



UK AIRPROX BOARD

ISSN 1479-2737

Analysis of Airprox in UK Airspace

**Report Number 18
January 2007 – June 2007**

Eighteenth Report by the UK Airprox Board:

‘Analysis of Airprox in UK Airspace’

(January 2007 to June 2007)

produced jointly for

The Chairman,
Civil Aviation Authority

and the

Chief of the Air Staff,
Royal Air Force

FOREWORD

The primary purpose of this, the eighteenth Report from the UK Airprox Board (UKAB), is to promote air safety awareness and understanding of Airprox. "Book 18" covers the first six months of 2007 in detail, containing findings on the 75 Airprox that were reported as occurring within UK airspace in that period and which have been fully investigated and assessed by the UK Airprox Board.

The withdrawal of Airprox 077/06 by the reporter at a very late stage has resulted in the overall numbers for 2006 being reduced by one from previously promulgated data. Furthermore, it should be noted that one Airprox from 2006 is still outstanding: 147/06 occurred within a portion of the UK's Oceanic airspace - the Northern Oceanic Transition Area (NOTA) – where by standing agreement ATS is provided by the Irish Aviation Authority. It was concluded by mutual agreement that this occurrence would be investigated and assessed by our counterparts in Ireland. When this Report was compiled, the results of the Irish Airprox Board's assessment of 147/06 were not available: consequently, this Airprox is not reflected in the statistics presented here but is planned to be included in subsequent reports.

The tally of 75 Airprox during the first six months of 2007 is 16 fewer than the average of comparable figures in each of the first half of the previous five years. The Table below shows the details. It should be noted that this figure of 75 is the lowest total in the dataset. Also at its lowest value is the figure for Risk A – 3. Risk B occurrences in the first six months of 2007 are only one more than the lowest recorded, in 2006. Thus the overall number of risk bearing Airprox (Risk Category A & B) is static at the lowest recorded number of 24 over these two reporting periods. This should be kept in mind when reviewing other data in this Report, especially percentages.

Risk Category	2002	2003	2004	2005	2006	2007
A	7	6	8	13	4	3
B	27	29	30	26	20	21
C	56	49	66	53	54	51
D	2	1	5	0	0	0
Totals:	92	85	109	92	78	75

Although this half-yearly Report is primarily concerned with aircraft operations across the broad spectrum of aviation activities that occur in UK airspace, it is understandable that there is significant interest in the safety and involvement of commercial air transport (CAT) in risk bearing Airprox. None of the three Risk Category A events in the first half of 2007 involved a CAT aircraft. Within the 21 Risk Category B events, five involved at least one CAT aircraft. The number of Airprox in Risk Category A where at least one aircraft was military is down to two, compared with an average of six. The corresponding number of Mil aircraft involved in Risk Category B is 13, exactly in line with the five-year average.

It is appropriate to acknowledge here those pilots and controllers who have conscientiously and frankly reported events in which they have been intimately involved so that others may learn from their Airprox experiences. The Board and Secretariat strive to respect people's concerns by disidentifying reports, focussing on the essential facts of an incident with the aim of determining what actually occurred so as to arrive at fair, impartial conclusions of Cause and Risk. If the collective effort of reporters, investigators and the Board helps to make flying safer then all involved will consider their efforts worthwhile.

David J Balchin

Acting Director, UK Airprox Board

CONTENTS

Introduction

UK Airprox Board (UKAB) Composition	4
UKAB's Role	4
Status of UKAB Reports	4
Risk Categories	4
Airprox Definition	5
The UKAB Data Set	5
Publication of Reports	5

Airprox Results for 2007

Half-Year Comparisons 2006 and 2007	6
Airspace in which conflicts took place	7

Commercial Air Transport (CAT) Section

CAT Risk Results	7
CAT Causal Factors	8

General Aviation (GA) Section

GA Risk Results	9
GA Causal Factors	9

Military Section

Military Risk Results	10
Military Causal Factors	11

UKAB Safety Recommendations 12

List of Abbreviations 14

AIRPROX REPORTS 16 - 275

INTRODUCTION

UK AIRPROX BOARD (UKAB) COMPOSITION

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

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

UKAB's ROLE

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

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

STATUS OF UKAB REPORTS

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

RISK CATEGORIES

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

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

AIRPROX DEFINITION

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

THE UKAB DATA SET

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

Note:

Prior to "Book 13" certain Tables included figures for 'Unknown' aircraft. Subsequently, numbers of 'Unknown' aircraft are added to 'Untraced' aircraft and weather balloons to produce a new category, 'Other'. All figures in the relevant Tables have been adjusted accordingly, including those for prior years.

PUBLICATION OF REPORTS

A key UKAB objective is to communicate effectively the lessons identified from Airprox events. Bi-annual 'hardcopy' Reports continue to be the primary means of communication, supported by presentations at flight safety meetings, cd-roms and the Internet. The UKAB Internet website is updated at least every month. The latest statistics are added, for example, as are details of the most recent set of Reports assessed by the Board.

The UKAB website address is www.airproxboard.org.uk

THIS REPORT

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

Some events, reported as Airprox and therefore assigned a reference number by the Secretariat, are subsequently withdrawn and are thus not subject to full investigation and assessment by the Board. Please note that only the reporter can withdraw an Airprox.

HALF-YEAR COMPARISONS 2006 AND 2007

A total of 75 Airprox were reported and opened for full investigation in the period 1 January to 30 June 2007. The total number of Airprox is thus down slightly from the corrected figure of 78 for 2006, a fall of just under 4% and the fourth successive reduction in this first half-yearly period. Whilst encouraging, caution should be exercised when drawing conclusions from these small variations. Tables 1 and 2 below give month-by-month data for the main three airspace user groups. The figures in the columns headed 'Totals' are shown in pie-chart format in Figures 1 and 2 from which it can be seen that although the number of Airprox where civil aircraft met civil aircraft (Civ~Civ) is static, the reduction in the overall total has resulted in the proportion being marginally higher, year on year. The figure of 8 Airprox for military encounters with other military aircraft (Mil~Mil) has increased the overall proportion to 11% against 5% in 2006 whereas a significant drop of 11% is revealed in the category Civ~Mil, down from 36% to 25%.

User Group Mix: January - June 2006

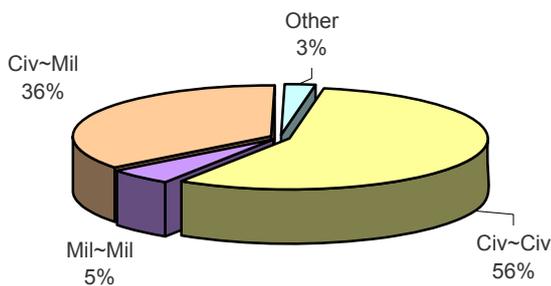


Figure 1

User Group Mix: January - June 2007

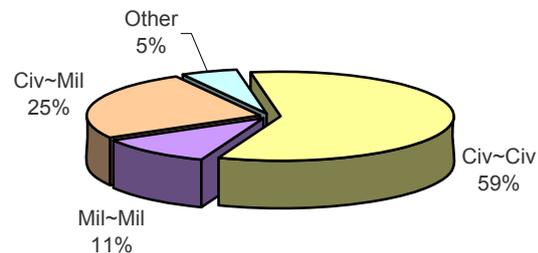


Figure 2

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	1	1	1	0	0	1	4
Civ~Mil	3	7	7	2	3	6	28
Civ~Civ	7	4	2	11	6	14	44
Other	0	0	0	0	0	2	2
Totals	11	12	10	13	9	23	78

Table 1

2007	Jan	Feb	Mar	Apr	May	Jun	Totals
Mil~Mil	0	0	2	1	1	4	8
Civ~Mil	4	1	0	6	4	4	19
Civ~Civ	3	2	10	7	10	12	44
Other	0	1	1	0	1	1	4
Totals	7	4	13	14	16	21	75

Table 2

The totals in Tables 1 and 2 can be 'broken out' as in Tables 3 and 4 below, these showing in more detail how the various user groups interacted with one another – the 'Mix' - during the first six months of 2007 (Table 4) with data for the same period in 2006 for comparison (Table 3). The figure for CAT~CAT is up marginally by one and hardly statistically significant whereas the number of occasions when a GA aircraft met another GA aircraft rose to 19 – 5 more than the previous year. This is counterbalanced entirely by a welcome reduction in CAT~GA encounters which are down by 6 to 13 with CAT~Mil also down 5 to a total of 7, an encouraging 41% reduction year on year. GA~Mil figures are also down by 25% but surprisingly Mil~Mil Airprox rose to a total of 8 for the half year although no common threads are readily apparent.

Mix details for 2006 (Jan-Jun):	
CAT~CAT	11
CAT~GA	19
GA~GA	14
CAT~Mil	12
GA~Mil	16
Mil~Mil	4
CAT~Unknown	1
GA~Unknown	0
Mil~Unknown	1
78	

Table 3

Mix details for 2007 (Jan-Jun):	
CAT~CAT	12
CAT~GA	13
GA~GA	19
CAT~Mil	7
GA~Mil	12
Mil~Mil	8
CAT~Unknown	3
GA~Unknown	1
Mil~Unknown	0
75	

Table 4

AIRSPACE IN WHICH THE CONFLICTIONS TOOK PLACE - JANUARY TO JUNE 2007

Figure 3 (below) shows the various classes of airspace within which the reporter's aircraft was situated when Airprox events occurred during the first six months of 2007. When comparing Jan-Jun 2007 with the same period in 2006, the number of incidents in Class G airspace, the 'Open FIR', in the altitude band from ground level to 3,000ft has changed little with an increase of one to 25. The proportion of Airprox occurring in Classes F & G airspace (including LFAs, ATZ & MATZ etc) is closely comparable with previous years, being 64% in 2007 as against 65% of the total in 2006. However, it should be noted that for just over half of the reporting period, from 15 Mar 07, airspace above FL195 became Class C.

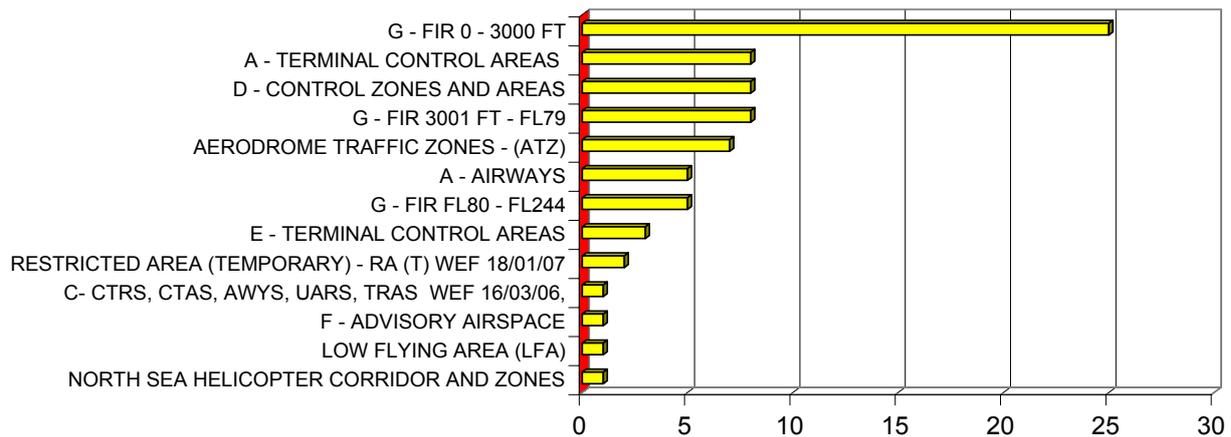


Figure 3

The figure for Airprox events occurring inside Class A Terminal Control Areas was eight, exactly comparable between 2006 and the same period for 2007, with a slight but unwelcome increase in Class A Airways up from two to five. The figure for TCAs was mirrored in that for Class D CTR/CTAs which now ranks as third in this period of 2007 in the above figure: 12 Airprox in 2006, reducing to eight in Jan~Jun 2007. Although the number of Airprox occurring within ATZs remains static at seven over the period year on year, this ranking is also down one to the fifth most significant. Notable also is the introduction into the dataset from 18 Mar 07, of Restricted Areas (Temporary) where two Airprox stemmed from infringements of this airspace.

COMMERCIAL AIR TRANSPORT (CAT) SECTION

Risk results for Airprox involving at least one CAT aircraft using the data in Tables 5 and 6 below are plotted by month in Figures 4 and 5 overleaf. The overall number of Airprox where one of the aircraft involved was CAT has declined by 19% from a total of 43 to 35: less than half of all Airprox involved CAT aircraft in the first six months of 2007. Continuing the trend of the previous year, there were reassuringly no Risk Category A encounters involving CAT aircraft in Jan~Jun 2007. Furthermore, the CAT risk bearing profile for Jan~Jun 2007 was more than halved in numbers of Airprox from that for 2006. Of the 43 Airprox involving CAT in 2006, 12% of the total were Risk Category B whereas the same period in 2007 resulted in merely two Airprox - just 6% of the Airprox involving CAT - being assessed as Risk bearing.

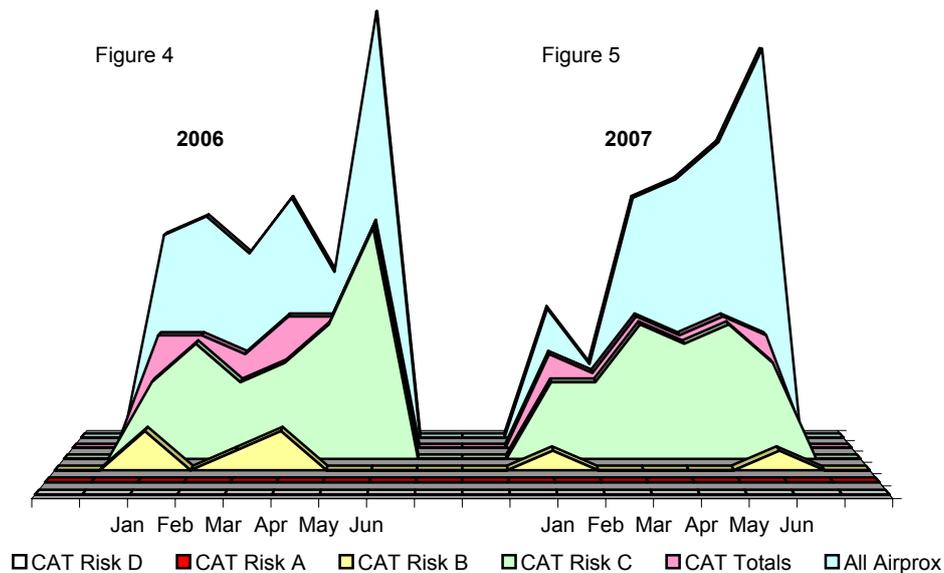
2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	2	0	1	2	0	0	5
Risk C	4	6	4	5	7	12	38
Risk D	0	0	0	0	0	0	0
Totals	6	6	5	7	7	12	43

Table 5

2007	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	0	0
Risk B	1	0	0	0	0	1	2
Risk C	4	4	7	6	7	5	33
Risk D	0	0	0	0	0	0	0
Totals	5	4	7	6	7	6	35

Table 6

CAT Involvement in Airprox: January - June in 2006 and 2007



Listed below in Table 7 are those 8 **causal factors** of the 66 assigned overall (any one Airprox event can have more than one causal factor) that featured most prominently on 36 occasions in the 35 Airprox involving 'at least one CAT aircraft'. The split between causal factors attributed to pilots or controllers was broadly comparable, being 19 and 17 respectively. For pilots, non-compliance with ATC instructions and level-busts were down by two but still significant causes, being cited four times in CAT Airprox. 'Penetration of CAS/ATZ without clearance' continued to feature prominently in 2007 as the second most significant cause. Overall however, the number has remained a constant, mirroring that of Jan-Jun 2006. Airprox where controllers did not separate CAT aircraft, or exercised poor judgement, remained the predominant factor associated with Airprox in the first half of 2007 and featured 11 times, an increase in the order of 37% over the same period in 2006.

Ser.	Cause	Totals
1	DID NOT SEPARATE/POOR JUDGEMENT	11
2	PENETRATION OF CAS/ATZ WITHOUT CLEARANCE	6
3	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	4
4	INADEQUATE AVOIDING ACTION/LACK OF POSITIVE CONTROL	3
5	CONTROLLED AIRSPACE CONFLICT IN VMC	3
6	CLIMBED/DESCENDED THROUGH ASSIGNED LEVEL	3
7	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	3
8	LACK/BREACH OF CO-ORDINATION BETWEEN CONTROLLERS	3

Table 7

As mentioned in the Foreword, it is understandable that there is general interest in Airprox involving CAT aircraft. There being no Risk Category A events during the first six months of 2007 in which at least one aircraft was CAT, attention naturally falls on the two Risk Category B Airprox. In essence, both Airprox are entirely dissimilar. Airprox 008/07 occurred in the Vale of York AIAA - Class G airspace - between IFR CAT and a military fast-jet operating VFR as OAT in a clear sky at night. Here the omission of co-ordination by the controllers involved, coupled with the misjudgement of the geometry by one of the crews were causal factors. The second case – Airprox 085/07 – involved two CAT aircraft: a departure under IFR in Class D CAS, and an IFR arrival flying IMC in cloud which was instructed to go-around at a late stage by the controller, resulting in a conflict with the departing aircraft.

GENERAL AVIATION (GA) SECTION

Risk data for GA Airprox are given below: Tables 8 and 9 show the 'raw data' from which the charts in Figures 6 and 7 are constructed. The proportion of risk bearing events is down by 7% of all GA Airprox continuing the trend from 2005. A welcome reduction of Risk A encounters by 33% belies the actual reduction in numbers by one. However, a decrease in Risk B encounters may be more significant: down from 18 in 2006 to 14 in the same period for 2007, a decrease proportionately from 37% to 31% of the respective GA totals. Airprox assessed as having no risk remained broadly level in the first six months of 2007.

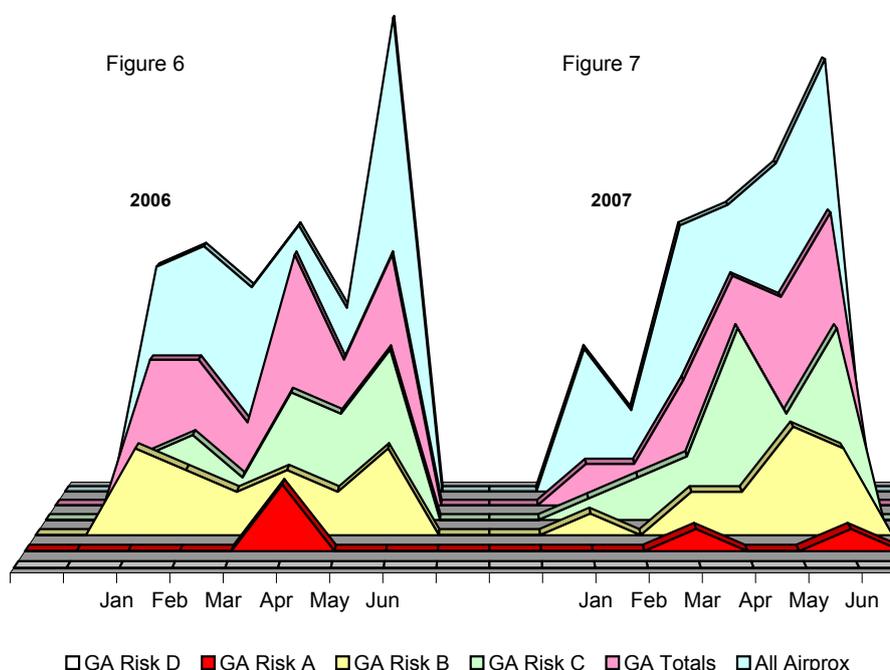
2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	3	0	0	3
Risk B	4	3	2	3	2	4	18
Risk C	3	4	2	6	5	8	28
Risk D	0	0	0	0	0	0	0
Totals	7	7	4	12	7	12	49

Table 8

2007	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	0	0	1	2
Risk B	1	0	2	2	5	4	14
Risk C	1	2	3	9	5	9	29
Risk D	0	0	0	0	0	0	0
Totals	2	2	6	11	10	14	45

Table 9

GA Involvement in Airprox: January - June in 2006 and 2007



The 49 'GA' Airprox events in 2006 gave rise to 84 **causal factors**, whereas the same period in 2007 gave rise to 85 causes within 45 Airprox, the 6 most significant being shown in Table 10. The number of times that each of the 6 prime causal factors listed in the Table was assigned: 39, accounts for less than half (46%) of the GA total of 85 causal factors. Sighting issues head the list significantly, mirroring previous years, but here by a reduced margin. In this half of 2007, on 19 occasions the pilot of one aircraft did not see the other aircraft or saw it late: this was 22% of the total causal factors assigned in this dataset – less than one quarter in 2007 compared to just under one third in 2006. The importance of good lookout cannot be over emphasized, it is fundamental to the safe passage of all who fly in 'see and avoid' airspace and the UKAB endeavours to broadcast this message as widely as possible. Significantly, controllers who did not effect separation or exercised poor judgment appears in 2007 as the third most common GA causal factor and one that has not figured here since 2005. When coupled with the 5th place 'Did not pass or late passing of traffic information' controller cause, this is equal to the prime piloting causal factor amongst GA Airprox. Absent from 'the top of the table' during this period of 2006, 'Penetration of CAS without clearance' reappears on one less occasion (5) than it did in 2005. Disappointingly, this is also the case on 4 occasions in 2007 where GA pilots 'Flew close to/over glider or paradrop sites'. Again, the UKAB vigorously promulgates the associated safety message.

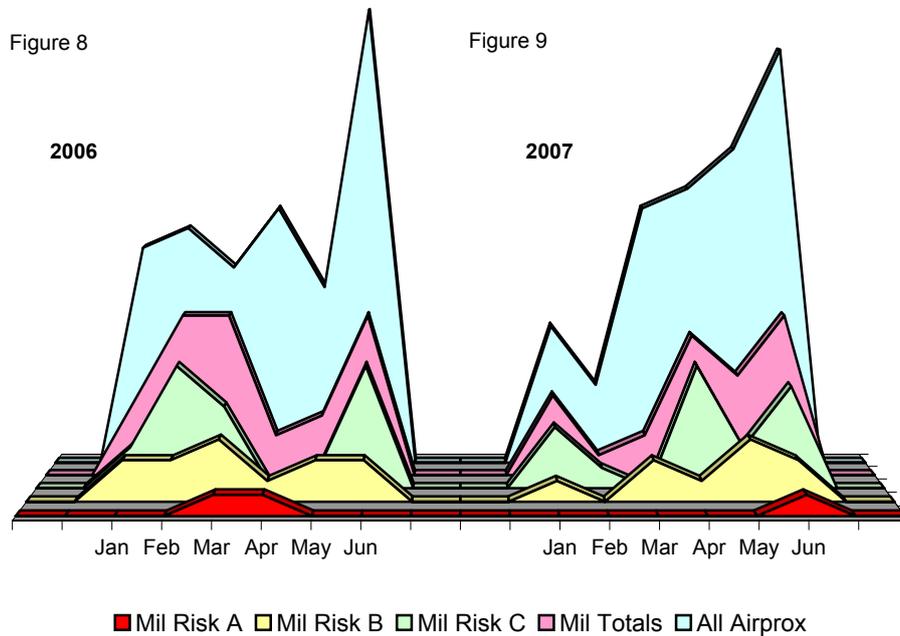
GA Section (cont.)

Ser.	Cause	Totals
1	DID NOT SEE CONFLICTING TRAFFIC	10
2	LATE SIGHTING OF CONFLICTING TRAFFIC	9
3	DID NOT SEPARATE/POOR JUDGEMENT	6
4	DID NOT PASS OR LATE PASSING OF TRAFFIC	5
5	PENETRATION OF CAS/ATZ WITHOUT CLEARANCE	5
6	FLYING CLOSE TO/OVER GLIDER OR PARADROP	4

Table 10

MILITARY SECTION

Military Involvement in Airprox: January - June in 2006 and 2007



The total numbers of Airprox shown in this set represents 33 Airprox in 2006, reducing to 27 in the same period for 2007 and reflecting a 6% reduction in military involvement during the respective year on year period. This was almost mirrored by the reduction in the number of **risk bearing** Airprox with a proportionate increase in 'No Risk' Category C events, up from 58% to 63%. The trend in the proportion of risk bearing events has reversed from the previous period in 2006 - where an increase to 42% was evident - into a 5% decrease to 37% in 2007 year on year. A downturn is also shown in the proportion of Risk A occurrences lowering from 6% of all Airprox involving Mil aircraft down to 4% for this half-year of 2007. This small number belies the halving of Mil aircraft involvement down to one Risk A Airprox for this latest period – Airprox 082/07, which was however, a very serious incident. Perhaps more significant statistically is the marked reduction of Risk B Airprox involving Mil aircraft, down 3 from 12 to 9 in this period of 2007.

2006	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	1	1	0	0	2
Risk B	2	2	3	1	2	2	12
Risk C	2	6	4	0	1	6	19
Risk D	0	0	0	0	0	0	0
Totals	4	8	8	2	3	8	33

Table 11

2007	Jan	Feb	Mar	Apr	May	Jun	Totals
Risk A	0	0	0	0	0	1	1
Risk B	1	0	2	1	3	2	9
Risk C	3	1	0	6	2	5	17
Risk D	0	0	0	0	0	0	0
Totals	4	1	2	7	5	8	27

Table 12

Following on from 2006, sighting issues continue to dominate the list of the 5 main **causal factors** in 'military' Airprox shown in Table 13 out of an overall total of 59 individual factors. Pilots should note that late or non-sighting of traffic was listed 11 times, representing 47% of the 5 main causal factors of Airprox listed in this set. Demonstrably significant also within the highest Mil aircraft Causal factors is that on 6 occasions 'Did not pass or late passing of traffic information' was cited as a 'controller' cause. This was balanced exactly by the remaining 2 main piloting factors, Inadequate avoiding action/flew too close, coupled with Non compliance with ATC instructions or advice that figured in 6 assessments. What is not immediately apparent from these figures is that 27% of the causal factors associated with 'military' Airprox were controller related. Indeed, Airprox 082/07 is a salutary example, worthy of review by pilots and controllers alike.

Ser.	Cause	Totals
1	DID NOT PASS OR LATE PASSING OF TRAFFIC INFO	6
2	LATE SIGHTING OF CONFLICTING TRAFFIC	6
3	DID NOT SEE CONFLICTING TRAFFIC	5
4	INADEQUATE AVOIDING ACTION / FLEW TOO CLOSE	3
5	NOT OBEYING ORDERS/ FOLLOWING ADVICE/ FROM ATC	3

Table 13

UKAB SAFETY RECOMMENDATIONS

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

186/05-02 06 Oct 05 involving a Duo Discus T Glider and a Tornado F3

Risk A

RECOMMENDATION: The CAA should continue to promote and with renewed urgency the production of a 'lightweight' transponder and, when available, consider mandating its carriage and use in gliders.

ACTION: The CAA accepts this Recommendation. The CAA proposes, "to amend the Air Navigation Order 2005 for the purpose of improving the technical interoperability of all aircraft in UK airspace" with the aim of introducing new regulatory requirements in March 2008. The Regulatory Impact Assessment, which received Cabinet Office approval for publication on 3 June 2006, will consult on the need to increase the carriage and operation of transponders to improve secondary radar conspicuity and to enhance ACAS and CWS capability. The CAA is promoting the development of a low powered SSR transponder to meet the needs of light-motorised and non-motorised aircraft.

UPDATE DEC 2006: The CAA is continuing to work towards development of a Low Powered Secondary Surveillance Radar Transponder (LPST), as covered in the published Regulatory Impact Assessment. A draft requirements document has been circulated to Industry and user groups and there are currently several companies in the UK that are in the process of developing a product.

UPDATE JUN 2007: A draft European Concept of Operations is being prepared by the CAA for submission into Eurocontrol and a European Civil Aviation Equipment Working Group (EUROCAE) meeting has been arranged for 29 June 2007 to discuss the associated technical issues.

UPDATE AT DEC 2007: The draft Concept of Operations was completed and submitted to Eurocontrol who have classified the document as Guidance material. The EUROCAE meeting in Jun 2007 was very constructive and resulted in a proposal for a review of Minimum Operational Performance Standards (MOPS) for LPST to be assigned to EUROCAE WG49. Confirmation that this task will be accepted is still awaited but European support for this is uncertain. Work on LPST development by several UK companies continues, but firm commitments will depend on the next stage of CAA-initiated consultation on proposed regulatory changes to transponder carriage and operation. This consultation is planned for Jan 2008. The CAA continues to work with Government departments to identify potential means of mitigating costs and encouraging development of a LPST.

STATUS – ACCEPTED - OPEN

136/06 22 Aug 06 involving a PA38 and a C172

Risk C

RECOMMENDATION: The CAA should review the procedures applicable to flight in the Manchester Special Low Level Route in the light of this Airprox.

ACTION: The CAA accepts this Recommendation. The CAA will undertake a review of the airspace and associated procedures applicable to the Manchester Special Low Level Route. It is

anticipated that the review will be complete by the end of July 2007, which will be followed by the implementation of any recommended changes.

UPDATE AT JUN 2007: Work continues with a target completion date of end of July 2007.

UPDATE AT DEC 2007: Changes to the Manchester Special Low Level Route procedures have been incorporated into an airspace change proposal (ACP) currently being developed by NATS/Manchester ATC that includes changes to the Manchester CTR. However, as an interim measure, NATS Manchester have agreed to review and revise Low Level Route related Visual Reference Points (VRPs) in advance of the ACP. The purpose of the revised VRPs is to enhance visual referencing in relation to the adjacent portions of the Manchester and Liverpool CTRs. In addition, Manchester ATC have been tasked to ensure that Liverpool ATC is fully aware of LL Route procedures from an ATC perspective in order to ensure common and consistent service provision in the area.

STATUS – ACCEPTED – CLOSED

081/07 06 Jul 07 involving an Ask 13 and a Slingsby T67M

Risk B

RECOMMENDATION: The CAA should review the depiction of glider launch sites on VFR charts with a view to making them more conspicuous.

UPDATE AT DEC 2007: The CAA's Directorate of Airspace Policy has reviewed the symbology on CAA VFR charts for the depiction of glider sites and agrees that at the location in question, around the Bicester area, the glider symbol is hard to detect in the busy airspace. In an effort to improve the depiction, not only at this location but nationally, a decision has been taken to increase the line weight on all gliding circles - both at primary locations and also where gliding is a secondary activity. As this is such a minor change - and is being carried out to enhance aviation safety - there is not considered to be a requirement for further consultation. Consequently, Ordnance Survey will make these amendments to the specification and have confirmed that they will be included for the first chart of the 2008 flying season - the 1:250,000 Sheet 8 England South.

STATUS – ACCEPTED – CLOSED

082/07 26 Jun 07 involving a Tornado F3 and a Dominie

Risk A

RECOMMENDATION: The MoD should direct a review of the ATC procedures for the entry/exit into/from Radar Corridors.

ACTION: The MoD partially accepts this Recommendation. It was concluded that there is no systemic problem with Radar Corridor (RC) operations. However, some areas were identified where administrative processes could be improved.

Following a very close review of the incident on 26 Jun 07, the MoD was entirely satisfied that the RC was simply a catalyst for a series of poor judgments by the controller concerned rather than the root cause of the Airprox. The Unit took immediate action following this Airprox: a valuable lesson was learnt by the controller and the wider lessons have been well-publicised within the Unit through the 'standards bulletin'.

STATUS – ACCEPTED - CLOSED

List of Abbreviations

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

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

AIRPROX REPORT No 001/07

AIRPROX REPORT NO 001/07

Date/Time: 5 Jan 1033

Position: 5047N 00330W (4nm NW Exeter - elev 256ft)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: Dash8 C130K

Operator: CAT HQ STC

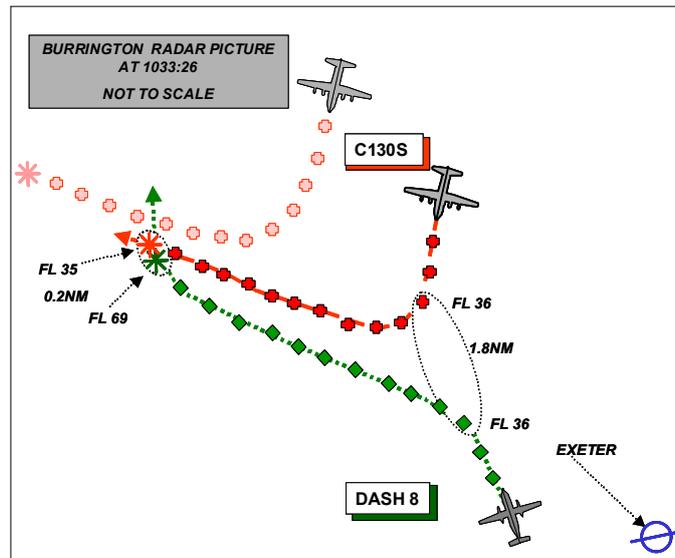
Alt/FL: 2500ft↑ 3400ft
(1013mb) (RPS 1014mb)

Weather IMC NR IMC NR

Visibility: Nil NR

Reported Separation:
500ft V/ ½nm H NR

Recorded Separation:
3400ft V/0.2nm H
(0ft V /1.8nm H)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DASH 8 PILOT reports flying a scheduled flight from Exeter, cleared by them to FL70 inbound EXMOR. After take-off from RW26 they were in IMC and still with Tower. Turning right through 320° at 190kt they were instructed to take up a radar heading of 290°. They started to reverse the turn (to the left) and were instructed to change frequency to Exeter Radar. Radar then advised them of 2 pop-up radar contacts and a contact was seen on TCAS. A TCAS RA of "maintain vertical speed" followed and lasted for at least 5sec; the TCAS event then terminated and the flight was continued normally (the autopilot remained engaged throughout the event). They remained IMC at all times and only observed one TCAS contact passing within ½nm of them. The other ac involved were believed to be two C130's. He assessed the risk as being medium.

THE C130 PILOT reports that he was leading a 2-ship tactical formation progressing in a S'ly direction at 210kt to the NW of Exeter having climbed out of low level due to poor weather. His No2 was 500ft above and slightly behind and right to maintain separation. He had attempted to get clearance for a climb to FL45 and FL50 respectively (clear of the base of Airway N864) from Swanwick Mil but he was told to maintain height at 3400ft and 3900ft on the RPS. Swanwick had asked him to turn the formation to the W in order to clear from under N864 for a climb but he elected to maintain his planned track in order to maintain formation integrity as station-keeping equipment was not fitted and the No2 had to maintain visual contact with him. He had accepted MARSAs on each other as the formation approached NW of Exeter. The leader observed a TCAS contact climbing out of Exeter towards his level and conscious of his No2 above and behind him he began a right turn in order to diverge from the contact. While in the turn he received a brief "maintain vertical speed" indication for approximately 2sec after which he regained his planned track and they were then handed over to Exeter for a radar service. He assessed the risk as being low.

EXETER APR comments that two contacts, later found to be C130's, were seen on radar passing about 10nm NNW of Exeter heading E to W when the ADC requested a departure clearance for a Dash 8. The Dash 8 planned track would pass behind the transiting ac on their observed headings and he estimated that standard separation would be maintained so he released the Dash 8 on an airways clearance to EXMOR at FL70.

Over one minute passed and the Dash 8 then departed RW26 but very soon after, the two contacts then transiting NW of the airfield and indicating FL35 & 40 turned unexpectedly onto a S track towards the departing ac. At that point he called the ADC and asked them to instruct the Dash 8 to continue 'straight ahead' but at that point he was advised it was too late. His next reaction was to try and stop the Dash 8 turn onto heading 290° 'due traffic'. The ADC passed this to the ac and transferred the Dash 8 to APR without delay.

The Dash 8 then called him in the left turn to 290° (he was unaware the ac had already passed through this heading and had to turn back). At that point the two contacts were in the Dash 8's 12 o'clock and at close range so he gave its pilot essential TI and an 'Avoiding Action' right turn onto heading 080°. The pilot did not take the turn but stated that he had the traffic on TCAS and was above it. He then advised that the highest of the contacts was indicating 400ft below, to which the pilot replied that he was 'well above'. The two military contacts then also turned NW and tried to call APR but they were broken and unreadable; he also tried to call the C130's several times and the Dash 8 also called and advised that APR had been trying to contact them. The C130 formation then called again and advised they were en-route to the W and would call on their way back. The Dash 8 was given 'own navigation' EXMOR and joined airways working Cardiff.

MIL ACC reports that the LJAO SW (SW) controller was controlling a formation of two C130K's under a RIS. The formation leader called SW at 1026:24 and after SW's initial response passed their details as, "Good morning, err, C130 Formation C/S, 2 C130s, err, just popped up from low level. Err, Tiverton, err, altitude is 3500 and 4000 feet on the regional 1014. Request Radar Information if you are able to see us." SW replied, "C130 Formation C/S, roger request your destination?" and the leader responded, "We're routing along the err south-west of err Devon, err, final destination Lyneham after err dropping in Salisbury Plain." SW requested type of service required and C130 Formation Lead answered, "Err, it will be Radar Information, err, shortly we'll err, number 2 will be climbing up to 5000 feet to see if he can get clear of the cloud, C130 Formation C/S." At 1028:01 SW applied the service, "C130 Formation C/S identified, Radar Information, beneath sector safety height. You are responsible for terrain clearance. If you maintain 4000 feet at the moment, just to keep you err underneath, err, an airway and I'll get you further climb in approximately 5 track nm." The leader acknowledged and then 50sec later stated, "Err Swanwick Mil from C130 Formation C/S, err, apologies, Radar Information is copied and we are now coming left onto 190." SW acknowledged this and subsequently asked the leader if he would accept MARSAs, which they did. At 1029:54 SW stated, "C130 Formation C/S, you're operating quite close to the, err, Exeter Zone. If you could take a turn onto West, err, the Western Area, I'll err, try and get you a climb further there" and leader replied, "Err, C130 Formation C/S will remain clear of Exeter Zone, we're not planning to go into the Zone." SW then stated, "That's understood, I can't really control you down at 5000 feet in that region, erm, obviously there are going to be Exeter climb-outs coming that way. Would you like to free-call Exeter or I'll try and get you clearer airspace further to the West?" Leader then responded "We'll free-call Exeter thanks for your help today, C130 Formation C/S." SW asked if they had the correct frequency; they stated that they did and the leader called them to leave the frequency at 1030:49. At 1031:43, one of the C130 Formation called, "Black check." SW asked, "C130 Formation C/S, Swanwick Mil, are you on this?". There was no response but SW transmits, "C130 Formation C/S, Swanwick transmitting blind. There is traffic north of you by 3 nm, tracking south, climbing out of Exeter, indicating 200 feet above" but there was no response.

UKAB Note (1): The traffic was actually S by 3nm tracking N not as reported.

Analysis of the Burrington Radar at 1029:31 showed the C130 formation 12nm N of Exeter tracking 260° with No1 indicating FL035 and No2 FL040. At 1029:17 the formation began a left turn and by 1029:57 they were tracking S and No1 began a slow climb. At 1030:15 the ac were 11nm NNW of Exeter and No1 continued to climb until it indicated FL040 when they were 9nm NNW of Exeter. The formation was 8nm NNW of Exeter at 1030:49 with both ac indicating FL040C. The Dash 8 showed on the radar for the first time, 4sec later.

At the time of the Airprox neither the C130's nor the Dash 8 were under the control of Mil ATC. The SW controller had provided a satisfactory RIS, suggesting a turn towards the W for better airspace and had done his best to help. Operating near the base of radar coverage with no conflicting traffic showing on radar, a free-call to Exeter was a sensible action, as that would have enabled more effective de-confliction. Instructing the ac to change to an appropriate squawk when free-calling would have more clearly indicated the status of the ac to Exeter ATC but this was not a factor in the Airprox.

ATSI reports that this Airprox occurred some 8nm NW of Exeter between a Dash 8 routeing from Exeter to Newcastle and a pair of C130's operating in the FIR.

The comprehensive and frank Unit Investigation reports "the APR released the Dash 8 on track to EXMOR climbing to FL070. This would have taken the ac behind two unknown contacts to the NW by 10nm that were squawking 3350/3351 (London Military) and indicating FL35/40. These ac had been on a steady W'ly heading since they appeared on the radar screen. Whilst APR was vectoring another inbound Dash 8 onto the RW26 ILS the two Lon Mil ac unexpectedly turned S towards the RW26 climb-out. When the airborne time of the Dash 8 was

AIRPROX REPORT No 001/07

passed to APR and he turned his attention to it for identification, he noticed the confliction and tried to get the ADC to get the Dash 8 to climb straight ahead. The ADC informed him that it was too late as the ac had already started to turn. In an attempt to stop the Dash 8 turning any further towards the conflicting ac he asked the ADC to stop its turn heading 290° and to pass it over to him as soon as possible. The ADC issued a radar heading to the Dash 8 and instructed him to call Exeter Radar. There was a short delay between leaving the Tower frequency and its call on the radar frequency by which time it was apparent that the heading of 290° was taking the Dash 8 directly towards the conflicting ac. This was partly due to the fact that the Dash 8 had already passed through 290° when it was given the radar heading and had to reverse the turn and also - because the instructions were not issued as avoiding action - the ac was being flown on autopilot. These factors added together placed the ac further N than the APR expected it to be.

As soon as the Dash 8 was on his frequency, APR issued it with an avoiding action turn onto 080° but the Dash 8 was already responding to a TCAS instruction and either ignored or did not hear the avoiding action. The Dash 8 was soon above the conflicting ac and was thereafter told to resume own navigation to EXMOR.

After the incident the conflicting 2 x C130's turned back to the NW and made an attempt to contact Exeter Radar before going enroute.

The ADC was working with the ATM set at a 10nm range and would have had little warning of the presence of the unknown ac. He responded immediately to the APR's instructions and could have done little else".

Due to concentrating on an inbound ac that was released late and was high, APR was late in noticing the confliction. He immediately tried to resolve the situation but, partly due to the factors mentioned above, was unable to do so. He has since stated that with the benefit of hindsight his choice of heading (290°) did not resolve the situation as he would have wished and he should have passed more vigorous avoiding action.

ATSI comments that at 1031 when the ADC instructed the Dash 8 to make his heading 290°, the closest of the C130's was 7nm NNW of Exeter on a S track and 7nm NNW of the Dash 8. The C130's were indicating FL039 and FL040 and the Dash 8 FL009. Thirty sec later when the Dash 8 pilot contacted APR, the ac was in a right turn with the closest of the C130's 4.9nm NNW of it, the C130's still indicating FL039 and FL040 and the Dash 8 FL022. The Dash 8 can be seen to be reversing the turn onto the 290° radar heading passed by the ADC. APR was unaware at this stage that the Dash 8 had already passed through 320° before reversing the turn. At that point the closest C130 was NNW of the Dash 8 by 2.6nm indicating FL036 and the Dash 8 was indicating FL034.

At 1032, as the Dash 8 stopped transmitting, APR, using the phrase 'Avoiding Action', instructed the Dash 8 to turn right onto a heading of 080°. The closest C130 was then 1.8nm NW of the Dash 8 with the indicated FLs being 036 and 037 as the Dash 8 began to climb above it. It can be seen that the Dash 8 did not make the right turn but continued round towards 290°. At 1032:13 the closest C130 can be seen to be turning right towards a W'ly track. At that point the C130, indicating FL035, was 1nm NW of the Dash 8 which indicates FL044. Twenty-seven sec later the closest C130, indicating FL037, was 0.8nm NW of the Dash 8 which indicated FL055. At 1033:19 the closest C130, indicating FL035, was 0.5nm NW of the Dash 8 which indicated FL069, the C130s tracking WNW and the Dash 8 290° on parallel tracks.

The CPA occurs at 1033:26 when the closest C130, indicating FL035, is 0.2nm NW of the Dash 8 that indicated FL069. At that point the Dash8 was turning right for Exmoor and 1033:33 it was 0.3nm NE of the closest C130 with the tracks diverging.

After the initial avoiding action turn onto 080° given by APR but not followed by the Dash 8 pilot, APR did not offer any further avoidance or TI. It is believed that this was because the Dash 8 had stated he was above the C130's and had them on TCAS. If, at 1032, the Dash 8 had again reversed the turn when instructed by APR to turn onto 080°, it is questionable, given relative positions, turn radii and speeds, whether at this stage the Airprox would have been avoided.

The Exeter report concluded: *"This was a conflict in Class G airspace caused by the unexpected turn made by the two C130's towards the RW26 climb-out. Because of the close proximity of the military ac to the climb-out, standard separation was going to be very difficult to achieve. However, the situation could have been improved by more appropriate avoiding action by Exeter Radar".*

HQ STC comments that having had to climb out of Low Level, the lead C130 crew were working hard to keep the formation together and to obtain a radar service. It is unfortunate that this all occurred close to the Exeter Zone and that the formation's attempt to contact Exeter was frustrated.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members observed that from the time the C130s turned to the S in their attempt to remain VMC (1029:30) it was inevitable that they would be a problem to the departing Dash 8. At that time the Dash 8 had already received its clearance; had taxied and was just being cleared for take-off, rolling a few seconds later. The ADC gave the Dash 8 crew their first avoidance heading of 290° just after 1031, about 1min after the ac rolled. Members thought that the ADC had acted as quickly as possible after RAD had asked him to stop the ac's turn. In addition the C130s had tracked S for less than 1min before RAD requested the ADC to pass avoiding action to the Dash 8. Bearing in mind that RAD was busy, also handling another ac on a high and late arrival, controller Members did not consider that in such circumstances the delay was excessive or even lengthy. In addition, the timings were such that delaying the takeoff of the Dash 8 had not been a viable option. Having taken off into conflict, it was inevitable the desired separation was not going to be achieved and the Board turned its attention to the RAD's actions after the Dash 8 had become airborne. Although in the end a vertical solution was achieved, passing instructions to the Dash 8 to attain 3000ft separation was never going to be possible particularly bearing in mind that RAD did not know what the C130s were intending to do: indeed, it was thought most likely that the C130 leader also had no clear plan at that precise moment other than to remain outside the Exeter ATZ. Members then considered the horizontal options available to RAD. Perhaps if the Dash 8 had been instructed to continue the right turn (not yet evident on radar) a greater separation would have resulted but it would still be a long way short of the 5nm required; a left turn onto any other heading would have the same effect.

The Board therefore concluded that in the precise circumstances of this event Exeter ATC could not have achieved the 5nm or 3000ft desired separation required when providing a RAS. Furthermore, Members noted that the C130 crews had acted correctly in the circumstances, Swanwick Mil doing as much as they could to assist them. Fortunately both ac were TACS equipped and squawking and were therefore visible to the respective pilots on their TCAS displays. Both ac received only a momentary passive (maintain) RA and the pilots both continued their respective flightpaths thereby removing any collision risk.

The Board concluded that in the circumstances reported here, this incident had been a conflict in the FIR and that, although there had been an erosion of the desired separation, there had been no risk attached.

PART C: ASSESSMENT OF CAUSE AND RISK

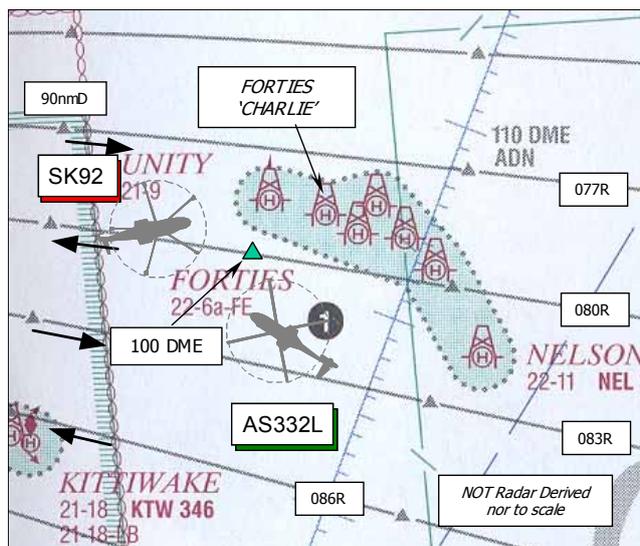
Cause: Conflict in Class G airspace resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT No 002/07

AIRPROX REPORT NO 002/07

Date/Time: 3 Jan 0759 NIGHT
Position: ~5740N 00050E (~103nm E by N of Aberdeen)
Airspace: Scottish FIR (Class: G)
Reporting Ac **Reported Ac**
Type: AS332L Sikorsky SK92
Operator: CAT CAT
Alt/FL: 2000ft 2000ft↓
Weather IMC NR IMC NR
Visibility: NR Zero
Reported Separation:
NR Nil V/4m H
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AS332L HELICOPTER PILOT reports that he was inbound to Aberdeen from the Nelson oil platform IFR and had just established a level cruise in IMC at an altitude of 2000ft Aberdeen QNH (1005mb) whilst in receipt of an [Enhanced] FIS from Aberdeen ATC on 135.175MHz. A squawk of A0040 was selected with Mode C: neither TCAS nor Mode S are fitted. Flying at 125kt, heading 280°(M) to join the 080 HMR at 100nm from Aberdeen, at a range of 106nm ATC advised them of opposite direction traffic [the SK92, the C/S of which was specified] descending through their altitude eastbound for the Forties Field. They reported to ATC at a range of 100nm, whereupon they requested the position of the SK92 and were informed by Aberdeen that it was at about 96nm. However, no altitude information was passed so he requested the other helicopter's altitude passing. After some delay the SK92 crew called passing 2000ft at 3 "something" miles from his helicopter. Given the weather conditions – in IMC - and the "unreliable separation achieved by small angles of radial separation", in his view this was unnecessarily close with a high degree of uncertainty that separation would not be achieved. Assessing the risk as "medium", the other helicopter was not sighted at all and no avoiding action was taken as they did not know the position of the SK92. He advised ATC of his concerns and also reported these to his company upon his return, querying whether the SK92 crew had his AS332L displayed to them on their TCAS. He added that from the Nelson platform it would be more sensible to return on HMR 086.

THE SIKORSKY SK92 PILOT reports he was outbound to the Forties IFR whilst in receipt of an [Enhanced] FIS from Aberdeen INFORMATION on 135.175MHz. SSR was selected on with Mode C; TCAS I and Mode S are fitted. Flying at 140kt descending through 2000ft Aberdeen QNH en-route to Forties 'C', at about 078° ADN 90nm they turned onto about 060° to self-position for an airborne radar [internal aids] approach with a wind direction of approximately 230° on the surface. Opposite direction traffic – he assumes it was the AS332L - was displayed on TCAS from about 15nm, level at 2000ft, which passed about 4nm away at the CPA; no avoiding action was deemed necessary. He stressed that he was under a FIS in Class G airspace, there was no conflict and he assessed the risk as "nil".

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

UKAB Note (2): The U.S. Naval Observatory Astronomical tables give Sunrise on this day as 0839UTC: thus 'Night' prevailed.

ATSI reports that the crew of the AS332L filed an Airprox on the perceived lack of separation against another helicopter while receiving an Enhanced Flight Information Service (EFIS) provided by Aberdeen ATC in accordance with the latter's SOPs. This Airprox involved the AS332L and an SK92 some 103nm ENE of Aberdeen.

The ATSU concerned conducted a very comprehensive investigation and provided the following report:

At 0748, the AS332L crew called Aberdeen INFORMATION – REBROS - from the deck of the Nelson platform requesting a climb to 2000ft QNH to return to Aberdeen on the 080 HMR. REBROS replied that there was no known traffic to affect this. At this time the SK92 was at a range of 71nm from Aberdeen on the 081 radial, maintaining 3000ft. The crew were still on the Aberdeen RADAR frequency which is cross-coupled with the REBROS frequency and being worked by the same controller.

At 0752:38, the SK92 crew made their first call on the REBROS frequency, at 80nm. REBROS informed them that the service was now a FIS and passed traffic information on the AS332L climbing out from the Nelson platform, because it would affect the SK92 when they were ready for descent. The SK92 crew did not acknowledge this transmission.

At 0753:09, before REBROS could repeat the traffic information passed to the SK92, the AS332L crew reported level at 2000ft QNH at 108nm, crossing the 083R to join the 080 HMR.

At 0753:29, the SK92 crew called again. REBROS repeated the traffic information on the AS332L which the crew copied and reported ready for descent. REBROS told the SK92 crew that the AS332L was the only known traffic to affect their descent and asked them to report passing 1500ft.

At 0754:40, REBROS passed traffic information to the AS332L crew about the SK92 which was "*copied*" by the AS332L crew. At this time the SK92 faded from radar coverage passing 2600ft QNH descending, at a range of 91.5nm on the 079R.

At 0758:22, the AS332L crew reported at 100nm crossing the 082R for the 080 HMR. They requested an update on the position of the SK92. REBROS replied that they are "believed to be" at 95nm on the 079R. The AS332L crew queried if the SK92 had descended through 2000ft yet. The REBROS controller called the SK92 whose crew confirmed they were now passing 2000ft, at 95nm. The AS332L crew queried the position of the SK92, asking if they were at 80nm. REBROS replied negative, the SK92 was through 95nm.

[UKAB Note (2): Just after this the transcript reflects a broadcast transmission from the SK92 crew "...we're just passing abeam you at...3 point 5 miles", to which no reply was given.]

At 0759:58 the reporting AS332L pilot called REBROS and stated that he was "not particularly happy with the separation" that they had had against the SK92. REBROS explained that the SK92 crew had been passed the traffic information and had elected to descend. The AS332L pilot said "but he was descending through our level with a separation of 3 miles in IMC". The REBROS controller again attempted to explain the situation but was quite busy and did not pursue it.

The ATS given to helicopter crews in the REBROS Sector is an Enhanced Flight Information Service which is clearly defined in the Memorandum of Understanding to which both operating companies involved in this Airprox are signatories. Under this service, pilots are passed traffic information on other helicopters according to a defined set of parameters, depending on relative tracks and reported positions. Other than that, it is a standard FIS. In this instance, the SK92 crew had been given traffic information on the AS332L when the former crew said they were ready for descent, and the AS332L crew was then given traffic information on the descending SK92. Both transmissions by the REBROS controller were clear, precise and unambiguous. The Aberdeen Controller provided the required ATS service appropriately. No apparent ATC causal factors.

The pilot of the AS332L said he was "not particularly happy with the separation". This implies that he was expecting ATC to separate him from the other traffic, which seems to indicate a lack of understanding of the service he was receiving.

It has been agreed with one of the helicopter operators that there is an ongoing potential for conflicts of this nature between inbound to the Forties Field and outbound from the Nelson platform. The company has agreed to return on a more southerly HMR - the 086 - rather than the 080, which will keep them clear of Forties inbound on the 083 HMR.

AIRPROX REPORT No 002/07

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 controller involved and a report from the appropriate ATC authority.

