AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Lynx HMA Mk8	Jaguar GR3A
Operator:	RN	HQ STC
Alt/FL:	2200ft-2300ft↑ (RPS 1009mb)	2300ft AGL (Rad Alt)
Weather	VMC CLBC	VMC NR
Visibility:	25km	>30 km
Reported Separation:	50ft H, 100ftV	>40m H, 300ftV
Recorded Separation:	Contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX HMA MK8 PILOT, a QHI who was instructing a type qualified student, provided a very comprehensive account, reporting that he was conducting instrument flying (IF) training, at the base of and within the eastern portion of the Yeovilton (NORTH) AIAA, also known locally as 'IF Area 2' some 700ft below cloud. The PF under instruction occupied the right-hand seat (RHS) wearing a standard RN issue IF 'Hood'; as the PNF and ac Captain, he occupied the left-hand seat (LHS) of the dual fitted ac and was also acting as the 'safety pilot'. His helicopter has a grey camouflage scheme and no HISL is fitted, but the red anti-collision light was on. They were in receipt of a RIS from YEOVIL RADAR (VLN RAD) on 262·925MHz and squawking their assigned code of A0251; neither Mode C nor any form of CWS is fitted.

They were about to execute a recognised IF training manoeuvre of a climbing co-ordinated 180° turn at 120kt IAS, turning L from S onto N and climbing from 2000ft to 3000ft Portland RPS (1009mb). He cleared the area to the L of and above his helicopter before instructing the RHS PF to commence the manoeuvre. The L turn was commenced and the PF had turned the Lynx through about 15-20° and climbed 200 – 300ft when RADAR broadcast traffic information pertaining to a Jaguar. He then saw the Jaguar at about the 09:30–10 o'clock position ½nm away flying in the direction of Wells TV Mast (ie westerley) closing directly towards and slightly above his helicopter. From the LHS he applied forward pressure to his cyclic to arrest their climb whilst warning the RHS student PF about the proximity of the jet. The RHS pilot's immediate actions were to level the ac and stop the turn followed by a gentle descending R turn after the Jaguar had passed. The jet passed 50ft ahead of and 100ft above his helicopter with a *"medium – high"* risk of a collision. The RHS PF then removed his IF Blind, located the Jaguar, levelled the Lynx at 2000ft and turned onto W to follow the flightpath of the jet. An Airprox was subsequently reported to ATC after landing.

THE JAGUAR GR3A PILOT reports his single-seat jet has a grey camouflage scheme, but the HISL was on. He was operating in a block from 2000ft agl to FL100, VFR, carrying out general handling under a RIS from Boscombe RADAR (BDN RAD) and flew about 10nm east and then north of Yeovilton aerodrome. As he was about to turn L from his northerly heading onto 270° at 420kt, RADAR passed traffic information on a contact 4nm NW, but with no height information. The airspace was relatively busy so the planned turn onto west was continued whilst he looked for the reported ac. Traffic information was updated

by RADAR when the contact was 2nm NW heading S, again with no height information. About 10sec later at 2300ft Rad Alt, whilst searching for the reported traffic, he spotted a Lynx ½nm away at 1 o'clock and slightly below his ac. Although it was a late sighting, he was able to assess immediately that he would pass above the Lynx, therefore, he took no instinctive avoiding action as he crossed about 40m ahead of the helicopter and 300ft above it with a *"medium"* risk of a collision. He added that the late sighting might possibly have been because the helicopter had been hidden behind the canopy frame.

MIL ATC OPS reports that the Yeovilton tape transcripts were found to be 17sec behind those of the radar recording and Boscombe's 1min 29sec ahead, therefore all times have been adjusted to coincide with those of the radar recording [UTC].

The Lynx departed Merryfield [Yeovilton's satellite aerodrome for general flying practice] at 1251:55, to operate in the IF training areas within the Yeovilton NORTH AIAA [2-5000 ft amsl]. The flight was assigned a squawk of A0251 [NMC fitted], identified and placed under a RIS by VLN RAD, who instructed the crew to *"…manoeuvre 2000 to 5000 feet…"*. Unrelated traffic was called to the Lynx crew and then at 1304:49, traffic information was passed on the Jaguar - *"…east 1 mile westbound no height"* to which the Lynx pilot responded, at 1304:57, *"thank you good call that was a Jaguar just flew across the top of us about 100ft"* adding *"…that needs an Airprox"*.

The Jaguar pilot was operating with BDN RAD under a RIS but traffic information was limited from all around due to radar clutter. Traffic information was passed several times on unrelated traffic and later the Jaguar pilot was warned of his proximity to CAS. At 1301:01 the Jaguar pilot reported *"…descending to 2000ft above ground, but still up to FL50"* and BDN RAD reaffirmed that he was responsible for his own terrain clearance; the pilot confirmed he was visual with the ground. BDN RAD commenced a series of traffic information calls at 1302:23, before the RIS was limited from below, because of the base of radar cover. Following calls about unrelated traffic at 1304:17, BDN RAD passed traffic information to the Jaguar pilot about the Lynx for the first time, *"..traffic north-west, 4 miles, tracking south, no height information".* Again at 1304:34, the Lynx was called *"…traffic in your…north-west, 2 miles, tracking south, no height"*. The Jaguar pilot acknowledged all these calls. BDN RAD continued to pass traffic information on various tracks until the ac recovered at 1317:13. The Jaguar pilot made no mention of an Airprox on the frequency.

[UKAB Note (1): Analysis of the Clee Hill Radar recording shows the Jaguar manoeuvring at 1300:23, in the vicinity of ADSON with the Lynx 12nm NNE of Yeovilton. The Jaguar takes up a northerly course just inside the eastern boundary of the Yeovilton MATZ, passing just behind another track at 1304:10. At the time traffic information is passed to the Jaguar pilot for the first time at 1304:17, the Lynx [NMC fitted] is shown southbound - 4½nm NW of the Jaguar. The Jaguar commences a L turn, towards the helicopter shortly thereafter at 1304:30, whence traffic information followed 5 sec later to the Jaguar pilot as the Lynx tracks SSE'ly, but which at this small scale may be the result of track 'jitter'. At 1304:51, moments after the Lynx crew was given traffic information by VLN RAD about the unknown jet, the helicopter is slightly R of the Jaguar's nose at a range of 1·1nm crossing R – L. At this point secondary and primary contact is lost on the helicopter and does not reappear again for another 30sec. Meanwhile the Jaguar continues westbound maintaining 2600ft Mode C (1013mb) equating to 2480ft RPS (1009mb) over another sweep; the Airprox probably occurs at about 1304:59, before the jet is shown climbing through 2800ft Mode C – 2680ft RPS and turned R northbound. Yeovilton ATC also provided photographs of their MSSR recording, which was the same picture displayed to VLN RAD at the time of the Airprox. These show the Lynx and Jaguar contacts merging with the Jaguar indicating 2500ft Mode C (1013mb) – 2380ft RPS.]

It is evident that BDN RAD was working hard to keep all his ac appraised of the traffic situation in a busy piece of airspace. The tape transcripts reveal that the Lynx was called twice to the Jaguar pilot by BDN RAD, both calls were in good time and acknowledged by the pilot.

The Lynx was operating in the eastern portion of the Yeovilton NORTH AIAA and VLN RAD was operating from the LARS position, with both the LARS VHF ICF and the IF control function

'bandboxed', onto the one position. During the 90sec period before the Airprox the controller was attempting to negotiate the transfer of a Navajo to Exeter ATC. Though working 2 frequencies, traffic levels were moderate and reported by Yeovilton as well within the controller's capabilities, however the conversations with Exeter and the Navajo did increased his workload to high at the time of the Airprox. Moreover, the potential threat posed by the Jaguar was not immediately evident, as the two ac were on parallel tracks some 3nm apart and therefore not actually in direct confliction. The VLN RAD Controller had been aware of the Jaguar operating in the Yeovilton area (a common occurrence), however he believed it was operating in the MAS. The turn towards the Lynx was spotted and, despite SSR not showing at that time, he elected to pass traffic information. The oncoming controller [the position was just about to be handed over] also reported that he had only seen the Jaguar's contact at the same time it was called, and thus had not observed the rapidly developing situation in time to alert the VLN RAD Controller. Undoubtedly, the passing of traffic information to the Lynx crew earlier would have been desirable, however, given the distraction of the complex handover to Exeter, the rapidly changing scenario and the SSR drop out, the late call is understandable.

It is evident that both controllers applied the RIS as accurately as they could though VLN RAD's call was later than desirable. Nevertheless, it did give the Lynx pilot a chance to sight the Jaguar. It is surprising however, that having been given 2 accurate traffic information calls by BDN RAD the Jaguar pilot elected to turn towards the confliction rather than away from it.

THE LYNX PILOT'S STATION comments that the IF profile flown by the subject Lynx is a standard sortie conducted daily by helicopters from Yeovilton with as many as 4 helicopters operating simultaneously in the AIAA to the North of Yeovilton. Due to the PF operating under an IF hood and thus restricted in visual lookout, these sorties are conducted in the promulgated AIAA and such flights always operate under a radar service from Yeovilton ATC. Although the AIAA is indeed Class G airspace and pilots transiting through the Area usually request an ATS from Yeovilton, here the Jaguar pilot who had been previously operating above it, elected to descend and operate within the AIAA. Immediately traffic information was issued to the Lynx pilot at 1nm, he visually acquired the Jaguar flying towards him, at the same level, and subsequently arrested his ac's climb to increase separation; because of the late sighting there was little else he could do.

In order to reduce further incidents of this kind, it is proposed that an MoU between Boscombe and Yeovilton be established detailing procedures by which Boscombe ATC would be required to positively identify to the Yeovilton Radar Supervisor, any aircraft under their control that wish to operate in the Yeovilton AIAA.

THE JAGUAR PILOT'S UNIT comments that in this encounter in VMC in Class G airspace, where 'see and avoid' is the guiding principle, neither a grey Lynx with red HISL, nor a grey Jaguar with white HISL, is particularly conspicuous or easy to acquire visually. Both high workload tasks implied reduced lookout, the Jaguar pilot saw the Lynx at a late stage and without taking any action passed in front of the helicopter by what he judged to be 300ft vertically.

The ac were both operating in the Yeovilton AIAA, where the acquisition of a radar service from ATC is sensible airmanship but the Jaguar was at the very base of Boscombe Down's radar cover. The Jaguar pilot may not have absorbed fully the implications of this limitation of cover in a very busy piece of airspace. This was, therefore, neither a particularly suitable place for the Jaguar to operate nor an appropriate unit to provide the ATS. If the Jaguar pilot had sought a radar service from Yeovilton he might well have been directed to a more suitable area for his sortie [fuel considerations permitting]. The lack of SSR Mode C on the Lynx is probably a marginal factor in this particular incident.

We shall continue to pursue actively a real time link between Yeovilton and Boscombe Down to allow the exchange of SSR data, which might just have prevented this incident. Liaison between Yeovilton and Boscombe Down remains an important issue to ensure that both units extract the best possible use out of the available airspace in the safest possible manner.

MOD DPA DIRECTORATE OF FLYING comments that there is little to add to the comprehensive comment and subsequent actions

by the station in respect of this Airprox. Of note is the intensity of the traffic in the Boscombe Down/ Yeovilton area, evident from the tape transcripts, during the period of the Airprox.

CINCFLEET comments that, whilst accepting the principle of "see and avoid" in Glass G airspace, this Airprox occurred in a promulgated AIAA. Instrument flying sorties from Yeovilton and Boscombe Down trials ac profiles both demand high cockpit workload and would similarly demand that the best possible use is made of available ATC services and radar cover in this highly dynamic area. The Lynx pilot did all that he could to ensure that his ac and the conduct of his sortie were safe.

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, and reports from the appropriate ATC and operating authorities.

The Lynx crew was conducting their IF training flight in an AIAA, where the likelihood of encountering other traffic was high, but where see and avoid was the overriding methodology for separating ac in the FIR. Sensibly, the pilots of the two ac involved here were receiving a radar service from their own respective ATSUs, although members realised that one of these units was better able to provide a comprehensive ATS than the other in this AIAA. The 'solid' radar cover provided by the Yeovilton SRE in the AIAA enabled that unit to provide the best radar service here. It followed, therefore, that it was eminently sensible for pilots transiting through, or operating in this area for any length of time, to obtain a service from VLN RAD. Doing so would also enable traffic to be co-ordinated and separated if warranted, thereby minimising disruption of either pilot's tasks, or if not feasible to go somewhere else. As it was, the Jaguar pilot chose to operate under a RIS from BDN RAD who at the altitude concerned could only provide a 'limited' radar service and only give altitude information about the Lynx if co-ordination with VLN RAD was effected. Thus the Board was pleased to learn that an MoU had been concluded between the respective ATSUs about mutual operations. Nevertheless, BDN RAD had passed traffic information about the helicopter twice and pilot members were surprised that the Jaguar pilot had turned toward the Lynx after the first traffic information had warned him of the presence of the helicopter in that direction at a range of 4nm. Perhaps the lack of altitude information promoted the decision but notwithstanding any check by him of the airspace in which he was about to fly, pilot members noted that as the turn continued he went increasingly more 'belly-up' toward the reported traffic, which he had not spotted beforehand in the good visibility that pertained. Then having turned and been given further traffic information, the jet pilot closed from a range of 2nm still without spotting the helicopter until it was eventually seen ½nm away – just over 4sec flying time. From the Jaguar pilot's description of events he had continued towards the reported traffic, unsighted, before his searching disclosed the helicopter at a late stage, leaving the Board to agree unanimously that this Airprox had resulted because the Jaguar pilot had turned into conflict with the Lynx.

Turning to risk, the Lynx crew had been warned by VLN RAD at a very late stage for the reasons cited and thus the safety pilot had little time to spot the jet approaching from the E, head-on, with little relative motion to draw attention to it. It was fortunate, therefore, that he saw it ½nm away, which enabled him to initiate the only form of avoiding action open to him - but it was only just in time nonetheless. Though the Yeovilton Watchman recording showed the contacts merged, without Mode C from the helicopter it was not feasible to determine the vertical separation and thus whether the Lynx pilot's action had materially altered the situation. There was a significant difference of opinion between the two pilots about the vertical separation that pertained; the Lynx QHI opined 100ft whereas the Jaguar pilot had cited 300ft, but the latter had reported that he was able to assess immediately that he would pass above the Lynx. Nonetheless, both pilots reported that a risk of a collision had existed. The Board agreed, therefore, that whilst the Lynx QHI might just have done enough to avert a collision, the safety of the ac involved had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Jaguar pilot turned into conflict with the Lynx.

Degree of Risk: B.

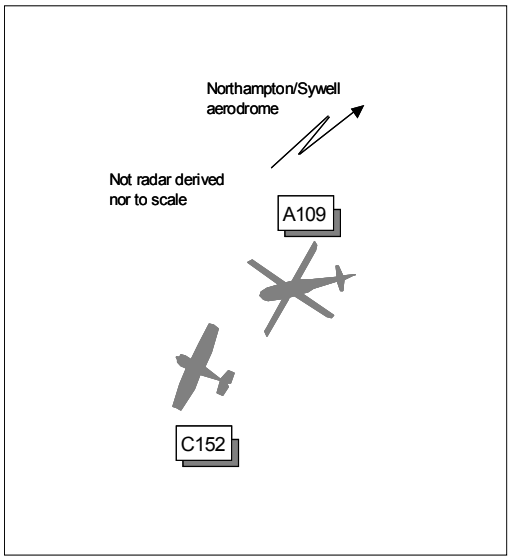
Contributory Factors: The Jaguar pilot:

a. Turned toward the Lynx after traffic information warned him of the presence of the helicopter, without sighting it beforehand.

b. Was not in contact with the most appropriate ATSU for providing a service through the AIAA.

AIRPROX REPORT NO 43/03

Date/Time:	30 Apr 0855	
Position:	5218N 0050W (1·5nm WSW Sywell - elev 429 ft)	
Airspace:	ATZ	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C152	A109
Operator:	Civ Trg	Civ Comm
Alt/FL:	600-700ft↑ (QFE 989mb)	1000ft (QNH 1004mb)
Weather	VMC CLBC	VMC CLNC
Visibility:	>10km	>10km
Reported Separation:	50-100ft V	150-200ft V 100m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying an instructional cct training sortie on RW21 RH from Northampton/Sywell and in communication with Sywell INFORMATION on 122·7MHz. The visibility was >10km 2000ft below cloud in VMC, the ac was coloured white/red and his strobe lights were switched on. After completing 4 ccts, the student climbed straight ahead to 500ft and completed a R turn onto heading 300° onto the crosswind leg at 65kt. Climbing through 600-700ft QFE, he noticed a movement (to his R) out of the corner of his eye (seated in the RH seat) and on looking down saw a helicopter, a blue Agusta, passing very close underneath, estimated at 50-100ft separation, from R to L. It was so close that at no time could he see the whole helicopter, only part of the rotor disc and fuselage. No avoiding action was taken as there had been no time to react, they were already established in a climb on the crosswind leg and the helicopter was already passing underneath. He assessed the risk of collision as very high.

THE A109 PILOT reports on departure from Sywell at 140kt to a private site near Cheltenham and in communication with Sywell INFORMATION on 122·7MHz. The visibility was >10km in VMC, the helicopter was coloured blue on top and cream underneath and his strobe lights were switched on. His intention was to cross the

RW03 threshold and pass underneath the D/W leg of the visual cct at 1000ft QNH (600ft QFE) on an initial track of 270°. He levelled off manually and then 'looked in' to select Alt and Hdg hold but as he looked up, he saw a red/white Cessna in his 10 o'clock about 500m away 150-200ft above. There was no time to react but he did not feel that a collision was a possibility. The Cessna passed from L to R, about 150-200ft above and 100m ahead when in his 12 o'clock position. His planned track should have taken him beneath ac in the D/W leg but he subsequently understood that the Cessna was still climbing crosswind which would account for the poor height separation. There was a strong southwesterly wind which may have allowed the Cessna to commence its crosswind R turn (at 500ft) earlier than usual and hence into conflict, however the reporting pilot later stated that his track had been in the normal place. Although he had operated from Sywell for 11 years and was familiar with the local rules, he agreed that in future he would aim for a point under the D/W leg abeam the RW midpoint.

UKAB Note (1): The UK AIP at AD2-EGBK-1-1 and 1-2 promulgates Northampton/Sywell ATZ as a circle 2nm radius centred on longest notified runway 03/21 position 521819N 0004734W to 2000ft above aerodrome elevation of 429ft and active in summer from 0800-1800 or Sunset and by arrangement. The AFIS or A/G is promulgated as operating on 122·7MHz within the above hours.

UKAB Note (2): The Airprox is not seen on recorded radar. At 0853:20 a primary only return is seen 1·5nm SW of Sywell tracking W, believed to be the A109. Approx 16sec later another primary only return pops up, 1nm ESE of the A109, tracking WNW believed to be the C152.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members wondered why the Agusta pilot had gone 'heads in', to select his A/P on, at a critical time. His safe departure from Sywell through the visual cct should have been his first priority, maintaining a good look out for joining/leaving and established cct traffic whilst listening out on the RT frequency for cct calls to build on and improve his situational awareness of the traffic situation. For whatever reason, it appears that the A109 pilot had not assimilated the C152's position from RT transmissions nor seen it getting airborne into the cct. In electing to depart the cct on a westerly track, the Agusta pilot had flown into conflict with the C152 and this had caused the Airprox.

The C152 pilot had only seen the helicopter, immediately prior to it passing beneath his ac, understandably, as it was approaching obliquely from behind. He was still climbing crosswind with no time to react, as the A109 passed an estimated 50-100ft below. After levelling at 1000ft QNH (about 600ft QFE), the A109 pilot saw the Cessna (post 'heads-in') in his 10 o'clock range 500m about 150-200ft above. Although he had no time to react, he assessed that the ac were not going to collide and watched the C152 cross ahead 150-200ft. However, the Board agreed that the A109 pilot had flown in such close proximity to the C152, during his departure, that the safety of both ac had not been assured.

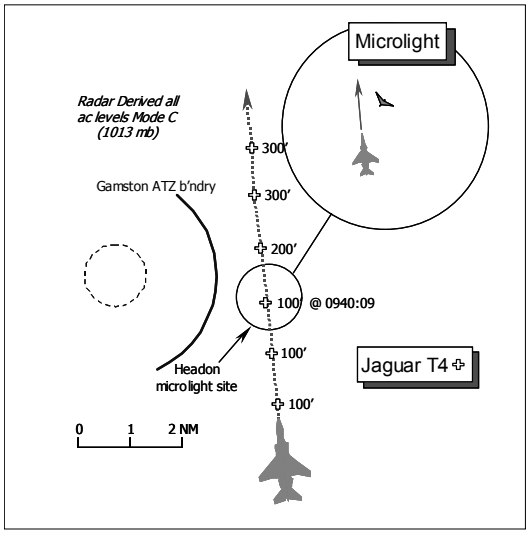
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A109 pilot flew into conflict with the C152.

Degree of Risk: B

AIRPROX REPORT NO 44/03

Date/Time:	7 May 0940	
Position:	5317N 0052W (Headon)	
Airspace:	UKDLFS/FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Jaguar T4	Microlight
Operator:	HQ STC	Civ Pte
Alt/FL:	300ft (Rad Alt)	500ft agl
Weather	VMC Sky Clear	NK CLOC
Visibility:	35km	>10km
Reported Separation:	250ft H/200ft V	200ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JAGUAR T4 PILOT reports that he was the rear seat handling pilot in a Jaguar T4 flying as a singleton on a low level sortie in LFA11, that was part of a 'Competent to Instruct' (C to I) check. His ac has a grey camouflage scheme, the HISL was on and a squawk of A7001 selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Approaching a position about 3nm E of Retford/ Gamston aerodrome, heading 358°(M) at 455kt, flying straight and level at 300ft agl, a small powered microlight was spotted late at 1 o'clock about ½nm away from behind the canopy arch. The microlight was heading SW as they crossed left to right about 250ft in front and about 200ft below it. His front seat PNF did not see it and there was insufficient time available to afford greater separation. He did not consider the risk of a collision to have been high, but the flight path of both ac was far closer than ideal and probably greatly alarmed the microlight pilot. With hindsight, if it had been a collision risk then he believed it would have been seen inside the canopy arch earlier and he would have given it a wider berth.

THE MICROLIGHT PILOT reports some 2 months after the Airprox, that his ac has a white & blue colour scheme and the 'strobe' was on whilst descending S of the field to join the Headon microlight site Cct at 50kt for RW23. Whilst descending through a height of 500ft in a L turn through 180°, a military jet was spotted about 1nm away heading N. He then stopped the L turn and turned R to avoid the jet. As they turned through 200º, the Jaguar passed slightly to port and 200ft below his microlight with a *"high"* risk of a collision.

UKAB Note (1): This Airprox is not illustrated at all on recorded radar and the diagram illustrates the encounter from the reporting pilot's perspective. Only the Jaguar is shown on the Great Dun Fell radar transiting through the area as reported. The T4's Mode C indicates 100ft (1013mb) as the jet approaches Headon microlight site from the S. The Jaguar is shown 'on top' Headon at 0940:09, indicating 100ft Mode C (1013mb); Met Office archive data gives an actual QNH for the area of 1024mb thus the Jaguar was flying at an equivalent altitude of about 430ft, before opening to the N in a gentle climb. The microlight is not evident at all.

UKAB Note (2): Though both pilots agree on the vertical disposition of each ac and the relative vertical separation that pertained, the differing perceptions of the horizontal geometry of this encounter cannot be resolved – the Jaguar PF reports the microlight passed to starboard, whereas the microlight pilot reports the jet passed

to port and he turned R to avoid it. The microlight pilot reaffirmed his view of the encounter when questioned, that the Jaguar passed to port. He also advised that he was instructing a student at the time and his student also saw the jet. The student's attention was first drawn to the jet by its shadow, but he also saw it pass to port and below. No other microlights were circuiting at Headon at the time of the Airprox.

THE JAGUAR T4 PILOT'S STATION comments that this Airprox highlights the difficulties of 'spotting' slow moving ac particularly, as here, the microlight was behind the canopy frame. Headon microlight sight is listed within the UK Mil AIP Vol 3 Pt 1 (UKLFS) at 1-2-11-8 as a warning only and a NOTAM may be issued when activity is planned, but as with all warnings, activity could be expected at any time. This Station has no record of the site being NOTAM'd on the date of the Airprox, thus in this case, the site was not 'infringed'. However, given that it is located in a known choke point, [there is no specified Low Flying System (LFS) 'flow' in this location] it would have been sensible for its activity to have been notified. Any supplementary information that helps to advertise airborne activity at any location can only be in the interests of flight safety.

UKAB Note (3): HQ STC Ops Spt LF confirmed that no Y series NOTAMs were issued warning of any notified activity at Headon microlight site. This facility is available to microlight pilots through the Low Flying Booking Cell at LATCC(Mil) on Freefone 0800 515544. Any activity so notified will be afforded warning status to all military pilots, though a minimum of 4 hours notice is generally required.

HQ STC comments that the problem of canopy frames (plus G-meters, HUD frames and HUD symbology) obstructing forward views is a known problem. The canopy arch t is there to protect the pilot from high-speed bird impact, can so very easily lead to the late detection of a conflict. The fact that, in this case, there was no collision risk because the microlight was going away could have so easily been the other way. The message is clear for all fast jet aircrew to look behind, and around, all blind-spots in the cockpit, in order to get and maintain the visual of other traffic as soon as possible.

Aside from, this we believe that the plethora of microlight sites on the 1:500,000 UK LFC, which are rarely active with microlight flying, leads the user to treat them as low priority within a busy area of airspace. It is of note that Headon Microlight Site does not appear on the CAA 1:500,000 chart (Edn 29). The fitment of TCAS or a CWS would not have benefited this incident due to a lack of transponder in this, and almost every other, microlight ac (due to weight constraints). Therefore for all Class 'G' airspace users the 'Y' Series NOTAM provides the best means for warning of potential conflict, especially with microlights without transponders, and would have done so in this case.

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.

The Board noted that the microlight pilot had not been able to render his report until over 2 months after the event, which was unfortunate; as a rule the sooner that reports can be filed the better. Here, there was a difference of opinion between the two reports that did not correspond – the Jaguar pilot said he passed to the W of the microlight, but the microlight pilot believed the Jaguar passed to the E. It was impossible to reconcile the differing perceptions without recorded radar data that showed both ac clearly. This was not available and the Board realised that the radar signature of a microlight ac is very small and it was not surprising that it was not shown. Members noted the Jaguar pilot's station's sage comments regarding general notification of activities, but also observed that Headon microlight site is depicted on the LFC and consideration might also have been given to avoiding direct overflight at the flight planning stage.

The microlight pilot had apparently spotted the jet about 1nm away as it approached Headon from the S and turned away from it; members recognised that the microlight pilot had the ability to alter his ac's direction very rapidly, but the resultant vector of his ac out of the way of the Jaguar at a speed of 50kt would have been very little, compared to the jet's 455kt. Here, both

pilots were legitimately going about their respective tasks and the reporting Jaguar PF had seen the microlight, leading the Board to conclude that this Airprox had resulted from a conflict in the LFS/FIR.

Irrespective of the relative positions as they passed, both pilots agreed that the jet was 200ft below the microlight at the closest point. This was fortunate and some members thought that the microlight pilot would have been poorly placed if avoiding action had been necessary in the vertical plane, which, coupled with the slow speed of the machine, suggested to them that safety was compromised. However, a significant majority of members agreed that although the Jaguar pilot had observed that he had passed closer than 'ideal', the microlight had been seen in sufficient time at a range of ½nm and would probably have been detected earlier if it had been a more direct hazard. This coupled with the vertical separation, convinced the Board there had been no risk of a collision in the circumstances reported here, but it was not a unanimous decision.

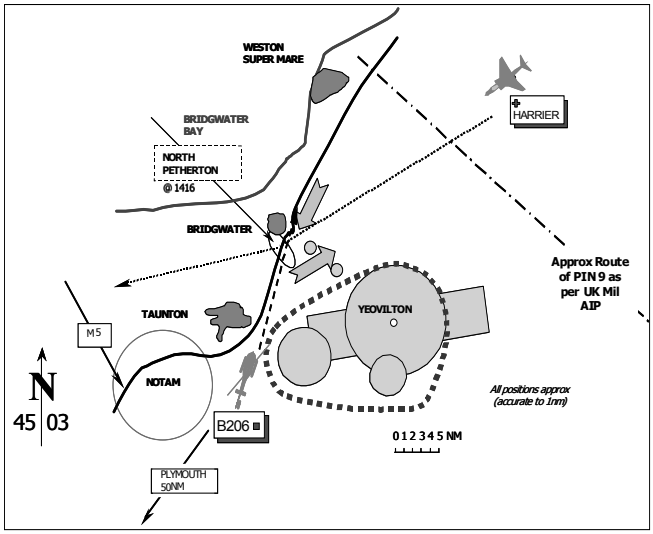
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in the LFS/FIR.

Degree of Risk: C.

AIRPROX REPORT NO 45/03

Date/Time:	8 May 1415	
Position:	5106N 0258W	(Nr Bridgwater)
Airspace:	UKLFS LFA 2	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	JetRanger	Harrier GR7
Operator:	Civ Comm	HQ STC
Alt/FL:	400ft	300ft agl
	(RPS 1017 mb)	(Rad Alt)
Weather	Good VMC	Good VMC
Visibility:	30nm	40vkm
Reported Separation:		
	100ft V 0 H	750ft V 0·75nm H
Recorded Separation:		
	N/A	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JETRANGER PILOT reports that he was flying a black and silver ac with the HISLs, anti-col beacons and landing lamps selected on, conducting a pipeline inspection sortie, from Plymouth to Filton, in good VMC. He was squawking 0036C *(Pipe/Power-line inspection flights)* but he was not in receipt of an ATC service. A PIN was notified for the sortie *(See UKAB Note 1).* He was heading NNE at 110 kt and 400ft agl following the M5 Motorway when he received a traffic report on the TCAS. He looked down at the screen to obtain the position of the traffic and changed scale to 2-mile. The visual indication was at 11 o'clock, and then jumped to 2 o'clock and back to about 12 o'clock. He was aware of this problem with the ac and both crew were scanning between 10 and 2 o'clock. The TCAS gave the height as minus 400ft, so they thought that the report was an intermittent one from an ac on the ground. The last report on the 2-mile scale showed the ac to be 200ft below them but due to insufficient time no avoiding action was taken. He saw the tail only of a jet through the footwell screen passing underneath

them very quickly but he thought that neither ac had seen each other so the risk of collision was very high.

THE HARRIER GR7 PILOT reports flying as singleton on a Hi-Lo-Hi OCU tactical sortie into LFA2. He was in receipt of a limited RIS from Yeovilton and was squawking 7001C. While heading 240° at 420kt and 300ft agl (radalt) he saw a white helicopter in his left 1030 at about 1½-2nm range. It appeared to be following the motorway Northbound at about 1000ft agl. He assessed that he would pass well in front and below it by about 0·75nm and 750ft and elected to update his nav computer. He delayed his intended turn until he was well clear of the helicopter and assessed the risk of collision as nil.

UKAB Note (1): On 8 May 03 PIN 9 (Southampton - Weston-Super-Mare - Liverpool) and A2 (Devon) were notified as active 11-1830Z. The reported position of the Airprox is over 15nm from the notified route of PIN 9 in the UK Mil AIP Part 1-7-4 and lies directly between Plymouth and Weston-Super-Mare. It was later confirmed by the ac operator that the JetRanger was not engaged on a pipeline inspection at the time of the Airprox but was positioning to start one at Weston-Super-Mare.

MIL ATC OPS reports that a Harrier called Yeovil APP, on handover from LJAO descending to FL100 with the intention of going low-level near Wells. The ac was placed under a RIS and instructed to descend to 3000ft the Portland RPS of 1018mb. At 1413:10 the Harrier pilot reported *"…… entering low-level"*, APP acknowledged this and instructed the pilot to *"…… squawk 7000, good day"* to which he responded *"……many thanks, good day"* and departed en route. Yeovilton LARS controller reported that the JetRanger freecalled Yeovil LARS at approximately 1420 to report an Airprox with a light grey Harrier just to the SE of Bridgwater. The JetRanger stated that he was at 500ft agl and the Harrier flew about 100ft below the nose with no lateral separation. No service was being provided to the JetRanger at the time of the incident.

UKAB Note (2): The Harrier can be seen on the radar replay squawking 7001 at 1400ft descending at 1413:58 and continues to paint until 1414:20 when it fades. There is no evidence of a 0036C squawk in the area for the duration of the replay.

HC STC COMMENTS that there appears to be significant differences between the heights perceived by the two pilots. The Harrier pilot was always comfortable that there was a significant vertical and lateral separation between the 2 ac, and delayed his turn to maintain that safe separation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The main focus of the Board's discussion centred on the apparent discrepancy in the Harrier pilot's and the JetRanger pilot's estimation of the miss-distance. Members noted that the Harrier pilot did not state that he had maintained visual contact with the JetRanger throughout, but that he *estimated* that he would pass well clear and then commenced other tasks. They felt that if the Harrier pilot had maintained visual contact he would have stated this in his report and that this incident might have been avoided. They were informed by the Civil Helicopter specialist who was familiar with the JetRanger, that if the fast jet was seen through the footwell window as reported, and the helicopter was at 4-500ft, then by simple geometry, the fast jet must have passed very close. (Calculated by UKAB as being between 70m if the JetRanger was at 500ft and 30m if it was at 400ft)

The apparent anomaly in the Harrier pilot's estimate of the height of the helicopter might be explained by the relative *altitudes* of the 2ac; the JetRanger was at 4/500ft over 400ft (downward sloping) terrain while the Harrier was at 300ft over level terrain at sea level, giving an apparent height difference of about 600ft when first sighted by the pilot.

The Board also considered the possibility that the Harrier pilot had seen and avoided another helicopter. They were informed by a member with considerable experience of the area concerned

that it was very busy with both civil and military helicopters so the possibility was well founded. They accepted that the traced Harrier *was* the ac involved and that its pilot had, for whatever reason, flown very close to the JetRanger, perhaps because he had been concentrating on updating his navigation equipment rather than looking out or perhaps because he had indeed noted another helicopter which also was not painting on the radar recording and had not seen the JetRanger. From the information presented, it was not possible to determine which of these 2 situations applied.

Azimuth unreliability of Skywatch is a well-known phenomenon and should not have been a surprise to the JetRanger pilot; however, it did alert him to the presence of another ac in the forward sector and prompt him to increase his lookout. The receipt of a LARS would have further improved his situational awareness and members recommended that while positioning for pipeline inspections pilots should, where feasible, ask for one; in this case communication with Yeovilton would have been useful. Further, flying at 4-500ft and squawking the pipeline/power line inspection code was considered by the Board specialists to be inappropriate while positioning for, rather than conducting, an inspection.

The Board noted that this incident took place in an area where there is a flow system stipulated in the Mil AIP (with which the Harrier pilot was complying) and this is annotated on the military low flying charts but not, similarly annotated on the CAA 1.250000 and 1.500000 Aeronautical Charts. HQ STC considered that annotating these charts would increase safety by alerting civil pilots operating at low level to areas of high military traffic density, particularly at choke points. In this case, the JetRanger planned to fly at 500ft directly opposing the military low-level flow, albeit probably without any knowledge of its existence. It was explained that 2 previous UKAB recommendations on flow arrows, together with one from the AAIB and a request from a pipeline inspection operator had all been turned down by the CAA.

In summary, although HQ STC did not agree, a majority of Board Members concluded that the proximity of the 2 ac was such that their safety had not been assured.

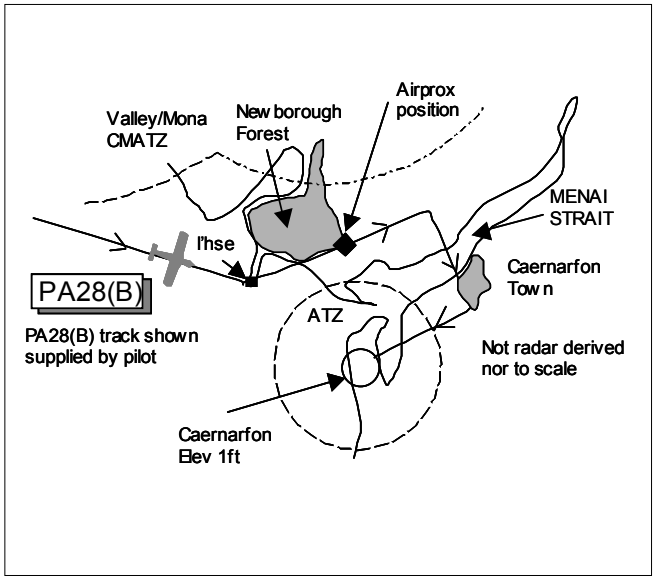
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Harrier pilot flew close enough to the JetRanger to cause concern to its pilot who did not see the Harrier until it passed below his helicopter.

Degree of Risk: B

AIRPROX REPORT NO 47/03

Date/Time:	5 May 1505	
Position:	5309N 0422W (3nm NNW of Caernarfon Airfield - elev 1ft)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	PA28(A)	PA28(B)
Operator:	Civ Trg	Civ Pte
Alt/FL:	2000ft↓ (QNH 1009mb)	1600-1700ft↓ (QFE 1009mb)
Weather	VMC CAVOK	VMC CAVOK
Visibility:	50km	NK
Reported Separation:	nil V 5m H	nil V 10m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28(A) PILOT reports flying a dual instructional training sortie from Caernarfon and he was in communication with Caernarfon RADIO on 122·25MHz squawking 7000 with NMC. The visibility was 50km in CAVOK, the ac was coloured red/white and the anti-collision and strobe lights were switched on. Near to Newborough Forest, Anglesey (3nm NNW of Caernarfon) turning R from heading 270° in a descent from 2000ft QNH 1009mb at 90kt, he heard another pilot report downwind (RW26 RH cct height 800ft) which he assimilated in his situational awareness picture as being >2nm to his S and 1200ft below in the ATZ. Despite maintaining a good lookout, he was therefore surprised to see another ac just R of his 12 o'clock, the subject PA28(B), about 5m away at the same level. An emergency turn to the L was executed, the other PA28 passing 5m clear to his R with nil vertical separation. He assessed the risk of collision as 'very severe'. After landing, he spoke to the pilot who was unfamiliar with the airfield but had not elected to join overhead.

THE PA28(B) PILOT reports flying inbound to Caernarfon from Ireland and he was in communication with Caernarfon RADIO on 122·25MHz squawking 7000 with Mode C. The weather was CAVOK and the ac was coloured white/grey/red with anti-collision and strobe lights switched on. Having been unable to establish RT contact with London INFORMATION during his crossing of the Irish Sea, he had contacted Caernarfon RADIO 20nm from the coast (Valley RADAR were closed). After receiving the RW information and sighting the airfield, he turned to orientate the ac for the visual cct and landing for RW26 RH – his VFR flight guide stated join below 1300ft. He had landed at Caernarfon the previous day and was using local landmarks (Menai Strait and Caernarfon Town NE of A/D) to facilitate this. Whilst maintaining a lookout for other ac in the cct and descending through 1600-1700 ft QFE to cct height at 100kt, he saw another ac slightly to the starboard of his nose about 300m away on an intercept path. He executed a slight deviation to port, as did the opposing ac, which was seen to pass 10m clear to his R at about the same level. He assessed the risk of collision as medium/high. After landing he spoke to the instructor of PA28(A) who had briefed him on his apparent error in calling downwind when not at cct height or within the ATZ. In reality, he was in the correct position relative to the RW but should not have reported 'downwind' until at cct height; he did call 'base leg' albeit a bit far out (over the town). The instructor also suggested joining overhead in future in view of his unfamiliarity with the airfield. His incorrect call was unfortunate but he thought that it did not absolve anyone from their responsibilities to

maintain a good lookout; he had not seen the other ac and they had not seen his ac until it was almost too late (300m is little time given opposite direction closing speeds of 100kt). As this incident had worried him, he discussed it with another flying instructor at his base airfield and undertook a refresher flight 4 days later on A/D joining procedures and associated RT calls.

UKAB Note (1): The UK AIP at AD2-EGCK-1-3 Para 2.22 Flight Procedures states:

(a) The aerodrome is in the vicinity of the Valley MATZ. Civil aircraft are to fly at 1500ft or below (Holyhead QNH) in the Menai Straits area.

(d) Circuit height; 800ft aal. Aircraft joining overhead are to join the circuit at 1300ft aal. Circuit direction: Runways 02 & 26 - RH.

Para (d) was amended 7 Aug 03 to: *Circuit height 800ft aal. Aircraft are requested to join overhead not above 1300ft aal. Circuit direction: Runways 02 & 26 – RH.*

UKAB Note (2): The Airprox occurred outside recorded radar coverage.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available was only the reports from the pilots of both ac.

Members commended the PA28(B) pilot for undertaking refresher flying post incident. It was agreed that the RT call 'downwind' made by PA28(B) pilot had been misleading and that positioning to join overhead the airfield would have been a better option to allow safe integration into the visual cct. However, these two elements did not absolve both pilots from maintaining a good lookout for conflicting traffic (see and avoid). The PA28(A) was general handling to the N of the ATZ, the PA28(B) joining the cct from the NW and, although the weather and visibility were both excellent, both pilots only saw each other at an extremely late stage which had caused this Airprox.

Although the PA28(A) pilot's first sighting distance was thought to be underestimated, he had executed an avoiding action L turn, watching the other PA28 pass 5m clear to his R at the same level. PA28(B) pilot had seen PA28(A) 300m ahead and turned slightly L as (B) also turned L, estimating separation as 10m at the same level. Nevertheless, both pilots agreed that they had passed abeam of each other by a very small distance - that members thought was dangerously close - which left most wondering whether the late turning actions taken by both pilots had been effective in preventing collision or if they had missed more by chance. On the balance of probability, the Board concluded that there had been an actual risk of collision.

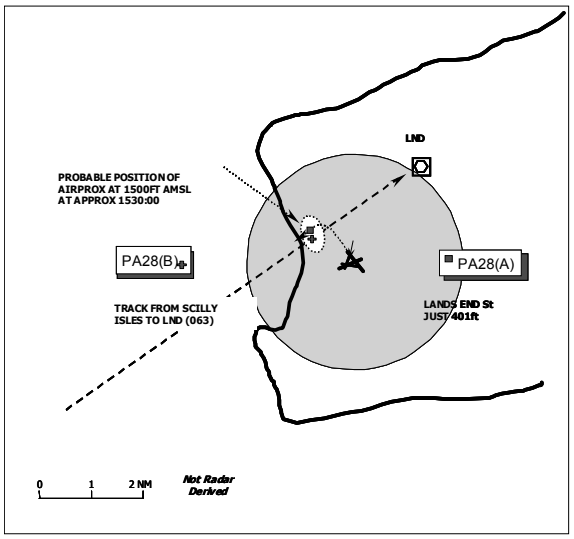
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Extremely late sightings by both pilots.

Degree of Risk: A

AIRPROX REPORT NO 48/03

Date/Time:	5 May 1530	
Position:	5006N 0540W Lands End St Just	
Airspace:	(Lands End ATZ)	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	PA28-140	PA28-161
Operator:	Civ Training	Private
Alt/FL:	1000ft (QFE 998 mb)	1500ft (QNH)
Weather	VMC Below Cloud	VMC
Visibility:	+ 10km	+ 10km
Reported Separation:	100m H 20/50ft V	N/K
Recorded Separation:	N/A	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28-140 PILOT (PA28 (A)) reports that following 50min of dual instruction he was flying solo within Lands End ATZ. He was the only ac in the circuit and was on his 2nd of 3 circuits practising glide approaches heading 260° at 100kt and 1000ft agl on a QFE of 998mb. On the crosswind leg of the circuit for 35LH he carried out a visual scan for traffic in preparation for turning, first looking left to right and back to left before commencing a left turn on to the downwind leg. Immediately on commencing the turn he became visual with PA28 (B) passing down his left side in the opposite direction. The ac was sighted in his 10 o'clock position approximately 100m horizontally and less than 50ft below him. He immediately rolled out of the turn remaining visual with the ac passing down his left side. After it had passed he recommenced the left turn onto the downwind leg. He was aware that Lands End ATC were in contact with the ac and they saw it at the same time as he did and informed the pilot of PA 28(B) that he was passing through the ATZ. In a previous transmission the other pilot had been asked if he was remaining clear of the ATZ to which he replied in the affirmative saying he was tracking towards the LND VOR and would pass N of the ATZ.

While PA28 (A) pilot was in visual contact with the other ac it appeared to remain on course taking no avoiding action and did not at any time state that he was visual.

THE PA28-161 PILOT (PA28 (B)) reports that the co-owners of the ac filed a VFR flight plan for a flight from Compton Abbas (Dorset) to St Mary's, Isle of Scilly. On the morning of the flight he called St Mary's ATC who gave them the reporting points for the inbound leg and then he confirmed that he would be using GPS to report distances. The outbound leg was flown without incident.

At St Mary's he was told that a flight plan was not obligatory for the return so he did not file one. They departed St Mary's at approximately 1510 and were cleared to transit the corridor at 1500ft. They reported at the points requested and at the 2nd point (18nm to go to LND) they contacted Lands End and were told to report at LND. Subsequently the Lands End Air Ground Operator (see note UKAB Note 1) asked him to avoid the Lands End ATZ but he already had Lands End in sight and was probably already in the ATZ at that point. As he reported LND the Air Ground Operator pointed out that he had entered the ATZ and he apologised. At no point did they see PA28 (A).

UKAB Note (1) In the UK AIP Lands End ATS (Summer) is notified as TWR (ATZ) Mon –Sat 0800-1700. Therefore it was Lands End TWR

who instructed him to remain clear of the ATZ. See also the ATCO's report.

Careful analysis post the request to submit an Airprox report and further study of the current Southern England 1:500,000 chart and the AFE Visual Flight Guide diagram of the Lands End Transit Corridor confirms that the track followed took them about 1nm inside the Lands End ATZ. He now accepts that a more prudent course may have been to climb to above 2400 ft thus passing over the ATZ (as on the outward flight) or to divert left to cross the North Cornwall coast at LND 280º 3nm, which would have taken him clear of the ATZ, and then to proceed to LND.

LANDS END ATCO reports that at 15:27 the PA28 (A) was lining up RWY 35 for left hand circuits and the pilot was passed TI on an eastbound PA28 at 2000ft QNH 1014. At 1527:20 PA28 (B) pilot reported 8DME W of LND and was passed TI on the circuit ac and on a C152 on the N coast; the pilot was told to report passing LND. At 1527:59 the PA28 (A) pilot was cleared for take off on RWY 35, QFE 998. Shortly after PA28 (B) pilot called descending to 1500ft on the QNH to remain VMC. At 1529:35 the pilot of PA28 (B) was asked to confirm that he was remaining N of the ATZ to which he responded affirm. At 1530:03 PA28 (B) was seen S of PA28 (A), which was on the crosswind leg about to turn downwind when the reported pilot was informed by ATC that he had 'cut up circuit traffic'.

The weather was reported as 32014kt 40km SCT016 09/06 QNH 1014 with significant glare off the sea looking W from tower position. The airfield elevation is 401ft.

UKAB Note (2): Neither ac was seen on the radar recording. Since neither the Controller nor the pilot of PA28 (B) reported the miss-distance, only the reporting pilot's estimate of 100m horizontally and 20/50ft vertically is available.

ATSI reports that there were no ATC implications apparent in this Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of reports from the pilots of both ac and a report from the air traffic controller involved.

Members considered the infringement of the Lands End ATZ by PA28(B) was the major factor of significance leading to this incident. The pilot's decision not to file a flight plan on the return leg was not considered by the Board to have contributed to the incident. They did however, think that he may have either been uncertain as to whether or not he had clearance through the zone and direct to the LND until it was too late to avoid it either laterally or vertically or, a more likely scenario was that he had become preoccupied with his GPS navigation and simply not considered the significance of the ATZ. If he was faced with any doubt as to his clearance, Members agreed that a more prudent course of action would have been to question ATC; however, had he planned to avoid the Zone to the N in the first instance this incident would not have occurred. It was unfortunate that PA28(B) was transiting at 1500ft which was almost the same altitude as the circuit height at 1000ft QFE, and thus bringing it into conflict with the other PA28.

The pilot of PA28(A), despite being in the circuit pattern within the ATZ, by virtue of his good lookout had seen the opposing ac, rolled away from it and, although separation had been closer than was comfortable, his action had prevented any risk of collision. Members considered however, that since the pilot of PA28(B) had not seen the other ac, that safety had not been assured.

Despite PA28(B) pilot stating in his report that a more prudent course of action would have been to climb to 2400ft above the zone, Members believed that, since he had already had to descend to 1500ft to remain VMC, this may not have been possible to accomplish (while remaining VMC) in the prevailing cloud conditions.

AIRPROX REPORT No 49/03

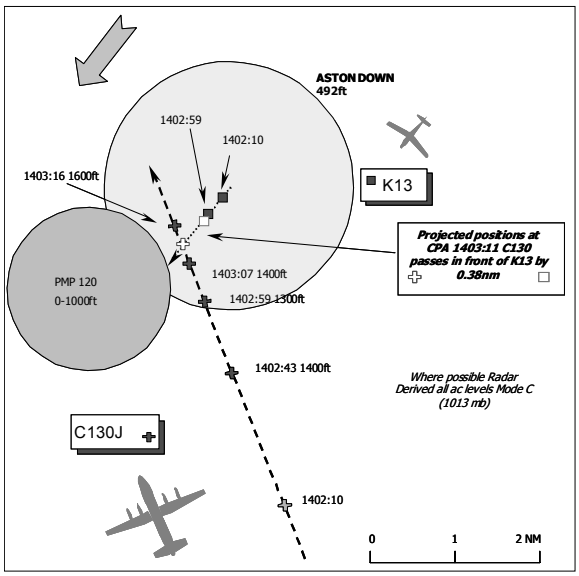
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: PA28(B) entered the Lands End ATZ without permission and flew into conflict with PA28(A) which he did not see.

Degree of Risk: B

AIRPROX REPORT NO 49/03

Date/Time:	9 May 1403	
Position:	5143 N 00208 W (Aston Down Airfield)	
Airspace:	Glider Site	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	K13 Glider	C130
Operator:	N/K	HQ STC
Alt/FL:	1750ft agl	1000ft
	(N/K)	(QNH 1018 mb)
Weather	VMC	VMC
Visibility:	20km	30km
Reported Separation:		
	150m H 250ft V	1nm H 0 V
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GLIDER PILOT reports heading SW at 45kt just after completion of a winch launch. At the point of the cable releasing he checked his height which showed 1750ft QFE. He then put the white glider into the normal flying attitude. As the nose came down he noticed the other ac 100/150m off on his left and approx 250ft below. At this point the C130 pilot seemed to notice the glider and turned left and continued at the same altitude of about 1500ft agl. He then checked to see if there were any other ac coming and, since there were not, he turned to the right to maintain visual contact. On landing, he was told that the instructor had noted the incident in the logbook.

THE C130 PILOT reports heading 340° at 220 kt when he inadvertently infringed the W edge of the Aston Down gliding zone as a result of a basic planning error. This was highlighted when a glider was spotted within the zone 2nm distant. By the time the error was discovered it was too late to avoid the zone, however the risk of collision was assessed as nil since the glider was visible throughout. The captain attempted to call the gliding club on return to base without success. They were finally contacted 5 days later and he apologised for the incident.

UKAB Note (1): The radar recording shows both ac intermittently, the C130 as 7001C squawk and the K13 as a primary contact almost from launch. Unfortunately, at the CPA neither ac are painting so their lateral positions have had to be extrapolated as depicted on the diagram. This shows a lateral CPA at 1403.11 of approx 0.38nm. It has not been possible to resolve the vertical displacement due to discrepancies between the reported and recorded altitudes of the ac. It must therefore be assumed that it is between 250ft and

0ft, the respective figures assessed by the 2 pilots.

UKAB Note (2): The Stn provided a detailed explanation of the planning error which was caused by lack of familiarity with the detailed modes of operation of new C130J model Tactical Mission Planning System. Since this statement was provided in confidence it has not been included.

UKAB Note (3): Aston Down is notified in the UK AIP ENR 5-5-1-1 as a Glider Launching Site (by winch/ground tow(W) and Tugac/motor glider up to 3000ft agl and in the UK Mil AIP Vol 3 P 1-2-2-5 as a Glider Site to be avoided by 1.5nm and 3000ft.

STATION comments this Airprox happened to one of the unit's most experienced low-level captains, who has been responsible for much of the development work on C130J in the low level role. He has been quite honest about the mistake and absorbed the lessons from it.

HQ STC comments that the C130J crew made a detailed and open analysis of what had caused them to infringe the Gliding Zone. They discovered that the route planned on the mission-planning computer on the ground, was adapted by the ac FMS computer in the air to give a different flightpath. The lessons on handling the differences in the computer systems have been learnt and disseminated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted only of a radar recording, reports from the pilots of both ac, and the C130 operating authority.

The Board accepted that the C130J pilots (there is no Navigator in a C130J) introduced a route planning error, caused by their unfamiliarity with a new mission planning system, when the mission data was entered into the ac's FMS computer. As a result of this error the C130 crew entered the area to be avoided round the Aston Down glider site at 1000ft agl contrary to the directive in the UK Mil AIP at 1-1-8 sub para m, despite believing that their planned track would take them clear of it to the W. Notwithstanding the error, the Board believed that normal routine navigation monitoring should have exposed their mistake earlier thereby allowing them to avoid the area.

The ground launching party would probably not have seen the C130 early enough to stop the launch since it approached from the S and would have been about 4nm distant when the launch was commenced at about 1402.

The board concluded that the C130 captain believed he would miss the glider by 1nm and therefore that there was no collision risk. However, he would not have known that at that time the glider had just released the cable, which would not yet have been wound in, and that his ac was well below cable top height.

The Board commended the C130 captain for his full and honest reporting of this error, which facilitated accurate investigation and allowed the incident to be publicised throughout the C130J fleet.

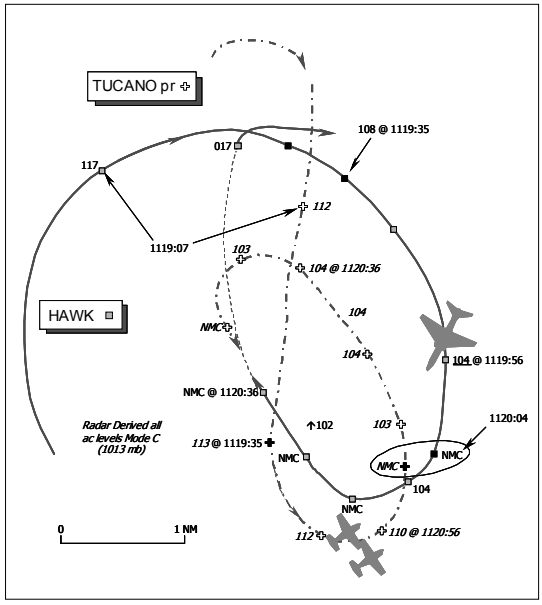
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unintentional penetration of a Glider Site published in the Mil AIP as a location to be avoided, by the C130J crew, who flew it into conflict with the K13 glider.

Degree of Risk: C

AIRPROX REPORT NO 50/03

Date/Time:	12 May 1120	
Position:	5406N 0032W (2½nm NW of Cottam)	
Airspace:	Vale of York AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk	Tucano Pr
Operator:	HQ STC	HQ PTC
Alt/FL:	12500ft (N/K)	10000ft (RPS 1005mb)
Weather	VMC CLBL	VMC CLOC
Visibility:	"Good"	20km+
Reported Separation:	¼nm H, 1-200ft V	½ nm H, 500ft V
Recorded Separation:	0·25nm H. <600ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports he was operating as a singleton on a Forward Air Controller's training sortie (FACEX) taking place at a position 54°08'N 000°26'W - which had been NOTAM'd to other airspace users. A squawk of A7000 was selected with Mode C but neither TCAS nor any other form of CWS is fitted. He was flying at about FL120-130, in VMC, visual with the ground – in a clearing in layered Cu, which extended to FL120 – but the broken cloud cover was compounding his task over the exercise area. Though not in receipt of any form of ATS, he had checked in with JACKPOT CONTROL who was monitoring 340·35Mhz. This medium level run necessitated identifying ground features whilst communicating with a FAC on the ground on 358·85MHz. Whilst orbiting in a L turn he thought [it was actually a continuous R turn] through SW at 250kt he spotted 2 Tucanos about ¼nm away that appeared to be belly up to him. The two turbo-props passed close by, 1-200ft above his jet in close formation, within ¼nm of his Hawk. No avoiding action was taken because he had not spotted them until the risk of collision had receded. The medium level run was terminated and he descended to low level. He was unable to assess the risk because of the late sighting.

THE TUCANO T1 PILOT reports he was leading a pair of Tucanos – coloured black with yellow flashes - both crewed by a QFI instructing a student. They were operating as a two ac formation under agreed Vale of York airspace arrangements on a discreet frequency in VMC with an in flight visibility of 20km+. A squawk of A4577 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted. Whilst manoeuvring at 180kt in a large clear gap between towering CU at a position about 5nm NE of Malton, he thought, with both students handling their respective ac, a flat R turn was established at about 10000ft RPS (1005mb) north and west of a location NOTAM'd for the FACEX. Both he and his student in the lead ac then saw a Hawk, that they had previously seen earlier in the sortie, about 3nm away. They tracked the jet as it flew a large orbit towards and then behind and below his formation, passing ½ nm astern and 500ft below them at the closest point. The R turn [in all probability it was a left turn at this point] was continued as the best avoidance manoeuvre but there was no risk of a collision, as visual contact was maintained until the Hawk passed, clear, in their 6 o'clock. It was reacquired as it descended down to low level toward the surface.

[UKAB Note (1): The British Isles Daily Navigational Warning Summary (BDNWS) for this day promulgated the FACEX at AB5408 – for the period 08-1600 UTC located at 5408N 00026W of radius 5nm from 250-2000ft agl with an associated telephone number. The NOTAM issued by AIS Heathrow (H2221/03) amplified that this was a Forward Air Control exercise, wherein a Hawk ac would conduct high energy manoeuvres and be unable to comply with the 'Rules of the Air' within 5nm of 54°08N 000°26W between 250-2000ft agl. Non-participating crews were requested to contact JACKPOT CONTROL 340·35MHz. It was noted that ac may also operate outside the notified area and up to 15000ft amsl and 3 telephone numbers were specified.]