It was evident that this Airprox in Class G airspace had occurred between transit IFR traffic operating at night. The challenges associated with N Sea helicopter operations were familiar to the Board and Members did not underestimate the difficulties of flying in this harsh environment outside radar coverage at over 100nm range from Aberdeen, in IMC, without the benefit of a comprehensive radar service. Here, the concise ATSI report reflected that the ATS available at this range on the HMR was limited to an 'enhanced' FIS provided by Aberdeen to alert pilots to the presence of other ac in their vicinity. It was evident that comprehensive traffic information had been conscientiously provided by the controller under this 'enhanced' FIS, advising the respective pilots about each other's ac in good time. Therefore, it was entirely the pilots' responsibility to ensure appropriate separation against other traffic on, or crossing, the HMR structure. The helicopter pilot Member intimately familiar with operating in this environment suggested that the AS332 pilot appeared to have expected more than this, for it was clear that the SK92 pilot had elected to descend through the AS332's transit altitude whilst 'self-positioning' for his own airborne radar approach to Forties 'Charlie'. However, unbeknownst perhaps to the AS332 pilot at the time, the SK92 was fitted with a basic form of ACAS – TCAS I – which because of the AS332's SSR emissions had provided the SK92 pilot with azimuth/range information on the location of the AS332 relative to his helicopter. This had enabled the SK92 pilot to ascertain that the AS332 was some 3½nm distant on the beam - according to the RT transcript and the SK92 pilot's account – at the closest point. Members understood entirely how the proximity of the SK92 might have concerned the AS332 pilot as he clearly did not have the benefit of TCAS fitted to his helicopter and would not have been able to maintain situational awareness on other traffic in the vicinity to the same degree as the other pilot. Some Members were concerned about the accuracy and interpretation of TCAS derived azimuth information used in this way. However, a helicopter pilot Member allayed these fears, explaining that the system installed in the SK92 was very accurate and would have enabled the pilot to determine that there was no conflict. The effectiveness of the various forms of ACAS was well known to the Board, especially TCAS II, and this combined with the carriage and operation of SSR Mode A & C has been one of the foremost advances in tactical air safety in recent years, especially in a non-radar, procedural, traffic scenario. Indeed, it was the outcome of a previous Airprox investigation into Airprox 23/2005 that resulted in a UKAB Safety Recommendation: "The AS332L operator should proceed with its plans to fit a CWS to its North Sea helicopter fleet with all speed", a Recommendation which the operator accepted. Moreover, the proposed introduction into more widespread use of Mode S potentially heralds even greater enhancement to air safety overall. As it was, the SK92 pilot was apparently well aware of the relative position of the AS332 pilot - both from the traffic information provided by ATC and that derived from his TCAS I display. Thus he was able to gauge the separation and adjudged that it was safe to descend his SK92 through the level of the AS332. The Board agreed therefore that this Airprox had resulted from a perceived conflict in IMC within the HMR structure with no risk of a collision in the circumstances conscientiously reported here.

It was also plain that the AS332 pilot was at a disadvantage without any form of TCAS to aid situational awareness; clearly its fitment would be beneficial - as previously recommended by the UKAB. Nonetheless, it was clear that the AS332 pilot's suggestion of utilising a more southerly HMR when departing inbound to Aberdeen had been examined by those involved and accepted as eminently worthwhile, thereby enhancing traffic separation on opposite direction HMRS. The helicopter Member also briefed the Board that participating helicopter pilots had been reminded of the exact extent of the ATSS provided in this inhospitable environment, following recent revisions to the 'Memorandum of Understanding' between NATs as the ATS provider and the helicopter operating companies involved.

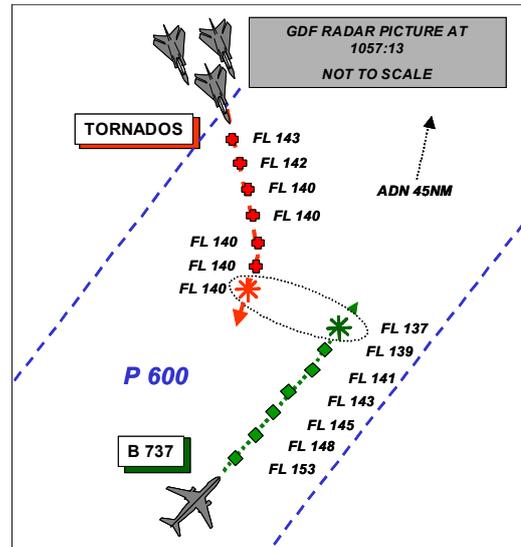
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Perceived conflict in IMC within the HMR structure.

Degree of Risk: C.

AIRPROX REPORT NO 004/07

Date/Time: 19 Jan 1057
Position: 5642N 00303W(45nm SW ADN)
Airspace: P600 (Class: A)
Reporting Ac Reported Ac
Type: B737 Tornado F3
Operator: CAT HQ STC
Alt/FL: FL130↓ FL130
Weather VMC NR VMC NR
Visibility: NR 60km
Reported Separation:
100ft V/4nm H 1000ft V/5nm H
Recorded Separation:
300ft V/3.1nm H (See Note 1)



[UKAB Note (1): The incident showed clearly on the Great Dun Fell Radar (GDF) but at the extremity of its range (135nm). The horizontal separation when measured on the (non-digital and much larger area) ScACC recording was of the order of 3.9nm; the vertical was the same as on the GDF. The horizontal separation should therefore be regarded as approximate].

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports flying a scheduled passenger flight to Aberdeen. He was descending in P600 at 2500fpm from FL250 and cleared to FL120, heading 035° at 320kt; ATC had requested them to expedite through FL130 [he thought]. Just before levelling off at FL120 a TA was displayed so they reduced the vertical speed to zero. ATC then called them, passing TI on fighter traffic in their 12 o'clock and giving instructions to turn right which at first they thought were for them but it later transpired were for the fighters. The fighters passed them in their 12 o'clock, veering off to their left indicating 100ft below and 4nm on TCAS; they did not get an RA but Scottish Control said they would be filing a report. He did not assess the risk.

THE TORNADO F3 PILOT reports leading a 3-ship formation under radar control [see Mil ACC report] from CRC Boulmer. While about 5nm N of ANGUS heading 180° at 350kt and FL130, Boulmer warned them of traffic on the airway (P600) and all 3 crews of the formation were visual with the reporting ac from over 10nm. They remained well clear of the traffic, opining therefore that no Airprox had taken place and that there had been absolutely no risk of collision at any stage

ATSI reports that a B737 was following the standard route from Amsterdam of UP58 to FINDO (5nm SW of Perth) before turning right onto P600 inbound to Aberdeen. The crew called the Tay Sector Controller (TAY), who was performing the tasks of both Planner and Tactical, at 1051:55. The ac was approximately 35nm NW of SAB and was heading 310° and descending to FL260. TAY instructed the crew to continue on the heading and, some 40sec later, to descend to FL120 and expedite through FL230. At 1053:35, as the B737 was approaching FINDO, TAY instructed the crew to turn right heading 035° towards Aberdeen. At around that point a handover of the TAY sector position took place. Shortly after 1056, Boulmer telephoned TAY and enquired whether he was working the traffic (the B737) on airway P600. The new controller advised that he was and the ac was descending in the airway to land at Aberdeen. Boulmer then said *"..OK I have got the traffic north of him by ten miles he's coming right at ten degrees to come behind him"*. At 1056:25, the new controller transmitted *"(B737 callsign) late notification there is military traffic in your ten o'clock range of seven miles flight level one four zero level in a right turn avoiding you"*. Initially the B737 crew believed that they should turn but the controller immediately responded by saying that the military traffic would be taking avoiding action and updated the TI. The crew replied by saying that they were visual. Analysis of the GDF radar recording shows that at 1056:58, the military traffic was tracking S and turning right in the 10 o'clock position of the B737 at a range of 4.4nm when the B737 was passing FL141 and the military flight at FL140. The military traffic is seen to turn right and pass 'port to port' with the B737 at a range of 3.3nm

AIRPROX REPORT No 004/07

and 100ft above the airliner's level. The next radar picture, timed at 1057:10, shows the military traffic in the 9 o'clock position of the B737 at a range of 3.1nm and 300ft above it. When the B737 crew were instructed to contact Aberdeen, they commented that the military traffic had come 'pretty close' to which TAY advised that he would be taking reporting action.

MIL ACC reports that the Boulmer Weapons Controller 4 (WC4) was providing a RIS to a Formation of 3 F3s recovering from air combat training to Leuchars. The No3 was in the process of re-joining the formation while a B737, under the control of ScACC Tay sector (TAY), was routeing towards Aberdeen on P600. On calling for recovery at 1053:00 F3 leader, when requested by WC4, passed his requirements as "[F3 Formation C/S], looking for direct track Leuchars, Radar Information Service, radar to visual". WC4 requested "[F3 Formation], state the level you are descending to?" to which he replied "[F3 Formation] is level FL175" which WC4 acknowledged. Thirty sec later WC4 instructed "[F3 Formation], Boulmer, right 230 for airway" and the leader reported steady 5sec later. WC4 then instructed the No2 to squawk standby which was also acknowledged. At 1054:35 leader stated "Boulmer, F3 Formation's on min fuel recovery request direct track" and WC4 responded "Standby". WC4 then discussed a plan with the Fighter Allocator (FA) to cross P600 on a S'y heading under Radar Control and then hand the ac to Leuchars when clear of CAS. At 1055:02 WC4 instructed "[F3 Formation C/S], Boulmer, descend FL140". The leader read back the clearance and then at 1055:17 WC4 stated "[F3 Formation C/S], Boulmer, Radar Control, turn left 140 initially" and leader replied: "Left 140 in the descent 140". WC4 then said "[F3 Formation C/S] negative, rollout FL, rollout 170" to which leader replied "Say again, broken unreadable" and WC4 restated "F3 Formation rollout 170, airways traffic south 20, tracking north east, indicating a descent through FL170". The F3 leader replied "Copied, rolling out 170, descending FL140." WC4 called TAY on the landline at 1056:01, the controller replied "Scottish Tay Sector", WC4 then said, "Hello there. It's Boulmer Controller 4. Do you have the 6265 on P600?". At that time, F3 No3 called, "Tally traffic right 1 o'clock 5 miles". TAY stated "Er, 6265, yes I have" to which WC4 said "Okay" and TAY continued "It's in the airway, descending FL120 to land at Aberdeen". WC4 then stated "120, OK, I've got the traffic North of him by 10 miles, coming right 10 degrees to come behind him" and TAY replied, "He's going right, okay dokey". WC4 then stated, "Ok, thank you" and TAY responded, "Cheers". Two sec later, at 1056:24, WC4 instructed, "F3 Formation, right 180 to come behind traffic, BRA 175, 9, tracking North East indicating FL150". F3 Leader read back, "Right South, now level 140 and tally that traffic, F3 Formation Lead" then at 1056:48 WC4 instructed "F3 Formation right, 1 disregard. F3 Formation right 220" and leader replied, "220, F3 Formation C/S". The FA called WC4 at 1057:02 and WC4 replied, "Controller's on" to which the FA stated "You wanna, might have come a bit further than that. I think they are taking the turn, you are alright.." WC4 made a non-committal reply and the FA continued "You should have put the, they didn't take your 170 initially, that was the problem". At 1057:11 F3 No3 reported, "Boulmer, F3 No3 C/S, is holding hands with 1 and 2" which indicated that the ac were in close formation. F3 leader stated at 1057:21, "Boulmer, [F3 Formation C/S] is now well clear of that traffic, good visual with him. Request, er" and WC4 acknowledged and the leader continued, "When able.". At 1057:21 WC4 stated "[F3 Formation C/S] right, left, disregard. [F3 Formation C/S] left 160 for Leuchars. Hand you over shortly" and leader acknowledged.

[Note: a radar analysis was provided but was essentially the same as that provided by ATSI above].

WC4 was initially providing a RIS but this was upgraded to RC 2min before the CPA. The statement by F3 Formation Leader that they were, "on a min fuel recovery" would have enhanced the controller's perception of the need for an expeditious recovery. WC4's plan, as discussed with the FA, was to take the F3's S through the airway: however, her initial actions were to instruct a heading of 140o. Although this was only implemented for 10sec, it acted to reduce the separation with the B737. The subsequent turn onto 170o resulted in a track of 160o which was not sufficient to provide standard separation within Class A airspace. Although WC4 stated in her report, "I rang Tay to inform them I was crossing the airway and to find information on the 6265. The 6265 descended through FL160 and so I did not attempt to coordinate, I ended the landline call and turned my aircraft right onto a heading of 220." The text of the transcript contradicts this and it would be reasonable for TAY to believe WC4 would provide horizontal separation. Furthermore, at this stage vertical separation still existed but she did not attempt to resolve the conflict vertically. At the time of turning the F3s onto 180o, there was less than 12nm between the ac. When WC4 instructed a turn onto 220o the separation was down to about 6nm. Throughout the sequence of events WC4 did not use the phrase "Avoiding Action!"; the use of this phrase would have more effectively communicated the urgency required to the F3 leader. This lack of urgency is illustrated by the 2 line report submitted by the F3 crew that states, "All 3 members of F3 Formation C/S visual with reporting aircraft outside 10nm. Absolutely no risk of collision at any stage." The turn given by WC4 direct to Leuchars after the ac had crossed was also passed before standard separation has been regained. Throughout the incident WC4's R/T was non-standard, turn instructions typically being incomplete, leaving room for ambiguity and potentially

delaying the implementation of planned turns. WC4's incompletely applied plan and her failure to take sufficiently positive action were major factors in this Airprox.

HQ STC comments that although the F3 formation remained well clear, visually, of the airways traffic, it was not vectored robustly enough by WC4 to ensure standard separation was maintained.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Specialist Members observed that WC4's approach to taking the formation of Tornados through the CAS had been less formal and meticulous than they would have preferred. Further, they observed that she seemed to have been slow to make the important transition from Fighter Controller to Air Traffic Controller when putting the Tornados under Radar Control to take them through the Airway. While noting that the Tornados had requested a minimum fuel recovery, the controller apparently did not consider holding them above the B737 at a level high enough to ensure standard vertical separation; this would have had the additional benefit of conserving fuel. Members found this so surprising that one suggested that she might have confused the height instructions with headings (140 and 170). The Member also observed that to resolve a conflict at a late stage (inside 20 nm in this case) requires large heading changes if a horizontal solution is used to ensure (standard) separation. Given the many interesting Human Factor (HF) issues in this occurrence, it was suggested that a full 'Human Factors Open Report' on this incident might have revealed much more of the Controller's train of thought leading up to the loss of separation.

On questioning, the Mil ACC Advisor and STC Member outlined the HF training given to RAF Controllers, Aircrew and their supervisors; a civilian controller Member (a senior supervisor) observed that this seemed less comprehensive than that given to their opposite numbers in NATS. The Army Aviation Member described the HF training given to their aviators, their programme seeming to Members to be very thorough.

Members considered that although, clearly, standard separation had not been achieved, there had not been any erosion of the safety of either ac since the B737 had not received a TCAS RA and neither pilot assessed that there had been any risk. One civilian Controller Member suggested that an ATC loss of separation report might have been a more appropriate way to investigate this occurrence.

PART C: ASSESSMENT OF CAUSE AND RISK

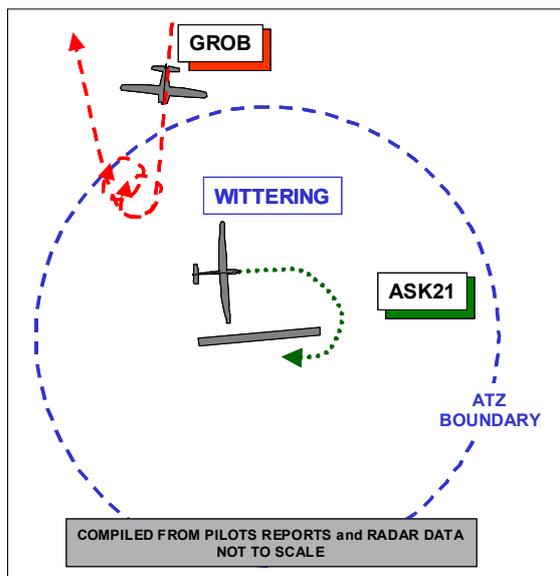
Cause: Boulmer WC4 did not ensure that standard separation was maintained between the Tornado formation and the B737.

Degree of Risk: C.

AIRPROX REPORT No 005/07

AIRPROX REPORT NO 005/07

Date/Time: 21 Jan 1225 (Sunday)
Position: 5237N 00029W (Wittering Airfield - elev 273ft)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: ASK21 Grob Tutor 115E
Operator: Civ Club HQ PTC
Alt/FL: 1100ft FL35
(QFE 999mb)
Weather VMC NR VMC NR
Visibility: >50km 20km
Reported Separation:
500ft V/200m H NR
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK21 PILOT reports that glider winch launching was taking place at RAF Wittering within the ATZ up to 2,700ft [See UKAB Note (1)]. They had launched to 2,500ft on an instructional sortie, with a second instructor in the rear seat, and were positioning at the upwind end of a right hand circuit onto the grass to the S of RW26, at 1100ft, heading 090°, at 50kt, when he noticed a Grob Tutor directly overhead and falling off what appeared to be a stall turn into a dive which subsequently became a loop. Pilot 2 was handling the ac and he (pilot 1) immediately took control and dived away opening the airbrakes and turning inside the circuit to increase vertical and lateral separation. Pilot 2 maintained visual contact with the ac which carried out a series of aerobatic manoeuvres within the ATZ, they thought, and within the area of the gliding site which is marked as winch launching to 3,000ft agl [he thought]. Winch launching was suspended until the ac departed the area to the north.

UKAB Note (1): The Wittering ATZ is 2½nm radius up to 2000ft aal and is active H24.

UKAB Note (2): The Military En-Route Supplement at Wittering RMKS 10 states: Four Counties Gliding Club operates out of Wittering Fri Evening & between Sunrise and Sunset and Sat&Sun. Winch Aerotow and Motor Glider ops up to 3000ft [amsl] within the ATZ.

UKAB Note (3): Wittering is promulgated as a Glider Launching Site (by winch/ground tow (W) and tug aircraft/ motorglider (T) in the UKAIP (Civ) at ENR 5-5-1-6 up to 3000ft [agl] for the hours above. It is also notified in Vol 3 of the UK Mil AIP as operating up to 3000ft [agl].

THE GROB TUTOR PILOT reports that he was flying a navigational exercise at FL35 in good VMC. The airfield at RAF Wittering was a turning point so he flew to the O/H from the NE, and despite heading almost into sun, he was able to see several gliders in the area from about 4nm out. He then turned right onto a NW heading towards his next turning point, the peninsula in Rutland Water. He saw no other ac significantly close to his. Having served for many years at Wittering, he knows the area and its operations well. Further, as a long-time glider pilot, flying from a military airfield with a co-located gliding club, he also knows the areas to avoid around a winch-launching site. With forecast thermal activity that day of only 1-2kts and with a broken cloud base of 3000ft, he was happy that his planned level of FL35 would keep him clear of all launching gliders and well above the airfield ATZ.

UKAB Note (4): The Grob pilot has subsequently left the service and was not contactable for additional information.

UKAB Note (5): Analysis of the Claxby Radar shows the Grob manoeuvring about 1½ nm NW of Wittering between FL039 and 045 (the Mode C drops out on some sweeps) for 4min before departing to the NW at 1229:34 and FL40. Some primary contacts can be seen very intermittently but none close to the Grob.

UKAB Note (6): The Wittering METAR for 1250Z was:

EGXT 211250Z AUTO 27022KT 9999NDV // NCD 07/01 Q1008.

HQ PTC comments that the glider pilots did not know that the Grob pilot was aware of the gliding activity taking place at Wittering and was remaining vertically clear. The decision to fly aerobatics near to the top of an active ATZ was less than ideal and added to the concern of the glider pilots.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a radar recording and a report from the Grob operating authorities.

Members suggested that the glider pilot had been mistaken in his understanding of the protection offered to gliding activity at Wittering. The Wittering ATZ is of 2½nm radius, extends up to 2000ft aal only and, being a government aerodrome, is notified as active H24. Above 2000ft aal, no protection is offered, Members noting that the UK AIP Mil Vol 3 (UK Low Flying System) promulgates that glider launching takes place up to 3000ft agl (amsl in the UK En Route Supplement).

The Board noted that the Grob pilot reported that he was operating at FL035 which equates to 3080ft agl in the prevailing atmospheric conditions. Although the radar recording showed him to be slightly higher (intermittently) there was little doubt that he had been manoeuvring down to about 1000ft above the ATZ and about 1½ nm NNW of the RW. The glider pilot reported being at 1100ft aal at the time of the incident (having descended from 2500ft); this would indicate that the vertical separation at the time of the Airprox was close to 2000ft. Nonetheless the position selected by the Grob pilot, in the opinion of the Board, was not an ideal location to fly aerobatic manoeuvres particularly since he was aware that gliding with winch launching took place nearby.

Since the separation was significant, Members concluded that this had been a sighting report but the presence of the Grob had without doubt caused the glider pilots some concern and, although not germane to the Airprox, temporary suspension of gliding activity.

The Board noted that HQ STC had addressed the misleading entry in the UK En Route Supplement regarding gliding activity at Wittering.

PART C: ASSESSMENT OF CAUSE AND RISK

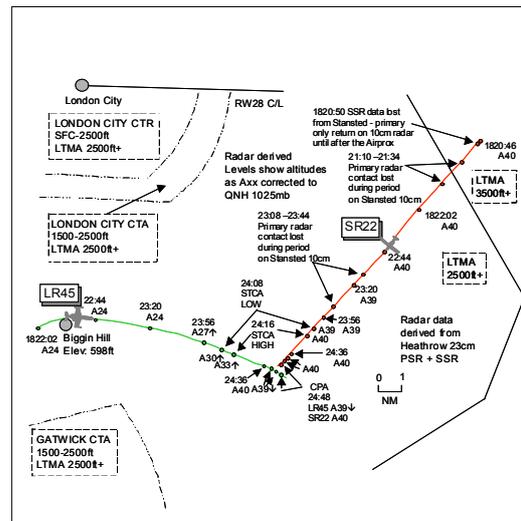
Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 006/07

AIRPROX REPORT NO 006/07

Date/Time: 26 Jan 1825 NIGHT
Position: 5118N 00017E (9nm ESE BIG)
Airspace: LTMA (Class: A)
Reporting Ac **Reported Ac**
Type: LR45 SR22
Operator: Civ Comm Civ Pte
Alt/FL: á5000ft 4000ft
(QNH 1023mb) (QNH 1025mb)
Weather IMC KLWD IMC IICL
Visibility:
Reported Separation:
'above'/down LHS 200ft V/0.4nm H
Recorded Separation:
100ft V/0.4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LR45 PILOT reports outbound from Biggin Hill IFR and in receipt of a RCS from London on 120.525MHz squawking an assigned code with Mode C. The Capt was conducting line training of a relatively inexperienced pilot. Previously whilst working Thames Radar at 3000ft, he thought [actually 2400ft], they were given climb to 5000ft, a radar heading and a frequency change. On first contact with London they were instructed to descend immediately to 3000ft. Simultaneously TCAS annunciated 'traffic traffic' so he disengaged the A/P and lowered the nose to reverse the 2500fpm ROC to approximately 1500fpm ROD. Reaching a maximum altitude of 3900ft QNH, TCAS gave 'adjust v/s' and in fact was asking for a higher ROD and this was when he caught a brief glimpse of the traffic slightly above going down their LHS; ATC then told them that they were clear of conflict. Workload was high during their departure phase and it was difficult changing from the climb profile to an immediate descent. He assessed the risk as high.

THE SR22 PILOT reports inbound to Biggin Hill IFR and in receipt of an ATS from Thames Radar on 132.7MHz squawking an assigned code with Mode C; TCAS 1 was fitted. The Airprox occurred whilst he was flying in cloud at 4000ft QNH 1025mb and 150kt following vectors for the ILS RW21 at Biggin Hill. He noticed on TCAS another ac closing in on his course below his level but climbing. TCAS gave a warning when the other ac was -200ft but at this time he broke clear of cloud and became visual contact with an approaching low wing jet. He was able to quickly assess that he would be clear of the other ac and collision was not immediate. After the very close passage TCAS indicated 0.4nm separation; at no point was he warned by ATC of any proximity with the incoming traffic. Since his TCAS was only capable of issuing traffic alerts he did not make any evasive manoeuvre. He assessed the risk as medium.

THE THAMES RADAR CONTROLLER reports that the Coordinator was busy so he called Biggin Hill in relation to an inbound ac, not the subject SR22. Biggin told him that they had not been passed an estimate on this inbound and that it could not commence an ILS approach owing to a departure in the ILS critical area. They offered a LLZ only approach which was subsequently accepted by the inbound flight whose pilot reported visual. During this telephone exchange the SR22 flight called on frequency and he acknowledged this call and on completion with Biggin Hill he instructed the SR22 flight to 'fly heading 230°' – the ac was about 4nm S of the extended C/L RW28 for London/City. The sector was busy and the Coordinator released the LR45 from Biggin Hill up to 2.4A towards DET and this flight was subsequently coordinated with TC S on a heading 115° and climb to 5A. He stressed that the nature of operations within Thames Radar, by providing an approach service to ac into 2 aerodromes, means there are inbound and outbound fpps for both London/City and Biggin Hill displayed in the fps display. This makes it difficult to highlight conflicts. He opined that Thames Radar is a 'radar to strip' sector whereby ac painting on radar are correlated to a fps held in the display board. When the LR45 flight called on frequency he instructed the crew to squawk ident and, according to his radar and the correlating fps, there was another ac (AC3) NE of it at 4.0A heading SW. He turned AC3 to the N and descended it to 3.0A followed by climbing the LR45 to 5.0A and

placing it on a heading of 115° as per the coordination. Other than AC3, there was nothing on the radar for him to correlate to a fps in his strip bay that would indicate a conflict with the LR45. He believed his actions were safe and transferred the LR45 flight to TC S on 120.525MHz. Shortly after this STCA started flashing red, high severity warning, indicating the LR45 and an intermittent primary contact. His colleagues on TC S shouted about the conflict however he and his Coordinator were perplexed as to why. There is a high rate of 'cry-wolf' STCA returns on Thames Radar because of the type of airspace (low-level with traffic below CAS up to 2.4A and traffic in CAS at 3.0A) and they believed that this occurrence was an example. He changed radar head to the Heathrow 23cm and all became clear. Later, prior to viewing a radar replay of the incident, he was adamant that nothing had been displayed on the radar or highlighted in his fps display to indicate a potential conflict with the LR45 – this was corroborated upon viewing the radar replay.

THE THAMES RADAR COORDINATOR reports the Thames RMA had traffic at both 3000ft and 4000ft inbound and outbound to London/City and Biggin Hill which included the SR22. Due to this he coordinated 5000ft and radar heading 115° from TMA SE for the LR45 departure from Biggin Hill. He told the Radar controller and marked the fps. After the LR45 became airborne, the Heathrow SVFR controller alerted the Thames Radar controller and himself to an STCA high severity alert to the E of Biggin Hill. Looking at the display only the LR45 was showing and there appeared to be no conflicting traffic in the vicinity.

THE LTCC BIGGIN RADAR CONTROLLER reports the sectors were split owing to a high volume of SE Low traffic. Being less busy than the TIMBA SC, she elected to work the LR45 from Biggin Hill which was treated as a Gatwick departure i.e. climbing to FL130 and a transfer to TC Capital. The LR45 was coordinated climbing to 5000ft and heading 115°. The flight was transferred to her climbing through 3400ft with STCA flashing 'red' against the SR22 into Biggin Hill which was under the control of Thames level at 4000ft. Her initial call to the LR45 flight was *"avoiding action turn right heading 180 degrees and descend immediately to altitude 3000ft"*. Her subsequent call was to pass TI on the SR22 and to re-emphasise the descent. Once the traffic had passed she climbed the LR45 to 5000ft; the flight did not at any time report a TCAS intervention.

ATSI reports that at the time of the Airprox, the SR22 flight was in communication with the TC Thames Radar controller whilst the LR45 flight had just been transferred from Thames Radar to the TC Biggin sector controller. The Thames Radar controller described both the workload and traffic situation as having been 'moderate'.

The area of responsibility for Thames Radar is defined, in the unit's MATS Part 2, as the London (City) CTR and CTA, the TC Thames RMA and TC airspace as delegated to Thames within 40nm of London City ATZ and 30nm of Biggin Hill ATZ, subject to the radar coverage of the equipment. At the time of the Airprox, a radar controller and a Coordinator were operating the Thames Radar sector.

The SR22 flight contacted the Thames controller at 1817:05, and reported descending to 4000ft on QNH 1025. At the time, the ac was approaching overhead Southend and passing 5900ft descending. Initially there was no response from the controller, as he was on the telephone to Biggin Hill, but he then acknowledged the pilot's call. The controller informed the pilot that he could expect radar vectoring for an ILS approach to RW21, at Biggin Hill, and then instructed him to fly a heading of 230°, which was acknowledged. At 1819:10, the controller asked the pilot to confirm that his cleared level was 4000ft, which he did. The ac was now passing 4900ft and located SW of Southend and N of the extended final approach to London City.

At 1822:45, the LR45 flight called the Thames radar controller, having just departed from Biggin Hill, and reported maintaining 2400ft following a BPK2, which required the ac to turn R after noise abatement and pass overhead the BIG VOR at 2400ft on track to DET and then BPK. The Thames controller instructed the crew to squawk Ident and, shortly afterwards at 1823:20, to climb to 5000ft heading 115°. At this time, the SR22, which was still heading 230°, was in the 11 o'clock position of the LR45, level at 4000ft and at a range of 9nm. The Thames controller asked the pilot of the LR45 to confirm his altitude to which he replied: *"Passing two thousand five hundred..."*. The controller then instructed the LR45 flight to contact London Control and report the heading.

At the time the crew of the LR45 was instructed to change frequency (1823:56) the ac was passing 2700ft, in the climb to 5000ft, with the SR22 in its 11 o'clock at a range of 5.3nm. Twenty-five seconds after being instructed to change frequency the pilot of the LR45 called the TC Biggin controller and reported *"London LR45 c/s's with you climbing to altitude correction now altitude five thousand feet heading one zero seven"*. In the background the words "Traffic Traffic" can be heard from the TCAS. The TC Biggin controller immediately responded with *"LR45 c/s avoiding action turn right now heading one eight zero degrees descend immediately altitude three thousand"*

AIRPROX REPORT No 006/07

feet descend now". The radar recording shows that as this transmission was being made (1824:36) the SR22 was converging and in the 10 o'clock position of the LR45 at a range of 1.3nm with both ac indicating 4000ft. The LR45 commenced a descent and the SR22 passed 0.6nm behind the LR45 and 100ft above it.

[UKAB Note (1): The LR45 crosses through the SR22's 12 o'clock range 0.6m 100ft below with the CPA occurring on the next sweep (1824:48) as the LR45, at 3900ft, diverges ESE bound in the SR22's 10 o'clock range 0.4nm which is at 4000ft.]

The Thames Radar controller took over the position at 1802, 22min before the Airprox. He reported that he was unaware that the Stansted 10cm radar was selected as this fact was not communicated to him in the handover. The radar selection is shown on the screen in an information box in the top R of the display, however, it is not particularly prominent and did not attract his attention. The unit MATS Part 2 states: *'The radar service(s) selected for use should normally be the most appropriate geographically sited, subject to satisfactory performance'*. It goes on to list the radar services available for Thames which are: Heathrow 23cm (Default picture), Stansted 10cm (Default Standby 1), Heathrow 10cm (Default Standby 2) and Debden (Default Standby 3). At the time the Debden radar was out of service due to long-term maintenance. The Thames controller advised that his first choice of radar selection would have been Debden but the Stansted 10cm was acceptable. The Heathrow 23 cm was frequently used but had poor coverage in respect of traffic around SPEAR and DET. In the opinion of the Thames controller, the Stansted 10cm radar provided generally good coverage. Immediately to the L of the Thames Radar position is a radar display for the London City Director, but on this occasion the Thames Coordinator was there. Immediately to the L of this position is the Heathrow SVFR control position. The Thames controller advised that the Heathrow SVFR controller must use either the Heathrow 23 or 10 cm radar, however, the MATS Part 2 does state that additionally, the Pease 23 cm and Gatwick 10cm radars may be used. He added that it varies from ATCO to ATCO as to whether the radar source used on the Coordinator/London City Director position is the same as that selected for Thames or a different one. Accordingly, the following ATSI recommendation is made: *'The unit should review and revise the MATS Part 2 entry regarding use of particular radars at operational positions. The revised entry should either indicate a priority of radar or provide sufficient guidance as to the coverage provided by each radar so that the controller can make an informed choice'*.

The Thames controller described the split of duties between himself and the Coordinator as akin to the 'Planner and Tactical' concept. The Coordinator undertakes coordination, passes releases and handles telephone calls whereas the Thames Radar controller is responsible for achieving the agreed coordination with the ac involved. Estimates for flights inbound to Biggin Hill are passed by the ATSA. At 1816:50, the Thames controller answered the telephone line from Biggin Hill who advised that they had traffic, the LR45, shortly ready to depart. The Thames controller informed them that the next inbound, a C650, was at a range of 10nm but Biggin Hill had received no estimate on this. Due to the presence of the LR45 in the ILS sensitive area, Biggin Hill could not approve an ILS approach for this inbound. Following discussion it was agreed that the C650 could either make a LLZ only approach or a visual one. The Thames controller said that this unexpected conversation distracted him somewhat.

The Coordinator had previously spoken to Biggin Hill regarding the departure of the LR45. The initial request for a release on the departure was made at 1813:30. The Coordinator contacted TC East who had agreed that the ac was released for departure. At 1818:00, the Coordinator telephoned Biggin Hill advising that the C650 was visual and would be making a visual approach. He added that subject to that ac the LR45 could depart on track to DET climbing to 2400ft, i.e. to remain beneath CAS and follow the track to DET.

The Thames Radar controller explained that his normal method for handling inbounds to Biggin Hill was to either vector the ac until it was parallel with the final approach for London City and then turn it L to intercept the LLZ for RW21 at Biggin Hill, or to vector it S of the extended C/L for RW28 at London City and turn it onto a heading of 275° and then turn such traffic Lt to intercept the ILS at Biggin Hill. Descent instructions would be issued commensurate with keeping the ac within CAS for the longest possible time. Analysis of the Stansted 10cm radar recording shows that the SR22 was visible on the radar when it first called and at the time that the Thames Radar controller instructed the pilot to fly a heading of 230° and confirm that the ac was descending to 4000ft. However, at 1820:50, when the SR22 was approximately 4nm S of the London City extended centreline, the SSR label disappeared from view leaving only the primary return.

At 1822:00, the SSR code from the LR45 appeared approximately 1nm W of Biggin Hill, but by now, the return from the SR22 was only an intermittent primary return. At 1822:30, the Coordinator telephoned TC South to

coordinate climb on the ac. Both the Thames Radar controller and Coordinator emphasised that they, effectively have only two levels to use within their airspace and those are 3000 and 4000ft. London City outbounds depart on SIDs climbing to either 3000 or 4000ft and inbounds are transferred descending to 4000ft. Due to traffic already in the area, the LR45 flight had been given a clearance to climb to only 2400ft and thereby remain below the LTMA until it could be climbed further. With such traffic the objective was to climb the ac to 5000ft so that it would not conflict with inbound traffic to the Thames area and route the ac N'bound towards BPK. The Thames Coordinator agreed with TC S that the LR45 flight should climb to 5000ft heading 115° and this was written on the relevant fps displayed in front of the Thames Radar controller.

The LR45 flight established contact with the Thames Radar controller at 1822:45, when the SR22, still only visible as an intermittent primary return, was in the 11 o'clock position of the LR45 at a range of 13nm. The Thames controller instructed the LR45 crew to squawk Ident and, at 1823:20, to climb to 5000ft heading 115°. The Thames Radar controller did not comply with the requirements of MATS Part 1 (Section 1, Chapter 5, Page 9, Table 5) in that the crew were not told they were identified, passed their position or told what service they were under either when outside CAS or when they climbed into it. Almost coincident with the Thames controller instructing the LR45 flight to climb, the Coordinator received a telephone call from the TC Biggin SC advising that she would take the ac on frequency 120.52 if the ac had not yet been put over. The Coordinator confirmed the frequency and reiterated that it would be climbing to 5000ft. The Thames Radar controller asked the crew to verify their level, which they did, before instructing the crew to change frequency to the TC Biggin SC. At this time the LR45 was passing 2700ft with the SR22 in its 11 o'clock at a range of 5.3nm with the SR22 indicating 3900ft. Although the SR22 was only visible on the Stansted 10cm radar as an intermittent primary contact, it was clearly visible on the Heathrow 23cm, Heathrow 10 cm and Pease radars. STCA activated in low severity at 1824:08, before turning to a high severity alert 8sec later. The Heathrow SVFR controller, seated to the L of the Thames Coordinator, shouted a warning to the Thames Radar controller who could see the STCA warning but could not see what the traffic was to the LR45. The Thames Radar controller advised that STCA alerts were commonplace due to the system detecting 'conflictions' between ac operating at 3000ft within CAS and those operating at 2400ft or below, below CAS. This, in part, would act as a weakening of the immediacy of the problem as detected by STCA. Replay of the radar recording in 'slave' mode does show the STCA activate and highlight the SSR label of the LR45, but the conflict alert box shows the callsign of both ac involved. However, it should be remembered that, by this time, the Thames Radar controller had instructed the crew of the LR45 to change frequency.

A discussion took place, with both the Radar controller and the Coordinator, with regard to fpss. A 4 bay display is provided and the third bay contains the active bay. The Thames Radar controller emphasised that the sector is a 'radar-to-strips' sector where strips are simply used to record administrative details and the controller works radar to strips. He opined that everything operating within the RMA was a potential conflict with traffic outbound from Biggin Hill. His way of operating was to arrange strips in the order that ac would arrive on the frequency. He did follow the practice of 'cocking out' strips to identify conflictions and he usually did this with Biggin Hill departures. However, in this instance he had not cocked out the strip relating to the LR45, as he hadn't identified any specific confliction. He had a strip on the SR22 but when he checked the radar, prior to issuing climb clearance to the LR45 flight, he had not seen anything in the way and so cleared the LR45 flight to climb.

The Coordinator advised that he had previously witnessed ac disappearing from the radar display, whereas the Radar controller was of the opinion that traffic did disappear for a short periods but not for any significant length of time. The SR22 disappeared from the Stansted 10cm radar at approximately 1820:50, and remained as an intermittent primary contact until a very short time after the Airprox occurred at 1824:50. The ac had been placed on a radar heading and so there was an obligation placed on the Thames Radar controller to monitor its progress. As the controller was employing a radar-to-strips methodology he did not detect any confliction between the SR22 at 4000ft and the departing the LR45, which had been cleared to climb to 5000ft. This over reliance on the use of radar at the expense of cross-referring to strips, colloquially known as 'black-holing', has in the past proved to be fallible. The fact that it was not unheard of for ac to disappear from the radar display, something that both the radar controller and Coordinator were aware of, reinforces the need to make full use of the information displayed on the flight progress strips. In conversation it would appear that this methodology is employed by a number of controllers when providing the Thames Radar service. Accordingly, the following ATSI recommendation is made: 'The unit should urgently revise the operational practices employed by Thames Radar controllers with regard to the usage of strips to enable a safe air traffic service to be provided'.

The unit (LTCC) carried out enquiries regarding details relating to the ac type involved, a Cirrus SR22. It was found that the transponder aerial is quite small and is located underneath the firewall between the two exhausts. What

AIRPROX REPORT No 006/07

is somewhat paradoxical is that traffic which was squawking, at a lower level and a greater range than the SR22, from the Stansted Radar head, were displayed when the SR22 was not. However, as the other radars (Heathrow 23 & 10 cm and the Pease Pottage) all showed the SR22's transponder signal, it is clear that the equipment was functioning at the time. This then leads to the question as to whether the Stansted 10cm radar is suitable for the provision of a Radar Control Service in this area. A flight check, subsequent to the Airprox, indicated that the radar was performing within specification. Accordingly, the following ATSI recommendation is made: 'The unit should review the suitability of the Stansted 10cm radar as a radar source for the provision of ATS by Thames Radar controllers. If it is decided to continue with its use then controllers must be provided with information as to where areas of poor radar cover, and the associated altitudes, are located'.

Both the Thames Radar controller and the Coordinator expressed the view that the procedures associated with Thames Radar were produced some years ago and now, given the very significant increase in movements, are woefully out of date.

NATS OPERATIONAL ANALYSIS AND SUPPORT provided a TCAS performance assessment using Pease Pottage single radar source into an Interactive Collision Avoidance Simulator (InCAS). The simulation indicates that the LR45 crew would have received a TCAS TA at 1824:17 when the ac was climbing through FL030 (3300ft London QNH 1023mb) when the SR22 was 3.1nm away at FL037 (4000ft QNH). The subject ac continue to converge and as the LR45 climbs through FL034 (3700ft QNH) at 1824:27 a TCAS RA 'maintain v/s, crossing maintain' would have been generated with the VSI green arc showing =>2500fpm (separation showing 2.08nm and 278ft). The LR45 continued to climb with the subject ac converging until at 1824:38 when separation shows 1nm and 100ft the simulation indicates that the LR45 would have been issued with a reversal RA 'descend' commanding a ROD between 1500-2000fpm. At this time the ac had already begun to reverse its flight profile indicating a slight ROD (300fpm). By 1824:42 the LR45 passes 0.65nm in front of and 100ft below the SR22, TCAS would have generated an 'increase descent' RA requiring 2500-3000fpm and 9sec later 'clear of conflict' would have been received. The CPA occurred at 1824:47 with LR45 now in the SR22's 1030 position range 0.42nm and 128ft below. The nature and the timings of these alerts were confirmed by Mode S messages collected by the RA downlink from the LR45. The InCAS also predicted that had the LR45 pilot's reactions to the initial TCAS command been ideal, the LR45 would have climbed through the level of the SR22 with vertical separation being about 610ft at the CPA.

NATS INVESTIGATIONS reports that immediately after the event the duty watch removed the Stansted 10cm radar from use by Thames Radar. The radar had been reported on several occasions in the past for poor performance and lost radar returns and with this in mind, engineering were tasked with carrying out a thorough investigation into the radar's performance. At the time, the radar was operating within specification but it was found that it had been operating with some suppression selected (RAG2 mode) since the beginning of the year. RAG2 is the highest level of suppression and, in conjunction with RAG1, is used to reduce false returns and lessen its susceptibility to weather. Looking at problems since May 2006, SSR failures were tracked down to a faulty Inductosyn circuit which was repaired. Poor PSR detection was found to be caused by a faulty T/R cell. Subsequently a number of reports about poor SSR performance over Luton and Detling were received but the majority of these were down to poor transponder performance which was demonstrated by similarly poor detection of the same ac by other radars. The number of reports over Luton may have been compounded further owing to an issue with turning data utilised by the Programmable GTC functionality. This anomaly has been resolved and the situation will be monitored pending any further reports regarding poor SSR performance in the Luton area. Other reports on poor PSR were analysed and it was found that other radars also struggled to track the same targets, this typically being due to the ac having low Radar Cross Section and outside the design parameters of the radar. Although there is a lack of ATC confidence in the Stansted Radar, there is no technical evidence to suggest the radar is performing below expectations.

Engineering also identified that the SR22 was a composite ac with a small Radar Cross Section and at the time of the incident was flying away from the radar head at an oblique angle. Investigation into the transponder showed that the aerial is shaped like a 'lollypop' and is positioned under the ac just aft of the engine firewall. The strength of the SR22's responses was significantly lower than comparable ac at similar ranges and bearings. The signal strength varied as the ac manoeuvred and this was most likely caused by shielding of the antenna by ac structures.

UKAB Note (2): The SR22 operator was contacted by the UKAB Secretariat and made aware of the NATS findings about low signal strength. The operator informed the maintenance organisation and requested that the transponder be re-tested, the ac having only just been returned from an annual check – a response is still awaited.

The SR22 manufacturer was contacted and made aware of the NATS findings and EASA was also contacted through the CAA Aircraft Certification Division and were asked to pursue the issue with the FAA.

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 downlinked Mode S data from the LR45, reports from the air traffic controllers involved and ANSP, together with a report from the appropriate ATC authority.

The Board initially reviewed the piloting aspects of this Airprox. The LR45 crew had been given a departure clearance that kept the flight below CAS - 2400ft London QNH - before commencing a climb to 5000ft under a RCS with Thames Radar. The LR45 flight had then been transferred to the TC Biggin SC, who on initial contact, realised that the flight was in conflict with the SR22 at 4000ft. Therefore, the Biggin SC immediately issued an avoiding action R turn and descent to 3000ft. Indeed during the LR45 crew's initial RT 'check-in' call a "traffic, traffic" TA was heard being annunciated by the ac's TCAS equipment in the background. The LR45 crew had endeavoured to follow the Biggin SC's instruction and had lowered the LR45's nose to reverse the 2500fpm ROC into a descent. During this manoeuvre the LR45 crew were reading back the ATC 'avoiding action' instruction, after which the SC passed TI on the SR22 to the crew, who then reported visual with it moments later. The LR45 Capt had reported that this sequence of events had occurred in a very short period, but he believed TCAS had annunciated an 'adjust vertical speed' RA which had then strengthened, as TCAS had then commanded an increased ROD to avoid the SR22. From the InCAS assessment, combined with the data received from the LR45's Mode S, it was revealed that TCAS had generated, initially, a 'maintain vertical speed, crossing maintain' RA which was not included within the LR45 Capt's report. Pilot Members thought that perhaps, during this fast-paced, rapidly changing, high workload situation, this RA was not fully assimilated by the crew before the descend' RA reversal was annunciated to them, probably as a result of the crew reversing their climb into a descent profile, in accordance with the ATC descent instruction. Moreover, continuous RT exchanges were taking place in addition to the LR45's onboard systems that would have generated warnings following the disconnection of the A/P by the Capt – generally known as the 'cavalry charge' – which is designed to capture pilots' attention immediately. That said, although the cockpit noise level was presumed to be very high, the TCAS display should have indicated to the Capt the appropriate sense of the RA to be adhered to - either a climb or descend – by appropriate red/green sectors on the VSI that needed to be followed. Pilot Members empathised with the LR45 crew's predicament, but it was clear that the LR45 Capt's recollection of the enunciated RA was somewhat at odds with the downlinked Mode S data as it coincided with the RT exchanges with ATC, whilst he was manoeuvring his ac and also looking for and acquiring the SR22.

[UKAB Post Meeting Note: This anomaly between the LR45 crew's first reported TCAS RA warning and the actual warnings generated could not be resolved at the meeting. Therefore the Chairman telephoned the LR45 Capt post meeting to discuss the TCAS event in more detail. In amplification of his written report, the LR45 Capt remembers hearing an RA aural warning probably the 'maintain vertical speed, crossing maintain' RA - as he was manoeuvring his ac to comply with the Biggin SC'S avoiding action turn and descent instruction. At this point he was concentrating on pitching the ac down and believed the RA he heard was reinforcing the ATC instruction to descend. He opined that the RA phraseology given was not entirely self-explanatory and somewhat misleading, as it did not give an aural prompt as to whether a climb or descent was required so, as he was reversing his original climb into a descent, he believed that he was conforming to the actions that TCAS was demanding. In the LR45 the VSI display is positioned in the bottom RH corner of the 'glass cockpit' display, and to a degree is masked by the control column, so he was not able to recollect exactly what indications he had on the VSI display at the precise time these events were unfolding. Discussion also broached the subject of audio queuing of cockpit warnings and the manufacturers set priorities when events are annunciated in an order through the audio system. This could potentially lead to a small delay of warnings being annunciated aurally when a higher priority alert might take precedence (the A/P disconnect for example). The LR45 Capt reiterated that at the time he was reversing his flightpath a TA alert was being received and he was speedily reacting to the ATC descent instruction and not the initial TCAS RA aural alert, as he perceived this RA was agreeing with his manoeuvre. Subsequently the RA guidance to 'descend' then 'increase descent' was assimilated just as he gained visual contact with the SR22.]

Noteworthy was the fact that the LR45 crew did not report any RA manoeuvre on RT to the Biggin SC. Normally with a passive RA, communication on the RT is not required if the pilot is able to satisfy the RA guidance and maintain the appropriate ATC clearance. In this case, the LR45 crew believed that the first RA was in accordance with the ATC descent instruction. However, had the 'maintain vertical speed, crossing maintain' RA been correctly

AIRPROX REPORT No 006/07

assimilated and actioned, it should have been reported on RT as a 'TCAS Climb' or 'Unable to comply, TCAS RA' when the Biggin SC issued the avoiding action descent instruction.

In answer to a question from the Board, the NATS Advisor explained that STCA operates from a multi-radar tracking system which is why the alert was given even though only one ac was showing on SSR on the controller's single source radar picture. Although STCA displayed both c/ss in a 'conflict box', this would have been at the periphery of the controller's display and not in his direct point of attention. As part of the radar development programme it is planned to have multi-radar displays for Thames use in 2010.

Moving on to the controlling aspects, ATCO Members acknowledged the ATSI investigation findings but also had some sympathy with the Thames Radar controller's situation. Provision of a RCS to inbound and outbound ac from both London/City and Biggin Hill - with only a limited vertical depth of airspace to use - did increase the complexity of the controller's task on this, at times, busy sector. Here the SR22 had been placed on a radar heading and then 2.5min later the SSR label had disappeared on the displayed Stansted radar for over 4min and did not show again until after the Airprox, with only the ac's primary return showing intermittently thereafter. Members agreed that this had been a significant length of time for the SR22 not to be displayed to the Thames Radar controller and the ac's progress should have been monitored during the period. Although the controller was perhaps being over reliant on the displayed SSR labels to execute his plan, the SR22's 'presence' should have been evident from the ac's fps in the fps display. Also, a further check of the fps display when the LR45 flight was given climb clearance to 5000ft should have revealed the SR22's fps as known traffic in potential confliction. However, it was clear to the Members that the Thames Radar controller had climbed the LR45 flight into conflict with the SR22 whose SSR label was no longer displayed on the radar in use (Stansted 10cm), which had caused the Airprox.

Turning to risk, the TC Biggin SC had reacted as quickly as possible to the rapidly deteriorating situation and given the LR45 crew an immediate avoiding action R turn and descent instruction. The LR45 crew had received a TA alert during their initial contact RT call and attempted to reverse the ac's climb into a descent to follow the ATC instruction. The TI subsequently given allowed the LR45 crew to catch a glimpse of the SR22 above them and to their L but the crew was unable to assess separation distances. The Thames Radar controller saw the STCA alert but was unable to assimilate the situation from his display (only the LR45 label was flashing red) until he changed radar heads, which then revealed the SR22's SSR response, however, by then the Airprox had occurred and it was too late to pass TI to its pilot. Fortunately, the SR22 pilot had detected the approaching LR45 on TCAS to his R, below but climbing, and had monitored its flightpath. The SR22's TCAS 1 generated a TA alert when vertical separation was shown at -200ft and it was then that he broke out of cloud and saw the LR45 to his R. Quickly assessing that collision was not imminent, he watched the LR45 cross from R to L in front of his ac and diverge to his L with lateral separation of about 0.4nm at the CPA. Although the LR45 crew had complied with ATC instructions, they had not assimilated the initial TCAS corrective 'maintain vertical speed, crossing maintain' RA which had led to the TCAS reversal. Members agreed that this had reduced the actual vertical separation distances at the CPA but the lateral separation distances were not duly affected, resulting in the LR45 crossing 0.6nm in front of the SR22 before diverging SE bound. The Board concurred with the SR22 pilot's assessment; his good situational awareness and then visual sighting had removed any actual risk of collision but the subject ac had passed in such close proximity in Class A airspace with the LR45 just commencing its descent – albeit lagging behind the TCAS guidance this left the Board in no doubt that safety had been compromised during this encounter.

The NATS Advisor informed Members that 14 internal recommendations were formulated and actioned post incident. NATS had recognised before this incident that the Thames Radar task was becoming increasingly complex and that changes to the procedures were required. These changes will be a part of the larger TC NE Airspace plan that is currently under development. As a result of the incident, however, some short-term solutions have been implemented including changes to procedures to provide greater track separation between inbound and outbound ac in the sector. Free-flow procedures have been introduced to reduce telephone coordination between Thames and London City Tower and changes to the strip layout have been tested. A new interim fps layout is currently being used pending further procedure changes in April, when Thames will have another level to use. Biggin Hill traffic is now highlighted on the fpss as are composite ac. Even with the previous limitations of the Thames fps display, the SR22 would still have been evident if the fpss had been used, so the NATS Human Factors team is working to ensure the correct use of the fps display in the future. The Thames operation, at low levels over a wide area, makes it difficult for one radar to provide adequate coverage at all times. Thames controllers are trained in the limitations of each available radar source and can make their selection according to many variables including atmospheric conditions. An operating position handover mnemonic contains a reminder

to pass on radar data, including any observed deficiencies in performance and the radar in use and this was not followed in this incident. A notice was issued to remind controllers about the limitations of radar, particularly primary performance, and this will be followed by other reminders about SSR capabilities.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LTCC Thames Radar Controller climbed the LR45 into conflict with the SR22, whose SSR label was no longer displayed on the radar in use (Stansted 10cm).

Degree of Risk: B.

AIRPROX REPORT No 007/07

AIRPROX REPORT NO 007/07

Date/Time: 1 Feb 1205

Position: 5405N 00434W (1.5nm E IOM
Ronaldsway - elev 52ft)

Airspace: ATZ (Class: D)

Reporter: Ronaldsway ADC

1st Ac 2nd Ac

Type: FK50 BN2T

Operator: CAT Civ Pte

Alt/FL: ↓ 600ft

(QNH) (QNH)

Weather IMC KLWD VMC CLBC

Visibility: NR Unltd

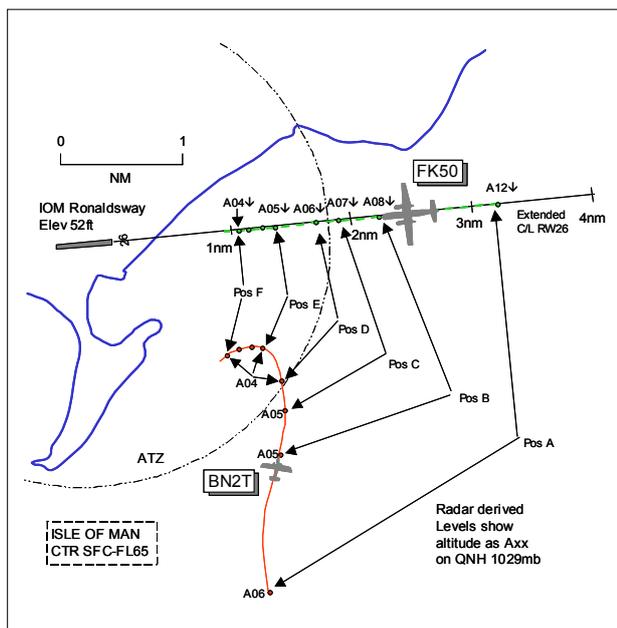
Reported Separation:

ADC: Nil V/1nm H

Not seen 100ft V/2nm H

Recorded Separation:

100ft V/1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RONALDSWAY ADC reports that the FK50 was on the ILS at 2nm from touchdown on RW26 and cleared to land. The BN2T flight was transferred to Tower frequency 118.9MHz by Radar but no contact call was made and the ac was seen on the Tower ATM to be heading directly towards the FK50 and not positioning behind it as instructed by Radar. As no contact call was made, a 'blind' transmission was made on 118.9MHz instructing the BN2T flight to turn L immediately with TI on the FK50. The BN2T pilot then acknowledged the instruction and added that he had the other ac on TCAS. The FK50 was by now on short final at 200ft and continued its approach and landed. The BN2T was separated by approximately 1nm at the CPA as the FK50 descended through its level.

THE OFF-GOING RONALDSWAY APR reports that the FPL ETA for the BN2T was 1236. At 1145 the flight called on frequency 120.85MHz but was unable to establish two-way RT contact. A 7000 squawk was seen on radar approaching from the S before it entered the CTR showing 1000ft on Mode C. This ac then turned S, climbing to 1600ft, before the flight established two-way contact. The flight was identified and given SVFR clearance to enter the CTR with a radar heading against inbound IFR traffic. When the BN2T was 6nm S of the aerodrome, the pilot was instructed to orbit R to provide separation against the ILS traffic, the FK50. At this point he handed the position over to another controller.

THE ONCOMING RONALDSWAY APR reports taking over the position with both subject ac on frequency 120.85MHz, the FK50 on 10nm final to RW26 with the BN2T orbiting to the S of the aerodrome and the final approach. He told the FK50 crew to contact Tower on 118.9MHz but this call was taken by the BN2T pilot which he queried. The BN2T pilot was given his position in traffic and was told to position No 2 to the FK50 on final before transferring the flight to Tower on 118.9MHz.

THE FK50 PILOT reports that he was only told about conflicting traffic by Ronaldsway Tower after he had departed IOM enroute back to London. The crew did not see the other ac at all whilst on final approach and they were flying in IMC down to 700-800ft.

THE BN2T PILOT reports flying solo inbound to IOM Ronaldsway under SVFR and in communication with Ronaldsway ATC, firstly with Approach on 120.85MHz and then Tower on 118.9MHz, squawking with Mode S; TCAS 1 was fitted. This was his 3rd flight in this new ac with complex electronics and he had held an IR for 30yr. As he approached the Welsh Coast flying VFR, he could see the Wx had deteriorated towards the IOM. He listened to the IOM ATIS which reported visibility >10Km but with overcast cloud much lower than that where he coasted out at Colwyn Bay. He commenced a slow descent to remain VFR and called Ronaldsway Approach on

120-85MHz several times but received no reply. He levelled-off at 1000ft QNH and assumed that he was below their 'line of sight', believing that he would be in RT contact as he came closer. He continued calling and tried Box 2 but still could not make contact. Realising from his GPS that he was approaching the main area of CAS, he turned away to the W to keep clear. He believed GPS indicated that he did not enter CAS. He then commenced a climb to 1500ft and tried calling Ronaldsway again: he immediately established contact so requested SVFR clearance into the CTR. ATC told him to perform an orbit and take up radar heading 360° to join L base for RW26 No 2 behind an ILS commercial arrival and to call Tower on 118.9MHz. He slowed the ac to lower first stage of flap and then slowed further to 80kt for final approach. The visibility was unlimited flying below a layer of stratus cloud base 600ft and by now he was 5nm out at 600ft QNH 1029mb, just below cloud. He had the aerodrome and RW in sight but not the ILS traffic so he looked for the ac on TCAS, scrolling in for a closer view. Initially no ac painted but then he saw the other ac's target in his 1 o'clock - as TCAS annunciated 'traffic, traffic' - before it quickly crossed 2nm ahead and 200ft below R to L. At that moment Tower called and told him to turn R, he thought [actually L], immediately which he did and he informed ATC that he had the other ac on TCAS. He then visually acquired the other ac in the spot where he would expect to turn final and was then cleared to land as No 1. After landing he was informed that an Airprox had been filed as he had not remained clear of No 1.

In retrospect, he thought that as the commercial traffic was descending on the ILS from 1600ft QNH he would never have been able to see it visually until it descended below the 600ft cloud base. As he was unable to observe No 1 visually, he had used TCAS which located the other ac 2nm ahead and 200ft below before seeing it visually in the spot where he would expect to turn final. Also, the ILS arrival was travelling half as fast again as his BN2T, he thought, so at 80kt there was no way he could ever have caught up with No 1 and did not believe that a true risk of collision actually existed. Furthermore, he thought the radar display would have shown a clear picture of the actual situation to the controller as it unfolded with No 1 descending straight down the ILS and his ac on a radar heading on base leg towards finals.

ATSI reports that the subject ac were both inbound to the IOM, the FK50 on an IFR flight and the BN2T was on a Special VFR clearance. Approximately 3min before the Airprox occurred the Approach Radar position had been handed over. At the time, both ac were on the Approach frequency and it was the oncoming APR who transferred them to the ADC: consequently, at the time of the Airprox, both flights were in communication with the latter controller. Both the ADC and APR reported their respective workload as light.

The BN2T flight, inbound from Fairoaks, attempted to establish communication with IOM Approach Control at 1144. However, despite various calls and responses, two-way communication was only established 10min later. The off-going APR commented that he had observed an ac squawking 7000, with Mode C showing 1000ft, approaching the area from the S, which he assumed was the BN2T. (ATC had the inbound flight plan for this flight.) This ac was observed to turn away to the S, close to the boundary of the IOM CTR (Class D airspace), when its Mode C showed it climbing to 1600ft. As the flight was tracking S, two-way communication was achieved at 1154. The pilot was requested to squawk 4550 and responded that he was at 1500ft just below the "Air Traffic Zone" and was heading away, so he would make a 180° turn. The flight was identified and instructed to orbit R in its present position.

In the period when the BN2T pilot was trying to establish communication, the FK50 flight contacted the APR at 1152, reporting descending to FL80, to be level by KELLY, heading 300°. The flight was instructed to continue the heading, to expect vectoring to the ILS RW26. Subsequently, it was given descent and headings and, whilst descending to 1600ft, it was, at 1200:25, instructed to turn L heading 295° to close the LLZ and report established. By this time, the BN2T flight had been issued with the updated weather information - i.e. Cloud scattered 400ft and overcast 600ft - and had requested a Special VFR clearance to enter the CTR. This was agreed and the flight was cleared, at 1156:00, to "enter the Zone Special VFR not above altitude two thousand feet fly heading Three Six Zero". The cleared altitude and heading were subsequently read back correctly by the pilot. The radar photograph, timed at 1156:00, shows the BN2T in a R turn, 16.1nm S of the airport, at 1500ft whilst the FK50 is 18nm due E of the BN2T, passing FL95. Neither the MATS Part 1, nor the IOM MATS Part 2, state any meteorological criteria below which it is not possible to issue a S/VFR clearance to inbound traffic. The UK AIP, Page AD 2-EGNS-1-9, states: 'Special VFR flights within the Control Zone, in IMC or at night, may be requested and clearance will be given whenever traffic conditions permit'. Although he was aware of the low cloud, the controller did not anticipate that the pilot of the BN2T would have any problems making his approach. He commented that he knew the pilot was used to operating into the airport and most of the approach to RW26 would be over the sea.

AIRPROX REPORT No 007/07

Just after the FK50 flight had been requested to report established on the LLZ, the BN2T flight, now approximately 6nm S of the airport, was instructed to *“BN2T c/s number two in traffic one orbit to the right please”*. [UKAB Note (1): The BN2T pilot replied *“er say again to the right”* to which the controller responds *“BN2T c/s one right-hand orbit”*; the pilot acknowledged this with *“one right-hand orbit understood”*.] This was initial action, with the controller intending to monitor the situation and take further action with the BN2T as required. With hindsight, had the ac been instructed to continue orbiting, the incident would probably not have occurred. At this time the Approach Radar position was handed over and the oncoming controller responded to the FK50 flight reporting established on the LLZ. He cleared the flight to descend on the ILS and transferred it to the Tower frequency. The pilot of the BN2T replied to this transmission, at the same time as the FK50 flight. However, the APR was able to correct the error and made sure that the pilot of the BN2T did not transfer. It has not been possible to establish exactly what was said about the BN2T's holding instructions during the handover. The off-going controller believed he had informed the oncoming controller that the flight was making one orbit, the latter believed that the flight had been instructed to continue orbiting. He confirmed he had not registered the instruction being issued on the frequency. The oncoming controller did comment that, with hindsight, he may not have listened as closely as necessary to the information being handed over and it may have been an assumption on his part about the BN2T's clearance. It would appear that no mention was made about the low cloud conditions during the handover, possibly because the off-going controller assumed that the oncoming controller would be aware of the information.

The MATS Part 1, Section 8, Chapter 1, Page 2, states procedures for 'Handing Over an Operational Position'. This includes: *‘The responsibility for the accuracy of a hand-over lies with the person vacating an operational position. The order in which information should be passed from one controller to another should be as follows: a) General information, including any variations from routine operations; b) Other supplementary information relating to the position; c) The detailed traffic situation. 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.’*

Having ensured that the correct flight had transferred to the Tower frequency, the oncoming APR transmitted to the BN2T flight *“BN2T c/s you're number two to a Fokker Fifty he's on a five mile final for runway Two Six report the other aircraft in sight”*. Not receiving a response the pilot was asked *“BN2T c/s did you copy that”*. He confirmed that he had and the information was updated *“Sorry I didn't get a response from you before er he's in your two o'clock at a range of about three and a half miles”*. The pilot replied *“Understood BN2T c/s”*. The APR explained that when he initially passed the TI the BN2T was still in its RH orbit which he believed the pilot would continue. However, as it approached N it resumed its (unknown to the controller) originally assigned heading 360°. The APR stated that, because the pilot had left the orbit following the TI, he assumed that he must have established visual contact with the FK50 and would be positioning himself behind it. This would not have been possible at the time, in view of the cloud, which was overcast at 600ft. He commented that he was not aware of the low cloud conditions. Just prior to taking over the position he had been in the restroom but whether or not the blinds were down he had not observed the weather conditions. He had not been in the VCR. Although he had looked at the meteorological display in the Approach Room, he had not registered the significance of the cloud measurements. At 1204, with the BN2T tracking N, in conflict with the FK50 on final approach, the BN2T flight was instructed to contact the Tower frequency.

It is a requirement (MATS Part 1, Section 1, Chapter 3, Page 1) for IFR and Special VFR Flights to be separated. The IOM is allowed to use reduced radar separation of 3nm. However, due to the degraded performance of the Watchman Primary Radar System, *‘Within 10nm of Ronaldsway the minimum radar separation shall be 5nm’*. (TOI 01/2007.) Consequently, the orbit position of the BN2T was providing the required 5nm separation. The APR confirmed that his intention, once he realised that the BN2T was proceeding N, was to use the MATS Part 1 procedures for Reduced Separation in the Vicinity of Aerodromes (same page reference as above). This allows the standard separation minima to be reduced *‘when one aircraft is following another the pilot of the succeeding aircraft reports that he has the other in sight and can maintain separation’*. However, no call was made by the pilot of the BN2T to report that he had the FK50 in sight, the APR only making that assumption. Additionally, MATS Part 1, Section 1, Chapter 3, Page 10, requires, when inbound ac are operating visually, that the pilots are informed of the recommended vortex wake spacing requirements. On this occasion, the required spacing behind the FK50 (Small) for the BN2T (Light) was 4nm. The APR could not explain why he did not pass this information to the pilot of the BN2T.

The ADC explained that he could see, on the Air Traffic Monitor in the VCR, the BN2T conflicting with the FK50. As the BN2T flight had not contacted him, he tried calling the pilot (1204:30). Unsure if the pilot was receiving his transmissions he transmitted *“BN2T c/s if you read this turn left immediately heading south”*. The pilot replied *“Left turning immediately”*. Information was passed *“Traffic information a Fokker Fifty on a one mile final”*; the pilot responded *“er we have him on TCAS”*. Once clear of the traffic, the BN2T flight was instructed to continue the L turn onto final for RW26. The ADC said that he did not sight the BN2T at the time.

UKAB Note (2): The radar recording supplied by IOM on a DVD was difficult to analyse accurately owing to variable picture ranging and centring displayed throughout the incident. No time-clock was evident so a diagram was created showing the relative positions of the subject ac during the final stages when a stable picture was briefly produced. The BN2T is seen tracking NNW'ly 5nm SE of IOM Ronaldsway 4.5nm S of the extended C/L RW26 after completing one RH orbit level at 600ft QNH when the FK50 is about 5.5nm from touchdown level at 1600ft QNH prior to commencing descent on the G/P. As the BN2T reaches position A on the diagram it is in a gentle R turn through N at 600ft QNH with the FK50 at 3.25nm from touchdown descending through 1100ft QNH. Just over 30sec later, at position B, the BN2T is tracking 015° level at 500ft QNH with the FK50 at 2.25nm from touchdown descending through 800ft QNH. Twelve seconds later (position C) the BN2T is steady N'ly maintaining 500ft QNH with the FK50 in its 1 o'clock range 1.6nm just inside 2nm from touchdown at 700ft QNH. Eight seconds later (position D) the BN2T is level at 400ft and commencing a L turn with the FK50 in its 1 o'clock range 1.33nm at 600ft QNH, 200ft above. When the BN2T was established in a L turn (position E), as instructed by the ADC, it was 1nm S of, and 100ft below, the FK50; both were operating at a similar speed. The BN2T remains laterally separated by 1nm for the next two sweeps before the tracks slowly diverge at position F, separation now just over 1nm with the FK50 at 1nm from touchdown at the same altitude, 400ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board's discussion initially focussed on the situation prior to the BN2T entering the CTR. Although the BN2T pilot had called several times without establishing two-way contact, the off-going APR was aware of the flight's transmissions. ATCO Members thought that the off-going APR could have relayed messages to the BN2T pilot through another flight that was on frequency. Utilising this facility would have allowed an exchange of information/instructions to take place as the BN2T approached IOM CAS which may have negated the BN2T pilot's need to turn away at the CTR boundary. That said, the BN2T's subsequent climb during the turn was sufficient to alleviate the situation. Moving on, the Board noted that the off-going APR had issued the BN2T flight with an entry clearance and assigned radar heading of 360° - with which the pilot complied - before instructing him to fly one RH orbit just as the position was being handed over. Although the content of the handover between the 2 controllers could not be verified, ATCO Members opined that the oncoming APR, as part of his self-brief prior to plugging-in at the position, should have been fully aware of the current and forecast weather even though the weather conditions should have been covered during the handover. Also, the handover of the traffic situation by the off-going APR should have alerted the oncoming APR that as the BN2T flight was flying under a Special VFR clearance, the weather conditions were unsuitable for VFR. Taking this weather element and the differing views expressed by both the off-going and oncoming APRs with respect to exactly what orbit instructions had been passed, Members were lead to agree that the conduct of the handover had been less than ideal.

Pilots Members thought that the BN2T pilot, flying a well-equipped ac in winter weather and being suitably rated, should have elected to fly IFR: indeed, a very experienced airline pilot Member commented that there seemed to be an element of 'press-on-itis' in the BN2T pilot's actions. Noting that SVFR is normally for pilots who cannot comply with IFR, ATCOs emphasised that the SVFR procedure is a concession, clearance being granted only when traffic conditions permit SVFR to take place without hindrance to normal IFR flights. Whilst operating on a SVFR clearance, a pilot must comply with ATC instructions and at all times be in flight conditions which enable him to determine his flight path and to keep clear of obstacles. Consequently it is implicit that the pilot remains clear of cloud and in sight of the surface. Moreover, ATC should provide standard separation between all SVFR flights and between such flights and other ac operating under IFR. In this incident, the BN2T pilot had resumed his assigned heading of 360° after completing one orbit. However, the clearance of "one RH orbit" had effectively cancelled the previous ATC instruction so the BN2T pilot should have queried with ATC what they wanted him to do before he left the orbit. That said, Members understood how the pilot could have been lulled into believing that the orbit was delaying action from his L base-leg track to fit him into the traffic sequence, ATC having told him that

AIRPROX REPORT No 007/07

he was No 2 in traffic to the FK50 when they issued the orbit instruction. The on-coming APR had taken over the position but had not taken positive control of the situation when the BN2T was seen to leave the orbit which was providing the stipulated separation minima of 5nm from the FK50. The oncoming APR had reiterated the BN2T's position in the traffic sequence and requested its pilot to report the FK50, which was by now 3-5nm away, in sight. By now, separation had been lost, the APR assuming that the BN2T pilot had the FK50 in sight even though the pilot had not so reported, and he took no positive action to correct the situation, only transferring the flight to Tower. This led Members to agree that the on-coming APR had not ensured that the stipulated separation was maintained until reduced separation in the vicinity of the aerodrome could be applied which had caused the Airprox.

Pilot Members were surprised by the BN2T pilot's actions, relying on TCAS to position himself behind the FK50 without reporting to ATC that he was not visual with it. The BN2T pilot's reported separation of 2nm and his assumption that his speed was a lot slower than the FK50s were both inaccurate. The radar revealed the BN2T's G/S as being similar to the FK50s which led to both ac closing to within 1nm of each other as the FK50 crossed ahead of the BN2T, slightly above but descending, unsighted but showing 2nm away on TCAS. Fortunately, the ADC had seen the confliction and as the BN2T flight had not called and being unsure if the pilot was receiving his transmissions, he issued an immediate L turn onto South to the BN2T pilot via a broadcast on his frequency. The BN2T pilot immediately responded that he was turning L and, following further TI on the FK50, he reported having the ac on TCAS. After commencing the turn the BN2T pilot saw the FK50 on very short final and after completing an orbit he positioned back onto final. Although this had the potential for being a serious incident, the prompt actions taken in particular by the ADC were enough to persuade the Board that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

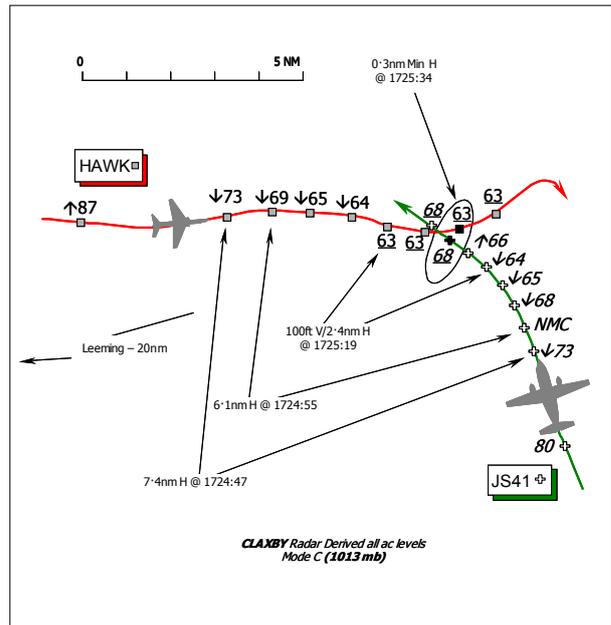
Cause: The oncoming Ronaldsway APR did not ensure that stipulated separation was maintained until reduced separation in the vicinity of the aerodrome could be applied.

Degree of Risk C.

AIRPROX REPORT NO 008/07

Date/Time: 30 Jan 1725 NIGHT
Position: 5423N 00100W (17nm ESE DTVA)
Airspace: Vale of York AIAA (Class: G)
Reporter: DTVA APR

<u>1st Ac</u>	<u>2nd Ac</u>
Type: Jetstream 41	Hawk
Operator: CAT	HQ STC
Alt/FL: 6700ft↓	9000ft
QNH	RPS (1018mb)
Weather VMC NR	VMC Clear Sky
Visibility: 10km+	50km
Reported Separation:	
200ft V/¼ H	500ft V/1nm H
Recorded Separation:	
100ft V @ 2.4nm H	
500ft V @ 0.3nm Min H	

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DURHAM TEES VALLEY (DTVA) APPROACH RADAR CONTROLLER (DURHAM RADAR) reports that the JS41 was inbound to DTVA under IFR and he was vectoring the ac under a RAS from the SE for an ILS approach to RW23. The JS41 was squawking A7062 with Mode C, flying level at FL80 and remained at this level for some time due to several A7000 squawks transiting through the vicinity NW - SE (one of which infringed the DTVA CTA some 5nm SW of the airport). In addition to these contacts, two further ac were observed departing Leeming tracking E and climbing. He notified the JS41 crew of these various contacts and that he would keep them advised. The second of the Leeming ac squawking A0404 – the subject Hawk - was on a steady easterly track and once this ac had passed FL85 and appeared well clear of the JS41 he instructed the crew to descend to 3500ft DTVA QNH (1022mb). It was during this descent that the Airprox occurred. The Hawk ac altered its track and started heading towards the JS41 so he issued traffic information and an avoiding action turn onto W. However, the Hawk then altered course again towards the JS41 so he gave another avoiding action turn onto NE and instructed the crew to stop descent. There were no other options available to him and in response to a TCAS RA the JS41 pilot executed a climb. Following the RA, the Hawk ac began a transit to the E again and the JS41 was vectored as normal into the ILS pattern.

At no point during this period did Leeming ATC advise DTVA of any departures. After the Airprox, he spoke with the Leeming ATC Supervisor and was advised that the other ac was a Hawk ac operating under a RIS with Leeming ATC on a general handling sortie.

He added that he did not initiate co-ordination himself initially as he was happy with the Hawk's eastbound and vertical profile up to the point that the Hawk pilot began to change his direction and level. However, he then became too engrossed with the traffic information and avoiding action to have had any effect if a phone call had been made to Leeming.

THE JETSTREAM 41 PILOT reports that he was inbound to DTVA under IFR and in receipt of a RAS from DURHAM RADAR on 118.85MHz in VMC, some 10km clear of cloud and with an in-flight visibility of 10km+. His ac's HISLs & navigation lights were on.

Whilst executing an en-route descent some 20nm S of DTVA northbound at 220kt, RADAR instructed them to turn to avoid other traffic. Following a turn onto a heading of 270° whilst descending through about 6700ft QNH, TCAS enunciated an RA "MONITOR VERTICAL SPEED". RADAR then instructed them to stop descent and a "CLIMB" RA was enunciated commanding a 2500ft/min climb. His 1st Officer then spotted a Hawk ½nm away and 1000ft

AIRPROX REPORT No 008/07

below which crossed from their 11 o'clock to 5 o'clock and passed down their starboard side, about ¼nm and maybe 200ft below his JS41. He assessed the risk as "high".

THE HAWK PILOT reports his ac has a black colour-scheme and the navigation lights and red HISLs were on whilst carrying out a night general handling sortie in the Vale of York AIAA under a RIS from Leeming on 313.6MHz. A squawk of A0404 was selected with Mode C on; neither TCAS nor any other form of CWS is fitted.

Operating VFR at 9000ft RPS (1018mb) in a clear sky with an in-flight visibility of 50km he was informed of traffic to the South. Both he and his student navigator were visual with what they believed to be the traffic reported by ATC and assessed it to be heading in a northwesterly direction some 7nm away. A few seconds later, he initiated a level L turn to ensure that they would pass behind that traffic. During the L turn at 300kt he looked ahead to clear his flight path but on looking back to see where the previously-called traffic had gone, he became aware of an ac passing down their starboard side. He can only assume that his initial assessment of the situation had been flawed and that he had misidentified the reported traffic for another ac, thus unwittingly putting himself in conflict with the JS41 which passed 500ft above his jet about 1nm away to starboard. Although the other ac was not seen until after his manoeuvre, there was no risk of collision.

UKAB Note (1): The US Naval Observatory ephemerical data table for DTVA gives the time of sunset as 1640, hence 'night' existed from 1710UTC.

ATSI reports that the JS41 was inbound to Durham Tees-Valley from Humberside at FL80 and called the Durham APR at 1720:10. The APR identified the JS41, 36nm SE of the airport, and placed the flight under a RAS. There were two SE-bound contacts squawking A7000 and the APR passed appropriate traffic information to the JS41 crew about them. At 1724:15, when the JS41 was 22nm SE of the airport, the APR instructed the JS41 crew to descend to 3500ft QNH (1022mb). At that time, there were two other ac displaying Leeming squawks which had departed from Leeming and were tracking to the E. One was in the JS41's 2 o'clock at a range of 9nm, indicating FL40, whilst the other was in its 10 o'clock position at 12½nm indicating FL87. This latter return - the subject Hawk - commenced a R turn onto a SE'ly track and the Durham APR transmitted at 1724:30, "*A lot of military about at the moment there's one passing eight heading towards you from the west and one at four and a half climbing to the east of you and several others around but you're in the out of the way of those*".

Analysis of the Great Dun Fell (GDF) Radar recording shows that shortly after this transmission was made, the subject Hawk started to descend and at 1724:55 the APR transmitted "[JS41 C/S] *that traffic at 8 is now descended so turn left immediately on to west*" which the crew acknowledged. The prefix 'avoiding action' was not used. The APR updated the traffic information with "*..indicating 7-0 11 o'clock at 8 miles*". This was followed, at 1725:22, with "[JS41 C/S] *stop your descent turn right immediately heading 0-4-0 it's turned towards you*". The crew acknowledged this and then reported traffic in sight at 1725:30, before reporting a TCAS climb. The GDF Radar recording shows that at 1724:55, the Hawk was tracking approximately E indicating FL71 [Claxby FL69] whilst the JS41 was passing FL72 when the two ac were 6.9nm apart. By 1725:07, the two ac were only 4.5nm apart, still converging, with the Hawk indicating FL65 and the JS41 FL67. At 1725:14, both ac were indicating FL64 and 3.2nm apart. The Claxby Radar recording shows the situation at 1725:19, when the Hawk was NW of the JS41; the latter now turning L onto W, at a range of 2.4nm and the Hawk 100ft below the JS41. At 1725:27, the Hawk is in the 12 o'clock of the JS41, at a range of 1nm, some 300ft below it, before they pass starboard-to-starboard at a range of 0.3nm with the Hawk indicating FL63 and the JS41 FL68. [The RT transcript reflects that the JS41 pilot reported at 1726:00, "*...clear of traffic now and the TCAS has resolved...*"]

The APR advised that he did not inform Leeming of the inbound JS41 as traffic from the southeast inbound for RW23 does not normally affect them. The latest version of the LoA (dated November 2006 and extant during the period of this Airprox) simply advises that DTVA will inform Leeming of all traffic likely to affect ac operations at Leeming. The JS41 was displaying a discrete DTVA squawk and so the opportunity existed for Leeming to contact Durham should they have perceived any potential conflict. The unit also added that when Durham controllers attempt to coordinate they are frequently told that the Leeming traffic is in receipt of a RIS and is visual, making effective co-ordination impossible.

MIL ACC reports that the Hawk crew was operating under a RIS from Leeming ZONE positioning for general handling (GH) over the Vale of York. At 1724:13, the Hawk crew called ZONE after a radar handover from Leeming APPROACH, "*...level 8-5 on top for GH.*" ZONE replied, "*...good evening, identified flight level 85, Radar Information, limited from all around due to poor radar performance. ..understand you wish to manoeuvre in the*

block 5 thousand to 10 thousand feet..Barnsley pressure 1018, for GH.” The Hawk crew responded, “that’s correct..[Hawk C/S].” At 1724:36 ZONE instructed the Hawk crew, “..roger manoeuvre as required between 5 thousand and 10 thousand feet, Barnsley 1018, report 1 minute from completion.” Hawk crew replied, “1018, wilco, [Hawk C/S]”. At 1724:45, ZONE passed traffic information, “[Hawk C/S], traffic southeast, 6 miles, tracking north, indicating flight level 7-0 descending.” To which the crew responded, “Looking..” and shortly after at 1724:55, added “visual with that traffic [Hawk C/S]” ZONE acknowledged the visual call. DTVA called ZONE at 1726:44, whereupon the DTVA controller stated “your second departure, that’s now [squawking] 0404?” To which ZONE replied, “affirm.” After stating his intention to file an Airprox the DTVA controller stated at 1727:01, that he is filing because, “nearly a midair against [the JS41]...inbound.” ZONE replied, “We’re radar information he was visual all the way”, but DTVA then stated, “well mine wasn’t. I’m on a RAS, was trying to avoid it and he kept turning towards me. I’m still filing on him anyway...type of aircraft?” ZONE then suggested that the Leeming ATC SUPERVISOR call DTVA when available and the call was terminated.

By passing traffic information at 1724:45, ZONE has complied with the requirements of a RIS as per JSP 552 Section 235.115.1 in that:

“RIS is an air traffic radar service in which 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. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information.”

Notwithstanding that the traffic information was not wholly accurate because the ac were 8nm apart, not the 6nm given by the controller, ZONE would have been reassured when the Hawk crew reported visual contact 10sec later. However, JSP 552 Section 235.115.1 sub para b further states that a condition of RIS is that:

“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 conflicting traffic continues to constitute a definite hazard.”

If the controller had observed the continuing confliction then the proximity of the two ac would have justified such an update. However, in his report the controller states that after the Hawk crew reported visual:

“Subsequently, the Hawk turned onto a southerly heading when approx 3 miles away from the conflicting ac and descended. As the Hawk turned S the conflicting ac turned onto a westerly heading placing the ac within 1 mile of lateral separation. Upon turning, the conflicting ac climbed through the Hawk’s level and at the closest lateral point was approx 500ft above [the Hawk].”

This description of events would suggest that ZONE had not actually witnessed the Hawk passing down the JS41’s right-hand side and is in fact describing the turn taken by the Hawk after the Airprox had occurred. ZONE was controlling another ac at the time and it is entirely reasonable for a controller to divide their attention between ac on radar, particularly when the crew of the Hawk had reported visual with the conflicting aircraft. Unfortunately the crew of the Hawk may have mis-identified the ac concerned as is suggested in the pilot’s report, or, having initially dismissed the traffic as posing no threat, had not observed the left-hand turn performed by the JS41 after they had reported visual. The left-hand turn taken by the JS41 actually reduced the final separation between the ac. Had it remained on its original track and had all other factors remained the same it would have passed ahead of the Hawk.

The LoA between DTVA and Leeming requires Leeming ATC where possible to coordinate outbound ac with notified DTVA inbounds. DTVA had not notified Leeming ATC that the JS41 was inbound. Therefore, Leeming were under no obligation to coordinate the Hawk under a RIS. DTVA did not attempt to coordinate the JS41, in receipt of a RAS, against the Hawk. This Command considers that ZONE’s omission to issue additional traffic information cannot be considered to be a contributory factor because the crew had reported visual contact. However, if additional traffic information had been passed, the Hawk crew’s situational awareness may have been enhanced. This Command is currently considering issues surrounding traffic information passed to crews at night and the potential for sighting anomalies.

UKAB Note (1): The UK Mil AIP at ENR 5-2-7 for military aircrew and the UK AIP at ENR 5-2-2 for civilian flight crews, promulgates that within the Vale of York AIAA:

AIRPROX REPORT No 008/07

a. Considerable military fixed wing and rotary flying training, including, in addition to airfield let down procedures, exercises in stalling, spinning, steep turns and formation flying, takes place within the area bounded by lines joining the following co-ordinates:

54 16 25N 001 44 18W - 54 24 17N 001 24 49W - 54 33 28N 001 07 34W - 54 35 50N 001 00 48W - thence along the coast to 53 56 00N 000 10 24W - 53 43 54N 000 40 00W - 53 41 34N 001 04 43W - 53 43 12N 001 16 36W - 54 11 52N 001 45 44W - origin. Operating levels are mainly from the surface to FL200.

b. Peak activity takes place \pm 0700 - 2359 Mon - Thu. \pm 0700 - 1600 Fri.

c. Pilots transiting the area are advised to maintain constant vigilance and a LARS is available from Leeming and Linton ATC.

THE HAWK PILOT'S STATION comments that this unfortunate Airprox appears to be a genuine case of mistaken identity. Although the Hawk pilot was passed information on conflicting traffic, he misidentified this traffic and manoeuvred to avoid another ac. It was fortunate that this manoeuvre also assisted in breaking any real conflict with the Airprox aircraft. The Hawk pilot was conducting legitimate military training within Class G airspace. CAA policy is that CAT should wherever possible operate within CAS, utilising the highest level of ATS available. Where this is not possible, there will always be potential for conflict between different users of Class G airspace and all aircrew, both military and civil, need to make their best efforts to mitigate this risk.

HQ AIR COMMAND (OPS) - previously HQ STC - comments that the traffic information passed to the Hawk may have been slightly inaccurate. However, having called "visual" it is reasonable for the controller to have assumed that the Hawk crew had seen the JS41. Having then concentrated their lookout on the one contact they was late in spotting the subject JS41 and came closer than the ideal. It is better, where possible, to split the lookout where there is more than one crew member to ensure all eyes are not in the same direction.

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 ACC Advisor to the Board explained that the LoA between the two ATSUs involved here had been subject to recent revisions but despite their close proximity it seemed that these two units were, at the time of the Airprox, still experiencing some difficulties operating in an integrated manner in this busy environment. The Advisor opined that this Airprox illustrated, unfortunately, an absence of meaningful co-ordination between Leeming ATC and Durham Tees Valley Airport ATC: it was disappointing that these two ATSUs did not appear to have co-operated more fully on this occasion. The Chairman reminded Members of the hard work that had been expended by Mil ACC; CAA-SRG and by the two units to improve their working agreements, specifically their co-ordination arrangements. This work had, in part, resulted from previous Airprox investigations. The Board's ATSI Advisor echoed these sentiments, adding that the terms of the LoA are robust and if followed are quite workable. From the comprehensive reports provided by both ATC authorities, it was plain that the requirements of the LoA were not strictly applied in this instance, Durham RADAR neither passing traffic information nor initiating co-ordination with Leeming ATC before the Airprox occurred. For their part, Leeming ZONE had not thought to be proactive by informing Durham RADAR of what the Hawk pilot was doing: this suggested a lack of appreciation on the part of the military controllers of the nature of the ATS provided to inbound IFR CAT.

It was evident from the various accounts provided that the JS41 pilot had obtained, appropriately, the highest level of radar service available for transit through the Class G AIAA – a RAS. The ATSI report made it clear that under the terms of the LoA it was incumbent on Durham RADAR to inform Leeming of any inbound traffic likely to affect them. In this instance it should have been plain that the JS41 would present a potential conflict with the outbound jets, and vice versa: indeed the Durham RADAR controller had pre-warned the JS41 pilot of the generally busy traffic scenario before he initiated the JS41's turn onto W at 1724:55 when the two ac were a little over 6nm apart at broadly the same level. It seemed to Members that the Durham controller, having descended the JS41, had assumed that the Hawk might maintain its initial climb and easterly track so that the descending JS41 would pass clear beneath the jet, thereby preserving the stipulated separation minima – 5nm, or 3000ft based on uncoordinated Mode C. However, the manoeuvres of the Hawk pilot during his GH sortie had apparently

invalidated the controller's assumption, the fast-jet's subsequent descent and turn necessitating further immediate action. This Airprox illustrated the difficulty of attempting to establish separation based on rates of climb/descent without knowing the intentions of the other traffic, especially when this traffic is conducting training in Class G airspace. Appropriate liaison with ZONE in advance might have revealed earlier to the Durham controller the unpredictable nature of the GH sortie and engendered co-ordination to resolve the issue. Members were critical of the controller for not initiating co-ordination at an earlier stage: it seemed that Durham RADAR's time might have been more judiciously utilised contacting ZONE before rather than after the event. Balancing this, Members noted the DTVA ATC's view, reiterated in the ATSI report, that when Durham controllers attempted to co-ordinate with Leeming they were frequently told that the Leeming traffic was under a RIS and visual, seemingly making effective co-ordination impossible. That might well have been the case here because Leeming ZONE had called their traffic to the Hawk pilot who had reported being in visual contact with the airliner and therefore responsible for maintaining visual separation under VFR. Nevertheless, in the Board's view, the controllers here could have worked within the spirit of the LoA more effectively and attempted to assist the passage of all of their traffic through this mutually available but busy airspace. There was clearly a divergence here between the requirements of IFR GAT where the controller was seeking to achieve the requisite separation under the RAS of 5nm horizontally - but only 1000ft if co-ordinated vertically - and on the other hand a highly manoeuvrable fast jet operating VFR on a general handling sortie where ZONE's only responsibility was to call traffic information if he could. For Durham RADAR's part this necessitated positive action at considerable range and the first positive action taken was not initiated until the two ac were 6.1nm apart. In a controller Member's view this was far too late and others agreed the situation should not have been allowed to deteriorate to these close quarters in the first instance. The subsequent turn instructions necessary at these ranges could still not resolve the situation and illustrated a salutary lesson - that horizontal avoiding action must be taken at an early stage to be entirely effective. A CAT pilot Member was concerned that the manoeuvrability of the JS41, an airliner, placed the pilot at a disadvantage when transiting through an AIAA where highly manoeuvrable fast-jets were conducting VFR operations at night, as they are legitimately entitled so to do. Nevertheless, the potential for a conflict should have been plainly evident to the controllers involved. Notwithstanding DTVA's reservations over the difficulties of co-ordination with Leeming, to rely on taking unco-ordinated separation with the JS41 against highly manoeuvrable fast-jets was not the best solution when Mode C data and the identity of the controlling ATSU was plainly evident and a co-ordinated resolution in the vertical plane would have been the most effective method of preventing a conflict. Moreover, the Mil ACC report had shown that the LoA requires Leeming ATC to co-ordinate their ac with DTVA, but only when notified of inbound traffic. Whilst this would clearly have also required the co-operation of the Hawk pilot - who might have been restricted in his ability to manoeuvre throughout his desired operating band for a few moments until the JS41 passed clear - this seemed to be a reasonable compromise. Indeed, a number of Members felt that such co-operation would have been readily obtained from the Hawk crew. Therefore, the omission of co-ordination by either controller was considered to be part of the cause.

Here, Members thought that the JS41 pilot was merely responding to the avoiding action advice belatedly offered by RADAR until TCAS was called upon to advise on action needed to resolve the situation. Clearly the nimble fast-jet should never have got to such close quarters and the Hawk pilot's laudably honest and open account had revealed that his initial assessment of the situation had been flawed. However, it was difficult for Members to rationalise how both the instructor pilot and his student navigator had misidentified the traffic reported to them at 6nm - but actually a little further away at a range of 8nm. The Board was briefed that no other ac were shown on the radar recording in the vicinity of the JS41 or close to the same relative bearing from the Hawk and the JS41's HISLs and navigation lights were all on. Moreover, given that the Hawk pilot had stated that he spotted the reported traffic at about 7nm away - not far short of the mark at all - CAT pilot Members could not reconcile the Hawk pilot's reported level L turn with his reported intention to ensure that his jet would pass behind the reported traffic. This turn seemed to be the wrong way to pass astern of the JS41 at the geometry plainly evinced by the radar recording, but this was at night and it was evident from the Hawk pilot's candid account that he had indeed misjudged the geometry of the situation and unwittingly flown into close quarters with the JS41, which the Members agreed was another part of the cause. A number of factors all had a bearing on this Airprox to various degrees but following a lengthy and wide ranging debate the Board resolved that this Airprox had been the result of a conflict in the Vale of York AIAA, exacerbated by the omission of co-ordination and the misjudgement of the geometry of the conflict by the Hawk crew.

Turning to the inherent risk of this encounter: plainly, for whatever reason, the Durham RADAR controller's avoiding action had not been effective and the controller had not succeeded in his aim of preserving clear airspace of 5nm and 3000ft around the JS41. Thus as the ranges decreased and the JS41 descended toward the Hawk, also descending at a similar rate, TCAS eventually enunciated an RA. The radar data showed that the JS41 crew

AIRPROX REPORT No 008/07

promptly succeeded in reversing their descent, achieving a climb above the Hawk which had meanwhile levelled out at FL63 as it crossed 1nm ahead of the airliner. At this point the JS41 crew also sighted the small Hawk jet, suggesting to some Members that these actions had effectively removed any risk of a collision. ZONE had reported the position of the JS41 to the Hawk crew, the latter sighting the JS41 within 10sec but incorrectly assessing the relative motion. So it was not until the Hawk pilot looked again after clearing his L turn that he said that he realised that the airliner was passing down his jet's starboard side at a range of 0.3nm and some 500ft above his ac at the closest point, according to the radar data. Therefore, it was not surprising that he might have perceived there to be no risk of collision. The Hawk crew's lack of appreciation of what was actually happening convinced other Members that safety was not assured by any means. The Board was evenly divided here and so the Chairman called for a vote: by the narrowest of margins it was concluded that the safety of these two ac had indeed been compromised in the circumstances reported here.

A Member commented upon the CAA policy relating to public transport flights routed outside CAS through Class G airspace as here. Whilst the CAA policy statement recommends that public transport flights be conducted, whenever possible, within CAS, it was clear that the JS41 pilot had obtained the highest level of radar service offered by civilian ATSUs in Class G airspace in conformity with the CAA's recommendations. The Chairman also mentioned that the Flight Operations Division of SRG had, by way of a recent 'FODCOM', issued guidance to operators conducting flights into/out of aerodromes outside CAS in the preparation of a safety case within their safety management systems. The Board's Advisor from DAP briefed the Members that work is in progress on a revision to the requirements of the ANO to ensure that operators are cognisant of the risks associated with routeing scheduled public transport flights outside CAS.

With both flights in receipt of a radar service there appeared to Members to be a disturbing lack of willingness on the part of both of these two ATSUs to talk to one another. Notwithstanding, that the onus might have been on DTVA to initiate the co-ordination dialogue, the JS41 was plainly displaying a discrete Durham RADAR squawk and so the opportunity existed for Leeming to contact Durham should they have perceived any potential conflict. Whilst ZONE might have been content that he had discharged his responsibilities entirely under the RIS after he had passed traffic information to the Hawk pilot who then reported visual contact, it was disappointing that ZONE had not been a little more pro-active. Controller Members expounded a view that recognisable traffic operating at night and being controlled by an adjacent ATSU should instil recognition of the other controller's difficulties; the separation he was seeking to achieve against other traffic and an incentive to be a little more helpful and proactive in anticipation that this would be reciprocated. A willingness to pass on traffic information between units and thereby facilitate possible co-ordination and the application of vertical separation - which is entirely reasonable when providing a RIS - would have been helpful in these circumstances and ensured safe passage for both ac as these crews proceeded about their legitimate occasions. However, in the light of apparently unhelpful attitudes, injudiciously applied working arrangements and the disappointing absence of sound working relationships, Members asked the Chairman of the Board to write to those ATSUs involved to communicate the Board's concerns on this topic, following the assessment of this Airprox.

PART C: ASSESSMENT OF CAUSE AND RISK

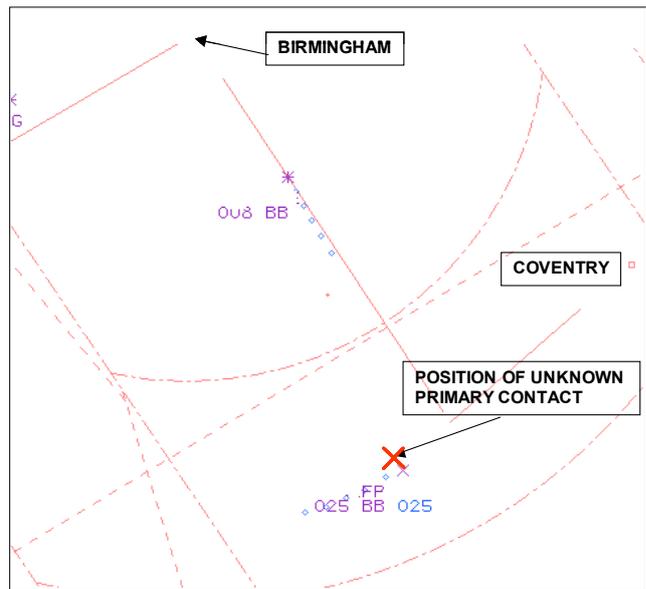
Cause: Conflict in the Vale of York AIAA exacerbated by the omission of co-ordination and a misjudgement of the geometry of the conflict by the Hawk crew.

Degree of Risk: B.

AIRPROX REPORT NO 009/07

Date/Time: 3 Feb 1600 (Saturday)
Position: 5220N 00155W (11nm SSE Birmingham)
Airspace: Birmingham CTA (Class: D)
Reporter: Birmingham APR

	<u>1st Ac</u>	<u>2nd Ac</u>
Type:	BAe 146	NK
Operator:	CAT	NK
Alt/FL:	3000ft↓ (QNH NR mb)	NR
Weather	VMC NR	NR
Visibility:	+10km	NR
Reported Separation:		
	~100ft V/100m H	NR
Recorded Separation:		
	NR	

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE BIRMINGHAM APR reports that he was on duty in the Birmingham Director (DIR) position when a BAe146 was being vectored downwind left hand for an ILS approach to RW33, towards the end of a sequence of traffic. Shortly before turning it onto a base leg heading he observed a primary contact in the Warwick area, S of the airfield by about 12nm. In that position he would expect traffic to be below the base of CAS and not above 1400ft amsl. However, the strength of the primary contact gave him cause for concern as the base of CAS to the S is 3500ft and he was uneasy about vectoring the BAe146, descending to 2500ft, directly overhead the contact. He called Coventry Radar to ascertain if the traffic was known to them but it was not. He therefore continued the BAe146 on a heading to miss the primary contact and passed TI. The vectors then placed the ac E of the approach and it closed to the centreline from the right.

The pilot gave no indication of the type or proximity of the traffic and it was only after the ac had landed that the pilot advised of the proximity of the unknown traffic stating it was about 0.5nm away and slightly above him (this would have placed it in CAS without a clearance). The pilot indicated he was happy with the TI that was passed which helped him to see the traffic.

THE BAe146 PILOT reports flying a scheduled passenger flight approaching Birmingham squawking with Mode C and TCAS was fitted. While heading 050° at 210kt during radar vectoring for an ILS approach to RW33, the controller informed them of unknown traffic and gave an avoidance vector. They saw an unknown light ac ½nm away in his 11 o'clock, at about the same altitude, and on opposite heading. The ac passed 100m down his left and he considered that the avoidance vector saved them from collision with other ac. He got no TCAS indication of the other ac and assessed the risk as being very high.

UKAB Note (1): Despite extensive tracing action which included contacting all GA airfields in the area, the other ac was not traced.

UKAB Note (2): The BAe146 painted on the radar recording throughout the incident. A primary-only contact can be seen just to the S of the area where the 'infringer' was reported for a few sweeps after the incident before it disappears in the Warwick/Coventry area.

ATSI reports that this Airprox was filed by Birmingham APR and occurred while a BAe146 was being vectored downwind left-hand for an ILS approach to RW33 at a position some 12nm S of the airfield. The event itself is not seen on any recorded radar.

AIRPROX REPORT No 009/07

APR was vectoring a sequence of inbound ac of which the BAe146 inbound from Munich via the airways system was one. He had passed TI on an observed primary radar return to a previous inbound before providing TI at 1558 on a primary return in the BAe146's eleven o'clock at a range of one mile. The BAe146 pilot did not respond immediately and the APR again advised that the traffic was now on the left hand side at half a mile. Although provision of avoiding action was not required, APR had decided to vector the BAe146 through the localiser, rather than route it immediately overhead the primary return, to provide some separation from the traffic which, due to the strength of the primary return, was causing him concern. He also attempted to 'identify' the unknown by contacting an adjacent radar unit. In addition APR would have expected the other traffic to be below the base of CAS (1500ft AMSL).

At 1558:30 the BAe146 pilot advised that the traffic was in sight and was then vectored back for an ILS approach. Subsequently the BAe146 pilot in a conversation with GMC advised that the other ac had been above him.

Although a primary radar return was observed on the Birmingham radar, MATS Part 1 Section1, Chapter 5, Page 13, Paragraph 14.2 states when operating in Class A or D airspace:

"If radar derived, or other information, indicates that an ac is lost, has experienced radio failure or is making an unauthorised penetration of the airspace – avoiding action shall be given and traffic information shall be passed."

At the time of this Airprox there was no radar derived (e.g. SSR) or other information to indicate that unauthorised penetration of the airspace had occurred and accordingly the Birmingham APR controller was entitled to disregard the primary radar return.

The ATC actions exceeded those required for the service being provided.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot of the BAe146, transcripts of the relevant RT frequencies, a radar video recording, reports from the air traffic controller involved and reports from the appropriate ATC authorities.

Members unanimously commended the Birmingham Controller for his chosen course of action which provided the BAe146 with albeit small but sufficient separation from the 'infringer' to remove any risk of a collision. He was not required and did not attempt to provide standard separation and was perfectly entitled to assume the light ac was below the base of CAS; his 'second sight' probably prevented a most serious incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An unauthorised penetration of CAS by an untraced light ac leading to a conflict resolved by the Birmingham APR.

Degree of Risk: C.

AIRPROX REPORT No 010/07

UKAB Note (3): The UK AIP at ENR 5-2-2 promulgates that peak activity in the Vale of York Area of Intense Air Activity (AIAA) takes place 0700 to 2359, surface to FL200. Crews are advised of:

Considerable military fixed-wing and rotary flying training, including, in addition to airfield letdown procedures, exercises in stalling, spinning, steep turns and formation flying.

THE HUMBERSIDE APPROACH RADAR CONTROLLER (APR) reports that the JS41 departed Humberside routing UMBEL – ALASO at 1418 following a R turnout from RW21 onto a radar heading of 360° climbing to FL100. The controller reports being aware of two ac squawking A5131 & A5132 “intercept manoeuvring” NNE of Humberside – the two Hawks. The ac squawking A5131 was SE-bound indicating FL210 Mode C to the NE of Humberside. When it was seen to reverse direction, the JS41 crew was instructed to turn L onto a heading of 340° and climb to FL185 to keep clear of the tracks the Hawks appeared to be taking up for their intercept. The Hawk then turned towards the JS41. Traffic information and then avoiding action was given to the JS41 crew, as the Hawk was 4nm to the S of the JS41 indicating FL125. When the JS41 was about 20nm NW of Humberside traffic information was passed on the Hawk that was now 2nm S of the JS41, some 500ft below it. The Hawk then turned N and passed behind the JS41 indicating less than 500ft separation on Mode C less than 1nm away. The JS41 reported a TCAS RA and the Hawk continued on its course to the NE (sic).

Boulmer was contacted on the landline to request the Hawks manoeuvre towards the E Coast as the traffic was under a RAS. Boulmer advised that they were a pair of Hawks operating from 5000ft up to FL240. The JS41 was turned L onto a heading of 290° as there was further unknown traffic 12nm away to the NE, heading SE indicating FL130, before the JS41 was handed to London MILITARY squawking A6143 at 1432.

A TCAS II event form was completed.

The 1420 Humberside METAR was reported as 300/8kt; >10km; FEW@3000ft; QNH 1005mb.

THE CRC BOULMER CONTROLLER (FC) reports that he was controlling a pair of Hawks - Hawk (A) & Hawk (B) - in the Vale of York conducting mutual practise intercepts (PI's) in a block from 5000ft to 24000ft Humber RPS (997mb). The Hawk pair was operating on a RIS throughout the sortie and had reported the weather conditions to be CAVOK. Hawk (A) had set up on a Combat Air Patrol to the SE of Humberside by about 5nm; Hawk (B) was approximately 60nm to the N of Hawk (A). Hawk (A) turned N at 16000ft to intercept Hawk (B). On receiving information on the location of Hawk (B), Hawk (A) manoeuvred NW. At this time an ac squawking A4277 – the JS41 - was climbing N out of Humberside. As Hawk (A) approached the A4277 a ‘stranger call’ was passed in terms of Bearing – Range - Altitude [BRA] and heading to the pilot of Hawk (A). At this point, there was about 10nm horizontal and 8000ft vertical separation between Hawk (A) and the ‘stranger’ A4277 which was climbing slowly: this information was also passed at this time. The pilot of Hawk (A) called “Tally” as a reply to the ‘stranger’ call. As the A4277 continued to climb to FL140, Hawk (A) descended quickly to 13000ft. A further ‘stranger’ warning was passed to Hawk (A) shortly after completing this manoeuvre. Hawk (A) again called “Tally” and stated that he was below the ‘stranger’. At this point Hawk (A) was approximately 5nm S of the A4277 which was still heading N. Hawk (A) then manoeuvred onto a N'ly heading. A call from the Fighter Marshall Assistant (FMA) was then received, informing him that Humberside ATC were on the landline and he would transfer the call, but the call transfer failed. He then received a call from the FMA requesting that he call Humberside ATC. At this point the A4277 was manoeuvring onto W and Hawk (A) was heading approximately 010° about 2nm away with 1000ft vertical separation and, as a result, the two ac were divergent. He instructed his assistant to initiate a call to Humberside ATC who then informed them that their ac [the JS41] was heading W and would shortly be handed-over to London MILITARY.

ATSI reports that the JS41 departed Humberside, was identified by the APR at 1420 and correctly placed under a RAS. The APR had observed contacts NNE of Humberside that were manoeuvring and appeared, to the APR, to be practising mutual intercepts. One of these tracks, subsequently found to be the subject Hawk – Hawk (A) - was SE bound indicating FL210 at this point 8nm NE of Humberside.

Just before 1425, seeing the contact reverse track and based on previous observation of the manoeuvres, the APR turned the JS41 onto a heading of 340° which was a tactical heading to split the tracks and avoid traffic some miles ahead of the JS41 on its intended route. The Great Dun Fell Radar recording, at 1424:10, shows Hawk (A) to be established on a NW'ly track in the JS41's 4 o'clock at 8.7nm. The JS41 is indicating FL106 and the Hawk FL214. The two contacts are on parallel tracks. The APR, at 1424:30, attempted to co-ordinate the traffic with

Boulmer but was unable to achieve either direct controller-to-controller contact or coordination. At 1425, the subject Hawk is in the JS41's 4 o'clock at 8.1nm indicating FL205 with the JS41 indicating FL118. The contacts are still on parallel tracks. Just after 1425:30, the APR advised the JS41 crew that there was traffic – Hawk (A) - in the JS41's 5 o'clock, 5nm (on the APRs displayed radar picture) now tracking behind with no height information and was trying to co-ordinate it. The Great Dun Fell recording shows that at 1425:21 the subject Hawk commenced a L turn W'ly [UKAB Note: to pass astern of the JS41] and at 1425:28, is in the JS41's 4 o'clock, 7.5nm indicating FL194; the JS41 is indicating FL125. At 1425:41 the Mode C read-out from Hawk (A) is lost momentarily, but reappears at 1425:52. At 1426 the APR, using the phrase 'avoiding action', passed an avoiding action L turn onto 270° and advised that the Hawk was *"in your six o'clock range 4 miles turning towards you indicating FL125"*. The radar recording shows that at 1426:08, the Hawk, still on a W'ly track, was indicating FL123 in the JS41's 5 o'clock, 4.8nm; the JS41 is climbing through FL133. At 1426:32 the avoiding action turn can be seen to be taking effect and the Hawk is seen 3.7nm S of the JS41 in a R turn towards it. Hawk (A) is indicating FL130 and the JS41 FL139. The CPA occurred at 1427:04, when Hawk (A) was ESE of the JS41 by 1.7nm. Hawk (A) is indicating FL134 and the JS41 FL137. Thereafter the tracks diverge as Hawk (A) steadies on a NW'ly track and the JS41 continues heading 270°. The JS41 crew advised the APR they had received an RA at 1427:30.

The APR provided a RAS as required by MATS Part 1, Section 1 Chapter 5 Page 2, Para 1.4.1.e). No apparent ATC causal factors.

MIL ACC reports that the Hawk pair was receiving a RIS from CRC Boulmer Controller 3 (FC3). The Lead ac of the pair – Hawk (A) - was the ac involved in the Airprox. At 1425:23, the Fighter Marshall's Assistant (FMA) called FC3 who answered the line and FMA said, *"...I've got Humberside for you reference...4277 squawk."* The connection was unsuccessful and FC3 continued passing tactical information to the Hawk pair. At 1425:50, FC3 stated, *"[Hawk (A) C/S] Boulmer stranger BRA north west 5, tracking north west, indicating climbing through Flight Level 1-3-0."* Hawk Lead replied immediately at 1425:57, *"[Hawk (A) C/S]..tally clear."* FC3 then provided more tactical information until called by the FMA, at 1426:13, who stated *"..I was unable to transfer Humberside. Can you get a controller to give 'em a ring please?"* FC3 confirms who to call and regarding which ac. After further tactical calls, FC3 updated the traffic information at 1426:47, *"[Hawk (A) C/S] previously called stranger BRA north 3 manoeuvring south west indicating Flight Level 1-4-0."* The lead Hawk pilot replied, *"still good tally."* FC3's assistant (FC3A) called the Humberside APR. When the Humberside APR picked-up the line, FC3A stated, at 1427:00, *"... it's Boulmer Assistant 3 here."* The Humberside APR responded and FC3A continued, *"We've got some traffic information for you, erm, on our 5132, 5131."* The Humberside APR acknowledged the traffic information and FC3A explained, *"Yeah that's.....2 Hawks..currently working the Vale of York from 5 thousand to 24 thousand."* The Humberside APR then stated, *"Yeah I know. I've just taken avoiding action on them. Wherever I go, they're following him. I'm under a Radar Advisory Service trying to hand it off to London Mil so, thanks."* FC3A asks, *"Is that for the 4277?"* the Humberside APR replied, *"Yeah it is and I'm going West at the moment, I'm trying to get him North, trying to keep clear of yours, but wherever I go, he's going."* FC3A then asks, *"He's going over to London is he?"* the Humberside APR responded, *"He's going to London Mil on a"* and is then heard to transmit at 1427:38, *"[JS41 C/S] affirm if you continue West Bound he's..in your right..3 O'clock..correction half past 4, now range of 4 miles tracking North West indicating Flight Level 1-4-0, there's a pair manoeuvring in the Vale of York and, er, they're only under a Flight Information Service so I'm just trying to avoid at the moment."* The Humberside APR then expressed an expletive and continued speaking to FC3A, *"Alright, well there's nothing you can do if you can't take a turn away so I'm just going to have to avoid."* FC3A says, *"Yeah."* The Humberside APR says, *"Thanks."* FC3A then asked, *"So are you just happy to keep avoiding, yeah?"* The Humberside APR replied, *"Well, no, I'm not happy coz he's Radar Advisory and he's just had a TCAS against them. I mean, if you can put them to the East Coast for about 5 minutes I'd be very grateful."* FC3A stated, *"Okay."* The Humberside APR and FC3A then rang off.