[UKAB Note (2): The Great Dun Fell radar recording shows both the reporting and reported ac manoeuvring within a range of 6nm of each other for a period of about 8min before the Airprox occurred. The Tucano pr is shown [as only one contact] entering the vicinity from the W at 1111:32 and conducting left and right hand turns between FL110-125 until rolling out of a R hand turn onto a southerly course at 1119:07, indicating FL112 Mode C. Meanwhile the Hawk maintains a continuous right-hand orbit of about 1¾-2nm radius for the same period between FL115-125, turning through ENE for the 4th time at 1119:07, indicating FL117 some 1·6nm W of the Tucano in the latter's 3 o'clock. The Tucano pair commenced a tight L turn at 1119:35, indicating FL113 as the Hawk passes 2¼nm astern some 500ft below the pair - this might well be the encounter reported by the Tucano leader but not in the position he states. Possibly unseen by the Hawk pilot at this stage, he might not have spotted the pair at close quarters to the SSE until after 1120 as he turned through SW, whence the pair would have been belly-up to the jet pilot, as reported, as the Tucanos turned L descending from FL110 and passed from L-R through the Hawk's 12 o'clock. Though NMC is shown at 1120:04, the Hawk is shown at FL104 before and after the 'merge'; the lead Tucano is shown indicating FL103 at the next sweep at a range of 0·25nm, which is when the Hawk pilot probably first spotted them. Evidently, vertical separation was less than 600ft as the Tucanos passed above the Hawk. Given the disparity in the pilot's reported geometry and that evinced by the radar recording this would appear to be the encounter reported by the Hawk pilot, but some 5min later than he stated. The location of this encounter is some 3¾nm SW of the position given in the NOTAM. The Hawk's Mode C is not shown again and both primary and secondary contact is lost after 1120:36, for some 24sec whence the ac is shown at 1700ft Mode C after the ac had descended rapidly into the lower airspace.]

THE HAWK PILOT'S STATION COMMENTS that although the NOTAM had a top height of 2000ft amsl, amplifying notes warned that the Hawk would be operating at altitudes up to 15,000ft amsl. Contact telephone numbers for the Unit were published – both landline and mobile – and crews were advised to contact the exercise controller on a given frequency if intending to operate in the area. Despite this information being available, it appears that the Tucano crews elected to operate in the immediate vicinity of the NOTAM'd exercise area without making the appropriate RT calls. Thus separation relied solely on 'see & avoid', when it appears that cloud may have increased the workload and the Tucano manoeuvre may have decreased their lookout time. This coupled with an increased workload for the Hawk pilot probably led to the Airprox.

THE TUCANO PILOT'S STATION comments that the Tucano pair was operating outside of the notified exercise area in Class G airspace conducting a student syllabus sortie. The lead crew of the Tucano formation was visual throughout a period when the Hawk passed underneath the pair and assessed the risk of collision as nil. Unfortunately, it appears that the Hawk crew's lookout was reduced due to external tasking and they failed to spot the Tucano formation until at close quarters. This incident, whilst not unusual, highlights the need to maintain lookout scan even when operating during periods of high workload.

HQ STC comments that operating with a FAC is acknowledged to be one of the most demanding tasks that a single-seat pilot is called upon to perform. However, in training as in operations, the pilot's priority must be to continue to maintain a good lookout, and not become target fixated. While the Tucanos were aware of the adjacent NOTAM, which did give warning of the possibility of medium altitude activity, it was poor airmanship not to call on the published frequency and check what activity was in progress. All aviators should

use all the information available to them, and abide by the spirit, as well as the letter, of notices and warnings.

HQ PTC comments that it seems that the Tucanos had the Hawk in sight well before their encounter but that the latter was necessarily focused on his task so that he saw the Tucanos only at a much later stage. It would be easy to comment that they should have given him more room but with the NOTAM'd area to consider and towering Cu about, there wasn't much more clear air available. Moreover, a tightened turn would have risked losing the student wingman.

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 authorities.

Though the Hawk pilot's FACEX had been NOTAM'd members wondered why the Tucano crews had not either called JACKPOT to advise them of their presence or communicated by telephone beforehand. Other airspace users had been warned of the activity and it was explained that although no form of ATS nor separation could be the given by JACKPOT CONTROL, the FAC could have warned the Hawk pilot about the presence of the formation in the vicinity. Nevertheless, the NOTAM did not accord the Hawk exclusive use of this airspace in the 'Open FIR' for their exercise. It was merely a warning, not a prohibition to others. However, pilot members were concerned at the loose wording of this NOTAM. Use of the phrase *"may also operate outside the notified area and up to 15000ft amsl"* was too vague, giving an impression that it had been added almost as an afterthought. Members opined that if the Hawk's intended manoeuvres included operations up to 15000ft amsl then this should have been set out clearly, for the benefit of other airspace users.

The Board was briefed that the ac involved here had operated in the vicinity of each other for some time prior to the Airprox reported by the Hawk pilot and the acs' various gyrations shown on the radar recording were explained. The extensive cloud reported in the area probably accounted for the circling tracks, but in the 'see and avoid' environment of Class G airspace, irrespective of any NOTAM'd activity, the Board agreed this Airprox was fundamentally a 'lookout' issue. There were 5 occasions when the circular flightpaths of the Tucano pair and the Hawk crossed each other (between 1111:32 and 1120:04) and it was apparent from the geometry reported that the Tucano pilots' version of the close quarters situation occurred just before that reported by the Hawk pilot. Members agreed the event just before 1119:35, seemed to be the closest match to the Tucano leader's report. After his formation had completed a R turn to the N of the locus of the Hawk's orbit and had been southbound for a short while, the Hawk passed more than 2nm astern and 500ft below them. The Tucano leader said he maintained visual contact until, understandably, the jet passed 'clear' into their 6 o'clock but was not reacquired until it descended down to low level. The radar did illustrate this dive later, however, after the Hawk had passed into the formation's port quarter the Tucanos had, at 1119:35, commenced a L turn whilst descending slowly as the Hawk converged, maintaining its R turn. It appeared to the Board that the Tucano crews had not realised that the Hawk pilot had maintained this turn back towards them. They were thus blind to the jet as they turned L 'belly up' descending into conflict toward the Hawk below them that was unseen by all at this stage. The PTC member agreed this was probable, adding that the two QFIs would have been very busy with their 'patter' to their students in this intensive exercise and though they thought they had maintained keen situational awareness they had lost sight of the Hawk at the critical point. The argument was that if they had been aware of the rapidly approaching jet it seemed inconceivable that they would intentionally have flown so close. From the Hawk pilot's perspective, the pair was not spotted by him until they had passed through the nose of his turning jet and was flying away to starboard. From all of this members deduced that the Hawk pilot was effectively unsighted until after the conflict, which was a part cause to this Airprox. Similarly, the Tucano crews had not reacquired the jet until it was descending to low-level, which occurred directly after this 'cross-over', so again they had not seen the jet as they passed above it, which the Board agreed was the other part of the cause to this incident.

Turning to risk, it was unfortunate that the radar recording did not show clearly the levels of the ac as they crossed at 1120:04. Evidently they were closer than 600ft as the Tucanos descended down from FL110 to FL103 above the Hawk, probably still at FL104, suggesting that the vertical separation was of the same order reported by the Hawk pilot. Nevertheless, the jet was ¼nm distant at this point, which was judged to be just enough to prevent the situation from becoming more serious. Therefore, the Board agreed that whilst the possibility of an actual risk of a collision was small in the circumstances that pertained, safety had certainly been compromised to the extent that it was not assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tucano crews, and effectively, a non-sighting by the Hawk pilot.

Degree of Risk: B.

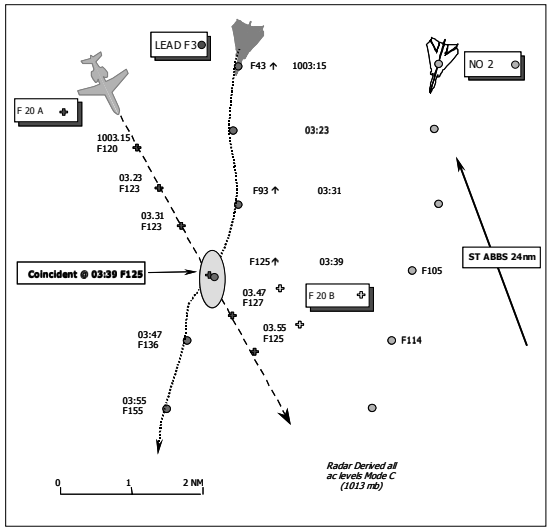
AIRPROX REPORT NO 51/03

Date/Time: 15 May 1004

Position: 5534 N 00155 W (24nm SSE St ABBS)

Airspace: Scottish FIR (Class: G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Falcon 20	Tornado F3
Operator:	Civ Comm	HQ STC
Alt/FL:	FL130	↑18000ft (RPS)
Weather	VMC Above Cloud	VMC Above Cloud
Visibility:	+10k	+10k
Reported Separation:	100ft V 100yd H	5 - 600ft H
Recorded Separation:	Contacts merged.	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FALCON 20 (A) PILOT reports flying in company with Falcon (B) and a BAC 1-11 performing an avionics trials sortie. The task involved flying a racetrack from 5 miles E of Edinburgh TMA, to a position 30 miles NE of Teesside. They had the white strobes and nav lights switched on, were squawking with Mode C and in receipt of a RIS from Scottish Mil. Falcon (B) pilot passed their sortie details on the OTA C operational frequency where Neatishead appeared to be giving broadcast control. On the run in question the sortie details were acknowledged by the leader of a formation of F3s, who were operating in the OTA, and he asked the Falcon leader to delay his run by 10min. The BAC 1-11 was unable to delay so the revised start times and ac levels were broadcast on the OTA C frequency but the F3 leader *[the leader of the other {defensive} pair of F3s]* stated that they were unable to avoid the area requested.

The run commenced at 0956 with Falcon (A) at FL130 and Falcon (B) at FL125, heading 140° at 270 kt, in a line abreast formation; Falcon (A) was to the W. Falcon (B) pilot achieved a visual sighting of a F3 approx 300ft below and 100 yd to the left of Falcon (A), however he was unable to call it in time. The pilot of Falcon (B) estimated that the F3 passed 100ft below (A) in a 15º nose up attitude. Falcon (A)'s crew heard the F3 before acquiring it visually and at that point the F3 was in

their 2:30 position, approx 200yd away, pulling up through their level in reheat.

Scottish Mil reported the F3 as pop up traffic 10sec after the event. On noting the position, time and details, he filed an Airprox with Scottish Mil.

THE TORNADO F3 PILOT reports that he was part of a 2-ship F3 formation working in OTA C as Offensive Counter Air (OCA) sweep for a pair of GR4s, with another pair of F3s opposing them as a Defensive Counter Air (DCA) fighter threat. They were in receipt of an Air Defence Information Service from Neatishead squawking with Mode C selected on. Whilst heading 180° at 450 kt and committing an attack against the other formation they started to climb rapidly from low level to approx 18000ft. As they passed 9-10000ft (subsequently amended in the written report submitted 4 months after the incident to 8000ft) the leader saw 2 Falcons in formation 4000ft above, which he assessed, would pass down his left side. He (Leader) manoeuvred his ac to the right to increase the lateral separation, passing 600ft to the W of the nearest ac (Falcon (A)) and his wingman passed 2000ft E of Falcon (B). Neither F3 crew considered that there had been a high risk of collision. Both crews were unaware of the Falcons' position prior to sighting, and were concentrating on targeting the other F3 formation, and the F3 leader was not aware that the Falcons had tried to deconflict with them since they had been operating on a different tactical frequency.

UKAB Note (1): An OTA (Operational Training Area) is defined only in Military Flying Regulations at 1G310.190 and has no standing other than for STC ac. It is the same class of airspace as that in which it is located, in this case Class G of the Scottish FIR.

UKAB Note (2) From the Neatishead transcript the controller passed TI on the Falcons to the OCA F3s at 1001:12 and at 1003:17 (corrected). The No 2 acknowledged the first call and the second reply was garbled.

F3 STATION comments that it is their understanding that the Falcons were attempting to operate within the confines of OTA C whilst conducting a trial sortie but without the support of GCI. However, the Airprox occurred in Class G airspace with all players operating VFR; therefore, in its simplest form, this was a case of see-and-avoid. The F3s were operating legitimately in OTA C and were coordinated with the DCA element. In their pull-up manoeuvre, the F3s saw the Falcon formation and took the appropriate action to avoid them within the time available, eventually assessing that there was not a high risk of collision. From the Falcon pilot's perspective, the F3s would have been unsighted until very late and this might have resulted in a perceived collision risk. Although this incident occurred in Class G airspace, the decision of the Falcons to operate in this area, on a trial and without GCI, led to an increase in the probability of such an event occurring. Coordination with the F3 Sqns on the ground prior to the sortie could, therefore, have negated any collision risk.

ASACS SSU reports that the F3s were acting as OCA in OTA 'C' with a pair of GR4s against a further pair of F3s on CAP as DCA. All the ac were operating under Neatishead control receiving a RIS/FIS with separate controllers, and frequencies, for defensive and the offensive packages. The Falcons and a BAC-111 were also operating within the confines of OTA 'C' under ScATCC Mil control whilst carrying out a trial. This EW Trial was not subject to NOTAM or any other form of pre-notification to the ASACS. Both F3 formations had checked in with Neatishead and were aware of the trial formation and their intentions. The offensive formation then chopped to a separate discrete control frequency.

Prior to the Airprox the Falcon formation had transmitted their intentions on the OTA 'C' frequency, to turn inbound from Dunbar at 0955, transiting South at FL120/130. The defensive F3 formation leader tried to negotiate a 5-minute delay with the Falcon leader to deconflict but was unsuccessful. Both the Neatishead and ScATCC Controllers also tried to negotiate a delay with their respective ac to deconflict, but neither party would agree; therefore, the controllers agreed between themselves to call the other ac under the terms of the RIS.

The ASACS T93 radar at Brizlee Wood was not available during the sortie which would have limited the low level cover in the OTA 'C' area; however, as all the F3 crews were aware of the Falcons' intention to transit S at FL120/130 it is not considered a contributory factor. The Neatishead Controller called the Falcons' position to the OCA F3 formation at 1001:12, which was

acknowledged by the No 2 F3. They then descend to low level and below radar cover but the Controller continued to pass target and stranger information.

The Neatishead Controller detected the offensive F3s when they popped up 5nm E of the Falcon formation and at 1003:39 (the time of the incident) called the Falcons to the F3s, which they acknowledged and indicated that they were visual with the Falcons in their *'right 9 o'clock'*.

Several factors promoted this Airprox. First was the inability of the crews to deconflict from each other despite negotiations over the RT. Second was the lack of any NOTAM or other form of notification of the EW Trial in a known area of fast jet activity. Third was the F3 leader's decision to climb rapidly from low level through the known transit level of the Falcon formation. However, under the terms of the RIS/FIS the F3 crews were responsible for safe separation from the Falcons.

UKAB Note (3): The time reference on the Neatishead RT transcripts was approx 3min 50sec ahead of the Radar/actual time. All times have been adjusted accordingly.

MIL ATC OPS reports the Falcon contacted Scottish Military at 0851:41, were identified, placed on a RIS and details of their sortie obtained. Over an hour later an internal formation call warned of the F3s crossing from the 3 o'clock, and this was immediately followed by a new Controller transmitting *"…2 pop-up contacts north-east 3 miles indicating FL 105 climbing"*. The formation leader advised that they were visual with the traffic and later the Falcon pilot reported that he wished to file an airmiss and passed the details.

Analysis of the Great Dun Fell radar video recording showed the Falcon pair flying in formation heading SE. At 1003:16 a contact, (F3) which was showing a Neatishead squawk, appeared NE of them by 1½nm. This contact merged with a Falcon's and within 3 sweeps a further contact appeared, NE by 3¾nm, (a second F3) at 1003:24; both (F3) contacts climbed rapidly. The second contact paralleled the Falcons briefly before turning across their nose, climbing while the first F3 appeared indicating FL043 and in 2 sweeps reached FL093 before merging with the Falcon's contact on the third sweep and reappeared to the SW indicating FL 135. The second F3 also climbed rapidly (FL 045 - 073 - 096 - 105 - 114 - NMC).

The Controller was quite busy with 2 other tracks both under a RAS and his attention was focused on this traffic. Under RIS *"The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information" (JSP552)*. Although such information may have been desirable, with his priorities focused on the 2 ac on a RAS and with the limited time available to spot the confliction, it is understandable that the Controller was able to provide only a belated warning on the second of the 2 conflictors.

HQ STC concurs with the comments of the Station. It is surprising that the Falcons chose to operate in airspace that they knew to be a primary fast-jet training area, without using the system that was well known to them, for prior coordination with the F3s.

In its simplest form, this incident was a case of see-and-avoid in class G airspace. Both parties to this Airprox knew the other was operating in the airspace, and elected to proceed with their exercises and accept the possibility of coming into close proximity. From the transcripts provided it appears that the F3s were first told of the proximity of the Falcons, 2min 27sec prior to the merge. The Intercept controller (IC) called "*Trial ac hdg SE, bull 355/6, 12.5k, friendly."* The No2 acknowledged this. There were no further calls on the Falcons until the F3s were visual with them. The F3s were focused on their playmates at this time. 1min 4sec prior to merge "*Bandits manoeuvre hot on CAP, bull 142/32, 13k"* was transmitted. At 31sec prior to merge, the F3s commit and commenced a climb on targets at 150/30 and 13k. Simulated shots were taken 8sec before the IC called the Falcons as "*Hooters directly above you"*. The F3s reply "*C/S has strangers, right – my right 9 o'clock"*. Wingman – "*between me and you"*. The F3s then returned to targeting and made no further comment on the Falcons.

The F3s did not appear to register the proximity of the Falcons above them prior to their climb, as they focused on their targets. However they did see and avoid them during their climb, albeit by a

margin that was less than comfortable for the Falcons.

Ultimately the inability of either formation to delay their manoeuvres in the air, highlights the need to use opportunities to communicate and co-ordinate on the ground, when planning to fly into known high-activity 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 controllers involved and reports from the appropriate ATC and operating authorities.

Members considered that a major factor causing this incident was that the leaders of the two formations did not deconflict their separate, and arguably incompatible, activities both considered to be of high priority by the respective pilots. Firstly, the Falcon leader planned to conduct (or agreed to if he was not the trial sponsor) the trial in OTA C airspace; he was aware of its existence and was familiar with the procedures for utilising the STC OTA system in support of fighter exercises. Members agreed that while there was no formal obligation to deconflict the trial in Class G airspace with other known activity, it would have been prudent to attempt to do so on the ground before getting airborne, rather than trying to do it over the RT later. Further, if the trial activity required flying in formation, at split and non-Quadrantal flight levels, and was of sufficiently high operational priority to require other users to be made aware of, or be deconflicted from it, NOTAM action could have been requested or the trial could have been conducted in a notified Danger Area. That said however, once airborne in a busy environment the F20 pilot did everything that could reasonably be expected of him to deconflict with the large Tornado package. The only remaining choice open to him would have been to abort and refly the trial at a later date; the Board accepted the pilot's decision to continue.

Some Board Members expressed concern at an apparent belief in some groups of military aviators that the HQ STC OTA system offers priority use of that airspace and a degree of protection from other users. This incident demonstrates again that this is not so. Class G airspace in which OTAs are located remains open to a wide range of other airspace users.

Turning to the part played by the F3 leader, he elected to climb from low-level to medium altitude very rapidly, in reheat, through cloud, in an area where he had been informed that other ac were operating. Further, his rate of climb was such that he could not have expected the Fighter Controller to provide him with clear information on traffic in his vicinity, however the F3 formation had been warned on 2 occasions of the Falcon's position and the No 2 had acknowledged on at least one of them, while they climbed for their attack. Members concluded that the TI might not have been assimilated properly by the F3 Ldr at the time, as his attention was absorbed with the immediate task at hand. The outcome was a confliction with the Falcons above him.

The Board agreed that the Controllers at both Neatishead and Scottish Military did all that could be expected when faced with the very rapidly changing situation imposed on them by the F3 leader.

Since the height at which the F3 leader reported that he saw the Falcon differed between his initial and, subsequent tardy, follow-up report, the Board could not determine accurately at what range this had occurred. From the worst reported case (passing 10000ft) they calculated that he would have had 2000ft, while climbing at 24000fpm (from the radar replay), equating to just 5sec, to react and manoeuvre his ac; they accepted however that this was probably pessimistic. Nonetheless, the F3 Ldr did see the Falcons, and manoeuvred his ac sufficiently to generate a lateral separation of between 300 and 600ft, thus ensuring that there was no risk of the ac colliding. Members accepted however, that since the Falcon pilot would have been blind to, and unwarned of, the overtaking F3 it would have been most uncomfortable from his perspective.

PART C: ASSESSMENT OF CAUSE AND RISK

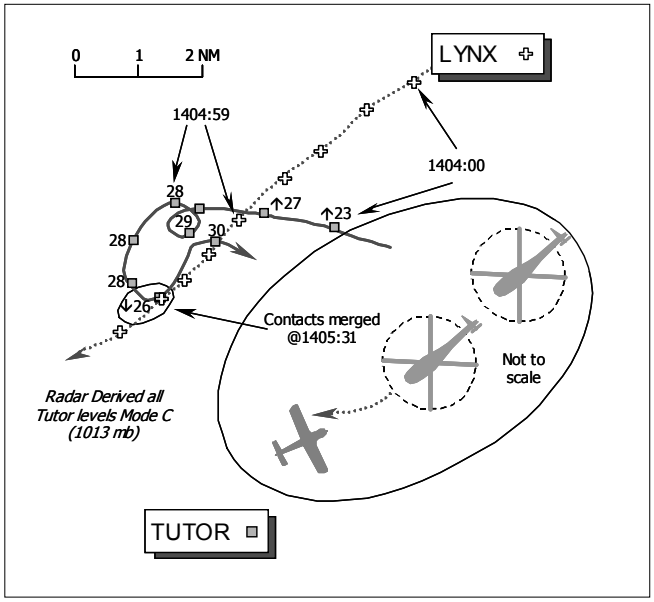
Cause: The F3 Leader flew close enough to the Falcon 20 to cause the crew concern.

Contributory Factors: Both formation leaders aware of each other's presence, elected to continue with their separate activities in the same airspace block.

Degree of Risk: C

AIRPROX REPORT NO 52/03

Date/Time:	15 May 1405	
Position:	5142N 0113W (8nm NW of Benson elev 226 ft)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Lynx HMA8 x2	Tutor
Operator:	COMNA	HQ PTC
Alt/FL:	2000ft (RPS 1016mb)	2000ft (QFE 1014mb)
Weather	VMC CLOC	VMC CLBC
Visibility:	>20km	NR
Reported Separation:	150-200m H/nil V	100m H
Recorded Separation:	Contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LYNX HMA8 HELICOPTER PILOT reports he was leading a section of 2 camouflage grey Lynx helicopters during a VFR transit from Coltishall to Yeovilton at 2000ft COTSWOLD RPS. Weather conditions were good, with an in-flight visibility >20km and no significant cloud or precipitation. In receipt of a FIS from Benson ZONE on 120·9MHz, he was squawking the assigned code, but neither Mode C nor TCAS is fitted.

Flying in loose tactical formation - 200m in trail - on a heading of 240° at 120kt, passing 10nm N of Benson, they had been speaking to ZONE on 120·9MHz for some considerable time since entering "their airspace". Though under a FIS, ZONE reported an ac that was approaching from 8 o'clock, he thought, at a similar altitude. [UKAB Note (1): The RT transcript shows that at 1403:15, ZONE advised of *"…traffic south 1½ miles.*.]. The ac - a low wing Tutor trainer - was sighted about 1nm away and proceeded to cross their track obliquely from L – R about ¾ - 1nm ahead of the formation. Once the Tutor reached their 1 o'clock position, it entered a steep (60-70°) left turn, through about 1½ complete revolutions - turning away from the formation initially - but rolling out of its turn onto a conflicting heading. The Tutor continued to track toward the Lynx formation until the range had closed to about 150-250m, whereupon it banked steeply to the R and crossed ahead of his formation in a descending R turn. To avoid the Tutor he was forced to instigate a descending R turn also, with his No2 also taking action to avoid a collision with both his helicopter and the Tutor ac. He called ZONE who informed him that the Tutor was operating from Benson and in contact on their APPROACH (APP) frequency, whereupon he advised the controller that he intended to file an Airprox upon landing. He

assessed the risk of a collision as *"medium - high"*.

THE TUTOR PILOT reports his ac has a white colour scheme and the HISL was on whilst conducting an air experience flight with a cadet seated in the left hand seat of the ac. He was operating some 2500ft clear below cloud in receipt of a FIS from Benson APPROACH (APP) on 268·825MHz and squawking A7371 with Mode C; TCAS is not fitted.

About 6nm NW of Benson whilst monitoring the cadet flying a gentle descending left hand turn through 2000ft QFE (1014mb) at 120kt, he spotted a camouflaged Lynx helicopter below his ac, very slightly left of the nose and crossing slowly from R-L. He took control of the ac from the cadet, rolled the wings level and initiated a gentle climb to avoid the helicopter. As he rolled the wings level, he realised that the Lynx he had spotted ½nm away was the trailing ac of a pair of Lynx helicopters, but he had not seen the leader until that point. He assessed the minimum separation against the No2 Lynx was 100m as it passed 500ft below but did not report that against the lead helicopter. He assessed the risk as *"nil"*, adding that the intensity of air traffic including gliders was high and the APP frequency was busy.

MIL ATC OPS comments that it is difficult to correlate the timings between the Benson RT transcripts and that of the radar video recording. However, it is believed that the RT transcripts are approximately 27sec ahead of the radar time base and all RT timings herein have been adjusted accordingly to UTC.

The Tutor pilot called Benson APP on UHF at 1351:53, departing VFR and was placed under a FIS. The Lynx section leader free-called Benson ZONE on VHF 2min later at 1353:52, and it was determined that they also required a FIS at 2000ft, routeing from Coltishall to Yeovilton.

APP made two broadcasts to advise pilots of paragliders operating W of Benson and contacts in the Didcot area believed to be gliders. Shortly afterwards at 1355:15, ZONE advised the Lynx section to *"…keep a good lookout for at least the next 10 miles transiting an area of high traffic density"*, which was acknowledged by the leader. ZONE gave more specific traffic information later on two other ac manoeuvring to the S, one of which the lead Lynx pilot reported sighting. The revised COTSWOLD RPS (1016mb) was passed by ZONE at 1401:19 and the Lynx adjusted to fly at 2000ft altitude. At 1402:44, APP made a broadcast call of general traffic information to the *"Tutor aircraft to the north west of Chalgrove by 3 miles* [the subject Tutor ac] *caution the MATZ crosser crossing north east south west with no altitude"* to which the Tutor pilot responded *"…he's about 2500ft"*. APP acknowledged this report and at 1403:05, passed further traffic information to the Tutor pilot about the Lynx section,*"…traffic north 2 miles south westerly heading no height information, last known at 2000ft…"*, which the Tutor pilot acknowledged. Meanwhile at about 1403:15, ZONE advised the Lynx pair of *"…traffic south 1½ miles believed to be a Tutor manoeuvring indicating similar altitude has been carrying out GH"* that was the subject Tutor, whereupon the lead Lynx crew reported *"…visual he is in the climb"*. Subsequently at 1404:55, the Lynx leader asked for confirmation that *"…the Tutor is actually talking to you, he* [is] *performing aerobatics at the moment and we had to take avoiding action"*, adding *"can you ask him to keep a good lookout he has just done a turn towards and forced both of us to take avoiding action"*. ZONE advised that he would relay this however, APP was engaged with a practice pan at the time (1405:06 - 1405:32) and did not appear to pass this message to the Tutor pilot - assuming he received it from ZONE. The Tutor called for recovery at 1405:36, and throughout the whole period both controllers were busy with other ac.

[UKAB Note (2): Analysis of the Heathrow Radar recording shows the lead Lynx, squawking A7352 (NMC fitted) on a steady SW'ly track towards Abingdon. The No2 Lynx is not evident at all, even as a primary contact. At 1402:30, the subject Tutor squawking A7371 (a verified squawk and one of many in the general area) can be seen manoeuvring about 6nm NW of Benson. This ac is shown on a northwesterly track at 1404:00*, and crosses about 1nm ahead of the Lynx just after 1404:16, in a slow climb through 2800ft Mode C (1013mb). At 1404:43, the Tutor starts a left hand orbit, indicating 2900ft (1013mb), that takes the Tutor back towards the Lynx before rolling out on a SW'ly heading maintaining 2800ft Mode C at 1404:59, in the Lynx pilot's 2 o'clock - ½nm. At 1405:11, the Tutor turns left again towards the Lynx indicating 2800ft

(1013mb) before descending to 2600ft Mode C - equating to 2690ft RPS - as the contacts merge at 1405:31. The Tutor is then seen to turn onto a NE'ly heading, but the Mode C is not shown again until 30sec after the merge as the ac turns easterly indicating 3000ft (1013mb).]

The rules applicable to a FIS are now promulgated at JSP 552 235.125. It is evident, however, that whilst a FIS had been requested by the pilots, both APP & ZONE controllers were in reality providing a RIS, such was the detail and accuracy of the information provided. The squawk used by the Tutor pilot - A7371 - is not a discreet squawk but is used by all Benson Tutor ac operating in the local area under a FIS. Consequently, the traffic information passed by APP at 1402:44, did not specify a callsign, however the position report contained within it enabled the Tutor pilot to realise the information was addressed to him. His response subsequently identified him to the controller and, although not a recognized form of identification, allowed APP to be more specific with the next transmission of traffic information. Both controllers appear to have done more than was required under FIS, therefore, there are no contributory Military ATC factors apparent within this Airprox.

UKAB Note (3): This Airprox occurred within the Oxford AIAA, permanently active from the sfc to 5000ft altitude.

THE LYNX PILOT'S STATION COMMENTS that the formation of two Lynx ac was operating in Class G airspace under a FIS from Benson ZONE. Despite being VFR the conflicting Tutor traffic was only visually acquired following traffic information from ZONE. Both helicopter crews observed the Tutor pass 1nm ahead and were unconcerned until it conducted a tight high AoB orbit, followed by a turn which ended with the ac on a converging heading with the Lynx, at close range. Believing the Tutor pilot must have had one or more of the Lynx ac in sight as he overtook them, the sudden manoeuvre by the Tutor ahead of the formation and subsequent rollout heading towards, left the lead Lynx pilot minimal time to react. His rapid manoeuvre away from the Tutor subsequently caused his No2 to take similar avoiding action to maintain separation from both ac. It would appear that the Tutor pilot was totally unaware of the presence of either Lynx. What traffic information the Tutor pilot received from Benson, if any, is not known however, it would appear the Tutor pilot did not clear the airspace adequately, before conducting a steep turn towards the Lynx formation.

CINC FLEET comments that this Airprox serves as a very good reminder of the need to maintain a positive lookout at all times, but especially when engaged in any form of unusual air activity and/or when notified that the airspace is subject to intense activity. In this instance both the Lynx and ATC did all that could be done to ensure separation and safety. It is not possible to tell from the Grob pilot's comments if any lookout turn was completed before he began his manoeuvres, but subsequently flew his ac in sufficiently close proximity to the Lynx formation as to cause concern.

HQ PTC comments that the controllers in this case seem to have furnished each ac with more than enough co-ordinated traffic information, right up to the merge. This demonstrates (again) that, however much eyestrain is applied, ac (especially when they are both in excellent camouflage) will get too close for comfort, without there being any technical neglect of duty by anyone. Because the ATC rules are not serving us well enough; although either pilot could himself have broken the intercept, where 2 ac are approaching each other at a known near-coincident level, even in VMC, there should surely be an incumbency on controllers to offer avoiding action. This should not aim to maintain prescribed separation but simply to prevent a 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, radar video recordings and reports from the appropriate ATC and operating authorities.

The Board did not agree with the comments expressed by HQ PTC regarding the provision of avoiding action when a pilot had not requested a radar service. Whilst a controller might in certain circumstances proffer a warning about the relative proximity of traffic which might constitute a hazard under a FIS as here, the Mil ATC Ops advisor

commented that Benson ATC had done all that was required of them - and more. To mandate the provision of avoiding action would be one step too far, especially as here the pilots had only asked for a FIS and were thus content to maintain responsibility for their own separation from other ac in the see and avoid environment of the 'Open FIR'. This did not dissuade the PTC member who opined that there was a case to suggest that when two flights were in receipt of a service from a military ATSU - one of their objectives being to prevent collisions between ac – then controllers who became aware that a serious close quarters situation was developing might proffer avoiding action instructions. However, this was a solitary view that did not gain additional support.

Some pilot members were concerned that the leading Lynx pilot could see the potential for a conflict developing with the Tutor, following the traffic information from ZONE advising that the latter was conducting general handling, but still pressed on to close quarters. It appeared to some that the Lynx pilot expected the Tutor to manoeuvre out of the way of the formation, whereas both had a mutual responsibility for detecting other ac and staying out of each other's way through the 'Open FIR'. This can only happen though, if the other ac has been sighted in good time and the old lesson – worth repeating here was - do not assume that your ac has been spotted. A turn away from the Tutor to give the pair more 'space' could have been useful. But importantly, the Tutor pilot in his very frank account reported that he was unaware of the leading Lynx, which he had not seen until he was turning to avoid the trailing helicopter. Having been passed traffic information by APP, members agreed that nothing appeared to have impeded the Tutor pilot from spotting both helicopters earlier and giving both a wider berth. The Board concluded, therefore, that the fundamental cause of the Airprox was effectively, a non-sighting of the leading Lynx by the Tutor pilot.

With regard to the risk inherent in this encounter, members pointed out that the Tutor pilot was expecting to reduce any potential for conflict by turning to avoid the trailing Lynx. He probably thought that he was giving it sufficient separation, while unwittingly turning toward the unseen No1 helicopter. Thus, this turn toward the unseen helicopter prompted the Lynx leader's avoiding action, which in turn caused the trailing No2 helicopter pilot to take avoiding action himself. This was not, as it should have been, a situation where safety was completely assured and, in the Board's view, the safety of the ac involved here had been compromised.

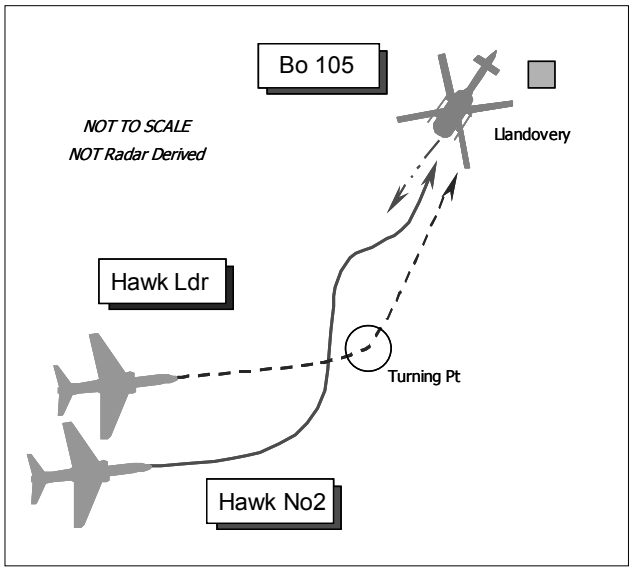
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting of the leading Lynx by the Tutor pilot.

Degree of Risk: B.

AIRPROX REPORT NO 53/03

Date/Time:	13 May 0958	
Position:	5200N 0348W (¾nm SW of Llandovery)	
Airspace:	FIR/UKDLFS	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	MBB Bo105 DB	Hawk Pair
Operator:	Civ Comm	HQ PTC
Alt/FL:	1700ft (RPS 1013mb)	250ft (msd)
Weather	VMC	VMC CLBC
Visibility:	30km	>20km
Reported Separation:	100m H	1000m H/750ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Bo105 DB HELICOPTER PILOT reports that his EMS helicopter has a distinctive red colour scheme with green highlights; all lighting was on including HISLs and the 2 landing lamps. TCAS is not fitted and he was not in receipt of an ATS.

Minutes before the Airprox occurred he had departed the site of an incident at about ½nm ESE of Llandovery (OS grid SN778343), outbound to the Morriston Hospital at Swansea heading 230° down the valley of the River Towy. He flew at very low level initially – less than 500ft agl – whilst scanning the horizon for military fast jet activity as he accelerated to 80kt, before commencing a maximum power climb to his intended cruising altitude. Moments after initiating the climb he spotted a black jet - low at 11 o'clock about 2nm away, he thought it was tracking SE - before it manoeuvred hard L and he lost sight of it against the terrain. Shortly afterwards another Hawk (that might have been the same ac) was seen flying towards his helicopter. He continued the climb, but the Hawk appeared to be climbing also. Reluctant to turn R to avoid the jet because of the nature of the terrain and that there might be two - possibly three ac in the vicinity, he believed the only option available was to continue climbing; any other avoiding action would have resulted in loss of visual contact on the other ac. Moreover, if he had turned R he would have flown into descending moderately turbulent air in the lee of the high ground, or, if he had turned L, into further high ground and possibly into conflict with the first Hawk he spotted earlier. Whilst he climbed through 1700ft RPS, one Hawk, passed less than 100m away to port on a reciprocal heading and about 10ft below his helicopter – both he and the paramedics were clearly able to see the pilot of the Hawk, a dragon "decal" which he thought ran the length of the port fuselage, and even the "danger" placards on the ac. He expected to see a "wing rock" but it did not occur. It was at this point that they noticed another black Hawk pass 200ft directly below his helicopter – also on a reciprocal heading. He assessed the risk as "high" and added, with the front seat paramedic facing rearwards only one pair of eyes was available – his - to scan ahead.

THE HAWK PILOT, reports his ac has a black colour scheme – but neither airframe of the pair has a dragon decal applied. The HISLs were on, but neither TCAS nor any other form of CWS is fitted. He was flying as a solo student, No2 of a pair flying in 'battle' displaced 2000yd off the starboard wing initially of his leader- a QFI – on a low-level instructional sortie at 420kt.

About 3nm SW of Llandovery heading 048° at 250ft agl, his leader first spotted a white coloured, light civilian helicopter, during a 30° assisted battle turn to the left, in which he moved from 'battle right' to 'battle left' ie off to port of his leader. Upon pulling out of the turn he first spotted the helicopter about 2nm away and so climbed and pulled right to fly high and right thereby increasing separation from the helicopter, which passed 1000yd to port 750ft below his jet. There was no risk of a collision as he had spotted the helicopter early.

THE HAWK PILOT'S STATION comments that the formation leader's early spot of the helicopter allowed the wingman to obtain visual contact on rolling out from a tactical turn. Although there was already no apparent risk of collision, the student pilot took sensible action to increase separation. Accordingly, the risk of collision appears to have been minimised as much as possible. The requirement to 'see and avoid' was achieved satisfactorily in this instance.

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

UKAB Note (2): According to HQ PTC, the "Dragon decal" referred to by the Bo105 pilot is only applied to one Hawk airframe (the actual airframe number was quoted). On the day of this Airprox, this Dragon emblazoned airframe was undergoing deep maintenance and was on jacks at St Athan MU and could not fly.

HQ PTC comments that the perceptions of this encounter differ so widely that we can only suppose that the Hawks saw a different helicopter. The Bo105 concerned is a dull red in colour and is unlikely to be perceived as a light colour against a normal low-level background. We can only suggest that they were unsighted on the Bo105, while preoccupied with their crossover and saw another helicopter shortly thereafter.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

From the information available from each pilot's report and that of the Hawk operating authority, it was evident there were significant anomalies in the pilots' perceptions of this Airprox. Whilst there had been a conflict, the absence of any radar data further compounded the difficulties that confronted the members in trying to resolve not just the geometry of this encounter but also the identity of the ac involved. The helicopter pilot had reported that the closest jet had a dragon 'decal' on the port fuselage, whereas it had been shown that he could not have seen that particular Hawk airframe. Whilst not questioning the veracity of the helicopter pilot's report (as supported by his paramedic crewman) he was mistaken over this identification aspect and it was clear that his version of the geometry of the encounter was somewhat different to that of the jet pilots. Furthermore, it might not have been the Bo105 that the Hawk pilots had seen either; they had reported sighting a white civilian helicopter but the subject helicopter was coloured red. It seemed unlikely to the PTC member that the distinctive colour scheme of the Bo105 could be confused as being white; other members agreed. Even reflections from the fuselage seemed unlikely. Thus there was little information to confirm that the Hawk pilots had actually seen this particular helicopter, apart from the location. It was explained that tracing action had not revealed any other Hawk jets flying through this valley at the time the Bo105 was departing the scene of the incident. Conversely, there was no such confirmation that this was the only helicopter in the vicinity at the time. The separation also widely differed between the two reports and both pilots thought the 'other' passed below; the Bo105 pilot stated one Hawk jet passed less than 100m away to port on a reciprocal heading and about 10ft below his helicopter, whilst the other Hawk ac passed 200ft directly below his helicopter. It seemed inconceivable to fast-jet pilot members that the Hawk pilots would have flown as close as this intentionally, if they had actually seen the Bo105. For his part the No2 Hawk pilot perceived that the helicopter he saw had passed 1000yd to port and 750ft below his jet. Members emphasised again that they had no reason to doubt the honesty of the jet pilot's account, but it seemed improbable to the majority of members that the helicopter seen by the Hawk pilots was the Bo105 - the two versions did not fit together - so members were unable to fully reconcile the two widely differing reports. The Board could only conclude, therefore, that the Airprox had resulted from a probable non-sighting by the Hawk formation of the Bo105.

With the scant and contradictory nature of the information available it was difficult to come to a definitive assessment of the risk that pertained here. Nevertheless, during an encounter where closing speeds were in the order of 500kt - at the separation distances reported by the Bo105 pilot and with the jet pilots probably unsighted - members agreed that at the very least safety had been compromised.

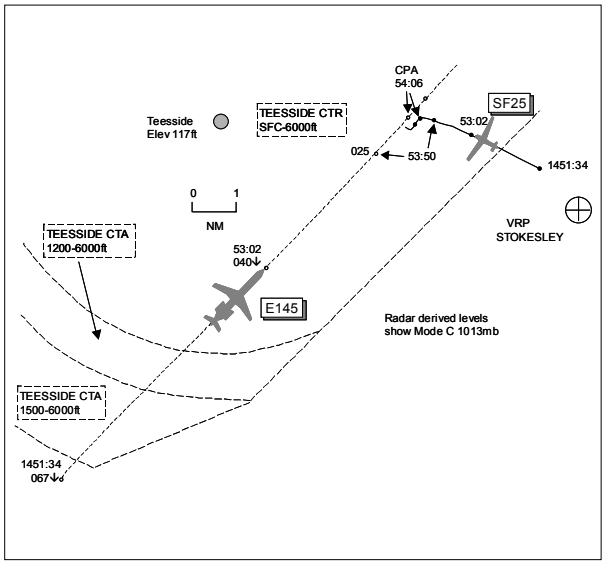
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Probable non-sighting by the Hawk formation of the Bo105.

Degree of Risk: B.

AIRPROX REPORT NO 55/03

Date/Time:	10 May 1454 (Saturday)	
Position:	5431N 0117W (6nm E of Teesside - elev 117ft)	
Airspace:	Teesside CTR	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	E145	SF25 M/Glider
Operator:	CAT	Civ Pte
Alt/FL:	↓2500ft (QNH 1015mb)	2800ft (QNH 1015mb)
Weather	VMC CLBC	VMC CLBC
Visibility:	>10km	>10km
Reported Separation:	nil V 500m H	200ft V 800m H
Recorded Separation:	0·25nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE E145 PILOT reports inbound to Teesside heading 050° at 180kt descending to 2500ft QNH 1015mb and in receipt of an ATS from Teesside on 118·85MHz. TCAS indicated 2 proximate traffic returns, the first in his 10 o'clock range 4nm (on approach to RW23 at Teesside), and the second at 2 o'clock range 4nm tracking towards him with no Alt readout. After levelling at 2500ft, the controller asked him to stop descent at 3500ft but after telling ATC of his level (2500ft), he was left on his assigned heading. A TCAS TA was received on the 2 o'clock traffic which was still on a conflicting track. It was sighted as possibly a glider with red and white markings at about the same level, which flew as close as 500m before it commenced a L turn. He did not mention this to ATC as they were very busy at the time but after landing he obtained their telephone number (internal extension). However, owing to the 30min flight turnaround, he was unable to leave the ac to use a phone in the terminal building to call them. He assessed the risk of collision as high.

UKAB Note (1): The reporting pilot's written report was received at the UKAB nearly 2 weeks post incident.

THE SF25 PILOT reports en route from Breighton to Dundee VFR at 2800ft QNH 1015mb and in receipt of an ATS from Teesside APPROACH on 118·85MHz squawking an assigned code with Mode C, he thought. The visibility was >10km, 3000ft below cloud in VMC, and the ac was coloured red/white. Heading about 330° at 65kt within Teesside airspace, he saw another ac on a crossing track, which he turned L to avoid; it was

seen to pass about 800m away and 200ft below. After it had passed, he continued cruising on track.

THE TEESSIDE APR reports that he was only made aware of the Airprox over 10 days post incident but he did listen to the RT tape and viewed radar prints before completing his CA1261 but he thought the reported ac had been another ac, a Europa type, which had called for transit and he had cleared to cross CAS at 2500ft. The traffic situation had been very busy with multiple contacts in Class G airspace including gliders. He instructed the E145 to stop descent at 3500ft and he thought he heard its pilot read back 3500ft. After listening several times to the RT tapes, it appears the pilot read back 2500ft; the recording was indistinct and he had expected to hear 3500ft. There were a number of ac crossing CAS at the time and the SSR was suffering from label overlap.

UKAB Note (2): The Europa ac was squawking with Mode C and passed 1000ft below and over 1nm behind the E145 about 4nm SW of the Airprox position.

ATSI reports that the SF25 contacted Teesside Approach at 1443, reporting routeing Breighton to Dundee on a VFR flight. It was 8nm from Stokesley, a VRP to the ESE of the airport, at 3000ft and requested a crossing clearance of the airspace. The ac was instructed to squawk 7040.

The E145 made its initial call on the frequency at 1447, reporting passing FL118 descending to FL65. The ac was placed on a radar heading of 360° and descent to 3500 feet was issued. The pilot was informed that it would be a Limited RAS due extensive traffic in the Vale of York. (Subsequently, he was not informed when entering the Teesside CTA/CTR Class D airspace or when the radar service would have changed.) Further descent to 2500ft was given at 1451, on a heading of 050°, downwind RW23.

At 1453 the APR requested the SF25's altitude. The pilot reported at 3000ft and was issued with clearance to transit CAS at 2500ft on the QNH. The pressure was read back but the pilot asked for a repeat of the clearance. This was repeated but no readback was received from the pilot and this went unchallenged by the APR contrary to MATS Part 1, Appendix E, Page 8 Pilot Read Back of RT Messages. The E145 was then instructed to stop its descent at 3500ft. Although the cleared altitude was clear on the RT recording, the pilot's reply was not readily understandable. Only after replaying it more than once was it obvious that the pilot had replied to maintain *"two and a half thousand"* rather than 3500ft. The APR did not register this message.

The RT recording reveals that the Teesside Approach frequency was busy at the time. In an 8min period, just prior to the Airprox, eleven first calls from ac were received. These included inbound/outbound and overflying traffic including a number requesting CAS penetration. The Teesside APR's intention had been to separate the subject ac by providing 1000ft vertical separation but this was not a requirement as the SF25 was VFR (MATS Part 1, Section 1, Chapter 2, Page 1 Classification of Airspace determining Flight Rules and Minimum Service to be provided by ATC applies). The APR did not pass TI and, owing to label overlap, he did not realise from the SSR Mode C that the E145 had descended to 2500ft.

UKAB Note (3): The Teesside 1450Z METAR shows EGNV1450Z 23011KT 180V270 9999 SCT045 15/02 Q1015=

UKAB Note (4): Analysis of the Gt. Dun Fell radar recording at 1451:34 shows the E145 squawking 1250 9nm SSW of Teesside tracking 045º indicating FL067 (6760ft QNH 1015mb) descending with the SF25 in its 1 o'clock range 13nm tracking 290º squawking 7040 NMC. The subject ac continue on steady converging tracks, the E145 is seen to level at FL025 (2560ft QNH) at 1453:50. The CPA occurs 16sec later at 1454:06 as the E145 crosses 0·25nm ahead of the SF25 which appears to have commenced a L turn. The next radar sweep 8sec later shows the SF25 steady tracking 220º, away from the E145, which accords with the pilot's reported turn to avoid.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that although the SF25 pilot had requested crossing clearance on initial contact at 1443 with Teesside, he had only been issued a discrete squawk. Ten min later (1453), when the APR noticed the subject ac in potential confliction, the SF25 was already inside CAS without clearance which was a part cause of the Airprox. Consequently, the busy APR was in a 'fait accompli' situation where he elected to 'separate' vertically the subject ac rather than pass TI. However, further valuable time was expended when the SF25 pilot requested the controller to repeat his 'crossing clearance' transmission. Following on, the APR misheard the E145 pilot's indistinct read-back to his request to stop descent at 3500ft. This had led him erroneously to assume that the ac were separated, the E145 1000ft above the SF25, who should have been at 2500ft. This too had been a part cause.

The E145 pilot had seen the potential confliction on TCAS in his 2 o'clock at range 4nm and visually acquired the SF25, while continuing on course, watching the M/glider turn away off to his R at about 500m range. The SF25 pilot had seen the converging Embraer jet and had turned L, watching it pass 800m clear to his R and 200ft below before turning back on course. These sighting elements combined with the geometry of the incident were enough to persuade the Board that safety had been assured during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

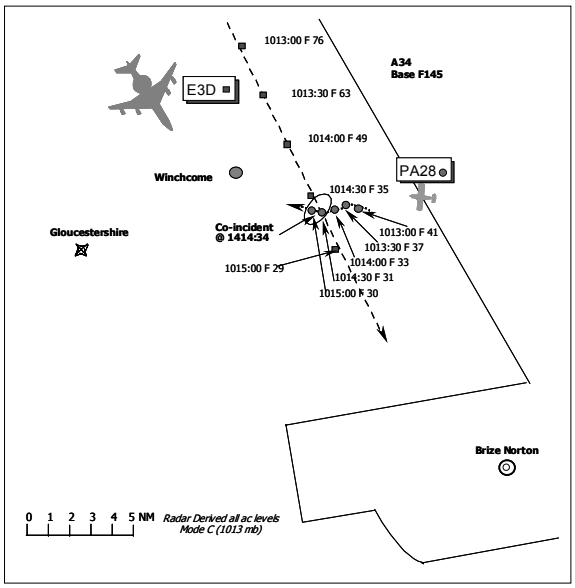
a. The SF25 pilot entered the Teesside CTR without clearance.

b. In a very busy traffic scenario, the Teesside APR misheard an indistinct read-back from the E145 pilot, which led the APR to believe, erroneously, that vertical separation existed.

Degree of Risk: C

AIRPROX REPORT NO 57/03

Date/Time:	23 May 1014	
Position:	5158N 0134W (12nm N of Brize Norton)	
Airspace:	Oxford AIAA	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Sentry AEW MK1	PA 28 Warrior
Operator:	HQ STC	Civ Comm
Alt/FL:	2800ft QFE	2800ft
	29.52 (1000mb)	(QNH 1004 mb)
Weather	IMC SCT Cloud	VMC Between Layers
Visibility:	N/K	5 - 10k
Reported Separation:		
	100m H 200ft V	N/K
Recorded Separation:		
	Contacts merge (see UKAB Note 3)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SENTRY AEW MK1 PILOT reports flying a grey ac with HISLs on but TCAS was not fitted. He was on a sortie from Waddington to Brize Norton with the cloud at Brize Norton reported as scattered at 2000ft. While heading 180° at 300 kt in receipt of a RIS from Brize Radar he was cleared to descend to 2500ft on QFE 29.52 (1000mb). During the descent, Brize Radar passed TI on a contact in his 12 o'clock 5nm and at an altitude relative to them that they calculated to be below their cleared height. They requested further information on the traffic and it was subsequently reported as slightly left of the nose in a slight descent at a height relative them that they calculated as approx 2000ft QFE. They continued the descent through scattered cloud and on passing 2800ft the pilot on the left hand side of the ac saw a light civilian ac approximately 100m to the left and 200ft below.

UKAB Note (1): The elevation of Brize Norton is 288ft AMSL.

THE PA 28 WARRIOR PILOT reports flying a white PA28 with blue stripes and the strobes and anti-collision lights switched on. The instructor was monitoring a student pilot conducting a simulated IMC Navex in the West Country which was to be flown VMC/VFR at 100kt throughout. While flying an arc to the W of Oxford they had to descend and manoeuvre to remain VMC clear of cloud between cumulus and strato-cumulus clouds. At around 1010 to 1015 they changed frequency from Oxford to Gloucester for a FIS. At approx 1016 the instructor directed the student to turn towards Winchcombe heading approx 240º to regain track to complete Navex. At the time of the Airprox he estimated that they were 5-7 nm NE Winchcombe but he never saw the Sentry AEW ac.

UKAB Note (2): 5nm NE Winchcombe is BZN 320/18

THE E3 PILOT'S UNIT COMMENTS that the captain elected for a RIS to achieve a procedural approach to Brize Norton. Experience in the Lincolnshire Airspace has convinced many pilots that they will rarely complete a full procedural approach, as published, under RAS due to continuous avoiding action. This predicated the pilot's decision on the service required. Having embarked on what proved to be a risky course of action, a false sense of security was engendered by using relative height separations during dissimilar descent rates to estimate the altitude of the light ac. The lag in receiving the separation on the conflicting traffic to compare with the current

(decreasing) altimeter reading eroded the safety margin the crew estimated that they had.

Although Brize Norton Radar met the requirements of RIS, it is considered that the controller was probably in a better position to anticipate the convergence rates of the E-3D and light ac and could have been proactive in 'encouraging' the pilot to revert to a RAS.

This Airprox was predictable before it developed into a dangerous situation and the chain of events could have been broken by either of the crew or the radar controller.

UKAB Note (3): The Radar recording clearly shows both ac and shows the actual position of the Airprox to be BZN 319/15.5 which is 10.5nm from the reported position; it occurs at 1014.36 which is 36sec later than the reported time. Six sec before the contacts merge they show a vertical separation of 400ft with the E3 descending slowly and the PA28 maintaining altitude. If the last recorded rate of descent of the E3 (2700 ft /min) were maintained it would have descended 270ft in 6 sec making its alt at the time of the Airprox 3230ft while the PA28 was at about 3050ft

MIL ATC OPS reports that RT Transcripts and radar video recording timings appear to be within seconds of each other, therefore no adjustments have been made.

Brize Director (DIR) was working the E3D under a RIS for a TACAN approach to Brize Norton. The ac came on frequency at 1011:44 *"….passing 115 in the descent to FL 55"*. After some routine administration tasks were completed the QFE, 29.52 inches, was given and the ac was instructed to *"…descend report level 2500ft".* It was established that the pilot did not wish to carry out any holds and was, therefore, cleared for the procedure. At 1013:11 TI was passed on *"…… traffic 12 o'clock 5 miles reciprocal heading indicating 3400ft beneath you"*, this was acknowledged by the E3D crew. The pilot requested clarification of the position so DIR updated his report at 1013:37, *"slightly left of 12 o'clock, 5nm now crossing left right and indicating 2400ft beneath you in a slow descent"*. Without prompting, DIR again updated this information less than 40 sec later (1014:11) *"C/S previously called traffic now 12 o'clock 2nm left right indicating 1500ft beneath"*. Fifty-two seconds later the E3D pilot reported level 2500ft and, at 1015:24, the pilot advised DIR *"…… that traffic passed quite close down our left hand side"*. Clarification was sought by the pilot regarding the indicated height of the conflicting traffic and DIR confirmed that it was *"…..indicating similar altitude as you passed"* at 1015:51.

Analysis of the Clee Hill Radar Video recording shows the PA28 12nm to the NW of Brize Norton indicating FL 042 at 1013:00. The E3D can be seen to the NW of the PA28 by 9nm routeing parallel to, and about 3nm outside the airways situated to the E. At 1013:11 the PA28 is in the E3D's left 11 o'clock 7.5nm indicating FL039, some 3200ft beneath the E3D, on a reciprocal heading. The PA28 is seen to commence a left turn at 1013:20 and by 1013:37 it is now slightly left of the E3D's 12 o'clock 5nm slowly crossing left to right indicating FL036 descending (2300ft beneath). By 1014:11 the PA28 is left ½ past 11, 2nm slowly crossing left to right indicating FL031 (1300 ft beneath). The contacts merge at 1014:36.

After analysis it is evident that the first TI passed by DIR was not accurate. Reported as 12 o'clock the PA 28 is actually in the 11 o'clock position and some 2.5nm further away. The controller was using Brize Norton derived SSR information and this may account for the discrepancies between vertical separation distances observed on the Clee Hill radar and those reported by the controller. Subsequent TI passed to the E3D pilot by DIR is accurate consequently it is considered that DIR fulfilled his obligations under RIS as laid down at JSP 318A. Altitude information could have been passed as an indicated level or, less accurately, as approximate level information (i.e. slightly above/below, well above/below). By calculating the actual vertical separation, although not strictly orthodox, DIR accurately indicated to the E3D pilot the relative vertical position of the PA28 and gave him plenty of opportunity to either slow or stop his own descent.

HQ STC comments that this Airprox appears to show, once again, a lack of awareness by the pilots of their full responsibilities for traffic avoidance when flying VFR under a RIS, and a lack of appreciation of the necessarily historic, and therefore inaccurate, nature of the information being received. The limitations of

providing 'relative' information are clearly highlighted in this Airprox. By the time the controller had registered the SSR indicated heights, calculated the difference, transmitted to the crew, and they then registered their current height, and made a calculation, a 500ft error due to time lag was introduced. The controller would have provided a better service by just passing the indicated height. This Airprox should be used as a case study for controller training, to illustrate the 'time-lag' pitfalls of using 'relative' information.