[UKAB Note (4): Mil ACC also provide a comprehensive radar analysis, which has been omitted here in the interests of brevity. The Great Dun Fell Radar recording shows that Hawk (B) remained at about FL195, in excess of 15nm to the N at the time of the CPA between the subject ac.]

FC3 fully complied with all the requirements of RIS in accordance with JSP552, Section 235.115. Not only was traffic information passed and the traffic reported in sight, but traffic information was updated when the ac continued to converge. When the updated traffic information was passed, the Hawk pilot reported that he was still visual and shortly afterwards turned to pass behind the JS41. There are no military ATC issues in this Airprox.

AIRPROX REPORT No 010/07

THE HAWK PILOT'S STATION comments that this Airprox appears to have been submitted as a result of TCAS alerts received by an ac flying under RAS in Class G airspace. There seems to be a discrepancy in the miss distance assessed by the CAT crew and the evidence of the Hawk crew. The closest approach of the Hawk pair has been verified by radar and matches their recollection of events. There does not appear to have been any risk of collision at any time, and the Hawk crews were fully cognisant of the position of the JS41 throughout.

THE JS41 PILOT'S COMPANY comments that Commercial Air Traffic servicing East Coast routes has historically used direct routings through Class G airspace due to the lack of an appropriate airway structure to support these routes. All company crews are well aware of both the UK AIP comment and any NOTAMs relevant to specific military operations in Class G airspace. The company notes that whilst these mechanisms exist for the Military to notify their activity, no similar ability exists to publicise regular CAT activity in similar airspace. In an attempt to address this, the Company has previously provided schedule details to the Military to allow them to disseminate this information as necessary.

This flight was operating under a RAS which is the highest level of radar service available in this airspace and followed all instructions given under this service which were attempting to keep the aircraft clear of the Hawk. Despite this manoeuvring, the actions of the Hawk also triggered multiple TCAS RA events which the Jetstream crew must obey.

The Jetstream crew's report was based upon their perception of events based upon the nature of the instructions given and manoeuvring required by the RAS and the subsequent TCAS information and alerts. Given that they were not visual with the Hawk at any stage, their perception of how close the encounter was and their level of concern is entirely understandable. It contrasts markedly with the experiences and comments of the Hawk pilot and his Station.

Finally, it is of concern that the Hawk pilot, who was visual at 8nm range, chose (for whatever reason) to erode this separation significantly and flew a path that resulted in TCAS RAs despite identifying the aircraft as a small civil airliner. This suggests that the pilot was not aware of the TCAS envelope of the Jetstream and the impact that the manoeuvring of his high performance aircraft would have on it. This is a common factor in other recent Airprox reports such as 116/06.

HQ AIR COMMAND (OPS) comments that the two Hawks, operating in the Vale of York AIAA, saw and avoided the Jetstream which did not see them. The AIAA is just that and it will always prove difficult for civil controllers to weave their ac through this area. Even at the separation distances noted in this incident, a TCAS RA was generated by the manoeuvres of the Hawks and this should be noted by the Hawk crews.

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 & ASACS controllers involved and reports from the appropriate ATC and operating authorities.

It was evident to the Board that both the JS41 crew and the Hawk pair were operating quite legitimately in Class G airspace. Whilst the JS41 pilot's company had stated that no "appropriate" airways structure was available to support their E Coast routes, a controller Member opined that CAS was available to ac flying to Aberdeen, albeit this would probably not permit the most direct routeing. The Chairman advised the Board that extensive 'military~civilian' liaison had been conducted by HQ STC [now HQ Air Command (Ops)] flight safety staffs in the past. The Board was reminded that this had been closely focused on Scottish ADRs, posters having been produced with appropriate advice and information for military crews about CAT activity on these routes. However, with regard to the subject JS41 company's schedules, neither the ASACS Advisor, the LATCC (Mil) controller Member nor the Air Command Member had been apprised of this company's specific schedules which were not generally available to military crews. The Air Command Member later opined that even if such information were currently available to aircrews, this operator was just one of many plying routes through Class G airspace and he was not sure what benefit there would be as many military flights operated without an ATS. The ASACS Advisor and the LATCC (Mil) controller Member both said that nevertheless they would like such general information, a point which the Chairman undertook to pass on to the airline concerned.

It was plain to the Members that from the Hawk crews' perspective they were merely conducting mutual PIs with no intention whatsoever of executing any form of visual identification/intercept training against civil traffic. Moreover, it had been reported that the Hawk leader had specifically broken-off the training to ensure that he could obtain and maintain visual contact on the reported traffic. The ASACS Advisor commented that although the Hawk leader said that he had terminated the intercept so they could gain tally, it was unfortunate that they did not tell the FC that. Any call for the time being terminating the exercise had apparently been made on the intra-formation frequency which was not available to the FC and not recorded. Had the controller been aware that the lead crew was no longer intercepting the 'target' ac – Hawk (B) - but instead attempting to gain 'tally' with the JS41, the FC could have concentrated on attempting to achieve co-ordination with the APR. The inability to achieve co-ordination here was significant and should not be underestimated but the FC's responsibilities under the RIS had been complied with and so he continued with the tactical aspects of his control, leaving his assistant to talk to the APR. The Advisor explained that the ASACS doctrine of endeavouring to minimise encounters between interceptor ac and non-participating ac by 'Plan clear, co-ordinate, apply Mode C separation, apply the service' is constantly being reminded to FCs. He added that CRC Boulmer recognised that despite the proximity of the JS41 to the Hawk when detected by FC3, more urgency to achieve co-ordination could have been shown by the fighter controller. Members agreed that the lengthy landline dialogue between the APR and FC3A clearly did not achieve anything constructive and the controller should have taken the call. Members noted that the APR's attempt to contact the controller had initially been thwarted by the landline switching failure. It was also plain that if the APR had specified at the outset that co-ordination was being requested then the controller's time might not have been wasted discussing the issue with the FC3A who could not agree any co-ordination at all. Moreover, it seemed to some that the assistant's conversation was misleading as FC3A appeared to be entering into an agreement with the APR which Assistants are not empowered to do. The ASACS Advisor explained that from their perspective, the working relationship between CRC Boulmer and Humberside ATC was sound. Nevertheless, ASACS controllers' Assistants are being reminded of the types of conversations they can and cannot enter into with adjacent unit's control staff. Controllers/Assistants alike must be aware that requests for co-ordination must take a high priority, second only to actual control of ac, and the need to swiftly conclude such agreements is essential. However, in the subject Airprox this occurred all too late as contact was not established with FC3A until 1427:00 – just moments before the CPA. For whatever reason, the inability of the APR to achieve satisfactory contact with the fighter controller promptly - and thereby agree co-ordination before standard separation was eroded - was a significant point and a salutary lesson here.

As no co-ordination had been agreed beforehand, the APR was seeking to achieve the requisite separation under the RAS of 5nm horizontally or 3000ft vertical separation based on indicated Mode C. This was entirely different to that of a highly manoeuvrable fast jet operating under a RIS on an air defence training sortie where the controller was only under remit to pass traffic information. The radar and RT recordings clearly evinced that the Hawk pilot had initiated his descent after turning towards Hawk (B) whilst inbound for the PI, over 1 min before he was first aware of the presence of the JS41. This was also some 30sec after Hawk (A) turned L onto a heading of 290° to offset for the intercept at a range of over 40nm from Hawk (B). Whilst it seemed odd to CAT pilot Members that the Hawk pilot should apparently descend toward the JS41 to gain visual contact on the airliner, the lead Hawk pilot reports he was manoeuvring through 13000-14000ft RPS when the JS41 was pointed out to him in the first call of traffic information from FC3. This was issued at 1425:50, when FC3 reported to the pilot of Hawk (A) the *"..stranger...north west 5 tracking north west indicating climbing through Flight Level 1-3-0."* It was clear from the RT recording that the pilot of Hawk (A) had immediately advised FC3 that he was visual with the other ac, the airliner – at a range of 8nm he said. The radar recording also showed that the lead Hawk pilot had carried on down a little further and had descended to 1000ft below the JS41. An experienced Air Defence pilot Advisor explained that this was the most advantageous position to be in because visual contact was easier to maintain with another ac. But this was all unbeknown to the APR who at the time was still endeavouring to maintain standard separation against the Hawk whose intentions were completely unknown to the APR at this point. A controller Member opined it would have helped if the APR could have been made aware that the Hawk pilot was visual with the JS41 at the outset but it had been shown that the APR's attempts to establish contact with the FC3 had initially been fruitless. The RT recording also reflected further traffic information passed by FC3 to Hawk (A) at 1426:47, and that the pilot of Hawk (A) was *"still good tally"* as he continued to manoeuvre below the airliner. Despite the APR's efforts the avoiding action turns did not enable the controller to achieve the stipulated separation minima as the Hawk continued to manoeuvre from the JS41's starboard quarter and then drew astern. However, a controller Member suggested that the APR's avoiding action turn instruction onto W had only succeeded in turning the JS41 across the nose of the Hawk which was by then flying a parallel course off the airliner's port quarter and 900ft below it, where the JS41 pilot apparently thought there were two jets. Whether this was a result of 'ghosting' on the airliner's TCAS display or whether the JS41 crew misunderstood what they had been told by the APR was not clear but the

AIRPROX REPORT No 010/07

radar recording reflected that only one ac was in the vicinity – Hawk (A) –the leader’s No2 – Hawk (B) - being some distance to the N and in the order of 6000ft above these two ac. Whilst the azimuth information about other ac displayed on TCAS is generally not as accurate as the vertical data derived from Mode C, CAT pilot Members stressed that the safety bubble surveyed by TCAS’ electronic eye was basically a function of time-to-conflict and level. The Members opined that if the Hawk’s vector was such that the ac was pointed in the direction of the JS41 projected track, at overtaking speed, or the latter manoeuvred across the fast-jet’s nose such that the safety bubble of broadly 400ft above and below at these levels would potentially be breached, ahead and also astern of the JS41, then a TCAS RA would quickly ensue. A Member suggested that was what had occurred here and the Hawk pilot’s manoeuvre, just before the CPA, was plainly to fly clear astern of the airliner towards Hawk (B) whilst maintaining sight of the JS41 from below. This was clearly all unknown to the JS41 crew at the time and with the ‘threat’ always abaft the beam and unseen this would have been doubly disconcerting for them. CAT pilot Members recognised that the JS41 pilot was compelled to follow the RA commands, Members agreeing it was the pilot of Hawk (A) who chose the separation here. Whilst he might have perceived that he had stayed far enough away from the JS41 – the radar reflected 1.7nm at the CPA – the westerly turn across his nose might have necessitated some slick manoeuvring in his nimble training jet but it was certainly enough to generate a TCAS RA as he climbed in step with the JS41 but always abaft the beam, the RA probably being MONITOR VERTICAL SPEED, a CAT pilot Member suggested. This was the crux of the issue - whatever the APR instructed the JS41 crew to do at these close quarters to avoid the Hawk, the latter’s pilot had merely manoeuvred just to keep it safely in sight – but the Board recognised that the lead Hawk pilot had no intention of intercepting nor carrying out a mock attack at all – during what was a chance encounter in the AIAA. Thus in Class G airspace, where ‘see and avoid’ prevails, the pilot of Hawk (A) had manoeuvred to maintain what he perceived was satisfactory separation under VFR but which was clearly less than the APR was seeking to achieve under the RAS provided to the JS41 crew and, more importantly, less than that required to trigger an RA. Therefore, the Board agreed unanimously that the fundamental cause of this Airprox was that the flight path chosen by the pilot of Hawk (A) had triggered a TCAS RA. However, given the minimum separation evinced by the radar recording of 300ft and 1.7nm at the CPA with the Hawk pilot in visual contact with the JS41 throughout and turning to pass clear astern, the Board also agreed unanimously that no risk of a collision had existed whatsoever between these two ac.

There were clearly a number of lessons for controllers and pilots alike within the encounter conscientiously reported here. CAT pilots must expect to meet highly manoeuvrable jets on training sorties at any point in Class G airspace, some of which may be flying seemingly unpredictable flightpaths. Controllers must ensure that any co-ordination attempted is actioned promptly, ensuring that the other unit understands plainly that it is a request for co-ordination where there is a reasonable chance of ensuring that it can be agreed before stipulated separation minima are eroded. Similarly, ASACS controllers should place a high priority on answering co-ordination calls and agreeing to co-ordination measures whenever practicable, remembering in the first instance that under a RIS the agreement of the pilot has to be obtained. The main message for military fast-jet pilots – and already voiced by the Hawk pilot’s Command but worth repeating here – is to give civilian ac as wide a berth as feasible for even at the distances evinced here [1.7nm] a TCAS RA can still be triggered with all that this entails. All pilots should also be prepared to readily accept momentary restrictions to their climb/descent or desired operating levels when requested so that co-ordination can be effected between controlling agencies and where such action could result in a lot less disruption to their flights overall.

PART C: ASSESSMENT OF CAUSE AND RISK

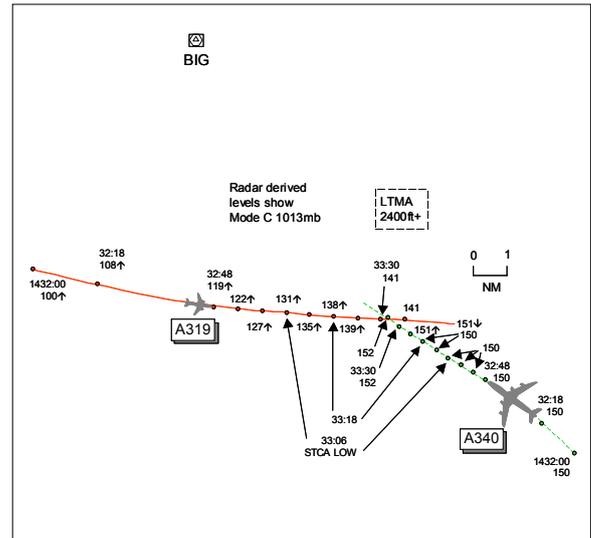
Cause: The flight path chosen by the pilot of Hawk (A) triggered a TCAS RA.

Degree of Risk: C.

AIRPROX REPORT NO 011/07

Date/Time: 12 Jan 1434
Position: 5112N 00011E (10nm SE BIG)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: A340 A319
Operator: CAT CAT
Alt/FL: FL150 ↑FL140

Weather IMC CLBL VMC NR
Visibility: NR 10km
Reported Separation:
 <1000ft V/ 'few 100m '1000ft V
Recorded Separation:
 1000ft V/0.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A340 PILOT reports heading 305° at 250kt inbound to Heathrow IFR and in communication with London Radar squawking an assigned code with Mode C. Level at FL150 about 20d inbound BIG, a TCAS RA 'climb' command was received and the PF immediately followed the guidance. 'Clear of conflict' was annunciated by FL152, 200ft above their cleared level, and the controller was informed of the occurrence. The other ac was not sighted visually but was believed to be <1000ft below and, from the TCAS display, within a 'few hundred' metres horizontally. He assessed the risk as medium.

THE A319 PILOT reports heading 095° at 300kt outbound from Heathrow IFR and in communication with London squawking an assigned code with Mode C. Climbing through FL130 to level at FL140 a TCAS RA 'adjust vertical speed' command was received so the A/P was disconnected and the ROC was reduced before levelling-off at FL140. The conflicting ac was at least 1000ft above at all times during the encounter and he assessed the risk as low.

THE LTCC BIGGIN RADAR CONTROLLER reports the A340 flight was cleared to FL150 inbound to BIG VOR and the A319 flight was climbed to FL140 whilst outbound from Heathrow. The A319 flight reported a TCAS RA and reduced climb rate and the A340 flight also had an RA and climbed 200ft.

ATSI reports that at the time of the Airprox the TC Biggin sector was being operated by a mentor and trainee. The A340 crew contacted the Biggin controller at 1424:15 and reported passing FL290 and heading 315°. The flight had been transferred from LACC tracking towards the BIG VOR and descending to FL150 to be level TIGER. The A319 departed Heathrow, climbing to 6000ft following a DVR4G SID, and contacted the TC BIG controller at 1427:20. Shortly afterwards the controller instructed the A319 crew to leave EPM heading 125°, which was correctly acknowledged. At 1430:15, just as the A340 was levelling at FL150, the controller instructed the crew to reduce to holding speed and the delay would be less than 10min. At this time the A319 was in the 10 o'clock position of the A340 at a range of 33nm.

Immediately after this the controller instructed the A319 crew to climb, first to FL120 and then to FL140 on a heading of 105°. From the radar recording and the associated Mode S data, it can be seen that the A319 was climbing at between 3500 and 4500 fpm. At 1432 the controller transmitted: "(A340 c/s) turn left heading three zero five degrees descend to flight level one four zero er correction maintain flight level one five zero turn left heading three zero five". The crew read back the heading and confirmed that they were maintaining FL150, which was verified by the radar recording. The controller then instructed the A319 crew to turn L heading 095°. At this time the A319 was passing FL108 climbing to FL140 and in the 10 o'clock position of the A340 at a range of 13nm.

AIRPROX REPORT No 011/07

STCA activated, low severity, at 1433:06, as the A319 was passing FL131 with a ROC shown as 4000fpm when the A319 was in the 11 o'clock position of the A340 at a range of 5.8nm. As the Mode C of the A319 indicated FL138, the rate of climb was 3424fpm and still shows 1216fpm as the ac was indicating FL139. The crew of the A340 reported a TCAS RA climb and climbed to FL152, while the Mode C of the A319 indicates FL141 as it passes from L to R through the 12 o'clock of the A340 at a range of 0.6nm at 1433:30.

[UKAB Note (1): The CPA occurs between 2 radar sweeps as the next sweep 6sec later at 1433:36 shows the A319 level at FL141 and the A340 passing through its 6 o'clock range 0.5nm indicating FL152. By interpolation, the CPA is estimated to be as the A319 moves into the A340's 2-3 o'clock, both ac separated by 0.1nm laterally and by 1100ft vertically.]

The A340 crew reported returning to FL150 and heading 305°. The A319 crew reported receiving a TCAS RA and when asked by the controller if they had descended they replied "*No, we it was just er vertical speed*".

Both ac had been cleared to separated levels which had been correctly read back, therefore there are no ATC errors disclosed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Pilot Members believed that the A319 crew had shown a lack of awareness when climbing their ac at 4000fpm with only 1000ft to go to their cleared level. All other things being equal, Members considered that best practice is to reduce the v/s to a much lower rate to reduce the chances of TCAS and STCA generating alerts. Although there was no doubt that the A319 would have levelled at FL140 with the A/P engaged, allowing an ac to climb at a high rate within the busy London TMA, where stepped climbs are normal, can create situations like this. TCAS equipment does not know that an ac is going to level-off 1000ft above/below another ac and therefore generates a warning based on closure rates and time to the CPA. Clearly with both flights being cleared to separated levels, the controller was not concerned, but the A340 crew were placed in the position of receiving a TCAS RA 'climb' warning, with which they complied, owing to the A319's high ROC and this had led to them filing an Airprox report. After climbing 200ft 'clear of conflict' was received, as the A319 levelled-off below their ac, so the A340 crew returned their ac back to the cleared level. Board Members agreed that this has been an avoidable incident but, at the end of the day, safety had been ensured throughout the encounter.

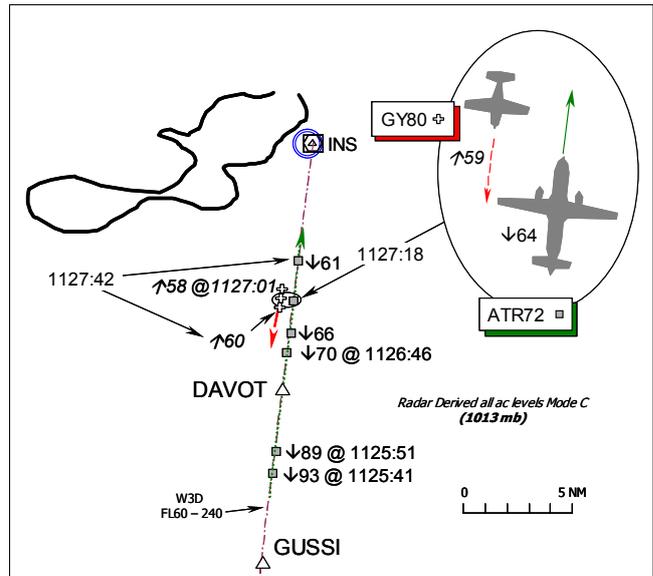
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A319's high ROC triggered a TCAS RA in the A340.

Degree of Risk: C.

AIRPROX REPORT NO 012/07

Date/Time: 16 Feb 1127
Position: 5724N 00405W (7½nm S Inverness - elev 31ft)
Airspace: ADR W3D/FIR (Class: F/G)
Reporting Ac Reported Ac
Type: ATR72-200 Gardan GY80
Operator: CAT Civ Pte
Alt/FL: 6800ft↓ FL65
 QNH (1001mb) (SAS)
Weather VMC NR VMC NR
Visibility: 30km 20km
Reported Separation:
 400ft V/nil H Nil V/800m H
Recorded Separation:
 500ft V @ 0.4nm Min H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ATR72-200 PILOT provided a very comprehensive account reporting that he was inbound to Inverness from Dublin under IFR but flying in VMC. A squawk of A6226 was selected with Mode C on; TCAS and Mode S (Elementary) are fitted.

Under the RAS previously provided by Lossiemouth RADAR, they were cleared to descend to FL70 on “airway” W3D [actually a Class F ADR] to Inverness and the controller advised them of traffic outbound from Inverness climbing to FL60. They were “handed over” to Inverness TOWER and called them about 15nm S of the airport, descending through FL90 for their assigned level of FL70. Under a “full ATC service” from TOWER on 122-6 in Class G airspace, Inverness ATC then cleared them to descend further to 5000ft Inverness QNH (1001mb) and upon reaching 10DME to continue the descent to 3500ft QNH. At this point they were on the INS 193° radial at about 12DME [DAVOT] heading 015°(M) at 260kt TAS and assumed the descent was co-ordinated with Lossiemouth when almost immediately TCAS enunciated “TRAFFIC” and they detected another ac displayed on TCAS some 900ft below them. Descending through 6800ft QNH [about 7160ft (1013mb)], again almost immediately, TCAS enunciated an RA “MONITOR VERTICAL SPEED” with the VSI green from 0 to -500ft/min and red below that so he disconnected the autopilot and levelled off - a few seconds later they received “CLEAR OF CONFLICT”. Inverness ATC was advised both that they were responding to a TCAS RA and again when they were “CLEAR OF CONFLICT”. They did not see the other ac visually at all but were fully visual with the airport throughout the encounter and subsequently carried out a visual approach to RW23 to an uneventful landing.

After speaking to a controller in Inverness Tower they advised him they would be filing a report and also spoke to Lossiemouth ATC in relation to the RA. He observed that as they had QNH set and the other ac was indicated as a flight level he was not 100% sure of the minimum separation but he quoted 400ft vertically as the other ac flew directly underneath them on a reciprocal track, based on his TCAS display. The risk was assessed as “high”.

It appeared to him that Inverness ATC had assumed they were clear of the outbound traffic and Lossiemouth RADAR had assumed Inverness ATC would contact them before giving them clearance to descend further. He had assumed they were “deconflicted” by Lossiemouth ATC, who had radar, before they were “handed over” to Inverness. He strongly recommended that this airspace be upgraded to CAS as it is very busy in this area and this is not the first TCAS event his company has had in this area. His ac’s company livery is white/blue and the HISLs and landing lights were on.

THE GARDAN GY80 PILOT promptly provided a comprehensive account reporting that he had departed Inverness at 1120UTC in good VMC – a visibility of >10km, SCT@4500ft - bound for Sleap under VFR. Once

AIRPROX REPORT No 012/07

established in a climb [toFL60] on track for RANOK, he was transferred to Lossiemouth RADAR on 118.9MHz for a RIS squawking the assigned code with Mode C; neither TCAS nor Mode S are fitted.

Heading 200° (M) at 110kt, he was aware of other traffic on the frequency [although he specified a particular airline it was actually a different company], inbound to Inverness and initially cleared for an overhead procedural approach to RW23. The other ac [the ATR72] was cleared to descend to FL75, he thought [actually FL70], still under a RAS from Lossiemouth RADAR. The other crew was advised of his ac's presence, as was he of theirs. Whilst approximately 15nm S of Inverness he heard the crew of the ATR72 request a visual approach to Inverness with the field in sight. With that, the ATR72 was transferred to Inverness TOWER (122.6MHz), but the crew was not cleared for a visual approach by Lossiemouth RADAR. His intention at this point was to wait until they had passed overhead and then continue the climb to FL85. However, Lossiemouth RADAR advised him of a radar contact in his 12 o'clock on a reciprocal heading descending through his level – this tallied with the earlier ATR72 ac routeing N to Inverness - so as they were now descending through his level he assumed the crew had now been cleared for a visual approach and were therefore aware of his position and level. As RADAR finished reporting the other contact, telling him it would pass 1000ft above before descending through his level, he became visual with a large white/blue twin-engine turboprop ac – he thought it was a DHC-8 but it was actually the ATR72 - with HISLs on and in his 11 o'clock, passing down his port side about 800m away and descending through his level. The closing speed was high but not unsafe and VFR separation requirements were maintained for himself throughout. The risk was assessed as “none” and as he was passing well clear down the other ac's port side no avoiding action was taken by either ac.

He stressed that a colour scheme of white/pale blue is extremely hard to spot against a uniform grey cloud background. He continued to track the other ac visually until it passed out of his line of sight astern. At no point did he feel in any danger, although he was operating under the clearly false assumption that the other ac was aware of his position and had him on TCAS. Indeed, he believed that any TCAS RA at these distances would have been to climb rather than to continue descent and he thought at the time that the other crew was visual with his ac. After this, he continued on his route to Sleaf. He added that this report was drawn from memory of a minor incident, but his workload was low – settled in a planned and self-briefed cruise – whilst keeping a lookout scan under a RIS. His ac is coloured bright yellow with a single anti-collision beacon on the tail.

THE LOSSIEMOUTH RADAR CONTROLLER (RADAR) reports that prior to him taking over the Lossiemouth RADAR position, the ATR72 crew was receiving a RAS from RADAR under IFR inbound to Inverness. In accordance with the LoA, the ATR72 was descended to the minimum usable holding level of FL70. The GY80 was receiving a RIS from RADAR under VFR outbound from Inverness. To maintain prescribed separation from the ATR72, the GY80 was climbed to minimum safe outbound level of FL60. At this point, fully briefed on the traffic situation he relieved the controller for a regular break and took over the position. As the ATR72 reached a position about 5nm S of GUSI, he gave traffic information to the ATR72 crew about the GY80 as “not above FL60” and received a response of 'happy traffic and good visual with Inverness'. He then instructed the ATR72 crew to 'continue with Inverness on 122.6MHz'. The GY80 was then given traffic information on the ATR72 as “not below FL70”. As the ATR72 reached 3nm S of GUSI, he thought, its Mode C was seen to descend to and maintain FL64. Updated traffic information was passed twice to the GY80, who reported visual contact with the ATR72 on the 2nd update as the 2 contacts merged. The GY80 pilot was then given the instruction “with that traffic in sight, climb report FL80” - the requested cruising level. As the contacts separated on radar the ATR72 was seen to continue descent towards Inverness.

THE INVERNESS CONTROLLER reports he was operating as the combined TOWER/APPROACH controller monitoring a trainee controller. At 1125 the ATR72 crew called on frequency from Lossiemouth inbound under IFR descending to FL70 in accordance with the LoA between Inverness, ScACC and Lossiemouth ATC. The ATR72 crew was given descent to 5000ft QNH (1001mb) - the MSA - and cleared for the procedure from overhead the INS for an ILS approach to RW23. At 1126 the ATR72 crew requested a visual approach, shortly afterwards the pilot reported that he had received a TCAS “warning”. The pilot then added that this had become an RA and that he was maintaining 6000ft QNH.

Opposite direction traffic - the GY80 - had departed Inverness at 1118 and then been switched across to Lossiemouth ATC.

MIL ACC reports that the ATR72 was initially receiving a RAS from Lossiemouth Radar (RADAR), whereas the GY80 was receiving a RIS, also from RADAR. The ATR72 crew made contact with RADAR at 1120:59 stating,

"Lossiemouth RADAR [C/S] is err direct GUSSI cleared 1-3-0 currently at Flight Level 1-7-0." RADAR replied to the ATR72 crew, "...Lossie Radar, [8 second pause] [C/S] Lossie RADAR how do you read?" The ATR72 crew responded, "Read you 5, slight bleep on it there but read you 5." RADAR then stated at 1121:23, "[ATR72C/S] roger it's a bit broken this end, I'll sort it out, you're identified descend report level Flight Level 7-0 Radar Advisory." The ATR72 crew read-back, "Radar Advisory Service...cleared to descend Flight Level 7-0 [ATR72 C/S]." At 1121:30, RADAR stated, "[ATR72 C/S] you're number one for the overhead Runway 2-3." The ATR72 crew replied, "for the ILS Runway 2-3...leaving 1-7-0 now for..7-0 [ATR72 C/S]." The GY80 pilot first contacted RADAR at 1121:48, "Lossie RADAR good morning [GY80 C/S] passing 2800 feet in climb Flight Level 6-0 direct RANOK request Radar Information Service." RADAR responded, "[GY80 C/S] Lossie RADAR, good morning identified, climb report level Flight Level 6-0 Radar Information." The GY80 pilot acknowledged the type of service. At 1125:41, RADAR passed traffic information to the ATR72 crew, "...traffic 12 o'clock 10 miles reciprocal heading not above Flight Level 6-0." The ATR72 crew replied, "copy traffic [ATR72 C/S], now we're fully visual with Inverness at the moment." Whereupon RADAR instructed the ATR72 crew at 1125:51 to "...continue with Inverness 122 x 6, Good Day", which they acknowledged. At 1125:57, RADAR passed traffic information to the GY80 pilot, "...traffic 12 o'clock 9 miles reciprocal heading, not below Flight Level 7-0." The GY80 pilot replied "traffic acknowledged [GY80 C/S]." RADAR updated the traffic information to the GY80 pilot one min later at 1126:58, "...previously called traffic has descended through Flight Level 70", which the pilot acknowledged. Further traffic information was passed at 1127:08, "now 12 o'clock at half a mile crossing right left indicating 500 feet above." The GY80 pilot replied, "...and I'm cleared to climb Flight Level 8-0?" RADAR responded "[GY80 C/S] with that traffic in sight climb report level 8-0", which the pilot read-back "Climb 8-0 [GY80 C/S]."

Analysis of the Perwinnes Radar shows, at 1123:35, the ATR72 29nm S of Inverness tracking 005°, indicating FL135 Mode C. The ATR72 steadily descends and throughout the incident maintains track on the centre-line of W3D indicating FL93 at 1125:41. The ATR72 passed FL70 at 1126:46, 10½nm S of Inverness. The GY80 is first shown on radar at 1127:01, southbound climbing through FL58 Mode C when the ATR72 is descending through FL66, with the GY80 at L 11:30 at a range of 2nm. The GY80 maintains a track of 180° throughout the incident. Neither ac appears to deviate from its course as they pass port-to-port. The CPA of 0.4nm occurs at 1127:18; the GY80 indicating FL59 is in the ATR72's L 9 o'clock, the latter being 500ft above indicating FL64. Minimum vertical separation is shown as the ATR72 descends through the level of the GY80, both indicating respectively FL61 and FL60 at 1127:42, but by then the horizontal separation has increased to 2.2nm with the GY80 in the ATR72's 6 o'clock.

RADAR complied with all requirements of a RIS in accordance with JSP552, Section 235.115. Traffic information was passed by RADAR and subsequently updated until the ATR72 was reported in sight by the GY80 pilot. RADAR could not guarantee that the ATR 72 was maintaining FL70 and this could have been misleading. However, this does not appear to have concerned the pilot of the GY80. RADAR complied with the LoA between Lossiemouth and Inverness. Furthermore, the controller had passed traffic information regarding the GY80 to the ATR72 crew prior to their free-call to Inverness. There were no military ATC factors in this incident; it appears to be the result of the application of a procedural service by Inverness in Class F airspace.

ATSI reports that the Inverness Aerodrome/Approach position was being operated by a Mentor and an experienced trainee. As the GY80 taxied to RW23 at Inverness, the flight details were passed to Lossiemouth ATC as "VFR FL60 to Sleep". Lossiemouth issued a squawk and frequency. There followed a separate telephone call from Lossiemouth, informing the controller of the ATR72's ETA as 1123. The GY80 pilot was cleared to LINE-UP on RW23 and issued with departure instructions: "it'll be a left turnout to route to RANOK VFR squawk 3-7-4-0". The pilot read back the clearance correctly and was cleared for TAKE-OFF. Airborne at 1118, the GY80 was transferred to Lossiemouth RADAR at 1120. The ATSU reports that the mentor and trainee listened in to the Lossiemouth frequency and heard traffic information being issued to the ATR72 about the GY80.

The ATR72 crew established communication with Inverness at 1126, reporting "Flight Level 8-0 descending Flight Level 7-0 13 miles to the south". The flight was instructed to descend to 5000ft and on passing 10 DME to descend to 3500ft. Following a correct readback, the ATR72 crew was cleared for a VOR DME ILS approach via the overhead. When given the option of reporting BEACON OUTBOUND or requesting a visual approach, the pilot replied that he was visual and could accept a visual approach. The controller responded "you're cleared for the visual approach to join downwind lefthand and that you are number 1". The pilot reported "Okay copy that we just have a TCAS alert at the moment I'll come back to you". He added "TCAS RA and we're level 6 thousand traffic showing underneath us". Inverness said that the traffic was probably the ac they were informed about by Lossiemouth. Once clear of the GY80, the ATR72 positioned for its visual approach to RW23, landing at 1132.

AIRPROX REPORT No 012/07

There is an LOA between Inverness and Lossiemouth ATSUs. Of relevance to this Airprox:

'IAC (Inverness) shall co-ordinate all IFR departures with Lossiemouth Radar. Furthermore, other than circuit traffic, VFR departures into the INS VOR sectors 055° to 140°, and all departures within a period of 10 minutes prior to an IFR inbound estimate, shall be notified to Lossiemouth Radar. To assist Lossiemouth's expeditious handling of IFR inbounds, they may allocate an SSR squawk to such VFR outbounds and request that they contact Lossiemouth Radar'.

However, on this occasion the GY80 was transferred to, and heard to be in communication with, Lossiemouth before the ATR72 was transferred to Inverness. Having no radar facility at Inverness, the only assistance that could be provided to the ATR72 was general traffic information about the GY80. (VFR/IFR traffic is not required to be separated in Class F airspace.) This, the Inverness controllers were aware, had already been issued by Lossiemouth.

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 provision of Air Traffic Services to GAT routeing through Class F airspace along W3D inbound to Inverness has heretofore been the responsibility of three ATSUs and the subject of an LoA between them: ScATCC for the major portion of the route; Lossiemouth RADAR for the provision of radar services in the ADR and lastly Inverness for a procedural Approach Control service to the airport. The services provided by Lossiemouth RADAR are specifically a RAS in Class F and when so doing in accordance with the LoA, Lossiemouth is the Controlling Authority for this portion of Class F airspace.

The reporting ATR72 pilot appears to have been under a misapprehension as within his account he believed he was routeing within an "airway" to Inverness under a "full ATC service". W3D is clearly a Class F ADR not a Class A Airway with all that this entails. Furthermore, the ATSI report had made it plain that whilst providing a procedural – non-radar – APPROACH Control Service, Inverness ATC has no inherent responsibility to effect separation between inbound IFR traffic from the ADR and other ac in the vicinity in transit under VFR through Class G or F airspace. Moreover, Lossiemouth RADAR had not "handed over" the ATR72 to Inverness but had merely pre-notified their arrival with an estimate. Thus as soon as the ATR72 was switched to Inverness flying level at the minimum useable holding level of FL70, clear of any confliction, Lossiemouth RADAR's responsibility for the flight ended. The ATSI report had explained that there was no obligation placed on Inverness ATC to separate the IFR ATR72 from the outbound VFR GY80 because from the Inverness controller's perspective traffic information had been passed so that was in the hands of the GY80 pilot. Nevertheless, the Mil ACC report had made it plain that when the GY80 was transferred from the combined Inverness TOWER/APPROACH controller to Lossiemouth RADAR, the latter had conscientiously taken positive steps to ensure that standard vertical separation of 1000ft was maintained by climbing the GY80 to FL60, clear beneath the ATR72 crew's assigned level. Thus the ATR72 crew, operating under a RAS at that point and descending to FL70, the lowest level available, was afforded appropriate IFR separation against the GY80 also operating under the 'control' of RADAR, VFR under a RIS. Traffic information was also dutifully provided by Lossiemouth RADAR both to the ATR72 crew before they were switched to Inverness and then to the GY80 pilot about the ATR72. However, the Mil ACC report had explained that once RADAR had terminated the RAS and switched the ATR72 to Inverness, RADAR could not guarantee that the ATR72 would maintain FL70 and that phraseology used within the transmission of traffic information to the GY80 pilot was potentially misleading. Members postulated that RADAR seemed in too much of a rush to switch the ATR72 across to Inverness: as soon as RADAR had relinquished control of this IFR traffic then unless co-ordination had been agreed between the two ATSUs, the controller was unable to ensure separation. Controller Members opined that it would have been preferable perhaps for RADAR to wait until both ac had passed each other before switching the ATR72 to Inverness. Although RADAR - as the controlling authority for that airspace - might not have expected Inverness ATC to descend the airliner without prior co-ordination, RADAR might have realised that Inverness had no responsibility to separate IFR inbound from VFR traffic, only to pass traffic information and this had already been done by Lossiemouth. Although having been told by the crew that they wished to continue for a visual approach, the ATR72 flight was still technically operating under IFR. From the respective ATC authorities reports it was evident that no co-ordination had been effected by Inverness to descend the ATR72 through the level of the GY80. Although the Inverness Mentor and his trainee controller had monitored RADAR's transmission of traffic information to the ATR72

crew and was thus aware that the GY80 had been told about it and climbed to a level 1000ft below the ATR72, the mentor allowed his trainee to descend the airliner without knowing if the crew was visual with the GY80 or if the two tracks had already crossed. In the Board's view this was unwise: indeed, it seemed to several of the Board Members that some unwise assumptions had been made by the air traffic controllers concerned. As the ATR72 pilot could see the airport at range in the fine weather perhaps Inverness perceived they would spot the GY80 and maintain their own separation against this outbound VFR flight. After all, they had been passed traffic information about the small light ac and should have been prepared for it. Lossiemouth RADAR might reasonably have thought that Inverness would not descend the ATR72 through the level of the GY80 without ensuring that either the tracks had crossed - but how would Inverness know that without radar data? Whilst both Lossiemouth RADAR and Inverness had complied with the LoA it seemed that no "transfer of control" point was established here between Lossiemouth and Inverness, the latter seemingly descending the ATR72 without ensuring that the GY80 was clear – an ac that was known to the controllers to be ahead and beneath the ATR72 from their monitoring of Lossiemouth's earlier transmission of traffic information to the crew. Whilst it might have been appropriate to conduct a further review of the LoA, the Board was briefed that from 30 June 2007 the responsibility for the provision of radar services to traffic routing along W3D inbound to Inverness in this vicinity will be simplified. Inverness already has a new Approach Control Room and, subject to a satisfactory check by the regulatory authority, will take-over responsibility for radar services to GAT inbound within W3D, utilising radar data fed to Inverness from the Lossiemouth SRE and the Kinloss SSR. Therefore, the necessity for close co-ordination between Inverness and Lossiemouth regarding W3D traffic will change significantly. After weighing all these factors for relevance during a lengthy debate, the Board concluded that this Airprox had resulted because the Inverness APP/ADC descended the ATR72 into conflict with the Gardan GY80.

Having departed Inverness under VFR, from his perspective the GY80 pilot had seemed content to maintain VFR separation against other observed traffic under a RIS. Nonetheless, RADAR's control instructions were accepted implicitly and having been afforded standard vertical separation the GY80 pilot was passed traffic information about the ATR72 on three occasions by RADAR. The ATR72 was seen in his 11o'clock, and he watched as it passed down his port side about 0.4nm away, descending through his level and plainly unconcerned about the separation that pertained before climbing further to his desired cruising level when approved by RADAR. The GY80 pilot could always have manoeuvred if needs be: however, in his view additional avoiding action was not necessary. Thus, in essence, the GY80 pilot had complied with ATC instructions, done what he was told and thus played little part in this Airprox. Similarly the ATR72 pilot had complied fully with ATC instructions and might have expected, perhaps quite reasonably, that ATC would ensure that his ac was separated from other traffic in W3D before they were instructed to descend further. The ATR72 crew were probably surprised when a TCAS RA was triggered. Whilst the ATR72 crew had not spotted the small light ac, the benefit of TCAS was well illustrated within this Airprox, the system ensuring that the ATR72 crew was alerted to the situation when an RA was enunciated by the presence of the GY80 beneath them. Thus they were able to respond to the TCAS RA and level their ac above the GY80 which passed unseen down the port side at a range of about 0.4nm and some 500ft below them at the closest point, before the light ac drew astern and clear to the S. The Board agreed, therefore, that no risk of a collision had existed in these particular circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Inverness APP/ADC descended the ATR72 into conflict with the Gardan GY80.

Degree of Risk: C.

AIRPROX REPORT No 014/07

AIRPROX REPORT NO 014/07

Date/Time: 2 Mar 1200

Position: 5324N 00100W (4nm S Doncaster/
Sheffield - elev 55ft)

Airspace: LFIR (Class: G)

Reporting Ac Reported Ac

Type: B757-200 R44

Operator: CAT Civ Pte

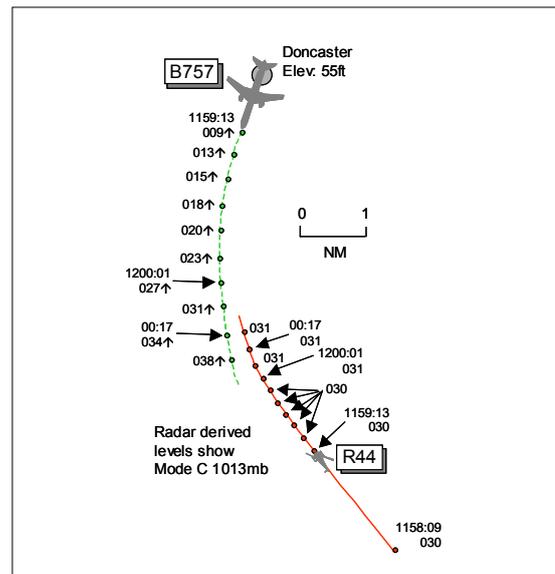
Alt/FL: 2500ft↑ 2500ft
(QNH 1005mb) (RPS 997mb)

Weather VMC CLOC VMC CLOC

Visibility: 30nm 25km

Reported Separation:
Nil V/300m H 300ft V/0.5nm H

Recorded Separation:
500ft V/0.25nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B757 PILOT reports outbound from Doncaster/Sheffield (DSA) IFR following a GOLES RW20 East departure route and in communication with Doncaster Tower then Radar squawking an assigned code with Mode C. Turning through heading 190° at 180kt climbing through 2500ft QNH 1005mb, a TCAS TA then RA was received on a contact 2nm S of them showing at the same level and climbing, he thought. They stopped the L turn and followed the TCAS guidance to FL45 during which a small black helicopter was visually acquired 1nm away tracking 350° towards DSA which passed 300m clear to their L with nil vertical separation. The departure was complex from DSA with increased workload (heads down) owing to ATC issuing instructions which were not simple; the L turn was into the conflicting traffic. He assessed the risk as high. The DSA SSR was NOTAM'd as being u/s.

THE R44 PILOT reports heading 345° at 100kt en route to Sherburn-in-Elmet VFR and in receipt of a FIS from DSA Approach squawking 6160 with Mode C. The visibility was 25km in VMC and the helicopter was coloured black/gold with anti-collision light switched on. When 3nm S of DSA at 2500ft Barnsley RPS 998mb, ATC informed him of traffic departing to the S which he saw on its take-off run and climbing out on RW heading. After its initial climb the ac appeared to increase its ROC and he informed ATC that he was turning R but whilst reporting this he saw the ac turning L. He reported this to ATC and told them that he was intending to increase his R turn for further avoidance clearance. The other ac, a large passenger plane, passed down his port side about 0.5nm away and 300ft above. He assessed the risk as low.

THE DONCASTER/SHEFFIELD APR reports mentoring a new trainee as an OJTI when the B757 was released on a RW20 E departure towards GOLES. There were multiple contacts seen on radar in the Gamston/Netherthorpe area which he deemed were suitably separated from the departure route; SSR was u/s. He stopped off the B757's climb against transit traffic at FL55. The B757 appeared on radar to climb straight ahead on departure rather than follow the Noise Preferential Route (NPR). The flight called on the radar frequency late and he noticed that it did not appear to have turned within 1nm of the end of the RW. He was able to pass TI to the VFR flight (R44) but was unable to get TI to the B757 via the ADC. By the time the B757 flight called on frequency it had climbed above the VFR R44. At the time of the incident the transit traffic levels were medium to high. He cited that the lack of intercom between the Tower and Radar was a definite problem on this occasion.

ATSI reports that the Approach Radar Control position, which is situated at Liverpool Airport, was being operated by a mentor and a trainee who had just commenced training. The mentor described his workload as medium/high due to a number of overflying VFR ac requesting a service. The Doncaster MATS Part 2 outlines the radar data supplied to the associated radar unit at Liverpool: 'SSR data is provided to Doncaster ATSU by the Royal Air Force. The raw SSR data is supplied primarily from the Scampton radar head (15nm SE of Doncaster). The SSR data is processed with Waddington primary and supplied to Liverpool via an ISDN line.' At the time of the Airprox the

Scampton SSR was officially out of service because it was not correlating with the primary returns. However, the controller commented that the SSR returns were being displayed on the radar display, albeit somewhat fragmented. This explains how, when SSR was out of service, he was aware of the close vertical position of the two ac during the occurrence.

At 1155, the ADC telephoned the APR to request a departure release for the B757 on a GOLES 20 (the RW in use) East Procedure. This is one of the standard routes for traffic departing Doncaster to join the ATS Route System i.e. *'Climb straight ahead to 500ft or FNL D0.5 whichever is later then turn left on track 190°. At I-FNL D2.5 turn left to intercept GAM R017° northbound at GAM D10 or FL60 (whichever is sooner). Turn left to GOLES. Cross GOLES FL70 or above.'* The trainee APR said he would call his colleague back. The delay was to allow the mentor/trainee to discuss the flight's release.

As this telephone call was ending, the R44 flight established communication with Doncaster Approach. The pilot reported routeing from Stapleford to Sherburn and was currently E abeam Gamston, at 2500ft, requesting a FIS and an O/H transit. Gamston is 12nm S of Doncaster Airport. The pilot was instructed to squawk 6160 (Doncaster conspicuity code), placed on a FIS and instructed to remain W of the ATZ (circle radius 2.5nm). The mentor explained that if he had been operating the frequency, he would have requested the R44 to route W of the A1 road to ensure that it passed at least 4nm W of the airport. However, he did not prompt his trainee to carry this out. One minute later, the trainee released the B757 for departure, not above FL45 due to overflying traffic routeing N to S at FL55. The mentor explained that there were a number of ac operating VFR in the Gamston area at the time, including the R44. He did not consider that there would be any conflicts between the B757 and these ac, as it would be turning away to the N and climbing through the other traffics' levels.

At 1158:10, the B757 flight reported rolling RW20. At the same time the R44 flight was informed *"traffic a Seven Five Seven just rolling runway Two Zero be turning initially to the southeast"* which was acknowledged. One minute and forty seconds later, the R44 pilot reported visual with the traffic at 12 o'clock and immediately after acknowledgement by ATC he added *"And it looks like he's turning into us sir request right turn"*. This was approved. The radar shows that, at this time (1200:01), the R44 is at FL31, tracking NNW, with the B757, passing FL27, 1.6nm away, in a L turn towards it. When the 2 ac are 0.9nm apart 8sec later, the R44 is still maintaining FL31 and the B757 is passing FL30. By the time the distance reduces to 0.4nm (1200:17), the B757 has climbed through the R44's level and is passing FL34. The two ac were now approximately 4nm S of the airport.

[UKAB Note (1): The CPA occurs during the period before the next sweep which reveals the subject ac having passed, horizontal separation 0.4nm with the B757 climbing through FL38, 700ft above the R44. It is estimated that at the CPA, the B757 would have been climbing through FL36, 500ft above and 0.25nm horizontally displaced from the R44 as the subject ac pass port to port.]

The B757 was transferred to Approach at 1159:10 but did not contact the frequency until 2min later i.e. after the subject ac had passed each other. During this time no attempt was made by Approach to try and establish communication with the flight. The controller said that, if the ac had been on frequency earlier, the level restriction could have been removed, as the B757 was clear of the FL55 traffic and, although reticent about turning the flight early due to noise restrictions, he could have issued an avoiding action turn (subject to whether the pilot reported a TCAS RA). Soon after initial contact, the pilot did report that he had received a TCAS RA on departure.

In accordance with MATS Part 1, there is no requirement to separate IFR and VFR flights in Class G airspace. Section 2, Chapter 1, Page 1, states that *'Aerodrome control is responsible for issuing information and instructions to ac under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between: ac flying in, and in the vicinity of, the aerodrome traffic zone'*. However, on this occasion, the ADC was unaware of the R44's flight details. The MATS Part 1, Section 3, Chapter 1, Page 3, states that *'Approach control shall co-ordinate with aerodrome control ac routeing through the circuit'*. Had the ADC been informed about the R44's presence, appropriate TI could have been issued before, or just after, the B757 departed. The mentor said that he believed initially that the B757 would route away from the R44 and would have climbed through its level. Consequently, he did not consider it necessary to inform the ADC of its presence. Subsequently, he believed that the B757 had not turned to follow the procedure and was not climbing quickly through the R44's level, possibly because it was having to level at FL45. The B757's pilot later reported that he had maintained heading and ignored departure climb instructions following TCAS. When it became apparent that the 2 flights would conflict, the mentor considered it too late to try and telephone the ADC to warn him of the situation. He explained that he was sitting to the L of the trainee and the telephone position is situated to his R. Therefore, there

AIRPROX REPORT No 014/07

would have been a delay, not only in reaching the position to select the switch but also whilst waiting for the call to dial. In any case, by then, the flight had been transferred by the ADC. The controller explained that it is possible to monitor the Tower frequency from the Approach position but it was too busy at the time to listen in to overhear the B757 being cleared for take-off or being transferred. He added that intercom between Approach and Tower might have been useful on this occasion to expedite the passing of information but it is not available between the two sites.

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 felt that the DSA APR had been optimistic in his belief that the departing B757 would not conflict with the transiting R44. Although there was no requirement to separate the subject ac (IFR v VFR), DSA ATC should have ensured that both crews were aware of each other's presence. The APR had passed TI to the R44 pilot on the B757 but had not alerted the ADC to the R44 such that TI could be passed to the B757 crew, either prior to departure or during the climb-out phase. A prime opportunity to pass TI was there when releasing the B757 for departure, through the ADC, which would have allowed the B757 crew to decide the best course of action to be taken. One option would have been for the B757 to hold on the ground for a short while. This led Members to agree that the cause of the Airprox was the DSA APR mentor allowing his trainee to release the B757 into conflict with the R44 without ensuring that the B757 crew were given TI.

It was disappointing that the APR did not try and resolve the conflict when it became apparent that the subject acs' flightpaths were converging. A 'blind' call on the frequency or relayed through the ADC should have elicited a response from the B757 crew who were undoubtedly busy at the time, assessing and reacting to the deteriorating situation via the TCAS alerts and warnings. The B757 crew's first knowledge of the R44 was a TCAS TA then RA such that they had elected to stop their turn and follow the TCAS guidance. During this turn, the B757 crew visually acquired the R44 1nm away and watched it pass 300m clear to their L. From his viewpoint, following TI the R44 pilot had seen the B757 during its take-off roll; had monitored its flightpath and on seeing it turn L towards him, had executed a R turn to increase separation whilst informing ATC of his actions; the B757 was seen to pass 0.5nm clear to his L and 300ft above. The radar shows a dynamic resolution of the situation as the B757 passes 0.4nm ahead of the turning R44, climbing through its level before passing 0.25nm W of and 500ft above it. The visual sightings by both crews when combined with their robust actions were enough to allow the Board to conclude that any risk of collision had been quickly and effectively removed.

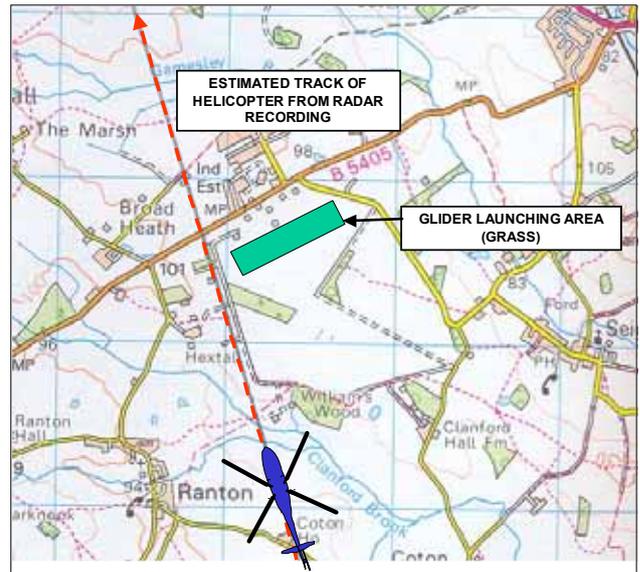
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DSA APR mentor allowed his trainee to release the B757 into conflict with the R44 without giving TI.

Degree of Risk: :C.

AIRPROX REPORT NO 015/07

Date/Time: 10 Mar 1643 (Saturday)
Position: 5249N 00211W (Seighford Airfield - elev 321ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Grob Twin Glider A109
Operator: Civ Club Civ Pte
Alt/FL: 1000ft 1500ft
 (QFE NR) (N/K)
Weather VMC NR VMC NR
Visibility: >20km CAVOK
Reported Separation:
 50ft V/100m H 300ft V/300ft H
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE GROB TWIN II GLIDER PILOT reports that he was flying solo in a white club glider and was circling at 50kt in weak lift and in a low workload situation over the S boundary of the airfield at about 1000ft agl when a blue and white retractable undercarriage helicopter flew straight over the airfield on a S to N track at the same height. He initially saw the helicopter when it was about 1nm away but its head-on aspect did not show the unexpectedly high closing speed that he later estimated as being about 150kt; consequently he needed to take rapid avoiding action by tightening the turn into a spiral dive to provide horizontal and vertical separation. Despite this, the helicopter passed between 100-200yd away and 50ft above; as a result of the height lost in taking the avoiding action, he immediately flew an abbreviated circuit and landed on the airfield. He reported the incident to the CGI on landing and assessed the risk as being high.

THE A109 PILOT reports flying a VFR private flight from a site near Oxford to a site near Chorley in a blue helicopter with strobes selected on, squawking 7000 with Mode C. He was cruising level at 1500ft (QNH), heading 350° at 140kt in good weather conditions, and had been in receipt of a FIS from Birmingham but was changing to Manchester. When he was about 1.5nm away and still S of the airfield, he saw Seighford as he looked down in his 2 o'clock and also saw a glider about 300-500ft away. He made an immediate precautionary left turn, easily avoiding the glider, and after 30sec he resumed his original heading to Jodrell Bank VRP and saw no other ac. Due to the terrain he was unable to contact Manchester until he was near Stoke on Trent.

He assessed the risk as being low.

UKAB Note (1): The glider does not show at any time on the recording of the Cleve Hill Radar. The A109, however, shows squawking 7000 with Mode C throughout the period that the incident was reported. It tracks 350° passing about 350m to the W of the centre of the airfield. No track deviation is evident but the ac climbs 600ft from FL008 (1130ft amsl).

UKAB Note (2): Seighford is promulgated in the UKAIP ENR 5-5-1-5 as a Glider Launching Site (by winch and tug aircraft/motorglider up to 2000agl, HJ with a site elevation of 321ft. It is also marked on the CAA VFR chart.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Glider winch cables are very dangerous, both in the air and on the ground, and can easily damage even large ac to an extent that they are no longer able to sustain flight – this is even more so with helicopters. For the safety of

AIRPROX REPORT No 015/07

the gliders and any transit ac, glider winch launch sites should therefore be given a wide berth. Turning to the subject Airprox, Members were concerned that the route selected by the helicopter pilot had gone virtually over a notified, active and busy glider site; they unanimously considered this to be poor flight planning. One GA/helicopter expert Member observed that with the now-widespread use of GPS equipment and digital route planning, even more care is required to ensure that selected route legs avoid 'hot spots' by an adequate margin, the Member commenting that airspace restrictions are more obvious when using a paper map. Further, a helicopter expert Member suggested that the helicopter pilot's lookout had probably been less than adequate if, as he reported, he did not see the Airfield, which was on his side of the ac, until he was 1½nm away from it and the glider until it was 3~500ft away. He also noted that there was no avoiding turn by the helicopter evident on the Radar recording and that the post-incident climb might have had more to do with establishing comms with Manchester than a sign of any previous vertical avoidance manoeuvre.

The Board was concerned that this was an avoidable incident caused by poor planning which had led to a situation where the safety of both ac involved had not been assured. Further, the helicopter pilot had been in a position to see the glider before the glider pilot had been able to see the helicopter. The reverse however, had actually been the case and the glider pilot had seen the helicopter almost as soon as his orbit had allowed and taken, most likely already effective, avoiding action before the helicopter pilot had seen the glider. Since however, both pilots agreed that there had been, albeit less than ideal, horizontal separation, there had not been any actual risk of collision.

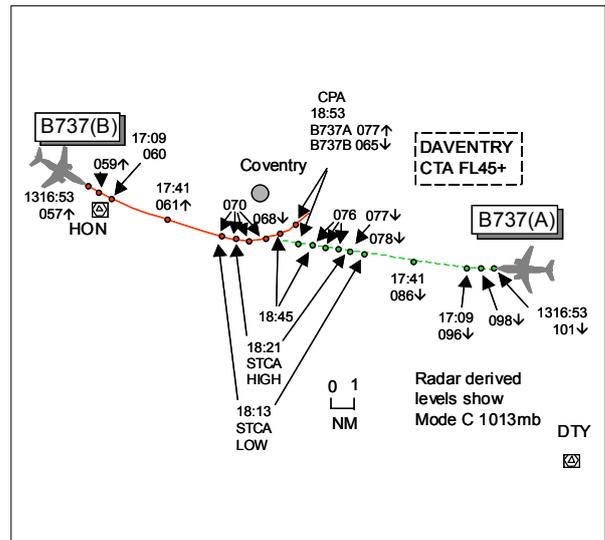
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A109 pilot flew over a notified and active gliding site and into conflict with the Grob Twin II.

Degree of Risk: B.

AIRPROX REPORT NO 016/07

Date/Time: 4 Mar 1319 (Sunday)
Position: 5219N 00126W (8nm E HON)
Airspace: Daventry CTA (Class: A)
Reporting Ac Reported Ac
Type: B737-300(A) B737-500(B)
Operator: CAT CAT
Alt/FL: FL77↓ FL70
Weather IMC KLWD IMC KLWD
Visibility:
Reported Separation:
 700ft V/1.5nm H 500ft V/1nm H
Recorded Separation:
 1200ft V/0.8nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737(A) PILOT reports inbound to Coventry IFR and in receipt of a RAS from Birmingham squawking an assigned code with Mode C. Initially following a GROVE1C arrival, they were given vectors by Radar towards HON and then L around for a downwind LH pattern for the ILS RW23. A continuous descent from FL220 was made and after passing FL90 cleared to FL70 heading 350°, he thought, at 250kt, a target was seen on the EHSI 5nm ahead climbing towards them which became a TA alert. It was apparent that if both flightpaths continued they would be extremely close. He disconnected the A/P and A/T and instigated a climb from FL77 coincident with an RA 'climb' being annunciated. They informed ATC of the climb who replied that they were not cleared to FL70. Both pilots heard the clearance to FL70 with the PF, setting 7000 in the window which the FO read back to ATC. The other ac was not seen visually owing to IMC but TCAS indicated it passed within 700ft and 1.5nm and he assessed the risk as high. Post flight he contacted the Birmingham ATC Watch Manager who told him that the controller had made a mistake having indeed cleared them to FL70.

THE B737(B) PILOT reports outbound from Birmingham IFR and in receipt of a RCS from London squawking an assigned code with Mode C. Heading 120° at 250kt they had levelled at FL60 with Birmingham Radar then at FL70 with London. Whilst checking TCAS to assess why they were being 'held down' they noticed a contact 5nm ahead 1000ft above descending. Shortly afterwards ATC told them to "turn L heading 035° and descend FL60, another ac at your cleared level". The A/P was disengaged and soon after initiating the turn and descent a TCAS 'monitor v/s' was received. Having been cleared to FL60, he decided to maintain the 'level change' descent which was at a higher v/s than that required by TCAS. The other ac was not acquired visually owing to IMC but was seen on TCAS to be +500 at the closest point and to pass about 1nm clear horizontally.

THE BIRMINGHAM RADAR 1 CONTROLLER reports B737(A) was inbound to Coventry and called routing to HON at FL80 whilst B737(B) was outbound from Birmingham on a DTY2E SID climbing to FL60. He was unaware at the time but he told the B737(A) flight to maintain FL70 to which the crew replied 'descending to FL70'. He did not correct this, only becoming aware of these details after listening to the RT recordings post incident. He could not explain how this happened. The B737(B) flight had been transferred to LTCC who climbed the flight to FL70. He estimated separation was approximately 500ft and 2nm.

THE LTCC MIDLANDS RADAR CONTROLLER reports the B737(A) flight was transferred to Birmingham Approach descending to FL80. Two minutes later B737(B) departed Birmingham on a DTY departure and was vectored to the E and climbed to FL70. After carrying out other sector duties he saw the Mode S SFL indicate FL70 on B737(A)'s label. He gave the B737(B) flight an avoiding action turn and then descent to FL60, the crew stating that they had received a TCAS RA descent.

AIRPROX REPORT No 016/07

ATSI reports that at the time of the Airprox, B737(A) was under the control of Birmingham Approach and B737(B) had just been transferred to the LTCC Midlands Sector. The Birmingham Radar 1 Controller described his workload as medium/low. In view of the workload he was performing both the Radar 1 and 2 positions. He did not consider the bandboxing of the Approach positions contributed to the incident.

The B737(B) flight established communication with Birmingham Approach at 1315, reporting passing altitude 2100ft, climbing to FL60, on a Daventry (DTY) 2E SID. This SID, from RW15 at Birmingham, is: *'Climb straight ahead to I-BIR D1 or 500' QFE whichever is later, then turn right to track 169°. At I-BIR D4 turn left to establish on DTY VOR R302 to DTY VOR. Cross DTY D16 4000 or above (approx.5.2%). Cross DTY D12 FL50 or above (approx 4.9%). Cross DTY D9 at FL60 (approx 4.9%).'* The radar recording, timed at 1315:14, shows B737(B) just airborne and B737(A), still under the control of LTCC, passing FL126, 28.8nm to its SE. Approximately 1min later, the Midlands Sector asked the Radar 1 Controller if he would accept B737(A) at FL90 or FL80. The Radar 1 Controller commented that there was inbound traffic to Birmingham, ahead and to the S of B737(A)'s track, descending to FL80. He anticipated this would be clear of B737(A) and agreed for the ac to be descended to FL80. At 1315:47, when B737(B) flight was transferred to LTCC (before B737(A) flight had contacted Birmingham) the subject ac were 25.4nm apart.

The published procedure for Coventry inbound airways traffic is to follow Birmingham Standard Arrival Routes (STARs). Consequently, such ac are, initially, under the control of Birmingham Approach. B737(A) flight, inbound to Coventry on a Grove 1C STAR, routeing via WELIN to Honiley, made its initial call to Birmingham Approach 1min after B737(B) flight had been transferred to LTCC. The pilot reported *"descending Flight Level Eight Zero inbound Honiley"*. The Radar 1 Controller replied *"roger maintain Flight Level Seven Zero continue towards Honiley"*. The pilot responded *"Descend Flight Level Seven Zero inbound Honiley"*. The controller followed up saying *"Correct it'll be a turn as you approach Honiley due outbound and inbound traffic to Birmingham to position left-hand runway Two Three at Coventry"*. The Radar 1 Controller confirmed that he had not realised that he had incorrectly instructed B737(A) flight to maintain FL70 and had not noticed the error when the pilot reported descending to FL70. He could not explain the reason for the error. He explained that FL70 is not usually issued to inbound traffic, especially when there is a DTY outbound. Additionally, he would have marked the level box on B737(A)'s fps with FL80 in advance of its first call. It was possible, he thought, that he was distracted by planning the ac's arrival to Coventry, especially as he considered it had been handed over from LTCC higher than usual. This may have led to him not registering the pilot's descent report. When B737(A) flight was instructed to maintain FL70 (1316:55), the radar recordings show the subject ac were 18.8nm apart. B737(B) is passing FL57, still not in communication with LTCC, and turning L to DTY, towards B737(A)'s track; the latter is passing FL101.

The Standing Agreement between Birmingham and LTCC allows TC Controllers to climb outbound traffic on a DTY 2E SID to FL70 (Birmingham MATS Part 2, Section 4-14). On this occasion the Midlands SC placed B737(B) on radar heading 125° and instructed it to climb to FL70. At the time (1317:05), the subject ac were 17.2nm apart, on conflicting tracks. B737(A)'s enhanced Mode S return, not available to the Birmingham Controller, still shows the Selected Flight Level (SFL) as FL80. The flight was passing FL98. The TC Midlands SC reported that he turned his attention to other traffic but, subsequently, noticed that B737(A)'s SFL was showing FL70. Initially, he issued B737(B) a L turn heading 035°, followed by an instruction to make an 'avoiding action' descent to FL60. He passed information on traffic *"five miles east of you descending to your level"*. The pilot reported descending to FL60. The radar recordings of the event, show that B737(A)'s SFL changed to FL70 at 1317:08. The LTCC MATS Part 2, Page DAT-34, states: *'Although the checking of SFL is not a mandatory task for controllers, it is encouraged for early identification of possible level busts'*. The Midlands SC noticed the unexpected change to B737(A)'s SFL within 1min and took appropriate action.

Meanwhile, the Birmingham Radar 1 Controller, having informed B737(A) flight of his positioning plan, telephoned Coventry to inform them about the ac's arrival routeing. About 1min after this telephone call ended, about the time STCA activated both at LTCC and Birmingham, the pilot of B737(A) transmitted *"is there traffic at Seven Zero?"* The Radar 1 Controller responded *"Affirm maintain Flight Level Eight Zero as you were instructed. Climb Flight Level Eight Zero"*. Shortly afterwards, the pilot reported *"Radar Advisory climb maintaining Flight Level Eight Zero"*. The radar recordings show that when the Midlands SC instructed B737(B) to turn L heading 035° (1318:10) the subject ac were 6.1nm apart. B737(B) was maintaining FL70 and B737(A) was passing FL78. When the pilot of B737(A) queried the traffic at FL70 (1318:20), he was passing FL77, 5nm from B737(B). B737(A) flight stopped its descent at FL76, when the 2 ac were 2.5nm apart, with B737(B) still maintaining FL70. Thereafter, the latter ac descended. By the time the subject ac were 1.4nm apart (1318:45), B737(B) was in its L turn, passing FL68,

800ft below B737(A). As B737(B) passed 0.8nm N of B737(A) 8sec later, vertical separation had increased to 1200ft.

The Birmingham Radar 1 Controller explained that he was unaware of his error requesting B737(A) to maintain FL70 until he heard the RT recording. He commented he was surprised that the pilot had interpreted the “maintain” call as a descent clearance. The MATS Part 1 and the CAA Radiotelephony Manual (CAP413) state that for climb and descent instructions the phraseology is ‘Climb/descend flight level (number)’. The phrase ‘maintain’ is used for level flight. This is reinforced in the ICAO Air Traffic Management (PANS-ATM) Publication (Document 4444). Additionally, Paragraph 12.3.2.3 of that document, states that: ‘The term “MAINTAIN” is not to be used in lieu of “DESCEND” or “CLIMB” when instructing an aircraft to change level’.

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.

ATCO Members thought it a pity that B737(A) crew did not challenge the Birmingham Radar 1 when he told the flight to maintain FL70 after they reported descending to FL80, their previously cleared level, instead taking the Radar 1's ‘maintain’ instruction as clearance to descend further. That said, the Radar 1 controller did not challenge the response that B737(A) crew were descending to FL70, only replying ‘Correct...’. The controller was unaware of his actions until hearing the RT recording, post incident. These facts led Members to agree that the cause of this Airprox was the Birmingham Radar 1 inadvertently descending B737(A) into conflict with B737(B). Although the proper use of ‘maintain’ is specified in several manuals, ATCO Members opined that controllers occasionally use the word when re-enforcing a previously given level or with a climb/descent instruction (“climb/descent and maintain FL...”).

Turning to risk, the B737(A) crew had noticed B737(B) ahead on TCAS at FL70 and warned the Radar 1 who had immediately instructed B737(A) flight to climb back to FL80, the level to which he believed he had cleared them. Meanwhile a TA alert was received and the B737(A) crew had quickly disconnected the A/P and A/T, arrested their descent and climbed coincident with receiving a complementary TCAS RA ‘climb’. The LTCC Midlands RC had noticed the SFL on B737(A) showing FL70 and immediately gave B737(B) flight a L turn away from B737(A)'s projected flightpath followed by an avoiding action descent and TI. The B737(B) crew reacted promptly by disengaging the A/P and following the ATC instructions, during which a complementary TCAS RA ‘monitor v/s’ was received. All of these actions when combined were enough to allow the Board to conclude that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Birmingham Radar 1 inadvertently descended B737(A) into conflict with B737(B).

Degree of Risk: C.

AIRPROX REPORT No 017/07

AIRPROX REPORT NO 017/07

Date/Time: 11 Mar 1552 (Sunday)

Position: 5359N 00140W (1½nm S of Menwith Hill)

Airspace: Leeds Bradford CTR (Class: D)

Reporting Ac Reported Ac

Type: Robin HR200 PA28-161

Operator: Civ Trg Civ Club

Alt/FL: 1500ft 2000-2500ft

QNH (1022mb) QFE

Weather VMC CLBC VMC CLBC

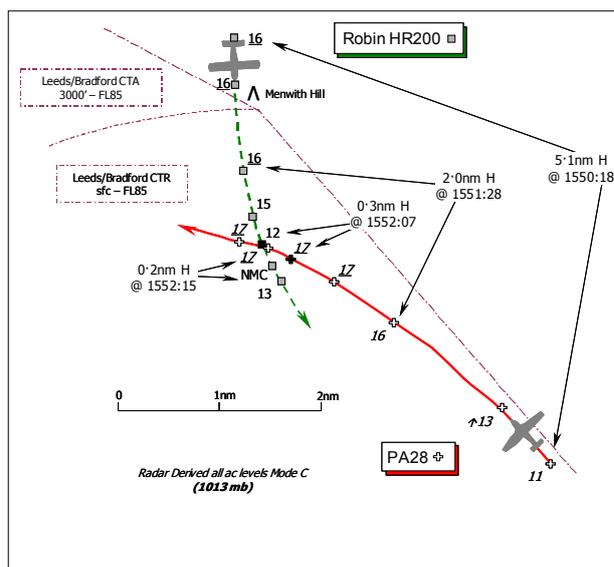
Visibility: 25km 20nm+

Reported Separation:

50ft V/nil H NR

Recorded Separation:

500ft V/0.2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ROBIN HR200/120B PILOT, a flying instructor, reports that he was returning to Leeds Bradford Airport (LBA) VFR, from the vicinity of Ripon/Harrogate during a local general handling instructional sortie with a PPL student. He was in receipt of a RCS from LBA RADAR on 123.750MHz, squawking A2651 with Mode C on whilst flying in VMC, in level cruise at 1700ft QNH (1022mb).

Whilst heading S at 90kt approaching a position about 1nm S of Menwith Hill a low-wing white/blue PA28 [he proffered the registration] was spotted 2nm away at 10 o'clock converging from L to R. To avoid the PA28 he descended and the other ac passed 50ft directly above his ac from 10 - 4 o'clock with a "moderate" risk of a collision. His ac is coloured blue/red & white

He opined that the PA28 pilot had infringed the LBA Zone without talking to ATC and appeared to be unaware of the Airprox. The other pilot did not contact ATC subsequent to the incident.

THE PIPER PA28-161 WARRIOR PILOT reports that he was airborne on a local sortie from Sherburn-in-Elmet and in communication with Sherburn RADIO Air/Ground Station on 122.60MHz.

He was flying at a height of between 1500-2500ft QFE (1023mb) in VMC heading between 270-290° at 100kt, when a blue low-wing single engine aeroplane was spotted about ¾nm away. No avoiding action was taken – none was considered necessary - and the other ac passed at an unknown but safe distance away. No risk was considered to exist either by himself or by his very experienced front passenger; consequently no data was recorded at the time.

He stressed that the other ac was in clear visual contact from approximately ¾nm on the starboard quarter until it had passed well underneath - slightly in front of them - and then cleared off their port quarter.

LEEDS BRADFORD RADAR CONTROLLER (LBA RADAR) reports that he cleared the HR200 into the Class D LBA CTR from the N, via Menwith, not above 2000ft QNH under VFR, when he became aware of an unknown ac squawking A7000 approaching from the E indicating an altitude of about 1200ft Mode C. The unknown ac was so close to the CTR boundary that he warned TOWER it might infringe CAS, but it continued NW along the Zone boundary before turning into the CTR on a westbound track. Traffic information was passed to the HR200 pilot who then became visual with the unknown ac before it passed overhead the HR200.

After landing the pilot of the HR200 called and indicated he would be filing an Airprox as he believed the other ac was only 50ft above his own. The HR200 pilot also stated that he recognised the PA28 and had telephoned the

flying school to inform them of his intentions. Shortly afterwards the PA28 pilot telephoned the Tower to state he had reviewed his route on his GPS and was aware he had infringed the Leeds Bradford CTR. Apologising profusely the PA28 pilot accepted advice regarding calling for a FIS when operating close to CAS and was advised that the HR200 pilot was filing an Airprox. Whilst the PA28 pilot was free and frank with this information, he also stated that he had seen the HR200 but believed it to be 300-500ft below his aeroplane.

The LBA weather was reported as Visibility: 25km nil weather; 220/13kt; FEW @2200ft; QNH 1021mb.

ATSI reports that the HR200 was on a local VFR flight from Leeds. At 1548, the pilot requested to rejoin via Menwith, which is situated on the Class D CTR boundary to the N of the airport. This was approved not above 2000ft, VFR, and the pilot was requested to report the airport in sight. Approximately 2 min later, the HR200 pilot reported visual with the airport and was instructed to join downwind LH for RW14. At 1551:30, traffic information was issued to the HR200 pilot, “*..unknown traffic 1 o'clock 1 mile tracking northwest bound right on the edge of the zone boundary same level*”. The pilot reported visual with the traffic. The radar photograph shows the subject ac at the same level, 2nm apart. Shortly afterwards the controller informed the HR200 pilot that the traffic was now inside the CTR, the pilot reporting “*he's just coming right over the top of us now*”, adding it was a PA28. The radar recording shows that, at the CPA, the unknown traffic was inside CAS, approximately 1nm from the boundary. No further comments about the incident were made on the frequency.

MATS Part 1, Section 1, Chapter 5, Page 13, states the action to be taken by controllers in respect of unknown ac in various types of airspace. For ac in Class D CAS:

“If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of airspace – avoiding action shall be given and traffic information passed”.

It also states that:

“When avoiding action is issued to an aircraft under a Radar Control Service, controllers must seek to achieve the required minima”.

However, because the HR200 pilot was operating VFR, the only responsibility, in Class D Airspace, is for the controller to:

“*pass traffic information to VFR flights on IFR flights and other VFR flights*” - MATS Part 1, Section 1, Chapter 2, Page 1.

On this occasion, the pilot of the HR200 was informed of the unknown traffic, both when he and the other flight were inside and outside the CTR and he did report visual contact with the other ac.

UKAB Note (1): The Claxby Radar recording shows the Robin HR200 entering the Leeds/Bradford CTR from the N in the vicinity of Menwith Hill level at 1600ft Mode C (1013mb) – about 1840ft QNH (1021mb). Meanwhile the PA28 has penetrated the NE Class D CTR boundary squawking A7000 indicating 1100ft unverified Mode C (1013mb), before climbing steadily through the level of the HR200 at a range of 2nm to a maximum indicated level during the period of 1700ft (1013mb) which is attained just before the Airprox occurred. Meanwhile the HR200 is shown descending at a range of 1.7nm through 1500ft and levelling at 1200ft Mode C – about 1440ft QNH – as it crossed through the 12 o'clock of the PA28 at a range of 0.3nm some 500ft below the latter at 1552:07. The respective tracks cross, in between sweeps, as the PA28 maintaining 1700ft unverified Mode C draws rapidly astern of the HR200 where it is next shown 0.2nm astern - the point of minimum recorded horizontal separation at 1552:15.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The recorded radar data had clearly shown that the PA28 had crossed the boundary of the Leeds Bradford CTR into Class D CAS and thereby into conflict with the HR200. It was also evident from the LBA Radar controller's report, coupled with the RT transcript, that no clearance had been issued to the PA28 pilot to enter the CTR. The

AIRPROX REPORT No 017/07

latter had not mentioned this in his account but it was clear from the reported telephone conversation that later took place with the LBA controller that the PA28 pilot had not appreciated this until he had later reviewed his route on his GPS unit and discovered that he had indeed infringed the Leeds Bradford CTR. As an aside, a GA pilot Member voiced a general concern to the Board over the use of GPS units, especially older devices, where for example airspace databases might be less frequently updated. Whilst it was not clear from the PA28 pilot's report that he had actually been using GPS as a navigation aid during the subject flight, the Member noted the lesson for all pilots that it was essential to ensure that only the very latest data was used in such equipment.

Under the ATS provided to the HR200 crew, flying within Class D CAS whilst inbound to LBA and in receipt of a VFR clearance, the comprehensive ATSI report had shown that "*traffic information to VFR flights on....other VFR flights*" is provided by ATC. Notwithstanding that the PA28 pilot had entered the CTR without a clearance, it was apparent that the alert LBA RADAR controller had spotted the infringement and passed traffic information about the unknown ac to the HR200 pilot. Although the controller reported the range within the traffic information transmission as 1nm when it was in fact 2nm, the ATSI report had shown it was subsequent to this traffic information that the HR200 pilot reported visual contact on the PA28. It was not clear if this traffic information had prompted the instructor pilot to scan for the PA28 or whether he had already seen it beforehand: nonetheless, from the reporting HR200 instructor's account it was clear to Members that the pilot had spotted the PA28 in his 10 o'clock - not less than 2nm away - converging on a conflicting heading from his port side. Thus it was the PA28 pilot with the HR200 on his R who was required to 'give way' in accordance with the 'Rules of the Air'. Nevertheless, whilst some might contend that the HR200 pilot could have maintained his course and speed, the instructor had wisely elected to descend in the knowledge that the PA28 pilot was not in communication with LBA RADAR and whose intentions were plainly unknown.

The Board next discussed the differing perceptions of vertical separation as assessed by the pilots. Whereas the two ac were indeed at the same altitude when 2nm apart, the HR200 pilot had reported that the other ac had passed 50ft above his ac. Whilst the Board was cognisant of the tolerances applicable to Mode C, it was clear that just as the HR200 crossed ahead of the reported ac at a range of 0.3nm and moments before the CPA, the vertical separation was 500ft from the respective Mode C indications and thus somewhat more than the HR200 pilot had thought at the time, possibly as a result of his avoiding action descent. Conversely, from the other cockpit, the PA28 pilot reported that he had not spotted the HR200 until it had flown into a range of $\frac{3}{4}$ nm. By then, however, the HR200 had already descended somewhat below the PA28's altitude so it was understandable that the PA28 might not have considered avoiding action necessary as they closed because it had already been initiated by the alert HR200 instructor. A GA pilot Member added that transit flight with reference to the Sherburn QFE rather than using the QNH was unwise, the Member going on to suggest that the fundamental cause of the Airprox was that the PA28 pilot entered CAS without clearance. Controller Members agreed that whilst this was surely an entirely unintentional infringement on the part of the PA28 pilot, this had nevertheless created the conflict. However, both flights were operating VFR and the prompt action of the HR200 instructor pilot had not only resolved the situation but also removed entirely any risk. The Board agreed unanimously that this Airprox had resulted because the PA28 pilot entered CAS without clearance and caused the HR200 pilot concern, but equally because of the reporting pilot's prompt action there had been no risk of a collision whatsoever.

PART C: ASSESSMENT OF CAUSE AND RISK

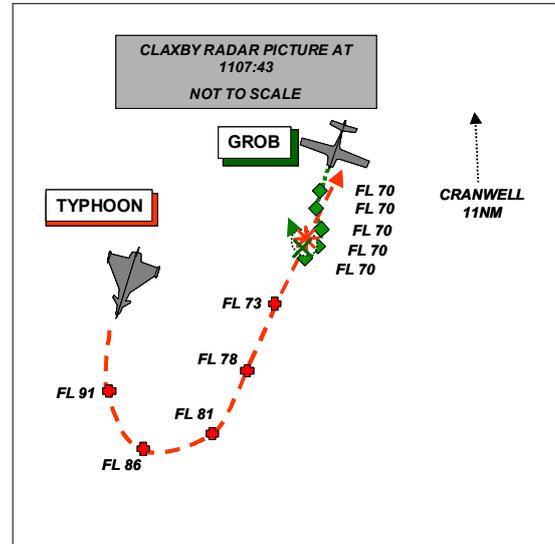
Cause: The PA28 pilot entered CAS without clearance and caused the HR200 pilot concern.

Degree of Risk: C.

AIRPROX REPORT NO 018/07

Date/Time: 13 Mar 1108
Position: 5251N 00026W (11nm S Cranwell)
Airspace: Lincs AIAA (Class: G)
Reporting Ac Reported Ac
Type: Grob Tutor Typhoon
Operator: HQ PTC HQ STC
Alt/FL: FL070 ~FL50

Weather VMC CAVOK VMC CAVOK
Visibility: 10km+ 40km
Reported Separation:
 100ft V/100m H Not Seen
Recorded Separation:
 V (See UKAB Note (1))/ 0.1nm H



UKAB Note (1): Both ac paint with Mode C until the sweep of the CPA when both Mode C's drop out, the Typhoon for one sweep and the Grob for three sweeps. The Typhoon shows FL073 on the sweep before the CPA and FL071 on the sweep after. The Grob shows FL070 on the sweep before the CPA and FL066 two sweeps (16sec) later.

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUTOR PILOT reports that he was flying a GH training sortie in a white ac with HISLs, nav and landing lights switched on, operating on a quiet frequency but squawking a Cranwell conspicuity squawk with Mode C. Whilst setting up for a spin from FL070, heading 290° at 114kt, a Typhoon was spotted manoeuvring about 6nm to the S of their position (164/11.4DME from CWL, near Folkingham) at about FL050 and was assessed at that time as no threat.

On completion of a clearing turn to the right, as the wings were rolled, the QFI (non-handling pilot at the time) spotted a Typhoon at exactly the same level in his 10 o'clock at a range visually assessed as being less than ½nm. The ac was assessed as being on a direct collision track so an emergency break to the right and downward was executed by the QFI; the ac was eventually levelled at FL065 on a Northerly heading. The Typhoon was subsequently observed to continue on its track with no sign of having seen them. The sortie was continued without further incident.

It was their assessment that without the evasive action there would have been a high risk of collision. He estimates the closest range was 100ft and 50-100m, although it was difficult to judge due to the closest point being while they were conducting the evasive manoeuvre and visual contact was temporarily lost.

THE TYPHOON PILOT reports that he was flying a local medium-level tactical training flight from Coningsby (CGY). At the time the incident was reported he was between 6 and 15nm SW of CGY at about FL50 in a level cruise in very good visibility and heading 023° (out of Sun) at 360kt. He conducted two IP-to-Target runs, the first conducted at FL50 and the second conducted at 3000ft on the CGY QFE, both flown on a heading of 023° from the IP that was 18nm from CGY on a bearing of 203°. He was in receipt of a RIS from Coningsby throughout but did not report getting any TI and he did not see the other ac.

MIL ACC reports that a Tutor was preparing to carry out a spin whilst operating autonomously and meanwhile a Typhoon was receiving a RIS (implied) from Coningsby Departure (DEPS). The Typhoon pilot contacted DEPS at 1106:45 but no type of service was requested or agreed. The Typhoon pilot then stated that his intentions were, "Typhoon C/S's descending to FL50 we'll be running inbound through Coningsby er for a flypast recce for the 11 Squadron stand-up in two week's time." DEPS replied at 1107:04, "Typhoon C/S roger multiple contacts to the err North and East of your position operating between er FL50 FL70 confirm you're descending FL50 initially." to which

AIRPROX REPORT No 018/07

the pilot replies "Affirm 50." There is then an exchange between DEPS and another ac before further TI was passed at 1107:27, "Typhoon C/S er traffic North three miles tracking South West indicating flight level 60." The pilot replied, "Typhoon C/S." Simultaneous with the TI, APP picked up the landline with DEPS and said, "Yeah." The TI was then heard on the landline before APP said, "Sounds like a radar information handover." DEPS then spoke to the other ac on frequency, then APP queried, "Typhoon C/S?". DEPS replied, "Affirm Typhoon C/S is I'll point to him cause it's [unintelligible]" and APP replied immediately, "Yeah I've got him." DEPS then continued, "He's er descending FL50 radar information for a recce err practice recce for this 11 Sqn stand-up thing. I don't know what height he's coming down to or what profile he wants to fly." The sound of rattling flight strips is then heard and then APP stated, "I don't want that." This comment is because APP has already made out a flight strip for this ac and does not require the one offered by DEPS, who said, "You don't want that do you." APP said, "No." and DEPS continued, "Erm I've called all the multiple tracks to the North and East they're operating 50 to 80." At 1108:11 APP instructs, "Ok stud 4.", and at 1108:15 DEPS stated, "Typhoon C/S contact Coningsby approach stud 4." and the pilot read this back correctly.

Analysis of the Claxby Radar shows the Typhoon 11SE of Cranwell at 1106:33 in a left-hand turn passing 270o and indicating FL114 while the Tutor is in its 3 o'clock at 1.6nm, tracking 175o and indicating FL070. The Mode C of the Typhoon disappears on the next sweep, probably indicating a rapid descent. This is verified when Mode C returns at 1106:56 with the Typhoon indicating FL095, tracking 220o with the Tutor in its 6 o'clock 2.6nm, tracking 175o and indicating FL070. At 1107:05 the Typhoon is passing through 200o, indicating FL091, with the Tutor in its 7 o'clock at 3.2nm; at that stage the latter was maintaining its track and level. The Typhoon continued in a descending left-hand turn and passed 020o and indicated FL078 at 1107:27 while the Tutor was in its half-past-twelve at 1.5nm, the altitude and heading unchanged. Eight sec later the Typhoon was indicating FL073, tracking 010o with the Tutor in its 1 o'clock at 0.6nm having made a right turn to track 240o and was indicating FL070. The CPA occurred at 1107:43 with the Tutor passing into the Typhoon's 6 o'clock at 0.1nm. There was no Mode C information on either ac at that time; the Typhoon is tracking 010o and the Tutor 360o. On the next radar update at 1107:51, the Typhoon's Mode C was FL071, suggesting that the vertical distance may have been less than the 300ft indicated immediately prior to the CPA.

By passing TI at 1107:04, DEPS complied with the conditions of RIS in accordance with JSP552. However, when the updated TI was passed at 1107:27, the information passed related more closely to another Tutor that was in the Typhoon's 1 o'clock at 4.8nm, tracking 150o and indicating FL060. The nature of this TI could have led to the Typhoon pilot to dismiss the traffic as posing no threat. Notwithstanding that the updated TI did not relate to the ac that in fact posed the most imminent threat, the pilots of both ac remained responsible for their own separation.

HQ Air (OPS) (Formerly HQ STC) comments that the Typhoon pilot may well have been concentrating more on his task than his lookout as he turned towards Coningsby.

HQ Air (TRG) (Formerly HQ PTC) comments that it is disappointing that the Typhoon pilot did not see the Tutor ac. However, the 'see and avoid' process worked sufficiently well to avoid the risk of 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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board determined that this incident took place in Class G airspace and that both ac had an equal right to operate there, the pilots having an equal and shared responsibility to 'see and avoid' one another's ac. For apparently sound operational reasons the Tutor pilot was not able to accept a radar service to assist him with this responsibility; the Typhoon pilot did but appeared not to absorb the generally accurate traffic information provided.

The Tutor pilot had lost sight of the Typhoon during a period of manoeuvring. Prior to his spinning exercise he sensibly conducted a clearing turn which served its purpose as they saw the Typhoon albeit late but in sufficient time to generate about 200m horizontal and about 1-200ft vertical separation – uncomfortably close to a large fighter ac.

Members were disappointed to note that despite TI on the Tutor from Coningsby; a sophisticated AI radar and operating at relatively low speed, the Typhoon pilot did not see the approaching, albeit white, Tutor and flew

virtually on a collision course until it manoeuvred out of his flightpath. Although the Typhoon pilot might have become totally preoccupied with identifying the precise point for the flypast, Coningsby was his home base and achieving precise timing was not a factor.

Controller Members found the approach taken by Coningsby ATC during the internal handover to be rather relaxed, resulting in less comprehensive and accurate TI than they would have wished.

Members were persuaded that there had been a compromise to the safety of both ac as indicated by the 'emergency break' conducted by the Tutor pilot and the relatively small separation that it achieved.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Non-sighting by the Typhoon pilot and very late sighting by the Grob Tutor crew.

Degree of Risk: B.

AIRPROX REPORT No 019/07

AIRPROX REPORT NO 019/07

Date/Time: 13 Mar 1115

Position: 5128N 00243W (5½nm N of Bristol International - elev: 622ft)

Airspace: Bristol CTA (Class: D)

Reporter: Bristol APR

<u>1st Ac</u>	<u>2nd Ac</u>
<u>Type:</u> JS41	PA34-200T
<u>Operator:</u> CAT	Civ Trg
<u>Alt/FL:</u> FL66↓	5000ft
	QNH (1031mb)

Weather VMC CLAC VMC CLAC

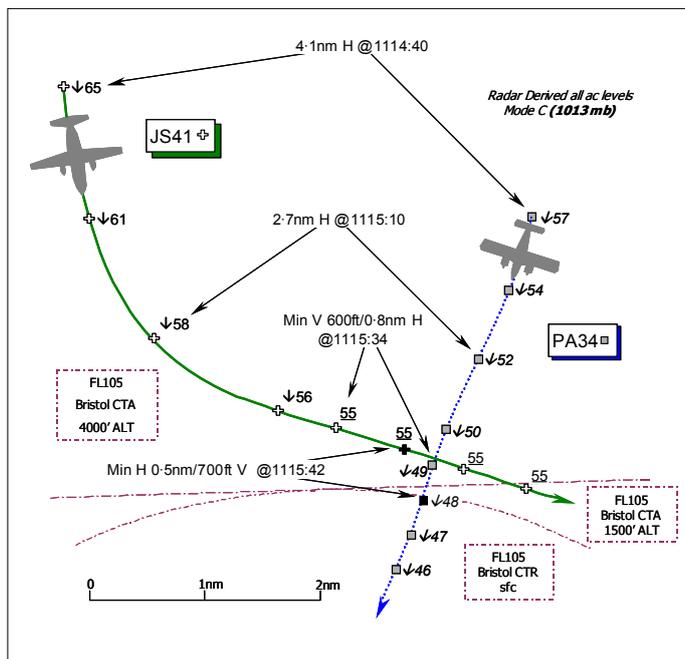
Visibility: 10+km 30+km

Reported Separation:
1600ft V/2nm H 500ft V/800m H

Recorded Separation:

Min V 600ft @ 0.8nm H

Min H 0.5nm @ 700ft V



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BRISTOL APPROACH RADAR CONTROLLER (APR) provided a laudably frank account reporting that the PA34 was flying a standard IFR training route ALVIN - BRI at FL80. The crew was instructed to leave ALVIN heading 175° and descend to 5000ft Bristol QNH (1031mb). The JS41 was inbound to Bristol under IFR and was released by Cardiff heading 175° descending to FL90. On first contact, the JS41 crew was instructed to descend to an altitude of 6000ft Bristol QNH (1031mb), the intention being to descend the flight to 1000ft above the PA34 before over-flying the latter, thereby positioning the JS41 as No 1 in the pattern for RW27. When the ac were about 9nm N of Bristol - both still in the descent - a departure was released on a BADIM 1X SID. At this stage, the PA34 was passing about FL62 and the JS41 passing FL73. In order to make the cross and turn the JS41 onto a downwind heading, the APR turned the PA34 onto a heading of 210° and then the JS41 onto a heading of 100°. Traffic information about the PA34 was given to the JS41 crew and that it was passing their assigned level descending to 1000ft below. However the relative rates of descent of the 2 ac were such that the vertical separation was not ensured. Also the very high QNH of 1031mb led the controller to perceive that the PA34 was just passing 6000ft QNH when it was indicating FL62 Mode C, the APR subsequently realising that this ac was actually still much higher than it seemed [about 6740ft QNH (1031mb)]. No avoiding action was issued. On passing clear of the PA34 the JS41 crew advised that a TCAS RA had been triggered but no other information was passed. Prescribed separation was eroded down to 600ft vertically when the ac were 1nm apart.

THE JS41 PILOT reports flying inbound to Bristol from the Isle-of-Man under IFR and was in receipt of a "radar" service from Bristol RADAR on 136-075MHz, squawking the assigned code with Mode C.

Heading 170°(M) at 220kt about 10nm N of the airport, descending through FL66 [about 7140ft QNH (1031mb)] in VMC with 1013mb set, he spotted a white coloured light twin-engine ac flying at an altitude of 5000ft in their 10-11 o'clock, just before TCAS enunciated an RA of "MONITOR VERTICAL SPEED" with which he complied. The light twin [the PA34] passed 2nm distant with 1600ft of vertical separation and "minimal" risk. At the time they were 3000ft above scattered cloud @ 3000ft.

THE PA34-200T PILOT, a flying instructor, reports he was conducting an IFR training flight and was inbound to Bristol for an ILS approach prior to a 'go-around' and practise diversion to Exeter. They were in receipt of a RCS from Bristol RADAR on 136-075MHz, squawking the assigned code with Mode C. TCAS is not fitted but the ac is equipped with Mode S.

Flying in VMC about 2500ft above cloud on a radar vector of 210°, they were flying into the high Sun but this was not a factor. The twin turbo-prop [the JS41] had first been spotted some 2min before the Airprox occurred. About 7nm N of the airport flying at 150kt in a level cruise at 5000ft (1032mb) [UKAB Note (1): The Bristol QNH changed from 1031mb to 1032mb some 6sec before the Airprox] both ac were flying under radar vectors from Bristol ATC. They had levelled approximately 1½min before the JS41 crew had been cleared to descend from 6000ft, through their level, to an altitude of 2500ft. The JS41 crew then reported a TCAS RA.

In good visual contact with the JS41, he watched the other ac pass about ½nm behind them in the descent. No avoiding action was taken as there was no conflict and he assessed the risk as “low”. Minimum separation was 500ft and 800m horizontally.

ATSI reports that both flights were in communication with the Bristol APR whose workload and traffic loading were both described as “low”. The PA34 crew established communications with the Bristol APR at 1059:35. The flight was identified some 33nm NE of Bristol International, maintaining FL80 and placed under a Limited RIS. The controller cleared the flight to join CAS and route BADIM – ALVIN – BRI maintaining FL80. At 1103, the subject controller took over the APR position. It was not the controller’s first session on radar that day, having occupied the APR position earlier in the shift. The handover was described as ‘standard’ and the controller was unable to recall any specific items that were highlighted. At 1103:51, the radar recording shows the PA34 entered CAS but the crew were not advised nor was the ATS changed to a RCS. The oncoming APR advised that it was normal practice to do so and could not explain why this had not been done in this instance. It was suggested that as it was close to the handover of the position that the oncoming controller might have believed that the offgoing APR had done this.

In accordance with standard procedures, the APR coordinated the PA34 with Cardiff who advised that they did not wish to work the flight. At 1111:20, the Bristol APR instructed the crew of the PA34 to fly a heading of 175° and descend to an altitude of 5000ft QNH (1031mb), which was correctly read-back. Almost immediately afterwards, Cardiff contacted the Bristol APR advising that the JS41 was inbound and it was agreed that the flight would be transferred descending to FL90 on a radar heading of 175°. The JS41 crew contacted the Bristol APR at 1111:55, when it was passing FL132, 21.5nm N of Bristol airport. The Bristol APR informed the crew to expect vectoring to the ILS for RW27 and to continue on the heading of 175° and descend to an altitude of 6000ft QNH.

The Bristol APR released an E145 for a BADIM 1X departure from RW27 which requires ac to climb straight ahead and be at or above 3000ft by DME 4.5 and then turn onto 089° to intercept the HON 219 radial which is followed to BADIM. Soon afterwards, at 1113:35, the Bristol APR instructed the PA34 crew to turn R heading 210° as delaying action. At this time, the PA34 was passing FL66 –about 7140ft QNH (1031mb) - descending to 5000ft, whilst the JS41 was passing FL90 – about 9540ft QNH (1031mb) - in the PA34’s 4 o’clock - 6.2nm. At 1114:40, the Bristol APR instructed the crew of the JS41 to turn L heading 110° downwind, adding “.... *may see TCAS traffic to the east southeast of you it’s a Seneca just passed your cleared level descending to a thousand feet below you*”. At that time, the PA34 was passing FL57 - 6240ft QNH - and the JS41 FL65 - 7040ft QNH, with the JS41 in the PA34’s 3 o’clock at a range of 4.1nm.

The two ac then started to converge quickly and as the JS41 rolled out on a heading of 110°, the PA34 passed from L to R ahead of it. Vertical separation reduced to a minimum at 1115:34, when the PA34 was in the 1 o’clock position of the JS41 at a range of 0.8nm, with the PA34 just 600ft below the JS41. [UKAB Note (2): The point of minimum horizontal separation of 0.5nm was achieved on the next sweep at 1115:42, with the PA34 some 700ft below the JS41.] As the two ac started to diverge the Bristol APR instructed the JS41 crew to descend to 2500ft. The crew acknowledged this and then advised “...*just be aware we got a resolution advisory on that one*”.

The Bristol APR, who was concerned over what had happened, said in a full and frank account of the incident that the initial plan was to place both ac on parallel headings and once the PA34 was established 1000ft below the JS41, cross the ac over in order to make the JS41 No1 in traffic. It was explained that the ATSA receives estimates on inbound traffic and the relevant strip remains in the pending bay of the FPS board until the flight is either seen on radar or is subject to any coordination, when the strip is moved into the active FPS bay. The Bristol APR could not recall when the FPS on the JS41 was moved over but explained that the standard level for traffic inbound to Bristol from the N was FL80. As the PA34 was cruising at that level, coordination was effected with Cardiff that the JS41 would be descending to FL90 and released for descent.

AIRPROX REPORT No 019/07

By the time that the JS41 crew called on the APR's frequency, the PA34 crew had been instructed to fly the same heading, 175°, and descend to 5000ft. The tracks of the two ac were parallel and separated laterally by just under 5nm. However, the significant point was that the ground speed of the JS41 was just under 300kt whilst that of the PA34 was only 155kt. The APR explained that when the request for the BADIM 1X departure was received the controller did not want to restrict either its heading or the level to which it was climbing. Therefore, to facilitate the cross-over between the JS41 and the PA34, the APR instructed the PA34 crew to turn R heading 210°, in the [erroneous] belief that the PA34 was virtually through the cleared level of the JS41 and that the latter was some 2400ft above the PA34. At Bristol the radar displays SSR Mode C FLs with an 'F' in front of the level whereas altitudes are shown with an 'A' prefixing the numbers. The high QNH of 1031mb had led the controller to believe, wrongly, that the PA34 was passing 6000ft and so vertical separation would be established as lateral reduced, but this was not the case.

The APR considered instructing the crew of the JS41 crew to stop their descent at FL70. However, this idea was rejected as in the past a pilot had been quite vociferous when, having been cleared to an altitude, the controller changed the clearance to stop the descent at a Flight Level. Furthermore, as the transition altitude at Bristol is 6000ft, there was a reluctance to instruct the JS41 crew to stop their descent at an altitude above this. Consequently, the two ac were allowed to continue their descent profiles and were turned towards each other when no form of separation was assured. At the time the JS41 crew was instructed to turn L onto a DOWNWIND, its ground speed was just over 100kt faster than that of the PA34 and the ac were 4.1nm apart converging with a vertical separation of 800ft. The APR realised the plan was not working but became fixated on it, deciding to pass traffic information to the crew of the JS41 but none to the PA34 crew. At the time the controller had become convinced [incorrectly] that the PA34 was below the level of the JS41 and so the situation was 'safe'.

The fact that the QNH was quite high, 18mb above the SAS, was a contributory factor: however the radar display did accurately reflect the levels of the two ac. The reluctance by the APR to change the original plan resulted in the two ac being vectored off their parallel headings into close proximity whilst continuing with their previously-issued descent clearances thus triggering a TCAS RA.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended the APR for conscientiously filing this Airprox as it was clear that there were a number of important lessons evident for all, albeit that the pilots involved were merely complying with the APR's instructions and had little impact on events as they unfolded. Controller Members were agreed that the APR's plan to separate these ac vertically and then turn the JS41 onto a downwind to become No1 in the pattern was sound, up until the point chosen to turn the JS41 onto a heading of 100°. Convinced wrongly that the PA34 was safely below the cleared level of the JS41, the APR instructed the latter to turn onto the selected DOWNWIND heading and thereby towards the PA34 before vertical separation was established, thus triggering a TCAS RA in the JS41. It was clear to controller Members that the APR had not correctly judged the vertical separation whilst the two ac were descending and although the PA34 was descended to a level below that of the JS41 the relative rates of descent of the two ac were such that vertical separation was not assured before horizontal separation was dispensed with - the APR under remit here to maintain 3nm horizontal separation between these two ac until 1000ft vertical separation was established. The Board recognised that there was an underlying human factors issue here and although the APR realised the plan was not working it seemed that the controller became fixated on it and merely elected to pass traffic information to the crew of the JS41 rather than issue robust avoiding action instructions. There was a salutary lesson here for the unwary and controllers should always remain flexible and not be averse to changing their plan if it became clear it was not going to work. The important point here was the need to take positive action at an early stage to ensure that separation is not eroded whilst keeping the crews informed of what was happening. The Board was briefed by the NATS Ltd Advisor that the salient points within this Airprox had been promulgated at the Unit concerned and discussed widely in an effort to ensure that the appropriate lessons are learnt. Members were therefore reassured that appropriate steps had been taken to proffer suitable advice. The NATS Advisor also explained that from the investigation of this Airprox the procedure for hand-over of the operating position has been reviewed with further advice for handing over controllers to highlight to the oncoming controller high barometric pressure. Furthermore, continuation Training in Unusual Circumstances and Emergencies (TRUCE) for controllers will also now include simulations where high barometric pressure is a factor to be taken into account. Whilst the ATSI report had cited the high QNH as a contributory factor here, Members

were not of the same view. Clearly a high QNH might add an additional complication and more for the controller to think about, but it was evident that 'altitude' and 'FL' were clearly and correctly differentiated on the radar display at Bristol. Controllers should be in no doubt from basic training of the effects of a significant difference between altitude and FL when high barometric pressure is prevalent and thus a factor to be taken into account in their tactical planning. Nonetheless, this Airprox was undoubtedly a timely reminder to controllers of the difficulties that can ensue. Of concern to CAT pilot Members was the expressed reluctance by the APR to change descent instructions in the face of a potentially negative response from a pilot. The ATSI report had made it plain that although the APR had considered stopping the JS41's descent at FL70 the controller was reluctant to do this, apparently as a result of previous negative comment from a pilot in the past. Whilst stressing that this point was not directed at the crews involved here, it seemed that the fear of a vociferous pilot taking the controller 'to task' for issuing a 'stop-off' at a FL whilst descending to a cleared altitude with the QNH already set outweighed the controller's apparent desire to issue revised instructions. CAT pilot Members agreed unequivocally that there was absolutely no place for unprofessional, intimidating comments on the RT and controllers should never feel inhibited by such comments were they to be made. The Board wholeheartedly concurred – far better to take action and ensure that a situation is made safe than risk an erosion of separation. The Board agreed unanimously that this Airprox had resulted because the APR vectored the JS41 and PA34 into conflict.

Turning to risk, despite the minimum separations evinced by the radar recording it was clear that both the PA34 instructor pilot and the JS41 crew had spotted each other's ac, the latter also with the benefit of traffic information from the APR. Moreover, the JS41's TCAS had detected the presence of the PA34 and enunciated a passive RA of 'MONITOR VERTICAL SPEED', thereby ensuring that the situation did not deteriorate further. Thus with the pilots alerted and ready to act if needs be, the Board agreed that there was no actual risk of a collision in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The APR vectored the JS41 and PA34 into conflict.

Degree of Risk: C.

AIRPROX REPORT No 020/07

AIRPROX REPORT NO 020/07

Date/Time: 14 Mar 1549

Position: 5210N 00032 W (6nm APP Cranfield - elev 358ft)

Airspace: London FIR (Class: G)

Reporting Ac Reporting Ac

Type: DA42 Folland Gnat

Operator: Civ Trg Civ Pte

Alt/FL: 2400ft↓ ~1500ft

(QNH 1034mb) (QNH 1034mb)

Weather VMC CAVOK VMC CAVOK

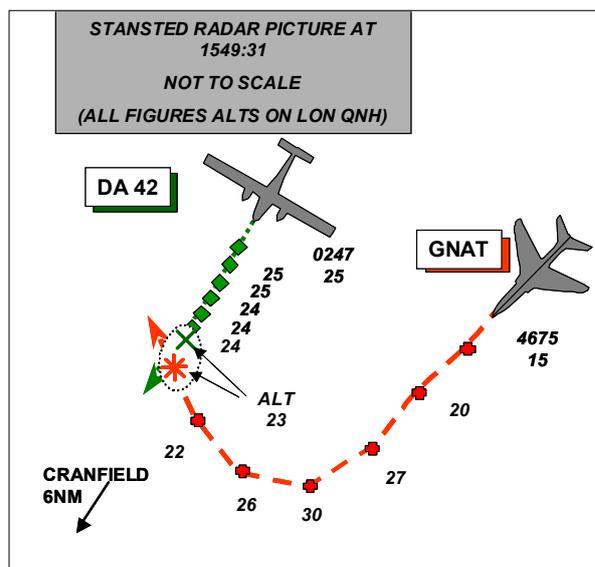
Visibility: 25km >10km

Reported Separation:

NR NR

Recorded Separation:

CPA Between sweeps (est 0ft V/ <50m H)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DA42 PILOT reports that his student was flying a simulated asymmetric ILS to Cranfield in a white ac with strobes and nav lights switched on, squawking 0247 (Cranfield IFR conspicuity) with Mode C and in receipt of an APP service from them. Although IF screens were fitted, the instructor's vision was unrestricted from the RHS. They were flying at 105kt, on the localiser, had just intercepted the glide path and commenced a descent with the gear down when the instructor spotted a Gnat ac at their level, 5 to 10° left of their nose crossing left to right but almost on a reciprocal heading (their heading was about 216° to hold the localiser (QDM214°)). He estimated the Gnat's heading to be 025° and its range was 100 to 200m on first sighting. He took control instantly and broke up and to the right, losing sight of the Gnat but "he was waiting for the impact". He visually re-acquired the Gnat that was flying a very large orbit round him.

After regaining straight and level flight he informed Cranfield that he would be filing an Airprox and assessed that the risk was very high. Cranfield subsequently informed him that the Gnat pilot had been talking to Luton.

After landing back at Coventry he received a telephone call from the Gnat pilot and they exchanged details.

THE FOLLAND GNAT PILOT reports that he was operating VFR at 250kt in the general area NW of Bedford, recceing at a site where he was to perform a display later in the summer. Whilst heading into Sun, around 200°, he saw a dark shape flash across the windscreen out of the corner of his eye. He instinctively turned right to avoid and felt slight airframe buffet. His passenger was also a pilot and both remarked, "what was that". He levelled off and checked the ac whilst starting a right hand turn to see if they had come close to something. He saw the other ac, also in a turn and realised what had happened.

CRANFIELD APP reports that a DA42 was on an ILS approach to RW21 and was transferred to the TWR when established on the localiser. At the time his workload was high.

Shortly afterwards the ADC advised him that the DA42 had reported an Airprox with a fast jet, at first believed to be a Hunter, and had taken avoiding action.

Within 2min he received a freecall from a Gnat ac who had had a "close encounter" with an ac near Cranfield. The pilot of the Gnat advised him that he was in receipt of a radar service from Luton Radar squawking 4675, had seen the ac late and had taken avoiding action and asked "if the other ac was alright". He was advised that an Airprox had been called by a DA42 on ILS Approach.

The pilot of the Gnat later telephoned Cranfield, identifying himself and his operating base. He stated he was in receipt of a Radar Service from Luton squawking 4675 and had seen the other ac late. He enquired if the other ac was "OK" and was advised it had landed safely at Coventry.

ATSI reports that the Gnat pilot established communication with the LTCC Luton INT DIR at 1528. The controller responded using the right flight number but a partly incorrect callsign name, (B). Using the correct callsign, the pilot reported departing from N Weald seeking to transit between Stansted and Luton, requesting a radar service, and he was instructed to squawk 6750. Just over one minute later the Gnat was informed "*you are identified it's very limited Radar Information Service due to radar performance*": however, a different - also incorrect flight name - was used, (C). The pilot read back the service but only used the flight number. In any further transmission before the Airprox occurred, the pilot of the Gnat did not use the flight name and the controller used callsign (C). At 1531:40, the INT DIR requested the Gnat's intended level. This was reported as, once clear of Luton and Stansted, FL100, over Grafham Water. The pilot was advised that to the N the base of CAS was 2400ft. Luton DIR passed TI to an inbound ac about the Gnat and the latter was also advised of the inbound. At 1533, there was a change over of controller, the new controller informing the Gnat pilot that the base of CAS was 5000ft and there was no traffic seen to affect a climb to not above 4900ft.

Shortly afterwards, a helicopter (Callsign 01) contacted the LUTON INT DIR to request clearance to enter the CTR to land close to the airport. Once identified, it was provided with a FIS. At 1535:50, the controller transmitted, intending to advise the Gnat that he was now providing it with a FIS. However, the transmission used Callsign (C) but number 01. The pilot of the helicopter replied "*Flight info I have thank you Zero One*". Still intending transmitting to the Gnat, the INT DIR said "*And Zero One squawk seven thousand please and just advise me leaving the frequency*". Although a transmitter was switched no modulation was received. The controller, using the helicopter's correct callsign, then instructed its pilot to retain his squawk and contact Luton Tower. No communication was made to or from the Gnat until some sixteen minutes later when the pilot reported back on frequency, having needed to talk to Cranfield for two minutes (about a close encounter with a DA42, subsequently reported as the Airprox). The Gnat continued under a FIS until transferring to N Weald at 1558.