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 that operating in IMC conditions in receipt of a RIS is generally inadvisable as it is frequently impossible for pilots to be able to fulfil their traffic avoidance responsibilities in such circumstances. Members considered this incident further reinforced their view in that the E3 pilot, despite getting TI, was not able to see the PA28 and take appropriate avoiding action.

With the benefit of being able to conduct the altitude calculations in slow time without the pressure of the cockpit environment, it seems that the E3 crew mistakenly believed the PA 28 to be below their planned descent level and therefore it did not pose a collision risk. The fact that it did, would imply that they made some arithmetical errors in their calculations of its height. These errors would also seem to be greater in magnitude than can be explained by the rationale suggested by HQ STC, although their argument regarding the historical, and therefore inaccurate, nature of the heights being passed by the Controller was accepted by a majority of Board Members. While Members accepted the point made by the E3 unit that is almost impossible to conduct a procedural approach while in receipt of a RAS, they thought that for a transit to the IAF it was not only practicable but also advisable in IMC. The Brize Norton Controller passed generally accurate and timely TI, considerably more than the minimum required under a RIS. This flow of information should have been enough to identify the confliction to the E3 pilots. Members however, considered that it was not appropriate for controllers to advise pilots of the type of Air Traffic Service they utilise and therefore did not agree with the E3 unit comment that the Controller could have been more pro-active in that respect. A majority of Board Members believed that the Controller's actions did not contribute to this incident, indeed had they been actioned by the E3 crew the Airprox may have been avoided.

The Board also considered the part played in this incident by the PA28 pilot. Although he had deviated form his planned track to avoid poor weather, he reported that he was VMC at the time of the Airprox. Members however, thought that the conditions must have been borderline since he did not see the very large ac passing 200ft above him with a lateral displacement of only 100m. Nonetheless, while conducting a flight under VFR he too had an obligation to avoid other traffic operating in the Class G airspace and the Board felt that he would have been in a better position to accomplish this had he been in receipt of a RIS from Brize Norton. Indeed specialist Members stated that it used to be SOP for this type of operation from the school concerned.

There was considerable discussion by Members regarding the degree to which safety had been compromised in this incident. A small majority however considered that since the ac had passed very close without either pilot seeing the opposing ac in sufficient time to initiate any avoiding action, there had been an actual risk of collision and only chance had kept the ac apart.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:

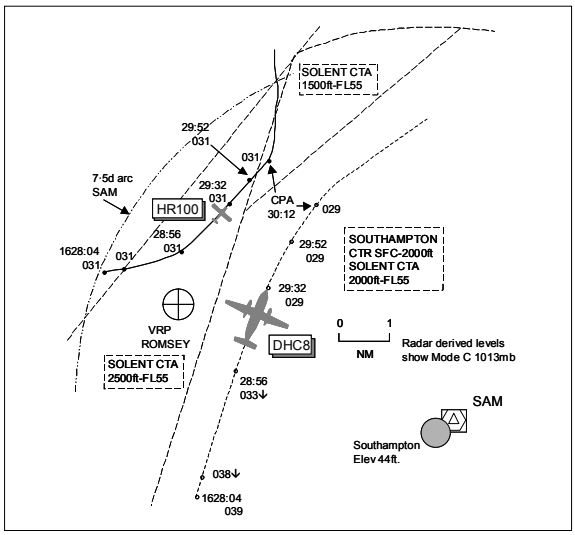
a. The E3D crew did not act on the TI provided and descended into conflict with the PA28 which they did not see in time to avoid.

b. A non-sighting of the E3D by the PA28 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 58/03

Date/Time:	29 May 1630	
Position:	5102N 0127W (6nm NW SAM)	
Airspace:	Solent CTA	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	DHC8	Robin HR100
Operator:	CAT	Civ Pte
Alt/FL:	4000ft (QNH 1016mb)	3200ft (QNH 1016mb)
Weather	VMC HZBC	VMC CAVOK
Visibility:	9km	>10km
Reported Separation:	nil V 1·5-2nm H	not seen
Recorded Separation:	200ft V 1·25nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports inbound to Southampton heading 025° at 180kt and 4000ft, he thought, QNH 1016mb and in receipt of an ATS from Southampton APPROACH on 120·22MHz. About 5nm NW of SAM VOR, he saw traffic on TCAS in his 10 o'clock, <2nm away indicating 100ft above his level. He queried this traffic with ATC who told him that it should be outside CAS and 500ft below him. ATC then gave him a R turn to avoid it, onto heading 060º, and as he started the turn, he visually acquired the other ac, a low wing single engine type, 1·5-2nm away at the same level heading about 020-030º. No TCAS alerts were received during the incident. The APR told him that the conflicting ac had penetrated CAS without radio contact and that it did not display an altitude readout.

THE ROBIN HR100 PILOT reports he had not seen the reporting ac during his flight but provided a comprehensive report of his sortie details. He was flying solo en route from Bournemouth to Denham at 3200ft QNH 1016mb heading 030° at a G/S of 121kt in CAVOK conditions, squawking 7000 with Mode C. The ac was coloured white/ brown and the twin strobe lights were switched on. He had departed Bournemouth initially flying below 2000ft, as cleared by ATC, via Stoney Cross VRP and then on towards the NW corner of the London TMA, turning E to Chalfont St Giles for Denham, a route he flew often. After leaving the Bournemouth frequency about 5nm NE of Stoney Cross, he had attempted to call Boscombe Down on 126·7MHz but had received no response so he had listened out with Solent 120·22MHz. He climbed to 3200ft QNH 1016mb whilst ensuring that the ac was never less than 7·5d from SAM VOR/DME which he monitored on his KNS80 RNAV equipment. When 2nm W of Popham, he called Farnborough on 125·25MHz and was issued a squawk and was provided with an ATS.

THE SOUTHAMPTON APR reports that the DHC8 was on a radar vector of 035º positioning DW RH RW20 level at 3000ft QNH1016mb; SSR was unserviceable. As the ac passed W of SAM, he noticed a radar contact converging with the DHC8 but believed it to be below CAS. He asked the ADC if he knew of traffic to the W but it was unknown to him. By now the DHC8 was E of Romsey VRP at 3000ft. He elected to pass TI on the unknown ac which the DHC8 crew acknowledged, reporting that they could see the traffic on TCAS 100ft above and 2nm away. On hearing this response, he immediately turned the DHC8 R onto heading 060º for avoiding action which resolved the confliction.

ATSI comments that there are no apparent ATC causal factors. The HR10 reported leaving the Bournemouth Approach frequency, at 1626, for Boscombe Down. The next call traced was to

Farnborough LARS at 1634, as the ac was approaching Popham and after the Airprox had occurred.

The DHC8 had been given descent by Solent Radar to 3000ft, within Southampton's airspace. Southampton ATC was operating primary only as Pease Pottage SSR was out of service. The Solent APR did well to pass TI on traffic that could legitimately have been operating below the base of the CTA (2500ft) just to its L. This should have ensured a minimum of 500ft separation from this traffic complying with MATS Part 1, Section 1, Chapter 6, Page 4-Use of Levels by Controllers. Using TCAS information provided by the DHC8 pilot, an 'avoiding action' turn was issued away from the unknown ac. When the Solent Radar Controller passed TI on the unknown ac (shortly before 1630), he did say that it should have been below CAS, below 1500ft. However, the radar recording would seem to indicate that the ac was, at the time, within the lateral confines of CAS, where the base was 2500ft.

UKAB Note (1): The Southampton METAR shows EGHI1620Z 15003KT 9000 FEW048 23/12 Q1016=

UKAB Note (2): Analysis of the Heathrow radar recording at 1628:04 shows the HR10 squawking 7000 7·7nm WNW of SAM tracking 080º indicating FL031 (3200ft QNH) with the DHC8 squawking 1255 4·9nm WSW of SAM tracking 025º indicating FL039 (4000ft QNH 1016mb); 8sec later the DHC8 commences descent. At 1428:56, the HR10 is seen to turn onto a 045º track 1nm N of Romsey VRP maintaining FL031 (3200ft QNH) with DHC8 2·6nm to its SSE indicating FL033 (3400ft QNH) descending. The DHC8 levels at FL029 (3000ft QNH) at 1629:32 a turns R 10º in accordance with a Solent APR heading instruction. Both ac continue to converge slowly until CPA occurs at 1630:12, the DHC8 at FL029 (3000ft QNH) passes 1·25nm SE abeam of the HR10 which is indicating 200ft above. The next radar sweep shows the HR10 tracking 360º as the DHC8 commences a R turn, in accordance with the ATC avoiding action instruction issued onto a 060º track.

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 commended the actions taken by the Southampton APR in passing TI on the unknown ac (the HR100) when primary radar indicated that it had crossed the CTA lateral boundary NW of Romsey VRP shortly after 1628. The ac could have quite legitimately been flying below the base level of 2500ft but this was not the case as the HR100 was actually flying at 3200ft. Members noted the HR100 pilot's comments, that he had never been less than 7·5d from SAM (a distance which is adjacent to the edge of CAS near Romsey, leaving little margin for error). However, the radar recording revealed otherwise and, for whatever reason, it was clear that the HR100 pilot had entered the Class D Solent CTA without clearance and had then flown into conflict with the DHC8, without seeing it.

Good airmanship and actions between the DHC8 crew and the APR led to a turn away from the developing confliction during which the DHC8 crew gained visual acquisition with the Robin at about the same level passing <2nm to their L. The geometry of the encounter was such that the DHC8 was always behind, but overtaking the HR100, and since the Robin turned L away just after the CPA, this probably accounts for the non-sighting by its pilot. Of note, these turns produced no TCAS alerts. The Board concluded that these actions had been effective in removing any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

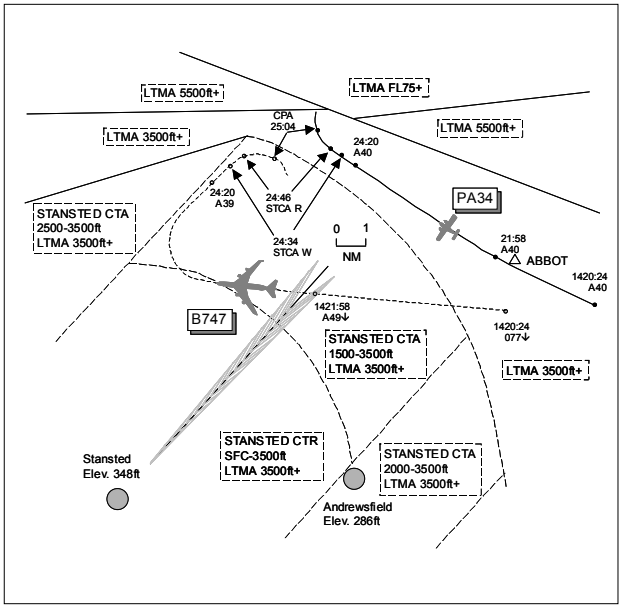
Cause: Unauthorised entry into Class D airspace by the Robin HR100 pilot, who flew into conflict with the DHC8, that he did not see.

Degree of Risk: C

AIRPROX REPORT NO 60/03

Date/Time: 28 May 1425
Position: 5205N 0025E (13nm NNE Stansted - elev 348ft)
Airspace: LTMA (Class: A)
Reporter: Essex RADAR + Stansted FIN DIR

	First Aircraft	*Second Aircraft*
Type:	B747-400	PA34
Operator:	CAT	Civ Trg
Alt/FL:	4000ft (QNH)	4000ft (QNH)
Weather	VMC NK	VMC NK
Visibility:	NK	NK
Reported Separation:	NK	NK
Recorded Separation:	nil V 1·8nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ESSEX INT RADAR CONTROLLER reports accepting a release on the PA34 at FL70 at CLN. The destination on the fps was shown as Andrewsfield (EGSL), which he questioned at the time of the release and which was confirmed, but on initial contact the PA34 pilot informed him that his destination was Cambridge (EGSC). The code callsign data dropped out so the ac was only being displayed as a squawk code of 4364 with Mode C. Owing to other traffic inbound to Stansted and Luton in the CLN area, he decided to descend the PA34 below CAS and informed the pilot of his intentions of providing a RIS and that his routeing would be ABBOT to CAM. Shortly thereafter, the B747 called, 20nm E of Stansted inbound at FL105 at 250kt. The pilot's response to instructions was very poor and slow; despite repeating the descent instructions slowly, they were read back incorrectly and then not at all. Owing to the B747's height and speed, he decided to vector the ac through the RW23 C/L to position it RH DW. Normally he would have instructed traffic in similar circumstances to take-up the hold at ABBOT but he had no confidence that the B747 crew would understand such an instruction. He telephoned Cambridge with the PA34's inbound details and was given a release level of 4000ft, the altitude to which he had already descended the ac to ensure it was below CAS E of Stansted. The B747 was transferred to the FIN DIR after advising the controller of the RH DW pattern. He then became involved with, and to some extent distracted by, FIR traffic joining CAS for Stansted being offered by London Military and other Stansted inbounds. He did not co-ordinate the PA34 with FIN DIR owing to his concentration with integrating the FIR ac with other traffic. The FIN DIR alerted him to the confliction and their avoiding action being taken, so he turned the PA34 to the N and then back on course to CAM.

THE STANSTED FIN DIR reports he was mentor to a trainee with the B747 on his frequency. The PA34 was working INT DIR and he pointed out to his trainee that it was an Andrewsfield (EGSL) inbound, indicated by the fps, and that its squawk had dropped out. The B747 had been positioned from the E into a RH cct for RW23 owing to its height and speed on first contact. Whilst his trainee started to turn the B747 from its DW heading onto base leg, he observed the 4364 squawk of the PA34 in conflict at 4000ft 4nm to its NE tracking NW. He pointed this out to his trainee who gave avoiding action and TI. The PA34 had not been co-ordinated and he had not noticed its position until the base leg turn had been given to the B747.

AIRPROX REPORT No 60/03

THE B747 PILOT reports inbound to Stansted maintaining 4000ft on a heading of 300º, he thought, which seemed to be positioning the ac to overshoot the final approach course. He queried this with ATC, asking if they wanted him to 'maintain heading 300º', which was confirmed followed by a R turn onto heading 050°. Later whilst turning at 160kt, traffic was seen approaching on his Navigation Display (ND) and he heard an aural *"traffic"* warning sound once. ATC issued a descend clearance to 3000ft and a turn onto heading 180º for final approach, which he complied with; landing clearance was given shortly thereafter.

THE PA34 PILOT reports he was flying a dual IR training flight with the IF screens up inbound to Cambridge. When NE of Stansted, he was turned R, off track, onto 360º, but this was not stated as avoiding action nor was any TI passed. The weather was VMC but he did not see any conflicting traffic.

ATSI reports that the Essex Radar controller, who had been controlling for about 15min, said that the position had been busy throughout but the complexity had increased significantly just prior to the Airprox, reaching, he thought, almost 'overload' proportions. He added that the off-going controller had offered, at handover, to act as a Co-ordinator if required but at the time he had not considered it necessary. He mentioned that, as an added consideration, because only 3 people were rostered for TC Stansted positions, continued operational use of this controller would have impinged on future breaks. He commented, however, that, subsequently, due to the sudden and unexpected increase in workload, he was considering requesting additional assistance from the spare controller but had not done so when the incident occurred. The FIN DIR was operating as mentor to an experienced trainee, who had previously been operational at another Aerodrome/Approach Radar Unit and he had completed about 200hr training on TC Stansted at the time. The FIN DIR described his workload as light.

The Essex Radar Controller accepted an inbound release on the PA34 at ABBOT at FL70. The ac, which was on a training flight, had departed from Stapleford and had joined CAS routeing to CLN. He commented that the code/callsign pairing had 'dropped out' and, consequently, its SSR label was showing only the assigned squawk of 4364. The fps provided for this flight showed its destination as Andrewsfield. LTCC investigations reveal that this flight was not activated because a Departure Message (DM) was not input into the Host Computer System (HCS). There is a requirement, stated in the LTCC MATS Part 2, for ac departing from airfields, which do not have an auto-DM facility e.g. Stapleford, to be activated manually. If this is not carried out, the code/callsign conversion deactivates after one hour from the provisional time on the fps i.e. on this occasion at 1410. The LTCC ATC Investigations (ATCI) Section report states that it has not been possible to determine why this procedure was not carried out. Mention is also made that some controllers are acting under the mistaken impression that the act of instructing an ac to 'squawk ident' would activate such flights. A recommendation has been made addressing the issue.

The PA34 established communication with Essex Radar at 1413, reporting at FL70 on a direct track to ABBOT. The Essex Radar controller instructed the flight to maintain FL70 and asked for confirmation that it was inbound to Andrewsfield. He explained that, in his experience, this was an unusual destination for this type of flight and this supposition was substantiated when the pilot replied that he was landing at Cambridge. Initial descent to 6000ft was issued, together with a routeing of ABBOT to Cambridge (CAM). At 1415, the PA34 was instructed to descend to 4000ft, with the proviso that on passing 5000ft the ac would leave CAS and would be provided with a RIS. The controller's intention was to issue further descent to ensure that the flight remained below the London TMA, where the base, on the ac's routeing to the NE of Stansted, is 3500ft.

The B747 made its initial call on the Essex Radar frequency at 1417. The pilot reported descending to "one zero thousand" direct to ABBOT, with a speed of 250kt. Dialogue took place between the controller and the pilot to ensure that the standard pressure setting was set and descent to FL90 and then FL80 was issued. The RT transcript shows that, in this period, the pilot did not always respond to the transmissions being addressed to his flight. The controller commented that he assessed that the B747 was approaching too high and fast to be vectored into the LH DW position for RW23 at Stansted. The radar recordings show it

was about 26nm E of Stansted, passing FL115, with an indicated ground speed of 301kt at the time it established communication with Essex Radar. He said that he had two options; to hold at ABBOT, whilst the ac lost height, or to position the ac through final approach, into a RH cct. In view of the difficulty in communicating with the crew, he chose the latter option, as he considered vectoring the ac would be more straightforward. Consequently, he instructed the B747 to turn L heading 280°, followed by issuing descent to 6000ft. Shortly afterwards, the pilot requested to fly "normal speed" and was given a speed of 220kt. At 1420:24, as the B747 was passing FL77, it was cleared to descend to 4000ft. The radar shows that the PA34 was 3nm behind the B747, at the time, maintaining 4000ft. The flight was then transferred to the FIN DIR for final positioning.

After establishing communication with the FIN DIR, the B747 was informed by the trainee that it was being positioned for a RH cct for RW23. Subsequently, close to the FAT 8nm NE of Stansted (1422:00), it was instructed to reduce speed to 180kt. The B747 was given two R turns to position it into the cct i.e. 035° and 050°, the latter when it was 16nm from touchdown. At 1424:20, the trainee instructed the B747 to turn R heading 135° for base leg. The mentor said that, as the instruction was passed, he noticed the 4364 squawk (the PA34), showing at 4000ft in the London TMA, just outside the Stansted CTA. He immediately warned his trainee of its presence, who, straight away, transmitted to the B747; *"c/s if you could expedite the turn please there's traffic er indicating c/s this is avoiding action descend immediately to altitude three thousand feet turn right heading one eight zero degrees"*. Once the pilot had acknowledged the heading and descent instructions, he was passed information on traffic at 4000ft, 2nm to his NE, which was tracking NW. The pilot commented about TCAS but the following word is unintelligible on the RT recording. The radar recording, timed at 1424:20, when the base leg turn was issued to the B747, shows this ac at 3900ft, with the PA34 in its two o'clock, maintaining 4000ft, 4·8nm away. The horizontal separation reduces to 3·8nm as the B747 is instructed to expedite its turn, at which time STCA activates with a low severity alert, changing to high severity at 1424:45, when the subject ac are 2·9nm apart. Meanwhile, as well as warning his trainee, the mentor had pointed out the confliction to his colleague on Essex Radar who, in turn, instructed the PA34 to turn R heading 360°. The Essex controller explained that, as the ac were now passing, with no risk of collision, he considered it unnecessary to use the term 'avoiding action' or pass TI. The minimum separation is recorded as 1·8nm/0ft at 1425:04, by which time both ac are in their respective R turns away from each other.

Much discussion took place as to why the potential confliction between the subject ac had not been detected earlier by either controller. Initially, the PA34's fps indicated that the ac was inbound to Andrewsfield. As this airfield is situated due E of Stansted, on the CTR boundary, the Essex Radar controller rightly believed that it would not be traffic to any ac working the FIN DIR and, accordingly, did not inform him of its details. The FIN DIR, who was seated to the L of his trainee, with the Essex Radar controller to his R, said that he had, in fact, noticed from the CCTV screen of the Essex fps display, the presence of the PA34 inbound to ABBOT at FL70. He had discussed this flight with his trainee but in view of its destination being given as Andrewsfield, they had both agreed that that it would not present a confliction to any of their traffic. However, when the ac's correct destination became apparent to the Essex Radar controller, he did not advise the FIN DIR accordingly, especially as he intended transferring the B747 to his frequency. The TC Stansted MATS Part 2, Page STN 3.3, states that: *"Transfer of communication to Stansted FIN is not to be carried out until the ac is clear of confliction with any ac remaining under the control of Stansted INT, unless the subject of coordination"*. The Essex Radar controller said that he did not anticipate that the subject ac would conflict and for this reason he did not inform the FIN DIR about the PA34's revised routeing. Subsequently, the Essex Radar controller became busy with the increasing workload on his position and did not monitor the progress of the subject ac, relative to each other. He commented that, not only was he controlling a number of inbound ac but also he was busy co-ordinating the PA34 into Cambridge and discussing with London Military an ac, about which he had no prior information that was returning to Stansted from an air test. The FIN DIR mentor said that, from his position seated well to the L of the Essex Radar controller, he was not aware how busy his colleague was. Because Cambridge agreed to accept the PA34 at 4000ft

inbound to CAM, the Essex Radar Controller said that he had to change his plan with regard to this ac. Instead of issuing descent to 3000ft, to ensure it remained outside CAS as he intended, by maintaining 4000ft it was within the London TMA and, consequently, came into confliction with the B747. The FIN DIR stated that he thought he should have noticed the presence of the PA34 in potential confliction with the B747 at an earlier stage. By his own admission, because his trainee only had two ac on the frequency, he was not monitoring his trainee, and the overall traffic situation, as closely as he might have done. Although his trainee had not made an error, he felt that if he had been concentrating closer, he might have noted the problem before the B747 was turned onto base leg. He could then have taken appropriate action by issuing the B747 with descent to 3000ft and instigating an earlier turn from the DW heading. He added that the flight was not routinely given descent to 3000ft, in case the ac made a wide turn at the end of the downwind leg, resulting in it routeing out of the Stansted CTR. He was not sure that, if the PA34 had been code/callsign converted, it would have helped to make it more conspicuous on the radar display. It is feasible though, as the PA34 was in an area where ac routinely transit below CAS, showing various SSR squawks, the controller mentally filtered it out as pertinent traffic.

LTCC ATCI RECOMMENDATION

Relative to the procedure for non auto-DM airfields: *"It is recommended that LTCC MATS Part 2 is amended to include an instruction to ATC staff to ensure that departures from non auto-DM airfields are activated. It would be advantageous if a statement was included explaining that the action of instructing an ac to 'squawk ident' is insufficient to activate such flights."* DGM LTCC accepted this recommendation and appropriate information and procedures have been promulgated in LTCC Supplementary Instruction 72/03 (effective date 7 July 2003).

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 Essex Radar controller had formulated a plan. The B747's arrival had necessitated him vectoring it into a RH pattern for RW23 which, although not unusual, was different from normal. He had noticed that the destination airfield given on the PA34 fps was unusual and had ascertained the flight's correct details. His plan to descend the PA34 below 3500ft beneath the LTMA then changed owing to Cambridge issuing a release level of 4000ft to the CAM. It was this revised level that affected his original plan as it meant the PA34 would now remain within CAS; this, combined with the change to the destination airfield, put both ac into potential confliction. Hence, the Essex Radar controller should have co-ordinated the PA34 with the FIN DIR when the changes to the PA34's flight were disclosed but this step never took place. This had been a part cause of the Airprox. The off-going controller, at handover, had offered to help but this was not taken up at the time, a misjudgement that events showed would have been beneficial when the sudden increase in workload occurred. Discussion then moved on to consider the second part cause of this Airprox - why the FIN DIR had been unaware of the PA34's presence when he vectored the B747 into conflict with it. Earlier, he had seen the PA34's fps but, as the destination had shown Andrewsfield, he had dismissed it as non-pertinent traffic to the B747. Although the PA34 went uncoordinated, it was showing on the radar display but as the flight had not been activated in the HCS, the code/callsign converted data block had dropped out, leaving only the squawk code and Mode C showing. In normal TC operations, code/callsign converted radar data blocks are displayed by ac which are within CAS, whilst non-code/callsign converted targets are those ac routeing outside. Members believed that because the flight's details had been both input incorrectly and not activated in the HCS, this had led the FIN DIR not 'to see' the confliction unfolding and had contributed to the Airprox. Members were unable to resolve how the FPL input error had occurred, being unfamiliar with the arrangements in place at Stapleford, the departure airfield. One possibility may have been a misread handwritten completed form or a typing error during the submission process, from the departure or parent ATSU through to the Initial Flight Processing System unit at Brussels.

Turning to risk, the FIN DIR mentor had only noticed the confliction when his trainee instructed the B747 to turn R onto base leg but action was then triggered. After warning his trainee, who issued avoiding action descent and turn instructions followed by TI, he alerted Essex Radar, who then turned the PA34 R onto N. Meanwhile the B747 pilot had seen the PA34 on his ND and had received a brief TA alert during the R turn and had complied with the ATC instructions. The PA34 pilot had been unaware of the conflict and had complied with the turn instruction given. All these actions combined in a way that was enough to persuade the Board that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Essex Radar Controller did not coordinate the PA34 with the FIN DIR who, unaware of its presence, vectored the B747 into conflict.

Degree of Risk: C

Contributory Factor: Flight details for the PA34 were input incorrectly into the Flight Data Processing System and not activated as per MATS Part 2 Instructions.

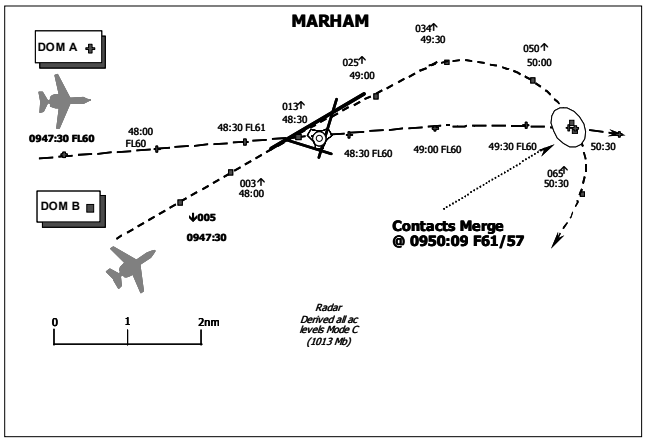
AIRPROX REPORT NO 61/03

Date/Time: 30 May 0950

Position: 5239N 0040E (Marham Overhead - elev 75ft)

Airspace: London FIR (Class: G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Dominie T Mk1	Dominie T Mk 1
Operator:	HQ PTC	HQ PTC
Alt/FL:	FL60	FL60
Weather	VMC	VMC
Visibility:	+10KM	+10KM
Reported Separation:	Nil H 2/300ft V	N/K
Recorded Separation:	400ft V c0.28nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT of DOMINIE (A) reports flying a black ac with a white top from Cranwell with HISLs selected on, squawking 3661C, conducting an instrument approach at, and in receipt of a RIS from, RAF Marham DIR . While heading 114° at 180 kt during a Sector 2 join to the TAC procedure for Marham Rwy 06 (Plate: R1C dated 20 Mar 03), he saw another Dominie from the same unit, below and to his left, turning towards in a climbing attitude. After 2-3sec it was clear that a collision was highly probable, therefore he initiated a steep climbing turn to the left while simultaneously selecting full power, thereby generating enough vertical separation from the other ac for it to pass directly underneath him 200-300ft below. The pilot's assistant in the right-hand seat concurred the captain's assessment that a collision would have been highly probable had the avoiding action not been taken.

At the time of the incident the ac was: 4DME (MAM) at FL60 (1nm past the IAF) Hdg 114M.

THE PILOT of DOMINIE (B) was flying a similar ac and was conducting a multi-engine refresher sortie. After conducting a radar search of the East

Anglian Coast, the Nav Instructor initiated a PD to Marham for a PAR approach and Anglia Radar handed him off to Marham DIR on a UHF frequency, he could not recall the squawk but Mode C was selected. When approximately 10nm S of Marham he heard DIR clear Dominie (A) to join the TACAN hold FL60. He did not hear a reply since, on Marham's instructions, the other ac was working a VHF frequency. He did not recall any other calls to Dominie (B) before he changed to Talkdown frequency and he continued with an uneventful PAR and overshoot on runway 06, his departure clearance at this stage being to climb on runway track to FL100 before heading for the Daventry RVC. Passing approximately 3000ft while in receipt of a RIS his clearance was revised to "Own nav for the Daventry corridor" and he recalls the Nav Instructor asking the student which was the best way to turn. With the Wash Danger Areas to the N of the ac position he initiated a right turn towards the W, after the PA looked then cleared him to the right. Approaching FL60 Marham DIR asked if he was visual with a similar type in the TACAN hold and the PA crouched down to look up through the right hand cockpit window whereupon she calmly called visual with Dominie (A) passing overhead. At that stage he was not aware of how close a collision had been but he did recall, about 1 to 2 minutes later, DIR asking if he had been visual with Dominie (A) to which he replied that he had been visual but did not clarify that this was only after DIR had asked.

THE DOMINE STATION comments that both crews involved in the Airprox are from the same Sqn. The crew of the Dominie (B) explained that the first call they received informing them of the other Dominie was after their clearance to maintain runway track and climb to FL100 was cancelled in favour of navigation at their own discretion. The facts are that the crew turned and climbed into the flight-path of the other ac. They were surprised that ATC allowed the radar returns of these ac to merge without positive responses from the crews that they were in visual contact. Lookout is restricted from all crew positions in the Dominie and in this case the captain was completely blind-sighted to the opposing ac by the cabin roof; the occupant of the right-hand seat has primary responsibility for visual clearance when in a right hand turn. When the crew cleared the initial turn it is probable that the other ac was not yet in sight however, once the turn had been initiated, it is a fact that the pilot's assistant in the right-hand seat did not see the other ac until prompted by ATC. The crew state that they were not aware of any previous advisory calls on the position of the other ac. They assessed that the risk of collision was high. The crew of Dominie (B) were perhaps, lulled into a false sense of security as they were under a radar service departing from the airfield and did not take enough care to maintain a good lookout during their climbing turn. They also believed that Marham ATC did not give sufficient advice to the crew of Dominie (B) on the proximity of the other ac. This is a salutary lesson that, even when receiving a service from an ATC unit, the crew is responsible for their safe separation from other ac.

MIL ATC OPS reports that all timings in this report are UTC. No RT transcripts are available for this incident; therefore the timings are solely from the radar video recording.

The airfield had been hit by lightning prior to the event and it would appear that the recording system had been damaged, but only on the DIR (DIR) and Approach (APP) frequencies. Thus there are no RT recordings of this incident. All recorded comments are therefore taken from written reports.

Analysis of the Debden Radar Video recording at 0947:58 shows Dominie A, on a 3661 squawk 1nm W of Marham, on an E heading at FL60. Dominie B is shown on a 3657 squawk 0.5nm WSW of Marham, on a NE heading indicating FL02. As the contacts pass overhead Marham, the Mode 3A of each ac drop out, but from the tracing, Dominie A remains on an E heading at FL 60 while Dominie B is shown to climb through FL27 on a similar heading. At 0949:12, Dominie B is slightly to the N of Dominie A but the 2 contacts are touching. As both contacts continue to head E and are still touching, Dominie B is shown to climb through FL50 and the contacts merge at 0950:10 as Dominie B indicates FL57, 400ft beneath Dominie A. The labels then garble and the contacts cross over so that Dominie A is now slightly to the N of Dominie B. At 0950:29, Dominie A climbs to FL66, as Dominie B is less than 0.5nm to the S indicating FL65. Dominie A descends back to FL61, 5sec later as Dominie B climbs through FL72 and the contacts diverge as Dominie B turns to the S.

The Marham weather at the time was reported BLU. DIR was working Dominie A in the TACAN hold at FL60 under a RIS. APP (U/T) was controlling Dominie B on an IFR departure following a PAR and from his report, he instructed Dominie B to climb to FL100 on his own navigation towards the Daventry Corridor under a requested RIS. As the departing Dominie (B) transited towards the Dominie (A) in the TACAN hold, the APP mentor report stated, the TACAN traffic was called to C/S B, who acknowledged "roger". As the ac returns closed, the traffic was called again and was again acknowledged "roger". The APP mentor commented that as the departing Dominie (B) passed the ac in the TACAN hold, he instructed APP U/T to verify that the departing traffic was visual, to which C/S B replied "affirm". DIR stated in his report that as C/S (B) climbed out, he called it to C/S (A) who was approximately Marham 120° at 2 miles, to which he responded "roger looking". As the departing Dominie passed FL 40, DIR stated that he called the traffic again and asked Dominie B to report visual, which he did. DIR added that after a few seconds, the Dominie in the TACAN hold asked if the other ac was visual with him and DIR sought confirmation from APP. Simultaneously, Dominie (A) transmitted that he was taking a climb and turn to avoid…at the same time C/S (B) turned South-West routeing for the Daventry Corridor.

The report submitted by the supervisor (SUP) corroborated the reports of DIR and APP; as the Dominie pilot in the TACAN hold requested if the other pilot was visual, SUP asked APP to confirm this and ″affirm″ came back. Without the RT transcripts it is difficult to determine whether Dominie A had turned before or after the departing Dominie became visual. Both these ac had been worked by DIR, doing the same evolution and following the same profile. Both ac were on the same frequency when Dominie A requested a TACAN approach. Under the rules in JSP 318A 235.115, both DIR and APP fulfilled the conditions of a RIS; although in hindsight, and acknowledged by the unit, imposing a climb out restriction on the departing Dominie, until he called visual would have prevented the incident from occurring. APP stated in his report that the departing Dominie was IFR, but the pilot reports both stated that they were VFR and VMC. As both ac were visitors conducting PDs, and possibly unfamiliar with Marham procedures, it would not be unreasonable to have taken the "belt and braces" approach by applying a climb out restriction until the 2 ac had passed in proximity. Both ac were provided with TI that enabled the crews to acquire visual contact with the other ac. Additionally, the Dominie in the TACAN hold opted to climb and turn in an attempt to ameliorate the situation, until the crew was assured that the other ac was visual. Following this Airprox, the unit has taken action to prevent a recurrence. The Marham Controller's Order Book has been amended so that a climb out restriction is to be imposed by APP when there are ac in the TACAN hold, regardless of the type of radar service being applied.

HQ PTC comments that it is regrettable that the RT recordings were lost. But this looks quite plainly like another case of controllers staying rigidly within the rules where the exercise of common sense – applying a climb out restriction until they were safely visual with each other – would have been the wiser course. Undeniably, either pilot could have broken the merge (and did, ultimately) but it was the controllers who (literally) had the big picture. The RIS rules are not serving us well. They need to be changed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board considered it most regrettable that an RT recording was not available. Members were informed that the Marham recording equipment records 28 channels and, in accordance with local procedures, one had been checked on the day of the incident and the equipment declared serviceable. The channel that was checked that day was not the APP or DIR frequency or the respective consoles.

There were several important discrepancies between the reports provided by the controllers and the pilots, which could not be resolved without an RT recording. In particular there were inconsistencies between the reports regarding which frequency and control station the pilots had been working at the time of, and immediately preceding, this incident. Furthermore controller

reporting indicated that on more than one occasion TI was passed to Dominie (B) on Dominie (A), and that the TI was acknowledged; yet the pilot states that no TI was received. It may have been, that though the Controller gave the TI, it was for whatever reason not transmitted or received by the pilot. The Board was not able to resolve these discrepancies and therefore was unable to compile a full and accurate reconstruction of the events leading up to and possibly contributing to the Airprox.

Members were informed by HQ PTC that the pilot's view from the cockpit of Dominie ac, particularly the cross-cockpit visibility, is well known as being particularly poor and that measures are in place in the Command to ameliorate the risk and to ensure that crews always positively clear their flight path prior to making any manoeuvre. On this occasion the Pilot's Assistant (PA) in the right hand seat had been an inexperienced trainee Flight Engineer who may not have been fully conversant with the role of being 'pilot's eyes' on the right or recognised that the closeness of the other ac presented a serious threat to their safety. When the pilot of Dominie (B) executed the overshoot and climbout, his rate of climb was high and, for seemingly good reasons, he turned towards the other ac in the Tacan Hold, indicating that he was probably not aware of its position.

There was discussion by members regarding the suitability of the types of radar service being provided and whether they were requested or assumed, however they were unable to determine whether the pilots were expecting a RIS or an Approach Control Service. Notwithstanding this, Members noted that both pilots stated in their respective reports that they were operating VFR under a RIS at the time of the incident, one conducting an 'instrument' departure and the other on an 'instrument' arrival. Members took the view that the pilots were ultimately responsible for collision avoidance. Owing to the aforementioned anomalies in the reports submitted, no conclusions could be reached on whether or not the controllers had fulfilled their responsibilities when providing a RIS. That said, controller Members thought it would have been more sensible to impose an altitude limitation on the departing Dominie thereby ensuring positive deconfliction and thus preventing the incident. The Board noted that this procedure has now been adopted at RAF Marham. As it was, lookout by the crew of Dominie (B) had not disclosed Dominie (A) above them and the former had climbed steeply into confliction.

When considering the degree of risk Members noted that despite conducting an instrument approach procedure and allegedly not being passed any TI, his lookout was such that the pilot of Dominie (A) saw Dominie (B) well below his ac and immediately recognised the potential confliction allowing him just enough time to take effective avoiding action. The pilot of Dominie (B) did not see the other ac and it was agreed that the proximity and relative positions of the 2 ac had been such that safety had been seriously compromised.

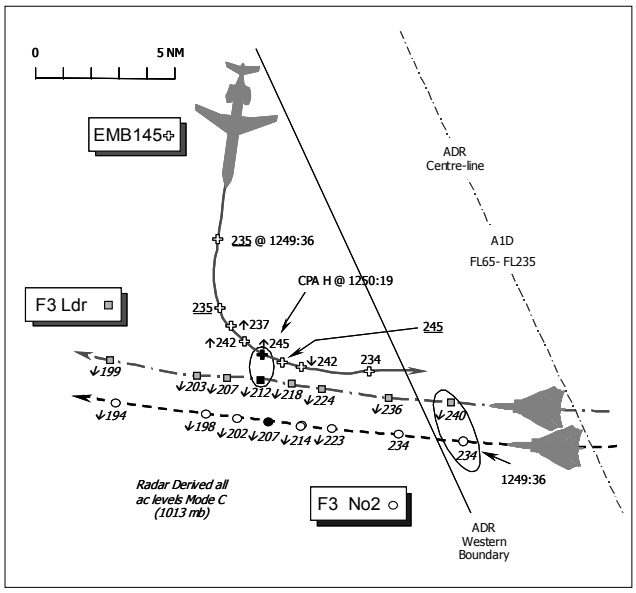
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the crew of Dominie (B) who climbed into conflict with of Dominie (A).

Degree of Risk: B

AIRPROX REPORT NO 62/03

Date/Time:	2 Jun 1250	
Position:	5639N 0517W (325° (T) LOMON 42nm)	
Airspace:	Scottish FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	EMB 145	Tornado F3
Operator:	CAT	HQ STC
Alt/FL:	FL235	23000ft (RPS 1001 mb)
Weather	IMC	VMC CLBC
Visibility:	NR	>10km
Reported Separation:	Not reported	4000ft V, 2½nm H
Recorded Separation:	100ft V @ 6·8nm 0·94nm H @ 3300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMBRAER 145 PILOT reports that before departure from Stornoway, ATC informed them of increased military activity in the area and asked if they would like a direct routeing to Edinburgh or via "*the airway"* [sic]. Due to the increased activity they elected to track via the *"airway"* with a RAS. About 80-100nm N of Edinburgh on track LOMON [on advisory route A1D] at 300kt, Scottish CONTROL informed them of traffic at 10 o'clock and advised them if not sighted to turn R onto 200°, before then instructing them to turn L onto 090º. Flying in IMC level at FL235 [the upper level of A1D] in the left turn with the Wx Radar on, about 50nm from Glasgow two returns appeared on TCAS within 10nm range heading straight toward them. A few seconds later – whilst still in the L turn - TCAS enunciated a '*climb'* RA. The 1st Officer - the PF - disconnected the autopilot and initiated the climb, ascending to FL244 before they were *'clear of conflict'*. The other ac was not seen but appeared from the TCAS display to have gone straight underneath them. He telephoned ScACC after landing and advised that a report would be filed. The controller advised that the military ac was working an AWACS, but ScACC had no way of contacting them. He opined that *"military ac should stay clear of airways if they were unable to maintain communications with ATC at all times".*

THE TORNADO F3 PILOT reports his ac has a grey camouflage scheme and the HISL was on whilst flying as the leader of a battle pair on a Combined QWI Course and the northerly ac of the pair. They were in receipt of an air defence service from an AWACS [broadly equating to a FIS] who informed them about civilian traffic, tracking S at 24000ft which was detected on their AI radar at a range of 15nm. The formation was not engaged in high energy manoeuvres and had maintained altitude and heading for the past 5min. Heading 265° at 480kt flying level at 23000ft RPS approaching a range of 10nm from the other ac, the track on the AI radar settled at 45 right, at 23000ft indicating that it would pass astern of his jet. Although he was visual with his No2 the *"visibility was IMC"*; at 10nm range he decided to descend to avoid the other ac, which was communicated to his wingman and a descent initiated at a range of 9nm. At the closest point the ac's cockpit recording tape shows the airliner passed 2nm astern and 4000ft above his ac that was descending at 2000ft/min. No risk of collision was observed. He viewed the 'tapes' on return and plotted the other ac 2nm W of the ADR at 23000ft. Considering that they were involved in an exercise with all its associated communications, he was content that they had

avoided any collision risk; the civilian ac did not appear to take any avoiding action.

ScOACC WEST COAST SECTOR CONTROLLER (W COAST SC) reports that Stornoway ATC requested clearance for the EMB145 to route direct to STIRA for Edinburgh. Stornoway was advised by WEST COAST Sector of heavy military activity to the E of ADR A1D and the EMB145 elected to route along A1D. After departure from Stornoway, the EMB145 was identified, placed under a RAS and the crew offered a climb to FL250 into the Class B UAS, but this was declined. Multiple military contacts - in several groups of 3-4 ac were observed manoeuvring to the E of advisory route A1D and across W3D, but Buchan CRC FIGHTER MARSHAL advised that all these ac were operating autonomously under the control of an AWACS ac. An initial turn onto 185º was given to the crew to remain some 10nm W of one group of contacts, which headed W toward the EMB145. On clearing this confliction the EMB145 crew was instructed to resume their own navigation for GOW VOR. Another group of contacts displaying 2 squawks - A0200 and A0300 – indicating between FL235 and FL240 unverified Mode C, were then observed some 25nm SE of the EMB145 heading W toward the ADR, anticipating that this group would turn N toward the first group a further right turn onto 190º was given to the EMB145. However, this group squawking A0200/ 0300 – subject F3 pair - continued W and so the EMB145 was then given a L turn onto 090º & then 080° to go behind them. During the turn the EMB145 received a TCAS resolution advisory to climb.

ScACC ATCI reports that the notified exercise, 'Combined QWI Course', was underway in the western portion of the Scottish FIR on the day of the Airprox. It had originally been planned to operate N of Lossiemouth but all activity had been moved S owing to an emergency near Wick. The ACN for the CQWI specifically addressed 3 other ADRs but not A1D. The movement of the exercise to the new location was not formally notified to ScACC by AUS. Prior to handover to W COAST SC the Stornoway controller requested a direct route to STIRA for the EMB145. The ScACC controller advised that there was heavy military activity to the east of ADR A1D and the EMB145 crew elected to remain on the ADR. Once identified, the SC placed the flight under a RAS and A clearance at FL235 – the correct quadrantal for that route [at the upper limit of the ADR] was issued. The W COAST SC advised at 1233:30 – some 17min before the Airprox occurred – *"[EMB145C/S] there's a lot of military activity …its just…to the north of RANOK by about 20 miles up towards Inverness so if you stay on the advisory route till about 20 miles short of the GOW then that should see you clear of that traffic",* which the EMB145 crew acknowledged. However, just before 1242:00 – over 8mins before the Airprox - W COAST SC offered the EMB145 crew a climb into Class B CAS *"…if you want to take a climb FL250 er can make it radar control on the upper air route"*, but this was declined by the EM145 crew, *"…I think we'll be OK here actually thanks"*. Traffic information was issued to the EMB145 crew with a turn away from the ADR to avoid other fast-moving westbound military traffic at 1248:04, 1 min before the Airprox with the subject F3 pair. This placed the EMB145 7nm W of the ADR centreline at the time the reported Airprox manoeuvres were initiated some 2nm outside Class F airspace. At 1249:06, the W COAST SC passed traffic information on further fast-moving traffic some 16nm distant westbound crossing from L-R, indicating the same level and squawking A0300 & A0200 - the subject F3s - together with an instruction *"if not sighted turn right heading 220°"*. This was immediately cancelled by another instruction *"if not sighted turn left heading 090°"*. STCA was triggered at 1249:22, when the ac were 12nm apart. Further traffic information and a turn were issued with the flights maintaining their levels and the military ac maintaining their course. Directly afterwards the EMB145 crew reported a TCAS RA and initiated a climb, ascending to FL245 as the pilot complied with a L turn instruction onto 080°.

[UKAB Note (1): The ScACC Tiree radar recording shows the F3 pair westbound crossing above Class F airspace; though the Mode C is difficult to read due to SSR label overlap the lead ac appears to be flying at FL240-241 and the No2 at FL236. At 1249:36, the lead ac – the most northerly of the pair which maintain 1½nm spacing to port throughout - is shown in descent some 4·2nm from the centre line of the ADR and 10nm from the EMB145, passing FL240 unverified Mode C with the No2 passing FL234. The lead F3 is shown descending through FL236 - 100ft above the EMB145 – at a range of 6·8nm at 1249:55. Maintaining FL235 until 1250:07, the

EMB145 is then shown climbing through FL237 in response to the TCAS RA; at the same time as the lead F3 is 4·03nm away 1300ft below the airliner. Minimum horizontal separation occurred at 1250:19, as the lead F3 passed 0·94nm S abeam the EMB145 – starboard to starboard – descending through FL212 some 3300ft below the airliner, which ascended to a maximum of FL245 at this point. The lead F3's RoD from FL240 unverified Mode C to the CPA was about 4200ft/min.]

Following the conflict the EMB145 crew turned toward the ADR centreline, but the W COAST SC turned the EMB145 direct for the GOW VOR. The pilot of the EMB145 subsequently stated that he never saw any military ac visually – only on TCAS.

Active steps are currently being taken at NATS headquarters level to arrange formal meetings between MoD and NATS to ensure that military ac engaged on exercises within the ScACC area of responsibility are fully aware of the location of ADRs, keep an active lookout when crossing and seek a service from military radar units where possible.

ASACS SSU comments that no tape transcript was available from the AWACS due to exercise communications jamming of the control frequency. The F3 pair was under a FIS from the AWACS E3D and was the southern element of 2 x F3 CAPS separated by some 90nm and subject to communications jamming on the control frequency. Therefore, a FIS was the highest available service that could be offered by the AWACS Weapons Controllers (WC). Under FIS the F3 crews were responsible for the safe separation from other ac. It is also clear from the narratives provided, that the weapons control team on board the E3D were busy and that the focus of their attention was to the Northern CAP and not the subject F3s. The WC states that he made several calls about non-exercise traffic to the F3s, although he cannot be certain that the EMB145 was one of those particular calls. However, the F3 pilot's report indicates that the crews were aware of the E145 and maintained what they considered to be appropriate safe separation.

UKAB Note (2): The exercise was notified to AUS who issued an Airspace Co-ordination Notice - ACN 2003-006-0081 - and took NOTAM action to notify other airspace users of the activity taking place from 02-13 Jun. [The Airprox occurred 20min after commencement of the exercise activity.]

The ACN noted that *"Activity within this airspace will be NOTAM'd by AUS. It is not segregated and is in no way protected or reserved for this Exercise. CQWI crews must expect to encounter non-participating military and civil aircraft operating in the area. Moreover…a number of busy Advisory Routes (ADRs) and Helicopter Main Routes (HMRs) transit the area; these will remain active during the Exercise times. Crews are advised to be vigilant when operating in their vicinity."*

Furthermore, the ACN warned *"Pilots operating on the ADRs listed below are to take note of the intense aerial activity associated with FAOR operations and exercise extreme caution when transiting the associated airspace. Exercise participants are also to be extra vigilant when manoeuvring in the vicinity of ADRs, particularly those listed below which are located directly below the FAOR North:*

W3D from BONBY to SUM; W4D from ADN to WIK;W5D from ADN to SUM."

THE TORNADO F3 PILOT'S STATION comments that based on the F3 pilot's narrative they were content that the pilot had adequate situational awareness and had taken appropriate action to ensure safe separation.

HQ STC comments that the F3 crews were fully aware of the ADR, which they avoided in the 1000ft crossing space provided. They were keeping an active lookout and had a service from a military radar unit. The F3 crews were aware of the EMB145 and manoeuvred to ensure safe separation. However, the EMB145 and ScACC were unsure of the F3s' awareness and intentions, and thus took avoiding action. The incident could have been avoided if the radar unit talking to the EMB145 had been able to communicate with the radar unit talking to the F3s, and thus confirm intentions. STC Flt Safety will pursue a study into how communication can be enabled between AWACs and ground radar units who are providing a service in shared airspace. Finally, it is unclear as to why the EMB145 did not accept W COAST SC's suggestion to fly at FL250,

and thus avail himself of the protection of the Class B CAS, rather than accept the lesser separation to be expected in Class F and G airspace. Furthermore, by flying at the upper limit of the ADR, he was only allowing 500ft separation from ac using the 1000ft crossing space available.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The STC member reiterated his concerns that the F3s were in communication with one of the most advanced control platforms in existence, yet, the controllers aboard this AWACS ac were unable to co-ordinate the F3s' flight with ground ATSUs. In operational theatres the 'all seeing' AWACS ac provides a highly effective service to air defence (AD) crews who are accustomed to working under close control from this airborne radar unit. This might give rise to a perception amongst some AD crews that the AWACS is more capable than it actually is in the intense environment of UK airspace. The ASACS advisor explained that co-ordination trials between AWACS controllers and ATSUs had been completed several years ago but had proved to be unsuccessful. Notwithstanding earlier efforts, the STC member resolved to find a technical solution to this perplexing difficulty which he believed hampered AD pilots operating in the UK airspace and air traffic controllers alike.

However, in the situation surrounding this Airprox the AWACS ac's sensors were subject to jamming during the exercise and the F3 pair was thus only in receipt of a FIS. Nevertheless, despite the artificial interference, it was noted that the AWACS controller had passed a warning about the civilian traffic, which enabled the F3 pair to detect the EMB145 at a range of 15nm on their AI radar. All this was unknown to the W COAST SC who had passed traffic information to the EMB145 crew at about the same point. For his part the airliner pilot was mistaken in thinking he was flying along an *"airway"* with the 'protection' of Class A CAS - the ADR is Class F airspace, which previous vectoring had taken him away from, leaving this clearly an encounter in Class G. Moreover, there is no stipulated requirement for AD flights to be in communication with the applicable civilian sector controller and the F3 pair were legitimately entitled to fly through this airspace if they elected so to do. CAT pilots and civil controller members alike thought the EMB145 crew's decision to fly IFR remaining in Class F airspace was unwise, when offered the alternative by the W COAST SC of climbing a mere 1500ft into the sanctuary of the Class B UAS. Operating characteristics and performance parameters of the airliner aside, in the Board's view, flight within Class B CAS might well have avoided much of the exercise traffic. Nonetheless, a civilian controller member was critical of the F3's decision to pass across the ADR without a radar service, but it was clear to the Board that the F3 leader had flown above A1D – crossing westbound at FL240, some 500ft above the upper level of Class F airspace - and thus remaining entirely within Class G airspace. It was also pointed out that the F3 leader was flying in an area where he was, at the time, IMC on visibility, so some members wondered if it was reasonable to operate under "see & avoid" parameters so adjacent to the ADR. However, with good AI contact on the conflicting EMB145 (possibly also with a 'data linked' picture the ASACS advisor suggested) the Board agreed that the F3 leader's decision to avoid the airliner by descending below it using onboard radar was sound. Notwithstanding the tolerances applicable to Mode C, it appeared the No2 had dropped marginally into Class F airspace when the pair started their descent to avoid the airliner, which the No2's AI radar would have shown was not itself in Class F airspace. As it was, the EMB145 crew had assiduously followed the W COAST SC's turn instruction to avoid the previous pair, an instruction that had the unwelcome effect of taking the airliner's track away from the ADR, where the exercise aircrews might have presupposed that GAT would be encountered. This produced a difficult situation for the ScACC controller with few options. The first avoiding action turn issued by the SC [R onto 220°] could have exacerbated the situation, however when the controller issued the subsequent L turn eastbound – eventually onto 080° - this also influenced the outcome of this encounter. Commercial pilot members opined that the L turn had the effect of taking the airliner's nose through the descending fighter's track,

thereby placing the fighters in the airliner's TCAS 'sights', which in turn had induced the climb RA. However, by the time the radar recording showed the EMB145 in the climb, the F3s were already some 1300ft below it. The F3 leader's report, coupled with the ASACS overview, had revealed that the fighter pilots were entirely cognisant of the airliner and the pair was descending rapidly to avoid the EMB145; unfortunately, this was not evident to the latter's crew nor the W COAST SC at the time. The Board concluded, therefore, that this Airprox had resulted from a conflict in the vicinity of an ADR resolved by the combination of the F3 pair's rapid descent and the W COAST SC's avoiding action turn instruction. Although the airliner appeared to track near to the F3 pair, by the time the subject ac had passed abeam each other at minimum horizontal separation of just under a mile, the combined result of the F3's premeditated descent and the EMB145's TCAS climb resulted in 3300ft of vertical separation that convinced the Board that no risk of a collision had existed.

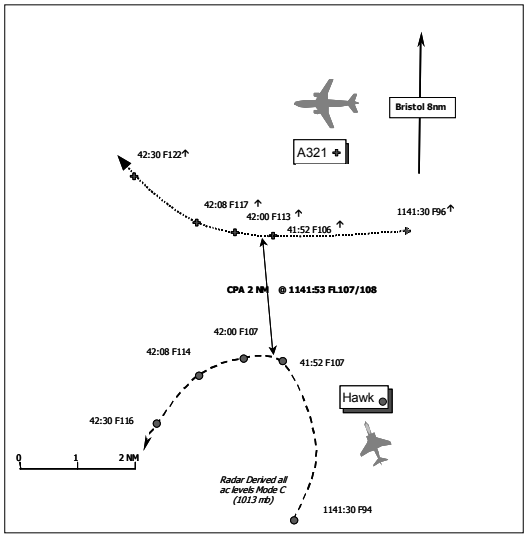
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the vicinity of an ADR resolved by the F3 leader and the W COAST SC.

Degree of Risk: C.

AIRPROX REPORT NO 63/03

Date/Time:	30 May 1142	
Position:	5115N 0240W (10nm S Bristol)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	Reported Aircraft
Type:	A321	Hawk T1
Operator:	CAT	DPA
Alt/FL:	FL90	FL90
Weather	VMC CAVOK	VMC CAVOK
Visibility:	+10km	+10km
Reported Separation:		
	4nm H 0 V.	1.5nm H 1000ft V
Recorded Separation:		
	2nm H 100ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports departing Bristol climbing through FL90 on a radar heading of 260º at 250kt when he observed on TCAS traffic on opposite track descending towards them. Bristol ATC requested a turn to 300º to avoid the traffic and recleared him to climb to FL130 so he selected expedite climb to reduce the turning circle. At this time he got a TCAS TA warning as they passed through the opposing ac's FL, which was seen to stop his descent and begin a climb. A single TCAS "climb" RA was received immediately followed by an "adjust vertical" RA. The autopilot was disengaged and TCAS warning was received "maintain vertical speed" followed by "clear of conflict". The opposing ac was under the control of Boscombe Down. The other ac was not seen due to sun and haze.

THE HAWK T1 PILOT reports that he was flying a red, white and blue Hawk ac on a singleton GH sortie where he was tutor to a Flight Test Engineer under instruction; they were squawking with Mode C while in receipt of a RIS from Boscombe. While he was in a level left turn passing through a

heading of 300° at 360 kt traffic was called to the N by Boscombe APP. He reduced the bank angle and sighted the ac but considered it to be no threat so the bank angle was reapplied and the mission continued.

BRISTOL APP reports an A321 departed Bristol towards EXMOR climbing initially to FL90 before being recleared to FL130. A Boscombe ac (Hawk) was seen operating to the SW and APP attempted to co-ordinate their traffic with Boscombe but were advised that the pilot was maintaining visual separation.

The Hawk turned towards the A321 on a parallel reciprocal heading and initially looked to be passing 3-4nm clear, however avoiding action was given to increase the separation. As the A321 was climbing through FL100 the Boscombe traffic turned left towards the A321 before turning away. The primary and secondary contacts were garbled with 2 other ac at low level.

The A321 advised that he had received a TCAS RA

MIL ATC OPS reports that Boscombe Radar (RAD) was working the subject Hawk on a 2622 squawk, in the block FL40 to FL150 under a RIS and were also working another Hawk on separate frequency. Prior to the incident RAD was continually updating TI to both ac. At 1140:42 the other Hawk called *"RTB, request practice PFL".* RAD passed TI to the subject Hawk. *"C/S, traffic N, 2 miles, manoeuvring no height"* which was acknowledged before turning his attention to the other Hawk for the requested a RPFL (Radar Practice Forced Landing). At 1141:49 he transmitted to the subject Hawk *"C/S, traffic N, by 2 miles, W bound, indicating FL 105*" (believed to be the A321 on a 7701 squawk). The Hawk pilot confirmed that he was visual with the other ac. At 1142:30, Bristol ATC called requesting TI on the 2622 squawk. RAD replied: "*he's manoeuvring in the block FL 40 to FL 150, is it the 7701 squawk?*" Bristol ATC confirmed this and stated: *"it's just that an Airbus has just taken avoiding action against it"*. RAD informed Bristol ATC that the ac was visual and manoeuvring under a RIS and continued to pass TI to the Hawk.