It was a requirement, in accordance with a permit issued by the CAA under Rule 23(2) of the Rules of the Air Regulations 1996, for the Gnat pilot to operate at more than 250kts only when in receipt of a radar service. On this occasion the pilot was initially informed that he was being provided with a RIS, albeit very limited. The oncoming INT DIR intended informing the pilot that the service was being changed to a FIS, before the Airprox occurred. However, because of an incorrect callsign, the message was not received and, consequently, not acknowledged by the Gnat pilot.

UKAB Note (1): Both the UKAB and NATS conducted independent calculations based on the radar recording of the speed of the Gnat in the lead up to the incident. Both calculations were the same at 300kt groundspeed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was unanimous that this had been a very serious incident and that there had been many hidden aspects which, while these may have contributed to the circumstances to a greater or lesser degree, were not the direct cause of the Airprox.

Both ac had been operating in Class G airspace where see and avoid is the prime means of collision avoidance. In this incident neither the DA42 instructor pilot nor the Gnat pilots saw the opposing ac in time to initiate any avoiding action; this, in the unanimous opinion of the Board, had been the primary cause of the incident. There were however many other factors.

The Board considered the actions of the Cranfield controller and the DA42 pilots in turn. Cranfield is not only a busy flying training aerodrome but attracts many visitors for instrument approaches. It has no radar so all approaches are procedural; that being the case, the Cranfield Controller, unaware of the presence of the Gnat, had played no part in this incident. For pilots in the area, the implications of no radar are that a good lookout is essential. The student pilot in the DA42 would have been concentrating on his single-engined ILS approach and is anyway briefed not to look out during the exercise. The student thus also played no part in the sequence of

AIRPROX REPORT No 020/07

events leading to the Airprox. The Gnat had approached the DA42 from behind and to its left (the blind side to the instructor). The radar recording shows that there was a period of just under 20sec when the Gnat was ahead of the DA42's 3/9 o'clock line, turning towards it and slightly above it. Although opinion was divided, it was generally felt that the DA42 instructor did have the opportunity to see the other ac, take control and initiate avoiding action. Whilst respecting the DA42 instructor's opinion, experienced GA instructor Members opined that the IF screens might have been a factor, possibly reducing the opportunity for the instructor to see the other ac in the position from which it had approached.

Extensive discussion followed regarding the Gnat's exemption from the Air Navigation Order; VFR below FL100; 250kt speed limitation. The main reason for the VFR 250kt speed limitation is to allow pilots time to implement the see and, most importantly, **avoid** principle. The implication is that sufficient time should be available from seeing an opposing ac to any avoidance taking effect. The exemption issued to certain ex-military ac to operate above 250kt below FL100 is understood to have been issued on the basis that due to their airframe design, ac handling is improved: it is safer to fly faster. The proviso for this exemption, stated within the applicable permit, is that a '**radar service**' is used in order to assist lookout and give early warning of other traffic. 'Radar service' is not defined and in many situations a tighter definition - RIS for example - although being clearer to all concerned might prove to be restrictive. It was assumed by the Board that if such a 'radar service' is refused or downgraded, say to a FIS, then the ac must either slow down to below 250kt or climb above FL100. The NATS Advisor stated that in general controllers were not aware of the existence of the exemption to the speed restriction: they (NATS) had, as a result of this incident, undertaken an extensive internal publicity exercise. Even with full equipment serviceability, radar coverage in the area and at the level of the incident is at best patchy so controllers are frequently not in a position to offer a 'radar service' even if they were aware of its importance to ac such as the Gnat. (It was noted that at the time of the Airprox the Debden Radar, one of the prime radars used by Luton, was under long term scheduled maintenance). In addition and understandably, other than at LARS units, controllers at busy airfields see their prime responsibility being to providing a service to ac arriving and departing from the airfield they serve.

The callsign confusion was regrettable but understandable. Presently there is no standardised format for callsigns for such ac as the Gnat involved in this incident and also no way for controllers to know - from the callsign - that an ac needs a radar service in order to operate (to the conditions of the exemption). Due to the callsign confusion the Gnat pilot was unaware that the service had been downgraded to a FIS and that he was not actually in receipt of a 'radar service' of any kind.

The Board was informed by both the NATS and ATSI Advisors that NATS, the CAA and the operators of ex-military fast jets are in discussion as to how best to improve the situation. Consequently the Board did not make any Safety Recommendation, accepting that any points highlighted by this Airprox would be addressed by the CAA (SRG). Two Board Members, both test pilots and with Gnat experience (one very extensive, including as a QFI and with the Red Arrows) suggested that although not necessarily true for all such ac types, the Gnat did not come into the category of ac that needed an exemption to the 250kt rule to operate safely. Both therefore felt that in this case ac speed had been a factor in the Gnat pilot not seeing the DA42. It was further opined that had the Gnat pilot simply been receiving the site this could have been better done at lower speed with one of the crew specifically briefed to assume the (ac) lookout responsibility while the other checked the display site. Additionally, it is well known that Cranfield is very busy and the instrument approach is clearly marked on the CAA VFR chart and should, as a general rule, be avoided. If it were absolutely necessary to operate there, then an information call (notwithstanding the 'radar service' proviso) to Cranfield would have allowed controllers to warn any ac on the approach or even ask the Gnat pilot to delay for a few minutes.

This was an entirely avoidable incident. Although the DA42 instructor pilot had an equal and shared lookout responsibility he was placed in a very difficult position by other circumstances. The Gnat pilot, on the other hand, was hindered by nothing but self-imposed factors, namely his speed, his possible concentration on other aspects of the flight less important than lookout and he flew at relatively high speed very close across the bows of the DA42 without seeing it. It was predictable that another ac could be at that height and in that position on the approach. That said, unaware of the callsign confusion the Gnat pilot believed that he was receiving a 'radar service' and that he would therefore be alerted by ATC to other ac in his vicinity.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Gnat pilot and effectively a non-sighting by the DA42 instructor.

Degree of Risk: A.

Contributory Factors: The Gnat was flown at relatively high speed in the vicinity of an ILS final approach path.

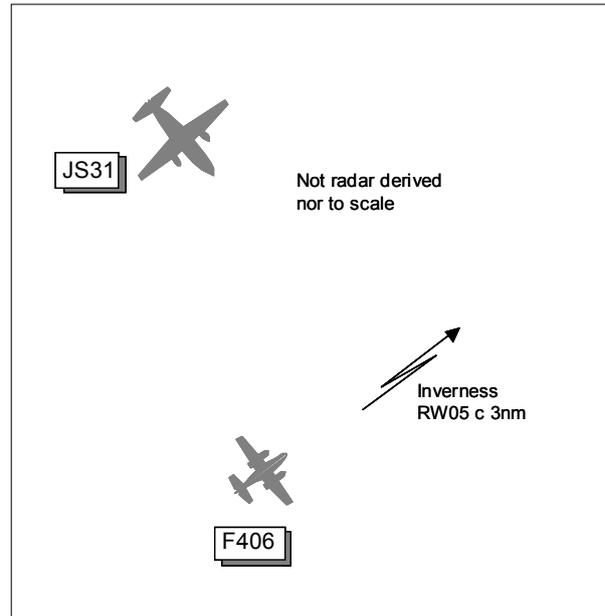
Post Meeting Note: The Flight Operations Division of the CAA's Safety Regulation Group advised that in July 2007 a Bulletin was sent to the Chief Pilots and Operators of Ex-military Aircraft. The Bulletin, CAP632 Bulletin 1/2007, communicated the key lessons for pilots of ex-military aircraft arising from this and a subsequent Airprox (reference number 096/07), the circumstances of which were very similar. The Bulletin also noted that the CAA and NATS are discussing the possibility of allowing ex-military aircraft holding a 250 knot Exemption to use the callsign prefix of "FASTJET".

AIRPROX REPORT No 021/07

AIRPROX REPORT NO 021/07

Date/Time: 19 Mar 1655
Position: 5731N 00408W (3nm FIN APP RW05
Inverness - elev 31ft)
Airspace: FIR/ATZ (Class: G)
Reporter: Inverness APP/ADC

	<u>1st Ac</u>	<u>2nd Ac</u>
<u>Type:</u>	F406	JS31
<u>Operator:</u>	CAT	CAT
<u>Alt/FL:</u>	1300ft↓ (QNH)	1000ft↓ (QNH)
<u>Weather</u>	VMC NR	VMC NR
<u>Visibility:</u>	NR	NR
<u>Reported Separation:</u>	0.5-1nm	NR
<u>Recorded Separation:</u>	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE INVERNESS APP/ADC reports that the inbound F406 from Stornoway converted from an ILS to a visual approach onto RW05 at 10nm final. The VFR inbound JS31 flight, also from Stornoway, was told to report S coast of Black Isle to enable sequencing to final. After the JS31 flight called S of Black Isle, he asked the crew if they had the F406 in sight and they replied 'negative' so he then instructed the flight to continue downwind LH and report traffic in sight which they did immediately. He then told the JS31 crew to position No 2 to the F406 but there may have been a clipped transmission from the JS31 flight. He looked out of the VCR window to visually acquire the JS31 and, as he did so, he saw the JS31 fly <100ft underneath the F406 on short final, manoeuvre to the S of the final approach before it positioned onto R base. He believed that owing to the proximity of the ac, safety was not assured. Following telephone conversations with both Captains, he learnt that the JS31 Captain had called the F406 pilot on company frequency shortly after departing Stornoway and indicated his intention to carry out 'TCAS training' but the F406 pilot was unable to accommodate this owing to being time critical. The F406 pilot did hear a call from the JS31 flight, when it was downwind for RW05, stating their intention to carry out training. However, it appears that as soon as the JS31 pilot stopped speaking, the pilot of the F406 looked to his L to find the JS31 already in close proximity.

The Inverness special METAR shows EGPE 1702Z 32013KT 9999 VCSH FEW005 SCT020CB 03M00 Q1009=

THE F406 PILOT reports inbound to Inverness IFR and in receipt of a procedural ATS from Inverness Tower on 122.6MHz squawking an assigned code with Mode C; TCAS was not fitted. When established on 4nm final heading 050° at 130kt and descending through 1300ft, he heard another flight call that for 'TCAS training' they would be passing behind his ac; ATC did not respond to this call. He saw a company JS31 in his 10 o'clock range 0.5-1nm heading towards him at a similar level and assessed that it would pass behind. He took no avoiding action as he was aware that the JS31 crew had seen his ac and he continued to concentrate on his approach and landing, assessing the risk as nil.

THE JS31 PILOT reports inbound to Inverness VFR and in receipt of a procedural ATS from Inverness on 122.6MHz and in communication with the F406 on company frequency squawking with Mode C. Whilst good visual contact with the company F406 on final, the Captain decided to carry out TCAS training by passing behind the F406. This occurred in good VMC whilst heading 140° at 150kt on L base for RW05 and the crew followed the TCAS guidance to descend. He assessed the risk as low.

UKAB Note (1): The JS31 and F406 Operator contacted the CAA FOI Regional Office post incident informing the Inspector of the incident details.

ATSI comments that there is no indication from the RT that the ac came into close proximity, the JS31 crew were aware of the F406 ahead in the cct and had reported it in sight.

UKAB Note (2): The Airprox occurred below recorded radar coverage.

UKAB Note (3): The Inverness RT transcript does not record any transmission with reference to TCAS training. The JS31 crew report visual with the F406 and are told by ATC to report final RW05 No 2 to it. Shortly after, at 1655, the F406 pilot reports 3.5nm final and is cleared to land and over 1min later requests a surface wind check. No mention is made of an Airprox and after 1656:30 the JS31 crew transmits "Ah JS31 c/s is visual with the traffic ahead on a right base runway zero five" to which ATC replies "JS31 c/s report turning final runway zero five".

UKAB Note (4): The UK AIP at AD 2-EGPE-1-7 promulgates Inverness ATZ as a circle radius 2.5nm centred on longest notified RW (05/23) 573233N 0040251W SFC to 2000ft aal, aerodrome elevation 31ft.

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 controller involved and reports from the appropriate ATC and operating authorities.

After clearing the JS31 to position No2 to the F406, the Inverness ADC/APP was undoubtedly surprised when he first saw the JS31 as it flew close to the F406 on final approach. Unbeknown to him, the JS31 crew had broadcast to the F406 pilot, on a company frequency, their intention to carry out TCAS training which communication went unheard by ATC. Consequently, the ADC/APP was concerned by the proximity of the JS31 crew's unannounced manoeuvre and had filed an Airprox.

ATCO Members expressed some concern as the JS31 crew's actions had laid grounds for further potential conflict when they flew from L base, through the final approach to the S before positioning onto R base. As both flights were under the control of the ADC in the cct area, it was possible that another ac could have been in the R base area, known to ATC but not notified to the crew by the controller as he was not aware of the JS31 crew's intentions. That said, on this occasion no other traffic conflict occurred.

Turning to risk, the ADC had observed the passage of the JS31 close to the F406 and believed that safety had not been assured. The F406 pilot had heard the JS31 crew's call on the company frequency and seen it approaching on a crossing track that would move it clear behind, in the knowledge that the JS31 crew were maintaining adequate visual separation whilst following the TCAS guidance. This was enough to persuade the Board to conclude that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The JS31 crew flew an unannounced manoeuvre which caused concern to the Inverness ADC.

Degree of Risk: C.

AIRPROX REPORT No 022/07

AIRPROX REPORT NO 022/07

Date/Time: 23 Mar 1741

Position: 5556N 00259W (13nm E Edinburgh)

Airspace: Scottish TMA (Class: D)

Reporter: Edinburgh APR

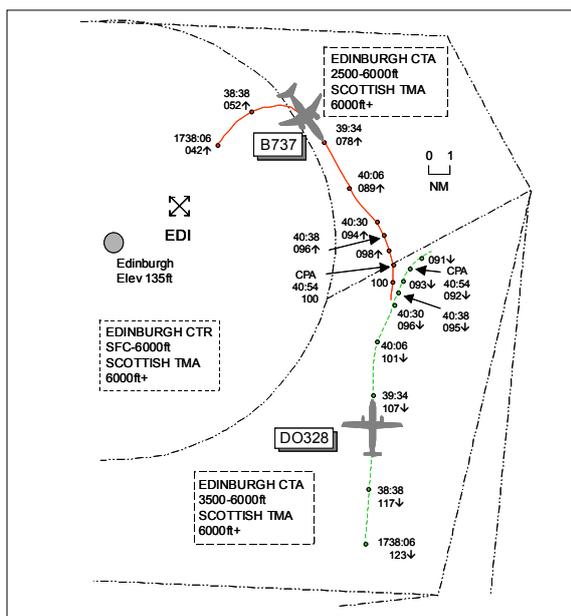
<u>1st Ac</u>	<u>2nd Ac</u>
<u>Type:</u> DO328	B737-400
<u>Operator:</u> CAT	CAT
<u>Alt/FL:</u> FL100↓	FL90↑

Weather VMC CLOC VMC CLAC

Visibility: >40km NR

Reported Separation:
1000ft V/2-5-3nm H <3nm H

Recorded Separation:
APR: 500ft V/1-5nm H
100ft V/2-7nm H OR 800ft V/0-7nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EDINBURGH APR reports carrying out OJTI duties with a colleague as the Radar1 controller. When the DO328, inbound to Dundee, was transferred from Scottish, it was given a R turn onto 005° in order to keep the ac to the E of S'bound departures. Tower was instructed to 'Check South' so that TLA departures would be coordinated before take-off. At this time the ADC asked for a release on the B737 which was approved, on a TLA 6D departure with no restrictions. Once airborne the B737 flight was climbed to FL100 on the SID whilst the DO328 was now descending to altitude 5000ft. He realised that further action was needed to maintain separation so after a short delay due to the trainee's workload, the DO328 was turned further R onto 025°. Further action was still needed so the B737 was turned R onto 200° at which point the crew queried traffic that they could see so the flight was turned further R onto heading 240°. Immediately after this the DO328 flight was given an avoiding action R turn onto 090°, the crew reporting visual with the B737.

THE DO328 PILOT reports heading 350° at 250kt inbound to Dundee IFR and in receipt of a RCS from Edinburgh on 121.2MHz squawking an assigned code with Mode C. Descending through FL100, traffic was seen on TCAS 10nm ahead, below and climbing, which gave a TA alert. ATC issued an avoiding action R turn onto 090° whilst a low wing twin-engined jet was seen, in a climbing R turn, to pass 2.5-3nm clear to their L and 1000ft above. He assessed the risk as low to very low, the incident occurring in VMC, with a low risk even if the avoiding action had not been taken.

THE B737 PILOT reports outbound from Edinburgh IFR. After take-off RW06, ATC told them to follow a TLA 6D departure and climb to FL100. Just prior to intercepting TLA 027°R inbound, they received clearance to fly heading 180° followed shortly thereafter onto 200°. Opposite direction traffic then appeared on the TCAS display flying S to N. When they were passing FL90 a TA alert was generated. A R turn onto 240° was given which they confirmed, also informing ATC about the traffic now showing at 3nm distance. The controller immediately instructed the other flight to change heading which included the words 'avoiding action' but by now they had visual contact with the other ac. As no TCAS RA was activated, he elected not to file an incident report; none of the other parties involved stated their intention to file at the time. However post-flight he was informed that ATC had filed an incident report.

ATSI reports that at the time of the Airprox, the controller was monitoring an experienced controller carry out familiarisation duties before he commenced full-time Approach Radar training. Consequently, the mentor was generally prompting his trainee's actions. Because of the low-to-medium workload, the Edinburgh Radar 1 and 2 positions were combined.

With hindsight, the controller thought his performance may have been affected at the time by a non-operational issue [on the nature of which the Board was briefed].

At 1733, the APR telephoned the ADC requesting him to check before releasing any S'bound departures. Normally, traffic departing in that direction is 'free flow' but because of the presence of the DO328 routing towards Dundee from the S of Edinburgh, a potential confliction existed. Straight away the ADC requested a release for the subject B737 on a TALLA (TLA) 6D SID from RW06 i.e. *'Straight ahead to I-VG D0.5 or 635ft QNH whichever is later. Turn left onto track 045°M. At I-VG D7 turn right onto track 145°M. At TLA VOR R026 (I-VG/I-TH) D12.5 turn right to intercept TLA VOR R028 to TLA VOR. Cross TLA D30 above 4000ft (3.4%). Then resume normal climb (3.3%) to be TLA D13 above 5500ft, TLA VOR at 6000ft'*. The flight was released with no restriction. Shortly afterwards, ScACC passed a radar handover on the DO328, heading 360° descending to FL70. Edinburgh confirmed it was identified and the APR continued the telephone call to agree co-ordinated climb for the B737 to FL100. The proposed plan was to climb the B737 through the level of the DO328.

The DO328 flight established communication with the APR at 1735, reporting descending to FL70 and heading N. The flight was instructed to turn R heading 005°, the intention being to route it within CAS to the E of the B737's departure track. At the time, it was passing FL153, 29nm SSE of Edinburgh Airport, within Class D airspace of the Scottish TMA. When the APR was informed by the ADC that the B737 was airborne at 1736, it was agreed that the flight would be transferred to the Approach frequency. When the crew contacted the APR, some 30sec later at 1736:40, they were instructed, in accordance with the agreed co-ordination with ScACC, to climb to FL100 on the TLA 6D routing. The radar shows the DO328 passing FL139, 24nm SE of the airport at this time.

The Edinburgh MATS Part 2, Section 4-20, states the coordination required between Edinburgh Approach and Leuchars for traffic inbound to Dundee from TLA. *'APC will coordinate a clearance limit and level including present SSR code. A radar handover will be given when outside CAS and clear of Edinburgh traffic, change SSR code if requested.'* Accordingly, at 1737:20, the APR mentor telephoned Leuchars to inform them of the DO328's details. A squawk, frequency and descent to FL50 were agreed. The DO328 flight was instructed to descend (1738:10) to altitude 5000ft on QNH 1022mb [UKAB Note (1): Change from FL50 to 5000ft altitude was re-coordinated during handover post Airprox]. The subject ac were 20nm apart. Both the mentor and trainee then turned their attention to vectoring 3 ac from the S towards the ILS for RW06 and did not monitor closely the progress of the subject flights. The mentor believed that the B737 would climb quickly through the level of the DO328, although he agreed that an initial vertical solution would have been prudent. The mentor commented that this was the first time the trainee had experienced positioning for RW06 and a strong SE'ly wind was making it difficult. At 1739:35, as the DO328 flight was passing FL107, it was issued with a R turn heading 025°. The subject ac were now 11.9nm apart with the B737, passing FL78, still on the SE'ly track of the SID before turning to TLA: consequently, it was converging with the DO328. The mentor explained that the heading change issued to the DO328 was not sufficient to ensure lateral separation between the subject ac. He added that when he first prompted his trainee to issue the turn, he considered the heading was appropriate but the instruction was delayed whilst the trainee transmitted to other ac.

At 1740:05, realising that the 2 flights were still conflicting, the B737 was instructed to turn R heading 200° and 6sec after acknowledging this instruction the pilot reported *"and we have traffic at two miles"*. The mentor said that he then took over the RT and instructed the B737 flight to continue the R turn heading 240°. By now (1740:30), the two ac were 3.9nm apart, the B737 was passing FL94 and the DO328 FL96. He immediately gave the DO328 *"avoiding action turn right heading zero nine zero degrees"*. The pilot reported visual with the traffic. No further transmissions were made to, or from, either ac until they had passed, when the DO328's pilot asked if he could route direct to Dundee.

Edinburgh is authorised to use 3nm minimum radar separation, under certain conditions, which were met on this occasion. The radar recordings reveal that when the subject ac were 2.7nm apart (1740:38), the B737 was passing FL96 and the DO328 FL95. Vertical separation increased while the horizontal separation reduced. As they passed (1740:54) 0.7nm apart, vertical separation was 800ft. The mentor commented that STCA did activate, initially a low, amber alert, then going to a high red alert. He added that as the ac passed close to each other he was not aware of the separation as the SSR returns overlapped. It is possible to individually change the position of SSR returns but it is time consuming. The Edinburgh radar display, unlike at other NATS ATC Units, does not show a separate box indicating the traffic involved in any STCA and their respective levels. Therefore the following recommendation is made.

AIRPROX REPORT No 022/07

ATSI Recommendation: It is recommended that the local ATC Management review the STCA display system at Edinburgh to establish the practicability of displaying a separate box to show the ac involved in the alert and their respective levels.

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 Edinburgh APR mentor for his open and honest Airprox report, highlighting his own actions during this encounter which ultimately led to the subject ac passing in less than ideal proximity. The mentor/trainee 'on the job training' scenario is well known to Members, a challenging situation where there is on occasion a fine line between allowing the trainee to continue controlling for as long as possible and the mentor taking over control too early to the detriment of the trainee's confidence. Here, the mentor was fully aware of the potential for conflict between the subject ac and had based his plan on ac performance and strategic headings/tracks, it being his intention to monitor the developing situation closely. When the conflict was noticed, positive/robust actions needed to be taken immediately to resolve it but the necessary ATC instructions were delayed owing to other RT transmissions. Thereafter, the mentor took control and gave avoiding action to both flights but this was only after he had allowed his trainee to vector the subject ac into conflict which had caused the Airprox. That said, both airliner crews were aware of each other's presence from their TCAS equipment, with TA alerts being generated on each flightdeck. Whilst following ATC heading instructions, both crews visually acquired each other's ac and monitored their relative flightpaths which, from their viewpoints, passed without any perceived erosion of safety margins. Board Members agreed with these assessments, opining that when all of the elements were combined with the actual geometry that pertained, safety was not compromised during the encounter.

The NATS Advisor informed Members that Edinburgh ATC was actively pursuing the ATSI recommendation. This proposal had further potential benefits as four other NATS ATSU's used the same radar display equipment as Edinburgh. Also, this incident was highlighted in the May unit safety publication.

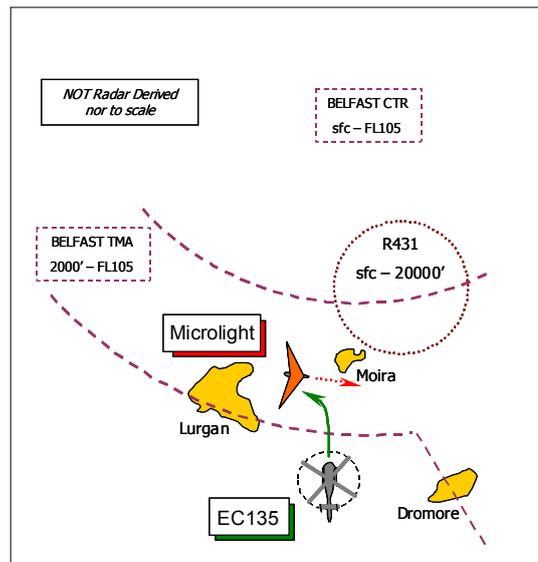
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Edinburgh APR mentor allowed his trainee to vector the climbing B737 and descending DO328 into conflict.

Degree of Risk: C.

AIRPROX REPORT NO 025/07

Date/Time: 26 Mar 1406
Position: 5429N 00614W (11nm S of Belfast
 VOR - elev 268ft)
Airspace: Scottish FIR (Class: G)
Reporting Ac **Reported Ac**
Type: EC135 Microlight
Operator: Civ Pte Civ Pte
Alt/FL: 2000ft↓ 1500ft
 QNH QFE
Weather VMC CAVOK VMC CLBH
Visibility: 10km+ 20nm
Reported Separation:
 Nil V/30m H NR
Recorded Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE EC135 HELICOPTER PILOT reports that he had departed in his blue-coloured ac from an aerodrome in the republic of Ireland inbound to a private helicopter landing site (HLS) at Ballinderry within the Belfast CTR in CAVOK weather. He was in receipt of a FIS from Aldergrove APPROACH on 128.5MHz and a squawk of A7000 was selected with Mode C.

Heading 360° with the Sun off his port quarter, he was descending through an altitude of 2000ft in the vicinity of Moira to the S of the Aldergrove CTR. With about ½nm to run to controlled airspace at 120kt, he observed a microlight ac ahead of his helicopter about 100ft away at the same altitude. To avoid the microlight – which had an orange/red wing and a white body - he executed a 60° AoB descending turn to the L, as the other ac passed some 30m away at the same altitude. At this point, he thought he had struck the microlight and proceeded to ensure the other ac was OK. After circling the microlight and ensuring it was indeed safe he reported an Airprox to Aldergrove APPROACH. The controller informed him that the other ac was just outside CAS and had not established communications with them. As the ac did not show on Aldergrove's primary radar, they had no way of knowing the ac was there. He stressed that in his view as a commercial pilot, Aldergrove ATC provide a first-rate service and afford every assistance to pilots on a daily basis in an extremely helpful and professional manner.

The airspace between Aldergrove and Belfast City is normally congested and it seemed that the microlight pilot had chosen to cross to the S of a busy joining point to the Belfast CTR at 2000ft, but did not establish communication with ATC.

THE FLEX WING MICROLIGHT PILOT reports that his ac has an orange & yellow wing with a white 'trike' body. Whilst not in communication with any ATSU, he was flying VFR over Lurgan towards Dromore in a level cruise at a height of 1500ft QFE, in VMC some 1000ft below a haze layer with no cloud. Although slightly hazy the in-flight visibility was still around 20nm as he was able to see Slieve Croob Mountain in the distance from his position over Lurgan.

Heading about 100° (T) at 55-60 mph, he was not aware that anything had occurred. He was later informed that the EC135 was on a descent to Ballinderry when its pilot suddenly observed his microlight and took evasive action by turning to the L – but he saw none of this. The EC135 was first seen when flying alongside his microlight to his L at a safe distance and remained in this position for a short time before accelerating and crossing his path to the R - again at a safe distance. That was the last time he saw the EC135.

He stressed that the detail provided was approximate as he did not feel the need to note positions, heights etc at the time.

AIRPROX REPORT No 025/07

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

ATSI reports that the EC135 was inbound to Ballinderry private HLS, SW of Belfast Airport and situated within the Belfast CTR. Initially operating on an IFR FPL, at 1353 the EC135 pilot reported wishing to close his IFR plan. The cancellation was confirmed by the Belfast APR. At the time, the EC135 was close to the FIR boundary, descending to 2500ft and routing to remain clear of EG P436. The EC135 pilot had been given a joining clearance from the SW TMA boundary to Ballinderry not above 2000ft QNH. No ATC service had been agreed but both the controller's and pilot's reports stated that a FIS was being provided. At 1359, the pilot was warned of unidentified primary radar contacts, possibly microlights, in the Lurgan/Portadown area, which would be on his left side. The pilot, subsequently, reported descending to 2000ft and at 1403:30, the APR updated the traffic information - *"..you're just passing those primary contacts now on your lefthand side range of about a mile"*. The pilot reported sighting two of them and confirmed they were microlights. Some 2min later, after being informed of other traffic, the pilot of the EC135 reported he would be descending to 1000ft to enter CAS. Shortly afterwards he transmitted *"I'd just like to report a near miss very near miss it's one of your microlights"*. He described the microlight's position as approximately 1.5nm S of the CTR boundary, at 2100ft.

The APR was not aware of the microlight's flight details as its pilot was not in communication on his frequency. However, even though providing a FIS, the controller was issuing appropriate traffic information to the EC135 pilot about ac observed on his radar display. It would appear that the microlight involved in the Airprox was not displayed on the Aldergrove SRE at the time of the incident.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Whilst clearly the EC135 pilot had been provided with a warning about the presence of microlights in the vicinity, controller Members agreed that it would be unrealistic to expect that every microlight would have been displayed to the Belfast APR or that each pilot would communicate with ATC. On the other hand, it was clear that if the subject microlight pilot had been communicating with ATC he might have ascertained that the EC135 was approaching his vicinity and thus prompted to look out for it. An experienced GA Member exhorted pilots to contact ATC if they have the means to do so, to advise of their presence: as evinced from the helpful ATSI report, it would seem that the subject Flex-wing microlight was not detected by the Belfast SRE. Therefore, whilst patently aware of other microlights in his vicinity it was clear from the EC135 pilot's own account that he had only spotted this brightly coloured orange & yellow Flex-wing, crossing from his L to R ahead, when it was about 100ft away. A helicopter pilot Member with experience of the EC135 opined that whilst the visibility from this helicopter's cockpit is very good forward and down, an instrument binnacle might potentially have obscured the pilot's view of the microlight - to port - from the right-hand seat. Nevertheless, good airmanship would dictate that the ac was moved in order to look into blindspots – possibly by means of a clearing turn where able. Fortunately, the EC135 pilot spotted the microlight in sufficient time to execute a very robust avoiding action descending turn using 60° AoB. Whereas the helicopter pilot reports that the Flex-wing was at the same altitude when it was spotted, it seemed to the Board that the microlight pilot should have been equally able to spot the helicopter as it approached from his right-hand side. However, the Flex-wing pilot reports he was completely unaware of the approaching helicopter at the time. A GA Member opined that the high-wing configuration of the Flex-wing might have masked the EC135's approach from the S. However, a CAT pilot Member reinforced the principle of clearing airspace obscured by an ac's structure; this was equally true of microlights as well as for any other ac and all pilots clearly have a duty to maintain an effective lookout scan for other ac. In the 'see & avoid' environment of Class G airspace 'the Rules of the Air' clearly delineate the responsibilities of pilots to avoid one another's ac, but realistically 'the Rules' can only work successfully if the other ac is spotted in time to take appropriate action. Here, unaware of the helicopter, the microlight pilot played no part in forestalling this Airprox. Thus it was left entirely to the EC135 pilot who fortunately spotted the microlight, but only just in time in the Board's view, to turn away when it was but a mere 30m away. The Board agreed therefore that this Airprox was the result of a non-sighting by the microlight pilot and a late sighting by the EC135 pilot.

The EC135 pilot's laudably frank account revealed a concern that he might have actually collided with the other ac but fortunately that was not the case. Whilst the absence of recorded radar data prevented any assessment of the actual separation that pertained here, it seemed from the helicopter pilot's account that it was a very close call nonetheless. A CAT pilot Member was of the opinion that with only one pilot visual with the other ac and the EC135

pilot only able to turn away moments beforehand, at the reported distance of 30m, the avoidance of a collision was merely fortuitous and an actual risk had existed. A GA pilot Member agreed. However, the overwhelming majority of the Members were of the opinion that the microlight had been spotted just in time to permit the EC135 pilot to take sufficient action to forestall a collision. Nevertheless, the safety of the ac involved here had certainly been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the microlight pilot and a late sighting by the EC135 pilot.

Degree of Risk: B.

AIRPROX REPORT No 026/07

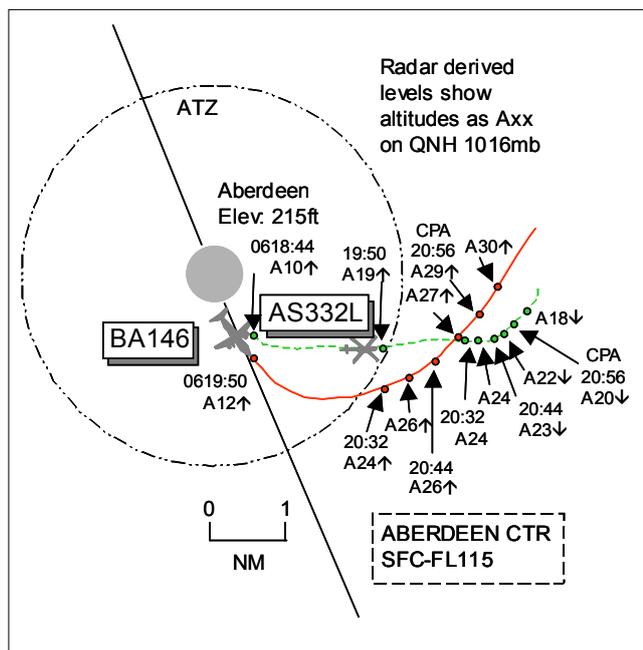
AIRPROX REPORT NO 026/07

Date/Time: 28 Mar 0621
Position: 5711N 00205W (4nm E Aberdeen - elev 215ft)
Airspace: ATZ/CTR (Class: D)
Reporter: Aberdeen ATSU

1st Ac	2nd Ac
Type: AS332L	BA146
Operator: CAT	CAT
Alt/FL: ↑3000ft (QNH 1016mb)	↑FL60
Weather VMC CLAC	VMC NR
Visibility: >10km	NK

Reported Separation:
ATC: Nil V/1nm H
Not seen NR

Recorded Separation:
Nil V/1.2nm H or 900ft V/0.5nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ABERDEEN ADC reports working the Tower position during the usual outbound morning rush. He received a radar release for both the AS332L and the BA146 – the AS332L was given a L turn and was asked to report turning L. As the BA146 was lined-up, the flight was given ‘hold position, after departure R turn heading 300°’. The heading was read back correctly but as the crew did not read back ‘hold position’, he confirmed this with the crew, being a critical part of the read back with the AS332L in the climbout. When the AS332L flight reported turning L, the BA146 flight was cleared for take-off and he monitored that ac’s track on the ATM for the correct turn. As soon as he noticed the BA146 make a slight L turn, he told the crew to turn R heading 300. Radar then telephoned to ask about the BA146 and he told radar that he had just told the flight to turn R. He heard radar give the AS332L flight avoiding action to the L and he again tried to turn the BA146 R; at no time did he see the BA146 turn R. By the time a L turn was appropriate for avoiding action, the subject ac were about to cross with some vertical separation.

THE ABERDEEN APR reports mentoring a trainee and at 0615 Tower requested radar departure for the AS332L followed by the BA146. He believed the AS332L was given L heading 100° and the BA146 was given R 300° and he thought this was read back correctly by the ADC. When the BA146 became airborne at 0620, he saw the flight turning L instead of R so he checked the fpss for an obvious error. Then the ADC rang to advise that the BA146 was turning L and that he, the ADC, would get the flight to turn R. After a few more seconds of track observation he gave the AS332L flight an avoiding action L turn onto 360° and descend immediately. Seeing the BA146 track going further L he gave the AS332L further instructions but as the labels were merging, it was difficult to see the Mode C readouts. He expected the BA146 to turn R after the ADC had spotted the error and gave 360° to the AS332L for this reason. In hindsight 360° was not effective as the BA146 continued its L turn onto 300°. As the BA146 climbed through the AS332L’s level it was heading towards the helicopter 1nm to its W. As the blips almost merged, he believed the BA146 was about 700-800ft above the Mode C readout of the AS332L. After the ac were clear of each other he advised the AS332L flight what had happened and the BA146 flight said that they were given a L turn onto 300°.

UKAB Note (1): Met Office archive data shows the Aberdeen METAR as EGPD 0620Z 18005KT 5000 HZ OVC007 06/05 Q1016=

THE AS332L PILOT reports outbound from Aberdeen IFR and in receipt of a modified radar service from Aberdeen on 119.05MHz squawking an assigned code with Mode C. After take-off the flight was steady heading 100° at 120kt and 3000ft, he thought [actually 2400ft climbing], QNH 1016mb when Radar warned of collision

avoidance, with an instruction to turn L onto 360° and descend to 2000ft. They complied with the instructions but nothing was seen throughout the encounter. The visibility was >10km whilst flying 1500ft above cloud in VMC.

THE BA146 PILOT reports outbound from Aberdeen to Scatsta IFR and, after lining-up, ATC instructed them to turn L, he thought, after departure onto heading 300°. During the L turn at 240kt they conflicted with helicopter traffic which resulted in a TCAS RA 'climb'. They climbed in accordance with the TCAS instruction but had good visual contact with the helicopter at all times. He assessed the risk as low.

THE BA146 FLIGHT OPERATIONS DEPARTMENT reports that the crew were debriefed with the benefit of viewing radar recordings with RT recordings supplied by NATS, the Aberdeen ATC provider. The crew agreed that they had both heard and acknowledged the turn but had continued with their normal expected SID with a L turn. The Operational Flight Plan (Pilots Log or PLOG) reveals the ATC clearance having been written down as "W5 L300°". The TCAS RA was acknowledged and the helicopter was sighted by which time the Captain, PF, believed that a R turn would have brought them into closer conflict with the helicopter so he opted to continue the climb with a L turn. Both crewmembers were unable to explain why they did not comply with the ATC instructions. This is the first incident of this kind experienced by the Company. An article featuring this incident will receive front page status in the company Flight Safety Circular which will be published mid-2007. Also, it has already been featured in the company annual SEP Safety Management Review delivered to crews mid-June 2007.

ATSI reports that the ADC described his workload as moderate.

The AS332L flight contacted Aberdeen Tower frequency, at 0612, reporting taxiing to holding point W5 for RW16. Approximately 1.5min later, the BA146 flight also reported approaching W5. At 0615, the AS332L flight was instructed to line up and wait RW16, having confirmed it was on a GORSE departure, IFR. This is a Standard Departure Helicopter route: *'Depart runway 16. After noise abatement turn left to Bridge of Don (BOD) then to GORSE, then to intercept the HMR at 40nm.'* The altitude restriction is to cross BOD at 3000ft. The ADC requested departure release from Approach Radar for the AS332L, followed by the BA146 enroute to Scatsta. Both were approved, the AS332L to turn L heading 100° and the BA146 to turn R heading 300°. Approaching 0617, the AS332L flight was cleared for take off RW16, to climb straight ahead initially because of a previous departing helicopter. The BA146 flight was cleared to line up after the departing AS332L.

In accordance with the release issued by Approach Radar, the BA146 pilot was instructed to *"hold on threshold after departure right turn heading three zero zero degrees"*. The pilot read back *"After departure heading three zero zero degrees"*. The ADC confirmed the clearance was correct and instructed the pilot to hold position, as the pilot had not acknowledged that part of the instruction. The ADC did not register that no mention of the turn direction was made by the BA146's pilot during his response. Consequently he did not request its read back. (NB. It is usual for ac routeing to Scatsta to receive a L turn after departure). The AS332L flight was instructed to turn L heading 100° when ready. Shortly afterwards, just after 0618:30, the crew reported starting to turn L. Believing that separation was now ensured, with the AS332L turning L and the BA146 having been cleared for a R turn after departure, the ADC cleared the BA146 flight for take off. The AS332L was then transferred to the Radar frequency.

The ATSU report states that the first two radar returns from the BA146, seen on the ATM, showed the aircraft on the C/L, the third indicating a very slight L turn. The fourth return displayed a more definite L turn. Accordingly, the ADC transmitted to the BA146 pilot (0620:15) *"confirming turning turning right now turn right heading three zero zero degrees"*. Receiving no response, the instruction was repeated *"turn right heading three zero zero degrees now"*. The pilot replied *"left three zero zero degrees"*. Because the BA146 was in a L turn, 1.5nm SW of the AS332L, at the same altitude, the pilot was instructed *"...avoiding action turn right immediately heading three zero zero degrees"*. This time the pilot read back *"turn right three zero zero degrees"*.

Meanwhile the APR, aware of the confliction, issued avoiding action to the AS332L flight at the same time as it was being issued to the BA146: *"avoiding action turn left heading three six zero and descend immediately the following aircraft one mile behind you at two thousand four hundred feet climbing through your level. Avoiding action turn left three six zero."* The pilot reported turning and descending. The controller responded *"descend immediately please descend immediately avoiding action"*. The pilot replied descending, passing 2200ft.

[UKAB Note (2): The radar recordings reveals the AS332L first showing on the Perwinnes radar at 0618:44 1nm SSE of Aberdeen in a L turn climbing through 1000ft QNH 1016mb before it steadies on an E'ly track shortly afterwards. About 1min later the BA146 appears for the first time 1.2nm SSE of Aberdeen (1.7nm W of the

AIRPROX REPORT No 026/07

AS332L) tracking SE'ly climbing through 1200ft QNH before turning L shortly thereafter. By 0620:32, the BA146 is climbing through 2400ft QNH, 1.2nm to the SW of the AS332L as it stops climb at the same altitude. Twelve seconds later (0620:44) as the BA146 passes 0.8nm behind the AS332L showing 2600ft QNH, vertical separation has risen to 300ft as the AS332L is just starting its avoiding action L turn heading 360° and descent through 2300ft QNH. The next sweep shows the BA146 at 2700ft passing 0.6nm W of and 500ft above the AS332L which is indicating 2200ft QNH. The CPA occurs at 0620:56 as the BA146 climbs through 2900ft 0.5nm WNW of the AS332L 900ft below, before standard separation is established on the next radar sweep.]

The BA146 crew believed that they had been given a L turn after departure. However, they had not read back the direction of turn and the ADC had not challenged the omission. The MATS Part 1, Appendix E, Page 9, states that *'Pilots are required to read back in full messages containing any of the following items: (these include) Heading instructions'. 'Controllers are to prompt a pilot if a read back is not immediately forthcoming.'*

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.

Pilots Members were surprised and disappointed that the BA146 crew did not comply with their ATC instructions, turning into conflict with the AS332L which action had clearly caused the Airprox. From the outset, the flight was given a R turn after departure onto 300° but this was not assimilated by the crew who appeared to be expecting a L turn as normal. The crew's partial readback, omitting the direction of turn, was not challenged by the ADC who focussed on the omission of the 'hold position' instruction that he had given in the same transmission. An ATCO Member opined that had the readback included a direction - L as the crew would normally be expecting - then this would have been picked up by the controller but the omission of any direction had slipped through the net. This incomplete readback (omitting the turn direction) had gone unchallenged by the ADC which, Members agreed, was the first opportunity to 'break the chain' of events that ensued and had contributed to the incident. That said, there was some sympathy for the ADC who became concerned that perhaps his 'hold position' instruction would not be acted upon, this probably diverting his concentration away from ensuring a correct readback of the ATC clearance.

As regards CRM on the BA146 flightdeck, pilot Members agreed that cross-cockpit checking of clearances should have picked up the ATC R turn issued but for whatever reason this slip went unnoticed by both pilots. Also, the BA146 crew should have gleaned from the RT that the previous departure, the subject AS332L, was turning L and that any L turn by them would potentially be into conflict with the helicopter. Once the BA146 was airborne, the ADC quickly noticed that the ac had commenced a L turn so he issued the R turn instruction for a second time. This was not acknowledged by the BA146 crew. When the instruction was issued again, for a third time, it was then erroneously readback as L. This prompted the issuance of an 'avoiding action' R turn which the BA146 crew acknowledged but then chose to ignore, without informing ATC.

The APR, believing from information given to him by the ADC that the BA146 was going to turn R, undoubtedly felt uncomfortable in this quickly evolving event when the BA146 was seen to turn towards the helicopter. The APR decided that he had to give the AS332L flight an avoiding action L turn and descent, which instruction was quickly acknowledged and actioned by the AS332L crew. Unbeknown to the APR in the absence of any call from the BA146 crew, they had received a TCAS RA climb. The BA146 crew followed the guidance and visually acquired the helicopter, assessing that at this late stage any turn reversal would have reduced the separation distance during their traffic avoidance manoeuvre.

Although this had had the potential to be a more serious encounter, in the end the AS332L crew's prompt and effective response to the APR's descent instruction together with the TCAS climb executed by the BA146 crew and visual acquisition of the helicopter were enough to satisfy the Board that any risk of collision had been effectively removed.

The NATS Advisor briefed Members that following this incident, controllers have been advised to pass any non-standard clearance either by using voice inflection or by placing particular emphasis on the non-standard element.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The BA146 crew did not comply with ATC instructions and turned into conflict with the AS332L.

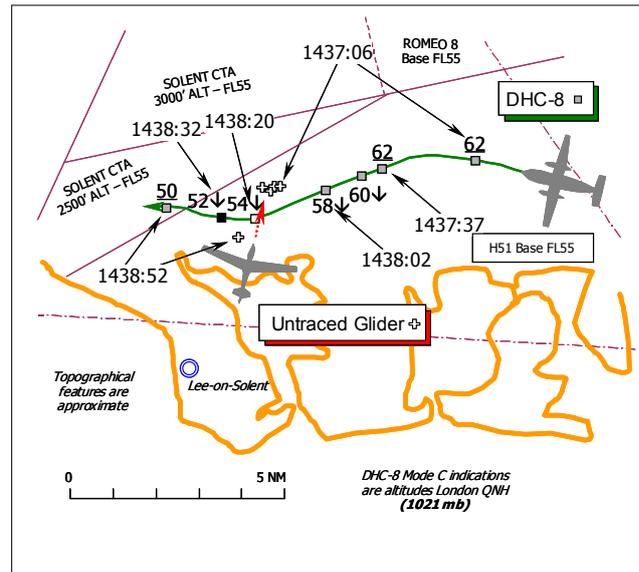
Degree of Risk: C.

Contributory Factor: The Aberdeen ADC did not challenge the BA146 crew's incomplete read back of their departure instructions.

AIRPROX REPORT No 027/07

AIRPROX REPORT NO 027/07

Date/Time: 31 Mar 1438 (Saturday)
Position: 5052N 00107W (10nm ESE of Southampton - elev 44ft)
Airspace: Airway H51/FIR (Class: A/G)
Reporting Ac Reported Ac
Type: DHC-8 Untraced Glider
Operator: CAT NK
Alt/FL: 5000ft NR
(QNH 1020mb)
Weather NR NK NR
Visibility: 10km NR
Reported Separation:
400ft V NR
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE DHC8 PILOT reports he was inbound to Southampton about midway between Goodwood and SAM VORs flying at 210kt. A squawk of A4445 was selected with Mode C and he was in receipt of a RCS from SOLENT RADAR who cleared them to descend from FL60 to an altitude of 4000ft Southampton QNH. Shortly afterwards the controller advised them of a possible primary radar return on a suspected glider inside CAS and possibly beneath them. RADAR advised them to level off at 5000ft QNH and for avoiding action to turn onto a heading of 290°. On that heading, the glider was spotted visually very shortly afterwards, some 400ft above his DHC8 and about ¼nm away and crossing from L to R in a shallow, descending banked turn to the R. Once it was seen, their flightpath was maintained and no further avoiding action was necessary since there was no chance of a collision as the glider was rapidly flying away from them. He assessed the risk as “moderate” and stressed that at no time was the glider on a converging course with them.

It was confirmed with Solent ATC that the glider was inside CAS without permission and that ATC would be filing a report of an airspace infringement. He advised ATC by radio that an Airprox report would also be filed.

RADAR ANALYSIS CELL LATCC (Mil) reports that despite exhaustive enquiries they have been unable to identify the reported glider.

THE SOLENT APPROACH RADAR CONTROLLER (APR) reports that when the DHC8 was within the confines of airway H51, between GWC and SAM, descent was given to FL60 on a radar heading of 295°. A number of primary radar contacts were observed on the overall radar display but it was not possible to ascertain whether these were spurious or actual ac. The flight was approaching the southeastern extremity of the Solent CTA – base altitude 2500ft - where it adjoins H51 so the DHC8 was descended to an altitude of 4000ft, some 1500ft above the base of the CTA [but below the base of the airway]. He recognised that with the strong ENE'ly wind the ground speed of the ac was greater than normally expected and believed that the descent profile would keep the ac within CAS. The DHC8 crew was instructed to turn L onto 250° to parallel the southern edge of R8 where it adjoins the Solent CTA. Shortly afterwards a slow moving primary radar return was observed in the DHC8's 12 o'clock. However, there was no requirement to pass traffic information or avoiding action as, in accordance with normal procedure, there was no evidence to suggest that the primary contact was an ac inside CAS. At this stage he felt it could have been a spurious radar contact. However, as the strength of the primary return became greater – and with knowledge of primary radar coverage in this area – he was not convinced the primary contact was below CAS. Consequently, traffic information was passed on the intermittent radar contact. The DHC8 crew was instructed to stop their descent at 5500ft, he thought, but soon afterwards corrected this to level off at 5000ft followed by an instruction to turn R 290° with the intention of positioning the ac towards SAM. His plan was now to position the ac within the portion of the CTA where the base is 3000ft rather than the original plan of positioning the ac in the

CTA where the base is 2500ft. The phrase 'avoiding action' was not used as there was no evidence to suggest that the primary return of the other ac was within CAS. However, soon afterwards the DHC8 crew reported "visual and above us" on a glider above them. Subsequently the crew reported the glider was in a descending R turn and indicated that his R turn vector onto 290° had turned their ac towards the glider. The DHC8 crew asked whether it should have been there and he indicated [apparently incorrectly] "no".

[UKAB Note (1): The Southampton ATC RTF transcript gives only 30sec and 1min time injects.]

ATSI reports with RTF transcript that at the time of the Airprox the DHC8 crew was in communication with the Solent APPROACH RADAR controller (APR) who described both his workload and traffic loading as light. At the time of the Airprox, the APR was operating without the aid of an ATSA who had been released to work in the simulator room providing the input for another controller who was undertaking some TRUCE (Training in Unusual Circumstances and Emergencies) exercises.

The DHC8 crew made contact with the APR at 1434:30, passing FL90 in descent for FL70 and tracking direct to SAM VOR. The APR updated the crew with the latest ATIS and advised them that it would be vectoring for a VOR/DME approach to RW02 at Southampton. The APR then instructed the crew to continue on their *"..present heading as a radar heading descend Flight Level 6-0"*. The crew acknowledged this and advised that their heading was 290°. At this time the DHC8 crew was 23.5nm ESE of the airport where the base of CAS is FL65. At 1437:00 the APR instructed the DHC8 crew to turn L onto 250° and, 20 sec later when the DHC8 crew was 14.5nm ESE of the airport, instructed the crew *"when ready descend to 4000 feet QNH 1-0-2-0 [C/S]"*. This was read back correctly but 30sec later, after 1437:30, the APR asked them to stop descent at FL50 if it was not too late. After the crew read-back the stop descent instruction the APR then transmitted *"or 5 thousand just see intermittent pop-up contact just appeared on radar in your 12 o'clock range of about 3 miles could be a glider so if you can just stop that descent"*. [At 1438:00, the DHC8 crew acknowledged *"Okay we'll make it 5 thousand if that's okay with you.."*] The APR then instructed the crew to turn R heading 290° and reaffirmed that the contact had just appeared and could be a glider. The crew advised that they were visual and moments before 1438:30 added: *"Yeah it's right on top of us at the moment and it's definitely a glider"*. [When the DHC8 crew later queried *"should he [the glider] be there"* above the airliner, the APR advised *"no he shouldn't"*] A few minutes later the crew of the DHC8 crew asked the APR whether they would be filing a report. The APR replied that he would be filing an infringement of CAS as he was of the opinion, erroneously, that the DHC8 was within CAS at the time, adding *"..or do you wish to file an Airprox.."*. The DHC8 crew advised that they would be filing an Airprox.

The APR advised that, to the best of his recollection, he had released the ATSA to assist with the TRUCE exercises. It was a quiet Saturday afternoon and was an ideal opportunity to get the training completed. It did mean that he would be required to undertake the ATSA's duties as well as those of the APR but he did not envisage any problems.

The APR stated that on the day of the Airprox there was a strong NE'ly wind blowing (6000ft wind reported as 060°/35-40kt). When a previous inbound ac had been vectored from the Goodwood direction, the APR had noted that it had a moderately high groundspeed which resulted in a slow rate of descent. [UKAB Note (2): Here the APR is incorrect. With a tailwind, for a given RoD it is the descent gradient that would be 'slow', not the RoD] His plan with the DHC8 was to route it from Goodwood to SAM descending to FL60 and, depending on other traffic, to position the flight for RW02. The airspace around the Solent area is quite complex with a number of differing base levels to the CTA. The APR had issued descent clearances based on the observed descent profile of the previous inbound ac and believed that the DHC8 would remain within CAS throughout. Analysis of the radar recording does show that the ac's GS upon initial contact was approximately 300kt but this later reduced to about 265-270kt. The APR opined that this may have been because the crew decided to reduce speed - which they were perfectly entitled to do as no speed control had been applied - as they approached the tops of the cumulus cloud that was prevalent that afternoon.

Analysis of both the Pease Pottage and Gatwick 10cm radar recordings shows a primary return operating some 9.5nm ESE of Southampton airport. [At 1437:06, the contact is 5½nm W of the DHC8 which was still indicating level at 6200ft London QNH (1021mb), just commencing a L turn onto 250°, prior to descent clearance being issued to 4000ft moments before 1437:30.] The APR stated that traffic information was passed to the crew of the DHC8 almost as soon as he saw the contact. An instruction to turn R onto 290° was passed but this, unfortunately, took the DHC8 towards the glider as it apparently passed underneath the latter. As the return from the glider is

AIRPROX REPORT No 027/07

intermittent it is not possible to accurately measure any distances. Moreover, the glider was not squawking and so vertical separation cannot be established.

When the APR instructed the DHC8 to descend to FL60, the base of CAS in that area is FL65. Having descended out of CAS it was about to enter another section where the base is FL55 and the APR instructed the crew to descend to 4000ft. The Southampton QNH at the time was 1020mb and so FL55 would equate to about 5710ft Southampton QNH. When the APR then instructed the crew to stop their descent at FL50 [5210ft Southampton QNH], the ac was still indicating level at 6200ft QNH. However, as the DHC8 descended approximately underneath the glider the airliner was, again, below the base of CAS.

MATS Part 1, Section 1, Chapter 6, Page 4, para 8 (Use of levels by controllers) states:

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

The APR stated that he never intended to descend the DHC8 out of CAS but had simply misjudged its descent rate and relied heavily on the profile flown by the previous traffic. He added that when he realised it was beneath CAS, he had not changed the service provided to the DHC8 crew to a RIS or RAS as his priority was to provide as much separation as possible between it and the glider. Up-to-date maps are displayed in the Approach Control Room displaying the base of CAS in the locality. However, most controllers are fully cognisant of these and only refer to them if they are operating in locations on the periphery of their area of responsibility.

The APR was required to keep the DHC8 within the limits of CAS which he did not fulfil. An error of judgment made in the descent clearances issued to the DHC8 crew resulted in the aircraft leaving CAS in conflict with an unknown glider that was operating close to the base of CAS. The APR opined that the airspace needs to be reviewed as it was originally designed when typically Tri-landers and Shorts SD330s operated into the airport whereas now B737 and Embraer ac are commonplace.