Analysis of the Clee Hill Radar Video recording at 1140:32 shows the A321, 6nm to the S of Bristol Lulsgate transiting WSW indicating FL77 on a 7701 squawk. The Hawk can be seen manoeuvring 12nm SW of the A321 in a NE direction indicating FL 90. At 1141:53 the Hawk is indicating FL107, 2nm S of the A321, which is indicating FL108. The 2 ac then diverge, the A321 moves to the NW indicating FL117 and the Hawk makes a left turn onto SW indicating FL114.

The Unit report states that RAD was working the Hawk in Class G in the Boscombe Down Advisory Radio Area, as defined in UK AIP ENR 5-2-4, which is typical of the sortie profiles flown from Boscombe Down. The rules applicable to a RIS are laid down at JSP 552 235.115. (was JSP 318A 235.125 at the time of the Airprox). The controller provided relevant TI to the Hawk prior, during and after the incident. The conflicting traffic was not called to the Hawk before it was 2nm away, however the TI enabled the Hawk pilot to become visual with the A321 with no less than 1.5nm horizontal separation. Although RAD was providing a RPFL on another frequency, he managed to divide his attention and allocate his priorities accordingly in an effective manner to provide both ac with a full service. The Bristol controller stated in his report that he had attempted co-ordination, with the A321 under RAS; from the tape transcript it is evident that TI was only requested after the incident had occurred from RAD by the Bristol Controller. The pilot of the A321 was responding to a TCAS RA and had "just taken avoiding action against it (the Hawk)".

ATSI reports that an A321 departed from runway 09 at Bristol International Airport. The airways clearance issued was to join controlled airspace at EXMOR climbing to FL90. The initial zone clearance was to climb straight ahead to FL60 and once in communication with the Bristol APP, the ac was turned right onto 180º and as it left the Bristol CTA it was placed under a RAS. When the ac was 12nm ESE of the airfield, the pilot was instructed to resume own navigation for EXMOR.

At 1139:30, the A321 was 8.5nm SE of Bristol Airport, maintaining FL60 and tracking approximately 260º whilst the Hawk, was 18nm to the SW of the A321 displaying a Boscombe Down squawk and manoeuvring with a Mode C readout of FL83. APP instructed the A321 to climb to FL130, having coordinated this with Cardiff and LACC. Forty sec later, the Hawk completed an orbit left with Mode C indicating FL91 and on

completion of this manoeuvre it took up a NE track, at which point it was in the 10 o'clock position of the A321 at a range of 8.1nm. Shortly after this, at 1141:00, APP passed TI to the A321 on the Hawk, which was unknown traffic to the controller, and instructed the A321 to turn right heading 300º. The words "*avoiding action*" were not used, but APP advised that the traffic would pass down the left of the A321 at a range of 4nm and that it was working Boscombe Down. The crew replied that they had the traffic on TCAS.

UKAB (Note 1): From the both the Bristol and Boscombe Down transcripts it is evident that the request from Bristol to co-ordinate was received by Boscombe at 1142:31 with the reply being transmitted at 1142:41. The CPA of the Airprox was at 1141.53.

At 1141:40, when the A321 was passing FL104, the Hawk, which was now 2.5nm S of the A321, commenced another left turn towards the A321. At this point the Bristol controller attempted to coordinate with the Boscombe controller but, unfortunately, he asked for information on traffic, which was squawking a different code to that of the subject Hawk. Separation reduced to a minimum, at 1141:53, when the Hawk was 1.9nm south of the A321 with 100ft vertical separation. No further 'avoiding action' was passed to the A321 after the initial instruction to turn onto 300º. Eventually APP established from the Boscombe controller that the Hawk was manoeuvring under a FIS provided by Boscombe Down.

UKAB Note (2). It is evident from the Boscombe Down transcript that the subject Hawk was in receipt of a RIS not a FIS from Boscombe and that was passed to the Bristol APP by Boscombe RAD at 1142.46. Bristol however, tells that A321 at time 1143 on the Bristol transcript that the Hawk was under a FIS.

The Hawk continued its left hand orbit and, at 1142:26, was in the A321's 8 o'clock position at a range of 3.5 nm. At that time the A321 indicated FL122 whilst the Hawk was indicating FL118. The Hawk rolled out of the turn and headed SE and the Bristol APP instructed the A321 pilot to resume his own navigation to EXMOR.

Bristol APP noted the presence of the Hawk early on but initially assessed that the 2 ac would not conflict. Subsequently, due to the random manoeuvres of the Hawk, he realised that they could come into conflict and he issued a precautionary right turn to the A321. It soon became apparent that this right turn instruction would be inadequate to maintain separation, as required under the terms of a RAS but instead of taking more positive action to resolve the confliction, the Bristol controller attempted to contact Boscombe Down to carry out coordination. The pilot reported that he had the other ac on TCAS but in the absence of an RA, the controller was responsible for attempting to achieve 5nm or 3000ft separation from the unknown traffic; therefore, the time spent attempting to coordinate would have been better spent issuing positive avoiding action instructions.

DPA comments that they do not consider this to be an Airprox. However if it is considered by the Board that it is, then one of the outcomes is that the A321 pilot is reporting an Airprox in Class G Airspace, in VMC, with an ac he did not see, although he was seen by the pilot of the reported ac who took appropriate action to remain well clear.

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 noted that the Hawk pilot had kept the A321 in sight throughout until their flight paths started to diverge. Further, the incident took place in Class G airspace and separation did not reduce below 2nm. On these grounds Members considered that, assisted by TI from Boscombe Down, the Hawk pilot had fulfilled his obligation to see and avoid the A321.

Members also noted and agreed with the succinct comment made by DPA.

Next the Board considered the information reported by the A321 pilot. The incident had been reported as an Airprox and as a TCAS Safety Report, with an annotated miss-distance of 4nm at the same height.

Weighing the miss-distances reported by both pilots, the ac tracks and CPA calculated from the Radar recording, the Board agreed that the A321 pilot had not seen the Hawk and that this incident constituted a sighting report by the A321 pilot based on TCAS information; since the Hawk pilot had been visual throughout there had been no risk of collision.

However, although it had not directly been a factor in the incident, ATC Members of the Board made the additional observation that, despite being aware of the Hawk at an early stage, the Bristol APP Controller did not attempt to meet the terms required by a RAS on the Hawk which had constituted 'unknown traffic'. They reinforced the ATSI comment that his time would have been better spent giving 'avoiding action' rather than attempting to coordinate with Boscombe Down.

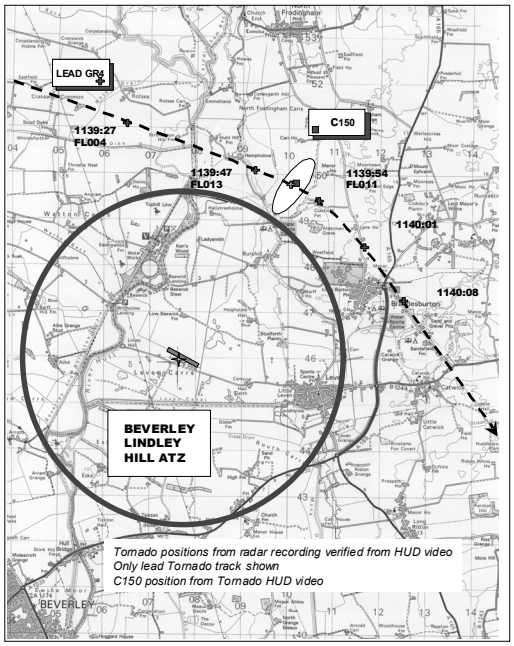
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS).

Degree of Risk: C.

AIRPROX REPORT NO 64/03

Date/Time:	4 Jun 1140	
Position:	5325N 0019W (Beverley Linley Hill CCT)	
Airspace:	UKDLFS LFA 11	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C150	Tornado GR4
Operator:	Civ Trg	HQ STC
Alt/FL:	1000ft (QFE 1009 mb)	1045ft agl (Rad Alt)
Weather	VMC Rain	VMC Below Cloud
Visibility:	8km	20km
Reported Separation:	7m V	50ft H 100ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C150 PILOT reports that he was on an instructional sortie from Beverley Linley Hill in a white C150 with red stripes in receipt of an Air Ground service from Beverley squawking 7000 but Mode C was not fitted. While heading 300° at 78 kt on the downwind leg of a visual circuit he had an Airprox with 4 Tornados, later identified by Humberside. First sighting was at 350m range with the Tornado passing 7m above. No further details were given.

THE HUMBERSIDE APP CONTROLLER reports that at 1143 he was called by the Cessna pilot to state that he had just been involved in an Airprox with a Tornado while operating in the Beverley Linley Hill ATZ. He met the Tornado head-on in the downwind leg and requested that a radar recording be retained. This was passed to the LACC supervisor and to AIS Mil. The weather was recorded as 210/06, 8k in rain showers, Few at 020, +16 +14, QNH 1010.

THE TORNADO GR4 PILOT reports that he was leading a 3-ship formation of grey Tornado ac on an authorised, booked, low-level tactical mission in the UK Low Flying System, within Class G airspace with HISLs selected on and squawking 7001C. He was turning to the NE of Beverley Linley Hill Airfield at position N5335·661 W00019 00 on to a hdg 130° true, at an altitude of 1045 ft agl with a TAS of 426kt, when his number 2 who was some 15sec (1½ nm) behind and displaced to the left as the formation was taking separation prior to joining Donna Nook AWR, called "*tally right, 2 o'clock. Light ac"* . Both the Navigator and he looked right in order to get sight of the contact but nothing was seen. They were then informed on the radio that an Airprox was being filed by the light ac.

On return to base they scrutinised the HUD video and saw a light ac fitting the description passing down his left hand side. It is worthy of note that the No2 pilot called the contact after it had passed the leader, who had no chance of seeing it at that late stage. The leader subsequently assessed the miss-distance as being 50ft H and 100ft V. At closest point they were just to the NE of Lindley Hill ATZ. He assessed the risk of collision as high, as they were unsighted.

STATION COMMENTS The SFSO studied the HUD video and listened to the R/T and intercom chatter and discussed the incident with several of the formation members including the leader. He was satisfied that the formation was properly authorised and flying in accordance with current low flying regulations. Owing to poor radio reception with Donna Nook AWR, the formation had climbed to 1000ft agl in order to get clearance to join the range. At the same time the ac were on slightly diverging flight paths to gain safe separation for the range join. The altitude prevented the light ac from being sky-lined and therefore seen much earlier; the divergent flight paths caused some perspective changes when the light ac was called causing the crew to look the other way. Unfortunately, the call came after the leader had already passed the light ac. The miss-distance quoted on the pilot's initial report is, he thought, somewhat pessimistic, the margin being in his opinion greater by at least a factor of 2.

This event was an Airprox in Class G airspace, where despite the fact that the No2 called the contact, circumstances prevented the lead crew from seeing it. He concurred with the Tornado pilot's assessment of a high risk of collision.

UKAB Note (1): The published ATZ for Beverley Linley Hill, from which the Military Avoidance Area is derived, is 2nm up to 2000ft agl with the airfield elevation shown 3ft.

UKAB Note (2): A thorough analysis was conducted of both the radar recording and of the Head-Up Display (HUD) video, which was provided by the Stn concerned. The Cessna is not seen at any time on the radar recording; it does however, show all 3 ac in the Tornado formation splitting into 3 individual elements in about 2nm line astern approximately 1min before the incident. The lead Tornado passes, as accurately as can be measured from the radar recording, 2½nm to the NE of Beverley Lindley Hill with the other 2 Tornados passing 2¾nm to the NE. The track of the lead ac is verified by the HUD video, which shows it tracking very close (within 50m) of Hunt Hill Farm and Hempholme (2.52nm N of the airfield datum measured on OS Sheet 107) both of which can be identified with a reasonable degree of certainty. In addition the IR signature of an ac can be seen momentarily on the HUD video as it passes down the left side of the lead ac, presumably due to the high closure rate, on a reciprocal heading. It is estimated that it passes less than 50m to the left and just below. It is therefore concluded that the Cessna is flying 6/700m outside the NNE boundary of the Linley Hill ATZ, heading 300° at between 950 and 1000ft agl.

HQ STC comments that this appears to be a case where 'see and avoid' did not work in class G airspace. It serves to highlight the dangers of flying at 'popular' heights, and the dangers of relaxing lookout when attending to other tasks. It also highlights the dangers of flying extra large circuits and thus leaving the protection of notified traffic zones.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB included reports from the pilots of both ac, radar video recordings, the Tornado head-up display recording, reports from the air traffic controller

involved and reports from the appropriate operating authority.

The Board considered it inadvisable for light ac to leave the protection of an ATZ when flying in the circuit pattern since the sole purpose of ATZs is to afford protection to ac in the vicinity of an airfield. Having said that, there was an obligation on both pilots involved to see and avoid in Class G airspace. It is clear that the Tornado pilot did not see the C150 and although the C150 saw the Tornado it was too late to effect any avoiding action. Members therefore concentrated on trying to establish why these simultaneous lapses had occurred. They thought it most likely that both pilots were preoccupied with other priority tasks at the time immediately leading up to the Airprox.

The lead Tornado pilot and his navigator became distracted by their inability to establish communication with Donna Nook Range. Further they were aware that they were close to Beverley and were most assiduous in ensuring that they remained clear of the ATZ (just). They did not consider the possibility of encountering an ac at circuit height outside the ATZ just as they climbed from low-level to 1000ft in order to try to talk to Donna Nook. In addition, members considered that although legal, planning to fly so close to an ATZ was probably unwise. It was unfortunate that the formation was reverting to 'trail' for range entry as the cross cover at that stage was lost and the call by the number 2 pilot came too late to be effective.

The C150 pilot thought that the circuit he was flying was within the confines of the ATZ, whereas the actual pattern flown was considered by GA specialists on the Board to be excessively wide. Although the wind was from the SW, it was not deemed to be of a strength such that it was a significant factor. It was therefore most likely that the pilot was primarily concentrating on instructing his student which may have degraded his routine lookout. Further it appeared from his report that although he saw the leader, he was not aware of the number 2 and 3 ac in 2 and 4nm trail respectively which were also a threat to him, albeit with slightly more lateral displacement.

Given these conditions, neither the Tornado pilot nor the C150 pilot had been in a position to influence in any way the final separation distance between them as they passed each other in opposing directions. What little separation that had existed was a matter of chance and for that reason members concluded that there had been an actual risk of collision.

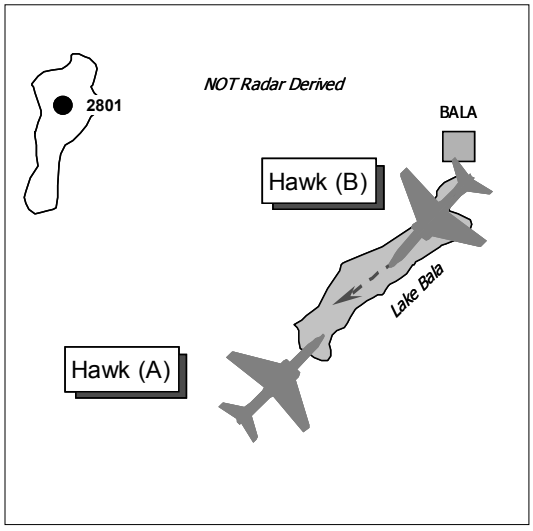
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tornado lead crew and a very late sighting by the C150 pilot, too late to take any avoiding action.

Degree of Risk: A.

AIRPROX REPORT NO 65/03

Date/Time:	2 Jun 1305	
Position:	5254N 0337W (Lake Bala)	
Airspace:	UKDLFS - LFA7	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk	Hawk
Operator:	HQ PTC	HQ PTC
Alt/FL:	250ft (msd)	400ft (msd)
Weather	VMC CLBC	VMC CLBC
Visibility:	+20km	15KM
Reported Separation:	nil H, 100ft V	100ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PILOT OF HAWK (A), a QFI instructing a student seated in the front seat, reports that his ac has a black colour scheme and the HISL and 'nose' light were on whilst conducting a low-level instructional sortie in LFA 7 as a singleton at 420kt. The low-level conspicuity squawk of A7001 was selected with Mode C but TCAS is not fitted and they were listening out on the LFS frequency of 300·8MHz.

Whilst heading 050° up Lake Bala at 250ft msd his student went 'heads-in' the cockpit to complete some checks prior to the 'IP to target run', when he suddenly spotted another Hawk about 1km directly ahead flying on a reciprocal heading straight towards them. He took control of the ac and bunted under the other Hawk to avoid a collision. He added that it was *"pure 180° by zero";* his ac's video recording had confirmed that Hawk (B) had passed about 100ft above them, but he did not assess the risk.

THE PILOT OF HAWK (B), also a QFI, provided a very frank and comprehensive account, reporting that the HISL was on but the landing nose light was unserviceable in his black painted ac. He was instructing his student on an 'introduction to low level flying in the Hawk' that was his front seat student's first instructional trip at low level. The low-level conspicuity squawk of A7001 was selected with Mode C, TCAS is not fitted and they were also listening out on the LFS frequency of 300·8MHz.

This training sortie concentrated on low level handling rather than navigation and before the out brief he discussed the de-confliction charts with his student thoroughly. They were both aware of a Hawk from another squadron that would be flying northbound from the Machynlleth loop and discussed operating on the northern plain, where they would need to be particularly vigilant with lookout to the S for the other Hawk. Their own de-confliction chart reflected that they would be flying anywhere in LFA 7, where conditions were most suitable for each particular lesson.

The weather was patchy with cloud covering the high ground and after time spent on basic handling around the Lleyn peninsular, they flew E and found a more suitable area around Bala Lake, south and west of 'spot height 2801' where there was a higher cloud base. After discussing the turning radius of the Hawk, two simulated emergency breaks were practised that positioned them N of the town of Bala. He instructed his student to turn down Lake Bala and then prompted him to do a FOEL (fuel/oxygen/engines/electrics/location) check once wings level. It was his student's first set of checks therefore the emphasis was on 'look in & lookout' throughout the checks. Heading 220° down Lake Bala at

420kt, flying straight and level at 400ft msd, as his student called out his fuel reading he looked inside to double check his student's assessment of the fuel contents (since the gauge is commonly misread at low level) whereupon his student suddenly called 'tally' and pulled the stick back to the stop into a 8G upwards pull and slightly R to avoid another Hawk. He did not see the other ac at all so they levelled off at about 2000ft and looked again for the jet but saw nothing. A recovery to base was then initiated as he suspected the manoeuvre might have injured his neck. He assessed that the risk was "high".

THE STUDENT PILOT OF HAWK (B) added that as he looked up from the fuel check he saw the nose light of another Hawk slightly below on a reciprocal heading about 500m away. The rate of closure was high and he perceived an imminent risk of collision so he instinctively initiated an emergency break. Hawk (A) passed under their port wing about 100ft below his ac and the crew did not appear to take any evasive action.

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

THE HAWK PILOTS' STATION COMMENTS that the reports from the 2 Hawk QFIs are consistent and match the recording taken from Hawk (A). The principle of 'see and avoid' worked in this instance, but only just. The combination of pilots being 'heads in' at a critical moment and the unserviceable landing lamp on Hawk (B), resulted in a very late spot by pilots in both ac. It appears that it was the emergency break, performed by (B)'s trainee pilot, which broke the 'chain' and prevented a collision. As this manoeuvre had only just been taught to him, as part of his first low-level sortie, he is commended for his quick and decisive actions. The bunt, performed by (A), subsequently increased slightly the margin of avoidance.

Going 'heads in' is a requirement of flying a FJ ac without a HUD. This Airprox is a reminder to all, of the need to minimise as much as possible the amount of time spent 'heads-in' the cockpit and avoid, where possible, having nobody looking out. Furthermore, the nose landing lamp is an effective aid to visual acquisition of small Hawk ac at low-level. In this incident, it was the first thing that (B)'s trainee pilot saw and allowed him to avert the collision. As is evident from (A)'s video, the unserviceable landing lamp on Hawk (B) delayed detection by the crew of (A) until after (B)'s emergency break. Accordingly, with immediate effect, an unserviceable landing lamp has been made a 'No-Go' item for 4FTS low-level sorties.

The extension to the lateral limits of EG-R218 in 2001 has affected the flow of low-level ac in the northern half of LFA7. As it is located in low ground with higher ground around, it has become more difficult to pass it in poorer weather conditions. Alternative routeing is either through D202, when inactive, or via the 'Northern plain' or Snowdonia. In this latter case, the Bala Valley (Between Lake Bala and Machynlleth loop) is often preferred routing for ac flying both N and S. Accordingly, the wider implications of extending restricted areas needs to be considered and, in particular, the dimensions of EG R218 should be reviewed.

HQ PTC comments that we are satisfied that the Station has explored all its options to deconflict sorties in advance. However, given that Wales is no larger than it ever was and that weather and airspace restrictions have a channelling effect, encounters like this cannot be ruled out. We applaud the decision to make the nose-light, so often a lifesaver, a "No-Go" item. We are insisting that a nose light be included in the Hawk 128 specification, which also has a HUD - which should also help lookout. Well Done, the student pilot.

UKAB Note (2): The UK Mil AIP at Vol III Part1–2-7-4, promulgates that EG R218 is a circle radius of 2nm around Trawsfynydd Nuclear Power station, which is to be avoided below an altitude of 2800ft amsl. Consultation with HQ STC OPS LF revealed that it was national policy to afford such protective measures to these installations and no change was envisaged to these avoidance criteria.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, and a report from the appropriate operating authority.

The Board also welcomed the change of policy that has now afforded 'No-Go' status to any nose

landing lamp unserviceability on No4 FTS. This is an effective enhancement to the conspicuity of Hawk ac which could, potentially, reduce the risks associated with visual acquisition of these small jet ac at low-level by other pilots. This incident was yet another example where the Hawk nose light had proved its worth, but it was somewhat ironic that the QFI in the back seat of Hawk (A) had detected the 'unlit' Hawk (B) at a range of 1000m and double the range at which the student pilot flying Hawk (B) saw the nose light of (A) – 500m. At these closing speeds – 840kt – a distance of 1000m is covered in still air in about 2.31sec; it is generally considered that a period of 2-2½sec is required for a pilot to detect another ac and make a positive control input that will start to change the ac's flight path. This suggested to some members that the student pilot probably saw Hawk (A) a bit further away than he reported. Moreover, although both pilots had said in their reporting signals that neither thought the other had been seen, the Board noted from the station's comments that (A)'s video recording showed it was the 'break' performed by (B) that attracted attention, suggesting that the student acted first. In any case it was fortunate that each saw each other when they did, for a fast moving head-on target with no relative motion to draw attention to it, was very difficult to detect. The Board commended the Student pilot of Hawk (B) for his sound appreciation of the situation and swift reaction that undoubtedly removed the actual risk of a collision here – clearly his QFI's teaching had been very worthwhile. Similarly, the QFI in Hawk (A) had acted positively and the combined result was that both ac were manoeuvred out of each other's way as they passed 100ft apart. The members agreed that this was a salutary CRM lesson on the benefit of good cockpit 'lookout' discipline. The Board concluded, that this Airprox had resulted from a Hi-speed head-on conflict in the LFS, resolved in the final stages by the student pilot of Hawk (B) and the QFI of Hawk (A). The members agreed unanimously that there had been a real risk of a collision here, which the actions of both pilots had narrowly averted, such that safety had indeed been compromised.

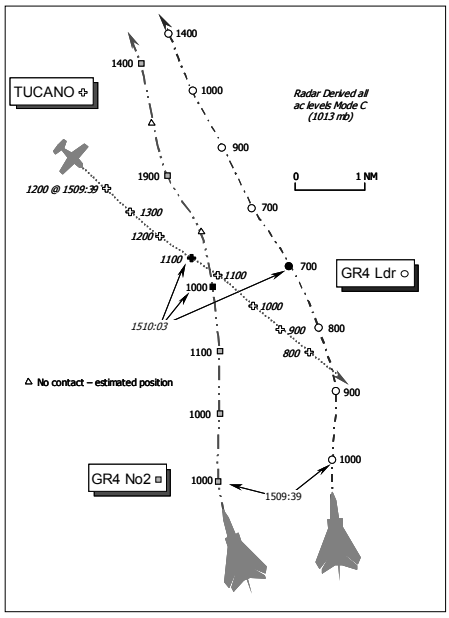
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A High speed head-on conflict resolved in the final stages by the student pilot of Hawk (B) and the QFI of Hawk (A).

Degree of Risk: B.

AIRPROX REPORT NO 66/03

Date/Time:	4 Jun 1510	
Position:	5441N 0244W (2nm NE of Penrith)	
Airspace:	UKDLFS - LFA 17 (Class: G)	
	Reporting Aircraft	*Reported Aircraft*
Type:	Tucano	Tornado GR4
Operator:	HQ PTC	HQ STC
Alt/FL:	300ft msd	300ft agl
Weather	NR CLBH	VMC CLBC
Visibility:	15km	"Good"
Reported Separation:	10ft H, 50ft V	150m H, 100ft V
Recorded Separation:	<350m H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO PILOT, a QFI with another QFI in the front seat, reports his ac has a black and yellow colour scheme and the landing lights were on whilst conducting a low-level sortie as a singleton in LFA 17. They were flying in VMC, 2000ft below HAZE, monitoring the LFS frequency of 300·8MHz, squawking A7001 with Mode C, but neither TCAS nor any other form of CWS is fitted.

Cruising at 240kt to the NE of Penrith heading 129° at 300ft msd, one of a pair of camouflage Tornados was spotted in the 1:30 - 2 o'clock position (through the canopy) 500m away. The front seat handling pilot instinctively bunted the ac to avoid the Tornado, which passed just 10ft in front and 50ft above his Tucano at very close range with a *"high"* risk of a collision.

THE TORNADO GR4 PILOT reports he was flying as the left hand No2 of a battle pair of GR4s on low level training flight in the LFS at 450kt, flying some 6000ft below cloud in good visibility. The ac has a light grey camouflage scheme, but the HISL was on; neither TCAS nor any other form of CWS is fitted.

Heading 340°(T) about 3nm SE of Penrith at 300ft agl, his navigator spotted what he thought was a red and white Tucano, at 11 o'clock – 200m away, head on and closing. His navigator called to pull up, at the same time as he also spotted the Tucano. He executed a hard pull up to avoid the other ac which passed 150m away to port and 100ft below his jet with a *"high"* risk of a collision.

[UKAB Note (1): The Great Dun Fell Radar recording shows the Tucano at 1200ft Mode C (1013mb) on a south-easterly course approaching the Airprox location at 1509:39, as the GR4 pair are shown northbound, both indicating 1000ft Mode C (1013mb) with the No2 the most westerly of the pair. The Tucano indicated 1100ft Mode C at 1510:03, as the No2 GR4 closes to the R 12:30 position at a range of ½ nm and probably just before the latter's crew spotted the jet. The contacts merge in azimuth and the No2 GR4 crossed ahead of the Tucano from R – L. Although both pilots agree that the jet passed above the Tucano, the recorded Mode C shows the Tornado - 100ft below the Tucano just before the merge, which is misleading. The No2 GR4 is not shown at the next sweep (an estimated position is given on the diagram), but is shown on the sweep thereafter at 1900ft Mode C (1013mb) and indicative of the avoiding action 'pull' reported by the Tornado pilot. Minimum horizontal separation cannot be accurately determined in

between radar sweeps, but was certainly less than 350m (<0·19nm). The Tucano crew's avoiding action bunt is not shown.]

THE TUCANO PILOT'S STATION comments that this was a late sighting by both crews and whilst the principle of "see and avoid" did work here, the margin for error was small, with a resultant high risk of a collision. Prompt action by both crews mitigated this risk, but the respective colour schemes probably contributed to the late 'pick-up', both the black of the Tucano and the light grey of the GR4 blending into the surrounding terrain. HISLs, whilst of some help, do not always give significant early warning. Good lookout will always be important, but a reliable CWS would undoubtedly help to reduce the probability of such occurrences.

THE TORNADO GR4 PILOT'S STATION comments that the light grey operational paint scheme may have made the Tornado less conspicuous and this airframe will be repainted during the course of normal servicing. The Airprox occurred in the Class G airspace of the LFS where *"see and avoid"* applied and, luckily, both crews saw each other, albeit late, and took appropriate action.

HQ PTC comments that both crews perceived this to be an extremely close encounter. Fortunately, they both correctly assessed their relative positions and took complementary actions. It was in near head-on encounters such as this, that the Tucano TCAS trial proved at its most effective.

HQ STC comments that this was an uncomfortably late sighting by both crews, but fortunately in time to take avoiding action. This incident re-emphasises the high priority needed for the fitting of TCAS to Tucanos, following the successful trials, and the need to progress the trials of a CWS for fast-jets.

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.

It was entirely evident that this Airprox in the see and avoid environment of the UKDLFS was fundamentally a lookout issue, but there were mitigating factors. The ac had approached at a virtually head on aspect to both crews at a constant relative bearing with little relative motion, all defeating early detection. The Board concurred that the black/yellow Tucano colour scheme had not apparently provided the high contrast desired against the background terrain and had not, in this instance, made the ac as conspicuous to the GR4 crew as might be expected in other circumstances. However, the GR4's camouflage scheme had been entirely effective here in masking the jet's presence from the Tucano crew until the last moment. The PTC member emphasised that it was in similar scenarios to this incident – head-on closing geometry at 720kt - that the Tucano TCAS trial had proved so effective, indeed 30sec warning had been achieved, which attested to the desirability of a collision warning system in this environment. The Board wholeheartedly endorsed the provisioning of such equipment for military ac.

Although the Tucano pilot reported he had detected the GR4 at 500m and had bunted underneath, it was evident that, exceptionally, the radar recording had not captured this geometry. Given the tolerances applicable to unverified Mode C, as both pilots' reports agreed in this respect, the Board accepted that the Tornado had indeed over flown the turboprop. Fast jet pilot members observed that in these situations with an almost head-on aspect and with a closing speed in the order of 660kt – 11nm/min - the human eye/brain was not able to judge range accurately. Here the GR4 navigator had first seen and called the Tucano (where perhaps understandably he had mistaken the ac's colour scheme in the momentary period that he saw it) 200m away at the same time as the pilot pulled up to climb above it. At these closing speeds, a distance of 200m would be covered in about two thirds of a second and it is generally accepted that the time required to see another ac, take action to avoid it and actually alter the jet's flight path would take in the order of 2sec. Notwithstanding the No2 GR4 pilot's candid account, members thought that the crew had probably seen the Tucano at a range greater than 200m, though this did not diminish the seriousness of the encounter in any way. The Board agreed unanimously that an extremely late sighting by both the Tucano and No2 Tornado crews had caused this Airprox.

Both pilots had seen the other's ac at short range and taken what avoiding action they could in the critically short time available. Although the Tucano pilot's bunt and the Tornado pilot's climb were both complementary to achieving vertical separation, time for this to take effect was not assured by any means. Whilst sceptical of the horizontal separation reported by the Tucano pilot – 10 ft - members agreed that this was the closest of encounters; the radar recording showed it was certainly less than 350m and undoubtedly the vertical separation was minimal leading the members to conclude – also unanimously – that an actual risk of a collision had existed in the circumstances pertaining here.

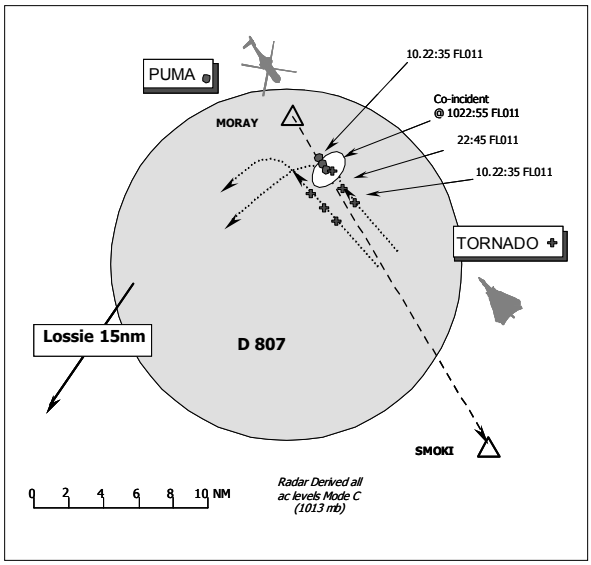
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Extremely late sighting by both the Tucano and No2 Tornado crews.

Degree of Risk: A.

AIRPROX REPORT NO 67/03

Date/Time:	5 Jun 1022	
Position:	5759N 0240W 18nm N of SMOKI	
Airspace:	D807	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	AS332	Tornado GR4
Operator:	CAT	HQ STC
Alt/FL:	1000ft (RPS 1004 mb)	1100ft (Rad Alt)
Weather	VMC CAVOK	VMC Below Cloud
Visibility:	50km	40km+
Reported Separation:	0·25nm H 300ft V	1nm H
Recorded Separation:	Contacts Merge	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS332 PILOT reports heading 165° at 1000ft on a RPS of 1004 and at 125 kt on a transit from an oilrig ~120nm NNW of Wick to Aberdeen in an orange, blue and white AS332. He was in receipt of a FIS from Lossiemouth and was squawking a Lossiemouth code with Mode C. Both the pilot and the co-pilot saw 2 Tornados manoeuvring at approx 5/6nm in their 12 o'clock and saw one turn and head directly towards them at the same height. The pilot asked Lossiemouth if they had any 'fast movers' on radar and the controller replied that he had not. He then told Lossiemouth that he had an ac coming straight towards him "on the nose" but the controller again replied that he had nothing showing on his radar. When the ac had closed to a range of approx ½ nm, the pilot told Lossiemouth that he was turning right for avoiding action and in the turn he looked out of the left window and saw it filled with a 'Tornado belly' as the ac turned right and climbed. He assessed the risk of collision as medium.

THE TORNADO GR4 PILOT reports heading 315° at 416 kt at 1100ft leading a pair of grey Tornados, conducting a routine OCU training sortie with an instructor pilot in the rear seat. They were in receipt of a FIS from Lossie Radar, were squawking a Lossie code with Mode C and had the HISL selected on. He had booked EG D807 and had been operating in the area for around

20min at 1000ft RADALT. They had just rolled out of a tactical turn with the No 2ac in line abreast formation on the left. After about 20sec straight and level he saw a dark blue helicopter with red and green flashes on the nose at a range of approx 1nm. He initiated a hard right turn and a climb, which allowed him to pass well above and to the right. He then descended back down to 1000ft and continued the sortie.

STATION COMMENTS the crews of the Tornado formation had booked the use of D807 up to 1500ft for the duration of their sortie. Consequently, they were surprised to find other traffic flying through it.

Lossiemouth ATC was unaware that D807 had been booked by the Tornado formation and did not warn the helicopter that D807 was hot.

The reason for this error was that Lossiemouth ATC had not received notification of the booking from Kinloss (who control D807) due to a broken fax and a lack of communication. This breakdown in communication has already been investigated and procedures have been put in place to prevent a recurrence.

UKAB Note (1): D807 is promulgated in the UK AIP at ENR 5-1-3-22 as a circle radius 10nm centred on 5758N 0250W from SFC to A1500ft. It is active from 0700 to 2359 (1hr earlier in Summer) with a DAAIS available from Lossiemouth.

UKAB Note (2): The UK AIP at ENR 1-15-5 (and the UK Mil AIP at a similar reference) details Helicopter Main Routes stating:

"A Helicopter Main Route is a route where helicopters operate on a regular and frequent basis and where Alerting Service, Flight Information Service or Advisory Service may be provided. HMRs have no lateral dimensions but over the Northern North Sea (55-62° N) the vertical operational limits are 1500ft amsl to F85. However, helicopter icing conditions or other flight safety conditions dictate, helicopters may be requested to operate below 1500ft amsl and where possible pilots shall endeavour to follow the HMR and advise the appropriate ATS unit of the new altitude giving reasons for operating below 1500ft amsl. Military operations near HMRs are normally conducted at or below 1000ft amsl or above F85 and with due regard for civil helicopter operations when crossing HMRs. Helicopter pilots operating along HMRs normally maintain track by use of Area navigation equipment and in the general interest of flight safety are strongly recommended to use the HMR track structure whenever possible."

The Military AIP and En Route Supplement have similar advice but go on to state pilots have

"due regard for civil helicopter operations when crossing HMRs"

Further the UKAIP at 1-15-6 para 2.3.4.3 states the cruising altitude on HMR X-Ray southbound is " 2000 ft to SMOKI then as directed by ATC".

MIL ATC OPS reports that all timings in this report are corrected to UTC. The radio timings are approximately 50sec ahead of the radar recording and have been adjusted accordingly.

At 1002:01 the Tornado leader called Lossiemouth APP. He advised that they would be descending VFR to operate at 1000ft and maintaining a listening watch, to which APP advised that the RIS would be downgraded to FIS as they descend below radar cover. Later, the AS332 pilot called RAD at 1016:55. reporting *"……fourteen miles south of them [Wick] at one thousand feet on a thousand and eight, err looking for a flight information"* and a FIS was granted. Later at 1022:31 the AS332 pilot reported *"…visual with these two fast movers just directly ahead one going in either direction in fact, in fact one's coming towards us now"* to which RAD advised *"……I've got no radar contact at the present"*. A contact was reported as *"…..right 2 o'clock three miles tracking north west…."* at 1022:55 and the AS332 pilot confirmed that he had *"..two fast movers running down .. one mile down my left and there's one on the right maybe three miles away"*. RAD reported both contacts being on radar at 1023:25 (after the Airprox), although both disappeared from radar again at 1028:08, which was notified to the AS332 crew.

Analysis of the SCATCC(Mil) radar recording shows the Tornado formation, squawking 3701, appearing on radar SW MORAY indicating FL 011 heading SE. The AS332 appears on radar some 4sec later to the NW of MORAY tracking S along HMR X-ray and at 1020:48 the Tornados turn onto

a NW heading directly towards the AS332. The Northerly contact of the 2 Tornados merges with that of the AS332 at 1022:56, the other Tornado passing approximately 2nm to the SW and 30sec later the Tornados are to the NW of the AS332 indicating FL 022 descending.

APP reports that the Tornado formation was warned out for Air Combat Training (ACT) to the N of Lossiemouth. The warn out flight strip also mentioned D807 at 1000ft, however the D807 booking sheet held by APP did not show any booking for the ac concerned. Kinloss is the co-ordinating authority for the Danger Area (DA). Late bookings should be faxed to Lossiemouth ATC and backed up with a telephone call to the Radar Supervisor. D807 activity and the DA 'hot' symbol displayed on the consoles is based on the booking sheet or ac calling Lossiemouth. On this occasion the ATC fax was unserviceable and so the late booking was sent to the Met Office fax. However, no follow up telephone call was made to the Supervisor so the booking was not actioned by ATC. APP reported that he was controlling a Nimrod and providing FIS to ac recovering to both Lossiemouth and Kinloss and the Nimrod questioned whether the Tornados were still operating in D807. APP checked with RAD to see if the Tornados had freecalled him on entering D807 after which it became apparent that the formation were still on APP frequency. By the time it became apparent to APP that the Tornados wished to work in D807, the Airprox had already occurred. RAD also reported that the D807 booking sheet for the day had no bookings for D807 consequently he was happy for the AS332 to proceed at 1000ft. Normally all Lossiemouth controllers and ac in the vicinity are informed of DA activity and the AS332 would have been instructed to climb above the DA.

This incident appears to rest on the activity status and notification of D807 which is primarily used by Kinloss and Lossiemouth based ac. The booking plan is faxed to ATC Lossiemouth each morning prior to the commencement of flying and Kinloss is then responsible for faxing and telephoning any changes to ATC Lossiemouth. In this case there was a late change to the Tornado's booking that was not notified to Lossiemouth ATC. As a result of this incident procedures have been tightened and enhanced in order to prevent a recurrence.

HQ STC comments that this Airprox highlighted a weakness in the communication systems between Lossiemouth and Kinloss Operations. This weakness has been investigated and remedial action taken.

The information from the GR4s to APP did not mention D807, so the connection was not made that they were working in the DA; a fuller brief may have prompted a question over its status.

Lossiemouth radar equipment has a history of poor performance, and a study is ongoing to find a solution.

Finally, the pilots of both ac were looking out and, while surprised to see each other's ac, they did and took appropriate 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.

HQ STC advised the Board that as a result of this Airprox RAF Kinloss and RAF Lossiemouth had revised the system for passing changes to the daily activity sheet for D807 to include a positive check of receipt of all change of status messages.

Members were also informed that there had been 2 controllers involved on the APP position, one handing over to the other, after the Tornados were airborne. They also noted that, although he informed Lossiemouth APP that he was descending to Low Level the Tornado Leader did not warn them that he would be entering D 807. While there was no specific requirement to do so, it would have helped to keep APP fully appraised. These factors led to a situation where the APP Controller at the time of the incident was not aware that the Danger Area was 'hot' and that the Tornados were occupying it, while listening out on his frequency.

Members considered that, although D807 was published as being active from 0700–2359 the

lack of knowledge by Lossiemouth APP as to whether it was 'hot' or 'cold' meant that, at the time, they had not been able to discharge their duty safely as the nominated DAAIS agency. The Board considered that this system breakdown had been a contributory factor in this incident.

Meanwhile the Tornado crews had believed that by opting sensibly to conduct the intensive manoeuvring portion of their exercise in a Danger Area, they were afforded protection from other traffic. This belief was partially true as far as other military users were concerned. Although normally good airmanship would militate against civilian users entering promulgated Danger Areas, they are not prohibited from doing so. At the time of the incident D 807 was published in the UK AIP as being active and, unless advised to the contrary, the AS332 pilot should have assumed that it was active and entered only if advised by the unit nominated as providing an DAAIS (Lossiemouth APP) that it was safe for him to do so. In this case however, the helicopter pilot reported that the weather was CAVOK therefore there would have been no meteorological reasons for flying low and, since HMR X Ray follows precisely the track that the Helicopter wished to take to Aberdeen, it would have been much more sensible to fly in it. The published southbound height for the HMR is 2000ft which is designed to give a vertical separation of 500ft from the upper level of D807. Military pilots expect to encounter Helicopter movements on, and at the published altitude of, HMRs. Flying below the HMR and through the promulgated Danger Area was a contributory factor to this Airprox.

Members were informed by ATC and Operations specialists that although it is Company Procedure for their ac to follow the designated HMR, this was not always complied with; although the ground track of the HMR is followed, the alt of 2000ft was sometimes not. Non-compliance with Company Procedures is a matter for the Company concerned to rectify.

The AS332 pilot saw the Tornados on his nose at an early stage, yet other than questioning Lossiemouth APP if he had them on radar, took no early action to avoid them. The Tornado crews on the other hand did not see the AS332 until a late stage, closing at about 9nm per minute and did not hear the AS332 pilot's conversation with Lossiemouth – the jets were on UHF while the helicopter was on VHF, and, since the APP Controller was not aware that the Tornados were listening on his frequency, received no warning of the helicopter's approach. However, the pilots concerned did see one another and took avoiding action, albeit at a late stage, achieving a miss distance of rather less than that reported by the Tornado pilot since the radar contacts overlapped (they did not fully merge). Further the pilots maintained visual contact with the other ac throughout, thus ensuring that there was no risk of collision.

Members were informed by STC that the Lossiemouth Watchman radar has a history of poor performance but the reason for this remained unclear. Further, the Board was informed that good radar cover of that area is available from other sources. This incident reinforced the need for good radar information of the whole the area of responsibility to be available to Lossiemouth ATC.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause A conflict within D 807 resolved by both pilots.

Contributory Causes:

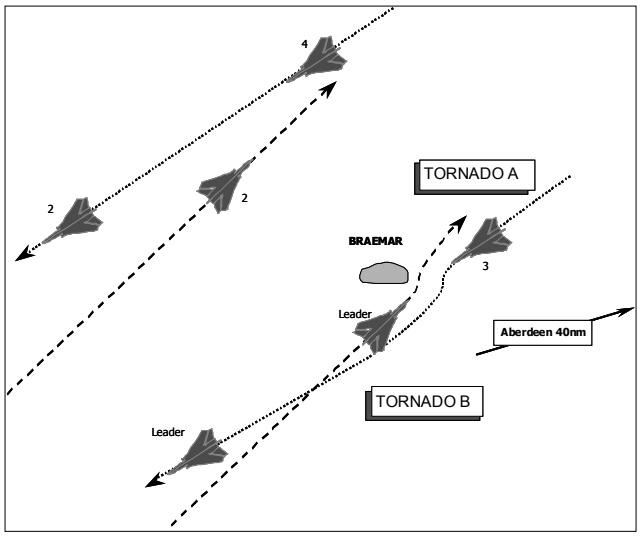
a. The pilot of the AS332 flew his ac below the HMR through an active Danger Area.

b. Kinloss Operations did not inform Lossiemouth ATC that D 807 was Hot.

Degree of Risk: C.

AIRPROX REPORT NO 68/03

Date/Time:	5 Jun 0851:35	
Position:	5700N 0322W (Braemar)	
Airspace:	UKDLFS LFA 14	(Class:G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado GR4	Tornado GR4
Operator:	HQ STC	HQ STC
Alt/FL:	430ft Rad Alt	Low Level
Weather	VMC	VMC
	Below Cloud	Below Cloud
Visibility:	+10KM	30KM+
Reported Separation:		
	200ft H 500ft V	300m H 100ft V
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT (Formation A) reports that he was the back left ac in a 4-ship of grey ac squawking 7001C, with HISLs on, flying in card formation in good visibility on a tactical sortie in LFA 14 and not in receipt of an ATC service. While heading 240º at 470kt and 430ft AGL he saw the lead ac of another Tornado GR4 formation exiting a valley in a right hand turn at the same height 1km ahead. He manoeuvred hard into a climbing left hand break and the ac passed right-right. He assessed the risk of collision as high.

THE TORNADO GR4 PILOT (Formation B) reports that he was also on a tactical sortie, from the same base, in a grey ac, leading a 2-ship in a 5km line abreast formation in LFA 14 in excellent visibility, with HISLs switched on and was also not in receipt of an ATC service. As they crossed a valley just S of Braemar heading 047º at 455kt and 570ft Rad Alt, he called the Northern Tornado at approx 5km then seconds later, saw the Southerly ac of the other formation on the nose at approx 1km which was called on the radio to his wingman. He then manoeuvred using 4G to dive left into a valley to the N before reversing right to watch the other ac pass down his right hand side and slightly above. He assessed that there was no risk of collision after he spotted the other ac.

THE TORNADO STATION CONMMENTS that there was no danger of collision since the leader of Formation B initiated avoiding action a second or so before the no3 of Formation A took further complementary avoiding action. That said, the miss distance was less than comfortable at 400ft horizontally and 300ft vertically (averaged form the 2 estimates) and the crews felt that an Airprox report was appropriate to highlight the incident and to add weight to the case for a Collision Warning System.

The late spot can be attributed to the terrain masking one formation from the other and the closeness of the Airprox can be attributed to the time available to react and effect separation at a closing speed of in excess of 800kt.

HQ STC comments that this Airprox is very similar to 014/03 which occurred on 21 Feb 03, where tactical terrain flying served to prevent the early operation of the 'see and avoid' principle. While in this Airprox both pilots saw each other in time to take positive avoiding action, crews must be aware that when terrain masking and contour flying, they are compromising their ability to see and avoid. When approaching high ground it is prudent to 'unmask' early during training flights, to allow the 'see and avoid' principle to be effective.

The Station comments that highlighting this incident might add weight to the case for a CWS, however it is probable that no current CWS would have been effective in this Airprox due to the effects of terrain masking. Trials are going to be conducted to see if existing technology can provide an effective CWS for Tornado.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted solely of reports from the pilots and from the operating authority.

The Board agreed that terrain masking had prevented earlier sightings of the opposing formation by the crews of both Tornado formations.

It accepted that attempts have been made to minimise the number of such encounters by the Stn concerned, whose sqns operate a cross-checking system for all their low-level flights: they notify their routes (via ROF proformas) to each other, and compare tracks for possible conflicts. Concern was expressed by members however, that the system did not seem to be effective as this was the second Airprox they had considered recently where, despite this commendable initiative, near head-on conflicts had arisen. It was acknowledged that the system was only effective if participants entered the LFS at the planned time; it was explained that start-up problems with the Tornado frequently caused delays on the ground resulting in late LFS entry.

Members concurred HQ STC's advice on terrain masking and contour flying, which could compromise crews' ability to see and be seen; approaching high ground it can be prudent to 'unmask' early during training flights to allow the 'see and avoid' principle to be implemented.

The acquisition conditions in this encounter were most demanding in that the aspect was head-on and the closing speed was about 900kt which equates to >15nm/min. Both pilots, however, saw the other ac and took successful, albeit late, avoiding action. While this removed the risk of an actual collision, the Board agreed unanimously that the safety of the ac concerned had not been assured.

They accepted that in this case a current generation CWS would not have given any advance notice of an impending collision to either crew involved; however, they were informed by HQ STC that future satellite or GPS based technology may produce equipment that may enable low flying ac to receive warning of other ac on conflicting flight paths.

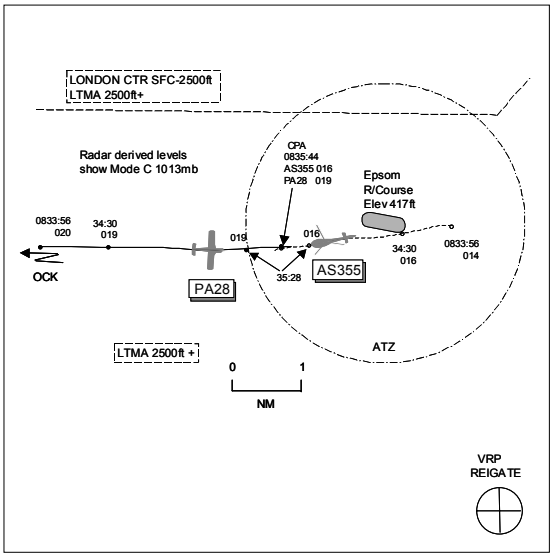
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Terrain masking prevented earlier sightings by all crews.

Degree of Risk: B.

AIRPROX REPORT NO 69/03

Date/Time:	6 Jun 0836	
Position:	5118N 0018W (1·5nm W Epsom R/Course - elev 417ft)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	AS355	PA28
Operator:	Civ Comm	Civ Pte
Alt/FL:	1750ft (QNH)	2100ft (QNH)
Weather	VMC CLBC	VMC CLBC
Visibility:	15km	10km
Reported Separation:	200ft V	50-75ft V <100m H
Recorded Separation:	Returns merge 300ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS355 PILOT reports heading 275° at 90kt flying solo en route from Norwich to Fairoaks at 1750ft QNH and in receipt of a FIS from Farnborough on 125·25MHz, he thought. The visibility was 15km, 2000ft below cloud in VMC, the ac was coloured silver/black and the anti-collision, strobe, position and landing lights were all switched on. Having passed through the Epsom temporary ATZ, he thought, whilst in two-way communications with Epsom and Farnborough, he spotted a blue/white low winged single engine ac 250m ahead. He executed a descending L turn through 30º to avoid it, passing 200ft below and almost directly underneath the other ac. As the traffic passed he made a R banked turn, with increasing torque to create a loud 'blade slap' which produced no reaction from the other ac's pilot. He assessed the risk of collision as high.

THE PA28 PILOT reports flying solo en route from Fairoaks to Southend cruising at 2100ft QNH and in receipt of a FIS from Farnborough 125·25MHz. The visibility was 10km, 3000ft below cloud in VMC, the ac was coloured blue/yellow and the anti-collision light was switched on. Prior to the flight he had checked the NOTAMS using the NATS Aeronautical Information System via the internet, as he knew there was a racing event taking place, but he did not see any mention of it in the information received. Two miles W of Epsom heading 090° at 100kt, he spotted a helicopter, in his 1030 position 500m ahead and 150-175ft below and, as he was about to turn hard R to minimise any risk, the helicopter turned hard L across his path, crossing 300m ahead and 50-75ft below apparently climbing. It was a sharp (purposeful) manoeuvre (S turn) with a large bank angle and the helicopter was seen to pass <100m to his R and 50-75ft below, almost close enough to read the ac's registration letters. He assessed the risk of collision as medium, if no avoiding action had been taken, as the helicopter may have been in a climb.

ATSI comments that the PA28 had contacted Farnborough LARS (125·25MHz) at 0829, routeing Fairoaks to Southend at 2000ft. The flight was placed under a FIS but not identified, Farnborough SSR was out of service. However, TI was passed about traffic also in contact with LARS, which was on a parallel track. Once past OCK the PA28 was advised to freecall Biggin at 0834.

Meanwhile, the AS355 had called the Farnborough APR (134·35MHz) at 0828, routeing via Epsom Downs to Fairoaks. The pilot was informed that he should have contacted LARS but was kept on the frequency. Again the flight was

not identified and he was provided with a FIS. A position report, approaching the Epsom overhead (he was in contact with the heliport), was obtained from the pilot at 0833, to enable TI to be passed on a departing Learjet. Three minutes later the pilot reported wishing to file an Airprox on a light aircraft. By this time the PA28 had left the LARS frequency, about 2 minutes previously.

It is open to conjecture whether, if both a/c had been on the LARS frequency, TI would have been passed to the subject ac in respect of each other (Proximity Warnings-MATS Part 1, Section 4, Chapter 3, Page 2 applies). However, Farnborough did not have SSR available and the pilots did not report routeing via the same point.

UKAB Note (1): NATS Aeronautical Information Service comments that the following NOTAMS were promulgated: -

B1126/03 0306060001 0306072359 London Control Zone tempo hel routes and procedures for the Epsom Oaks and Derby Day race meetings. UK AIP S16/2003 refers.

L1270/03 0306060900 0306072000 daily 0900-2000 Temp Licensed Heliport at Epsom Racecourse 511842N 0001525W elev 417ft. A/G EPSOM RADIO or EPSOM TOWER freq 121·17MHz.

B1191/03 0306060900 0306072000 daily 0900-2000 temp ATZ established for Epsom Heliport 511842N 0001525W Rad 2nm sfc-2000ft agl.

UKAB Note (2): The Farnborough APP frequency RT transcript at 0837:00 reveals that the AS355 pilot transmitted *"Farnborough AS355 c/s ma'am do you have any other traffic in this area I'd like to report an Airprox"*. The APR replies *"AS355 c/s I've no known traffic in that area my Lear fortyfive is two miles south of the field"*. The helicopter pilot responds *"and AS355 c/s that's copied er just passed through Epsom Down station I believe that's protected airspace er had a er right hand side pass light aircraft light blue in colour monoplane"*. This transmission was acknowledged by the APR who was subsequently informed by the helicopter pilot that the other ac was flying in the opposite direction at 1800ft on QNH 1018mb.

UKAB Note (3): The Farnborough 0820Z QNH was 1018mb.

UKAB Note (4): Analysis of the Heathrow radar recording at 0833:56 shows the AS355 1nm E of Epsom Racecourse tracking 265º squawking 7000 indicating FL014 (1550ft QNH 1018mb) with the PA28 in its 12 o'clock range 6nm tracking 090º squawking 7000 indicating FL020 (2150ft QNH). At 0834:30 the AS355 is 0·33nm SE of Epsom indicating FL016 (1750ft QNH) with the PA28 head on range 4·2nm maintaining FL019 (2050ft QNH). The subject ac continue on steady tracks until the radar returns merge at 0835:44, with the PA28 indicating FL019 (2050ft QNH) and the AS355 FL016 (1730ft QNH).

UKAB Note (5): The incident occurred within the lateral limits of the Epsom temporary ATZ at 0836 but prior to the NOTAM'd activity time of 0900Z.

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.

Clearly there had been a misunderstanding by the AS355 pilot about being afforded some protection (i.e. flying in an ATZ promulgated by NOTAM), which was subsequently found to be incorrect - the NOTAM showed an activation time of 0900Z. Although the PA28 pilot had not obtained the correct NOTAM information prior to departure, as chance would have it, this had not affected the outcome during his transit of the area. Consequently, in the absence of promulgated airspace, this had been an encounter in the 'open' FIR (Class G airspace) and the Airprox was assessed accordingly. Both pilots had been going about their 'lawful business', whilst flying under VFR, and had flown into conflict which had caused the Airprox.

Two different sighting perspectives were apparent for both cockpits. The PA28 pilot had seen the helicopter in his 1030 position range 500m and, as he was about to turn R to increase separation, saw the helicopter turn L across his path, watching it pass 300m ahead before it turned R to

pass 100m clear to his R, just below. Members wondered why the helicopter pilot, after seeing the PA28 250m ahead, had elected to turn L when normally the initial reaction would be to turn R, in accordance with the Rules of the Air Regulations 1996 Rule 17 Rules for avoiding aerial collisions. As it was, the helicopter pilot chose to manoeuvre as he did, turning L and descending to pass an estimated 200ft almost directly below the PA28. Although the mutual sightings by both pilots, combined with the actions taken by the AS355 pilot, had meant that the ac were not going to collide, the Board believed that the subject ac had flown in such close proximity to each other, that safety had not been assured during the encounter.

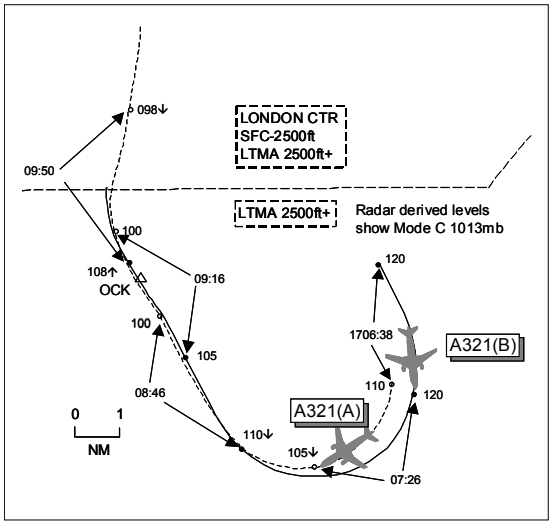
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR

Degree of Risk: B.

AIRPROX REPORT NO 70/03

Date/Time:	28 Apr 1709	
Position:	5118N 0026W (OCK)	
Airspace:	LTMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	A321(A)	A321(B)
Operator:	CAT	CAT
Alt/FL:	FL100	↓FL100
Weather	VMC CLAC	VMC NK
Visibility:	Unltd	NK
Reported Separation:		
	400ft V 2nm H	500ft V 3nm H
Recorded Separation:		
	500ft V 3·3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321(A) PILOT reports flying inbound to Heathrow holding at OCK at FL100, at 220kt and in receipt of an ATS from Heathrow DIRECTOR on 119·72MHz. The visibility was unlimited whilst flying in VMC on top of a cloud layer and the ac's nav and strobes were switched on. He noticed an 'intruder' ac on TCAS 1000ft above and behind descending into confliction which was subsequently given climb and turn clearance by ATC. This clearance was misread by the 'intruder' pilot who seemed pre-occupied, possibly with a TCAS RA alert, he thought. At this point, flying inbound to the VOR on a 332º heading, he asked his co-pilot to disconnect the A/P and to be ready to take avoiding action. He received clearance for an immediate turn onto heading 360º and descent to FL80, which was 'stepped on' by the 'intruder' ac's pilot. He complied with the instructions and informed ATC after the frequency became uncluttered and when completed. After being vectored overhead Heathrow for a DW RH pattern, a normal landing ensued. He contacted ATC post flight, who informed him that the other ac, the subject A321(B), had taken a wrong clearance and had flown within 600ft and 2·5nm of his ac. His TCAS equipment had indicated 400ft and 2nm separation minima, although at no time was a TA or RA alert received, and he assessed the risk of collision as medium/high.

THE A321(B) PILOT reports holding over OCK in VMC at 230kt and in receipt of an ATS from

LTCC. ATC cleared him to descend to FL110, which he readback correctly, but FL100 was selected on the AP. On passing through FL108 ATC issued a warning and he started taking corrective action by stopping his descent, reaching FL105 before climbing back to FL110. The other ac was seen about 3nm ahead on a similar heading and he reported that workload had been a relevant factor during the incident.

THE A321(B) FLIGHT SAFETY DEPARTMENT MANAGER reports the FO was the PF and, as he was a new trainee Co-pilot, this was a check flight under the supervision of a Check Pilot seated behind. The Capt was handling the communications and he had correctly readback the clearance to descend to FL110. The Co-pilot had thought that the clearance was to FL100 and inserted this figure into the altitude select window. At this time the Check Pilot was engaged in a conversation with the FO giving suggestions and advice. However, the Capt did not communicate the clearance to the FO nor crosscheck the FO's actions and the FO did not make the required 'call-out' of the new altitude. These errors in cross-cockpit monitoring went unnoticed by the Check Pilot. Following this incident, the Flight Safety Dept has recommended that: -

The Training Dept brief and discuss this incident with all Instructors and Check Pilots.

CRM Training shall use this occurrence as required.

The Annual Pilot Recurrent Training Syllabus will be updated to include this incident.

LTCC ATCI reports that the A321(A) pilot established contact with the Heathrow INT DIR S at 1657 reporting holding at FL110 and was advised that there would be a 10-15min delay. A321(B), inbound to OCK at FL120, established contact with the INT DIR S at 1704 and its crew were also advised to expect a 10-15min holding delay.

A321(A) was cleared down to FL100 at 1706:38 and at 1707:26, A321(B) was cleared down to FL110. The descent instruction to A321(B) was clearly and correctly acknowledged by the crew, the ac was approximately 3 track miles behind the A321(A), which in turn was descending through FL105. A radar replay of the event shows that A321(B) reached FL110 at 1708:46, but continued its descent through that level.

The INT DIR S observed the A321(B) descending below its cleared level and at 1709:06 sought confirmation from the crew that they would be maintaining FL110. The crew replied, after a moment's hesitation, *'climbing now to one one zero'.* At this point (1709:16), it was 3·3nm behind A321(A) and 500ft above.

To ensure separation the INT DIR S instructed the A321(A) to descend to FL90, to expedite its descent and to continue on its present heading. This instruction was answered by A321(B) pilot so the INT DIR S instructed him to climb to FL110 and then repeated his instruction to A321(A) to fly a heading of 360 and to descend to FL90. The A321(A) pilot acknowledged the instruction stating *'we have him in sight'.* This statement probably refers to a TCAS contact.

Standard vertical separation was restored at 1709:50 and A321(A) was positioned over Heathrow for a RH DW pattern to uneventful landing. No mention was made on the frequency that the crew of A321(A) wished to file an Airprox thus, with lateral separation in excess of 3nm, the event initially went unreported by ATC.

There was no activation of Short Term Conflict Alert (STCA) and no mention on the RT of any TCAS action taken by A321(A). Separation Monitoring Function (SMF) was not activated.

ATSI endorsed the ATCI report.

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 that this Airprox had been caused by those on the flight deck of A321(B), who descended below their cleared flight level. Although the FO had been distracted by the Check Pilot at a critical time, when the descent clearance had been given, members were critical of the Capt, in that he could and should have

intervened to ensure that vital cross cockpit monitoring checks were carried out, in accordance with normal flight deck procedures. This breakdown in CRM had contributed to the Airprox.

Fortunately, this 'level bust' had been noticed early during the encounter, by the A321 (A) crew and the INT DIR S, and their good situational awareness was commended. The INT DIR S had queried the cleared level with the A321(B) crew who had replied that they were climbing back to FL110. The A321(A) crew had watched the other A321 on TCAS as it followed them around in the hold, and had reacted promptly when they were given resolution instructions. Despite the crew of A321(B) taking a call addressed to A321(A), this further mistake had been immediately countermanded by the controller. The recorded radar showed that the ac were flying line astern at similar speeds separated by >3nm and in this configuration neither crew had received any TCAS alerts. These combined elements led the Board to conclude that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

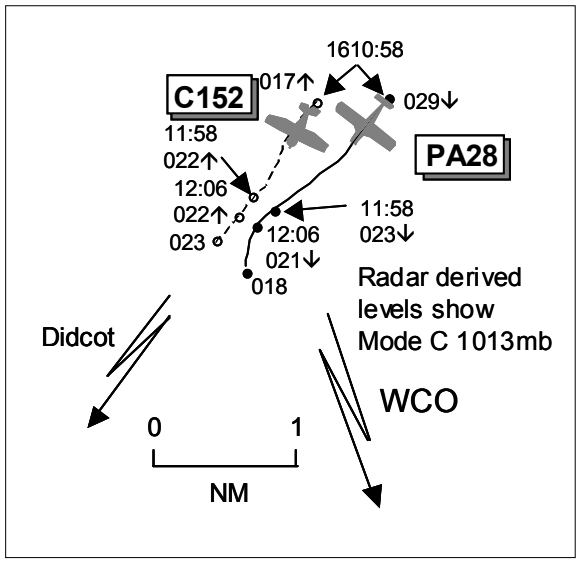
Cause: The crew of A321(B) descended below their cleared flight level.

Degree of Risk: C.

Contributory Factor: Breakdown in CRM.

AIRPROX REPORT NO 71/03

Date/Time:	5 Jun 1612	
Position:	5156N 0101W (5nm NNW WCO NDB)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C152	PA28
Operator:	Civ Trg	Civ Trg
Alt/FL:	2250ft↑	NR
	(QNH 1019mb)	NK
Weather	VMC CLBC	VMC CLOC
Visibility:	40km	NK
Reported Separation:		
	5m V 25m H	NR
Recorded Separation:		
	100ft V 0·1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports flying a dual training sortie from Halton and in communication with Halton RADIO on 130·42MHz squawking 7000 with Mode C. The visibility was 40km 2000ft below cloud in VMC, the ac was coloured white/ green and the nav, landing and strobe lights were all switched on. The student was carrying out a climbing/descending exercise and, prior to commencing climb, was using Didcot Power Station as a straight and level visual reference at 1500ft QNH 1019mb. After completing a lookout scan, which involved lifting both wings tips, the student commenced climbing on heading 220° at 65kt (best ROC speed) with intentions to level at 2500ft QNH. The student was then maintaining the climb using the 'DABLE' mnemonic - Direction, Airspeed, Balance, Lookout, Engine. Climbing through 2250ft QNH the student,

apparently alarmed, alerted him to an ac on the port side. He leaned over for a better view and saw a PA28 coloured maroon/cream in his 8-9 o'clock position range 25-30m approaching on a converging course at an overtake speed from behind, from slightly below (estimated 5m vertically) in what appeared to be a climb. The other ac had initially been hidden from his view, seated on the RHS, as it was slightly below the window and came from behind. He thought his student had unknowingly applied a little R aileron at this stage. The PA28 was exceedingly close on the LHS (25m); he could see at least two people on board and see the registration letters and believed it to be 2-5sec from collision. Before he could take action himself, the other pilot did by rolling L away from him and descending rapidly, ending up 200-300ft below them and diverging on a heading of 200°. He contacted Benson Zone to report the Airprox and stated the separation to be 100m horizontally and nil vertically. However, on reflection, considering his formation display experience and taking into account ac size/ relative position, he considered the separation to be 25m and 5m respectively.

AIS MIL reports that when PA28's operator was contacted, the ac was reported to have been on the ground at the time of the incident. However, after carrying out a radar analysis, tracking the conflicting ac to its destination and identifying it as the subject PA28, the reported pilot was identified and agreed to complete a CA1094, 3 weeks post incident.

THE PA28 PILOT reports flying a dual training sortie from Elstree and in receipt of a FIS from Elstree on 122·4MHz squawking 7000 with Mode C. The weather was VMC, the ac was coloured maroon/white and the anti collision light was on. This had been one of several flights during the day, none of which caused her to conflict with other traffic in her professional opinion as a full time flying instructor.

UKAB Note (1): The PA28 instructor was contacted by UKAB, 6 months post incident to discuss the incident which occurred during a climbing/descending exercise in the vicinity of Westcott. After describing the scenario, as shown by the radar recording, she didn't remember there being an incident. Both she and the student were maintaining a good lookout and would like to think that she had seen the C152 as a matter of course but couldn't be sure.

UKAB Note (2): Analysis of the Heathrow recorded radar at 1610:58 shows the C152 5·5nm N of WCO NDB tracking 210° squawking 7000 indicating FL017 (1880ft QNH 1019mb) climbing with the PA28 0·5nm to its E tracking 225° squawking 7000 indicating FL029 (3080ft QNH) descending. Both ac continue on almost steady flight paths, the C152 climbing at 500fpm and the PA28 descending at 600fpm. At 1611:58 the PA28 is descending through FL023 (2480ft QNH), 0·175nm E of the C152, which is climbing through FL022 (2380ft QNH). NMC is displayed on the PA28 on the next radar sweep, the CPA occurs a further 4sec later at 1612:06 when the PA28 is indicating FL021 (2280ft QNH) 0·1nm E of and 100ft below the C152. The next radar sweep shows the PA28 in a L turn away from the C152, eventually steadying on a track of 180º 12sec later at FL018 (1980ft QNH), as the C152 levels at FL023 (2480ft QNH).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members found it hard to believe that the PA28 pilot had not seen the C152, particularly when the C152 student and instructor could see the PA28 clearly close by. Both flights were being conducted in the student-training regime where 'in-cockpit' teaching requires good CRM to be exercised - to balance the 'heads-in' monitoring with maintaining a lookout scan. The opportunity had been there to see the Cessna ahead, whilst descending on a slowly converging track at a slow overtaking speed; a good lookout scan should have disclosed the conflicting Cessna's presence. However, from the information given to the Board, it was agreed that the PA28 pilot had flown into conflict with the C152, which she did not see.

Although the C152 crew initially did not have the opportunity to see the PA28 approaching from behind, they had seen it very late, 25m on their LHS, just below their level and converging. As the Cessna instructor was about to take avoiding action, the PA28 was seen to break away to the L and descend. With the PA28 pilot not seeing the

C152, having flown in such close proximity, the Board could only surmise that the L turn made by the PA28 had been purely fortuitous. This was enough to persuade the Board that during this encounter there had been an actual risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot flew into conflict with the C152 which she did not see.

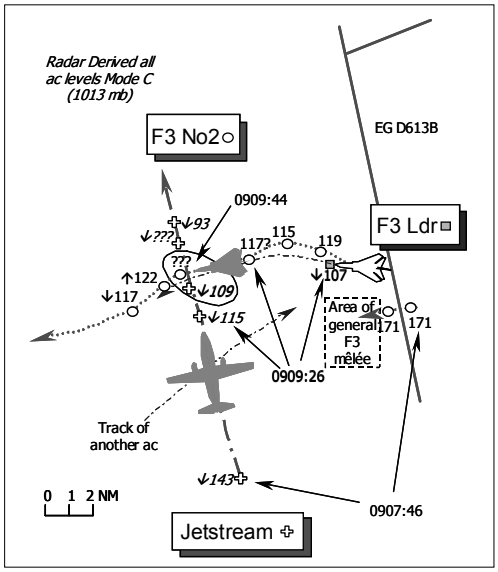
Degree of Risk: A.

AIRPROX REPORT NO 72/03

Date/Time: 9 Jun 0909
Position: 5640N 0156W (36nm NE of Leuchars)
Airspace: Scottish FIR (Class: G)

	Reporting Aircraft	*Reported Aircraft*
Type:	Tornado F3	Jetstream 32
Operator:	HQ STC	CAT
Alt/FL:	11500ft (RPS 1007mb)	FL110↓
Weather	VMC NR	VMC NR
Visibility:	50km	>10km

Reported Separation: 0·5nm H, 1000ft V 400m H, >1000ft V
Recorded Separation: 0·7nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO F3 PILOT reports he was flying as the No2 of a pair of camouflage grey F3s that had been conducting air combat training in the vicinity of D613B, but which had not been specifically activated for there use. They were operating under a RIS from Scottish MILITARY and the assigned squawk was selected with Mode C, but neither TCAS nor any other form of CWS is fitted; the HISL was on.

Following these air combat manoeuvres, he disengaged on a westerly heading back towards Leuchars descending from 14000ft down to 10000ft RPS at 450kt, whereupon ATC reported an ac 3nm to the S tracking NW descending through FL110. This was the first warning about the traffic. His navigator then called *"pull up"* after spotting a civil twin in their L 10 o'clock about ½nm away just below their jet. To avoid the other ac - a low-wing twin – he pulled up and it passed about 1000ft below and ½nm astern with a *"minor"* risk of a collision.

He believed that the traffic information given was called late, this had led both he and his navigator to concentrate on the other F3 whilst disengaging as the confliction developed.

THE JETSTREAM 32 PILOT reports his ac has a white & red livery. They were inbound to Aberdeen approaching the CTA, VMC, heading N at 240kt, whilst in receipt of an ATS from ScACC descending through FL110 in accordance with their flight planned route. The Tornado was spotted at 1 o'clock – 5nm away following traffic information from ATC. No avoiding action was necessary as the jet passed 400m ahead from R

– L, more than 1000ft above his Jetstream and climbing, with *"no"* risk of a collision.

ScATCC (Mil) CONTROLLER 2 (CON 2) reports that the F3 pair was operating under a RIS within the confines of D613B [though not specifically activated for their exclusive use] in a block 5000 – 24000ft RPS (1007mb) on 259·77MHz. Additionally, he was controlling traffic N of Aberdeen and another F3 pair also operating in a similar block S of Aberdeen and assessed his workload as *"medium"*. Minutes before the Airprox he passed traffic information to the subject F3 pair about unrelated traffic crossing through the area of D613B NE bound toward KLONN above them and he also noted the presence of slow moving medium level traffic – the Jetstream – west of D613B, tracking towards Aberdeen NE of St ABBS. The F3s continued to manoeuvre performing numerous high energy turns and then rolled out of a tight orbit without warning and crossed the SW boundary of D613B into direct confliction with the slow moving Jetstream. As they rolled out he rotated the SSR track data blocks - which had been obscuring one another - correlated with the FPS which of the F3s was in direct confliction with the Jetstream – the No2 - and called the traffic indicating FL110 to the crew at 3nm range. The Jetstream was again called to the No2 crew at 10 o'clock - 1nm descending through FL110, before calling it to the lead F3 crew - 3nm behind the No2 - who reported visual with the traffic.

MIL ATC OPS reports that the F3 was one of a pair operating with ScATCC (Mil) CON 2 under a RIS performing high energy turns and after a tight orbit rolled out across the line of D613B in direct confliction with the slow moving Jetstream. After confirming which F3 was first 'threatened', CON 2 called traffic information at 0909:30, "[C/S 2] *traffic to the south west 3 miles tracking north west indicating FL110 descending",* however, the No2 F3 pilot queried *"say again"*. Traffic information was immediately repeated at 0909:40, *"Traffic now left 10 o'clock 1 mile 110 descending",* whereupon the crew reported *"in sight…"*. CON 2 then called the traffic to the lead F3 crew at a range of 2nm, who also reported the traffic in sight.

The radar video recording shows the F3s exiting the lateral confines of the DA to the west at 0907:57, indicating FL171, whilst the Jetstream is 10nm SW indicating FL142 descending. At 0908:07, the F3s commenced a L turn outside the DA, this appears initially to be a turn back into the area however, this subsequently becomes an orbit involving some high energy manoeuvres. Eventually at 0909:04, the F3s rolled out on W, in trail, descending into confliction.

It is a matter of judgement whether a controller should, or should not, call traffic transiting through or close to a formation manoeuvring. Controllers are very mindful not to burden aircrew, already operating under a high workload, with unnecessary information. On this occasion CON 2 elected to call the traffic transiting through the F3 operating area but decided not to call the traffic routeing to the west, clear of the DA. The F3s had advised that they would be operating within the confines of the DA and the L turn initiated at 0908:07, gave every indication that the pair was turning to regain the area. At this stage the Jetstream was 8·6nm SW of the pair and over 3000ft below them, with the F3s evidently turning away from the Jetstream, TI would have been superfluous. It is common practice to instruct manoeuvring flights to advise 1min before completion of their evolutions. This not only allows the controller to prepare for recovery of the ac but also allows him to offer advice on a suitable heading to avoid confliction. [The RT recording transcript did not encompass the complete period from the commencement of service, therefore it is not feasible to determine if a '1 minute to completion' call was requested by CON2]. Careful observation of the radar recording reveals that the F3s remained just outside the DA for approximately 40sec manoeuvring and it is at this stage that it may have been prudent to call the traffic as a reminder. However, this is with the benefit of hindsight and concentration focused entirely on this incident; CON 2 was also working other ac away from this area. Controllers strive to pass relevant and timely traffic information and undoubtedly, earlier information on this occasion would have been desirable. Nevertheless, when the conflict was perceived, accurate traffic information was passed and repeated with an updated range, which enabled the F3 crews to become visual with the Jetstream. With the first traffic information being passed at 3nm, it is believed that the rules for a RIS were complied with.

ATSI reports that the crew of the Jetstream established communication with the ScACC TAY Sector at 0848, approximately 22min before the Airprox occurred and the flight placed under a RIS. At 0905, the pilot requested descent and was advised *"no known traffic to affect your descent to FL90"*. Minutes later, at 0909, the TAY SC ascertained that the Jetstream crew were VMC and passed traffic information: *"…traffic right 2 o'clock 4 miles FL110 descending crossing right to left".* The pilot reported the traffic, *"a Tornado",* in sight. Approximately 30sec later, the controller advised: *"… further contact 3 o'clock 4 miles right to left again showing FL110."* The pilot said that he would look out and, approximately 20sec later, reported that the second ac was just astern. The Jetstream crew did not appear concerned on either occasion and made no further reference to the encounters. Although this comment was prepared without reference to the appropriate radar recording, from the information available, the TAY SC appears to have fulfilled his responsibilities under the terms of the RIS being provided and no civil ATC causal factors are evident.

[UKAB Note: The poor quality of the ScATCC (Mil) radar recording did not allow the geometry of this encounter to be assessed with certainty. The F3 pair are shown crossing the SW boundary line of D613B, which was not active, and then entering into what appears to be a combat mêlée where it is difficult to retain track identity and determine ac levels because of SSR label overlap between the F3 pair, the Jetstream and another unrelated ac transiting the vicinity above the ac involved. The close proximity of these track data blocks predominantly obscures the Mode C indications for most of the time. However, the No2 F3 is shown approaching the northbound Jetstream from the E and descending slowly through FL115 with the lead ac apparently in trail by about 3nm. At 0909:26, the northbound Jetstream descended through FL115 with the No2 F3 closing at R - 2 o'clock 4nm away, descending, it would appear, through FL117. The jet crossed about 0·7nm ahead of the turboprop at 0909:44, but it is not possible to determine the vertical separation that pertained. However, an apparent avoiding action climb through FL122 in conformity with the No2 F3 pilot's report is shown in the successive sweep, although the Jetstream's Mode C cannot be determined. The lead F3 subsequently passed 3·2nm astern of the Jetstream and some 1100ft above it at 0910:31.]

THE TORNADO F3 PILOT'S STATION comments that although this appears to have involved a later than ideal call of conflicting traffic from ATC, this did get the crew's eyes onto the civil ac, which allowed a manoeuvre to achieve clearance. However this incident is a timely reminder for aircrews to clear their paths visually, when disengaging from air combat.

HQ STC comments that ScATCC (Mil) CON2 provided as timely traffic information as practicable to allow the F3 crews to acquire and avoid the Jetstream. When performing tactical manoeuvres crews must acknowledge their need to communicate their intentions in a timely fashion to ATC and other agencies, if they wish those agencies to provide a timely and effective service. Under the terms of the RIS the F3 crew had full responsibility for collision avoidance and even when in mock combat must continually scan for other conflicts. After all, it's the one you don't see that shoots you down!

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 Mil ATC Ops advisor explained that the Central Managed Danger Area - D613B (10000-55000ft by NOTAM) - had not been specifically activated for the jet's exclusive use. However, the F3 pair had declared that they were operating within the lateral confines of the area and ScATCC (Mil) CON2 expected the ac to stay in the area, east of the western boundary till they had completed their combat. Hence CON2's decision to call only the other ac crossing above the pair earlier but not the Jetstream, and the Mil ATC Ops report had explained the logic for this which members considered was entirely reasonable. When seen in the clarity of hindsight, it might have been helpful if the controller had mentioned that the pair had 'spilled-out' over the western boundary, but it appeared to pilot members that their intensive manoeuvres had

focused the No2 F3 crew's attention exclusively on the mock combat. Colleagues wholeheartedly endorsed the STC fast-jet pilot member's view that good two-way communication was essential in such a highly dynamic environment. Ac crews must ensure that they brief controllers fully on what they intend to do, so that controllers can react accordingly and provide them with the service that they require. The Board agreed that here, the F3 formation should have given the controller an earlier 'heads-up' of their intentions. Nonetheless, when CON2 realised the situation, the traffic information given was pertinent, accurate and did ensure that the No2 crew spotted the conflicting Jetstream, which enabled them to take appropriate action to remain clear. The Board agreed unanimously therefore, that this Airprox had resulted from a conflict in the FIR resolved by the No2 F3 crew after traffic information had been passed.

From the Jetstream pilot's perspective (also under a RIS) he had received traffic information from the TAY SC and spotted the Tornado climbing above his ac, which suggested this was after the F3 pilot had initiated his avoiding action climb. Nonetheless, the Jetstream pilot had not perceived any inherent risk. This coupled with the reporting pilot's own assessment of a "minor" risk was in line with the Board's unanimous assessment that in the circumstances that pertained here, no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

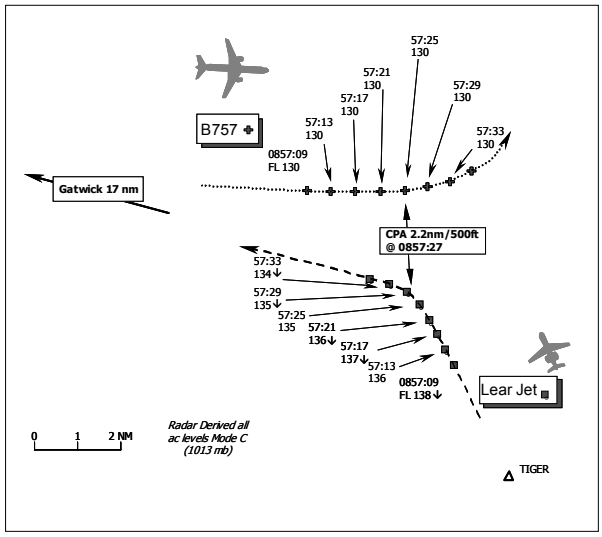
Cause: A conflict in the FIR resolved by the No2 F3 crew after traffic information had been passed.

Degree of Risk: C.

AIRPROX REPORT NO 74/03

Date/Time: 9 Jun 0857
Position: 5102N 0005E (25nm SE BIG)

Airspace:	London TMA	(Class: A)
	Reporting Aircraft	*Reported Aircraft*
Type:	B757	Learjet 35
Operator:	CAT	Civ Comm
Alt/FL:	↑FL140	↓FL120
Weather	VMC CLOC	VMC CLOC
Visibility:	>10km	>10km
Reported Separation;		
	300ft V,1nm H	3-4nm H
Recorded Separation:		
	500ft V 2.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports heading 090° at 300kt shortly after take off from Gatwick and was instructed to route direct to DVR climbing to FL140. When passing FL120 he noted a target on the TCAS at FL140 in his 2 o'clock at approx 10nm showing FL140 descending. He selected VS 0ft, levelled at FL130 and a TCAS TA was received shortly after, followed by an instruction from London Control to turn left 055° then further left 045° The conflicting traffic was not seen, but it appeared to pass down their starboard side at 300ft and 1nm and they were told by ATC that a report would be filed. He assessed the degree of risk as high.

AIRPROX REPORT No 74/03

THE LEARJET 35 PILOT reports heading 320° at 250kt on a BIG 3A arrival inbound to Northolt. They had passed TIGER intersection and had received descent clearance to FL120. Visibility in the area was excellent. He became aware of the other ac a few minutes prior to an emergency left turn given by the controller. He was not concerned as he noted that the other ac was under radar control and assumed that he would be turned shortly. He assessed the risk as minimal.

THE LONDON CONTROLLER reports that he was operating TC SE bandboxed mode in light to moderate workload conditions, when there was a sudden rise in activity due to a phone panel problem.

A B757 was received on a WIZAD departure from Gatwick at FL100 and was turned right to go behind an ac inbound to Heathrow at FL100. When they had passed he climbed the B757 to FL140, as he thought, to be safe against the Learjet inbound at FL150. Unfortunately he had already cleared this ac to FL120.

Having recognised his error he issued avoiding action to the B757 but there was no reply so reissued it with TI. The Learjet was then given an avoiding turn to the left. There was no mention of TCAS by either ac but the B757 was noted in level flight at FL130 at some stage, which he thought may have affected the minimum vertical separation achieved.

ATSI reports that the Airprox occurred SE of BIG in the Class 'A' CAS of the London TMA. Both ac were under the control of the LTCC TC SE SC, who was operating the TC SE sectors bandboxed. The SC described the traffic loading as 'light' and the workload as 'light to moderate' in the lead-up to the developing conflict however, the workload increased significantly as a telephone problem occurred prior to the Airprox. Seven flights, including the subject ac, came onto the frequency in the 4 minutes preceding the incident.

The B757 was co-ordinated into TC SE airspace at FL100 and the pilot established communication at 0854:20, reporting level at FL100, routeing direct DVR. The SC's task was to climb the B757 to FL170 for transfer to the next sector. He routed the B757 behind a Heathrow inbound and when lateral separation had been established he next instructed the B757 pilot to continue the climb to FL140. He chose this level so that 1,000ft vertical separation would be provided on any further inbound traffic.

The next inbound was the Learjet whose pilot established communication and reported descending to FL150 at 0855:30 to which the SC confirmed that he was cleared direct BIG and gave further descent clearance to FL120; this put the Lear on a conflicting flight profile with the B757. Approximately 4sec before the STCA activated, the SC became aware of the developing conflict and he instructed the B757 pilot *"… turn left immediately heading zero five five degrees this er avoiding action traffic coming in in your two o'clock position range seven miles."* There was no response so he amended the instruction : *"… turn left immediately heading zero four five degrees avoiding action traffic two o'clock range five miles."* This time the pilot responded: *"Turning left."* The SC then instructed the Lear pilot: *"… turn left immediately heading two nine five degrees avoiding action traffic dead ahead same level crossing right er left to right."* to which he responded: *"Roger … we have him in sight."* The radar recording confirms that the B757 passed, left to right, below and in front of the Lear, going through its 12 o'clock at a range of 3.5nm with 700ft vertical separation. The closest point of approach, 2.2nm/500 ft, occurred after the B757 had passed through the Lear's 12 o'clock.

The avoiding action phraseology employed by the SC was not standard, but he indicated that he did not like the recently introduced changes. That said, he conveyed the appropriate degree of urgency and his instructions contained the essential elements. He accepted that a basic error on his part had led to this occurrence, but he was disappointed with the separation finally achieved. This would have been greater he thought if the crews had responded to his instructions in a timely manner. He also thought that if the B757 had continued its continuous climb profile to the cleared level of FL140, rather than levelling unannounced at FL130, the outcome would have been less serious.

Addressing these points, the RT and radar recordings confirm that the crew of the B757 only acknowledged the avoiding action instruction when issued the second time after a pause of 9 sec and that they levelled off at FL130. Although TCAS may have played a part in this, the B757

pilot did not inform the controller that he was responding to TCAS indications or alerts. Prior to the Airprox, the B757 was climbing at approximately 2000fpm and the Lear was descending at about 1500fpm. If the B757 had maintained its rate of climb to FL140 instead of levelling at FL130, it is estimated that it would have reached approximately FL135 when lateral separation reduced to 3nm. Thus continuing the climb would have reduced vertical separation further. The 'avoiding action' turn by the B757 first becomes discernible at 0857:15, some 8sec after the pilot acknowledged the instruction. It seems likely therefore, that the pilot acted on the SC's first instruction, even though they did not acknowledge it on RT, and that the delay was not excessive. In having to repeat the instruction, the subsequent 'avoiding action' instruction to the Lear was delayed. The latter instruction ended at 0857:16 and a turn becomes discernible on the radar recording 7sec later. Although executed promptly, the turn appeared to have been fairly gentle, probably because the crew were visual with the conflicting traffic and that it had already passed their 12 o'clock. In summary, although the lateral separation may have been increased slightly if both crews had responded quicker, the vertical separation would have been reduced further if the B757 pilot had continued his climb to FL140.

The SC also explained his error probably arose because he had departed from his accustomed mode of operation. He had recognised the potential conflict between the subject ac and would normally have climbed the B757 straight to FL170 and descended the Lear straight to a suitable level below FL150, assigning headings as necessary to ensure a minimum of 3nm lateral separation. On this occasion, in part because of the difficulties being experienced with the telephones, he elected to opt for a more 'conservative' approach, planning to climb the B757 to FL140 initially and leaving the Lear at FL150, thus providing vertical separation and giving him further opportunity to evaluate the situation. Unfortunately, while he cleared the B757 to FL140, according to plan, he descended the Lear below his planned level of FL150 to FL120. With the benefit of hindsight, he thought that his handling of the Lear was 'automatic', in accordance with his 'normal' method of operation. It was not a 'slip of the tongue' as such, because he correctly annotated the Lear fps with FL120.

Both the frequency and desk side recordings were checked to see whether it would be possible to assess the extent to which the failed telephone panel actually constituted a distraction or increased the workload. Unfortunately, an assessment could not be made because the nature of the problem meant that attempts to use the telephone were not captured and only the RT transmissions can be heard. The SC explained that he had carried out any necessary co-ordinations by communicating directly (shouting across the operations room) with the controllers concerned. He recalled that, during the period preceding the Airprox, the Co-ordinator had been assisting TC SW primarily. On becoming aware that his workload was increasing, the SC requested assistance from the Group Supervisor who he believed was with the Co-ordinator at that point discussing the telephone problem. Although a controller did not arrive before the Airprox occurred, a replacement controller was in position within 4 minutes of it taking place.

Neither pilot made any mention of TCAS on the RT and subsequently it was established that the Lear was not TCAS equipped. However, the B757 pilot's report confirms that the crew received the initial 'avoiding action' instruction, however, their response to the indications on their TCAS equipment appears to have been unorthodox and certainly not what controllers are trained to expect. The provisions of AIC54/1999 (Pink 194) "AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS) – LEGAL ASPECTS AND INTERFACE WITH AIR TRAFFIC CONTROL", were not followed. The AIC guidance states that pilot should inform ATC *"… as soon as practicable of any deviation from an ATC clearance …"* and that *"… pilots are not expected to take avoiding action solely on the basis of TA information".* On this occasion, the B757 was levelled off at FL130 without notifying ATC and it appears, prior to even a TA being received. Paragraph 4 of the AIC reminds pilots *"Avoidance manoeuvres, vertically or horizontally, should not be attempted solely on the basis of TA information. If there is a cause for concern then flight crew should seek advice from ATC".*

It is not possible to determine, conclusively, how the B757 crew's actions affected the outcome of this Airprox, however, it would seem that they did not affect it adversely and it is possible that they actually improved the situation. However, that

crew did not follow correctly the promulgated ACAS procedures and they did not inform ATC that they were departing from their clearance or even query the situation. On this occasion, the Lear would have passed behind the B757 even if no action had been taken but the result of such actions could have been much more serious.

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 authority.

Specialist ATC Members of the Board tried to determine the factors, which led the experienced TC SE Controller to descend the Learjet below and through the level that he had already cleared the B757 to climb to. They accepted in full the comprehensive report provided by ATSI and commended the TC SE SC for his honest reporting of this incident.

The controller had a sound plan, which would have worked in getting the B757 transferred to the next sector at FL170, and the Lear descended through its flight profile for an approach to Northolt. Members could not determine why, having had this workable plan, he only implemented half of it and did not stop the Lear's descent at FL150.

The Board considered that the controller's increased workload just before the incident, possibly amplified by the telephone problem, had undoubtedly been a factor. They also accepted that his departure from his normal mode of operation was also most likely a further adverse contributing element. The Board was informed that a WIZAD is a published, but not often used Gatwick departure, designed to position departing ac further to the S than normal; this too could have been a factor in the controller's oversight. During the rapidly developing, high workload situation, the co-ordinator was not available immediately to assist the controller since he was trying to rectify one of the causes of the problem, namely the telephone fault.

The Board also considered what part the actions of the B757 pilot had played in the incident. Based on the information provided to them, the Commercial pilots on the Board thought it likely that the B757 pilot had been aware of the developing situation for some time, firstly reducing his ROC and then stopping the climb, probably having noted the presence of the Lear on TCAS. Members were reminded that the minimum ROC permissible in CAS is 500fpm; ac not able to maintain that, must inform ATC. However, while accepting that the captain was responsible for the safety of his ac, they informed the Board that TCAS was not designed as an 'airborne radar' and current procedures, as also mentioned in the ATSI report, prohibit its use in that manner. If however, he was aware of a situation developing that he considered unsafe, his first action should have been to inform and seek clarification from ATC. It was suggested that with 7 new ac coming on frequency around the period of the incident, the RT may have been too busy for him to make such a call but, although there was no information in his report to support that, it is clear from the RT transcript that the frequency and controller were very busy over the period.

In considering the degree of risk, the Board noted that at the CPA the ac were separated by 2.2nm horizontally, 500ft vertically and were diverging following the avoiding action given by the controller. Furthermore, both pilots were aware of the position of the other ac. Members therefore agreed that there had not been a risk of collision.

The Board was most concerned that during this incident there had been another instance of a controller not using the correct 'avoiding action' phraseology. Although they agreed that this had not played any part in the Airprox, in view of the number of examples of this which had come before them recently, Members considered that a review of the situation by the CAA was now appropriate and would be helpful.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC TC SE SC vectored the B757 and Learjet into conflict.

Degree of Risk: C.

Recommendation: That the CAA considers:

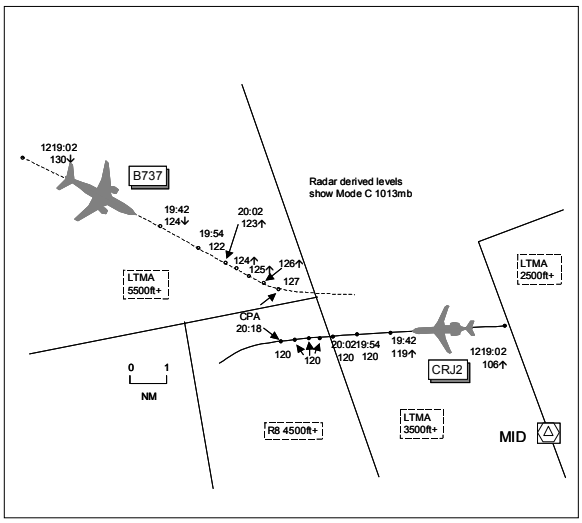
Providing an update on the review into terminology used by civil controllers when effecting avoiding action.

Advising if there are other factors, which may inhibit civil controllers from using the terminology 'avoiding action'.

AIRPROX REPORT NO 75/03

Date/Time: 12 Jun 1220
Position: 5106N 0051W (8nm NW MID)
Airspace: LTMA (Class: A)
Reporter: LTCC OCK SC

	First Aircraft	*Second Aircraft*
Type:	B737-800	CRJ2
Operator:	CAT	CAT
Alt/FL:	↓FL110	↑FL120
Weather	VMC CLBL	VMC CLOC
Visibility:	>10km	
Reported Separation:	200ft V 2-3nm H	NR
Recorded Separation:	700ft V 1·4nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LTCC OCK SC reports that at the time of the incident the situation had been complex, involving Farnborough and Bournemouth traffic, further compounded by other ac entering the Sector 'high' and descending. The B737 was co-ordinated with the WILLO Sector from FL140 to FL110 and was issued with descent clearance. The CRJ2 outbound from Gatwick was given a step climb to 5000ft, FL100, FL120 and eventually FL150 after he assessed that the projected tracks of the subject ac were suitable. However, the B737 pilot reported "TCAS" and, although he had no time to give 'avoiding action', he gave turns to both ac to improve the situation during the separation loss. He assessed the ac passed 400ft vertically and 2nm horizontally apart.

THE B737 PILOT reports inbound to Gatwick heading 115° towards MID at 280kt cleared to FL110. The Capt, PNF, noticed proximate traffic 5-6nm directly ahead on his Nav Display at FL110, he thought, which was quickly followed by a TCAS TA (range 3·5-4nm) then an RA "climb". The FO, PF, followed the TCAS guidance and the Capt advised ATC of their actions, who acknowledged his call and issued a L turn onto 080º. He thought they climbed up to FL118 before "clear of conflict" was received and ATC recleared them to descend back down to FL110 and route direct to MID. He did not visually acquire the other traffic but TCAS indicated that it had passed within 200ft vertically and 2-3nm horizontally of his ac.

THE CRJ2 PILOT provided a brief report on the incident which occurred whilst flying outbound to Spain from Gatwick IFR. He received a TCAS TA on traffic, which he saw visually, but he did not receive an RA warning during the encounter; no separation distances or assessment of risk were stated.

ATSI reports that the Terminal Control Ockham Sector controller described his workload at the time of the Airprox as 'medium to high' and the traffic loading as 'moderate'. An analysis of the RT recording showed that a total of 12 ac came

under the control of the TC Ockham SC during the 8min that the B737 was on frequency. The relevant ATC equipment was reported to have been serviceable at the time of the Airprox with the exception of the Pease radar, which was unserviceable; and the effect of this is described later in the report.

The B737 pilot established communications with the TC Ockham SC at 1214:40, descending to FL140, on a heading of 125º and was instructed to maintain FL140 and route direct to MID. Shortly afterwards, at 1215:00, the CRJ2 pilot reported on the SC's frequency, having departed from Gatwick and was instructed to squawk ident and climb to 5000ft with no ATC speed restriction. At 1216, when the SC told the CRJ2 to turn R onto 265º and climb to FL100, the B737 was in the 2 o'clock position of the CRJ2, at a range of 47nm.

At 1217:20 the SC instructed the CRJ2 to continue climbing to FL120 and 25 seconds later he issued a descent clearance to the B737 to FL110. At that time, the B737 was still in the 2 o'clock position of the CRJ2 but now the range was 29nm. No further transmissions were made to, or received from, either ac until 1219:55, when the B737 pilot reported a Resolution Advisory. Although the crew did not report that it was a TCAS climb, this was evident from the Mode C readout. The controller reacted immediately, turning the B737 L onto heading 080º but the words "*avoiding action*" were not used nor was TI passed to either ac. It was clear that this turn was intended as avoiding action and, as such, should have been prefixed appropriately. MATS Part 1, Supplementary Instruction No. 3 of 2001 – Airborne Collision Avoidance System Traffic Alert and Collision Avoidance System – TCAS II, advises controllers that when a pilot reports a TCAS Climb or Descent, the controller should acknowledge the report. The entry neither recommends nor prohibits controllers passing avoiding action in such circumstances (see ATSI recommendation). When asked why he did not pass any TI, he explained that the B737 had the other traffic on his TCAS display and he considered that if he passed complex TI to the CRJ2 there was a strong probability that the crew would not understand it due to language problems, and that the traffic would have passed behind the ac and so be out of sight of the crew. In the Airprox report supplied by the crew of the B737 after the incident, they state that at no time did they visually acquire the CRJ2 so it would, therefore, have been prudent for the SC to pass TI. Having turned the B737 L, the SC then instructed the CRJ2 to turn L heading 240º. Separation reduced to a minimum at 1220:12, when the B737 passed 1·9nm north of the CRJ2 and 600ft above. Soon afterwards, standard separation was restored and the SC informed the B737 crew that they had passed the traffic. Turning the B737 onto 080º enabled it to stay N of the CRJ2, whilst the crew of the B737 complied with their TCAS Climb. Likewise turning the CRJ2 L onto 240º achieved some lateral separation as soon as possible. By 1220:25, the SC was able to turn the B737 direct to HOLLY and descend to FL110 as it had passed the traffic.

[UKAB Note (1): The CPA occurs at 1220:18, the CRJ2 passing 1·4nm S of the B737 which is levelling at FL127.]

When the B737 pilot first called, the SC's initial plan was to leave the ac at FL140 and then coordinate with the Willo SC to obtain an inbound level. The usual method of operation was to descend inbound ac to FL110 and climb departures to FL100. The Ockham SC had recognised the potential for confliction with the B737 and the CRJ2 from the outset and he was also aware of the presence of a slow Gatwick departure bound for Plymouth as well a Citation ac inbound to Farnborough, which was still rather high descending into his sector. The CRJ2 departed Gatwick on a SAM SID and communication was established with the SC at 1215 "*London good morning CRJ c/s*". The UK AIP, page AD 2-EGKK-6-6, states that when pilots make first contact with London Control, they should provide their callsign, SID designator, current altitude and initial cleared level. Much of this information was missing requiring the SC to request it from the crew.

Later, the SC instructed the CRJ2 to climb to FL120 and shortly afterwards, at 1217:45, instructed the B737 to descend to FL110, as he had assessed that both the climb and descent could be achieved safely. The SC then turned his attention to other traffic on his sector. At 1219:41, STCA activated between the B737 and the CRJ2, when the latter was just levelling at FL120 with the B737 still in its two o'clock position but now at a range of 7·5nm and descending through FL124. The SC explained that he had seen the alert but

did not consider it a problem, as he believed that the B737 would safely descend through the level of the CRJ2. It should be noted that, from the radar display, the groundspeed of the B737 from the time it entered the sector up until this point remained around 390kt. The Speed Limit Point (SLP) for the WILLO arrival is 5nm SE of MID, approximately 17nm ahead of the B737 when STCA activated. When the B737 passed the SLP, the groundspeed indicated 375kt but the UK AIP, page AD 2-EGKK-7-4, states that ac are to cross the SLP at 250kt IAS or less. Information provided by the Meteorological Office showed that at the time the upper winds in the vicinity of MID were 235º/37kt at FL100 and 235º/65kt at FL140.

The SC cited several areas which, in his opinion, contributed to the complexity of the sector at the time of the Airprox. In the past, there had been the facility to 'split' the Ockham sector if required which entailed the opening of a SW Departures position. He advised that the Ockham sector was responsible for operations from 7 airports, many of which had experienced a significant increase in traffic during the preceding 12 months. Recently, a decision had been made to remove this facility to split the sector and so, in his opinion, this added to both the SC's potential workload and complexity when the Ockham sector was busy.

Another factor was, in his opinion, the frequent poor presentation of traffic from the LACC Sector 19/20 combination. Immediately prior to the incident, a Citation ac inbound to Farnborough, had been transferred to his frequency descending to the standing agreed level of FL110 level at BEGTO, but passed abeam this point at FL160 descending. (*Note: analysis of the incident by the unit's ATC Investigations Section revealed that the ac had been instructed to be level FL110 level 10nm before HAZEL, which is 8nm beyond the point specified in the LACC MATS Part 2. This matter is now being addressed internally by NATS*). This ac had to be integrated into his other traffic, and that of adjacent sectors, which added to his workload. Another aspect was the unserviceable Pease radar at the time. This meant that Southampton would not be supplied with any SSR data, and this required releases to be passed to Southampton in respect of its inbounds, rather than the more usual silent handover procedures. All this increased the workload on the TMA South Coordinator and also increased the SC's own workload, as it was ultimately his responsibility to ensure coordination had taken place before transfer of control of such inbound ac.

ATSI Recommendation:

It is recommended that the entry in MATS Part 1 advising controllers to simply acknowledge a TCAS RA report is reviewed with a view to stating a definitive policy as to whether or not controllers should issue lateral avoiding action instructions to ac in such circumstances.

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 initially discussed those areas highlighted by the SC as contributory to the incident. The NATS advisor informed members that the choice to 'split' the OCK sector had been removed owing to its lack of use by SCs. However, this situation was reviewed last year and, following a small simulator evaluation, a decision was made to reinstate the option in the future (July 04) after Sector training had been completed. ATCOs familiar with the Sector commented that traffic levels were known to build up very quickly and a decision to split would have to be made early. Although having the extra SC in place would spread the traffic loading over both positions, it would increase the amount of inter-Sector coordination required. Moving on to traffic presentation from LACC, although this had been perceived as being poor during the encounter, the routeing of Farnborough I/B traffic towards HAZEL after BEGTO with descent to FL110 to be level 10nm before HAZEL was by no means uncommon. This traffic was normally accepted and integrated with other sector ac, with O/B traffic to the W (the CRJ2 in this incident) normally being stopped at FL100, but this Farnborough ac had undoubtedly added to the SC's workload during the incident. The Pease radar unserviceability and associated suspension of the 'silent handover' procedure to Southampton would have also increased the S Coordinator's workload; the SC would need to check that

coordination had been effected, through the information annotated on the fpss, and ensure the I/B release was then correctly executed.

The SC's plan to climb the CRJ2 to FL120 and then descend the B737 to FL110 was based on ac performance. The subject ac were 29nm apart when the climb/descent instructions were issued but this was a scenario that required constant monitoring as the ac were on conflicting tracks. Members agreed that when the OCK SC dispensed with vertical separation without ensuring lateral separation, the likely outcome was the Airprox, and so it proved.

Members noted that although the B737 was flying at 'high speed', it had every right to do so since this was prior to it reaching the SLP; radar indicated a ROD of 1000fpm. The SC was alerted to the conflict by STCA but elected to ignore it, certain that the B737 would descend safely through the CRJ2's level. Meanwhile, the B737 crew had seen the developing conflict on TCAS and had followed the RA 'climb' guidance, informing ATC of their actions. The SC had then issued turns to both ac, without using the words 'avoiding action', to increase separation, which began to take effect at the CPA but by which time, the B737, had climbed 700ft above the CRJ2. Members were surprised that the CRJ2 crew had received only a TA alert but the crew reported that they had visually acquired the B737 during the encounter. Worthy of further note was the information (proffered by the NATS advisor) contained in the MATS Part1 Supplementary Instruction SI 3/01 which informs controllers that they should continue to provide traffic advice to ac which are affected by a TCAS manoeuvre. Although untidy, the prompt actions of the B737 crew in response to TCAS combined with the visual acquisition of the B737 by the CRJ2 crew led the Board to conclude that any risk of collision had been effectively removed.

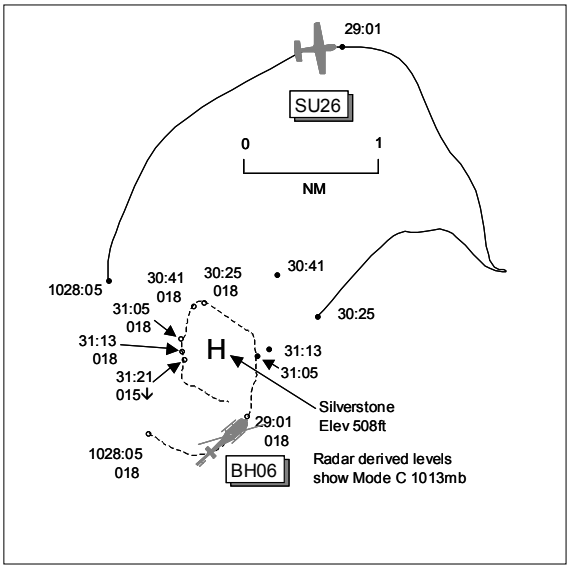
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC OCK SC dispensed with vertical separation without ensuring lateral separation.

Degree of Risk: C.

AIRPROX REPORT NO 78/03

Date/Time:	15 Jun 1031	
Position:	5204N 0101W (O/H Silverstone - elev 508ft)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	BH06 JetRanger	Sukhoi SU26
Operator:	Civ Comm	Civ Comm
Alt/FL:	2000ft (QNH 1020mb)	AEROS (N/K)
Weather	VMC CLNC	VMC CAVOK
Visibility:	30km	NK
Reported Separation:	300m H	0·5nm H
Recorded Separation:	0·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BH06 JETRANGER PILOT reports flying on a local sortie (rebroadcast of racing) from Silverstone making blind calls on Silverstone frequency 121·07MHz and being in receipt of a FIS from Cranfield on 122·85MHz squawking 7000 with Mode C. The visibility was 30km in VMC, the helicopter was coloured black/silver and the strobe, position, pulse, landing and anti-collision lights were all switched on. His activity had been NOTAM'd. Flying at 2000ft QNH (Cranfield 1020mb) in a 5º AOB L turn, passing through 180º, at 60kt, he saw a blue/red coloured Sukhoi aerobatic ac in his 9 o'clock position range 300m in a vertical climb passing through his level streaming white smoke. The sortie was abandoned and an autorotation was entered to land at Silverstone whilst the Sukhoi continued to display. As he made his approach to the heliport, the Sukhoi's lowest altitude was seen to be 350ft agl and it continued to display for 15min in the Silverstone overhead. No blind calls were made by any other ac during his sortie and no squawk was observed on TCAS. Also, no other activity had been NOTAM'd to take place nor notified by the event organisers. He assessed the risk as medium.

THE SUKHOI SU26 PILOT reports flying an unlimited aerobatic sequence in the area to the N and E of the racing cct outside the aerodrome boundary. The weather was VMC in CAVOK conditions, the ac was coloured blue/white and he was squawking 7000 with Mode C, he thought, but carried no lighting. On arrival in the area at about 1020Z he had called Silverstone RADIO but had received no response. Turweston RADIO informed him that there was no ATC at Silverstone on that day so he remained on the Turweston frequency during his display, as it was his intended destination airfield. He had seen the BH06 about 1·5nm away as it appeared to be in a hover 1500ft agl over the race cct which was well clear of his display area. Although he called it, the helicopter did not respond to his calls on either frequency. He had maintained visual contact with the helicopter throughout his display routine and had remained at least 0·5nm away from it. He believed that its pilot would have seen his ac easily as it was producing large volumes of smoke and, having monitored the BH06's movements, was disappointed that it had not landed or cleared the area. Its position over the crowd was safe from his point of view, as he was not permitted over the cct for display purposes. At many motor racing and other events, helicopters and balloons are airborne behind the crowd line whilst display flying is in progress. He believed that there had been no Airprox nor risk of collision. This air display was conducted iaw CAA permission Ref: 9/99/15-1127/2003 and was coordinated with

Silverstone race cct/event organisers who had in turn notified the helicopter operator of the intended display timings.

DAP comments that AUS did not receive either an Unusual Aerial Activity notification from the aerobatic pilot concerned nor a copy of the CAA Permission subsequently issued by CAA SRG. Because of this, no NOTAM or deconfliction action was taken by AUS. However, a NOTAM Navigation Warning (NW) was issued by AUS to cover the helicopter filming activity at Silverstone and should have alerted the aerobatic pilot to the planned presence of the helicopter on the day.

UKAB Note (1): NOTAM H3035/03 valid 15/06/03 0600Z to 1830Z promulgated helicopter filming and camera rebroadcasting activity within a 2nm radius of position 5204N 00101W (Silverstone Race Circuit, Northamptonshire) from surface to 2500ft agl.

UKAB Note (2): The UK AIP at AD 3-EGBV-1-3 promulgates Silverstone as a Heliport centred 520417N 0010100W active by arrangement, daylight only with A/G available by prior arrangement on 121·07MHz.

UKAB Note (3): Analysis of the Clee Hill radar recording at 1028:05 shows a 7000 squawk 0·75nm SW of Silverstone Heliport (on the SW boundary of the Motor Racing Circuit) passing through heading 120º in a slow LH turn indicating FL018 (2000ft QNH 1020mb). At the same time, a primary only return is seen, believed to be the SU26, 1nm NW of the Heliport tracking 010º in a R turn which is continued until it reaches 2·25nm ENE of the heliport where it abruptly changes course to the NW before fading from radar at 1030:25 on a SW track 0·75nm to the ENE. Meanwhile, the BH06 has continued in a slow LH turn and, as the SU26 fades, has progressed to a position 0·38nm NNW of the Heliport turning through a WNW heading. Intermittent returns are seen on the SU26 thereafter at 1030:41 to the NE and then two further returns at 1031:05 and 1031:13 about 0·3nm to the E of the Heliport before fading completely. This is believed to be when the Airprox occurs with the BH06 tracking S, 0·5nm to the W of the SU26, as the BH06 is seen 8sec later to commence a rapid descent (ROD 2000ft fpm) and turning L to the SE before fading from radar.

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.

Reports from both pilots indicated two very different viewpoints on the incident as seen from either cockpit. The SU26 pilot was aware of the helicopter's activity and carried out his aerobatic display in the knowledge that his operating area was outside the race circuit perimeter, clear of the associated crowd and therefore adequately separated from the helicopter's area of operations. In contrast to this situation, the BH06 pilot was surprised to see the Sukhoi appear, 300m away adjacent to the Silverstone race circuit in a vertical aerobatic manoeuvre; his sortie had been NOTAM'd and he had no prior knowledge of this unexpected aerobatic activity. Members agreed that this incident had the potential for becoming a serious situation as the intentions of the SU26 pilot were unknown to the helicopter pilot. However, exhibiting good airmanship, the BH06 pilot took early positive action to the perceived threat, and carried out an immediate landing - the recorded radar indicated 0·5nm lateral separation - which the Board agreed had been effective in preventing an Airprox, and reducing a potentially serious incident to a 'sighting report'. Members noted that although no SSR responses were seen on radar from the SU26, its pilot thought he was squawking 7000 with C whereas an aerobatic code of 7004 should have been displayed during the aerobatic manoeuvring.

Of more concern to members was the fact that the SU26 pilot had received CAA permission for an aerobatic display but this had not resulted in the promulgation of a NOTAM. Although the event organiser/display director should have de-conflicted the two activities in the Silverstone overhead as part of a safety brief and ensured that a NOTAM had been issued, DAP/AUS were unaware of the planned SU26 display beforehand from either direct notification from the event organisers or a copy of the permission granted directly to the Sukhoi pilot from CAA SRG. Although other airspace users would have been aware of the BH06 activity from the helicopter NOTAM, the aerobatic display went undisclosed.

The Board agreed that this should not occur and that a review should be undertaken by the CAA of the existing arrangements.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

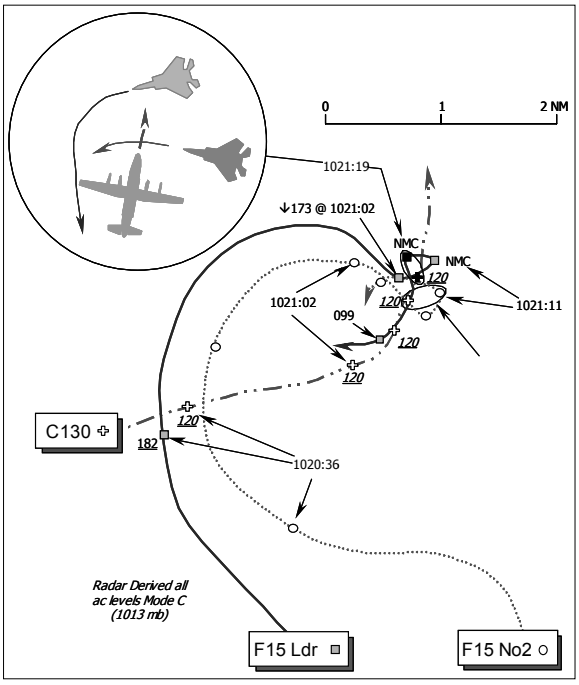
Degree of Risk: C

Recommendation:

The CAA reviews arrangements to ensure that when a 'Permission to Display' is issued, this results in a NOTAM being promulgated.

AIRPROX REPORT NO 79/03

Date/Time:	18 Jun 1021	
Position:	5251N 0100E (8nm E of Sculthorpe elev - 214ft)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C130	F15Cx2
Operator:	HQ STC	Foreign Mil
Alt/FL:	12200ft (QNH 1017mb)	FL140
Weather	VMC	VMC NR
Visibility:	40km	NR
Reported Separation:		
vF15 Ldr/300m H, nil V		3000ft
vF15 No2/100m H, nil V		
Recorded Separation:		
vF15 Ldr >400m vF15 No2		NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C130 PILOT reports his ac has a grey camouflage scheme but the HISL was on whilst inbound to Sculthorpe Drop Zone (DZ) at 190kt for a paratroop drop and was in receipt of a RIS from Marham on 362·75MHz. A squawk of A0033 was selected with Mode C, but neither TCAS nor any other form of CWS is fitted.

Turning L through N (out of the sun) about 3nm E of Fakenham, cruising at 12200ft QNH (1017mb) he suddenly spotted an F15 jet 300m away in a steep dive, tracking from his 2 o'clock high position. The jet passed 300m ahead through his altitude before exiting at 7 o'clock low, relative to his C130.