UKAB Note (3): The Pease Pottage Radar recording shows the DHC8 level at 6200ft London QNH 1021mb within the confines of the Class A airway H51 at 1437:06. Simultaneously, primary radar contacts, which may or may not be the reported untraced glider, are shown in the vicinity of the Airprox location some 10nm ESE of Southampton Airport. The DHC8 steadies on a track of about 250° at 1437:37 and thereafter the airliner commences a descent. The DHC8 is shown descending through 5800ft London QNH (1021mb) - about 5560ft (1013mb) - at 1438:02, just before exiting Class A CAS by descending below the base of H51 into Class G airspace. The DHC8 pilot reported that the Airprox occurred as his ac was heading 290° and transmitted moments before 1438:30, that the untraced glider was "... right on top of us at the moment...", suggesting that the CPA was between 1438:20 and 1438:32 when the DHC8 was descending through 5200ft London QNH (1021mb) - equating to about 4960ft (1013mb) and some 540ft below the base of H51 as the DHC8 steadied on the given vector of 290°. The Reporting pilot's account states that vertical separation against the glider was about 400ft suggesting that the glider was close to the base of CAS at the CPA but the minimum separation cannot be determined from the radar recording. A primary contact which may, or may not be, the reported untraced glider is shown again at 1438:52, just after the DHC8 crossed the lateral boundary from Class G into the Class D SOLENT CTA. (The difference of about 30ft between the Southampton QNH (1020mb) and that of the radar recording - the London QNH (1021mb) - over the period of the Airprox is virtually insignificant.)

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was most unfortunate that it had not been possible to identify the reported glider, trace its pilot and obtain a report. The Board was aware, therefore, that with only two thirds of the story, an intrinsic element was missing within the investigation of this encounter. Nevertheless, it was clear that some valuable learning points had been identified during the analysis. In all probability the catalyst to this report was the DHC-8 pilot's erroneous presumption that his ac was in Class A CAS and thus that the glider above him had probably made an unauthorised penetration of CAS. Yet the very comprehensive ATSI report had made it plain that this was not the case: the DHC-8 was not in CAS and the glider had probably not penetrated CAS. But as most gliders do not

transpond on Mode C there was no sure way of establishing with certainty whether the glider was inside or outside CAS at the time. Nonetheless, the Board recognised that when the glider was reported to be above the DHC-8 at the CPA - about 1438:32 - the DHC-8 was descending through 5200ft London QNH, in the order of 540ft below the base of H51 in Class G airspace as it flew toward the boundary of the Class D CTA. The only evidence available to the Members about the vertical position of the glider was from the DHC-8 pilot's own account wherein he states that the glider was about 400ft above him. Given his own ac's exit from Class A CAS – albeit unintentionally and unbeknownst to the DHC-8 pilot at the time it would seem – this suggests that the glider was in the order of 140ft below the base of airway H51 at the CPA but it was also clear to the Members that the minimum separation could not be determined with accuracy. Given the available data, the Board could only presume the glider was flying clear below the base of Class A airspace at the time it was seen and, in all probability, operating quite legitimately in the 'Open FIR'. So when the DHC-8 pilot queried "*should he [the glider] be there*" above the airliner, it seemed that the SOLENT APR's advice that "*no he shouldn't.*" was incorrect.

For their part the DHC-8 crew were understandably complying with the APR's instructions and might well not have appreciated that they had been descended out of the relative sanctuary of Class A CAS. A CAT pilot Member thought that the DHC-8 crew should have been more alert to this situation and should have questioned the APR's instructions. However, controller Members contended that it was the APR's responsibility to keep the DHC-8 within the limits of CAS which patently he did not accomplish for whatever reason. Whilst it seemed the APR had misjudged the moment to descend the DHC-8, basing his instruction on a previous ac's profile, in this light traffic scenario he should have realised his error sooner and corrected it - at the very least informing the crew what had occurred. An experienced terminal ATC Member stressed that it was especially important to keep CAT ac well inside CAS at weekends when the GA community, including gliders, might be more commonly encountered. Whilst controllers might make mistakes just as easily as any other human being, it was important to correct those mistakes immediately they were recognised, but here it seemed the controller was oblivious to his error at the time.

The specialist gliding Member postulated that the glider involved here might well have been a high-performance type and it was more likely that it was equipped with some sophisticated navigational aids allowing the pilot to know exactly where he was at the time and navigate clear of CAS. The Member stressed that the glider pilot might well have been entirely aware of his altitude relative to the base of H51 and whilst it was to a certain extent conjecture, in all probability he was operating clear below the base of CAS as had been suggested by the available data. Thus the Members determined that it was the descent clearance issued to the DHC8 crew that resulted in their ac leaving CAS and thereby flying into conflict with a glider - albeit untraced - that was operating close to the base, but outside the airway in Class G airspace. The Board agreed unanimously, therefore, that this Airprox had been caused because the Solent APR vectored the DHC-8 out of CAS into conflict with an untraced glider. Given the visual sighting of the glider by the DHC-8 crew and the vertical separation that apparently existed at the time, the Board also agreed unanimously that no risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Solent APR vectored the DHC-8 out of CAS into conflict with an untraced glider.

Degree of Risk: C.

pilot had received a TCAS 'climb'. He passed this on to the EMB135 crew who said that they did not receive a TCAS RA of any type. No avoiding action was given to the EMB135 flight as by the time it was realised that the PC12 had climbed to the same level, the EMB135 had already passed abeam and separation was increasing.

THE THAMES RADAR CONTROLLER reports mentoring a trainee. The IFR PC12 was executing a visual approach into Biggin Hill and, as it had left CAS, was under a RIS. Approximately 11nm SE of London/City the PC12 flight was given a QDM of 245° and asked to report visual with Biggin Hill: the ac was seen to take up a direct track shortly afterwards. At 1742, whilst tracking 200°, the PC12's Mode C readout indicated 2·7 and continued to increase to 3·1. During this manoeuvre the PC12 entered the base of CAS – the LTMA - and passed about 1nm S of the EMB135 which was at 3000ft downwind RH for RW10 at London/City. As the Mode C readout increased, the trainee asked the PC12 pilot to confirm he was maintaining 2400ft or below to which he replied that he was responding to TCAS and had traffic at the same level – there was nothing showing on radar in the vicinity. No avoiding action was passed as by the time the PC12 entered CAS and climbed to the EMB135's level, separation was increasing.

UKAB Note (1): Met Office archive data shows the London/City and Biggin Hill METARs as EGLC 1720Z 04013KT 360V060 CAVOK 16/02 Q1026= and EGKB 1720Z 07015KT 6000 NSC 13/M00 Q1025= and 1750Z 07015KT 5000 HZ NSC 12/02 Q1025=

ATSI reports that the PC12 flight established contact with the Thames Radar controller at 1734:15 and reported descending to 4000ft inbound to DET. The ac was approximately 9nm S of DET passing 6300ft whilst the EMB135 was 16nm E of London City airport level at 4000ft and tracking SW. The Thames controller instructed the PC12 pilot to leave DET heading 320° and at 1737:00, he instructed the EMB135 crew to turn L heading 170°. The PC12 had now passed DET and was instructed to descend to 2400ft, QNH 1025, which was correctly read back.

At 1737:55, as the two ac passed each other 9·7nm apart, the controller instructed the EMB135 to descend to 3000ft. Soon afterwards the controller instructed the EMB135 flight to turn L heading 010° which would position it into the sequence for landing on RW10 at London/City airport. At 1739:40, when the PC12 was 7nm NE of the EMB135 and indicating 2400ft, the controller informed the pilot that he was under a RIS. However, this was simply acknowledged and not read back in full as required by MATS Part 1. The PC12 pilot was informed (1740:10) that he could route direct to Biggin.

At 1740:40, the EMB135, which was now level at 3000ft, heading 010° and 5·5nm due S of the PC12, was instructed to turn L heading 300°. Having acknowledged this heading change the EMB135 crew were instructed to contact the City Radar controller. The City controller instructed the crew to stop their turn on a heading of 310° and informed them that they were 25nm from touchdown and No3 in the landing sequence.

At 1742:10, the City controller advised the EMB135 crew that they would shortly be over-flying traffic, the subject PC12, which was below them and outside CAS at 2400ft. The crew reported visual with the traffic and then the City controller informed them that the PC12 appeared to be climbing. At this point (1742:18) the PC12 was crossing through the 12 o'clock position of the EMB135, at a range of 1·2nm and passing 2700ft. Meanwhile, the PC12 pilot transmitted to the Thames Radar controller: "*Approach we've got traffic in our er we've we've got in our area*". The Thames controller responded by asking the pilot to confirm the PC12 was at 2400ft QNH 1026 to which the PC12 pilot responded: "*Negative ma'am we had to climb to avoid traffic on the TCAS and now resuming two thousand four hundred feet*". The EMB135 maintained its level and continued on the assigned heading, visual with the PC12, which climbed slightly through their level (CPA 1742:26) at a range of 1nm.

Analysis of the radar showed that the PC12 continued tracking approximately 240° and climbed to 3100ft before descending back down to 2400ft. No other traffic, other than the EMB135, can be seen in the immediate vicinity.

With the benefit of hindsight it might have been useful had the Thames Radar controller informed the PC12 pilot about the EMB135 which would be passing overhead. However, it is accepted that the two ac were deemed separated (one inside CAS and the other outside) and so there is no requirement for TI. The City controller kept the EMB135 crew updated with TI and the crew advised that they did not receive any TCAS alerts.

AIRPROX REPORT No 028/07

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.

From the received reports it was apparent that the PC12 crew had not fully understood the nature of the ATC service under which they were placed when the Thames controller provided the flight with a RIS: for example, when the flight descended below CAS to 2400ft, the crew had thought this was informing them they were out of radar coverage. The flight had been under a RCS but this was changed as the ac left the Class A LTMA and entered the Class G LFIR.

Radar data had clearly shown the EMB135 maintaining 3000ft, 500ft above the base level of CAS, with the PC12 at altitude 2400ft, below CAS, and therefore deemed separated. Pilot Members were unable to understand the PC12 crew's actions as they had manoeuvred their ac in azimuth in response to a perceived threat indicated on their Traffic Advisory System (KTA870) equipment and then responded vertically in the wrong direction by climbing towards the 'intruder' ac, the subject EMB135, not descending away from it. Pilot Members reiterated one of the features of TCAS equipment, viz the system is designed to resolve only in the vertical plane, information displayed in azimuth being difficult to interpret at short ranges. When a TA alert is received, crews are expected to attempt to establish visual contact with the intruder ac and other ac in the vicinity but not to deviate from an assigned clearance based solely on TA information. That said, the KTA870 system installed in the PC12 can only generate TA-type alerts and display relative bearing and altitude information, the associated symbology altering when the threat level of the intruder ac changes. Members agreed that the PC12 crew has responded inappropriately to a Traffic Advisory System TA alert and climbed into conflict with the EMB135 and this had caused the Airprox. Members expressed some concern that these actions, taken by the PC12 crew, had then resulted in the flight climbing back into CAS without clearance. As the PC12 crew had reported on frequency that they were climbing to avoid traffic on TCAS, ATC procedures to be followed meant that ATCOs are then not responsible for separation or issuing any traffic avoidance instructions to the subject ac, effectively going 'hands-off' with the situation, until the acs' crews report back under ATC control when clear of conflict. However, in this case the manoeuvre executed by the PC12 crew was not in accordance with recommended procedures and certainly not that to be applied in response to a TCAS RA. The Director UKAB agreed to provide CAA International a copy of this report, requesting that it be forwarded to the safety regulatory authority of the State of the PC12 operator.

The NATS Advisor informed Members that whilst acknowledging the ATSI comment that the passing of TI to flight crews would have been useful, owing to the nature of operations within the Thames and City Radar environs this would not always be possible owing to the increased workload and available time.

Turning to risk, there was a degree of surprise that STCA had activated 'high severity', in part because the EMB135 TCAS equipment had not generated a TCAS RA warning. In the discussion, Members noted that although providing aircrew and ATC with appropriate /timely warnings, TCAS and STCA operate to different parameters. In this Airprox, STCA and TCAS had both triggered alerts with the subject ac separated by 600ft on crossing tracks but STCA had changed from low to high as the PC12 climbed through 2500ft. However, this occurred as it was passing through the EMB135's 12 o'clock from R to L, then very quickly diverging SW'bound which was possibly outside of the time/vector 'bubble' parameters to trigger a TCAS RA. Fortunately, the EMB135 crew had been given TI on the crossing PC12 and had seen it on TCAS 500ft below. A TA alert was received and the EMB145 crew visually acquired it in their 1 o'clock, watching the PC12 as it commenced a climb before it levelled at a similar altitude in their 10 o'clock and then descended. This visual sighting when combined with the geometry of the incident was enough to persuade the Board that safety had not been compromised during the encounter.

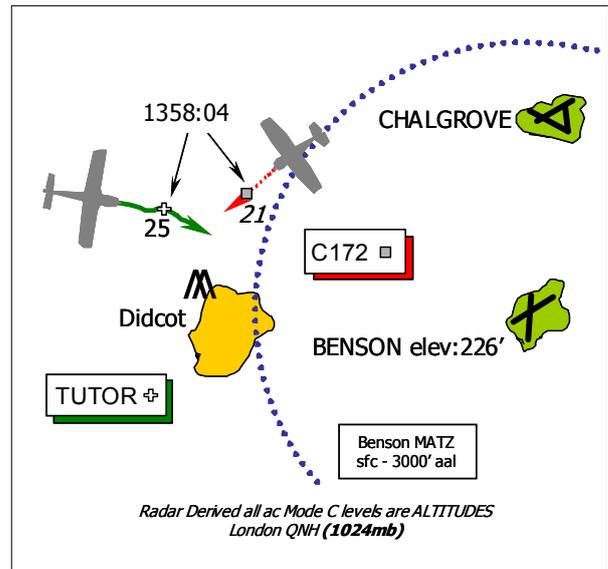
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Following an inappropriate response to a Traffic Advisory System TA, the PC12 crew climbed into conflict with the EMB135 and entered CAS without clearance.

Degree of Risk: C.

AIRPROX REPORT NO 029/07

Date/Time: 4 Apr 1358
Position: 5138N 00115W (6nm WNW of Benson - elev 226ft)
Airspace: Oxford AIAA (Class: G)
Reporting Ac **Reported Ac**
Type: Grob Tutor C172
Operator: HQ AIR (Trg) Civ Trg
Alt/FL: 2000ft 1900ft
 QFE (1019mb) QFE (1019mb)
Weather VMC CLBC VMC NR
Visibility: >10km >10km
Reported Separation:
 Nil V/400ft H Not seen
Recorded Separation:
 0.3nm H - see Note (2)

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE GROB TUTOR PILOT, a solo student, provided a very comprehensive account reporting he was recovering to Benson VFR from W of Didcot for cct consolidation following 20min of general handling. Throughout the departure and this 20min period outside of the Benson MATZ he was in constant contact with Benson APPROACH (APP) who was providing a FIS on UHF - 376.65MHz. The assigned squawk of A3621 was selected with Mode C.

Inbound, flying in VMC some 1000ft clear below cloud with an in-flight visibility of over 10km, following completion of the pre-descent/recovery checks in accordance with the flight reference cards (FRC's) and a radio call for a visual recovery to APP, he thought he had entered the MATZ about 1nm N of Didcot - about 010° COMPTON VOR 8nm. Shortly afterwards, just as he was heading E at 124kt, he received a further call from APP requesting his range. He initially looked inside the cockpit to confirm his range on the DME before replying he was 5nm to the W of the aerodrome. Upon looking out of the ac following this check he first spotted a high-wing ac in his 10 o'clock with about 400ft separation. Assessing that the other ac – a single-engine Cessna-type coloured red & white – was crossing in a N – S direction from L – R on a constant bearing at the same altitude, he considered collision a risk so he immediately took avoiding action by commencing a climbing maximum rate turn to the R through 360°. After about 220° of this turn he regained visual contact with the other ac that was still at the same altitude, in an unchanged attitude and he thought on the same track as before he took avoiding action. No indication was given by the pilot of the other ac that he was visual with his Tutor at any time.

APP was informed that there had just been a conflict with another ac, which was acknowledged: however, an Airprox report was not made at this stage. Upon switching to Benson TOWER to request his cct join he noted that the high winged ac was still in this 3 o'clock paralleling his track. He then confirmed with Benson TOWER that ATC was in contact with its crew. Following this he continued with the cct join and detail as briefed. The risk was assessed as "medium". All the ac's lighting including HISLs and the landing light was switched on.

THE C172 PILOT, a flying instructor, reports conducting a VFR training flight for a PPL holder (with about 90hr total time). It was flight No2, specifically for the student to learn the differences between a G1000 'glass cockpit' and a conventional ac cockpit, which usually consists of a NAVEX. This entailed a flight from Wycombe Air Park to Didcot Power Station; thence to the WOODLEY NDB to involve the student with using the Course Deviation Indicator (CDI) and comms on the ac. The purpose is also so that the student is constantly reminded of the need to keep a good lookout as the G1000 'glass cockpit' tends to capture a pilot's attention at the expense of lookout unless they have been trained initially to keep an excellent lookout. The transit was flown at a height of about 1900ft QFE in the vicinity of Didcot, and a FIS and MATZ penetration was obtained from Benson ZONE on 120.9MHz. The other ac was not seen at all.

AIRPROX REPORT No 029/07

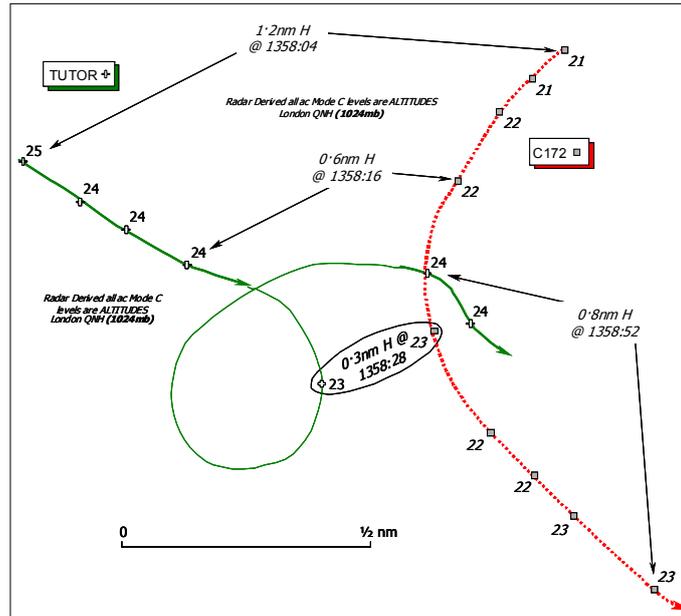
It was stressed that the student is generally very safety conscious and has an excellent lookout as is that of the instructor. Notwithstanding UKAB's best efforts, the Airprox was not brought to the instructor pilot's attention until some 2 months after the Airprox and so recollection of the flight was obviously vague. The pilot could not recall in the past year having had any incident with any other ac that could be considered to be an Airprox or a collision risk.

THE BENSON RADAR APPROACH CONTROLLER (APP) reports that a "very busy" radar display included multiple VFR transits, both under control of Benson ATC and A7000 squawks not in receipt of an ATS. During this period 6 Tutors were airborne all squawking A3621 and 2 rotary 'tracks' were in receipt of an ATS heading towards the London TMA. The Digital Readout Direction Finder (DRDF) was unserviceable.

The reporting Grob Tutor student pilot called for recovery with the relevant ATIS weather code. The RW in use - RW01RH - was reiterated, the pilot being asked to report visual with the aerodrome. The Tutors had been operating to the NW of Benson where it had been impossible to maintain track identity on them but an A3621 squawk was observed about 3-4nm W of Benson that he believed was the reporting pilot's Tutor. A second Tutor then called for recovery requesting a PFL: although this transmission was garbled in places, the pilot was passed the RW in use and the PFL approved. Observing the Mode 'C' readout of the ac that he believed was the reporting pilot's Tutor, he noticed that the indicated Mode C was more in line with that of the ac recovering for the PFL. To ascertain which ac the Tutor executing the PFL was, he queried its position whereupon the pilot reported changing to TOWER. The reporting student Tutor pilot then made a further transmission; although this transmission was garbled he understood it to mean that the reporting Tutor pilot was visual with a C172. As he was still unsure he asked the reporting student Tutor pilot for a position report which was given as 5nm W of the aerodrome. This still did not identify the reporting Tutor pilot's ac as there were 2 other A3621 squawks in that vicinity. However he did observe an A3621 heading towards the airfield indicating 1900ft Mode C (1013mb) with a A3602 squawk about 1nm to the S on a southerly track indicating a similar altitude/level. The reporting Tutor pilot then advised changing to TOWER. He assessed his workload as "*medium*" during the period of this Airprox.

MIL ACC reports that the subject Grob Tutor flown by the reporting student pilot was recovering VFR from the W to join the visual cct at Benson, its pilot in radio contact with Benson APP. The C172 was on a navigation exercise from Wycombe Air Park, routeing around the Benson MATZ in an anti-clockwise direction under a FIS from Benson ZONE. APP and ZONE were both busy, with multiple ac on frequency. At 1350:51, the C172 crew called ZONE stating '*Wycombe Air Park to Wycombe Air Park..just passed the Chinnor mast..[aka the Stokenchurch Mast]...altitude 1900 feet QNH 1025..request MATZ penetration..en-route to..Didcot [C172 C/S]*'. At 1351:13, ZONE replied '[C172 C/S] *Squawk 3602, Flight Information Service*', which the C172 crew acknowledged. [UKAB Note (1): At 1351:55, ZONE then advised the C172 crew "*...MATZ transit approved 1900 feet Benson QFE 1019 routeing north of Chalgrove*", which the crew acknowledged]. ZONE then established the C172 pilot's routeing after Didcot [to the WOODLEY NDB] and, at 1355:49, advised '*..roger, report turning at Didcot*', which the C172 crew acknowledged.

At 1357:45, the subject Tutor pilot called APP saying '[Tutor C/S], *visual recovery with E*'. APP confirmed the runway in use - RW01RH - but did not attempt to identify this Tutor as the flight was under a FIS on a visual recovery and there were 4 other Tutors in the area on similar sorties. The Airprox occurred at about 1358:28. At 1358:45, the C172 pilot called ZONE stating '[C172 C/S] *at Didcot turning to Woodley*'. The Tutor pilot called APP with what appears to be an attempt to declare an Airprox [twice, at 1358:49 & 1358:58] but is initially ignored. APP, who was trying to establish RT contact with a departing helicopter, acknowledged the Tutor pilot's call, whereupon at 1359:04 the pilot transmitted his message, '[Tutor C/S]... [garbled]... *with traffic heading North to South, Cessna in my 12 o'clock*'. [Thereafter, the subject Tutor pilot reported his position as "*5nm W of the field inbound for initials..*" and switched to TOWER at 1359:36].



[UKAB Note (2): Analysis of the Heathrow 23cm Radar recording shows the Tutor at 1358:04, tracking 130°, indicating 2500ft London QNH (1024mb), with the C172 at L 10 o'clock - 1.2nm, tracking 240°, indicating 2100ft London QNH (1024mb). On the next sweep the Tutor is tracking 130° and indicating 2400ft QNH, with the C172 still in the Tutor's L 10 o'clock at 1nm, tracking 230°, maintaining 2100ft. At 1358:12, the Tutor's profile is unchanged, but the C172 has closed to a range of 0.8nm on a steady bearing in the Tutor pilot's L 10 o'clock, tracking 230° the former having climbed slightly to 2200ft QNH. By 1358:16, the Tutor is tracking 120° at 2400ft with the C172 0.6nm away in its L 11 o'clock, just before commencing the L turn approaching Didcot. Thereafter good radar contact on the Tutor is lost for a while as the C172 turns L SE'ly just N of Didcot. Whereas the Tutor pilot reports executing a climbing maximum rate turn to the R through 360° to avoid the C172, this is not illustrated by the available data. The Tutor is shown for one sweep at 1358:28, indicating 2300ft QNH, with the C172 indicating the same altitude as it turns through 170°, 0.3nm away. This might be the CPA: however, the veracity of the radar data on the Tutor is questionable as an A0000 SSR return is displayed on the sweep beforehand. The Tutor is not shown again continuously until after 1358:52, in all probability after rolling out from the reported R turn and after the Airprox has occurred, with the C172 0.8nm away to the SE at 2300ft QNH. Thereafter, separation increases as the ac diverge.]

Both ac were working the same ATSU but were on different frequencies and receiving a FIS from different controllers. Therefore, without direct reference to radar, the controllers would have had no indication that the two ac were in the same area at a similar level. The application of the same squawk for FIS ac (in this case A3621 for Tutor ac) is common practice.

This Command considers that the Benson APP and ZONE controllers fully complied with JSP 552 235.125 - FIS. Moreover, JSP 552.235.125 para c is clear in that:

'Controllers are not responsible for separating or sequencing aircraft.'

This Command considers that there were no ATC factors relating to this incident.

HQ AIR (TRG) comments that this incident occurred in Class G airspace which puts the responsibility on the pilots to 'see and avoid' each other's ac. Aircraft on a constant bearing to each other makes it more difficult for pilots to detect movement and to see each other. The 'excellent lookout' of the student and instructor in the C172 did not detect the Tutor but the late sighting by the Tutor pilot was in sufficient time for him to reduce the risk of a collision by taking avoiding action.

AIRPROX REPORT No 029/07

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.

A GA Member voiced a concern that whilst Benson ATC were in communication with both flights here, no prior information at all about the other ac was passed on to either pilot. The Mil ACC Advisor emphasised that the Grob Tutor student pilot was under a FIS on a visual recovery and thus there was no implicit requirement for APP either to afford separation or pass traffic information about the C172 which was also under a FIS from ZONE after it exited the MATZ. Whilst clearly under a FIS "*Where a controller suspects, from whatever source, that a flight is in dangerous proximity to another aircraft...*" a warning might be issued to the pilot, but here it seemed that ZONE was either unaware of the conflict or legitimately engaged on other tasks. It was also apparent from the concise Mil ACC report that APP had not identified the subject Grob Tutor and was similarly not able to issue a warning to the student pilot about the C172. Higher priority tasks such as the provision of radar approach services to inbound traffic or to transiting flights that have requested a RIS/RAS could understandably result in incomplete information or no warning being passed at all to those that had merely asked for a FIS. Clearly in Class G airspace 'see & avoid' prevails so pilots should always bear in mind that a FIS is the most basic of ATSS and it might be that little or no warning is forthcoming about other traffic from ATC under such a service.

Clearly, the C172 crew engaged on their NAVEX were responsible for 'giving way' under the 'Rules of the Air' to the Grob Tutor as the ac closed on their starboard side - but a few hundred feet above them, the radar recording had revealed. However the 'Rules' can only work if the other ac is seen in sufficient time to take appropriate action and here the C172 instructor reports that the Grob Tutor was not spotted at all - the high wing configuration of the C172 with the Grob just above them closing on a steady relative bearing might have been a factor here. Consequently, as they approached their turning point at Didcot and turned onto the next leg of their NAVEX they were oblivious to the presence of the Grob turning through a full orbit it would seem just 0.3nm to the W. Nevertheless, the solo Grob Tutor student pilot had detected the presence of C172 and whilst a GA Member opined that the full 360° avoiding action turn seemed a little excessive other Members commended the Grob Tutor student pilot for taking positive and robust action to ensure the conflict was resolved. A highly experienced military instructor pilot Member pointed out that, perhaps with only 20-30 hours flying behind him, the student pilot in the Grob Tutor would have had little experience of what to do in such situations, it being further suggested that it might only have been on the previous exercise that the action to take in such circumstances had been explained to the student. The Board concluded, unanimously, that this Airprox had resulted from a conflict in Class G airspace resolved by the Grob Tutor student pilot. Furthermore, through the judicious application of an avoiding action turn coupled with the minimum separation in the order of 0.3nm, any risk of a collision was averted by the robust actions of the student pilot.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G resolved by the Grob Tutor student pilot.

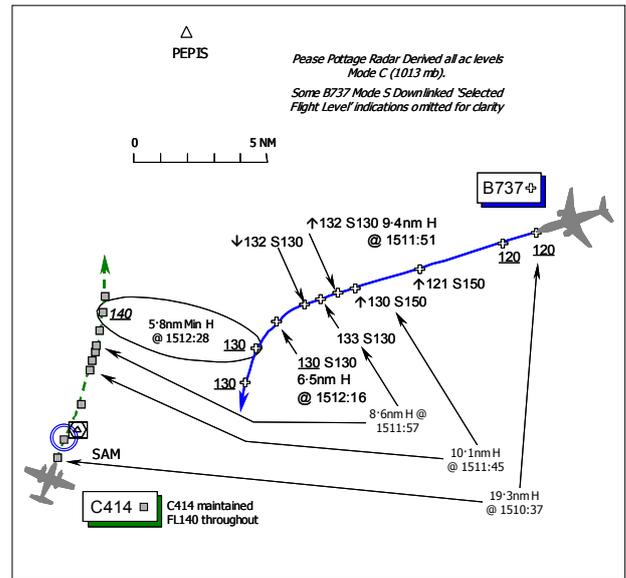
Degree of Risk: C.

AIRPROX REPORT NO 030/07

Date/Time: 5 Apr 1512
Position: 5100N 00115W (5nm NE of SAM VOR)
Airspace: Airway (Class: A)
Reporter: LACC S19/21 TAC

<u>1st Ac</u>	<u>2nd Ac</u>
<u>Type:</u> Cessna 414	B737-500
<u>Operator:</u> Civ Pte	CAT
<u>Alt/FL:</u> FL140	↑FL150

Weather VMC CLOC NR
Visibility: 10km+ NR
Reported Separation:
 700ft V/5nm H NR
Recorded Separation:
 1000ft V/5.8nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LACC SECTOR 19-21 TACTICAL CONTROLLER (S19 TAC) reports that the C414, level at FL140, had just been transferred to TC SW who then transferred the B737 to S19 TAC climbing to FL150 and thus into conflict with the C414. The B737 was stopped off at FL130 – but crept up to FL133 before levelling - and then turned L onto a heading of 210°. At the time, the controller was not sure if separation was subsequently lost after the stop-off and turn.

THE LTCC SW DEPARTURES CONTROLLER (TC SW DEPS) reports that he was operating under a heavy workload. The C414 over-flight was co-ordinated into the sector level at FL150, routing northbound through SAM to CPT. This was later changed by the CO-ORDINATOR to FL140, and the ac transferred across to his [TC SW DEPS] frequency of 129.075MHz.

Through an error of judgement he climbed a SAM outbound - the B737 - to the standing agreement level of FL150, mistakenly believing this level was now available. What he did not appreciate fully at this very busy time was that the C414 over-flight was not sufficiently far N to guarantee any form of separation against the outbound B737 on its current track. He then transferred the B737 to LACC S19 TAC who immediately spotted the error and stopped the B737's climb at FL130 - as was indicated by the ac's Mode 'S' Down-linked Ac Parameter (DAP) Selected Flight Level (SFL) readout. The ac did however 'balloon' through this level and reached FL133 before descending back down to FL130, but standard separation was not eroded.

THE CESSNA 414 PILOT reports that he was in transit from Alderney to Nottingham in a level cruise at FL140 under IFR and in communication with LTCC.

Heading 017°(M) - he thought on the 010R SAM at about 16 DME - at 180kt, the B737 was observed from the flight deck at about 2 o'clock some 5nm away to starboard and below his ac. Minimum vertical separation was about 700ft. The risk of collision was assessed as "low".

THE B737-500 PILOT reports he had departed from Gatwick on a SAM 3P SID bound for Jersey. A clearance to climb to FL180 was issued by LTCC on 134.125, followed by a frequency change to LACC on 129.425. Passing FL129 on a radar heading of 260° at 280kt, LACC instructed them to stop climb at FL130, following this with an avoiding action L turn onto a heading of 210°. The autopilot was disconnected and the ac banked to 35° in the L turn, the ac reaching FL133 before levelling at FL130. Another ac was displayed on TCAS 1000ft above them about 8nm ahead, but no TCAS "warnings" were enunciated. ATC apologised and the flight was continued. Neither the passengers nor cabin crew were aware of the manoeuvre. He assessed the risk as "low".

AIRPROX REPORT No 030/07

ATSI reports that at the time of the incident the LTCC SW DEPS controller was experiencing a heavy workload. The C414 had been co-ordinated into TC's airspace initially routeing from SAM to WESTCOTT at FL150 but this was later changed, by the TC SOUTH CO-ORDINATOR, to FL140. The B737 departed Gatwick on a SAM 3P SID and contacted the TC SW DEPS controller at 1503:10. The controller instructed the crew to fly a heading of 260° and then issued a climb clearance initially to 4000ft and then to 6000ft.

A change of controller had taken place at the LACC S19 TAC position and, at 1506, the oncoming controller instructed the crew of the C414 to descend to FL140. At this time the C414 was 15nm SSW of Southampton, the B737 being 5nm NW of Gatwick passing 3800ft.

At 1506:15, TC SW DEPS instructed the B737 crew to climb to FL100 and, 1min later, to FL120. At 1508:20, LACC S19 TAC instructed the crew of the C414 to contact TC SW DEPS which was correctly acknowledged; two-way communications were established between the C414 pilot and TC at 1508:25. The TC SW DEPS controller then, at 1510:50, made an error of judgement, instructing the B737 crew to climb to the standing agreement level of FL150, believing that level was now available. The crew were instructed to contact LACC S19 TAC. At this point the C414 was in the B737's 11 o'clock at a range of 17½nm, crossing from L to R, with the C414 level at FL140 and the B737 just leaving FL120 climbing for FL150.

The B737 crew reported on the S19 frequency climbing to FL150 and heading 260°. Initially, the S19 TAC controller missed the callsign and so asked for it to be repeated which the crew did. S19 TAC then transmitted just before 1511:40, "[B737 C/S] stop your climb flight level 1-3-0". The crew acknowledged and were then instructed to "...turn L heading 2-1-0 degrees". At this point the 2 ac were 10.9nm apart and the recording of the Pease Pottage Mode S DAP shows that by 1511:51, the B737 crew had set FL130 in their Selected Flight Level (SFL) box. [UKAB Note: The B737 ascended to a maximum indicated level of FL133 Mode C at 1511:57, at a range of 8.6nm, before descent back towards FL130 is indicated on the next sweep when the C414 was 7.8nm away.] When the B737 was indicating level at FL130 the C414 was 6.5nm W of the B737 and as the effect of the turn instruction took effect, the two ac passed starboard-to-starboard at a minimum range of 5.8nm after 1000ft vertical separation was established.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The comprehensive report from ATSI coupled with the LTCC controller's own laudably frank account had allowed the Board to quickly identify the crux of the reporting LACC controller's concern. It was clear to the Members that even though the TC SW DEPS controller was, during this very busy time, aware of the presence of the C414 at its recently revised and co-ordinated level of FL140, he had still climbed the departing B737 to the standing agreement level of FL150 and thus through the level of the C414. This was because, the TC SW DEPS controller opined, he did not appreciate fully that the C414 over-flight was not sufficiently separated from the B737's outbound route. Thus the B737 was switched to LACC S19 TAC climbing into conflict with the C414. The conflict was nevertheless promptly recognised by the alert S19 TAC controller who stopped the B737's climb below the level of the C414 almost as soon as the B737 crew called. It was evident that the C414 pilot played little part in this Airprox, merely complying with ATC's instructions, and it was equally clear that the pilot had spotted the B737 some 5nm away out to starboard and could have acted if the situation had deteriorated significantly. The avoiding action instructions promptly issued by S19 TAC alerted the B737 pilot who also spotted the C414 on TCAS 1000ft above them and about 8nm ahead. Moreover, Mode S – which is currently only available to LTCC controllers - clearly proved its worth here, as the DAP from the B737 had allowed the SW DEPS controller to identify from the B737's SFL indication that the B737 crew were intending to stop their climb safely below the C414. Whilst the B737's climb momentum took the airliner some 300ft above FL130 for a short period, the B737 crew's prompt compliance with the controller's instructions – both 'stop climb' and 'turn' – despite the term avoiding action not being used, ultimately ensured that an erosion of standard separation was prevented. The final outcome was that the B737 passed 5.8nm away at the closest point - as evinced by the radar recording - and by that stage 1000ft vertical separation had already been safely established. Evidently this Airprox had been filed with the best of intentions, but it was clear that at these distances safety had not been compromised because of S19 TAC's prompt action. The Board concluded, unanimously, that this report had stemmed from a conflict that had been resolved by LACC S19 TAC, thereby removing entirely any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict resolved by LACC S19 TAC.

Degree of Risk: C.

AIRPROX REPORT No 031/07

AIRPROX REPORT NO 031/07

Date/Time: 8 Apr 1342 (Sunday)

Position: 5324N 00235W(10nm ENE Liverpool Airport - elev 80 ft)

Airspace: Manchester CTR (Class: D)

Reporting Ac Reported Ac

Type: A319 Cessna 172

Operator: CAT Civ Pte

Alt/FL: 2500ft 1250ft

(QNH 1024mb) (QNH 1024mb)

Weather VMC CAVOK VMC CLBC

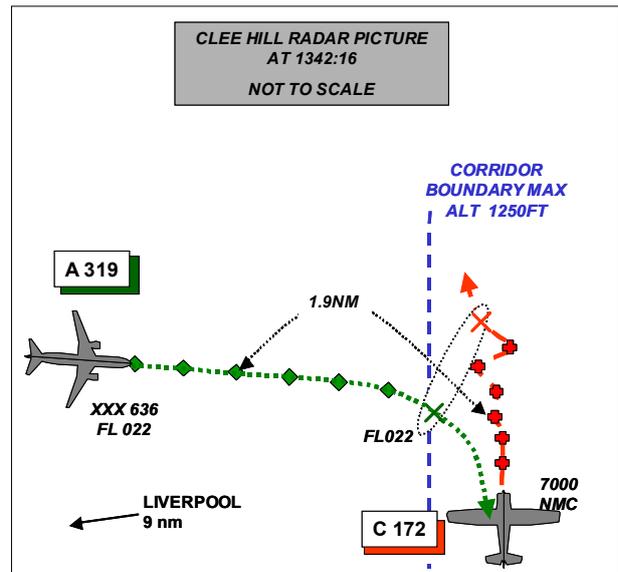
Visibility: >50nm 20km

Reported Separation:

0ft V/3nm H Not Seen

Recorded Separation:

NR V/0.9 H (See UKAB Note (1))



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports flying a scheduled passenger flight to Liverpool under IFR. Liverpool DIR was vectoring him downwind in the ILS pattern for RW27, heading 090° at 195kt, and the controller said she was keeping them at 2500ft due to a light ac N'bound in the [Manchester] VFR low-level corridor. They picked up a non-mode C TCAS contact and both pilots looked for the ac below them since the maximum altitude in the corridor is 1250ft. The controller turned them S for the base leg and at the same time they saw a white, single piston, high wing light ac in their 12 o'clock at about 5nm and at the same altitude heading N. As the turn was taking them clear of the other ac, he did not call for any further avoidance but told the controller that he was visual with the other ac and that it appeared to be at the same altitude as they were. He assessed that the closest the two ac came was 3nm. He assessed the risk as being low.

THE CESSNA 172 PILOT provided a brief report stating that he was flying a local private flight from Barton with one passenger with all lights switched on, squawking 7000. Although Mode C was fitted, it was switched off. They were in receipt of a FIS from Barton Info. At the reported time of the incident they were near the Burtonwood VRP [approximately the position of the Airprox] flying N in the Manchester corridor at 1250ft (QNH 1024), heading about 360° at 110kt but neither he nor his passenger saw nor were aware of any other ac.

ATSI reports that an A319 pilot established contact with the Liverpool APR at 1335:05 reporting that he was passing FL85 for FL60. The controller advised that they were number three in traffic for the ILS to RW27. At 1336:20, after the pilot was instructed to leave TIPOD heading 095°, he was cleared to descend to 2500ft and at 1338:45 the ac was passing FL028 for 2500ft and approaching the downwind right hand position. Meanwhile, 'number one' in the sequence, an ATR, was on a closing heading for the ILS at a range of 9nm and a return, squawking 7000 but with no Mode C, can be seen within the lateral confines of the Low Level corridor tracking N. These two ac pass with just over a mile lateral separation: however, the ATR crew made no comment to the controller. At 1341:25 APR passed TI to the A319 crew about the 7000 squawk which was in its 1 o'clock position at a range of 4.5nm, crossing from right to left, and the pilot replied that they had it on TCAS. The controller then advised the crew that she was keeping them at 2500ft to keep their ac well above the other traffic (*ATSI note: The maximum permitted altitude within the Manchester Special Low Level Route is 1250ft on the Manchester QNH*) and to turn right onto a heading of 180° for the base leg. When this instruction was passed the unknown 7000 squawk was crossing from right to left at a range of 2.4nm and the A319 was level at 2500ft; as the ac crossed the A319's nose it was at a range of 1.9nm. The A319 crew advised the APR that the unknown ac appeared to be at 2000ft but later changed this to 2500ft. As the unknown 7000 squawk continued N'bound the A319 remained to the SW of it and the lateral separation reduced to a minimum of 0.9nm. Manchester was informed and the radar contact was tracked to Barton airfield.

Shortly afterwards [2½ min] APR asked the pilot of a C150, which was operating close to where the Airprox occurred, if he had seen the unknown ac and he replied: *“Affirm he was actually quite close to the (A319 airline) and I was at one thousand two hundred feet he was well higher than me at least possibly about another I’d say about another five hundred feet or so”*.

UKAB Note (1): An analysis of the Cleve Hill radar was conducted which verified that contained in the ATSI report above. Although the actual CPA (H) was 0.9nm the ac were diverging at this point. As stated above the Cessna was at a range of 1.9nm heading N in the A319’s 12 o’clock when the latter commenced its turn onto base leg (S) as directed by the controller.

UKAB Note (2): The Secretariat contacted the C172 pilot in an attempt to resolve the apparent anomaly in his reported altitude compared with that given by the A319 pilot. The pilot very experienced (3000hr + GA), was locally based and very familiar with the local area and procedures. Although he was flying a pleasure flight he was certain that he did not deviate substantially (100ft or so) from his reported altitude. The ac had undergone a CofA inspection within the last few months and there was no record of any altimeter malfunctions.

UKAB Note (3): Arising from its assessment of Airprox 136/06, the Board was minded to make a Safety Recommendation which asked the CAA to review the procedures applicable to flight in the Manchester Special Low Level Route. The CAA accepted this Recommendation, advising the UKAB that it is anticipated that the review will be complete by the end of July 2007, to be followed by the implementation of any recommended changes.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Board Members were disappointed to note that although the C172 was Mode C equipped, the pilot opted to leave it switched off. There was discussion about why some GA pilots do not activate Mode C, notwithstanding the safety benefits. A GA Member commented that he has encountered a perceived fear of prosecution if a pilot inadvertently strays into CAS. The NATS Advisor informed the meeting that they very rarely file a report with the Enforcement Department of the CAA on inadvertent penetrations and even then only under well defined circumstances. The CAA is also reassuring pilots that provided they have exercised all due diligence and reasonable care to ensure that they do not infringe airspace, it will not use information from their transponders to prosecute them if they do stray into controlled airspace. The use of full SSR with Mode C not only allows ACAS systems on other ac to see and avoid opposing ac but also allows controllers to take action to achieve the same objective. In this case, almost by some second sight, the controller wisely held the A319 high thus avoiding the C172 that was quite legitimately operating within the lateral confines of the Low Level Route but at an unknown altitude.

In the absence of Mode C information, Members were not able to resolve the disparity in the reported altitude of the C172. The A319 pilot was not sure whether the C172 was at 2000ft or 2500ft - nevertheless he thought it to be at about the same altitude as themselves. One pilot Board Member familiar with A319 operations noted that in certain configurations and under some operating procedures, the ac can be in a slight nose-down attitude at this stage of flight. Had this been the case, it might have given the airliner’s pilots a false impression of the C172’s altitude. Although the C172 pilot was fairly certain that he did not deviate from his planned [max] altitude of 1250ft, some Members thought it possible that he might have strayed slightly above this while concentrating on looking at ground features. That the C172 pilot (in the left seat and thus closest to the A319) did not see the relatively large and brightly coloured airliner as he passed through its nose at 1.9nm was also discussed. One GA Member suggested that the airliner might have been above the Cessna’s wing thus giving some credence to the latter pilot’s reported level. The Board however could not positively resolve these disparate reports. Accepting the A319 pilot’s estimate of the risk of collision, it was clear to Members that there had been none.

AIRPROX REPORT No 031/07

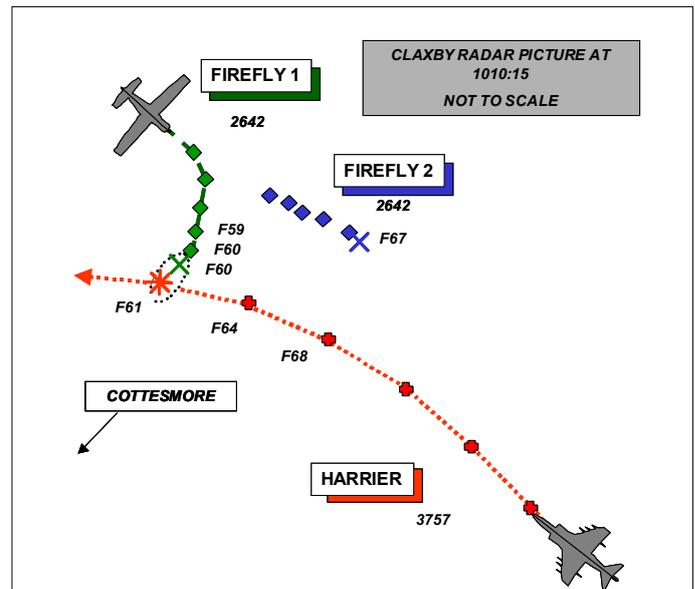
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT NO 032/07

Date/Time: 12 Apr 1010
Position: 5252N 00017W (10nm SE Barkston Hth)
Airspace: Lincs AAIA (Class: G)
Reporting Ac **Reported Ac**
Type: Firefly 260 Harrier T10
Operator: HQ AIR (Trg) HQ AIR (Ops)
Alt/FL: FL60 FL70↓
Weather VMC VMC CAVOK
 Slight haze
Visibility: 10km >10km
Reported Separation:
 0 V/50m H Not Seen
Recorded Separation:
 100ft V/0.2nm (360m) H
 (Projected between sweeps)

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE FIREFLY 260 PILOT reports flying an EFTS GH instructional sortie with a student pilot in a yellow ac with nav lights and strobes switched on, squawking 2642 (Lincs AIAA Conspicuity) and listening out on Cranwell APR. He had just completed a lookout turn through 180° to the right from 360° heading, rolling out on 180°. He closed the throttle while maintaining FL60 and continued his lookout until at about 60-65kts, just before entering a full stall, he saw a Harrier ¼nm away to his left, heading about 270° at the same altitude. He assessed that it would pass just in front, which it did, at about 50m away. He could not take any avoiding action as by that time he was in the stall. The Harrier was not seen to take any avoidance: he therefore assessed the risk as being high.

THE HARRIER T10 PILOT reports flying dual in a grey ac with HISLS on and squawking as directed by Cottesmore APR who were providing them with a RIS. They had just commenced a descent to Cottesmore for a PD, heading 230° (he thought) at 300kt, when they were warned of traffic to the NE of their position. He looked in that direction and saw a Firefly but considered it not to be a confliction. It was only after looking that he was informed by Cottesmore that the ac with which he had visual contact was not the called traffic and they had come very close to another ac in the stall configuration. His rear seat pilot saw the conflicting traffic only after they had passed which, as it was no longer a factor, he did not mention its proximity until after final landing.

MIL ACC reports that a Firefly was operating VFR in the Lincolnshire AIAA conducting GH, including practice stalls, but they were not receiving an ATC service, while a Harrier T10 was general handling in the block FL80 to FL190 and was receiving a RIS from Cottesmore APR. At 0959:51, the Harrier pilot called APR requesting a block for GH, stating: "5 Miles Northwest of Marham in a right hand turn, passing 7000 feet. We are looking for a radar pickup (unreadable), just be for General Handling in (unreadable) area". APR instructed "Harrier C/S copied. Squawk 3757 Ident", to which the Harrier crew responded "3757 Flash Harrier C/S". Shortly afterwards, APR transmitted "Harrier C/S identified Radar Information Service, limited using SSR only, separated from squawking aircraft only. Request your block". The Harrier crew stated "Operating in the block 80 up to 190." After a short pause, APR transmitted "Harrier C/S roger, you have that block. Report one minute to completion. Traffic West 6 miles, Southbound, slow moving, no height information", which the Harrier pilot acknowledged. APR updated the TI at 0959:49 transmitting "Harrier C/S, traffic Northwest 6 miles, Southbound, indicating FL70 descending" and the Harrier pilot called "Visual". APR updated the TI again 39sec later stating "Harrier C/S, traffic Northwest 6 miles, Southeast bound, indicating FL115". The Harrier pilot responded by giving their callsign. At 1001:03, APR informed the Harrier that it was "clear of traffic" and the Harrier pilot said "Thanks". Some 3½min later, at 1004:39, APR transmitted "Harrier C/S, traffic North 6 miles, manoeuvring, indicating FL60 climbing", to which the Harrier responded "Looking". At 1005:32, APR updated the TI by saying "Harrier C/S, traffic North 4 miles, Southbound,

AIRPROX REPORT No 032/07

indicating FL60", which is acknowledged with a shortened version of the C/S. The TI was updated at 1006:51, with APR saying *"Harrier C/S, traffic North 4 miles, manoeuvring, indicating FL60 descending"* and the Harrier pilot replied, *"copied"*. A further update of the TI was given 2min later as *"Harrier C/S, traffic Southeast 4 miles, Southbound, slow moving, no height information"* which again, the Harrier pilot acknowledged. At 1009:32, APR transmitted *"Harrier C/S, traffic Northwest 4 miles, indicating 2000 feet below"* and the Harrier pilot responded with *"Harrier C/S copied and er I'd like if possible to arrange a practice diversion into Cottesmore for two circuits please. First one being a, er, join downwind for a FT, er, L, landing."*; APR acknowledged this request. Shortly afterwards, at 1010:01 APR updated the traffic saying: *"Harrier C/S, traffic Northwest at 2 miles, manoeuvring, indicating 600 feet below"*. The pilot again acknowledged the transmission saying *"Harrier C/S"*. The Airprox then occurred at 1010:15.

Analysis of the Claxby Radar shows that there were two Fireflies (Firefly1 & Firefly2) manoeuvring in Lincolnshire Agreed airspace in the 15min before the incident occurred. At 1008:51 the Harrier is 17nm SE of Cranwell heading 060° indicating FL091. Firefly1 is in its 9 o'clock at 8.9nm, tracking 005° and indicating FL060, whilst Firefly2 is in its left 9 o'clock at 9.4nm, tracking 110° and indicating FL057. At 1009:10 the Harrier has commenced a left-hand turn and is passing through 010° and indicating FL088. Firefly1 is in its 10 o'clock at 8.6nm tracking 005° and indicating FL060 and Firefly2 is in its 10 o'clock at 8.0nm, tracking 110° and indicating FL059. At 1009:30 the Harrier has rolled out tracking 315° and indicates NMC with Firefly1 in its 11 o'clock at 6.3nm in a right-hand turn passing through 090° and indicating FL059C. Meanwhile Firefly2 is in the Harrier's 12 o'clock at 5.4nm in a right-turn passing through 100° and indicating FL062. At 1009:37 the Harrier is 13.4nm SE of Cranwell, maintaining a track of 315° and indicating FL077, with Firefly1 in its 12 o'clock at 5.0nm, still in the turn, passing through 130°, indicating FL059. Meanwhile Firefly2 was in the Harrier's 1 o'clock at 4.2nm, rolling out on 120° and indicating FL063. At 1009:44 the Harrier was maintaining a track of 315°, indicating FL077, with Firefly1 in its 12 o'clock at 3.9nm, continuing a right-turn through 180°, indicating FL059, while Firefly2 was in its half-past-twelve at 2.1nm, maintaining a track of 120° and indicating FL063. At 1009:51 the Harrier was maintaining heading 315°, indicating FL071, with Firefly1 in its 12 o'clock at 2.8nm having rolled out on a track of 190°, indicating FL059, while Firefly2 was in its half-past-one at 2.1nm, maintaining a track of 120° and indicating FL065. At 1010 the Harrier was 10.9nm SE of Cranwell, still on a track of 315°, indicating FL068C with Firefly1 in its 2 o'clock at 1.8nm maintaining a track of 190° and indicating FL059C. Firefly2 was then in the Harrier's 2 o'clock at 1.2nm, tracking 120° and indicating FL067. Firefly2 then ceased to be a factor in the incident as it passed down the right hand side of the Harrier. At 1010:07 the Harrier had started a slow left-hand turn and was passing through 290°, indicating FL064C with Firefly1 in its 1 o'clock at 0.8nm, tracking 190° and indicating FL060. Seven sec later the Harrier passed in front of Firefly1, still in a slow left turn, through 280°, and indicating FL061 with Firefly1 in its right, 4 o'clock at 0.3nm indicating FL060; this is the CPA. After the incident the Harrier continued its slow left turn with the Firefly in its 6 o'clock and thereafter separation continued to increase as the aircraft continued on their respective tracks.

APR fully complied with all requirements of RIS in accordance with JSP552, Section 235.115. TI was passed and updated on both tracks; however, it may have appeared on the R/T that the Harrier pilot thought that he was receiving information about only one track. It is unfortunate that APR did not highlight to the Harrier pilot that there were two tracks general handling to the NE of him: use of the phrase *'two tracks'* or *'further traffic'* might have improved the pilot's situational awareness. Although this phraseology is not laid down in Section 900 of JSP552, there is provision (JSP552.915.5) for a controller to provide *'additional information as deemed relevant/useful'*. Had the pilot been aware that there were two tracks, being visual with only one may have encouraged him to continue his search for the second track and/or request an update. Although the Harrier pilot called *'visual'* with traffic at 0959:49, it is unclear whether he maintained visual contact until the Airprox some 10min later. Firefly2's position was called to the Harrier pilot at 1009:32. Although the pilot's report states that he was visual with a Firefly, saying *'Looking that way I visually identified a firefly and considered the contact to be no factor'*, he did not relay this to APR. As the Harrier pilot was not aware of the second Firefly, he probably thought that the threat had passed. However, this does not exempt the Harrier pilot from the requirements of RIS which state: *'the pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information'*.

(It is worth noting that, at 1009:32, from the Harrier pilot's perspective, Firefly1 was almost directly behind Firefly2 and indicating 400' below).

HQ AIR (OPS) comments that although the Harrier pilot was given TI on a number of ac in the vicinity, it seems that he believed the Firefly he saw was the only confliction. Again, as on other occasions, the message is that it is essential not to 'lock on' to the confliction you can see to the detriment of continuous lookout.

HQ AIR (TRG) comments that ultimately in Class G airspace it is the pilot's responsibility to see and avoid other traffic. In this case the Firefly crew did not see the Harrier until very late when their ac was in a stall and were unable to take any avoiding action. The Harrier crew were receiving a RIS, limited to squawking aircraft only, and had received a steady stream of TI. It appears that the Harrier crew did not realise that they were being given TI on 2 aircraft in their 12 to 2 o'clock position and in seeing Firefly2 did not maintain a sharp lookout for Firefly1. APR complied with the requirements of the system: however, in this case it appears the APR may have allowed the Harrier crew to think that there was only one aircraft in their vicinity. Maybe a change to the standard, accepted phraseology in JSP552 would prevent similar incidents occurring.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board agreed that although there was no obligation to do so, Cranwell APR had provided very extensive TI to the Harrier pilots who were busy setting the ac up for the PD. Unfortunately this TI did not include the fact that there were two Fireflies in the Harrier's one o'clock. Members felt that such additional information would have been beneficial in helping to make the Harrier crew's mental picture even clearer. The Harrier crew would then have attempted to identify both ac rather than just the one, this being dismissed as no threat which, indeed, it was not – but the unseen one was.

In Class G airspace there is an equal and shared responsibility for pilots to see and avoid other ac. Although the Firefly instructor saw the Harrier it was too late to take any meaningful avoidance. An experienced GA flying instructor commented that perhaps the Firefly instructor should have abandoned the stalling exercise but other pilot Members could understand the impracticality of that action at such a late stage.