About 3sec later, a second F15, passed within 100m of the nose following the same track as the first ac. The other ac passed so close it was impossible to calculate whether they would pass above or below his ac and in both cases, there was insufficient time to take avoiding action.

He assessed the risk as *"very high"*.

His paratroop drop had been promulgated by NOTAM and it was included in the United Kingdom Daily Navigation Warning Summary [UKDNWS AB5251 & AB5251A], warning that parachuting would take place from an altitude of 12200ft. Although LATCC (Mil) would usually

provide an ATS for flights at that altitude, he elected to obtain a service from Marham ATC because of the close proximity of their DZ to the Marham MATZ.

THE F15C PILOT reports he was leading a flight of 2 F15C light grey camouflaged ac. The anti-collision beacons were on and they were in receipt of a RIS from LONDON MILITARY, squawking the assigned code with Mode C; neither TCAS nor any other form of CWS is fitted.

The flight was heading S at FL150 when LONDON MILITARY reported the C130 traffic at 1017:05, 10 miles west manoeuvring indicating FL120 – a paradropper - which both members of the flight saw and he reported visual contact. No further traffic information was passed to the flight prior to the Airprox, which occurred at about 1021:17.

The flight then climbed to FL180 and initiated a series of turns at 300kt limiting their movement no further W than the original position of the formation when the C130 traffic was pointed out. During this series of turns, the flight lost visual contact with the C130 and assumed it was manoeuvring 10nm west of the pair.

The flight began a Basic Fighter Manoeuvres engagement at FL180 and at 1021:10, whilst passing 11000ft he called "knock it off" as they passed the C130, which went through the formation. As flight leader he never got closer than 3000ft. However, his wingman was at 14000ft descending and selected afterburner to avoid the C130, and passed 2-3000ft below and slightly in front of the turboprop with a "high" risk of a collision.

MIL ATC OPS reports that the Marham RT timing equipment was 2 hours out; therefore all timings within this report have been correlated to UTC. The C130 crew was working Marham ZONE under a RIS, whilst conducting a paradrop exercise in an area around Sculthorpe for which two NOTAMs had been issued. LATCC (Mil) Controller 11 (CON 11) was providing a RIS to a flight of 2 F15 ac intending to operate in a block *"…from FL50 to FL230"* and was released to manoeuvre at 1013:15. At 1017:01, CON11 reported *"…traffic west 10 miles manoeuvring indicating FL120 para dropper"* to which they reported *"…visual with traffic".*

At 1017:21, the C130 pilot advised ZONE that his DZ controller was reporting fast jets to the eastern side of the DZ and ZONE confirmed that he was just about to speak to LATCC (Mil) about it. At 1018:01, traffic information was passed to London Military Assistant 11 (AST11) who advised ZONE, after confirmation from CON 11, that the F15 pilot was visual. ZONE advised the C130 crew that the jet pilots were visual with them at 1018:48. Further traffic information was called at 1020:23, *"….south east 3 miles manoeuvring, no height information"*, and again at 1020:57, *"…north east 2 miles manoeuvring, no height information"* to which the C130 crew reported visual. Meanwhile the F15s enquired about the C130, whereupon at 1022:25, CON 11 advised, *"….it is a para dropper Sculthorpe active up to 15,000ft"*. It became evident that another agency was attempting to call the F15s on GUARD at 1022:46, 9sec later the F15 pilot/leader asked CON 11 to *"confirm the aircraft the C130 right there is NOTAM'd for that airspace"*, which CON 11 confirmed. At 1024:52, the C130 crew advised ZONE that they had had an Airmiss (sic).

Under RIS the controller will *"… inform the pilot of the bearing, distance and, if known, the level of the conflicting traffic. No avoiding action will be offered".* Generally, to minimize unnecessary interruptions, controllers will only pass traffic information on traffic likely to come within 5nm of their ac. ZONE decided that a timely reminder to LATCC (Mil) of the evolution would be prudent. As the situation unfolded ZONE provided relevant traffic information that ensured the C130 crew became visual with the F15s. Considering the evolution undertaken by the C130, CON 11's timely warning to the F15s at 10nm was entirely appropriate and allowed the pilots to become visual with the C130, however, this was some 4min before the Airprox. As the contacts closed, despite an indicated separation of 5000ft, knowing the C130 was operating within the agreed vertical limits of the F15s' operating block, it would have been prudent for CON 11 to have updated the F15s on the C130's position. Though a NOTAM advises other airspace users of an activity within an area, it does not grant the sponsor sole use of the airspace concerned. Additionally, under RIS *"The pilot is wholly responsible for maintaining separation from other aircraft whether on not the controller has passed traffic information"*. Given the earlier traffic information and the NOTAM, it could be argued that the F15s had enough warning of the paratroop

dropping C130 in the vicinity, however, it is considered that CON 11 could have done more and the inexperienced controller has been re-briefed to this effect.

THE C130 PILOT'S STATION COMMENTS that this was a startling experience for the C130 Captain and his crew who were engaged in a demanding task. It raises 2 questions:

Which is the best ATC unit to provide a service during such an exercise? If it was being carried out at low level exclusively then the crew could be expected to be in contact with the nearest LARS unit - in this case Marham. If it were carried out at medium level only, then would LATCC (Mil) appear to be the best agency? A medium-to-low activity seems to fall between the two cases.

Were the F-15s warned of the C130 in the vicinity? It is understood that the C130 crew tried to contact them on Guard after the event, but with no response.

This Airprox happened to an ac apparently afforded "protection" by NOTAM and the UKDNWS. Had they already left the ac, the para troops would have been vulnerable through some 12000ft of freefall. It is of concern that the F-15s approached so close and hopefully the investigation of this Airprox will lead to measures to avoid a repetition, which could have tragic consequences.

[UKAB Note (1): The UKDNWS promulgated at AB5251 NOTAM for the paratroop drop *"0800-2300 12000ft agl…Sculthorpe DZ: PJE 3nm rad 5251N 00046E…"* and a contact telephone number was included.

AB5251A, promulgated the activity "1300-1500 2000-2200 15000ft agl *Sculthorpe DZ: PJE 15nm rad 5251N 00046E drop cone extends 5nm sfc/ 5000, 10nm 5000/10000ft, 15nm 10000/ 15000ft…"*.]

[UKAB Note (2): The Debden and Cromer Radar recordings shows the C130 squawking A0033 manoeuvring to the S and SE of Sculthorpe maintaining FL120 Mode C. The F15s are operating to the E and SE of the area – the leader only squawking – and indicating well above the C130 until 1019:41, when the F15s can be seen in a L turn to the SE of Sculthorpe which places them onto a closing heading with the eastbound C130, about 3nm SE of Sculthorpe. The C130 turns L through N as the F15 lead descends through FL173 whilst the pair pass N of the Hercules. The Airprox occurred 8nm E of Sculthorpe DZ just before 1021:19, as the F15 pair turn about and cross ahead of the C130 from R – L as reported. The relative geometry is difficult to determine because of the close proximity of the three ac involved and the nature of the manoeuvres executed by the F15 pair. Hence the minimum separation cannot be determined with accuracy, however, it appears that the lead F15 passed in the order of 400m ahead of the C130, from R – L, the No2's primary radar return is not evident at that point but from successive returns might have passed somewhat closer. NMC is displayed by the lead F15 again until it is shown well to the S at FL99.]

HQ STC comments that this unfortunate incident highlights several worrying assumptions. Firstly, the C130 crew thought they were operating within the NOTAM'd airspace, when in fact they were outside of its time limits. Thus the F15s were justified in not briefing the NOTAM, since it was not active during their flight period. Secondly, there is the assumption that operating within the bounds of a NOTAM would afford "protection", when the NOTAM was only a warning and would not prohibit other ac from entering the area. Thirdly, the F15s assumed that LATCC (Mil) would update them on the C130, but having called "visual" on the notified traffic, it was logical for the controller to believe that the F15s were maintaining a 'tally'. Furthermore, LATCC (Mil) passed information that the C130 was a manoeuvring para-dropper, which should have indicated to the F15 pilots that it was likely to remain in the area. The F15 pilot's should have maintained contact with the C130 that they were told was a paradrop ac, but having lost tally they should then have requested a traffic update from CON 11, or executed a 'knock it off' to scan for the 'bogey'. This omission directly led to them flying through the C130's gunsight!

HQ 3AF comments that the F-15 formation had not briefed the NOTAM because it was not perceived to affect the sortie. Subsequently, the formation leader was of the opinion that the C-130 was operating outside of the time window and area specified in the NOTAM. The formation was receiving a RIS from LATCC (Mil); the controller,

by identifying the C-130 to the formation and receiving confirmation of visual contact in return, fulfilled his responsibility. The F15 leader, even if he did not expect the C-130 to turn in his direction, would have been wise to inform London (Mil) that he had lost contact with it, although he believed that had the C-130 come into confliction with his formation then the controller would have updated its position. The LATCC (Mil) controller, on observing the decreasing separation between the C-130 and the F-15 formation, might have thought to confirm with the formation leader that he was still visual with the C-130. In the event, neither action was taken and a seemingly avoidable Airprox 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.

It was unfortunate that these two incompatible flights had ended up in the same piece of sky, and some members viewed this as an entirely avoidable Airprox. Whilst considering their assessment of the 'Cause and Risk', the Board could only deal with what had actually occurred and not what might have happened. At the time of the encounter the paratroops had not been dispatched and thus the basis of the Board's assessment was solely the conflict between the C130 and the two fighters - not any potential conflict with the parachutists, however dangerous such a possibility might have been.

The reporting C130 pilot's station had posed two questions: Firstly, which is the best ATC unit to provide a service during such an exercise? In this instance the Marham Watchman SRE could equally survey the area at the Hercules' altitude and more importantly ZONE would have better low-level radar coverage of the DZ, which LATCC (Mil) would probably not, depending on the radar source in use. Moreover, the LARS unit would most likely be in communication with the myriad of other ac transiting through the lower levels of the FIR that the parachutists intended to penetrate at the time. Thus, depending on the nature of the ATS requested by the pilot, the terminal ATSU was better placed to provide a warning to both the C130 pilot – as occurred here - and also to other pilots in the vicinity. On this basis the Board agreed that the LARS unit utilised by the C130 pilot was the better agency from which to obtain an ATS.

Secondly, were the F15 pilots warned of the C130 in the vicinity? HQ 3rd AF had made it plain that the F15 crews had disregarded the NOTAM information, because the latter believed - from the information it contained - that it would not affect their flight. The C130 crew had endeavoured to ensure that their para drop exercises were notified to other airspace users by NOTAMs. Both the C130 pilot and his station had stressed this in their reports, but it was unfortunate that the information promulgated did not encompass completely the bounds of their activity, if they thought erroneously that it afforded some form of 'protection' to the Hercules during the 'run-in' prior to the drop. Clearly the NOTAM was meant to warn other airspace users that parachutists might be encountered in the air. Whereas NOTAM AB5251 advertised during the time period 0800-2300 activities up to 12000ft agl, it was only promulgated for a 3nm radius around the Sculthorpe DZ and this Airprox occurred a further 5nm to the E outside this notified area. Similarly, NOTAM AB5251A, helpfully promulgated concise details of a drop cone out to 15nm radius of the DZ, but notified that this did not commence until later - more than 2½hr after the Airprox occurred - in the period 1300-1500. Thus the NOTAMs had been somewhat ineffective in advertising accurately the Hercules' activities and rendered understandable why the F15 crew had discounted the NOTAMs at their pre-flight brief. Notwithstanding the NOTAM situation, however, CON11 had told the F15 pilots about the C130 4min before the Airprox.

Turning to actual events, it was also evident that the C130 crew had been warned about the F15s but they could not have been expected to see them any earlier than they did. Thus they were unable to manoeuvre out of the way of the jets diving from above. For their part, the F15 pilots having been warned about the Hercules by CON 11 and that it was a para-drop ac, then lost tally with it. The HQ STC fast-jet member opined that during tactical manoeuvres any 'stranger' ac should be treated as potentially 'hostile' and so losing sight of it amounted to poor tactical

awareness on the part of the F15 pair, a shortcoming that was exposed by subsequent events. Additionally, it was unfortunate that CON11 had not updated the traffic information about the C130 before the three ac met again. A LATCC (Mil) controller reinforced the Mil ATC Ops view that this lapse stemmed from inexperience on the controller's part, but it was also evident that the F15 pilots had not requested an update. The Board drew out the salutary lesson here for pilots & controllers alike: for pilots – if you want to be kept informed about traffic under a RIS make sure you ask for an update; whereas for controllers - do not hesitate to provide an update if the situation warrants it. Thus the F15 pilots closed on the Hercules unaware of its close proximity until committed in a steep descent when the leader spotted it as he flew across its nose and called the 'knock it off'. This warning enabled his No2 to acquire it also, but at a very late stage. The Board agreed that the F15 pilots had not maintained effective situational awareness and had not cleared their flight path sufficiently to disclose the large transport ac resulting in a very late sighting on their part.

With regard to the risk, the F15s' Basic Fighter Manoeuvres were clearly high-energy ones as evinced by the radar recording. Though difficult to determine precisely due to the tight gyrations of the jets, this was a close encounter where it appeared that the lead F15 had passed in the order of 400m across the nose of the C130 from R – L and the No2 had probably passed somewhat closer. The lead F15 pilot's own assessment that the risk had been *"high"* was broadly in line with that of the C130 pilot. While both jet pilots had managed to manoeuvre out of the way of the transport ac, it was the use of afterburner by the No2 F15 to do so, that convinced members that the safety of these ac had indeed been compromised.

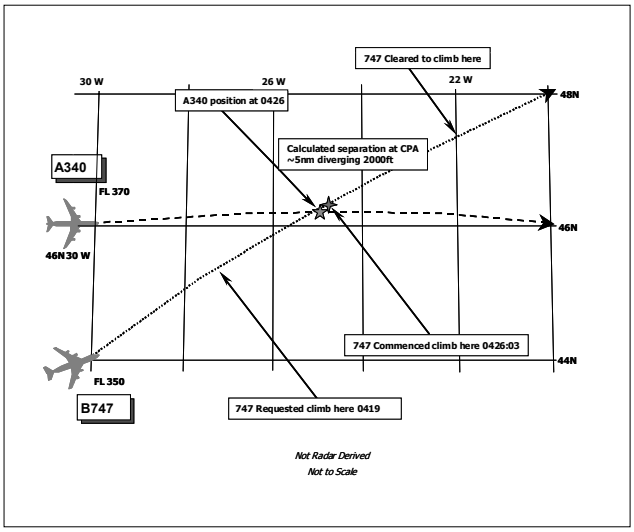
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Very late sighting of the C130 by the F15 formation pilots.

Degree of Risk: B.

AIRPROX REPORT NO 80/03

Date/Time:	19 Jun 03 0426	
Position:	4615N 2457W (Mid Atlantic)	
Airspace:	OCEANIC	(Class:A)
Reporter:	ScOACC	
	First Aircraft	*Second Aircraft*
Type:	B747-300	Airbus A340-300
Operator:	CAT	CAT
Alt/FL:	FL350	FL370
Weather	VMC	NK
Visibility:	N/K	N/K
Reported Separation:		
	NK	NK
Recorded Separation:		
	4nm (NATS calculation)	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

SCOACC reports that a B747 was routeing French Antilles to Paris. When it was at position 4615N 2450W he cleared the pilot to climb from FL350 to FL370 after passing 22W. The pilot, however, initiated a climb immediately and came into conflict with an A340 at FL370. As soon as he was aware that the ac had commenced a climb he issued an avoiding action, immediate descent instruction. He informed the pilot that reporting action would be taken. He estimated that the separation at the CPA was 8nm and 0ft vertically.

THE B747-300 PILOT was on a W to E Atlantic transit inbound to Paris. Crossing 45N he contacted Shanwick on 3016 HF, a busy frequency, with a Position Report and a request to climb from FL350 to FL370. A few minutes later he received a call from Shanwick: *"clears XXX passing 22W climb and maintain FL 370 report 20W"* to which he replied: *"ATC clears XXX passing 22W climb and maintain FL370 report 20W".* Shanwick then responded *"XXX leaving FL350 report reaching FL370".* While in the climb approaching FL370, Shanwick called him saying: *"XXX descend FL350 report reaching".* At 20W Shanwick advised him that a report would be filed.

THE AIRBUS A340-300 PILOT reports that he was unaware of the Airprox, received no notification from Shanwick and had no TCAS warnings.

UKAB Note (1): The transcript of Ballygirreen Radio shows the exchange as follows:

0418:40 *'XXX checked position four five North two seven four niner West zero four one one level three five zero estimate four eight North two zero West zero four five two BEDRA next selcal check kilo mike bravo delta request level three seven zero go ahead'*

0419:01 *'XXX Shanwick a position is copied requesting three seven zero, standby this frequency on your request, kilo mike bravo delta.*

0425:21 (answering selcal) *'go ahead Shanwick for XXX'*

0425:24 *'XXX Shanwick amended level clearance. Shanwick clears XXX after passing two two West climb to and maintain flight level three seven zero. Cross two zero West level. Report leaving and report reaching read back'*

0425:41 *'After passing two two one fortysix??? (decipherability in question) XXX to climb and maintain flight level three seven zero and report two zero West XXX.*

0425:52 *'XXX Shanwick report leaving for three seven zero'*

0425:57 *(from the 747 to Shanwick) 'and I got aah leaving three five confirm to climb to three seven zero'*

0426:*03 (from Shanwick to 747) 'Affirmative XXX leaving now three five zero for three seven zero report reaching'*

0426:09 'report reaching XXX'

0428:29 *'Go ahead Shanwick for XXX'*

0428:31 *'XXX descend immediately to flight level 350, your clearance was to climb after passing two two West. Descend now three five zero'*

0428:43 *'flight level three five zero XXX'*

0431:08 '*XXX reaching flight level three five zero maintaining etc XXX'*

ScOACC INVESTIGATIONS reports that a B747-300 from Fort de France Le Lamentin to Paris Orly, was routing Eastbound on a random route via 44N30W - 48N20W - BEDRA at FL350 while a A340-300 from Chicago to Madrid, was also routing Eastbound at FL370 on a random route via 46N30W – 46N20W – PASAS which crossed the 747's track, converging to the same point 4611N2459W at 0426.

Following the initial call by the 747 pilot at 0419 at position 4539N2616W, requesting a climb from FL350 to FL370, the controller made a copy of the 747 plan in FDPS and 'probed' the climb profile, which highlighted a conflict with the crossing traffic (A340) at FL370, at 4604N2607W. The Controller then inserted a waypoint at 22W with the knowledge that the ac would be laterally separated by that point. The way point of 4719N2200W was inserted into the copy plan and then a climb profile to FL370 from 22W was probed and showed no conflict. As FL370 was under the control of another sector at time 0422, the Controller electronically transferred the copy plan, containing the climb to FL370 from 22W, to the appropriate sector. This was accepted by the sector involved and returned.

At time 0424 the Controller issued a climb clearance to the 747 pilot via Ballygirreen which read "*Shanwick clears XXX after passing 22W climb to and maintain FL370 cross 20W level report leaving report reaching."* (See UKAB Note (1))

At time 0426 (4611N 2459W) the 747 pilot read back the climb clearance and reported leaving FL350 for FL370; at this time the A340 was at point 4607N25W. Ballygireen have since advised that the 747 pilot's command of English meant that he did not fully understand the clearance restriction and that the Communicator did not satisfy himself that the clearance was completely comprehended.

On receipt of the pilot's report climbing to FL370, the Controller at once sent a priority message to Ballygireen instructing 747 pilot to descend immediately to FL350 and he read back leaving FL370 for FL350 and reported level again at FL350 at time 0431.

It is calculated that the minimum lateral separation between the ac was 4nm instead of the required 60nm. Longitudinal separation was 0 minutes instead of the required 15 minutes.

The Controller who issued an immediate descent clearance to the flight dealt with the situation swiftly. However, due to the limitations of HF and the time it takes to get a pilot readback, the 747 pilot had commenced a climb by the time the Controller was aware of the incorrect readback.

This Airprox highlights the limitations of HF communications utilised in the North Atlantic area, and reaffirms the importance that both pilots and radio operators listen to clearances and read backs very carefully on HF.

ATSI reports that they concur the ScOACC Investigations report into this incident.

UKAB Note (2): The minimum separation permitted on by N Atlantic transits is 60nm lateral, 15min longitudinally or 1000ft vertically.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that the revised clearance transmitted from the Shanwick controller (via Ballygirreen) to the B747 pilot at 0425:24 was clear, correctly formatted and unambiguous, but R/T reception may have rendered parts of the instruction difficult to hear clearly on the part of the B747 crew, who were not native English speakers. Further it was considered likely that the Radio Officer had confused the B747 crew by using non-standard phraseology and, as a result, they read back an incorrect interpretation of their clearance, which the Duty Radio Officer did not challenge. Furthermore his call of 'Affirmative xxx leaving 350 for 370' just 6sec after the instruction to call leaving 350 led the B747 pilot to believe that the climb had been authorised. As soon as the sequence of calls was completed the crew acted on this incorrect assumption and the pilot called his departure from FL350 for 370 as instructed. However owing to the lengthy time lag in communication, the Shanwick controller was not able to issue an instruction to stop this climb and return to FL350 – or for the pilot to start to implement it, until some 2½min later. The Board determined that the Shanwick controller had acted correctly throughout the incident but due solely to the inadequacy of the communication system, was unable to rectify the serious erosion of separation in a timely manner.

Plotting the ac positions and tracks, using timings provided in the NATS report and taken from the RT transcript, suggests that when the A340 crossed the track of the B747, the ac were separated vertically by 2000ft. Very shortly after, when the B747 pilot commenced a climb at 0426.03 the ac were then diverging and separated by over 5nm. Since neither pilot reported a TCAS alert/warning the Board considered this incident to be an infringement of the minimum separation criteria, an extract of which is at UKAB Note (2) above. Although this incident had the potential for a much more serious outcome, in the event the Board concluded that, more by luck than design, there had been no risk of collision on this occasion.

The Board agreed unanimously that the current system of communication on the North Atlantic is inadequate with nothing to prevent incidents such as this taking place repeatedly. Modern communication equipment now allows messages to be exchanged reliably, in near real-time over very long distances. Had such equipment been in place it is probable that this incident would not have occurred. It is ironic to observe that passengers can engage in real-time calls from Mid Atlantic, but controllers cannot transmit safety messages to pilots in the same time scale.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Duty Radio Officer at Ballygirreen did not obtain a correct readback of the clearance passed by the ScOACC Controller.

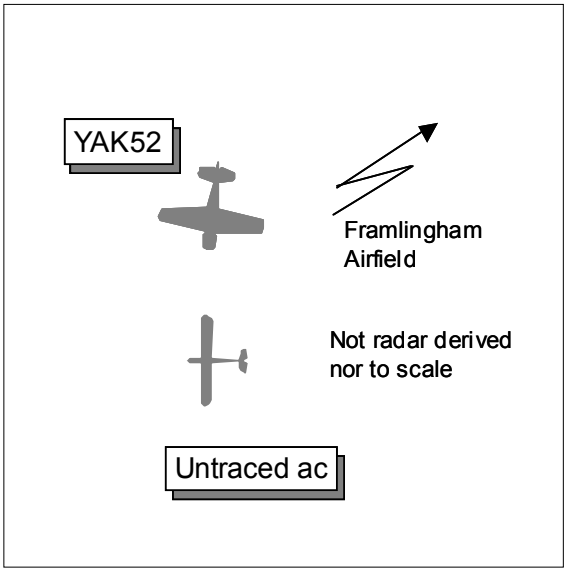
Degree of Risk: C.

Recommendation:

That the CAA considers the introduction of more effective and faster communication between controllers and pilots in the Shanwick Oceanic Area of responsibility.

AIRPROX REPORT NO 81/03

Date/Time:	15 Jun 1337 (Sunday)	
Position:	5210N 0120E Easton (13nm E Wattisham)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	YAK52	Untraced light ac
Operator:	Civ Pte	NK
Alt/FL:	500ft	NK
	(QFE)	(NK)
Weather	VMC CLNC	NK
Visibility:	10km	NK
Reported Separation:		
	<50ft V	NK
Recorded Separation:		
	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE YAK52 PILOT reports flying an aerobatic display with Article 70 permission at Easton and he was listening out with Elmsett RADIO on 130·9MHz; no transponder was fitted. The visibility was 10km in VMC and the ac was coloured white/yellow and black and carried no lighting. Heading 190° at 160kt rolling out of a 45º dive during the 'pull up' recovery from a 'Cuban eight' manoeuvre, a white coloured high wing single engine ac with tricycle u/c and thin fuselage, possibly a Jabiru or similar type, was seen about 25-30m ahead, crossing the display line L to R (E to W) at the same height (500ft agl). He took 'severe' avoiding action by diving his ac, passing <50ft immediately underneath the other ac, whose pilot appeared to be unaware of the occurrence, and he assessed the risk as serious. The incident was witnessed by other pilots on the ground who thought the offending ac might have been from Framlingham airfield close by (3nm to the NE). This had been the second time that this sort of encounter had happened to him and he believed that a major factor in the incident was that, although all the paperwork had been completed and permission granted (CAA Ref 9/99/15-1027/2003), no NOTAM had been issued for this single item display/event. Bearing in mind the ease of NOTAM information gathering available to pilots via on-line systems (internet), the lack of a NOTAM meant the other pilot would have been unaware of the organised event with 4000+ people gathered and consequently led to a breach of Rule 5-1(d). Furthermore, he believed that all displays carried out by Display Authorised (DA) pilots should be NOTAM'd, irrespective of their size. It should not be left to an arbitrary decision by AUS. He had specifically requested NOTAM action for previous small displays but to no avail.

AIS MILITARY reports that despite extensive tracing action, the identity of the reported ac remains unknown. The Debden radar recording shows an intermittent primary only return manoeuvring overhead the stated incident position but no other ac returns are seen to transit the area. Procedural enquiries to airfields adjacent to the incident site, including Framlingham, did not reveal any ac movements which correlated with the reported ac description and the timing of the incident. Tracing action was terminated 1 month post incident.

DAP reports that AUS did not receive either an Unusual Aerial Activity notification from the aerobatic pilot nor a copy of the CAA permission subsequently issued. Because of this no NOTAM or deconfliction action was taken by AUS.

UKAB Note (1): The Rules of the Air Regulations 1996 Rule 5(1) d (i) states that *"an aircraft shall not fly over, or within 1000 metres of, any assembly in the open air of more than 1000 persons assembled for the purpose of witnessing or participating in an organised event except with the permission in writing of the Authority and in accordance with any conditions therein specified and with the consent in writing of the organisers of the event"*.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the YAK52 pilot.

This had been an unfortunate incident for the YAK pilot. During recovery from an aerobatic manoeuvre, he had seen another ac as it crossed 25-30m ahead of his projected flight path at the same level. Members were cognisant that there was always a risk in Class G airspace that an ac may fly through inadvertently, irrespective of whether a display was NOTAM'd or not. Although the onus was on the YAK pilot to clear the area into which he was flying, this had been understandably a late sighting during an aerobatic display, of the crossing ac whose pilot was apparently unaware of the confliction. This had caused the Airprox.

Fortunately, the YAK pilot saw the conflicting ac in time to take avoiding action, by diving his ac to pass <50ft beneath it, so removing the risk of an actual collision. However, the Board agreed that the ac had flown in such close proximity, apparently with one pilot unsighted, that the safety of both ac had not been assured during the encounter.

Subsequently the YAK pilot's perceptions, with respect to arbitrary NOTAM action, were found to be incorrect. However, members were concerned that the YAK pilot had received permission from the CAA to display but this had not resulted in a NOTAM being promulgated. It transpired that DAP/AUS were not aware of the planned display but should have been, so the event had gone undisclosed to other airspace users. Normally notification was received direct from the event organiser/display director or, as a back up measure, a copy of the permission granted to the YAK pilot was received from CAA/SRG; either would result in NOTAM action by DAP. The Board agreed that an internal breakdown in communication had occurred and that a review should be undertaken by the CAA on existing arrangements.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the YAK52 pilot during his aerobatic display and a probable non-sighting by the pilot of an untraced ac.

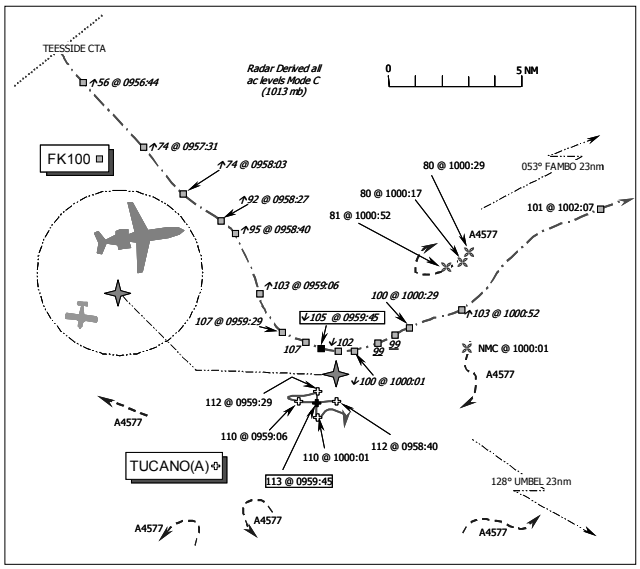
Degree of Risk: B.

Recommendation:

The CAA reviews arrangements to ensure that when a 'Permission to Display' document is issued, this also results in a NOTAM being promulgated.

AIRPROX REPORT NO 82/03

Date/Time:	16 Jun 0959	
Position:	5416N 0100W (233°(T) FAMBO 23nm)	
Airspace:	Vale of York AIAA (Class: G)	
	Reporting Ac	*Reported Ac*
Type:	FK100	Tucano
Operator:	CAT	HQ PTC
Alt/FL:	FL100↑	Manoeuvring (NK)
Weather	VMC NR	VMC
Visibility:	10km+	NR
Reported Separation:		
	Not seen	Not seen
Recorded Separation:		
	v Tucano (A): 2·03nm H, 800ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK100 PILOT reports [some three weeks after the event] that his ac has a blue & white livery and the HISL was on whilst climbing outbound under IFR from Teesside for Amsterdam. He was in receipt of a RAS from Teesside RADAR and squawking the assigned code of A7310 with Mode C; TCAS is fitted.

After take-off from RW23, RADAR instructed them to turn L onto a radar heading of 090° and climb to FL150. After about 1min heading E, Teesside RADAR instructed them to resume their own navigation to a reporting point [which he could not recall and was not readily identifiable] and then call London MILITARY on 131·22MHz. At this point, there was a little confusion between himself –the PF - and his 1st Officer – the PNF. He thought RADAR had instructed them to route to FAMBO, but the 1st Officer, who had flown the route several times over the previous few days, thought the instruction was to route to UMBEL, which had been the norm over the previous days' flights. Whilst he tried to route to FAMBO, the PNF was trying to call London MILITARY, but with no response. He was also having difficulties as FAMBO was not in the ac's FMS database or shown on any of their charts. Furthermore, UMBEL is en route to 'OTR', which was on their flight-planned route. There being no response from London MILITARY on the RT frequency given, the PNF recalled Teesside RADAR. Meanwhile he had to navigate the ac as sensibly as he could and so took up a course towards UMBEL in accordance with their flight-planned route. Teesside RADAR then advised that they should be routeing towards FAMBO and to call the London MILITARY again on the same frequency - 131·22MHz. The 1st Officer called again and immediately the London MILITARY controller started to issue avoiding action instructions. Very shortly afterwards climbing through FL100 heading 160° at 270kt, he received a TCAS TA and then a 'CLIMB' RA. This was followed immediately by a 'DESCEND' RA at the same time as the controller was issuing large turns - both left and right. The intruder ac were 3 fast jets, he thought, unknown to either himself or his 1st Officer. He did not see the other ac and did not quantify the minimum separation that pertained nor assess the risk. He added that as they cleared the area en route to Amsterdam, they tried to confirm that FAMBO did actually still exist, however, FAMBO was not evident on any charts that they carried on the flight deck.

THE TUCANO PILOT, a QFI flying with another QFI crew member on a standardisation sortie, reports his ac has a black colour scheme and the HISL was on. They were not in receipt of an ATS but the Vale of York conspicuity squawk of A4577

was selected with Mode C; neither TCAS nor any other form of CWS is fitted.

Neither crew member recalled seeing the FK100 – or another ac in confliction in close proximity that would generate a flight safety concern during the sortie. Although the FK100 pilot reported three fast jet ac as the possible reason for the TCAS alert, he was operating as a singleton. He stressed that his sortie was not formation flying and raised doubts as to whether his Tucano ac was the cause of this TCAS alert.

ATSI reports that before departure, the FK100 crew was given their departure instructions from Teesside thus *"..left turn radar heading 090, climb to maintain FL230"* and allocated a squawk of A7067. This code is designated as a unit conspicuity code and is only to be used in the event of the Great Dun Fell SSR being out of service (OOS), which it was at the time and so the pilot was informed accordingly. The flight was transferred to Teesside RADAR at 0954.

The Teesside MATS Part 2, at Page 4-12, describes the procedures for CAT flights intending to join the CAS structure [through Class G airspace] via UL602/UL90 thus:

a) Prenote LATCC (Mil) on the pending departure and obtain an agreed level, SSR squawk, routeing instructions and frequency. b) Pass route, level and Teesside squawk to ADC with any local instructions. c) Notify LATCC (Mil) of the departure time and squawk. d) If clear of confliction, freecall the aircraft to LATCC (Mil) with the LATCC (Mil) squawk. If there is pertinent traffic the aircraft is to be the subject of a radar handover.

At 0955, the FK100 crew established communication with Teesside RADAR, climbing to FL230 on a radar heading of 090°. Shortly afterwards, the crew was instructed to resume their own navigation to FAMBO. The pilot's response to this instruction is not clear on the RT recording. The UK AIP notifies the procedures for outbound ac from Teesside; those intending to join the CAS structure to the SE at OTR should file a FPL route via FAMBO-OTR (for UL90) and FAMBO-OTBED (for Y70). Consequently, as the ac's FPL was via OTR, there should not have been any confusion as to the required outbound routeing.

In accordance with local procedures, the RADAR controller telephoned LATCC (Mil) and Controller 12 (CON12) was advised of the departure; the FK100 was identified to CON12 when it was S of Teesside heading E but no mention was made of the fact that the ac would be routed to FAMBO. It was agreed that the flight would be transferred to CON12 *"early"* as long as it had passed FL50 in the climb. The Teesside controller warned that the ac's SSR would not be validated or verified [as the GDF SSR was OOS], so CON12 agreed to carry out those checks after transfer to his frequency.

The FK100 crew was instructed to change squawk to A6122 [CON12] and at 0956, once the pilot reported passing FL55, the flight was transferred to London MILITARY CON12 on 131·22MHz. The FK100 crew read this frequency back correctly. However, about a minute or so later, the pilot reported back on the Teesside frequency that he had not been able to establish contact on 131·22MHz, whereupon the crew was instructed to try the frequency again and was reminded that the flight had been 'cleared' to FAMBO.

Although the Teesside controller might be criticised for not ensuring that a clear readback was received from the FK100 pilot regarding the 'clearance' to FAMBO, RADAR had no reason to believe that the flight would not fly to that position in accordance with the routeing in the UK AIP. In the event, the flight was transferred early to LATCC (Mil) and the Airprox occurred some minutes after the FK100 had been instructed to contact CON12 for the second time.

MIL ATC OPS reports that at 0955:07, the Teesside Radar Controller (RADAR) prenoted the FK100, to CON12 when the airliner was 2½nm S of Teesside at FL40 and requested an early handover. CON12 agreed that the FK100 could be transferred straight away passing FL50 and at 0955:27, reaffirmed the contact frequency of 131·22MHz. The FK100 crew duly called CON12 at 0956:47, "[C/S] *climbing 230 to UMBEL".* CON12 said that the flight was *"…identified radar advisory climb report level FL230, you're approaching an area of high traffic density, standard separation may not be achieved. You've got multiple contacts 12 o'clock at 15 miles all manoeuvring and there's further traffic in your 10 o'clock at 8 miles manoeuvring. If not sighted,*

turn left heading 040…(pause) …[C/S] London Mil, positioning, turn left heading 040." However, these instructions were not actually transmitted on frequency 131·22MHz by CON12. Without a response from the FK100 crew, CON12 attempted to establish contact again at 0957:26, *"*[C/S] *LONDON MIL you're identified radar advisory avoiding action turn right heading 210 traffic was left, 11 o'clock, 12 miles, crossing left right, indicating slightly above."* Again there was no response from the FK100 crew; CON12 called twice more still with no response, but then after a fourth attempt at 0958:00, the crew replied *"morning* [C/S] *we tried earlier, no response, climbing to level 230, we're going to FAMBO at the moment, any chance* [of] *routeing direct UMBEL?"* Immediately at 0958:06, CON12 transmitted *"avoiding action, turn right heading 240, traffic…*(unintelligible word)*…you've got multiple contacts, left 10 o'clock to right 2 o'clock at ranges 10 to 15 miles, multiple contacts manoeuvring, indicating similar level and slightly above. In fact, stop your turn, request your heading now?"* The FK100 crew reported heading *"125",* so CON12 added at 0958:25, *"roger, it's limited traffic information from ahead, your approach now high traffic density. Standard separation may not be achieved, late warning of traffic all around, it's multiple contacts left 10 o'clock to right 2 o'clock, ranges 12 to 15 miles,"* which was acknowledged. At 0958:40, CON12 passed more *"…avoiding action turn left heading 040, traffic* [Tucano (A)] *was right one o'clock 5…7 miles, manoeuvring indicating slightly above."* The FK100 pilot read back the heading and CON12 asked for a hard left hand turn to which the FK100 gave an unintelligible reply. CON12 updated the traffic information *"*[C/S] *the traffic's* [Tucano (A)] *just passing through your 12 o'clock at 4miles crossing left right, indicating 700ft above"* and the FK100 crew replied *"we're looking."* Shortly afterwards, CON12 added *"*[C/S] *there's further traffic east of you, 10 miles, slow moving northbound, no height information, confirm you're in the left-hand turn."* At 0959:30, the FK100 crew reported a *"TCAS traffic warning now - standby"* whereupon CON12 responded immediately, *"affirm, continue left climb corresponding with the TCAS warning or continue left heading 020, the traffic's now manoeuvring south east of you 3 miles."* Once the FK100 reported *"left 020 looking"* at 0959:42, CON12 interjected *"*[C/S] *stop turn, request heading"* and the FK100 replied that the heading was 070º. At 1000:00, CON12 instructed *"roger, maintain your heading the traffic's south west of you, 3 miles, indicating 1000ft above, and the second aircraft's north east of you by 7miles, manoeuvring, indicating 2000ft below"* which was acknowledged *"copied looking"*. Some 10sec later, the FK100 requested to maintain FL100. CON12 positively confirmed that the crew were VMC and queried *"roger maintain, are you happy with RIS initially, then I can turn you back towards UMBEL when you're clear of all these aircraft?"* The FK100 stipulated *"we really must have radar advisory,"* whereupon at 1000:29, CON12 proffered further *"…avoiding action, turn left heading 050, traffic was right 1 o'clock 2 miles an intermittent contact manoeuvring and you've still got that further traffic north of you 3miles, indicating 2000ft below*." At 1000:52, CON12 clarified *"you were heading 070° initially and I asked you to turn left to head 050 to pass between both aircraft."* Shortly after, CON12 informed the FK100 that it was now *"clear of traffic, turn right heading 110…climb report level FL 250"* and at 1002:00, released the flight to turn right 'own navigation' towards UMBEL.

The details of this Airprox were not brought to light until several weeks after the incident and neither CON12, nor the SUPERVISOR, could remember any more detail than that derived from the radar replay and the tape transcripts. Teesside RADAR reported that the FK100 was given a normal routeing to FAMBO but it was handed over early to LATCC Mil in order to provide a better service as Teesside were operating without SSR. When the FK100 called CON12, despite the pilot having been given a route to FAMBO by Teesside ATC and stating that the ac was tracking towards FAMBO, it was, in fact, tracking towards UMBEL with multiple contacts operating in the area of the Vale of York AIAA in confliction. Although CON12 responded immediately with positive identification and traffic information the controller had not selected the allocated VHF frequency transmitter, and so the FK100 crew were not given the information iterated by the controller from 0956:47. However, the frequency was later selected to transmit and at 0958:00, 2-way communication established with the FK100 crew. CON12 then advised that the FK100 was identified and correctly issued avoiding action against traffic 12nm SE, subsequently limiting traffic information *"… from ahead…high traffic density, standard separation may not be achieved, late warning of traffic all around. It's*

multiple contacts, left 10 o'clock to right 2 o'clock ranges 12 to 15 miles."

CON12 gave further avoiding action on the contacts as they closed and reiterated to the FK100 crew to make a hard L turn in order to avoid the 4577 squawk which had manoeuvred back into the path of the FK100. At 0959:05, it was described as *"passing … 12 o'clock at 4 miles, crossing left right, indicating 700 ft above,".* At 0959:30, the FK100 pilot reported a *"TCAS traffic warning"* to which the UK AIP ENR 1.1.3 (4.7.3.1) states that *"ATC does not expect pilots to take avoiding action on the basis of traffic information alone."* As it was not specified either as a TA or RA, the controller responded with the options of *"continue left turn climb corresponding with the TCAS warning or continue left heading 020"* along with associated traffic information. In accordance with Reference A, faced with the knowledge that standard separation could not be maintained in an area of high traffic density, CON12 positively verified that the pilot was VMC and offered a RIS initially. Additionally CON12 informed the pilot that this was in order to manoeuvre through the conflictions and to route back towards UMBEL. After the pilot declined the offer of a RIS, the controller correctly provided further avoiding action and attempted to route the FK100 on the best avoiding action heading, between 2 conflicting ac. Once finally clear of the traffic the FK100 crew was given own navigation towards UMBEL.

Notwithstanding CON12's initial error of not selecting the transmitter to transmit to the FK100 on first contact, when 2-way RT contact was established about 1min 13sec later the controller launched straight into avoiding action against the many conflicting ac squawking A4577 in the vicinity. CON12 made a valiant attempt at providing the best service possible for the FK100 in a congested piece of airspace, limited traffic appropriately, ensured that the FK100 crew was given traffic information coupled with avoiding action and attempted to use the rules in order to provide a more expeditious route. None of this would had been necessary if the FK100 crew had flown to FAMBO, instead of to UMBEL through an area of high traffic density. Since the Airprox occurred, Teesside ATC has been asked to remind controllers and crews to route traffic to FAMBO. Additionally, a technological solution is being investigated to overcome the error of not having the transmitter selected 'on' when first selecting the frequency, meanwhile the salutary points from this Airprox have been disseminated throughout the unit in a LATCC (Mil) standards bulletin.

[UKAB Note (1): Analysis of the Claxby radar recording reveals that many ac squawking A4577 – the Vale of York AIAA conspicuity code – were operating in the vicinity of the Airprox location and some of those in closest proximity to the track of the FK100, which may have had an impact on events are shown on the diagram. Unfortunately, the intricate manoeuvres executed by some – not all of which displayed Mode C continuously – does not allow exact determination of the tracks flown. Despite the FK100 pilot reporting the presence of three *"fast jets"* that are not evident on the radar recording, the other ac involved were all probably training ac conducting various profiles within the AIAA. The track of one ac –Tucano (A) flown by the reported pilot - is shown and it was in all probability the manoeuvres of this ac that triggered the initial TCAS RA reported by the FK100 pilot.

The airliner is shown departing the Teesside CTA generally SE bound climbing through FL56 at 0956:44, moments before the FK100 crew made their initial call to CON12. The FK100 climbs steadily, passing FL85 at 0958:03 (still tracking towards UMBEL) whence the crew finally established 2-way RT contact with CON12 who issued avoiding action against Tucano (A) 3 sec later, the trainer indicating FL117 at this point. At 0959:20, both indicated FL106 at a range of 3nm. After the FK100 had started to turn L, it ascended to a maximum of FL107, before indicating a descent at 0959:45 through FL105 – in conformity with the reported TCAS RA - as the airliner passed some 2·03nm N of Tucano (A) that was southbound indicating FL113 Mode C - 800ft above the FK100 at the CPA. The FK100 descends to FL99, before climbing once more, passing FL103 at 1000:52, 1½ nm S and 2200ft above another ac to the N and one other to the S that is not indicating Mode C.]

UKAB Note (2): The UK AIP at ENR 4-3-5, - effective at the time of the occurrence - promulgated that FAMBO is a fix for Teesside and Newcastle low-level traffic and included the relevant co-ordinates and position from POL VOR.

THE FK100 PILOT'S COMPANY comments that FAMBO was not loaded in the ac's FMS database as waypoint at the time of the Airprox. FAMBO is a so called 'floating' waypoint, a waypoint that is not attached to any procedure, they thought, airway or company route. Floating waypoints are not stored by default in their FMS database due to limited internal memory of the FMC. The western limit of the geographical limits of the FMS database might cause the inclusion of a lot of Oceanic 'floating' waypoints and this may lead to a database oversize. To solve this specific problem with FAMBO, they have now stored a company route into the FMS with FAMBO being a waypoint on this route.

HQ PTC comments that the Tucano crew seems to have been going about their lawful occasions in this case and triggered a TCAS RA at a particularly unwelcome juncture for the FK100 crew.

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 Board recognised that a number of break-points had existed in events leading up to this Airprox and intervention at any one of them could have forestalled the outcome. Additionally, they judged that the part played by the Tucano crew had little influence in what had happened, apart from being in the airliner's extended path at one stage. Neither QFI had seen the FK100 some 2nm away and 800ft below them, but even if they had it probably would not have aroused any undue concern as the airliner turned away to the E.

The first break-point came when Teesside RADAR directed the FK100 crew to fly under their own navigation to FAMBO and it would appear from the ATSI report that the response was rather indistinct instead of a clear and unambiguous read back of the instruction. It was feasible that the 1st Officer might have indeed read back "FAMBO", which was then received clearly by the controller, even though the recording did not make it plain. If he did, then there was no reason for RADAR to challenge it, but if it was at all unclear as reflected in the RT recording then RADAR should have queried the pilot's readback, which could then have removed the FK100 crew's confusion over FAMBO. As it was, the crew then made an erroneous assumption and flew towards UMBEL instead of asking for more information about FAMBO and its location. This was the second missed opportunity to break the chain of events. Contributing to the crew's decision process had been the absence of FAMBO in the ac's FMS database and this aspect had been addressed by the Company. However, it did expose a further shortcoming. Although the purpose of FAMBO had changed in recent years, its location was promulgated in the UK AIP and the correct FPL routeing from Teesside was to FAMBO and then to OTR. A CAT pilot member pointed out that the FK100 operator could not have 'filed' the appropriate routeing - if they had, it would have been realised that FAMBO was not in the FMS database. Members weighted this aspect as a significant contributory factor.

Next came the switch selection error by CON12, the second example in recent months. The Mil ATC Ops advisor explained that no technical solution was feasible and a LATCC (Mil) member added that the error should not have occurred. As a result of this error, although the controller had proffered sound avoiding action to the FK100 crew, it was all to no avail.

When the FK100 crew recalled Teesside RADAR some members thought there was potential for that controller to spot that the FK100 was not heading toward FAMBO, but the unserviceability of the Great Dun Fell SSR was crucial here as it denied the controller the ability to identify this ac quickly. Although Teesside RADAR re-iterated that the crew should fly to FAMBO they did not do so. Instead they flew deeper into the busy area of the VALE of York AIAA before contact with CON12 was eventually established. At that point the FK100 crew told CON12 that they were heading for FAMBO, knowing this was not the case as they continued towards UMBEL but by that stage it was perhaps too late.

Thereafter CON12 had done well to thread the airliner through much traffic and the FK100 crew must have had to work hard following instructions both from ATC and from TCAS. It was unclear

from the radar recording what the first reported 'CLIMB' RA was based upon, but the DESCEND RA was consistent with the position and level of Tucano (A) as the airliner passed 2·03nm to the N. Having unpicked the information available and traced the sequence leading to the conflict, Board members agreed unanimously that the FK100 crew had not followed ATC routeing instructions and had flown into conflict with the Tucano in the AIAA. Although events could have turned out very differently, and importantly neither the FK100 crew nor the Tucano QFIs saw each other's ac, the safety net of TCAS coupled with the avoiding action under the RAS had worked successfully, which convinced the Board that no risk of a collision had existed throughout the incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The FK100 crew did not follow ATC routeing instructions and flew into conflict with the Tucano in the AIAA.

Degree of Risk: C.

Contributory Factor:

a. The FK100 operator did not file the approved routeing to OTRINGHAM via FAMBO.

b. RADAR did not query the pilot's readback of the routeing instruction to FAMBO.

c. The reporting point FAMBO was not contained within the FK100's FMS database.

d. The FK100 crew did not query the location of FAMBO, but flew instead to UMBEL.

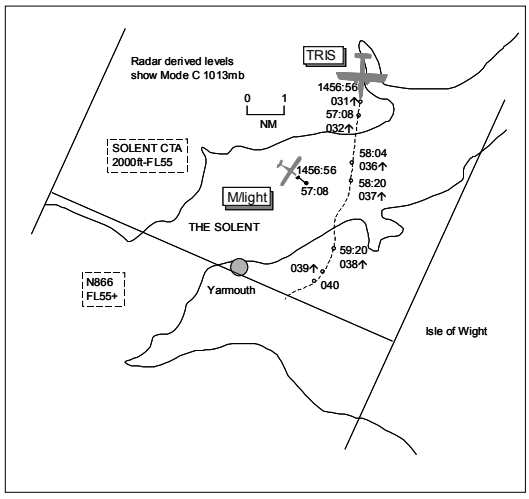
e. CON12 did not switch on the VHF transmitter in the first instance.

AIRPROX REPORT NO 83/03

Date/Time: 21 Jun 1159 (Saturday)
Position: 5043N 0126W (15nm SSW SAM)
Airspace: Solent CTA (Class: D)

	Reporting Aircraft	*Reported Aircraft*
Type:	TRIS	Untraced M/Light
Operator:	CAT	NK
Alt/FL:	FL037↑	NK
Weather	VMC CLNC	NK
Visibility:	>30km	

Reported Separation:
100ft V
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TRIS PILOT reports en route from Southampton to the Channel Islands heading 180° climbing to FL40 at 100kt and in receipt of a RCS from Solent RADAR on 120·22MHz squawking 0334 with Mode C. The visibility was >30km with no cloud in VMC, the ac was coloured yellow/blue and the anti-collision and landing lights were switched on. Climbing through FL037, he saw a high wing 'pusher' type Microlight to the R of his nose 150m away crossing R to L in level flight. He increased his ROC and passed 100ft above the conflicting ac which had white wings and a yellow cabin. He assessed the risk of collision as moderate to high.

THE SOUTHAMPTON APR reports that owing to Pease Pottage SSR being u/s, only primary radar was in use. The Trislander was vectored, following its departure from Southampton RW20, to FL40 remaining within CAS at all times. TI had been passed on several unknown primary only contacts observed outside the lateral limits of the CTR and believed to be below the CTA. Further TI updates were given, the last of which was passed when the Trislander was climbing through 2500ft QNH and when the observed ac should have been below 2000ft. About 3-4min later, the Trislander pilot reported a Microlight to his R at an altitude of 3700ft where the base of the Solent CTA is 2000ft. He described the Microlight as having a 'white wing and yellow canopy'. The primary contacts were tracking towards Sandown Airport before they faded from radar. It was established that a 'fly-in' event was being held at Sandown.

AIS MIL reports that tracing action did not reveal the identity of the reported ac. Representatives of the British Microlight Aircraft Association (BMAA), who were in attendance at the event, were unable to help with the investigation, despite reviewing video footage taken at the time. Sandown ATC had noted over 500 movements on the day of which 380 were Microlights but had been unable to record landing and departure times. One microlight had been identified by ATC as fitting the Trislander pilot's colour description but was subsequently found not to be a 'pusher' type of ac.

ATSI comments that the Pease Potage radar was unserviceable at the time and so the only source available to ATSI to view the Airprox was the Heathrow 23cm radar. A primary return, possibly from the microlight in question, is seen in the Solent area SSW of Southampton for a few sweeps before it disappears.

The Approach controller appears to have complied with all the relevant requirements and performed well. No apparent ATC errors were disclosed.

UKAB Note: The Heathrow radar recording does not show the Airprox. The Trislander is seen

squawking 0334 tracking S at 1456:56 climbing through FL031 when a primary only return pops-up, possibly the Microlight, in its 1 o'clock range 2·5nm tracking SE. The primary only return is seen for the next 4 radar sweeps before fading at 1457:08 in the Trislander's 1 o'clock range 2·3nm which is climbing through FL032. The Trislander continues tracking S and appears to level off at FL037 at 1458:20 for about 1min before it is seen crossing the NW coast of the IOW just to the E of Yarmouth climbing through FL038 but no other ac are seen in confliction.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the Trislander pilot, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Owing to the unserviceable Pease Pottage radar, Southampton ATC was only able to offer a reduced service, with reference to primary returns and no SSR data. The APR had passed TI to the Trislander pilot on primary contacts ahead of his projected track which may have assisted/alerted him in gaining visual contact with the Microlight. However, as the situation unfolded, it became apparent that the Microlight had penetrated the Solent CTA without clearance and had flown into conflict with the Trislander which had caused the Airprox. As the Microlight went untraced, lessons could not be gleaned from whatever errors promoted the airspace infringement. From the limited information available to members, it was presumed that the Trislander had been unsighted by the Microlight pilot and that he/she had been unaware of penetrating CAS without permission.

Fortunately, the Trislander pilot had seen the conflicting Microlight, albeit at a late stage, ahead in his 1 o'clock range 150m crossing R to L and had increased his ROC temporarily, to avoid it, estimating that it passed 100ft below his ac. Although this had been a late sighting, there had been just enough time to take effective avoiding action, ensuring that the ac were not going to collide. However, this left a situation where the ac had passed in such close proximity that safety had not been assured.

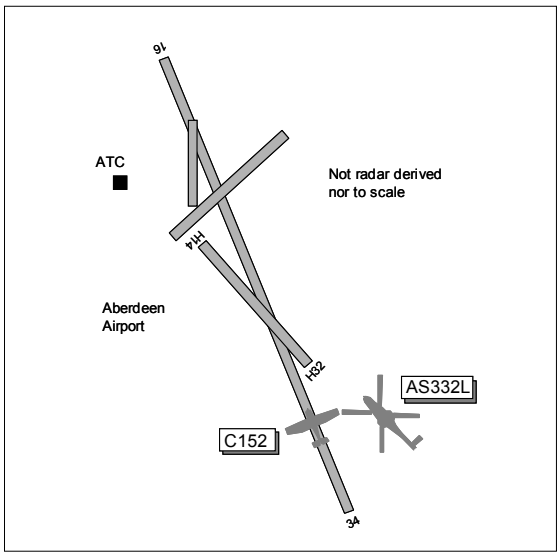
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of Class D airspace by an untraced Microlight pilot who flew into conflict with the Trislander that was presumed to be unseen.

Degree of Risk: B.

AIRPROX REPORT NO 84/03

Date/Time:	21 Jun 1638 (Saturday)	
Position:	5712N 0212W (RW34 Aberdeen - elev 215ft)	
Airspace:	ATZ	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	C152	AS332L
Operator:	Civ Trg	CAT
Alt/FL:	100ft↑ (QFE)	100ft↑ (QFE)
Weather	VMC CLBC	VMC CLBC
Visibility:	40km	30nm
Reported Separation:	50ft V	100ft V&H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C152 PILOT reports he was a student PPL flying a solo cct training sortie from Aberdeen on RW34 RH and in receipt of an ATS from Aberdeen TOWER on 118·1MHz. The visibility was 40km beneath an overcast cloudbase in VMC and the anti-collision, landing and nav lights were all switched on. He had been cleared for a touch and go on RW34 and was aware, from the RT, of inbound helicopter traffic which he heard call 'visual with the landing'; he completed his approach and landing. On raising the flaps and applying full power, he became aware of a helicopter overhead and close to his port side. At this point, he felt it was unsafe to abort his take-off so carried on into a shallow climb. When passing the RW34/32 intersection at 100ft QFE and 70kt, he asked ATC for an early R turn, as the helicopter, estimated to be 50ft above him, appeared to be turning back across his path from L to R. The request was denied, ATC asking him to carry on as the helicopter was accelerating away; the remainder of the cct was completed without incident. He assessed the risk of collision as high with a potential vortex wake hazard.

THE AS332L PILOT reports inbound to Aberdeen IFR and in receipt of an ATS from Aberdeen TOWER on 118·1MHz. The visibility was 30nm below cloud in VMC and he was squawking an assigned code with Mode C. He had been given clearance to make an approach to RW32 and requested to report when on RB. There were two light ac on final, a Cessna on short final for a touch and go and another ac at approx 3nm for a go around. Approaching the airfield, ATC told him to *"keep it tight"* and to pass behind the first ac (sighted initially 2nm away and by now on very short final) and to approach on RW32. He slowed the helicopter down in order to comply with the ATC instruction however, confusion then arose as to which ac he was cleared to pass behind. He was under the impression that he was cleared to pass ahead of the ac just touching down and increased speed to do so, believing this to be correct; he could not see another ac and assumed this was the 'second one' referred to by ATC. At no point could he remember ATC asking for confirmation that he was visual with the second ac. Unfortunately, by the time he realised his error, he could not slow down sufficiently to pass behind and had to cross ahead of the ac on RW34. The go around was commenced at 70kt, approx 100ft above and to the L of the ac to avoid wake turbulence problems and this was followed by a tight RH cct and landing on RW34. He assessed that there had been no risk of collision. He opined that there had been a breakdown in CRM between both crewmembers in not ensuring that they both fully understood the ATC clearance. He believed an assumption was made by the FO that he, the Capt (PF), had understood the clearance; this was never confirmed and his actions were never questioned until it was too late. Also, ATC had not asked for confirmation that they had visually identified both ac and the ATC instruction to *"keep it tight"* had added to the confusion. Crew tiredness was also cited, with both members being high on hours and it had been on a long duty day.

THE ABERDEEN ADC reports the C152 was DW RH low level for RW34, its pilot having reported visual with the AS332L, which was 4nm NE of the airfield and visual with the Cessna. Another ac was at 6·5nm on a NDB approach for low approach and go around RW34. The C152 was cleared for a touch and go RW34 and then he asked the AS332L to keep its cct tight behind the C152 owing to the NDB approach traffic at 4nm. The C152 touched down but he thought the helicopter was turning in too quickly for RW32 so he repeated that the Cessna was on a touch and go. From his view from the VCR it appeared that the AS332L was on approach to RW32 but had not yet crossed the main RW. The helicopter pilot then reported *"going around"* at what seemed to be high speed over the RW with the Cessna on its take-off run. The Cessna pilot asked for an early R turn out but from his perspective the AS332L was pulling away quickly and turning R so he advised the Cessna pilot to continue straight ahead. Subsequently, both ac carried out a cct and landed safely.

UKAB Note (1): The Aberdeen METAR shows EGPD1620Z 33003KT 9999 FEW030 BKN037 15/07 Q1015=

ATSI reports that the C152 was operating in the cct RW34 at Aberdeen and at 1631 it was cleared

for a touch and go, into a low level RH cct. Approximately 2min later the AS332L called on the Tower frequency and was instructed to report RB RW32 (helicopter only RW). The pilot was passed TI on the C152 as *"There's a Cessna One Five Two who's just on a touch and go this time. He's just rolling this time for departure off three four. He's turning right for a low level circuit for three four right hand"*. The pilot replied that he would *"try and keep an eye out for him".*

The controller's plan was for the C152 to approach ahead of the AS332L and, to this end, he asked the C152 pilot to make a reasonably early R turn because of helicopter traffic 6nm NE for RW32. Shortly afterwards, the C152 pilot reported visual with the helicopter and DW for a touch and go. He was requested to report ready to turn RB. The helicopter pilot was informed that the light ac was early DW, well ahead, to which the pilot reported visual.

When the C152 pilot reported ready to turn base, at 1636, he was instructed to keep it reasonably tight because of NDB approach traffic at 6·5nm. Shortly afterwards, he was cleared for a touch and go, followed by a LH cct. A transmission was then made to the ac on the NDB approach to RW34, warning that it would be a late clearance for a go around because of a helicopter on approach to the cross RW32. At 1637:09, the AS332L was instructed to *"keep it tight for three two please the Cessna's just about to do his touch and go. There's another aircraft on a four mile for a low approach and go around."* The pilot replied *"visual with the landing".* The AS332L pilot stated in his report that he was under the impression that he was cleared to pass ahead of the ac just touching down, as he assumed this to be the second ac referred to. (He had been informed that the second ac would be carrying out a go around). His transmissions to ATC did not indicate that was his understanding.

The controller stated in his CA1261 that he thought that the AS332L was turning in too quickly for RW32, behind the C152. Consequently, he warned its pilot that he would not be able to issue a landing clearance until the RW was vacated by the C152 carrying out a touch and go. The pilot of the AS332L reported going around to the L. However, the controller said he could see the AS332L going R and instructed the C152 to continue ahead, instead of approving its request for a R turn.

From the reports received from both pilots, that they were visual with each other, it is understandable why the controller believed that the situation was resolved. He had no reason to believe that the AS332L would not position behind the C152 and ahead of the other traffic, until he was able to detect the former turning in too tight. Based on the view from the VCR, he took positive action to resolve the situation.

The MATS Part 1, Section 2, Chapter 1, Page 1, states that: *"Aerodrome control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: a) aircraft flying in, and in the vicinity of, the aerodrome traffic zone and b) aircraft taking off and landing"*. Although the controller passed appropriate TI to the pilots of the subject ac, he did not issue a number in the traffic sequence to either, or, for that matter, to the other ac on approach. It is open to conjecture whether this would have resolved the situation.

UKAB Note (2): 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 air traffic controllers involved and reports from the appropriate ATC authorities.

It was felt that the student pilot in the C152 had been placed in an unenviable situation, one in which a more experienced pilot would probably have stayed on the ground and not continued with the take-off. The ADC had asked the student to fly a 'low level' cct and to 'keep it tight' which were tasks thought by some to be perhaps too demanding for a student to complete. But, as the pilot's experience level would have been unknown to the controller, it was thought by others that the student pilot could have declined to comply if he had been unhappy with any ATC instruction. Against this background the Board analysed what had happened. ATC had passed appropriate TI

and there was no reason to doubt that the subject ac would not integrate safely as both pilots had reported visual with each other. The AS332L Capt had positioned onto RB for RW32 and reported 'visual with the landing' after being asked to 'keep it tight'. Next, the ADC noticed the AS332L apparently turning in too tight behind the C152 and had warned the helicopter pilot that he could not issue landing clearance until the C152 had vacated the RW on its touch and go; the AS332L pilot had then reported going around. Although the AS332L Capt had later reported confusion in the cockpit as to the traffic sequence, he had not questioned the ADC's instructions and had simply flown into conflict with the C152 that was taking off on RW34. This had caused the Airprox.

The C152 pilot had been unaware of the AS332L's proximity until it appeared 50ft overhead and to his L then starting to turn R on its go around. At that stage he had elected to continue his take-off into a shallow climb only to be denied a R turn away subsequently by ATC as the helicopter converged laterally to cross his track while accelerating away from the Cessna. The AS332L Capt had chosen at a late stage to abort his approach onto RW32 and in doing so had flown 100ft above the Cessna before turning R and executing his missed approach. The Board were clear that the actions taken by the AS332L pilot were enough to avoid an actual collision, but the resulting flight path flown meant that safety had not been assured during the incident.

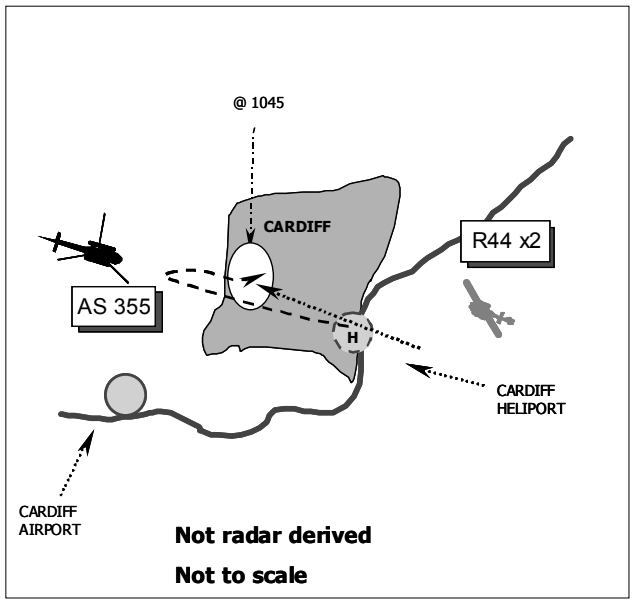
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Contrary to ATC instructions, the AS332L Capt flew into conflict with the C152, which was taking off.

Degree of Risk: B.

AIRPROX REPORT NO 85/03

Date/Time:	18 Jun 1045	
Position:	5132N 0313W (Cardiff City (West) - elev 220ft)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Twin Squirrel	R44 x2
Operator:	Civ Comm	Civ Pte
Alt/FL:	700ft (QNH 1017mb)	N/K
Weather	VMC below cloud	N/K
Visibility:	2 - 5km in Mist	N/K
Reported Separation:	c500m H c200ft V	N/K
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TWIN SQUIRREL PILOT reports flying a police task in a dark blue and yellow ac squawking 7015C with HISLs on, in receipt of a FIS from Cardiff. While heading 110° at 70kt, 5 minutes after take-off, he decided to abort the task and RTB, due to the poor prevailing weather conditions. He informed Cardiff APP who subsequently advised him of an unknown contact

over Cardiff Heliport, squawking 7000, but displaying no height information. He reduced speed, selected the landing light on and asked the crew to increase their lookout. He suddenly became aware of the landing light of a small black helicopter just right of the nose at about 1km and once he had established its track, he made a turn to the left to reduce the risk of collision. It was during this turn that he became aware of a second helicopter flying in echelon port formation on the first, in its 7 o'clock position. Both ac passed right abeam at a distance of approximately 500m and approximately 200ft below his height.

He immediately informed Cardiff APP of the contacts and recommended that should communication be established with these ac they should be informed of extremely poor weather conditions ahead of them. In his opinion, there was no way these ac would be able to continue on their present track. He chose not to report an Airprox over the radio at this time, but was worried about the safety of the ac and personnel on the ground. After completing their approach to Cardiff Heliport, they could see the contacts orbiting in the Cardiff Bay area and could hear some radio discussion between Cardiff Approach and a pilot with a foreign accent.

During subsequent telephone conversations with Cardiff ATC, he learned that the ac were part of a flight of 8 Robinson helicopters that had caused further problems at Cardiff and Swansea airports, as well as in Danger Areas D117/118. He informed the controller of his intention to file an Airprox and was provided with the registration of one of the ac.

He assessed the risk of collision as moderate.

THE ROBINSON HELICOPTER LEAD PILOT reported that he was flying in a silver R44 with strobes and nav lights switched on, heading 280 from Cardiff squawking VFR, with another similar ac following him. The visibility ahead was about 4km while behind to the E, it was better than 8 km. He was in contact with the ground but reduced speed to less than 80kt, as he did not know how the visibility would develop as he flew W.

He saw an ac in his 10 o'clock at about 3km which he called to his passenger and switched on his landing light in addition to the strobe and navigation lights, while also informing the ac flying behind him. The ac out to the left flew from the 10 o'clock to the 2 o'clock position. He only realised that it was a helicopter as it crossed his 12 o'clock position at about 2km at the same height but could not recognize the type. Once in the 2 o'clock position it was past him and did he think that there had been a risk to his ac as he had the other ac in sight all the time.

The pilot of the R44 flying behind him said that the helicopter in question passed behind him too and he also saw no risk.

The AS 355 had been so far away that they thought that perhaps there had been a fourth helicopter which they did not see.

ATSI reports that there would appear to be no ATC causal factors in this incident. The AS355 called Cardiff APP on departure from the heliport, which is situated outside CAS, requesting clearance to transit the Cardiff CTR en route to Swansea. This was approved, Special VFR, and the pilot was informed that the flight was being provided with a FIS. Some 4min later the pilot reported canceling his detail and returning to the heliport due to adverse weather. Although still only providing a FIS, the controller informed the AS355 pilot about a 7000 squawk, visible at the heliport, which was tracking NW. Approximately 1min later the pilot reported visual with two light single engine helicopters, which were low level (500ft) over Cardiff City Centre. Subsequently, the pilot of an R22 helicopter contacted Cardiff Approach. In the course of communications he reported that there were 8 Robinson helicopters altogether; 2 were R44s routeing to the north of the Cardiff area and the other 6 (R22s), including himself, were routeing westbound along the coast to Haverfordwest. No radar recordings of the event were possible.

UKAB Note (1): The ANO Part 2 Section 5 Para 26 (2) (b) (iii) applies and states that outside CA VFR is defined as follows:

'Helicopters may fly at or below 3000ft above mean sea level at a speed, which having regard to the visibility is reasonable, and they remain clear of cloud and in sight of the surface.'

UKAB Note (2): Notwithstanding the Airprox, airmanship aspects included:

Flying over the centre of a major city at 500ft in a single engined helicopter contrary to the ANO Section 2, Rule 5 (b and c).

Although not directly pertinent to the circumstances of this Airprox, flying through 2 active Danger Areas may have contravened the ANO Section 1 Rules 63 and 64 by endangering an ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available to the UKAB consisted solely of the AS355 and R44 pilots' reports and the incident was not recorded on radar. However although information was limited and no radar recording available, there was enough to conduct a reconstruction of the incident with a reasonable degree of accuracy.

The Board considered that since the AS 355 pilot was locally based, he would have been very familiar with the area, therefore his recollection of the position of the occurrence would be accurate. Furthermore since his report was filed soon after the incident, his recollection of the details would also be reasonably accurate, unlike the R44 pilot who provided his report over 4 months later and whose recollection would probably be less clear.

The AS 355 pilot was genuinely concerned over the safety of the other ac and of people on the ground in the city. When he spotted the other ac, the AS 355 pilot's acquisition was of the leading Robinson only and was based on sighting the landing light, reasonable confirmation that the visibility at the time was very poor. Although pre-warned by Cardiff ATC of the possibility of another ac in the area, he was quite understandably surprised to encounter one flying inside the boundary of a major built-up area and at his height. He had dispensation from the ANO Section II Rule 5 which restricts helicopters to *'1500ft above the highest fixed object';* the other pilot had no such dispensation. Members viewed this as a serious incident and suggested that it might have been appropriate for the AS 355 pilot to submit a Mandatory Occurrence Report (MOR) in parallel with the Airprox.

Given the situation in which he found himself, the sound airmanship and actions of the Twin Squirrel pilot in conditions of very poor visibility, markedly reduced the probability of a collision. However, even though the Robinson pilot should not have been flying where he was, he was also visual with the other ac throughout the event; the Board therefore considered that although this was a serious incident, there had not been a risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in marginal weather conditions resolved by the Squirrel pilot.

Degree of Risk: C.

AIRPROX REPORT NO 86/03

Date/Time:	24 Jun 0815	
Position:	5653N 0212W (29nm NE of Leuchars)	
Airspace:	Scottish FIR	(Class: G)
Reporter:	Aberdeen APR	
	First Ac	*Second Ac*
Type:	Jetstream JS32	Tornado F3 pr
Operator:	CAT	HQ STC
Alt/FL:	↑FL195	FL120
Weather	VMC CLBL	VMC NR
Visibility:	30km	40km+

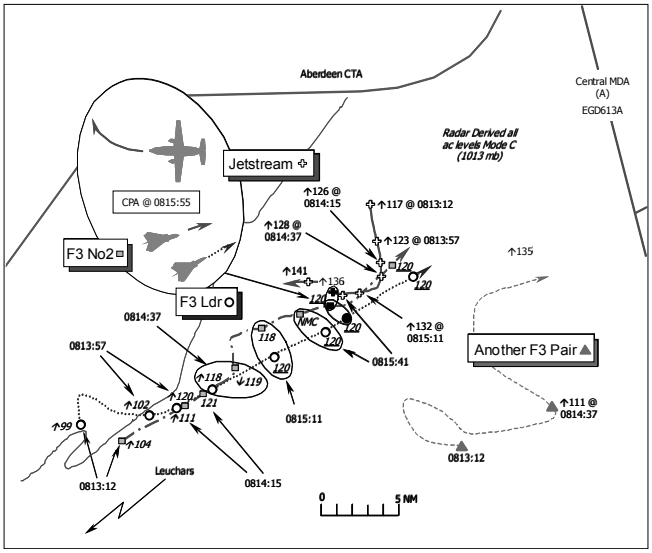
Reported Separation:

Aberdeen APR:1·5nm H, 1200ft V

500 yd H, 1-2000ft V 2nm H, 2000ft V

Recorded Separation:

Jetstream v No2 F3: 0·75nm H, 1600ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ABERDEEN APPROACH RADAR CONTROLLER (APR) reports that the Jetstream departed Aberdeen bound for Leeds/Bradford squawking A5077 with Mode C and was turned L onto a radar heading of 180°. When leaving the CTA the flight was placed under a RAS and the crew's flight conditions were confirmed as *"good VMC"*. He had observed 2 military contacts squawking A0206/7 operating on a racetrack pattern between 25nm SE and 40nm S of the Airport at FL120 [shown as another F3 pair]. Then 2 further contacts squawking A0214 & 0215 – the subject F3s - appeared climbing out from Leuchars heading NE so he elected to co-ordinate the Jetstream's transit with Leuchars against their departing ac. When the intentions of the 0214/5 were queried he was told they would head E so he stated that he would take the Jetstream W and then S 'round the back' of the Leuchars traffic. An easterly routeing was not an option due to the other jet traffic. Consequently, the Jetstream crew was instructed to turn R heading 270°, but the 0214/5 continued NE and so he issued a further turn onto 310° with traffic information. The military jets were intermittently indicating FL120 Mode C at a range of 5nm from the Jetstream as it climbed through FL120. The SSR track data blocks then merged and he issued an 'avoiding action' turn onto 330°. As the Jetstream crew read this back they reported visual with the jets; a L turn onto 230° was subsequently given. He estimated the minimum horizontal separation was 1·5nm and 1200ft vertically. The Jetstream was later released onto own navigation to the NEW VOR, the RAS terminated at 40nm and transferred to SCOTTISH CONTROL.

THE JETSTREAM JS32 PILOT reports his ac is predominantly white with coloured stripes; the HISLs, landing lights and 'mapping' radar were all selected on. Outbound from Aberdeen at 160kt IAS, under a RIS he thought, from RADAR, they were squawking the assigned squawk with Mode C but neither TCAS nor any other form of CWS is fitted.

Climbing to their assigned level of FL150, flying in VMC - between layers some 3000ft above cloud with an in-flight visibility of 30km - outside CAS, they were approaching intense military activity S of Aberdeen. This resulted in multiple heading changes from RADAR including an immediate avoiding action turn onto 330°, whereupon a pair of military jets was spotted passing down their port side about 500yd away, *"maybe"* 1000-2000ft below them, with a *"low"* risk of a collision. This resulted in an Airprox being filed by ATC.

THE LEUCHARS DEPARTURES CONTROLLER (RAD), reports that she was undergoing a standards check following a 4 week break from controlling when the two F3s climbed out on a SID 1 for the Central MDA (A) [EGD613A]. Following identification the pair was placed under a RIS and the Mode C verified. The Aberdeen APR then called requesting co-ordination on the F3s against their traffic – a departing Jetstream. After informing the APR of the F3s' intentions to transit to the Central MDA (A), the APR stated he would turn his traffic due W and then turn S behind the F3s. On completion of the landline call the F3 pair then split – one turning N. She called the Jetstream to the F3s as the latter passed FL110 climbing, she thought. However, seeing that Aberdeen would not be able to maintain horizontal separation, the quickest course of action was to ask the F3s to stop their climb at FL120 as the Jetstream was already through FL130 climbing for FL195, which they acknowledged.

UKAB Note (1): The Leuchars actual Weather was reported as colour code BLUE – Visibility 70 km; FEW 3000ft.

THE TORNADO F3 PILOT, a QWI with a student, reports his ac has a grey camouflage scheme but the HISLs were on whilst flying as the No2 of a pair of jets climbing outbound from Leuchars in transit to the Central MDA (A). They were under a RIS from RADAR on 257·8MHz and squawking respectively A2014 & 2015 with Mode C; AI radar was serviceable but TCAS is not fitted.

Some 30nm NE of Leuchars, heading 050° at 350kt the Jetstream was called to them by RAD and the formation was requested to stop the climb at FL120. The leader confirmed that they would comply with the request and both ac levelled at FL120. The Jetstream was picked up by both jets on AI Radar at a range of 10nm and he gained visual contact shortly after, at 3nm range; he called this in to his leader who then gained visual contact as well. Although there was no confliction, he elected to increase lateral separation by turning his jet R, just in case the Jetstream turned toward the formation. The Jetstream passed 2nm away and 2000ft above them with "nil" risk of a collision.

MIL ATC OPS reports that the F3s departed Leuchars and the leader called RAD at 0809:20, requesting a RIS, this was provided and the ac's Mode C verified. At 0813:12, the Aberdeen APR called on the landline *"..requesting co-ordination on your 0214 0215 squawks"*. The co-ordination process was interrupted initially by the APR with instructions to another flight after which the APR identified the Jetstream to RAD at 0813:20, "*…north east of them* [the subject F3s squawking 0214 & 0215] *by 20 miles is a 5077 squawk"*. RAD identified the traffic, responding *"tracking south contact"* at 0813:35, whereupon the APR advised that *"…he* [is] *climbing to FL195…subject to your.."* when the conversation was interrupted by another RT call to the APR. At 0813:57, some 20sec later the APR queried *"…I was just wondering where your 0214 and 0215 were heading"?* RAD advised that the F3s were *"…heading out to the east at the moment to MDA…Central A"*. The Aberdeen APR responded, *"….OK, in that case the 5077 squawk is* [C/S]*, I'll go due west to pass round the back and then south"*. RAD responded *"roger"* and the landline call was terminated at 0814:13. Some 23sec later at 0814:36, RAD passed traffic information to the F3s about the Jetstream *"…traffic…12 o'clock 12 miles crossing left-right…indicating correction tracking south indicating FL15 err 30 in the climb, stop climb FL120 initially"*. The F3 crews correctly read back the instruction at 0814:49, *"stop climb…FL120* [C/S]" whereupon RAD turned her attention to another flight.

When Aberdeen APR initiated 'co-ordination' with RAD at 0813:12, the horizontal separation was about 23½nm. RAD was busy with other ac manoeuvring and climbing out from Leuchars, therefore the landline conversation was somewhat protracted. The landline call was terminated at 0814:13 with the ac some 14·8nm apart, however, given the constant bearing and the closing speed, the co-ordination allegedly 'agreed' was unlikely to be achievable.

JSP 552 promulgates that 'co-ordination' is *"….the act of negotiation between 2 or more controllers… vested with the authority to make executive decisions…"* and is effected *"…when the controllers….involved agree a course of action on the basis of known information"*. Furthermore, JSP 552 article 230.120.1, 3 & 4 promulgates the procedures for co-ordinating ac under RIS. These references require a controller to obtain the agreement of the pilot before

completing co-ordination. RAD did NOT obtain any agreement to compliance from the F3 crews beforehand. Additionally, JSP 552 states that responsibility *"….for ensuring implementation of the agreed course of action, may be vested in one of the controllers involved"*. In this case the Aberdeen APR stated that he would *"…go due west to pass round the back and then south"*, which he did not achieve. Moreover, RAD clearly stated that her aircraft were heading *"…east **at the moment**…"* which cannot be construed as an agreement for them to **maintain**, or even take up, an easterly heading.

When the Airprox occurred, RAD was undergoing a standards check by the Local Examining Officer (LEO). RAD's heading information was, undoubtedly, misleading as the ac track generally northeast throughout, however, she did say that the subject F3s were going to MDA Central 'A'. This should have indicated to the APR that the ac would always be heading to the ENE, rather than directly E, to attain this area; it is obvious from the radar recording that the ac are NOT heading E and this should have been questioned at the time. The LEO reports that no co-ordination was agreed nor achieved and on the information presented we concur with that statement. Whatever 'agreement' might have been perceived from this landline conversation was woolly and probably unachievable in the horizontal plane and obtaining compliance from the aircrew would have further delayed the process. RAD did issue timely traffic information to the F3s. Moreover, the controller understood that Aberdeen would take their ac behind her traffic and although not required to do so under the RIS that the crews had requested, she stopped the F3s' climb 1000ft below the Jetstream's observed level to ensure safety. However, RAD could have shown more appreciation of Aberdeen's dilemma and taken charge of the situation more readily. Given the dynamics here, the only safe form of co-ordination was to stop the F3s' climb beneath that of the JS32, which was clearly acceptable to the F3 crews.

ATSI reports that after leaving the Aberdeen CTA, at 0810, the Jetstream was placed under a RAS and 2min later, the controller telephoned Leuchars RAD to request co-ordination against two of their ac. The Leuchars controller was informed of the position of the Jetstream relative to these two ac, reported 'contact' and was told that the Jetstream was climbing to FL195 "subject to the intention of yours". Leuchars RAD responded that they were heading out to the E at the moment, to MDA Central Alpha. The Aberdeen controller informed Leuchars of his intentions and in accordance with this plan, the JS32 crew was informed at 0814:20, about *"…multiple military contacts to the south and southwest of you at the moment…similar levels to yourself turn right heading 270°"*, which was read back by the crew. At 0815:10, traffic information was passed to the pilot of the JS32 as *"..2 unknown traffic to the southwest of you by 4 miles indicating FL120 unverified, heading eastbound",* to which the crew responded *"looking"*. A turn onto 310° was advised if the pilot did not sight the traffic, to which the crew replied that they were *"..turning now"* just before 0815:30. Realising that the subject ac were still converging, the Jetstream crew was subsequently advised at 0815:40, *"…labels merging avoiding action turn right immediately heading 330"*. The Jetstream crew reported traffic in sight passing down his port side.

The Aberdeen Controller realised the potential confliction between his JS32 and the two military jets when they were about 20nm apart. He took positive action by telephoning Leuchars to arrange co-ordination and informed them of his plan to route W and S of their traffic believing that the military ac would be routed out to the E, clear of his traffic whereas they flew NE. In view of this, further turns were issued, together with an 'avoiding action' turn. Although not using the correct phraseology that did not affect the outcome, it is considered that the Aberdeen APR did all that he could to resolve the situation.

UKAB Note (2): At 0813:12, the time that the APR initiated co-ordination with RAD, the Aberdeen Radar recording shows the F3 pair departing NE bound, climbing and squawking 0214 & 0215 – Ldr & No2 respectively - as the Jetstream tracks southbound slowly climbing through FL117. Simultaneously, another pair of F3s is shown operating further to the SE throughout the period, as reported by the APR. The subject F3s appear to perform their weapons checks before steadying NE bound with the lead ac trailing the No2. The Jetstream is shown in the R turn onto W some 17sec after the instruction was issued by the APR at 0814:20. Simultaneously at 0814:37, (24 sec after the landline call was completed), the No2 is shown

turning northbound and the point at which RAD passed traffic information about the Jetstream to the F3 pair – that was splitting into a 2½nm wide battle formation with the No2 on the leader's port beam; this was also the point the pair's climb was stopped by RAD at FL120. The No2 then established a converging heading with the lead F3 and turns further to the R as reported; the CPA occurred between the No2 and the turboprop at 0815:55, as the jet, maintaining FL120 passed 0·75nm to the S – port to port – and 1600 ft below the Jetstream, which is climbing through FL136 and steadying northwest bound in conformity with the earlier avoiding action turn instruction issued by the APR.

THE TORNADO F3 PILOT'S STATION comments that the Tornado formation had full situational awareness with respect to the Jetstream by both radar and visual contact. Appropriate action was taken to ensure safe separation and there was no collision risk.

HQ STC observe that this was a mutual sighting in VMC by ATC co-ordinated traffic, where safe separation was maintained in accordance with the rules pertaining to Class G airspace. The ac achieved a comfortable height separation following sensible advice from Leuchars RADAR to the F3 pair. It is apparent that the time allowed to affect full communication, co-ordination and flight profile adjustment (less than 3 mins), was insufficient for it to be properly effected. It would be prudent for controllers to initiate an information exchange, well in advance of traffic entering busy class G airspace, if they wish to co-ordinate separations greater than the 'see and avoid' that pertains.

It was pleasing to note the positive actions of the Leuchars controller, who observed that the belated attempts at horizontal separation would fail, and took decisive action to effect vertical 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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The ATSI advisor stressed that the APR had been endeavouring to provide the Jetstream crew with an effective service, but it was unfortunate that Leuchars RADAR had not passed on subsequently that she had restricted the F3s to FL120, thereby effecting vertical separation beneath the climbing Jetstream. Although the Mil ATC Ops report had contended that co-ordination had not existed in the circumstances reported here, Board members were not convinced. The Aberdeen APR had clearly requested co-ordination and the plan proposed, to all intents and purposes, required the APR to effect standard horizontal separation between the Jetstream under the RAS, where he was seeking to achieve 5nm separation. This plan of action had been duly acknowledged by RADAR. A wide-ranging discussion ensued over the intricacies of co-ordination including the difficulties encountered when controlling traffic in receipt of dissimilar services, as was the case here. Nevertheless, irrespective of RADAR obtaining the agreement of the F3 leader under the RIS that pertained, the Leuchars controller had not countered the plan suggested by the APR and though the LEO might contend an agreement had not been reached, RADAR had certainly not made any attempt to dissuade the APR that the measures proposed for resolution of the perceived conflict could not be accomplished. As it turned out, the APR did not achieve his aim and horizontal separation was eroded despite his best efforts (though 1600ft existed between the Jetstream and No2). However, the Board realised that the APR's contention that he was told that the F3s would head east was not quite accurate. The landline transcript revealed that RADAR advised the jets were heading *"…east at the moment…"* during a protracted and somewhat disjointed conversation. In the Board's view this could not be considered as a firm undertaking that the F3s would maintain E throughout, indeed the additional information provided by RADAR that they were going *"…to MDA…Central A"* made it plain that they would indeed continue on a NE'ly course to that area, as could be seen at the time, which suggested to some that the APR's plan was not sound. Controller members agreed that whilst seeking to achieve 5nm separation against the faster jets the APR had set himself a difficult task, avoiding action should probably have been taken much sooner to accomplish this. As it was the F3s then completed their weapons checks – a routine occurrence - which took the No2 slightly further N

thereby exacerbating the APR's predicament. Though this was a matter of judgement at the time, civil controller members opined that it would have been preferable to negotiate a resolution of the conflict in the vertical plane, which would have been more straightforward and disrupted the Jetstream's flight even less. The Board commended RADAR's wise decision when she instructed the F3s to level off at FL120, this promptly prevented the situation from deteriorating further and demonstrated that co-ordination in the vertical plain would have been far wiser. However, it was unfortunate that RADAR had not proposed this course of action in the first place.

Pilot members were quick to point out that both F3 crews had obtained AI and visual contact at range following RADAR's traffic information and the Jetstream pilot had also eventually spotted the jets. With 1600ft between these ac vertically at the closest point, they had not come close enough to cause concern to the crews involved, who had not been perturbed enough to report the event themselves. Board members found it difficult to perceive, therefore, how the safety of the ac had actually been compromised to the extent that an Airprox was warranted. Following the observation from a CAT pilot member that this encounter in the FIR had been a controller perceived conflict, the NATS advisor questioned what more the APR could have done. Some, including the STC fast-jet member, thought that co-ordination had not been requested early enough, but plainly the APR's plan was not the best way of resolving a situation between fast-jets and an unwieldy airliner, that would have been demonstrably more effectively accomplished with vertical separation. The Board agreed unanimously that this had been a controller perceived conflict where no actual risk of a collision had existed in the circumstances reported.

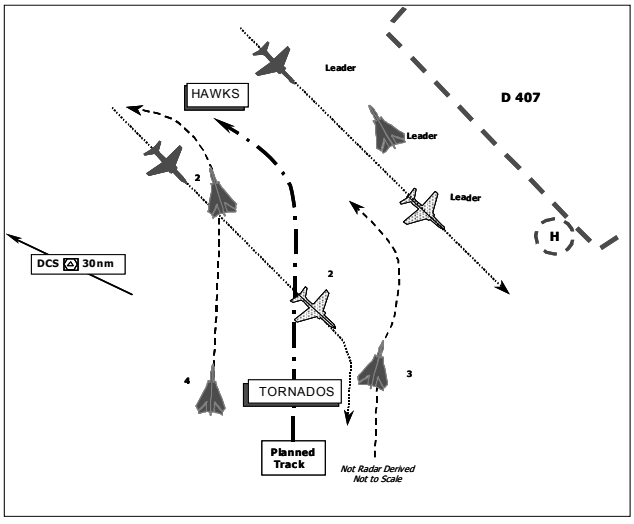
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Controller perceived confliction.

Degree of Risk: C.

AIRPROX REPORT NO 87/03

Date/Time:	24 Jun 1000	
Position:	5426N 0221W (2-3nm SW of Appleby)	
Airspace:	UKDLFS Area 17 (Class: G)	
	Reporting Aircraft	*Reported Aircraft*
Type:	Hawk	Tornado
Operator:	HQ STC	HQ STC
Alt/FL:	250ft (RPS 1014 mb)	250ft (Rad Alt)
Weather	VMC below Cloud	VMC below Cloud
Visibility:	50km	>20 km
Reported Separation:	10-20m H 0 V	200ft H 0 V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT reports flying a black Hawk ac as No 2 of a pair on tactical sortie in the UKLFS with HISLs on, squawking 7001C. While heading 155° at 360kt and 250ft agl visually and passing in a southerly direction through the Appleby valley in LFA 17 in good weather, the leader called an ac

on his No 2's nose. He acknowledged, and saw the ac, which broke left as he climbed to approx 500ft when 2 further Tornados were seen, one approx 1nm left and another approx 1nm right. After they passed, he eased back down to 250ft and saw another Tornado immediately in front very close indeed (200m). He broke right; it broke right as it passed at co-altitude within 20m. He assessed that the action of both ac breaking right had just avoided a collision.

THE TORNADO PILOT reports flying a grey GR4 ac with HISLs selected on and squawking 7001C leading a 4-ship formation heading N at 420kt and 250ft Rad Alt. Just S of Kirkby Stephen he spotted a single Hawk passing N to S 0·25nm down his left side. He called the traffic as 3 and 4 were in card formation behind him. The No 3 spotted a Hawk approaching the rear pair from the N. Shortly afterwards the No 4 reported another Hawk that had passed close to him that had not been previously spotted. Since both the No 3 and 4 crews were deployed overseas on Operations and unable to make a report, the exact relationship between them and the Hawk pair may be slightly different.

Due to the late visual acquisition of the other ac, he considered the risk of collision to have been moderate.

THE HAWK STATION comments that this incident illustrates the importance of keeping a good lookout at low level and the old adage that if you can see one ac there may well be more in the vicinity.

THE TORNADO STATION comments that the Flight Safety Officer discussed the incident with the formation leader and was satisfied that the formation were fully briefed, authorised and flying within their booked LFA times. After studying the HUD footage of this incident it would appear that, despite information being passed on the location of both Hawks, the high aspect nature of the ac flight paths meant that both pilots achieved a late sighting and were unable to achieve sufficient separation; hence he agreed the GR4 captain's assessment of a moderate risk of collision. He discussed with the No 3 ac captain the possibility of gaining some vertical separation by climbing following the information call, however, the miss-distance appeared significantly greater on the HUD video and the pilot's initial separation assessment may have been pessimistic.

HQ STC comments that it has long been taught by old and bold pilots that when you spot another tactical ac 'look for the wingman, he's the one that will shoot you down'. It must always be expected that tactical ac will fly in flocks, so look for the others, and if not flying operationally make yourself easy to see and do not be over zealous in terrain masking. Fortunately the two ac involved in this Airprox saw each other in sufficient, though uncomfortably short, time to effect avoiding action.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted only of reports from the pilots of both lead ac since the incident occurred below the base of radar cover. The Board also noted that the crew of the Tornado involved was deployed on operations overseas and unable to comment on the incident but accepted that the formation leader's account of events would be accurate.

It would seem from the reports that only the pilot of the No 2 Hawk saw all the other ac as the 2 formations passed through each other, on opposing tracks, at a relative speed in excess of 600kt. However, all of the pilots concerned saw the ac that conflicted with their own. The No 3 Hawk pilot saw and successfully avoided the first 3 ac, and it was unfortunate that the final one appeared at close range on an opposing track on his nose giving him only a couple of seconds to take avoiding action. Although he reported seeing it at 200m, it must have been in excess of this; at the closing speed involved, 200m would equate to less than 1 sec to see, react and for the ac to change its flightpath which it clearly did. Fortunately the opposing Tornado pilot also saw the Hawk, again very late, but for the same reason as outlined above in excess of the reported range of 200ft, and also took effective avoiding action to the right. The combined action of the 2 pilots was sufficient to remove the risk of colliding, albeit resulting separation was less than comfortable. Although the actual separation distance was not possible to calculate accurately, analysis of the HUD video was most helpful and indicated that it was slightly in excess of the 200ft reported by the

Tornado pilot. The outcome was a situation where the proximity of the ac had been such that safety of both ac had not been assured.

The Board noted that none of the Tornado pilots reported seeing the Hawk's headlight but were advised that, due to the initial geometry of the opposing formations, the Tornados may have been outside the relatively narrow beam of the light.

Although they were informed that incidents such as this are considered a normal operating hazard, some civilian members of the Board considered it surprising and potentially dangerous that there was no system for pre-warning pilots of the usage of the LFA by other military users and of the proximity of other ac when they are flying in the LFS. As an observation it was pointed out by other colleagues that the same conditions pertain to non-military airspace users who elect to fly at or below 2000ft in Class G airspace.

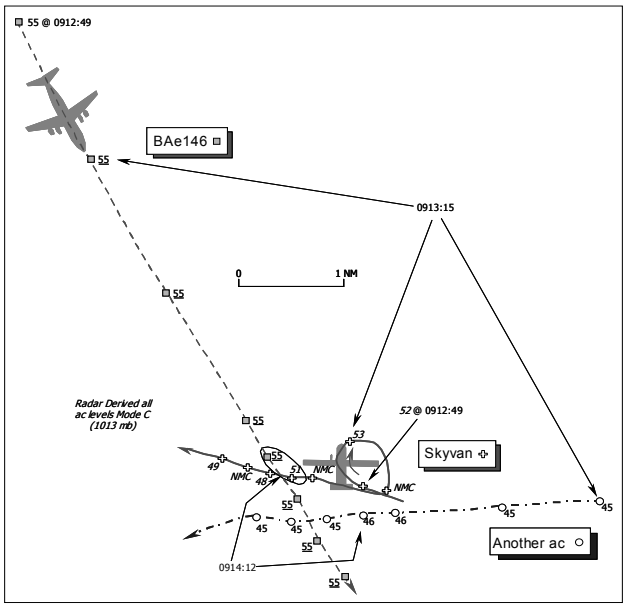
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: While both formations flew through each other's tracks, a late sighting by the pilot of the No 2 Hawk and the crew of Tornado No 3.

Degree of Risk: B.

AIRPROX REPORT NO 88/03

Date/Time:	24 Jun 0914	
Position:	5155N 0146W (285°(T) Oxford/Kidlington 17nm)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Shorts SC7	BAe146
Operator:	Civ Trng	HQ STC
Alt/FL:	5500ft (QNH 1020mb)	FL55↓
Weather	VMC CLAC	VMC CAVOK
Visibility:	40km+	20km+
Reported Separation:	300ft V nil H	700-1000ft V 1-300ft H
Recorded Separation:	Tracks merged, nlt 400ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SHORTS SC7 SKYVAN PILOT, the PNF provided a very frank account reporting that he was conducting a conversion to type training sortie. His ac has a red/white & blue colour scheme, the HISL was on and he was in receipt of a FIS from Oxford APPROACH, squawking A7000 with Mode C; TCAS is not fitted.

Just before the Airprox occurred they had been carrying out general handling including stalls, some 1500ft clear above cloud with 40km visibility - out of sun. After recovery from the stall they had just levelled off at 5500ft QNH (1020mb), westbound at 125kt, when the BAe146 was first spotted at 1 o'clock - no more than 1km away - as he moved his head to look around the windscreen frame. As the Skyvan is a *"low energy ac"* he took control of his aeroplane and to avoid the airliner *"pushed down"* and closed the throttle. The BAe146 crossed from R – L 300ft directly above

his ac with a *"high"* risk of a collision and they watched it continue SE bound maintaining height and heading with no obvious sign that they had been seen by its crew. He added that his cockpit workload was high.

THE BAe146 PILOT reports his ac has a red/ white & blue colour scheme, the landing lights & HISL were on. They were in receipt of a 'Limited' RIS he thought [it was actually limited after the Airprox had occurred] from BRIZE RADAR (LARS) squawking the assigned code with Mode C; TCAS is not fitted. In accordance with the Squadron SOP all flight deck seats were occupied and, in addition to the two pilots, the crew chief was in the jumpseat and all were looking out for other ac.

Inbound to Northolt VFR - in CAVOK with 20km visibility into sun - heading 130° towards Princes Risborough at a reduced IAS of 230kt, the ac was descended from FL95 to FL55, when the Skyvan and 'another ac' were spotted at 10-11 o'clock about 5km away. He saw the crew of the third ac take avoiding action to pass behind the Skyvan, so he levelled his BAe146 at FL65, he thought, [it was actually level at FL55 for some distance beforehand] to afford safe vertical separation until they had passed. At the closest point, the Skyvan passed about 700-1000ft below his airliner and 1-300ft away horizontally with *"nil"* risk of a collision.

He added that these two ac were but a few of the many seen in the area around Oxford/Brize, hence the need for a good lookout. He thought that the Skyvan pilot might not have seen his ac and the sight of a comparatively large ac passing so close could have surprised him – but he did not think that the occurrence warranted an Airprox and so did not report it himself,

[UKAB Note: The Clee Hill radar recording illustrates this encounter in the FIR clearly - just above the Oxford AIAA. The BAe146 is shown maintaining FL55 throughout as it closes toward the Skyvan from the NNW at 0912:49, at a range of 7nm. The Skyvan flown by the reporting pilot describes a R hand orbit at FL53 unverified Mode C (1013mb) before rolling out westbound at 0913:39, but NMC is evident at this point – when LARS passed traffic information to the BAe146 crew about 'another ac' generally level at FL45 Mode C. This ac was probably that also referred to by the BAe146 pilot, shown westbound and passing S of the Skyvan. The BAe146 closes maintaining FL55 and at 0914:05, is shown at R 1 o'clock - 1nm – probably just before the Skyvan pilot saw the airliner. At 0914:12, just before the tracks crossed in between radar sweeps, the Skyvan is shown at FL51, some 400ft below the BAe146 that is still level at FL55 at the CPA. The Skyvan pilot's reported "push-down" is evident from the next sweep which reveals the Skyvan had descended 300ft to FL48 Mode C, 700ft beneath the BAe146 as the latter crosses above the Skyvan and opens to the S 1000ft above 'another ac', upon which traffic information was given by LARS.]

MIL ATC OPS reports that the Brize Norton RT recordings appear to be 23sec ahead of the radar recording timings. RT timings herein have therefore been adjusted to UTC.

The BAe146 crew contacted the Brize Norton LARS Controller at 0909:51, the ac was identified and placed under a RIS at FL55. Some routine administration was conducted before LARS advised the pilot that descent would be issued once *"…south of the Brize Approach Lane"*. At 0912:49, traffic information was passed on other traffic manoeuvring 2000ft below, that the crew acknowledged. Further traffic information was passed at 0913:39, *"…traffic left 11 o'clock 5 miles left to right…1000 feet below"*, [shown on the diagram as 'another ac', also under the control of Brize at FL45], that was also acknowledged. At 0914:47- some 35 sec after the Airprox – the BAe146 pilot reported *"…visual with the 2 that have just passed underneath"* – the Skyvan and 'another ac'. At 0915:38, LARS again passed traffic information on other traffic whence the controller limited the RIS as the BAe146 transited close to the radar overhead. Thereafter LARS continued with traffic information, sequencing and descent into Northolt, until the BAe146 crew was instructed to switch to Northolt at 0922:37.

It is evident from the Brize RT tape transcript that LARS provided traffic information on both the BAe146 and the Skyvan to 'another ac's crew – the westbound traffic at FL45. He also provided traffic information about 'another ac' to the BAe146 crew. However, LARS omitted to pass traffic information about the subject Skyvan to the BAe146 pilot, who reported visual with both other ac at 0914:47.

It was not apparent that Brize Norton was involved in this incident until 3 weeks after the Airprox, consequently the controller had no recollection of what was apparently an uneventful flight. It is clear from the transcripts that LARS was endeavouring to advise flights about conflicting traffic in the vicinity. However, it appears that a call to the BAe146 crew about the Skyvan was missed. Nevertheless, under RIS *"the pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information".*

HQ STC comments that there are 2 issues to consider from this Airprox. Firstly, the FIS that the Skyvan was receiving was a purely procedural service as Oxford ATC has neither primary nor secondary radar. It was, therefore, impossible for the Skyvan crew to be warned of the approaching BAe146. It was feasible that the Skyvan crew had elected not to use the Brize Norton LARS due to the frequency being too busy, as is normal for this busy LARS and AIAA. However, it is likely that LARS and the BAe146 crew would have been more aware of the Skyvan's presence and intentions had the Skyvan crew used the LARS. The second point is whether the Skyvan crew, having just conducted a R orbit, had complied with the VFR lookout and collision responsibilities laid down in Rule 17 of the Rules of the Air. The BAe146 had been approaching from his right, 200-400ft above, for some 30sec after his roll-out. By the Skyvan pilot's own admission *'his cockpit workload was high'*.

The BAe146 did pass close to, but not on a collision course with, the Skyvan as shown by the radar recording. However, the BAe146 pilot could have given the Skyvan a wider berth (the BAe146 ranging estimates being some 50% inaccurate). However, the BAe146 crew was expecting the Skyvan to manoeuvre to avoid their airliner in accordance with the 'Rules of the Air' and if the BAe146 pilot had manoeuvred this could have made the situation more unpredictable.

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 and operating authorities.

The Board was concerned that LARS had not spotted the confliction between the Skyvan and the BAe146 and consequently had omitted to pass traffic information about the reporting pilot's ac to the BAe146 crew. This was unfortunate, but the Board agreed it was not fundamental to the way events unfolded as it was evident from the BAe146 pilot's account that he had already spotted the Skyvan at a range of 5km (2·7nm) and watched it as they closed. Some members thought that the BAe146 pilot could have afforded the Skyvan a wider berth after spotting it at such range and considered that the airliner crew had flown close enough to cause concern to the Skyvan pilot. The radar recording had shown that the BAe146 crew's visual acquisition occurred as the Skyvan was in the R turn through E and thus the airliner would have been in the Skyvan pilot's blind arc until the ac rolled out westbound. Clearly the Skyvan crew had not spotted the airliner up until this point and some thought that they should have been able to see it earlier. The ATSU they were working - Oxford APPROACH - was busy, as is invariably the case, and many GA pilots do obtain a FIS from them whilst transiting this airspace, enabling others on the frequency to glean a measure of what other ac were around. But some members thought it might have been more advantageous if the Skyvan crew had obtained a radar service from a LARS unit (such as Brize Norton) for their stalling exercise, which might have given them earlier warning of the airliner's approach. Members were aware, however, that the Brize Norton LARS frequency was invariably also very busy, which inevitably entailed an unwelcome high RT workload. Stalling was a difficult instructional exercise that demanded concentration and a quiet RT frequency was more conducive to achieving the instructional aim, nevertheless this had to be balanced against the safety advantages that a LARS could bestow in the 'Open FIR'. In the Board's view, any assistance that could be obtained to help lookout was worthwhile. Notwithstanding the LARS controller's unfortunate omission of traffic information here, members concurred that the Skyvan pilot might have been better placed if he had been under a RIS from Brize Norton to provide improved situational awareness of the traffic in his vicinity whilst conducting his stalling exercise. As the

conflict between the two ac developed, the Skyvan pilot – who was required to give way in this situation under the 'Rules of the Air' - did not spot the airliner until it was only 1km away, but in time to take effective avoiding action by diving, unlike the BAe146 pilot who maintained his flight path. The Board concluded, therefore, that this Airprox had resulted from a conflict in the FIR that had been resolved by the Skyvan crew.

It was evident from the radar recording that a mere 400ft of vertical separation existed just before the two acs' tracks crossed. Some pilot members were surprised that the BAe146 pilot was content to fly directly over the Skyvan at these levels not knowing whether his ac had been seen; his estimate was that 700ft had existed while the ac passed each other. Members considered that the radar recording revealed a separation that was too close and pointed out that if no action had been taken an unsafe situation could have resulted. As it was, the airliner was spotted in time for the Skyvan pilot to take control and dive down safely thereby increasing vertical separation. This judicious action convinced the Board that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the FIR resolved by the Skyvan crew.

Degree of Risk: C.

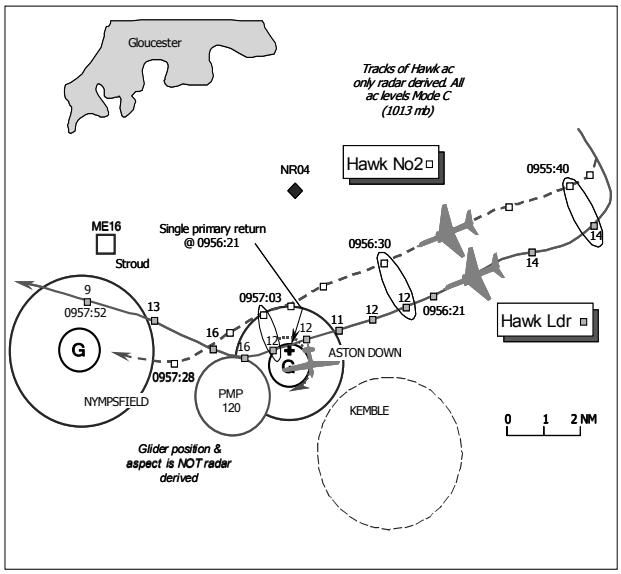
AIRPROX REPORT NO 89/03

Date/Time: 23 Jun 0957

Position: 5143N 0209W (vicinity of Aston Down Glider Site elev: 600ft)

Airspace: UKDLFS/London FIR(Class: G)

	Reporting Aircraft	*Reported Aircraft*
Type:	K13 Glider	Hawk x2
Operator:	Civ Club	HQ PTC
Alt/FL:	1100ft (agl)	250ft (msd)
Weather	VMC NR	VMC CLOC
Visibility:	20nm+	15km
Reported Separation:	200-300m H/300ft V	0·5nm H/1000ft V
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE K13 GLIDER PILOT reports that his red glider with white wings does not have a radio fitted. He was circling overhead Aston Down Glider Site at about 1100ft agl and 50kt, about 2 min after he had taken off on a winch launch from RW03. Whilst turning R he heard a loud jet noise but did not see either of the two jets, which ground witnesses later informed him were Hawks that overflew the site on a westerly heading. The nearest passed an estimated [by ground observers] 2-300m astern of his glider from E - W about 300ft below and over the area of the winch run at 800–1000ft agl.

He assessed that the risk of collision had been *"very high"* and added that if the Hawks had been minutes earlier there would have been a very high risk of hitting his glider or the cable during the

winch launch. The launch had taken about 1min during which he attained a height of about 1200ft agl.

UKAB Note (1): The UK AIP at ENR 5-5-1-1, promulgates that Aston Down Glider launching site is active during daylight hours for winch and aerotow launches that can attain a height of 3000ft agl, above the site elevation of 600ft amsl.

THE HAWK PILOT reports he was the rear seat QFI of the No2 of a pair of Hawks conducting an instructional low-level tactical formation surface attack sortie. Both Hawk ac were coloured black with white HISLs on and the nose landing light was also selected on. The sortie was flown at 250ft msd in good visibility of 15km, out of sun and with no cloud, on a 1nm displacement parallel track to the lead ac. A squawk of A7001 was selected with Mode C [only the lead ac was shown transponding], but neither TCAS nor any other form of CWS is fitted. Both ac crews were monitoring discreet tactical UHF and VHF frequencies, together with GUARD.

Flying at 420kt, heading 239° (M) out to starboard of his leader, at 0958 he reported the No2 ac was approaching a position 51°44'N 002°10'W [2nm NW of Aston Down] he thought, when a glider was seen between the formation ac. The glider passed ½nm away between the pair and 1000ft above them with *"no"* risk of a collision and the sighting was reported to the leader on UHF as the formation flew onward passing N of Stroud [he thought] and into the Welsh LFA.

Their route was planned to pass N of Provost Marshall Prohibited Area (PMP) 120 but S of Gloucester. However, before the occurrence the formation leader had turned late at the previous turning point and could have passed adjacent to, or even into, Aston Down Glider Site [GS10] as he attempted to avoid squeezing him – the No2 – into the PMP just 3nm N of Aston Down.

[UKAB Note (2): The UK Mil AIP at Vol 3 Pt 1-2-2-3, promulgates the location of PMP120, which is to be avoided by military crews by a circle of 1nm radius up to 1000ft agl. PMP120 is located immediately adjacent to the SW of Aston Down not 3nm N as perceived by the No2 Hawk QFI. Confusion over the position of the Provost Marshall Prohibited Area may have resulted from its depiction on the UK LFC, where the designation *"PMP 120"* is written to the N of Aston Down adjacent to the diamond graphic symbol of a mandatory LFS avoidance for a Nature Reserve [NR04 – 0·25nm/2000ft agl] but with a long red leader line to the correctly depicted location SW of the Glider Site.]

He opined that, with hindsight, the pair should have collapsed into a tighter formation; climbing would not have been wise in an area of intense light ac activity. The glider was not considered a hazard so his leader kept the formation at low-level to pass safely underneath. He added that although gliders are reasonably large and can be seen, none of the pilots saw a winch cable. However, the crews would not have been looking at the ground directly underneath, but concentrating instead on potential airborne threats and the ground ahead.

[UKAB Note (3): The UK Mil AIP at Vol 3 Pt 1-2-2-5, promulgates that Aston Down Glider Site (GS10) is to be avoided by military crews by 1·5nm radius and cautions that it operates to 3000ft agl. Furthermore, Nympsfield Glider Site (GS08) is to be avoided by military crews by 2nm and the Mil AIP cautions that it also operates to 3000ft agl.]

[UKAB Note (4): The Clee Hill radar recording does not illustrate this Airprox clearly as only the Hawk pair is shown flying through the vicinity. The lead ac is shown squawking A7001 with Mode C turning SW at the start of the leg at 0955:40, with the No2 shown as a primary contact to starboard, as reported, after completing a 'Battle' turn. The lead ac – the southerly of the pair at this stage – indicates 1200ft Mode C (1013mb) as the jets approach Aston Down passing S of NR04. At 0956:21, before the Airprox, a single primary return is evident just to the N of Aston Down, which may or may not be the reporting pilot's glider or that reported by the No2 Hawk QFI. The lead Hawk is shown entering the 1½nm avoidance area of Aston Down Glider site at 0956:47, indicating 1100ft Mode C, then tracking about ½nm N of the site location, passing abeam at 0957:03 indicating 1200ft (1013mb); this equates to a height of 480ft agl, given an actual QNH of 1009mb for the location and the Aston Down elevation of 600ft amsl. The lead jet then turned R and climbed some 400ft to 1600ft Mode C (1013mb) at the edge of PMP120. Throughout this period the No2 is shown clearly on the

leader's starboard beam closing to 1nm track spacing to the N as they pass abeam Aston Down about 1min before the time reported. The pair then executed another (assisted) turn placing the No2 onto the leader's port wing at 1nm as they continue westbound through the Nympsfield Glider Site LFS Avoidance Area, whereupon the No2 Hawk's primary contact fades.

[UKAB Note (5): Though not intrinsic to the Airprox itself, HQ STC OPS LF advise that the feasibility of making the annotation of airspace on the LFC in the vicinity of Aston Down/PMP120 clearer will be investigated with AIDU.]

THE HAWK PILOT's STATION comments that the formation leader was a QFI and a trainee pilot was flying the No2 ac with an experienced QFI in the rear seat. Due to a navigational error, the formation was flying S of their planned track. It is likely that one or both of the ac inadvertently infringed Aston Down Gliding Site.

The commander of the No2 Hawk saw a glider 1000ft above the formation and information was passed to the leading crew. No avoiding action was necessary and the Hawks remained at low level.

HQ PTC comments that having missed the previous turning point they tracked wide enough to come closer than they intended to Aston Down, but were confident that they saw and avoided a glider. However, the invisibility of winch cables and their potentially disastrous effect has not been lost on the Station.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the glider pilot & No2 Hawk pilot, radar video recordings and a report from the appropriate operating authority.

It was clear that this unfortunate incident stemmed from a navigational error by the student in the lead ac that had not been corrected by the QFI and that the Hawk formation had tracked further S than intended. The PTC member opined that the area concerned was a difficult portion of airspace to navigate through with a multitude of avoidance areas to trap the unwary. Indeed, some fast-jet pilot members thought this was a poor choice of route for a Hawk low-level instructional sortie – the Hawk has few navigational aids - as minor deviations from track could promote infringements with any of the mandatory LFS avoidances on this leg of their route. Here the mistaken perception on the location of PMP120 was not fundamentally contributory to the Airprox - but evidently had been in the mind of the leader - as according to No2 pilot's report it had prevented him from tracking further to the north.

The glider pilot was not able to effect the outcome of this encounter as he had not seen the jets at all, while flying overhead Aston Down. Unsurprisingly, the Clee Hill radar recording was unable to detect the glider. Conversely the No2 Hawk thought the Airprox had occurred 2nm NW of the glider site where he had seen a glider and indeed his ac had tracked further away, but the radar recording had clearly shown the 'track made good' of the leading Hawk through the location displaced further S than they had thought and confirmed the lead ac had penetrated the LFS avoidance area, which the Board determined was the fundamental cause of the incident.

In considering the risk inherent here, members noted that there were no other low-flying Hawks in the immediate vicinity at the time and it was the subject jets that the glider pilot had heard and the ground observers had seen, but it was not clear whether the Hawk pilots had seen the glider flown by the reporting pilot. Gliders are commonplace in this vicinity and the differing perceptions of the geometry of the encounter made it far from certain that the two jet crews had seen this one. The No2 Hawk pilot's view was they had each passed ½nm away and 1000ft below a glider that had passed in between both the Hawks suggesting that one flew S of the glider. Nonetheless, separation in the horizontal & vertical plane was difficult to determine from the perspective of the ground observers and here their assessment differed somewhat, thus the Board had to consider other factors. Some members wondered if there was sufficient information upon which to determine risk. However, on balance the majority view prevailed that the information provided was adequate. Though the K13 pilot had mentioned the danger from the cable, the Board could only consider the actual circumstances that prevailed and here with the glider not on the winch, this was not a factor. The radar data showed the leading

jet at 480ft agl as it passed abeam Aston Down and the glider pilot said he was at 1100ft agl suggesting therefore that in any event the vertical separation between the leading Hawk and a glider at the height reported was of the order of 600ft - broadly between the two assessments. Therefore, regardless of whether the Hawk crews had seen the reporting K13 a vertical separation of 600ft existed as they under flew it, which led members to conclude that no risk of a collision had existed in the circumstances reported.

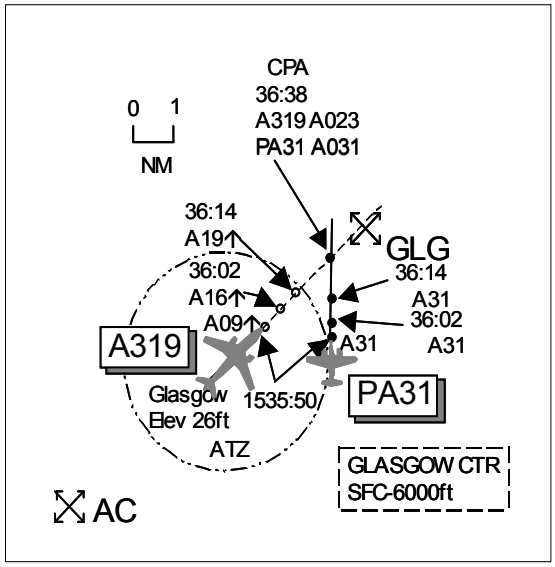
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk formation leader penetrated the Aston Down Glider site avoidance area (GS10).

Degree of Risk: C.

AIRPROX REPORT NO 90/03

Date/Time:	25 Jun 1537	
Position:	5553N 0424W (3nm NE Glasgow - elev 26ft)	
Airspace:	CTR	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	A319	PA31
Operator:	CAT	Civ Comm
Alt/FL:	↑6000ft (QNH)	3300ft (agl)
Weather	VMC CLOC	VMC CLBC
Visibility:	10km	>10km
Reported Separation:	700ft V	1000ft V
Recorded Separation:	Returns merge 800ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports heading 053° at 210kt on initial climb out from RW05 at Glasgow and in receipt of an ATS from Glasgow TOWER on 118·8MHz. He was advised of other traffic which was 2nm E of the airport at 3000ft working Glasgow APP; his initial cleared altitude after departure was 6000ft. As he was climbing through 1800-1900ft, visual contact was established with the other ac (the subject PA31) and he levelled off at 2300ft. The PA31 then passed directly overhead, 700ft above, northbound which triggered a TCAS TA alert. No TI had been passed prior to departure and he assessed the risk of collision as high.

THE PA31 PILOT provided a very comprehensive report for his local survey flight from Glasgow which had involved over 3hr flying in the Glasgow area on the day in question. The visibility was >10km below cloud in VMC and the ac was coloured grey with strobe lights switched on. He was in receipt of a RIS, he thought, from Glasgow RADAR squawking an assigned code with Mode C flying at 3300ft agl heading 360ºT cruising at 130kt G/S. On receiving a warning from ATC, both he and the laser operator saw an A319 just clearing the RW after take-off. At this stage, his ac was just passing through the RW extended C/L but he was flying at a height and heading

cleared by Glasgow and which was being passed to all ac during his survey sortie. However, after reporting this sighting, the A319 rapidly disappeared under his L wing, climbing, eventually to emerge again behind his R wing about 1000ft below. This was exactly what he expected bearing in mind the Airbus was climbing towards him a good deal faster and he assumed the A319's pilot had been advised of his position. He felt that his options were limited. A turn towards or away from the climbing A319 would have delayed clearing the airliner's take-off path while trying to climb or descend clear of the A319 would have made little difference owing to the disparate performance of both ac and may have added to the risk as he was flying at a cleared height as shown by his transponder on the radar display. On one previous occasion, he had been turned away from the take-off path but he had been well short of it when the other ac had departed. Also previously he had been instructed to abort a survey run or hold off to avoid inbound/ outbound ac. Given the relative positions and performance of both ac and that both crews knew of each other's presence, he believed that there had been no risk providing the other pilot had taken appropriate avoiding action, if necessary, which is what he thought had happened.

UKAB Note (1): The Glasgow METAR was EGPF 1520Z 12007KT 080V160 9999 FEW045 23/11 Q1019=

ATSI reports that this Airprox occurred within the Glasgow CTR (Class D airspace). The PA31 was carrying out a survey flight at 3100ft, operating on a VFR clearance in an area from approximately 7nm SE to 4nm NE of Glasgow Airport. The ac had been operating the detail, under the control of Glasgow Approach, for about an hour prior to the incident. The ADC had been informed of the flight's details and in view of its close proximity, at times, to the RW05 climbout, a 'check all' restriction had been imposed. This was in accordance with the procedures stated in the Glasgow MATS Part 2, Page 4-18 i.e. *"APR will issue an appropriate 'Check (left, right, all)' instruction to AIR whenever they are aware that an inbound, or transit, ac will conflict with any SID route, or local clearance"*.

At 1533, as the A319 was taxying to the holding point for RW05, the ADC Trainee requested its departure on a New Galloway (NGY) 1J SID from the APR. Initial routeing for this SID is *"straight ahead to NDB(L) GLG. Turn left onto PTH VOR R240"*. Altitudes are to cross GLG above 2000ft, climbing to 6000ft. The APR agreed to the flight being lined up on the RW and he said he would call back with its release. Shortly afterwards, ascertaining that the A319 had lined up, the APR agreed to its immediate departure, the PA31 being approximately 2-3nm SE of the airport at the time. Immediate take-off clearance was issued to the A319 at 1534:50 but no mention was made of the presence of the PA31.

The APR informed the pilot of the PA31, at 1535:30, that an A319 was *"just rolling runway zero five"*. About 1min later, further TI was passed to the PA31 i.e. *"the Airbus just airborne on your left-hand side now passing eighteen hundred feet"*. No response is heard on the RT recording to this message, although the pilot stated in his written report that he saw the A319 *"just clearing the runway after takeoff"*, probably as he was passing through the centre line of the runway but it then disappeared under his left wing.

Meanwhile, at 1536, the ADC trainee issued TI to the A319, now airborne, informing the pilot of the presence of a PA31, which was 2nm E of the airport, tracking northbound, at 3100ft VFR. The pilot responded *"visual with the traffic in our right one o'clock high"* and after a further RT exchange, when he commented that he was climbing to 6000ft, he reported levelling at 2200ft, having received no conflict resolution advice from ATC. The ADC Mentor then took control of the frequency and instructed the A319 pilot to maintain that altitude. The radar recording of the event shows that when the radar returns of both ac merge (1536:38), the A319 is at 2300ft and the PA31 at 3100ft. Subsequently, when clear of the PA31 and after co-ordination with the APR, the A319 was cleared to resume its SID.

The MATS Part 1 states, Section 1, Chapter 2, Page 1, that the minimum service to be provided by an ATC Unit, in Class D airspace, is to *"(a) separate IFR flights from other IFR flights (b) pass traffic information to IFR flights on VFR flights and give traffic avoidance if requested (c) pass traffic information to VFR flights on IFR flights and other VFR flights"*. Arguably, in accordance with these procedures, having not received a specific request from the A319's pilot for traffic avoidance, the controllers fulfilled their responsibilities by

passing TI to both flights. However, the MATS Part 1, Section 2, Chapter 1, Page 1, also states that: *"Aerodrome control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: aircraft flying in, and in the vicinity of, the aerodrome traffic zone"*.

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 appeared that there had been a misunderstanding by the PA31 pilot as to the type of service he was receiving and his responsibilities when operating under VFR. Flying within Class D CAS, he was under an ATC service where separation is not provided, with only TI being passed to enable pilots to resolve a confliction. The PA31 pilot's perception that ATC would keep him clear of the other traffic in Class D airspace was a misconception that is by no means uncommon among GA pilots generally. Seemingly, and confusingly, however, the APR had intended to provide some separation as he had decided to release the A319 for departure, after he knew it was lined up on the RW, probably in the belief that it would pass ahead of the PA31 if it had departed with 'immediate' take-off clearance. Although TI was then passed to the A319 pilot, it was at too late a stage, after the ac was airborne, with both ac on conflicting flight paths. In the absence of any deconfliction measures, TI should have been passed to the A319 pilot prior to departure, which would have given him the option of requesting traffic avoidance. Members agreed that the Airprox was caused by Glasgow ATC releasing the A319 into conflict with the PA31 without timely TI.

Turning to risk, from the PA31's cockpit, the pilot's options were limited after he had seen the A319 as it became airborne. Although he believed he was on an ATC 'clearance' to continue, he should have maintained visual contact with the Airbus to ensure it passed safely clear of his flight path, but instead he had lost sight of it until it emerged from behind his R wing 1000ft below his ac. Some members believed that safety had been compromised during the A319's critical phase of flight, when its pilot levelled off immediately after take-off whilst the ac was flying towards high ground to the NE of the airport. This view was not shared by all. By a small majority, members agreed that the timely actions of the A319 crew in visually acquiring the PA31 whilst maintaining visual separation had been effective in removing any risk of collision.

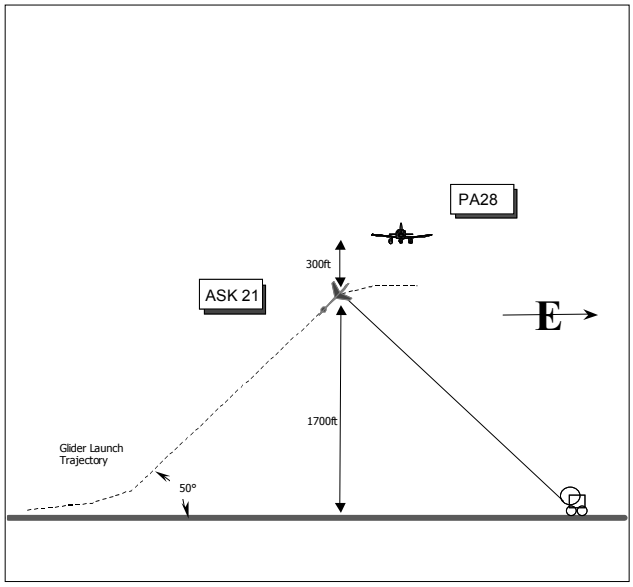
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Glasgow ATC released the A319 into conflict with the PA31, without timely TI.

Degree of Risk: C.

AIRPROX REPORT NO 91/03

Date/Time:	29 Jun 1453z (Sunday)	
Position:	5111N 0103W (Overhead Lasham - elev 618 ft)	
Airspace:	Lasham Glider Site	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Ask 21 Glider	PA28
Operator:	Civ Club	Civ Club
Alt/FL:	1700ft (QFE 994 mb)	2300ft (QNH 1006mb)
Weather	VMC CAVOK	VMC Below
Visibility:	20km	10km
Reported Separation:	0H 300ft V	NR
Recorded Separation:	NR	



(Glider pilot's diagram of the incident)

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 21 GLIDER PILOT reports heading 090° at 60kt flying a winch launch with a student at the controls in a white and orange glider. Once established in a full climb at an angle of approx 50° nose up, a PA28 was spotted to their left (N) coming towards them, which he assessed would overfly their extended trajectory. Once at a reasonable height for the circuit, 1700ft agl on a QFE of 994, they released early from the winch to allow vertical separation from the PA28 which continued on an undeviating southerly heading. Their rate of climb was about 3000fpm so there was very little time between seeing the ac and releasing the cable, (he estimated between 5 and 10sec). He estimated that with that climb rate, it would have been a further 5sec until their flightpaths would have conflicted. As he could not see the cockpit of the PA28, he assumed that the other pilot could not see them and he assessed that they would have collided had he not taken avoiding action by releasing early.

THE PA28 PILOT'S report was received 6 months after the event. He reported flying a white and blue ac with strobes and nav lights selected on and squawking with Mode C. He flew from Blackbushe routeing to the Isle of Wight and returning to Blackbushe. A few minutes after take off he was heading 173° at 100kt and 2300ft on a QNH of 1006 in receipt of a FIS from Farnborough on a route that he had flown many times before. He was

aware of the Lasham glider site and thought that he could see the airfield to his port away from his wing tip. He saw gliders all over 1km from his ac and slightly below his Alt but neither he nor his passengers saw a glider close to them. He did not consider that there had been any danger at any time as he planned to route from Blackbushe, turning on to a track of 173° over the centre of Basingstoke which would avoid Lasham airfield.

He had a clear view of the gliders all round him and cleared his flightpath ahead. His workload at the time was low and his passengers were also looking out, however he stated that in future he would avoid Lasham by a larger margin.

ATSI reports that initially there was some confusion regarding the timing of this incident as some reports referred to local time and others to UTC. Eventually however, it was confirmed that the incident had occurred when the PA28 was outbound from Blackbushe and not on its return.

The PA28 pilot called Farnborough LARS at 1445:00 and advised that he was outbound from Blackbushe for the Isle of Wight, level at 1500ft on a QNH of 1007 and was requesting a FIS. At this time the ac was within the Blackbushe ATZ tracking W, was allocated a squawk of 0434 and shortly afterwards at 1446:50, was identified by Farnborough 4nm N of Odiham. The pilot reported that his Alt was now 2400ft; the Controller confirmed he was providing a FIS and passed TI on conflicting traffic not involved in the Airprox. The radar prints indicate that around 1449, the PA28 pilot made a left turn on to S. Farnborough LARS did not specifically mention Lasham activity, however, he did pass TI to another ac at 1446:30, stating that he was about to pass some gliders. The pilot of that ac reported seeing around 7 operating between 3 and 5000ft.

Meanwhile the PA28 continued on a southbound track towards Lasham. The UK AIP page ENR 5-5-1-3, states that Lasham is a notified glider launching site with a vertical limit of 3000ft above aerodrome level, active from sunrise to sunset. It would have been reasonable for the Farnborough Controller to believe that since the PA28 was operating from Blackbushe, the pilot would have been fully aware of Lasham and its associated activity. Farnborough LARS was busy handling numerous ac requesting FIS/RIS or RAS and, given the known high level of gliding activity, it may have been prudent to broadcast a general warning to this effect as part of a FIS.

The Airprox was reported as taking place at 1453, the precise time that the PA28 passed directly overhead Lasham, still displaying the 0434 squawk but since he had no Mode C displayed, his Alt was unknown. No mention was made by the PA28 pilot of passing close to any gliders and, at 1454:30, he left the Farnborough frequency.

UKAB Note (1): The Heathrow radar recording shows the PA28 squawking 0434NMC on a S heading passing through an area where several primary returns are painting, just after 1450. At 1451:48 the PA28's contact and a pop-up primary return merge just to the N of Lasham. Shortly after at 1453.19, the 0434NMC contact also merges with another pop-up primary return. Considering the reported time of the incident (1453) and the proximity to the reported (and radar verified) position of the incident, it is probable that the second merge is the reported Airprox.

UKAB Note (2): The only Alt information available is from the pilots' reports. The glider pilot reported the incident as occurring at 1700ft agl (equating to 2300ft amsl) while the PA28 pilot reported to Farnborough that he was at an Alt of 2400 ft 6min before the incident, and that his planned Alt for the leg was 2300ft.

UKAB Note (3): Lasham is promulgated in the UKAIP as a Glider Launching site up to 3000ft agl (3618ft amsl) at position 5111.12N 00101.55W.

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 controller involved and reports from the appropriate ATC and operating authorities.

The Board noted the late submission of the PA 28 pilot's report and considered that after 6 months his recollection of events might have been less than clear. While he may have flown the route from Blackbushe to the Isle of Wight many times, it is clear from the radar recording that he did not commence his left turn on to a southerly heading over the centre of Basingstoke, as reported, but further E causing him to track directly over Lasham airfield at a height reported to ATC a few minutes before as being 2400ft amsl. This was 1200ft the height notified in the AIP up to which winch launches take place. The Board agreed unanimously that by, albeit not deliberately, flying over a notified and active glider site the existence of which was well known to the PA 28 pilot, his actions had caused the Airprox and had posed a danger to both gliders and his own ac. Although the pilot saw several gliders, he reported that none came close to him; the radar recording however, shows that there were 2 merges indicating that he may have come close to two. Additionally, the Board thought it likely that the airfield that he reported as seeing to his port side 'away from the wing tip' was Odiham which could appear similar from the air.

Members discussed at length the degree of risk in this incident. Fortunately the glider pilot's lookout was effective and he saw the PA 28 while conducting the winch launch. His considered and effective avoiding action in releasing from the launch early had prevented a collision, but the two ac still came close together with reduced separation, although the distance was difficult to determine. The Board noted that PA 28 pilot said that he was squawking Mode A and C, but no Mode C was seen on the radar replay suggesting that Mode C had not been switched on. This factor prevented an accurate determination of the ac's altitude and thus the vertical separation. The glider pilot said, however, that he released the cable at 1700ft agl equating to 2300ft amsl, therefore it is probable that the actual vertical separation from the PA28 was less than the 300ft that he reported. An additional observation by the Board was that the glider ground launch party should have been in a position to see the approach of the PA 28 and warn the pilot accordingly.

In the end members decided by a small majority that although the glider pilot had done enough to prevent an actual collision, risk levels had been compromised to an extent where safety had not been assured.

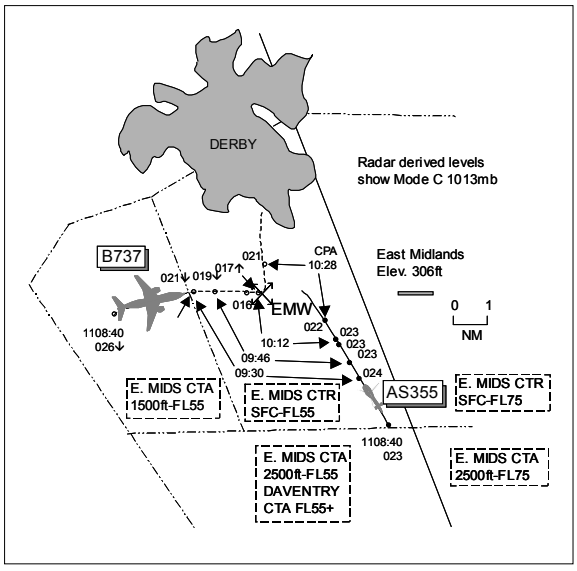
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The PA28 pilot flew over a notified active Glider Launching Site, below the maximum height of the cable, into conflict with a launching glider, which he did not see.

Degree of Risk: B.

AIRPROX REPORT NO 92/03

Date/Time:	29 May 1110	
Position:	5250N 0127W (4·5nm W East Midlands - elev 306ft)	
Airspace:	CTR	(Class: D)
	Reporting Aircraft	*Reported Aircraft*
Type:	B737-300	AS355
Operator:	CAT	Civ Comm
Alt/FL:	2000ft↓ (QNH)	2500ft (QNH)
Weather	VMC NK	VMC CAVOK
Visibility:	NK	>10km
Reported Separation:	2-3nm H	3-4nm H
Recorded Separation:	100ft V 2·5nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to East Midlands at 160kt and established on the ILS RW09 with gear down and flaps set to 15º. Passing 5nm from touchdown and descending through 2000ft QNH, the Capt, PNF, went off RT to talk to the cabin crew to confirm that the 'cabin secure' check had been completed. The arrival from the N had kept them high over MCT and subsequently involved the crew trying to descend and slow down for the approach; the checks were being held until the cabin had been secured. Whilst the Capt was on the intercom, ATC transmitted *"…turn left repeat turn left heading 360 climb altitude 3000ft.. pop-up traffic two*

o'clock range…". Simultaneously, the FO, PF, saw a yellow TCAS TA indication (no aural) on climbing traffic about 300ft below, he thought, and very close (2-3nm). He disconnected the AP and auto-throttle and executed a climbing L turn, using 25º of bank, and acknowledged ATC's call. The 'cavalry charge' aural alert of the AP disconnect brought the Capt back onto the RT and he was briefed on the situation. Shortly thereafter, ATC re-cleared them to 2000ft and they were subsequently vectored for a further ILS approach. Owing to the conflicting traffic passing close to the threshold, he believed a 'reasonably serious' Airprox incident had existed.

THE AS355 PILOT reports heading 320° at 120kt en route from Rush Green (5nm E of Luton) to Crewe at 2500ft QNH and he was in communication with Cranfield on 122·85MHz squawking 7000 with Mode C. The visibility was >10km in VMC (CAVOK conditions), the helicopter was coloured maroon and his nav and strobe lights were switched on. This flight was planned as a direct track, marked on a chart, which routed clear of CAS and it was programmed into the Skymap IIIC nav equipment fitted to the ac as a flight plan; he was an experienced user of this type of equipment. The chart and Skymap were cross checked on several occasions after departure from Rush Green and, as both had agreed with each other, he felt confident in relying on the Skymap for keeping him on track for the remainder of the leg. He was surprised to see an airliner at distance, which appeared to be slightly above his level and climbing, but he assumed that it had been a non standard departure from Coventry or Birmingham. It had been far enough away for him to feel that neither ac were in conflict. Very shortly afterwards, he carried out another cross check between chart and Skymap, only to discover that neither matched, despite it appearing that he was accurately following the track line on the Skymap display. He visually established his position as being on the outskirts of Derby outside CAS but realised that he had transited East Midlands CAS without authorisation. Knowing the seriousness of the occurrence, he telephoned East Midlands ATC immediately after landing rather than having a complicated exchange on the RT at the time.

He accepted full responsibility for this gross navigation error, opining that the cause had not been any lack of attention to accurate flying or his inability to navigate, but he had not noticed that the track line on the Skymap was the same colour as lines depicting the boundaries of CAS. He had inadvertently branched off his track line and had started to follow the line depicting the boundary of the Daventry CTA. The Skymap display did vibrate considerably in the helicopter and it was mounted at a distance where he was unable to read town names either with or without wearing reading glasses. Also the E2B compass was not well damped and he believed he had been maintaining a heading of 320º. The incident had left him feeling extremely stupid and embarrassed at having been caught out so easily even though he had over 30 years commercial aviation experience.

UKAB Note (1): Met Office archive data shows the East Midlands METAR EGNX1050Z VRB03 9999 HZ FEW045 21/11 Q1019=

ATSI reports that this Airprox, approx 5nm W of East Midlands Airport in Class D airspace, has no apparent ATC causal factors. Under the control of the East Midlands APR (a trainee with mentor), the B737 had been cleared to altitude 2500ft and at 1108:40, when at a range of about 8nm from touchdown, the pilot reported *'established'* on the ILS for RW09 at East Midlands. Further descent on the ILS was then approved and the flight instructed to contact East Midlands TWR. At 1109:35, about 30 seconds after the B737 made its first call on the TWR frequency, the APR telephoned the TWR controller to advise that traffic to the S within the CTR and indicating altitude 2600ft (1019mb) was not known to him. He then issued instructions to the TWR controller to break off the approach of the B737. At 1109:49, the TWR controller transmitted to the B737 *"c/s there's unknown contact to your right so turn left now please turn left onto a heading of 360 climb altitude 3000 feet".* There was initially no response from the pilot but after a second attempt the pilot correctly readback the turn instruction. It was then agreed between the APR and the TWR that the B737's climb would be stopped at 2000ft and that it would be transferred back to the APR. Meanwhile, the APR made a blind call on his frequency inviting the unknown ac to establish contact; there was no response. The radar recording shows this traffic, later identified as the subject AS355 helicopter, entering the East Midlands CTR (Class D airspace) at its southern boundary at 1108:40 on a consistent

northwesterly track that ultimately converges with that of the B737. Minimum horizontal separation was 2·5nm at 1110:28, when the B737 had just become established on a northerly track, at FL021 (2280ft QNH 1019mb), with the helicopter in its 4 o'clock position indicating FL022 (2380ft QNH) unverified.

[UKAB Note (2): The B737 is seen on the next two radar sweeps to descend, levelling 16sec later at FL018 (1980ft QNH)].

The tracks of the two ac subsequently diverged when the B737 was vectored to the W, downwind for a second approach, while the helicopter continued on its northwesterly track and exited the CTR at its northern boundary.

The steps taken by East Midlands ATC were appropriate under the circumstances and in accord with the MATS Part1 guidance of the action to be taken by controllers in respect of 'Unknown Aircraft' in class D airspace. It states in the relevant part of Para 14, Section 1, Chapter 5, page 13, *"Give avoiding action if radar derived or other information indicates that an aircraft is lost, has experienced a radio failure, or has made an unauthorised penetration of the airspace".*

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Pilot members agreed that it must have been disconcerting for the B737 crew to be given avoiding action once established on the ILS. The AS355 pilot's intended track would have kept him outside CAS, had it been followed; although his explanations for his navigation error were credible, it was observed that his track made good did not coincide with any airspace boundary lines depicted on charts. It was clear that, for whatever reason, the AS355 pilot had not monitored his position closely enough and had entered the East Midlands CTR without authorisation. This resulted in a confliction with the B737 and had caused the Airprox.

The East Midlands APR had seen the penetrating helicopter in sufficient time to alert and instruct the TWR to give avoiding action, which was followed by the B737 crew. The action of these safety nets meant that horizontal separation never reduced below 2·5nm and had removed any risk of collision.

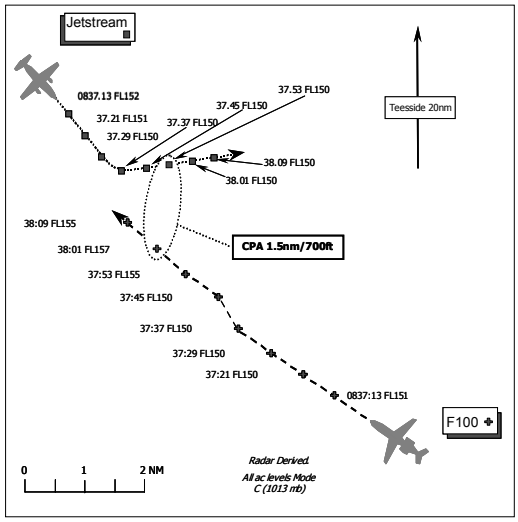
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Unauthorised penetration of East Midlands Class D airspace by the AS355 pilot, who flew into conflict with the B737.

Degree of Risk: C.

AIRPROX REPORT NO 93/03

Date/Time:	26 Jun 0838	
Position:	5412N 0132W 20nm S of Teesside	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	FK100	Jetstream 32
Operator:	CAT	CAT
Alt/FL:	FL150	FL150
Weather	VMC	NK
Visibility:	30km	50nm
Reported Separation:		
	<2nm H 0 V	½-1nm H 100ft V
Recorded Separation:		
	1.5nm H 700ft V	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK100 PILOT reports routeing from Amsterdam to Newcastle with 50nm to go on a Northerly heading at 270kt and FL150, receiving a RAS from London Military. ATC instructed him to turn right to enable descent which he then commenced. He was then warned of traffic ahead and instructed to turn left 30º to avoid; nothing was shown on his TCAS at this stage. After he rolled out, the traffic appeared on TCAS about 10nm to the N. ATC then instructed him to turn hard right about 60º. The ac was turning towards the traffic which was now at a similar level and TCAS gave a RA warning 'climb'. TCAS instructions were followed and ATC was informed. The Controller did not appear to comprehend the situation as she asked if we were still descending so we informed her again: *'TCAS climb'*.

Once clear of the conflict, he resumed the descent, informed ATC and told them that he would file a report. Although he did not see the other ac, he estimated from TCAS that the other ac was inside 2nm at the same level and notwithstanding his TCAS response he assessed the risk of collision as high.

THE JETSTREAM 32 PILOT reports routeing from Aberdeen via NEW to East Midlands at 210kt. At NEW on handover from Scottish Control to Pennine Radar he was offered a RAS and a few minutes later he requested a descent towards GOLES and FL100 was offered. While tracking southbound towards GOLES he initiated a descent but Pennine instructed him to stop descent at FL150 because of traffic co-ordinated between Pennine and London Mil. They were advised it was a Fokker 100 to operate not above FL140. At about 50 miles S of NEW, Pennine gave him an immediate left turn on to East and he asked for the bearing of the conflicting traffic to which they advised him right 3 o'clock approaching FL150. He looked out of the first officer's window and the Fokker was sighted 100ft above his level (FL150) at between ½ and 1nm away. Had he stayed on track he thought that there was a possibility of a collision but Pennine's action had reduced the risk to medium.

THE LONDON MILITARY CONTROLLER reports the F100 was released from Manchester Control at UMBEL in the descent to FL250. She gave the pilot further descent clearance to FL150 inbound Newcastle. SE of Teesside by 25nm she gave the F100 avoiding action to the NW against non-squawking traffic. Shortly after, further conflicting traffic squawking 6313 was observed to the NW, which was tracking SSW passing FL140 climbing. At that time the F100 was descending through FL160 to FL150 so she gave the pilot an avoiding action right turn on to heading 030º. The F100 pilot was relatively slow in taking the avoiding action so she gave the avoiding

action instruction again. Pennine radar then called, stating that the Jetstream would be stopping descent at FL150. She informed Pennine that an avoiding action instruction to the NE had been given to the F100 so she asked the Controller to turn the ac squawking 6313 to the right. The Controller stated that it was too late and that the ac was already turning to the left. She then said that the F100 would be descended to FL140. Although the F100 pilot was given the descent instruction to FL140, he climbed in response to a TCAS RA and informed her that he was visual with the conflicting traffic and would be filing an Airprox.

MIL ATC OPS reports that the F100 was receiving a Radar Advisory Service (RAS) from London Mil Controller 10 who was providing a service to 3ac in the same busy piece of airspace. At 0835:45 she issued avoiding action to the F100 pilot to avoid other unrelated traffic, *"…turn left heading two nine zero traffic crossing right one o'clock ten miles manoeuvring no altitude",* and the pilot confirmed that he was taking this turn at 0835:55.

Less than a minute later at 0836:50, further avoiding action was issued against the subject Jetstream: *"…turn hard right heading zero three zero"* and although this is partially read back the end of the transmission is garbled. No turn is observed on the radar replay at this time.

Although the landline from Pennine is answered at 0836:55 no relevant conversation is recorded until 0837:05. Controller 10 confirmed that the F100 pilot had heard the instruction and received a read-back at 0837:11. Immediately after at 0837:17, the F100 pilot is told to descend to F140 and the 2 controllers talked to one another, the London Mil Controller advising *"…he's turning hard right heading 030 descending to 140…"*. It was determined that Pennine was turning the Jetstream E and maintaining FL150 and advised London to *"……keep going down…"*. At 0837:39 the F100 pilot was instructed to expedite his descent to FL140, which following the request for confirmation that he was descending from the controller, he acknowledged at 0837:59, but no descent was observed on the radar replay. The Controller gave a further instruction to descend at 0838:28 and at 0838:41 the F100 pilot again acknowledged the instruction to descend and advised *"……for your information……we'll be filing that one that was a very close call"*. At no time is there any evidence on the transcript of the F100 pilot informing ATC that he was reacting to a TCAS warning.

Analysis of the Claxby radar video shows the F100 descending northbound into Newcastle through a busy airspace. A non-squawking ac can been seen to the NE of the F100 and the avoiding action turn on to 290º is observed. This turn puts the F100 into conflict with the Jetstream which is in the Teesside area tracking S. At 0837:30 a left turn on to E by the Jetstream is observed however, despite the F100 pilot being advised to turn hard right 030º twice, no turn of this magnitude is observed.

LATCC (Mil) reports that Con 10 was working hard throughout this incident providing a service to 3 ac in the same busy airspace. Although she spotted the confliction late, the London Controller took positive action to resolve the confliction with the ac at a range of 13.6nm which should have been sufficient. Although both controllers gave avoiding action in the same easterly direction, the perceived lack of turn by the F100 is of concern. Had the instruction given at 0836:50, some 40 seconds before the Jetstream is seen to turn, been acted on promptly, the Pennine Controller may have elected to turn the Jetstream right. The second avoiding action issued by London Mil was still some 20sec before the Jetstream is seen to turn and, had the F100 been responding to a TCAS RA by this stage, this was not mentioned to the Controller.

It is difficult to be over critical of a controller trying her best in a busy piece of sky, nevertheless, the rules for RAS were not adhered to nor was standard phraseology used. Additionally, advice on the advantages of routeing Newcastle inbound traffic via FAMBO to avoid the busy Vale of York, has also been proffered.

ATSI reports that Pennine RAD described both his workload and traffic loading as light.

The MACC MATS Part 2, Page Pen, Chapter 1, lists areas and routeings that are excluded from the Pennine area of responsibility and these include "*Services to aircraft operating to/from Newcastle and Teesside Airports via OTR or OTBED"* (e.g. the F100).

AIRPROX REPORT No 93/03

The Pennine RAD received a call from the ScACC at 0823 informing him of a Jetstream intending to route through the FIR from NEW to GOLES, rather than on P18 from NEW to Pole Hill. He agreed to accept it and advised MACC that it would be remaining clear of CAS.

The Jetstream contacted the Pennine Sector at 0825 squawking the assigned Pennine code reporting approaching NEW at FL195, routeing to GOLES. The pilot requested a RAS, which was agreed and he was informed that the Vale of York AIAA was active. In this case it was not necessary to invoke the procedure notified in the MACC MATS Part 2, Page Pen 1.7, which states that "When the Vale of York AIAA is active, and the provision of RAS is impracticable a re-route, a RIS or a service limitation should be offered".

At 0827, the London Mil Controller contacted Pennine RAD to co-ordinate traffic against another unrelated Jetstream, which was some distance ahead of the subject Jetstream and en route to Norwich. Co-ordination was agreed, with the Pennine adding, "*I have further traffic…just abeam Newcastle [the subject Jetstream] but you'll stay well below. I'll watch you beneath okay?"*

The Pennine Controller said that he thought that he had passed London Mil an 'ident' on this ac but having read the transcript he agreed that this was not the case. At 0828, he gave the Jetstream pilot descent clearance to FL100, his requested level to cross CAS at GOLES; however, about 30sec later, he told the pilot to level at FL150 because of unknown high speed military traffic crossing at FL120 and then recleared him to FL100 when it was clear.

Meanwhile the Pennine Radar Controller had prenoted the Norwich inbound's details to the London Mil Assistant and following this, the Controller initiated co-ordination on the F100, which was tracking 330°, 10nm SE of UMBEL. The F100 was code/callsign converted on the Pennine display, with destination Newcastle and was identified by the Pennine Controller. It was reported that the F100 was leaving FL270 descending to FL230 and the Pennine Controller agreed to maintain FL215 with the Norwich ac. TI was passed to the pilot of the Norwich ac on the F100. Although further co-ordination took place between Pennine and another London Mil Controller on the Norwich ac and a military ac, no further calls were made from/to London Mil regarding the Jetstream. Neither the civil nor military controllers mentioned the type of ATC service being provided to the 3 civil ac during co-ordination; however, the pilot of the F100 stated in his report that he was being provided with a RAS by London Mil which was confirmed by the R/T transcript (0834:25).

The Pennine RAD said that he continued to monitor the progress of the F100 towards the Jetstream until the ac were about 10nm apart with the former remaining above the latter, although its rate of descent was over 2000fpm. Acting on the incorrect supposition that he had identified the Jetstream to the London Controller, he believed that the F100 would not descend to less than 1000ft above his ac. In any case, whether an 'ident' had been passed or not, he reasoned that the Pennine squawk shown by the Jetstream, would indicate to the Controller that the flight was working Pennine Radar and thus was probably a civil airliner routeing southbound towards GOLES. As the ac approached approximately 10nm of each other he decided to call London Mil Controller 10 to confirm her plan of action. He explained that it is not possible to telephone a specific console direct from Pennine, although he said that the Controller would have had a direct line to him, so he had to route the call through the Allocator. Having done this, whilst waiting for the London Controller to answer, he instructed the Jetstream pilot at 0837 to *"turn left please onto a heading of east there's traffic military looks like a Fokker One Hundred actually just going in your left now range of two mile a range sorry left ten o'clock range of five miles descending through flight level one five zero probably inbound to Teesside"*. This message was followed by another instructing the Jetstream pilot to maintain FL150 and advising him that the traffic was descending through that level. As soon as he had finished this transmission, the London Controller answered, saying *"he's turning right heading zero three zero descending to one four zero"*. Although no mention was made of a callsign, Pennine RAD was convinced that the message referred to the F100. Quickly recognising that both controllers had turned their respective ac towards one another, the Pennine RAD said *"okay I'm maintaining one five zero, you keep going down"*. To which London Mil replied, *"I will".* At this time, the radar recording shows the ac apparently

turning towards each other, 4.1nm apart, with both showing FL150. Further TI, giving the relative position of the F100 and the fact it was descending through his level, was passed to the Jetstream pilot, who reported visual with the traffic but commented that it was actually climbing. The radar recording shows that the F100 did not continue the turn onto the reported heading of 030° but instead turned left again before straightening on a NW heading to pass 2nm behind the Jetstream, which was now on an easterly track. By this time the F100 had climbed to FL157, in reaction to a TCAS RA, as it passed 1.5nm SW of the other traffic while descending through FL155, as it passed behind.

The Pennine RAD commented that when he instructed the Jetstream to turn E he did not use the term avoiding action, as he did not consider that there would be a loss of separation. He believed, having realised that the F100 was not levelling at FL160, that the military Controller's plan must have been to descend it through the Jetstream's level. Although tight, he considered that this might have worked if the F100 had continued a high rate of descent, through the level of the Jetstream, when they were about 10nm apart. He added that it was very unusual for traffic inbound to Newcastle from the UMBEL direction to be positioned as far W as the F100 was routed. Neither he, nor his colleague could recollect an ac being in that position when flights inbound to Newcastle were controlled by Pennine Radar. The Pennine RAD explained that, for this reason, although the F100's SSR label indicated its destination as Newcastle, he made the assumption that it may have been diverting into Teesside and informed the Jetstream pilot accordingly.

The MATS Part 1, Section 1, Chapter 5, Page 2, describes a RAS as *"an air traffic radar service in which the Controller shall provide advice necessary to maintain prescribed separation between aircraft participating in the advisory service".*

The incident occurred whilst Pennine Radar and London Military were providing the Jetstream and the F100 respectively with a RAS. Neither controller completely fulfilled their responsibilities under the terms of a RAS, i.e. the provision of prescribed separation, primarily due to inadequate co-ordination between the units. The Pennine RAD was aware of the presence of the F100, having been given a radar ident from London Mil, following observation of its SSR label on the radar display and continued to monitor its progress relative to the Jetstream. Although he had not identified the Jetstream to London Military, as he believed he had, its Pennine allocated squawk should have indicated its presence to Controller 10. Co-ordination should have been effected prior to the subject ac approaching within 10nm of each other. The Pennine Controller assumed that the F100 would not be descended through the level of the Jetstream without prior co-ordination. This incident again demonstrates the danger of making such assumptions. In the event, he did make a telephone call to the London Military Controller, whilst taking a course of action intended to resolve the situation, albeit too late. After consideration of the geometry of the situation, it is understandable why the Pennine Controller took the course of action he did, it being unfortunate that both ac were turned towards each other. It would appear that the action taken by the F100 pilot, in reaction to a TCAS RA, prevented a closer encounter.

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

Although at first sight this appeared to be a very complex incident, at least for the London Military Controller in a very high workload environment, the relevant parts of the reports could be condensed to reveal a small number of significant factors.

It was clear from the F100 pilot's report and from the RT transcript that there was a lack of trust that the instructions being given by the London Military Controller were correct. The Board agreed that it was likely that the pilot believed that he had a good picture of the situation probably derived from TCAS information. It was also clear from the radar recording that he did not react to the avoiding action turn 'Hard Right 030º' given well before the incident at 0836.54 when the ac were separated by about 11nm. However, the reason

for his not reacting to this right turn instruction, repeated by the Controller 11sec later, was not obvious, since had it been complied with, it would have prevented the conflict if the Jetstream had continued on its southerly track and not also been turned to the E. At about that critical time there was a short period when it appears from the transcript that the RT frequency being used by the London Military Controller was completely obscured by the landline to Pennine Radar. It may be that the F100 pilot called during this period that he was reacting to a TCAS RA. However, the Board considered it more likely that the RA occurred later at around minute 37½ when a small lateral deviation followed by a climb can bee seen on the radar recording and when the opposing Jetstream became a threat in his 12 o'clock, co-altitude, about 4nm distant. No call to London that he was reacting to a TCAS RA is recorded on the RT transcript at that or any other time. Further, had the F100 pilot complied with the descent instruction given by the London Military Controller at 0837:17, the 2 ac would have been separated by 1000ft, albeit at a fairly late stage, and again the incident might have been prevented. One explanation for the pilot's sequence of actions was that he had used the TCAS information to navigate in the horizontal plane around the opposing traffic after receiving a TA rather than reacting only to an RA by following the vertical manoeuvring instructions.

The Board was concerned that the 2 controllers involved, although both identifying the confliction early enough to prevent it from happening, did not achieve co-ordination of their respective ac. They also observed that the Pennine Controller believed that he had co-ordinated the Jetstream involved with London Military but the RT transcript confirmed that he had not; further he did little to resolve the emerging conflict until it was too late to prevent it. The result was that both ac were instructed to turn to the E independently and within 10sec of each other which would have brought them into conflict initially at FL150. The F100 pilot however, neither turned right nor descended to FL140. Members also noted that the Jetstream's turn, although on to the heading given, appeared slow to begin. ATC members said that had the Controller correctly prefixed his transmission with the words 'avoiding action' the turn would have been executed with more urgency and resulted in greater separation.

Since the incident occurred in Class G airspace and the minimum separation finally achieved between the 2 ac was 1.5nm and 700ft while the ac were already diverging, the Board concluded that there had not been a risk of their colliding.

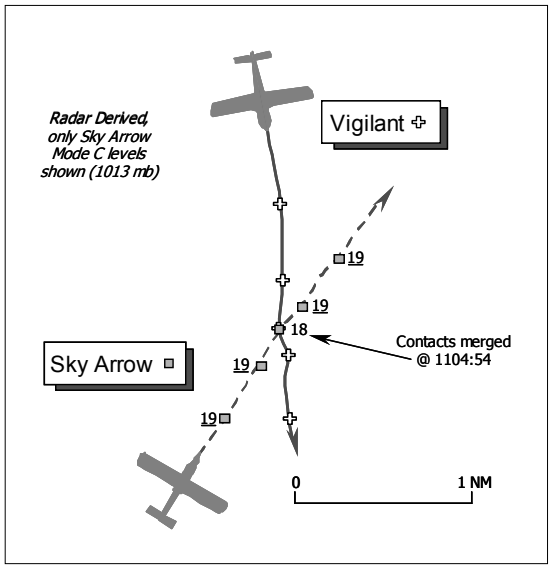
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F100 pilot did not follow the avoiding action turn instructions given by the London Military Controller 10.

Degree of Risk: C.

AIRPROX REPORT NO 94/03

Date/Time:	20 Jun 1104	
Position:	5313N 0101 W (4½nm SSW of Gamston - elev 91ft)	
Airspace:	London FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	Vigilant M-Glider	Sky Arrow 650TC
Operator:	HQ PTC	Civ Pte
Alt/FL:	2100ft (QFE 1014mb)	2500ft (RPS)
Weather	VMC CLBC	VMC Below Cloud
Visibility:	20km	25nm
Reported Separation:	20-30ft V, nil H	100ft V
Recorded Separation:	Contacts merged	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT (GROB) MOTOR GLIDER PILOT, a QFI, provided a very frank and comprehensive account. He reports he was on the final leg of a NAVEX returning to Syerston with a visiting instructor as the PF, in communication with SYERSTON RADIO A/G Station on 125·425MHz and squawking A7000; no Mode C is fitted. His motor glider is predominantly white, with Day-Glo markings on the wings; the landing lamp and HISL were on.

Flying in level cruise at 2100ft Syerston QFE (1014mb) with good visibility - >20km in slight haze but into sun – about 1500ft below some scattered CU above 3000ft, they had just turned at Worksop disused airfield and were tracking 170º for Southwell at 90kt IAS. About 4nm SW of Retford/Gamston another ac, [later identified as the Sky Arrow] was sighted late - 100-200m away - head-on flying a reciprocal track at the same height, which prompted the PF into a diving evasive manoeuvre. The other ac passed 20-30ft directly overhead his motor glider with no apparent change of course and he opined that a collision would have been inevitable if avoiding action had not been taken.

He added that the two ac were, in his estimation, within 4-5 sec of a near head-on collision and he could only attribute the late sighting to the relative position of the Sky Arrow exactly head-on, wings level on their horizon. Another Vigilant crew several miles behind witnessed the event; the pilot stated that the Sky Arrow did not seem to change heading or height and continued in the direction of Gamston.

THE SKY ARROW 650TC PILOT reports his aeroplane is coloured white with fine red stripes; the HISLs were on. Whilst inbound to Retford/ Gamston from E Midlands, he was receiving a FIS from East Midlands until visual contact with Gamston Aerodrome was established at a range of about 5nm, whereupon he switched to Gamston RADIO A/G Station on 130·475MHz, squawking A7000 with Mode C.

About 2½nm NW of Ollerton heading 036° at 85kt, flying in level cruise at 2500ft BARNSLEY RPS [1015mb], some 500ft below cloud, a Grob115 motor glider was first sighted at 11 o'clock - about 150m away and it passed about 100ft below his aeroplane. As he had spotted the motor glider a few seconds before it passed below him, instinctively he took no avoiding action. He

assessed the risk as *"slight"* and observed that both ac are made from composite materials painted white that are not easily seen with white cumulus cloud in the background.

Note (1): Meteorological Office archive data reveals the BARNSLEY RPS for the period 1000-1100 & 1100-1200UTC was 1015mb.

Note (2): The LATCC (Mil) Claxby Radar recording clearly illustrates the geometry of this encounter in plan. The Vigilant is shown tracking 170° (NMC fitted) as the Sky Arrow approaches on a constant relative bearing, squawking A7000 in the Vigilant crew's R 1 o'clock maintaining 1900ft unverified Mode C (1013mb). This would equate to about 1960ft RPS (1015mb) but does not jibe with both pilots' reports, which agree that the Sky Arrow overflew the Vigilant that was flying at a reported 2100ft (1014mb). The ac converge and the contacts merge at 1104:54 – the Sky Arrow indicating 1800ft Mode C - some 4½nm SW of Gamston, a small L turn is evident thereafter, which may be indicative of the avoiding action dive effected by the Vigilant crew.

THE VIGILANT MOTOR GLIDER PILOT'S STATION comments that this Airprox occurred in Class G airspace in good weather conditions with the Vigilant being flown by 2 experienced instructors who were practising formal navigation techniques, the emphasis being on lookout scan.

Motor gliders, from certain aspects, are very difficult to see; indeed the ac involved had been modified with a high conspicuity Day-Glo marking on its wings for this very reason. Similarly, the other ac involved was a small ac, with an especially narrow fuselage, and painted primarily white. Two such ac, approaching head-on, do not provide optimum conditions for early visual acquisition – as this incident has proved.

Other than by some form of procedural separation, or a device to warn of the proximity of other ac, it is difficult to envisage how this incident could have been avoided. It is extremely fortunate that one of the pairs of eyes in the two ac involved spotted the confliction in time to avoid more serious consequences.

HQ PTC comments that this was undoubtedly a fairly late spot due to the near head-on aspect and both ac's inconspicuous finish. We suspect that the Vigilant saw the Sky Arrow rather later from looking into sun. However, their relatively low closing speed allowed the Vigilant pilot to take appropriate avoiding action.

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 authority.

It was evident to the Board that the crux of this Airprox was one of lookout, in the predominantly 'see and avoid' environment of Class G airspace. The members noted the well-founded comments expressed by the Vigilant pilot's Station; the radar recording had revealed this was a crossing situation, but the small cross sectional area of the white Sky Arrow flying at a near head-on aspect at a similar speed - with little relative movement to draw attention to it - would have been very difficult to detect by the Vigilant pilots, who were required by the 'Rules of the Air' to give way in this situation. However, the 'Rules' can only be applied if the other ac is seen in good time; from the Vigilant pilot's laudably frank account it was clear that this was not the case here, as he had reported that despite an assiduous lookout the Sky Arrow was spotted a mere 100-200m away. At a closing speed of around 3nm/min, 200m would be covered in fewer than 2 sec leaving little time to react to the sighting and alter the motor glider's flight path. However, the Vigilant pilot had also reported that they were *"within 4-5 sec of a near head-on collision";* the Board thought that this figure was nearer the mark and was more in line with the time required to manoeuvre the Vigilant out of the way of the other ac, which clearly the PF had managed to accomplish. Members concurred that the late sighting by the Vigilant pilots was part of the cause. From the other cockpit the Sky Arrow pilot had to contend with similar geometry that also impeded his early detection of the motor glider and it was probable that he saw the Vigilant moments after the two QFIs had spotted his ac. Some thought it might have been the avoiding action dive effected by the Vigilant PF that highlighted the proximity of the motor glider to the Sky Arrow pilot, but whether or not this was the case, it was clear that he also had not seen the Vigilant until a late stage and the other part of the cause of this Airprox.

Turning to the inherent risk, it was not feasible to determine the vertical separation that pertained here as the misleading Mode C data from the Sky Arrow and the absence of any confirmation of the Vigilant's altitude from SSR data, denied the Board the benefit of this crucial information for their assessment. Nevertheless, the radar recording had confirmed that the respective contacts had merged in azimuth, probably as the Vigilant pilot executed his vital avoiding action dive, which he reports effected 20-30ft of vertical separation at the last moment. In the Board's view, at 150m range flying a nearly reciprocal heading the Sky Arrow pilot had probably sighted the other ac too late to effect any avoiding action. Indeed, from his own account the Sky Arrow pilot had not thought it necessary, suggesting to some members that he saw the motor glider as the other pilot dived beneath his ac. This might also explain the differing perceptions of the vertical separation reported at the time by the Sky Arrow pilot (100ft) – some 300% more than that of the Vigilant pilot. Undoubtedly both pilots had described a close encounter and while the prompt action of the Vigilant PF had averted a collision, the situation led the Board to agree unanimously that the safety of these two ac had indeed been compromised, considerably.

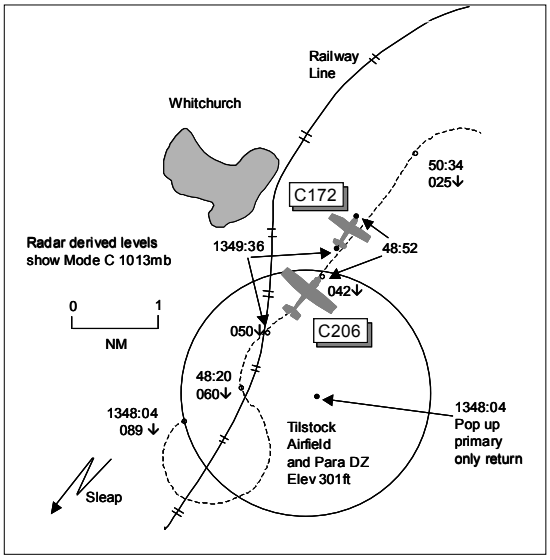
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the Vigilant pilots and the Sky Arrow pilot.

Degree of Risk: B.

AIRPROX REPORT NO 95/03

Date/Time:	28 Jun 1351 (Saturday)	
Position:	5259N 0238W (3·5nm NNE Tilstock A/D - elev 301ft)	
Airspace:	FIR	(Class: G)
	Reporting Aircraft	*Reported Aircraft*
Type:	C172	C206
Operator:	Civ Pte	Civ Club
Alt/FL:	2500ft	3000ft↓
	(QNH 1015mb)	(N/K)
Weather	VMC CLBC	VMC CAVOK
Visibility:	25km	>10km
Reported Separation:		
	nil V 50ft H	nil V 300m H
Recorded Separation:		
	not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE C172 PILOT reports flying solo en route from Sleap to Barton at 2500ft QNH 1015mb, at 110kt and he was reporting and listening out on the Shawbury frequency 120·77MHz. The visibility was 25km, 1000ft below overcast cloud in VMC, the ac was coloured white/blue and the nav, anti-collision and strobe lights were switched on. No transponder was fitted. He had changed frequency from Sleap to Shawbury at Whitchurch and did not receive any response to his RT calls to indicate that ATC were open. About 3nm N of Whitchurch whilst flying straight and level following a line feature (railway line), he scanned over his shoulder to approx 4 o'clock and saw a high wing single engine blue/red coloured ac, possibly a C172, turning away to the R at a range

of 50ft, at the same level. He felt that it must have approached from behind and below as he had been carrying out a horizontal scan over 180°, looking upwards (for possible cloud/ac) and downwards to ensure nearness to the line feature. He assessed the risk of collision as high.

UKAB Note (1): During a subsequent telephone conversation with the C172 pilot (6 months post incident) he couldn't remember much about the incident details. He had not been aware of any activity at Tilstock as he would have normally expected notification of it from Sleap Radio or from Shawbury who were closed.

THE C206 PILOT reports on recovery to Tilstock having completed a para-drop descending at 130kt in CAVOK conditions. The ac was coloured blue/red and he was squawking 0033 with Mode C. Descending through 3000ft, he saw a high wing single engine ac, coloured white with dark markings, about 3nm away flying straight and level tracking approx N. He continued his descent, passing about 300m behind the other ac, from its 6 through to its 4 o'clock positions whilst in a slight R banked turn. He assessed the risk of collision as nil. After landing he was informed that a high winged single engine ac had just infringed the DZ with parachutists under canopy, the timing and track of the ac was consistent with it being the reporting ac.

UKAB Note (2): The UK AIP at ENR 5-5-3-4 promulgates Tilstock as a Free Fall Drop Zone, a circle radius 1·5nm centred 525551N 0023905W from FL150 active normally during daylight hours, Fri from 1400 & Sat & PH Winter (Summer 1hr earlier); and other times as notified. Activity notified on the day to Shawbury ATC or LACC outside hours of Shawbury; alternative contact Tilstock RADIO 122·075MHz.

UKAB Note (3): Met Office archive data shows the Shawbury 1350Z QNH 1015mb.

UKAB Note (4): Analysis of the Clee Hill radar recording proved inconclusive. Two 0033 para-drop squawks are seen manoeuvring adjacent to Tilstock prior to the Airprox, one climbing, whilst the other is believed to be the C206, which it is seen to commence a descent from FL100. At 1348:04, as the C206 0033 squawk is seen 1·5nm W of Tilstock in a LH orbit passing through heading 260° descending through FL089 (8840ft QNH 1015mb), a pop-up primary only return appears overhead Tilstock, (possibly the C172) for one radar sweep. At 1348:20 the C206 is seen 0·75nm W of Tilstock, stopping its L turn on a NW track and turning R descending through FL060 (ROD 2500fpm) before rolling out on a track of 025° at 1349:36 1nm NW of the DZ. Simultaneously a primary only return pops up 1·7nm N of the DZ, believed to be the C172, tracking 025° before fading completely from radar 16sec later when the C206 is 0·84nm behind it on a similar track descending through FL042. The C206 continues on a steady NNE track until a R turn is seen to commence at 1350:34 as it descends through FL025 thereafter continuing descent and turning back towards Tilstock. The Airprox is believed to occur at this time as both pilots describe this manoeuvre.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members initially discussed the events leading up to the Airprox. Although there was no radar information to show that the C172 had flown through the Tilstock Free Fall DZ, it was clear that if its pilot had followed the railway line, as he said he did, this would have led to an infringement of the DZ. This DZ is shown clearly on the 1:500000 charts and the area should have been avoided if there had been doubt about its activity status. However, thorough pre-flight planning would have disclosed the hours of operation and the frequencies to call to check the activity status. Moving on to the reported Airprox, the C206 pilot saw the C172 at 3nm range but had then elected for whatever reason to fly within 300m of it before turning away back towards Tilstock. In doing so the C206 pilot had flown close enough to cause concern to the C172 pilot and this had caused the Airprox.

Turning to risk, members could not resolve the discrepancies in the separation distances reported by both pilots. The C172 pilot was undoubtedly surprised when he noticed the C206 in his 4 o'clock, reported as 50ft away, at the same level turning away. Unbeknown to him, the C206 pilot had seen the C172 and maintained visual contact with it whilst he descended. It was unclear

why the C206 pilot had chosen to fly so close - he reported 300m separation - to the C172 but he had, without knowing its pilot's intentions. However, it was agreed that the C206 pilot was always in the position to manoeuvre to avoid the C172 which led the Board to conclude that there had been no risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C206 pilot flew close enough to cause concern to the C172 pilot.

Degree of Risk: C.

INDEX TO AIRPROX REPORT SUMMARIES

Airprox No	Date	Types	Position	Risk	Page
57/03	23 May	Sentry AEW mk1/PA28	12nm N of Brize Norton	A	166
58/03	29 May	DHC8/Robin HR 100	6nm NW SAM	C	169
60/03	28 May	B747-400/PA34	13nm NNE Stansted	C	171
61/03	30 May	Dominie T/Dominie T mk 1	Marham O/H	B	175
62/03	02 Jun	EMB 145/Tornado F3	325° (T) LOMON 42nm	C	179
63/03	30 May	A321/Hawk T1	10nm S Bristol	C	183
64/03	04 Jun	C150/Tornado GR4	Beverly Linley Hill CCT	A	186
65/03	02 Jun	Hawk/Hawk	Lake Bala	B	189
66/03	04 Jun	Tucano/Tornado GR4	2nm NE of Penrith	A	192
67/03	05 Jun	AS332/Tornado GR4	18nm N of SMOKI	C	194
68/03	05 Jun	Tornado GR4/Tornado GR4	Braemar	B	198
69/03	06 Jun	AS335/PA28	1.5nm W Epsom R/Course	B	200
70/03	28 Apr	A321/A321	OCK	C	202
71/03	05 Jun	C152/PA28	5nm NNW WCO NDB	A	204
72/03	09 Jun	Tornado F3/Jetstream 32	36nm NE of Leuchars	C	206
74/03	09 Jun	B757/Learjet 35	25nm SE BIG	C	209
75/03	12 Jun	B737-800/CRJ2	8nm MW MID	C	213
78/03	15 Jun	BH06JetRanger/Sukhoi SU26	O/H Silverstone	C	217
79/03	18 Jun	C130/F15 x 2	8nm E of Sculthorpe	B	219
80/03	19 Jun	B747-300/A340-300	Mid Atlantic	C	224
81/03	15 Jun	YAK52/Untraced Light ac	13nm E Wattisham	B	227
82/03	16 Jun	FK100/Tucano	233° (T) FAMBO 23nm	C	229
83/03	21 Jun	TRIS/Untraced Microlight	15nm SSW SAM	B	235
84/03	21 Jun	C152/AS332L	RW34 Aberdeen	B	236
85/03	18 Jun	Twin Squirrel/R44 x 2	Cardiff City (West)	C	239
86/03	24 Jun	Jetstream 32/Tornado F3 Pair	29nm NE of Leuchars	C	242
87/03	24 Jun	Hawk/Tornado	2-3nm SW of Appleby	B	246
88/03	24 Jun	Shorts SC7/BAe146	285° (T) Oxford/Kidlington 17nm	C	248
89/03	23 Jun	K13 Glider/Hawk x 2	Vicinity of Aston Down Glider site	C	251
90/03	25 Jun	A319/PA31	3nm NE Glasgow	C	254
91/03	29 Jun	Ask 21 Glider/PA28	O/H Lasham	B	257
92/03	29 May	B737-300/AS355	4.5 nm W East Midlands	C	259
93/03	26 Jun	FK100/Jetstream 32	20nm S of Teesside	C	262
94/03	20 Jun	Vigilant M'Glider/Sky Arrow	4.5nm SSW of Gamston	B	267
95/03	28 Jun	C172/C206	3.5nm NNE Tilstock A/D	C	269

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