Members were of the view that as the Harrier crew effectively did not see the second Firefly and that as neither pilot could take any effective avoidance, then although there had been no risk that the ac would have collided, the safety of both had been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the Harrier crew and a late sighting by the Firefly crew.

Degree of Risk: B.

AIRPROX REPORT No 033/07

AIRPROX REPORT NO 033/07

Date/Time: 12 Apr 1114

Position: 5259N 00035W (Barkston Heath Circuit
- elev 367ft ft)

Airspace: Barkston Heath ATZ (Class: G)

Reporting Ac Reported Ac

Type: Firefly 260 R44

Operator: HQ AIR (Trg) Civ Pte

Alt/FL: 800ft 1000ft
(QFE 1010mb) (QFE 1016mb)

Weather VMC Haze VMC Haze

Visibility: 5km 10km

Reported Separation:
100ft V/100m H 100ft V/NK H

Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIREFLY 260 PILOT reports that he was flying a 3rd circuit consolidation sortie at Barkston Heath with an ab-initio student as handling pilot who was focused on his spacing from the RW. As they rolled out downwind heading 290° at 90kt he saw a black helicopter approaching the circuit area from the N. He delayed taking control for about 5sec to see if the helicopter pilot took any avoiding action; as it did not he took control and avoided it by descending below its height. He was not at any time notified of the helo's presence. He reported the incident (although not as an Airprox) to Barkston TWR as he believes that had the student been solo, there would have been a high chance of a collision.

UKAB Note (1): In a follow-up telephone conversation between the Secretariat and the Firefly Instructor he stated that he was certain that there would have been a mid-air collision had he not descended their ac. He also reiterated that had the student been solo it was in his view likely that, in the prevailing haze, he would have been so preoccupied flying the ac accurately on this early stage circuit flight that he would not have seen the R44 approaching from his 2.30, co-alt. The next sortie (the solo) was due to be flown later that day but was cancelled due to the incident and the weather. As was SOP, they had been operating solely on UHF, although their VHF radio had been checked on start up and was serviceable. He was certain that neither he nor his student heard any response by the Barkston ADC (on UHF) to the R44 pilot's (VHF) initial call to TWR. It was only when the wings were levelled and he looked to his right that he saw the helicopter and this was the first time that he (they) were aware of its presence.

THE R44 PILOT reports flying a blue and yellow helicopter under VFR from a private site to Sywell in communication with Cranwell and then Barkston Heath squawking with Mode C. He was heading 180° at 100kt and 1000ft on the Waddington QFE 1015mb and was receiving a RIS from Cranwell. Cranwell spoke to Barkston Heath TWR advising of his routing and he was advised that he was cleared through the MATZ as requested. He then transferred radio communication to Barkston Heath as a courtesy to advise them of his presence.

He was not advised of the incident until some days later.

THE BARKSTON HEATH ADC reports that at 1109 she was pre-noted by Cranwell Radar that an R44 had requested to fly through their circuit at 1000ft. At 1113 she received a further call to inform her that the R44 was coming to her now and when clear of the MATZ it was to free call Cottesmore. She questioned the speed of the ac and was informed that it was slow moving. At 1113:58 the R44 called on VHF, just as she was completing the telephone call. She then transmitted simultaneously on VHF and UHF 281.225MHz (See UKAB Note (1)). She informed the R44 pilot that Barkston was using RW11, the QFE was 1010 and that there was one Firefly in the visual circuit. The R44 pilot responded by informing her that he was changing squawk to 7000; that he was visual

with traffic that was approaching the RW11 threshold; that he had been given permission to come through at 1000ft on 1015mb and that he was calling out of courtesy. She visually identified the R44 during this transmission, at approximately the Northern boundary of the airfield, as it flew from North to South over the airfield in line with the tower. In the meantime the Firefly pilot informed her on UHF that he was descending to avoid the traffic and she informed the R44 pilot that the Firefly was visual with him. At 1114:58 the R44 pilot informed her that he was changing to Cottesmore VHF.

UKAB Note (2): The transcript of the Barkston UHF RT shows that the initial call from Barkston to the R44 was made on both UHF and VHF frequencies as the ADC reported. No explanation can be offered as to why this was not heard by the Firefly pilots.

THE BARKSTON HEATH UNIT REPORT states that the incident was regrettable as there was ample opportunity to take control of the situation and prevent any conflict from occurring. Firstly, during the initial call from Cranwell there was no mention of the pressure setting that the R44 was operating on. Secondly, a Barkston all-stations broadcast at this stage – some 4min before the ac penetrated their ATZ – would have alerted the Firefly to the presence of the helicopter and the Firefly pilot would then have had the opportunity to listen to VHF and hear the R44's transmissions. Thirdly, at no point was specific TI given to the R44 pilot on the Firefly in relation to each other: generic TI is not acceptable especially when the weather conditions are marginal.

Barkston Heath ATC identified some valuable lessons from this incident that will be used in Truce Training and also points for discussion in their SMS role.

UKAB Note (3): The recording of the Claxby radar is accurately summarised at the Mil ACC report below. By projection it would seem that the CPA was at 1114:10.

UKAB Note (4): The UKAIP ENR 2-2-3-2 Para 2.3 refers to MATZ procedures. This was amended on 12 Apr 07, the day of the incident, but was distributed iaw the AIRAC cycle well in advance of its implementation. The amendment included a new paragraph 2.3 as follows:

'Pilots are reminded that an ATZ usually lies within the MATZ and, where applicable, a MATZ penetration approval will implicitly include any necessary approvals/clearances to transit the associated ATZ. Where a MATZ penetration approval cannot be issued, pilots are to be advised to avoid the MATZ, notwithstanding any action necessary to maintain the safety of the aircraft and/or its occupants.'

UKAB Note (5): There is a LoA between RAF Cranwell and RAF Barkston Heath. The LoA is contained in RAF Barkston Heath MATS Part 2. Applicable parts are as follows:

MATS Part 2 Para 11.1:

'Whenever possible aircraft crossing the MATZ are to be routed clear of the BA (Barkston) ATZ. When it is necessary to transit the ATZ aircraft will only be allowed to enter the ATZ when the ADC has issued a crossing clearance in response to a request from the RAF CWL Radar Controller(s). This clearance will detail the direction of flight, range and height/altitude of the fly at.'

Annex A to Appendix B (LoA), Para 3b (Responsibilities):

RAF Cranwell. CWL ATC is responsible for the provision of:

'b. On request a radar service to transit aircraft within the CWL/BA MATZ.'

MIL ACC reports that a Firefly was operating in the Barkston Heath visual circuit under the control of the ADC while an R44 was receiving a FIS when it was handed from Waddington Zone to Cranwell Zone/Depos (ZONE). The handover took place between 1106:33 and 1107:23, the details of the flight being passed as, "1000ft Waddington QFE 1016" and "R44 Helicopter to Sywell, FIS". At 1109:05 ZONE passed details to Cranwell ADC. However, the visual circuit was clear and the ADC stated: "The circuit is clear, you can keep him". Simultaneously Cranwell APP called the Barkston ADC and stated: "You're going to have a MATZ crosser very shortly. It's North of me at the moment. Callsign is [R44 C/S]". After a brief exchange, APP states: "He's going to Northampton, Sywell. He's going through my overhead at the moment and I would like to free-call him straight across to you on

AIRPROX REPORT No 033/07

VHF if I may at 1000ft. He said he would rather not climb". The Barkston ADC asked: "He's at 1000ft?" and APP continued: "Yes.[2 second pause] He's quite happy to hold and sequence with you're" and the Barkston ADC added, "Ok, I've got one in the circuit at the moment". APP then stated: "So, as soon as he is South of me, if I may, I will free-call him to you on 120x42" and the ADC replied: "Yes, that's fine" and both controllers signed off. The R44 pilot made contact with ZONE at 1109:19, stating: "Cranwell Zone, this is Helicopter [R44 C/S] on 2635". ZONE replied, "[R44 C/S], Cranwell Zone identified FIS, set Cranwell QFE 1016" and the R44 pilot read back: "1016, FIS, Helicopter [R44 C/S]". ZONE then requested: "Helicopter [R44 C/S] confirm at 1000ft?" to which the pilot answered: "Affirm at 1000ft, Helicopter [R44 C/S]". At 1110:32 ZONE stated: "[R44 C/S], your MATZ crossing at 1000ft, 1016 is approved", the pilot said: "Sorry, say again, Helicopter [R44 C/S]" and ZONE restated: "[R44 C/S], your MATZ crossing at 1000ft, 1016 is approved, circuit is clear". The pilot then read-back: "MATZ crossing at 1000ft approved, 1016, many thanks [R44 C/S]". There is then an unrelated telephone conversation before ZONE instructed at 1112:50: "[R44 C/S], squawk 7000, continue with Barkston Tower 120x42", to which the pilot replied: "[unreadable number] 20x42, squawk 7000, Helicopter [R44 C/S]". At 1113:06 APP called the Barkston ADC and stated: "We're free-calling [R44 C/S] to you now and when you're finished with it, would you like to free-call him straight to Cottesmore on 130x2". The ADC asked: "130x2. How fast moving is he? Is he really slow?", APP replied, "Oh no, he's pretty slow. He's 2 miles North of you at the moment", the ADC acknowledging and both controllers sign off.

Analysis of the Claxby Radar at 1111:01 showed the R44 3nm NW Cranwell, tracking 190° and indicating FL010 and a non-squawking contact, believed to be the Firefly, was 1nm W of Barkston Heath manoeuvring. The latter disappeared from radar at 1111:35 while the former continued, passing 1.9nm W of Cranwell. At 1112:43 the R44 was 010°/3.4nm from Barkston, still tracking 190° but indicating FL011; it was still tracking 190° but indicating FL010C some 40sec later. The contact believed to be the Firefly re-appeared in the R44's 11 o'clock at 2.5nm, tracking 030°. The Firefly then turned left and was tracking 310° at 1113:53 putting it in the R44's left 10 o'clock 1.2nm, its track and alt unchanged. The Firefly disappeared from radar at 1114:03 just as the R44 appeared to turn 20° to the L before returning to its original track at 1114:25. The Firefly did not reappear on radar and the R44 continued on track, indicating FL010 and passed 0.1nm E of Barkston Heath at 1114:33. Due to the level at which the incident occurred, the CPA was not displayed on recorded radar.

The MATZ crossing clearance issued by ZONE at 1110:32 clearly stated that the R44 crew had permission to cross the MATZ at 1000ft on the Cranwell QFE of 1016 and that the circuit was clear. Cranwell and Barkston Heath have a combined MATZ (CMATZ) and the R44's route was 1.9nm to the W of Cranwell and directly overhead Barkston Heath. Whilst ZONE may have intended that the clearance was only to cross the Cranwell ATZ that was not what was stated. The R44 pilot would have been wholly justified to believe he could cross the whole CMATZ. Furthermore, because he was told that the circuit was clear so he would not have expected to encounter the Firefly in the Barkston Heath visual circuit. The R44 pilot acknowledged the frequency change when he was 2.9nm from Barkston Heath. He was travelling at a ground speed of approximately 115kt which would have allowed around 30sec for the pilot to contact Barkston Heath prior to entering the ATZ but as he had already been cleared through the CMATZ he would not have felt any need to do so quickly. Furthermore, it is unclear why APP stated that the R44 did not wish to climb and was willing to hold, as they stated to the Barkston ADC, as the pilot had not been asked if he could climb or hold; this could have given the ADC a false impression of the pilot's intentions. The MATZ crossing instruction issued by the ZONE Controller led the R44 pilot to believe that he was cleared to cross through the Barkston Heath visual circuit and this may have contributed to the Airprox. However since the actual Airprox occurred whilst both ac were in communication with Barkston Heath ADC, the cause is not within the scope of a military ATC investigation.

In light of this incident Cranwell ATC has undergone a re-appraisal of phraseology and the potential unintended consequences of poorly chosen R/T have been reinforced.

UKAB Note (6): The UK MIL AIP states at ENR2-1-4 Para 3.6 (MATZ Procedures)

Separation. The ATS unit providing the service will give traffic information and any instructions necessary to achieve safe separation from known or observed traffic within the zone.

ATSI reports that at the time of the Airprox the Firefly was carrying out left hand circuits to RW11 at Barkston Heath. Shortly after 1109, the Barkston ADC received a telephone call from Cranwell APR advising that there would shortly be an R44 to transit overhead Cranwell, then Barkston, at 1000ft bound for Northampton Sywell. At this time the R44 was approximately 9nm (over 4 min) NNE of Barkston. Cranwell was advised that Barkston's traffic

was just one (the subject Firefly) in the circuit. At 1111:30, the Firefly reported finals and was cleared to roll by the ADC. At 1113, when the R44 was 2.9nm NNE of Barkston, Cranwell called and advised that they were instructing the R44 pilot to contact the ADC now and requested that the flight be free-called to Cottesmore when S of The R44 pilot called and the ADC responded by transmitting: "[R44 C/S] *Barkston Tower good afternoon to you we're using runway one one we've currently got one Firefly in the visual circuit our QFE is one zero one zero*". This transmission was made on both the UHF and VHF frequencies as the R44 was utilising VHF and the Firefly UHF. The R44 replied by saying that he was just approaching the RW threshold at 1000ft and had already been given permission to come through hence his call was a courtesy one. Immediately after the Firefly pilot called stating that he was descending to 500ft to avoid the traffic.

The Barkston Heath MATS Part 2 includes a Letter of Agreement between Cranwell and Barkston. This essentially states that permission to enter the Barkston ATZ will be given by the Barkston ADC. In this case no such clearance to transit the ATZ had been issued by the ADC.

MATS Part 1 states (Section1 Chapter 1 Page 1) that Aerodrome control is responsible for issuing information and instructions to ac under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collision between ac flying in, and in the vicinity of, the aerodrome traffic zone: a similar entry can be found in JSP552 Para 310.110.1.

Notwithstanding that no legitimate clearance had been issued by Barkston [to Cranwell to allow them to issue a MATZ crossing clearance and therefore allow the ATZ penetration] for the R44 to transit the Barkston Heath ATZ, the ADC did not pass any TI to the Firefly crew on the imminent arrival of the R44. When the R44 made his initial call, this was on the VHF frequency and would not have been heard by the Firefly pilot thus depriving him of a full situational awareness. Furthermore, the traffic information provided to the R44 pilot on the position of the Firefly was very generic in nature and could easily have been more specific and thus more informative.

HQ AIR (TRG) comments that this Airprox was totally avoidable and only occurred through a series of ambiguous statements and lack of timely TI to both ac.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was disappointed to note that despite both pilots operating with the respective ATC agencies and correctly informing them of their intentions in good time, a close encounter in the Barkston ATZ was not avoided.

Despite slight ambiguity in the wording of the amended MATZ crossing procedures promulgated in the UK AIP on 12 Apr 07, the day of the Airprox, their intent was recognised by both ATC agencies and were correctly reflected in the extant procedures that are promulgated in their respective local documents. These procedures however were not complied with by Cranwell ATC who informed the R44 pilot that he had a clearance to transit the CMATZ when in fact no Barkston ATZ clearance had been requested by Cranwell ATC nor had approval been given by the Barkston Heath ADC despite the R44's intentions being discussed between controllers (with some significant inaccuracies) at length.

When contacted by the Secretariat, HQ Air (ACC) (who are responsible for Military ATC policy and procedures) were firmly of the view that any MATZ (or CMATZ) crossing clearance implicitly includes clearance through any/all ATZs on the intended routing. When asked by the Chairman, a very experienced civil helicopter pilot Member familiar with MATZ transit procedures confirmed that this was also his understanding. It is therefore incumbent on APP/APR controller(s) to request an ATZ penetration clearance from the controlling authority of ATZs before issuing any such MATZ/CMATZ crossing clearance. It was the intention of the 12 Apr 07 amendment to the UK AIP to make this clear and in due course the revision will also be reflected in the Military AIP and in applicable JSPs.

Cranwell APP informed the R44 pilot that the cct was clear (meaning - but not saying - only the Cranwell cct) in the CMATZ crossing clearance but this was not wholly accurate as it gave the impression that Barkston was also clear: it was not and the Barkston ADC had already made the Cranwell controller aware of this.

AIRPROX REPORT No 033/07

Specialist controller Members could not understand the sequence of events that led the ZONE controller to issue the incorrect and inaccurate CMATZ crossing clearance. Members thought that she might have intended the R44 pilot to request a further ATZ crossing from Barkston albeit leaving insufficient time available for the pilot to accomplish this.

The Barkston Heath ADC, as identified in their comprehensive unit investigation, also had the opportunity to prevent the incident by telling Cranwell at an early stage that the R44 should avoid the circuit area, either vertically or horizontally. In any case, even having allowed the R44 to transit the ATZ (overhead), the Firefly pilot should have been passed clear and unambiguous TI regarding the R44's position and track, which he was not. This might have allowed him to adapt his circuit pattern accordingly.

Horizontal and vertical options to prevent this conflict were plentiful since neither Cranwell nor Barkston was busy at the time; the phraseology and procedures adopted however were not in accordance with best practise and led to a breakdown in understanding. In the event however, despite the unsatisfactory situation, since the Firefly instructor had time to assess the situation and then initiate positive avoiding action, the Board determined therefore that there had been no risk of collision.

Post Meeting Note:

DAP will be issuing clarification to the wording in the UK AIP on CMATZ crossings in order to remove any ambiguity.

PART C: ASSESSMENT OF CAUSE AND RISK

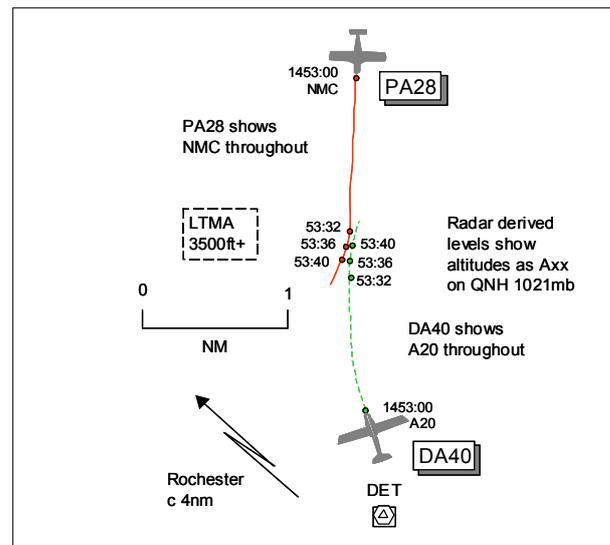
Cause: Cranwell ATC did not comply with the agreed procedures such that the R44 flew into conflict with the Firefly in the Barkston Heath cct.

Degree of Risk: C.

Contributory Factors: The Barkston Heath ADC did not provide TI to the Firefly pilot

AIRPROX REPORT NO 034/07

Date/Time: 12 Apr 1454
Position: 5120N 00035E (2nm N DET)
Airspace: LFIR (Class: G)
Reporting Ac **Reported Ac**
Type: DA40 PA28
Operator: Civ Trg Civ Trg
Alt/FL: 2000ft 2000ft
 (QNH 1022mb) (QNH)
Weather VMC HAZE VMC CLOC
Visibility: 3-5km >10km
Reported Separation:
 10ft V/30m H NR
Recorded Separation:
 <0.1nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DA40 PILOT reports flying a dual training sortie (exercise 18c Radio Navigation) from Rochester and in receipt of a FIS from Rochester on 122.225MHz squawking 7000 with Mode C. The visibility was 3-5km in haze and the ac was coloured white /red with strobe lights switched on. After departing Rochester they climbed to 2000ft QNH 1022mb and routed to DET on the 130°R before turning L onto the 360°R outbound. Heading 360° at 110kt and 2.8nm N of DET (1.5nm outside the ATZ) he was discussing and demonstrating a 'position fix' to the student. They were checking the DME and on looking forward they saw another single-engined ac about 1000-1500ft ahead on the reciprocal heading. Both he and the other ac's pilot simultaneously took action by banking steeply R to avoid collision, the ac passing within about 100ft (30m horizontally and 10ft vertically) of each other. He assessed the risk as medium. Apart from the variable visibility, the navigation exercise involved looking-in the cockpit for a position fix and this had resulted in a late sighting of the other ac and late avoiding action. The other pilot was not on the Rochester frequency so there was no communication regarding other ac in the locality.

THE PA28 PILOT reports en route from Norwich to Headcorn VFR on a dual cross-country flight heading 180° at 105kt and 2000ft QNH and in communication with Headcorn Radio on 122.0MHz squawking 7000 with NMC. The visibility was >10km in VMC and the ac was coloured blue/white; no lighting was mentioned. On sighting another ac, he immediately turned R so he was unable to notice any details of its type or colour. It was about 1-2nm ahead, to the L of his track at the same level, and in his estimation would have passed clear on his LHS. He was very aware that traffic would be heavy in the vicinity of DET VOR and Rochester airfield and was very alert to a possible encounter. The other ac was seen in good time and, with the avoiding action, there was no danger of collision.

UKAB Note (1): The Met Office provided a Wx aftercast which showed a slow moving area of high pressure over the N Sea feeding a dry flow off the continent on an E'y gradient. Two distinct inversions were apparent with associated haze layers, the first layer tops at 2650ft amsl. Surface visibilities were reported between 3000m and 10km, the better visibility generally found some distance inland. Biggin Hill visibility at 1450Z was 3000m in haze, Manston 4000m, Lydd 4500m, Gatwick 7km with London/City reporting 8km.

UKAB Note (2): Analysis of the Heathrow radar recording at 1453:00 shows a 7000 squawk, believed to be the DA40, 0.8nm N of DET tracking 345° indicating altitude 2000ft London QNH 1021mb with another 7000 squawk, believed to be the PA28, 2.3nm to its N tracking 180° showing NMC. The DA40 steadies on a N'y track shortly thereafter as both ac then close head-on, with separation reducing to 0.3nm at 1453:32, the DA40 still indicating altitude 2000ft. The next sweep 4 sec later reveals a slight alteration to the R of both ac with separation reduced to 0.1nm. The CPA occurs just after this (<0.1nm) before the next radar sweep at 1453:40 shows the subject ac having passed with separation 0.1nm and increasing with R turns firmly evident by both flights.

AIRPROX REPORT No 034/07

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members agreed that with the weather conditions reported by the Met Office, the in-flight visibility would have been poor, as stated by the DA40 pilot - certainly marginal for flying under VFR. With the two distinct haze layers, one option for the pilots in this Airprox would have been to climb above the first layer whilst still being able to remain below the CAS base level and able to conduct their sorties where the visibility would have been better. GA pilot Members knew of the difficulties when trying to arrange the appropriate training exercise for students which are compatible with the Wx conditions that pertain at the time. Certainly, both of the subject flights being on dual training sorties (radio navigation and dual cross country) would have involved a lot of 'heads-in' but this should always be balanced with the need to maintain an adequate look out – cockpit tasks should be split into small bullets with each one interspersed with a lookout scan. However, Members were clear that the cause of the Airprox was down to a sighting issue as 'see and avoid' pertained at the time for this encounter in Class G airspace. In addition to the poor visibility was the small target aspect shown by each ac as they approached 'head-on'. This would have made visual acquisition difficult, with little or no relative movement across either pilot's field of view during their lookout scan.

Using data from both pilots' reports, there was a large difference in reported 'first sighting' distances. From the DA40 pilot's perspective, he was surprised by the appearance of the PA28 300-500yd ahead as he looked out, a very late sighting and this was a part cause of the Airprox. Meanwhile the PA28 pilot had seen the approaching DA40, he thought 1-2nm away, and turned R in good time to avoid. The radar recording reveals the PA28's turn taking effect slightly before the DA40's track shows any deviation. This led Members to opine that the sighting distance by the PA28 pilot was before the DA40 pilot's but at a distance less than he had reported and had occurred late into the proceedings - the second part-cause of the Airprox. With a separation distance shown as being <0.1nm at the CPA with both ac established turning R, the Board believed that although an actual collision had been averted, the subject ac had passed uncomfortably close whilst manoeuvring to the extent that safety had not been assured during the encounter.

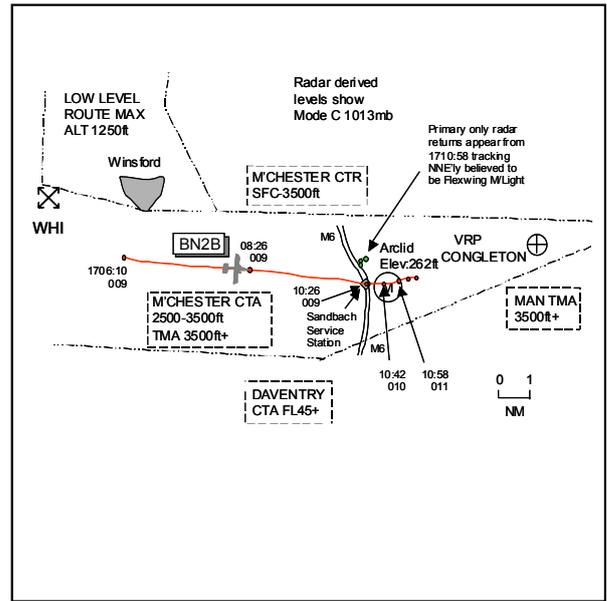
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In marginal weather conditions, a very late sighting by the DA40 pilot and a late sighting by the PA28 pilot.

Degree of Risk: B.

AIRPROX REPORT NO 035/07

Date/Time: 14 Apr 1710 (Saturday)
Position: 5308N 00220W (0.5nm W Arclid M/Light Site - elev 262ft)
Airspace: LFIR (Class: G)
Reporting Ac Reporting Ac
Type: Pegasus Quik BN2B
 Flexwing M/Light
Operator: Civ Trg Civ Comm
Alt/FL: 800ft 1200ft
 (QFE 1014mb) (QNH 1023mb)
Weather VMC CLOC VMC CLNC
Visibility: 15km 7km
Reported Separation:
 150ft V 50ft V
Recorded Separation:
 NR



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PEGASUS QUIK GT450 FLEXWING M/LIGHT PILOT reports flying a dual training sortie from Arclid M/Light Site and not in communication with any ATSU. The visibility was 15km in VMC and the ac was coloured yellow/white. When passing O/H the Sandbach service station heading 020° at 60kt at 800ft QFE 1014mb, in the cct downwind RH for RW20, he first saw a blue/yellow BN2 in his 10 o'clock range 200m slightly above flying towards him. He immediately descended and the BN2 passed O/H his ac with about 150ft vertical separation. He assessed the risk as very high.

THE BN2B PILOT reports heading 100° at 120kt and in receipt of a FIS from Manchester Approach on 118.575MHz squawking a discrete code with Mode C; TCAS 1 was fitted. The visibility was 7km in SKC but hazy VMC and the ac was coloured blue/yellow with anti-collision and 2 wing-tip landing lights switched on. Cruising level at 1200ft QNH 1023mb with A/P engaged, he and his observers were actively searching for any M/Light activity at Arclid, both visually and with onboard cameras. A highwing M/Light was first spotted on camera by a crewman close-by and the ac's image rapidly crossed the screen from R to L showing the upper surface of its wing in a side view. Very shortly after this the rear observer saw the ac pass beneath their ac. He, the pilot, did not visually acquire the M/Light but the crew 'sightings' happened with no time to react or take avoiding action. He believed the M/Light passed about 50ft below his ac and he assessed the risk as very high. He went on to reiterate that he and his crew were all actively looking out, cognisant of possible M/Light activity from Arclid, searching both visually and using on board equipment but neither he nor his crew observers saw the M/Light in time to take the avoiding action that was required.

THE MANCHESTER APPROACH S CONTROLLER reports that at 1710 a call was received from a M/Light pilot over Arclid M/Light Site reporting an Airprox involving the BN2B which was transiting to the S of the Low Level route E bound to Congleton at 1250ft amsl. This was the first time the controller had spoken to the M/Light pilot and the BN2B pilot was then asked if he had heard that transmission which he said he had.

ATSI reports that the BN2B pilot established communication with Manchester Approach at 1705, reporting S of Winsford at 1200ft, routeing towards Congleton. The pilot requested a FIS. The service was approved and the pilot was requested to report if he wished to climb higher. Some 5min later, the M/Light pilot contacted the frequency, reporting in the cct at Arclid, wishing to report an Airprox with the BN2B. Relative to the ATC service being provided to the BN2B, there are no ATC causal factors.

AIRPROX REPORT No 035/07

UKAB Note (1): Met Office archive data shows the Manchester and Liverpool METARs as EGCC1650Z 08007KT CAVOK 22/04 Q1023 NOSIG= and EGGP1650Z 11005KT 8000 NSC 22/10 Q1023=

UKAB Note (2): The UK AIP at ENR 5-5-4-1 promulgates Arclid (Nr Sandbach) as a Microlight Site centred 530828N 0021900W with a site elevation of 262ft amsl.

UKAB Note (3): The ANO Rules of the Air Regulations Rule 12 Flight in the vicinity of an aerodrome para (1) states *“Subject to paragraph (2), a flying machine, glider or airship while flying in the vicinity of what the commander of the aircraft knows or ought reasonably to know to be an aerodrome, shall- a) conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed; and b) make all turns to the left unless ground signals otherwise indicate. Para (2) states “Paragraph (1) shall not apply if the air traffic control unit at that aerodrome otherwise authorises.”*

UKAB Note (4): Analysis of the Clee Hill radar recording does not capture the Airprox, the Flexwing M/Light only appearing after the incident. The BN2B is seen at 1706:10, the time the Manchester controller was acknowledging the BN2B pilot's request for a FIS, wearing a discrete code passing 2nm SSW of Winsford tracking 095° indicating FL009 (1200ft Manchester QNH 1023mb). This track is maintained, the BN2B passes over the Sandbach Service Station at 1710:26 (reported Airprox position 0.5nm W of Arclid M/Light Site) still at FL009, the Flexwing M/Light pilot reports flying at 800ft QFE (1062ft QNH) in that position. Sixteen seconds later the BN2B passes O/H Arclid indicating FL010 (1300ft QNH) turning L, rolling out on a 080° track towards Congleton VRP 16sec later now at FL011 (1400ft QNH). Simultaneously, a primary only return appears 1.1nm NW of Arclid, believed to be the Flexwing M/Light, tracking NNE'ly downwind for RW20 which then commences a R turn towards baseleg.

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.

Pilot Members were not surprised that this incident had occurred. Although cognisant of Arclid M/Light site, the BN2B pilot elected to fly through the notified and active M/Light cct. In doing so he flew into conflict with the Pegasus M/Light which he did not see and this had caused the Airprox. The BN2B pilot had at least two options which could have prevented this encounter - making a slight lateral deviation to give the site a wider berth or climbing to a level above the cct. As this was Class G airspace, there was equal onus on both pilots to see and avoid each other. Whilst the Pegasus pilot had right of way under the Rules of the Air Regulations, the BN2B would have been approaching from the Pegasus pilot's 8 o'clock before quickly moving into the latter's field of view owing to the BN2B's faster speed. Fortunately, despite the non-sighting by the BN2B pilot, the Pegasus pilot acquired the BN2B, albeit late, as it appeared in his 10 o'clock range 200m and slightly above. The Pegasus pilot immediately descended his ac to increase the separation distance which was reported as between 50-150ft vertically. The Board were in no doubt that this had been an uncomfortably close encounter. With the passage taking place unsighted by one pilot, the Board concluded that safety had not been assured during the encounter.

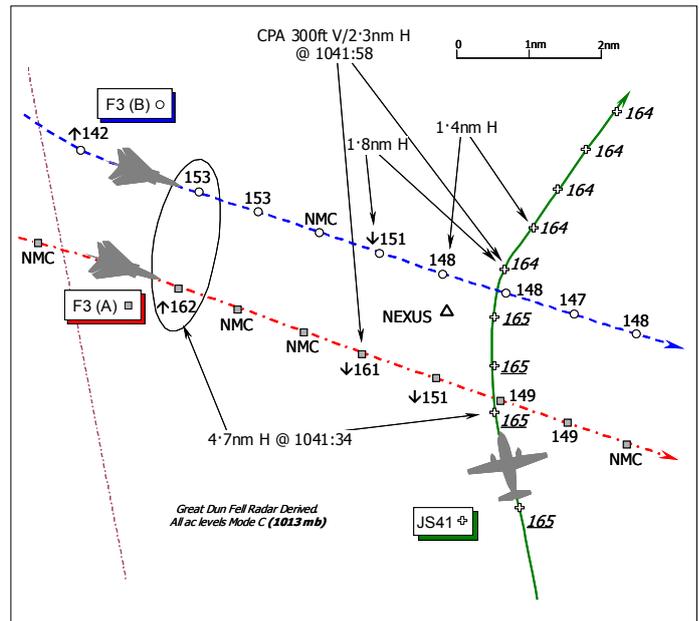
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The BN2B pilot flew through a notified and active M/Light cct and into conflict with the Pegasus M/Light which he did not see.

Degree of Risk: B.

AIRPROX REPORT NO 036/07

Date/Time: 12 Apr 1041
Position: 5612N 00151W (NEXUS - 35nm ESE of Leuchars)
Airspace: Scottish FIR (Class: G)
Reporter: ScATCC MIL
1st Ac **2nd Ac**
Type: JS41 Tornado F3 Pair
Operator: CAT HQ AIR (Ops)
Alt/FL: FL165 ↑15000ft
RPS (1020mb)
Weather VMC NR VMC CLOC
Visibility: NR 30km
Reported Separation:
NR Nil V/2½nm H
Recorded Separation:
300ftV/2.3nm H - F3 (A)
1.4nm H/1600ft V - F3 (B)

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

ScATCC MIL CONTROLLER 4 (CON4) reports that he was working a JS41 routing from DTVA to Aberdeen under a RAS in a level cruise at FL165 tracking 350° approaching MADAD. A pair of ac climbing out from Leuchars had previously been noticed squawking A0201/0202 – the subject Tornado F3 pair - so he called Leuchars to co-ordinate the tracks. It was agreed with Leuchars APPROACH (APP) [co-ordinating on behalf of DEPARTURES (DEPS) 'by proxy'] that the F3 pair would not be above 15000ft TYNE RPS (1020mb) but as DEPS was in the process of handing the F3 pair to CRC Boulmer, the co-ordination would be 'passed on' to the CRC controller; he, CON4, was informed that the squawks would change to Boulmer's A5131/5132. As the F3 pair tracked closer to the JS41 he passed traffic information to the JS41 crew advising that the pair was coordinated not above FL155. Updated traffic information was passed as they closed to a range of within 19 miles; at this stage their Mode C indicated the pair was not above FL150. He then looked at his next expected ac and on returning his scan to the JS41, the Mode C of the lead F3 squawking A5131 [F3 (A)] was showing FL160 and climbing rapidly with the other element of the pair climbing through FL150. An avoiding action R turn was given to the JS41 crew and traffic information passed. The SUPERVISOR was informed who had also observed the incident and immediately called Boulmer. It was established from the fighter controller (FC) that his ac were indeed co-ordinated not above 15000ft TYNE RPS (1020mb) and that the pair had 'bust' their assigned altitude. The lead ac squawking A5131 reached FL170, before descending rapidly below FL155. The No2 - [F3 (B)] - squawking A5132 did not climb above FL153. The minimum horizontal separation was assessed to be below 2nm at the same level. Once 5nm separation was evident on radar, the JS41 was cleared to turn again for Aberdeen and he informed the crew as to what had occurred, advising them that he would be filing a report. When questioned whether the JS41 crew had received a TCAS RA, the pilot said that he had and he would be consulting with his Company.

After being relieved from the console, he spoke with the Fighter Allocator (FA) at Boulmer, to establish events from their perspective, who said Boulmer would be filing a report. He also called Leuchars, informed ATC of the events surrounding the incident and as the ac had climbed through their cleared altitude and discussed the situation with the F3 crews' Acting Squadron Commander.

THE ScATCC (MIL) SUPERVISOR reports that CON4 had been controlling a number of similar tracks to Aberdeen and had been required to co-ordinate with Leuchars or Boulmer against fast-jet traffic in transit from Leuchars to the D613 complex. The JS41 was passing approximately E abeam ST ABBS when conflicting traffic – the subject F3 pair - was observed departing from Leuchars on an easterly heading. Co-ordination was timely and he was standing behind the controller at the time it was agreed with Leuchars. Seconds later, whilst seated at the Supervisor's desk, he observed the co-ordinated fast jets changing from Leuchars to Boulmer squawks. He

AIRPROX REPORT No 036/07

continued to observe the traffic as it approached the JS41. The two fast jets were in loose formation - about 1½nm apart - with both SSR labels clearly visible on the Lowther Hill Radar. Mode C occasionally dropped out, probably as a result of the pair's RoC. As the fast jets came within 5nm of the JS41, the more southerly of the contacts – F3 (A) - continued its climb, passing through FL160 at about 3nm from the JS41. CON4 gave appropriate avoiding action to the JS41 crew, onto a NE heading. He immediately called Boulmer by landline and spoke to the Boulmer Controller involved - FC3. He asked if the FC had given the ac any instruction to climb but the controller responded that he had not given a clearance to climb and that he had been handed over the relevant co-ordination (between Leuchars and ScATCC (Mil)) on handover of the ac.

THE JS41 PILOT reports he was inbound to Aberdeen and in receipt of a RAS from SCOTTISH MILITARY whilst in a level cruise at FL165, under IFR but flying in VMC.

Heading 350°(M) at 240kt, some 5nm E of the southern tip of the Firth-of-Forth, SCOTTISH MILITARY informed them of 2 military contacts – the F3 pair - in their 12 o'clock coordinated below and not above FL155. Both contacts were observed on TCAS and were seen on TCAS to climb – generating a TCAS TA. At the same time SCOTTISH MILITARY gave them an avoiding action R turn onto 040°. The other ac were not seen visually so the minimum separation was not quantified but he assessed the risk as “low”.

THE LEAD TORNADO F3 PILOT [F3 (A)] reports he was leading a pair of camouflage grey Tornado F3s [with the No2 to port] departing from Leuchars VFR under a FIS from DEPS, in VMC some 12000ft clear above cloud with an in-flight visibility of 30km. Heading 110° at 400kt during their initial climb to 17000ft RPS (1020mb), they commenced weapons' checks in accordance with SOPs. A top altitude clearance limit of 15000ft RPS (1020mb) was then given for the climb, against co-ordinated civil traffic at FL165. This was misheard and so he read the clearance limit back as 16000ft on 1020mb; this was not corrected by ATC who immediately handed them over to Boulmer. The check-in with Boulmer, which encompassed altitude clearances for the exercise and geographic position checks, was being carried out when he mistakenly passed the cleared altitude and continued to climb. During this they were under a RIS with Boulmer squawking A5131 with Mode C and had AI radar contact with the co-ordinated civil traffic from 10nm. They had reached 17000ft when Boulmer instructed them to descend back to 15000ft (1020mb). During this RT call they gained visual contact with the JS41 at 3½nm co-altitude to the L of the ac's nose and he immediately descended his jet as instructed. When visual with the civil traffic he assessed there was no horizontal collision risk and so did not need to adjust their ac's heading to avoid the airliner. Minimum horizontal separation was assessed as 2½nm at the same altitude and the risk of collision as “low” as they passed astern of the JS41. HISLs were on.

UKAB Note (1): This Airprox occurred outwith the period of activation of P18 (0530-0900), a Category 1 CDR. Thus it occurred in Class G airspace.

MIL ACC reports that the Tornado F3 pair [F3 (A) & F3 (B)] departed Leuchars on an air defence exercise. On departure the F3 pair was initially receiving a FIS from DEPS but was in radio contact with and under the control of CRC Boulmer Controller 3 (FC3) at the time of the Airprox. The JS41 was on a scheduled passenger flight from Durham/Tees Valley Airport to Aberdeen under a RAS from ScATCC (Mil) CON 4.

By 1037:33, DEPS had identified F3 (A) and F3 (B) and had initiated a handover to FC3. DEPS started the handover at 1037:56, stating '*Leuchars handover on [F3 (A) and F3 (B) C/S]*'. FC3 said '*Go ahead*', but at 1038:00, DEPS said to FC3 '*Just standby*', quickly followed by '*not above 15,000 1020*' in answer to a query from APP. At 1038:02, DEPS told FC3 '*This might be with co-ordination*' as, at exactly the same time, CON4 at ScATCC had observed F3 (A) and F3 (B) airborne from Leuchars and made contact with APP requesting, '*co-ordination 0201, 02 South East of Leuchars by 10 Eastbound*'. [UKAB Note (2): At this point, APP is talking to CON4 co-ordinating 'by proxy' and DEPS is talking to FC3, handing over the F3 pair on different landlines, who switched between talking to APP 'off-line', FC3 and F3 (A) on RT.] At 1038:05, DEPS said to FC3 '*Leuchars 150, 15 miles, heading..100, squawking 0201 and 02*', before immediately responding to APP, following CON4's initial request, saying '*not above 15000 feet Tyne 1020*', which APP passed to CON4. At 1038:10, CON4 said to APP '*15000 on 1020, okay request co-ordination then, traffic bears from Leuchars 130, 46 miles tracking North on a 4642*'. Whilst at 1038:11, FC3 replied to DEPS saying '*Good contact recycle [squawk] 5131 and 32 please*'. Responding to FC3, DEPS confirmed '*31 and 32*' (at 1038:14) and then passed on the squawks to the lead crew of F3 (A), which they acknowledged correctly. At the same time that the crew of F3 (A) was responding (1038:18), DEPS continued with the handover to FC3 stating '*Climbing 15000 on the Tyne 1020 flight information*'. APP acknowledged '*contact on the JS41*', and then CON4 continued at 1038:22, '*I'll.....eh.....maintaining FL 165*'. FC3 replied to DEPS

a second later saying 'Up to 15000 1020 flight information, eh, was [there] any co-ordination?'. At 1038:25, accepting co-ordination by proxy for DEPS, APP said to CON4, 'okay, so not below FL165, the....eh....previously called traffic is....just about to be handed over to Boulmer, squawking..5131, 32, co-ordination, not above 15000 feet, 1020. Okay that co-ordination has been handed over to Boulmer so.....'. At 1038:30, DEPS told FC3 'Just standby, Scottish are on the line now if you just hang on 1 second'. As FC3 responded with 'Yeah, no problem', at 1038:35, DEPS transmitted this co-ordination to F3 (A) flight C/S, '..there's traffic South East of you 30 miles Northbound Flight Level 165, for co-ordination maintain not above 15000 on 1020'. It took several sec for the crew of F3 (A) to respond saying 'Not above [UKAB Note: The DEPS RT transcript reflects at line 26 "?????" - unsure if the pilot reads back 15000 or 16000.] 1020 [F3 (A) C/S]'. (MIL ACC Note: In his report, the lead pilot of F3 (A) stated that he "... misheard the instruction and read back 16000 on 1020", but this was not picked up by ATC). At 1038:39, CON4 said 'Okay, so they're on a 5131 and 32 squawk', which APP confirmed and the conversation ended. At 1038:48, DEPS continued to hand over the F3's to FC3 stating 'Okay, okay the traffic [the JS41] is, where are we, north of MADAD 3 miles Northbound squawking 4642'. FC3 reported radar 'contact' on the ac so DEPS responded immediately saying 'Is not below flight level 1-6-5 traffic I'm handing you is not above 15000 on the Tyne 1020'. At 1039:01, FC3 read-back 'not above 15000 Tyne 1020 [F3 (A) C/S] identified to me please....on TAD22, back-up 65'. DEPS read-back the frequencies and both controllers signed off, whereupon DEPS switched the F3 pair to FC3's frequency at 1039:17.

At 1039:50, CON4 advised the JS41 crew '..traffic left 11 o'clock, 19 miles crossing left right, a pair, not above flight level 155, co-ordinated'. [UKAB Note (3): The JS41's level of FL165 equates to about 16710ft Tyne RPS (1020mb), thus 1710ft of vertical separation would have existed if the F3 crews had levelled at 15000ft RPS as instructed.] The JS41 crew responded to the traffic information 10sec after CON4's call, saying 'eh...that's copied, [JS41 C/S]'.

The F3 crews checked-in with FC3 at 1039:55 and, after checking the clarity of their radios, FC3, at 1040:04 transmitted '...you're identified Radar Information Service, limited below 7000, Flight Information Service below 5000 feet. Radar Control at and above flight level 245 outwith the confines of 613C'. At 1040:17, the crew of F3 (A) transmitted to FC3 '..flight copies and requesting VFR above 245'. FC3 responded at 1040:21, stating 'That's copied; you're VFR approved above Flight Level 245, not above 15,000 on the regional 1020. Your previous co-ordinated traffic [the JS41] is BRA [Bearing Range Altitude] 135/16 at flight level 165 heading North' to which the crew of F3 (A) reported "..contact..." [on their AI radar] before querying other traffic unrelated to this Airprox.

Over 1min later at 1041:38, FC3 asked the crew of F3 (A) 'Confirm you're.....(garbled).....16000? At 1041:44, FC3 instructed the crew of F3 (A) to 'descend, not above 15000 on the regional 1020. Co-ordinated traffic is nose 3 indicating flight level 165', which the F3 (A) crew acknowledged immediately at 1041:53.

Meanwhile, at 1041:32, CON4 transmitted [JS41 C/S], 'avoiding action turn right heading 040, traffic was to the Northwest 4 miles, converging has climbed through his level, turn right, 040'. It took the JS41 crew 8sec to respond to the avoiding action given by CON4, transmitting 'right 0-4-0 degrees, [JS41 C/S]' at 1041:40. At 1041:48, CON4 told the JS41 crew 'Traffic's now to the Northwest 1 - 2 miles, passing 400 feet above'. 10 sec later, the JS41 crew responded by transmitting their C/S.

Although a lengthy conversation between CON4, the JS41 crew and Boulmer followed, CON4's involvement with this incident effectively ends here. The only fact worth noting is that, at 1043:40, the JS41 crew confirmed that they did get a TCAS TA on the F3's. At 1041:59, FC3 transmitted '[F3 (A) C/S] show you descending now below FL165'. The F3 (A) crew replied 'Apologies [F3 (A) C/S] level', which FC3 acknowledged. A conversation between FC3 and the ScATCC (Mil) SUPERVISOR followed, during which they both agreed that F3 (A) had 'bust his level'.

Analysis of the Aberdeen radar shows that at 1041:12, the JS41 was 160° NEXUS 3-6nm, tracking 350°, indicating FL165. F3 (A) is in the JS41's left 10 o'clock, 8.9nm, tracking 135°, indicating FL147. F3 (B) is in the JS41's left, half past 10, 9.3nm, tracking 125°, indicating FL137. F3 (B) remains in F3 (A)'s left 9 o'clock - 1.4nm, for the duration of the Airprox. At 1041:19, the JS41 is maintaining a track of 350°, FL165. F3 (A) is in the JS41's left 10 o'clock, 7.6nm, tracking 115°, indicating NMC. F3 (B) is in the JS41's left, half past 10, 7.8nm, tracking 115°, indicating FL142. At 1041:27, the JS41 is still on a track of 350°, FL165. F3 (A) is in the JS41's left 10 o'clock, range 6.1nm, tracking 115°, indicating FL158. F3 (B) is in the JS41's left, half past 10, 6.5nm, tracking 115°, indicating FL148. At 1041:34, the JS41 is tracking 350°, FL165 (the avoiding action turn was given at 1041:32 and it is possible that, due to the radar update rate, the turn is not showing). F3 (A) is in the JS41's left 10 o'clock, 4.7nm, steady tracking 110°, indicating FL162. F3 (B) is in the JS41's left, half past 10, range 5.1nm, tracking

AIRPROX REPORT No 036/07

110°, indicating FL153. At 1041:42, the JS41 is in the right turn, passing through 360°, indicating FL165. F3 (A) is in the JS41's left 9 o'clock, 3.6nm, tracking 110°, indicating NMC. (Although the radar data does not show F3 (A)'s level, other evidence suggests that F3 (A) was at FL169 and was starting to descend.) F3 (B) is in the JS41's left, 10 o'clock, 3.9nm, tracking 110°, indicating FL153. At 1041:50, the JS41 is turning right, through 005°, indicating FL165. F3 (A) is in the JS41's left half past eight, 2.7nm, tracking 110°, indicating NMC. (Again, other evidence suggests that F3 (A) was in the descent from FL169 and that F3 (B) was at FL157). F3 (B) is in the JS41's left, 9 o'clock, 2.7nm, tracking 110°, indicating NMC. At 1041:58, the JS41 is passing through 020° and is indicating FL164. F3 (A) is in the JS41's left 7 o'clock, 2.3nm, tracking 110°, indicating FL161. On the radar data available, this is the CPA, with a vertical separation of 300ft evident between F3 (A) and the JS41. F3 (B) is in the JS41's left, 8 o'clock, 1.8nm away, tracking 110°, indicating FL151. At 1042:06, the JS41 is steady tracking 040°, indicating FL164. F3 (A) is in the JS41's 6 o'clock, 2.5nm, tracking 110°, indicating FL151. F3 (B) is in the JS41's 7 o'clock at a minimum range of 1.4nm, tracking 110°, indicating FL148. At 1042:14, the JS41 is still tracking 040°, at FL164. F3 (A) is in the JS41's 6 o'clock, 3.1nm, tracking 110°, indicating FL149. F3 (B) is in the JS41's 6 o'clock, 1.6nm, tracking 110°, indicating FL148. Thereafter, separation between the JS41 and the F3's continues to increase.

This Command considers that CON4 and DEPS correctly applied the relevant rules of JSP552, Sections 230 and 235 in respect to co-ordination and, in the case of CON4, the avoiding action turn. The potential for conflict was identified early, a sound course of action was agreed between CON4 and APP for DEPS 'by proxy' and this co-ordination was satisfactorily passed on to FC3. This Command commends the pilot of F3 (A) for submitting an honest and accurate account of the incident, which greatly assisted this investigation. He stated that he misheard the altitude restriction of '*not above 15000 on 1020*' and believes he read-back '*16000ft on 1020*'. This mistake was not spotted by DEPS due to the transmission being garbled. The pilot, in his report, goes on to say that he '*mistakenly passed the cleared altitude and continued to climb.*' Although the crew of F3 (A) read-back the co-ordination incorrectly to DEPS on RT at 1038:45, the correct 'not above' altitude restriction was passed to the crew by FC3 at 1040:21 - 1min 37sec before the CPA. FC3 had previously repeated the correct co-ordination when it was passed on by DEPS and correctly reiterated it to the F3 crews. The formation leader would normally be expected to pick up on the discrepancy between what altitude he thought he was cleared to and what he was being told the second time by FC3, but here he did not.

The following points are worthy of consideration by the Units/Sqn involved and the wider Controlling community:

The complex nature in which transmissions from CRC controllers are made to establish types of service may camouflage the cleared level.

Controllers need to be sure that co-ordination has been fully understood by the crews. Unless a clear, unambiguous reply is heard, the Controller should check again. From a Human Factors point of view, it may be that DEPS had 'Confirmation Bias' in that, because the controller was busy and because the response sounded like the one expected, it was assumed it had been repeated correctly.

Although listening to the same frequency, the navigator of F3 (A) and the crew of F3 (B) did not query the level that the formation was cleared to at any point before or during the critical point when F3 (A) climbed above 15000ft. This was despite them (probably) hearing F3 (A) incorrectly reading back the co-ordinated altitude earlier and the crew of F3 (B) seemingly complying with the co-ordination. There was no evidence available to determine whether the crew of F3 (A) and F3 (B) were in contact on a discrete 'inter-cockpit' frequency. This incident could be used in future training to highlight the need for teamwork and communication between crews within a formation.

UKAB Note (4): In a subsequent telephone discussion with the lead F3 pilot, it was reported that the recording from his ac's cockpit voice recorder was unclear at the moment of the readback transmission. However, the pilot reaffirmed his frankly held belief that he had read-back 16000ft to LEU DEPS. It was also ascertained that the No2 ac's radios were not operating entirely satisfactorily, which might explain why the crew of F3 (B) did not counter the undetected readback error when first transmitted nor when the altitude restriction was reiterated by FC3.

THE TORNADO F MK3 PILOT'S UNIT comments that this was a preventable 'level bust' because the formation leader, in this case the pilot concerned, commenced weapons' checks at a time that caused him to be distracted from flying the ac safely. However, as the crew were both radar contact and visual with the civil traffic, there was no collision risk.

HQ AIR (OPS) comments that it would appear that 4 people in the F3 formation misheard the cleared altitude issued by DEPS and confirmed by FC3 Boulmer. Also, DEPS did not challenge the reply, which would appear to have been garbled. This, combined with the F3 lead crew completion of their weapons checks distracting them from the RT (as suggested by the several seconds of delay before the reply) and the plethora of information always passed by CRCs, set the scene for this level bust and Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It seemed that the very comprehensive report provided by Mil ACC had covered most areas of concern. The account from the leader of the F3 pair – F3 (A) – was a commendably frank and honest report and it was only from his account that it was apparent that he had misheard the level instruction issued by Leuchars DEPS and read-back 16000ft. As noted, this was not clearly evident from the transcript and the Board was briefed that even the digital recording separately provided to the UKAB had not resolved the matter. Similarly, the F3 pilot's unit had examined the cockpit voice recordings which were equally unclear in this respect. The Low Flying Advisor, himself an experienced F3 pilot, explained that the audio quality of the F3's main radio is known to be poor. Indeed it was said the F3's standby radio is significantly better and invariably intra-formation weapons checks are conducted using the standby set. Possibly a reason, therefore, as to why the crew of F3 (B) might have missed their leader's incorrect read-back. Whilst it was not possible to independently verify whether the pilot of F3 (A) had indeed read-back 16000ft and not the 15000ft transmitted by the controller, there was, however, no reason to doubt the veracity of the pilot's report. The Mil ACC Advisor briefed the Board that the Unit SATCO had accepted that Leuchars DEPS had apparently missed an incorrect read-back by the F3 leader which was the first link in the 'chain of events' which could potentially have been broken thereby avoiding the Airprox. The Board was briefed that a standards bulletin had been issued at Leuchars on this topic – not a new lesson but worthy of wider dissemination. However, it was clear from Mil ACC's report that the F3 formation's altitude restriction was correctly passed on in the co-ordination and reiterated after the 'check-in' by FC3 at 1040:21, stating '*...not above 15000 on the regional 1020*' and traffic information added about the JS41. It was evident that the crew of F3 (A) also reported '*..contact...*' on their AI radar at this point over 1½min before the CPA. Therefore, there was no reason for FC3 to suppose that the F3 crews would not comply with the altitude restriction and stop their climb safely below the JS41 that evidently they were aware of and had been co-ordinated above them maintaining FL165. However, the (F3 pilot) Low Flying Advisor opined that, in his view, the stop off transmission '*... not above 15,000 on the regional 1020*' was not specific enough and should have been stressed separately. Certainly, the Mil ACC report had expounded a view that the complex nature of FC3's transmissions – in conformity with current AD practice - to establish the type of service may have unintentionally camouflaged the cleared altitude. The ASACS Advisor briefed the Board that these transmissions are essential to the 'contract' established between the CRC and the crews at the time. He emphasised that there was a lot for the CRC controllers to include at the 'check-in' - Mode C verification, reiterating warnings on RoD/RoC apart from the ATS applied itself. It was explained that this Airprox had engendered a lot of discussion between ACC staff at HQ AIR, ASACS and the CRC about the length and complexity of these messages. Whilst Members recognised the difficulties for themselves, it seemed that this Airprox was a classic example of aircrews being passed essential control instructions and acknowledging them but, because they were 'buried' in a multitude of other information, either not registering or simply forgetting what they were required to do and thereby exceeding the acknowledged level. In essence this was what had occurred here and all this against the background of an ac radio of allegedly poor audio quality. Whilst this might be an over-simplification of a complex human factors issue, controller Members were clear that the initial transmission from a controller at an ATCRU, in response to a crews check-in after a radar handover, would have merely included the essential ATS and level information, perhaps emphasising the cleared level/altitude in a climbing/descending scenario. It was felt that simplification of initial calls to the essential safety critical information, of which the altitude restriction was the most important here, might possibly reduce the potential for such incidents. The ASACS Advisor explained that discussions on this topic are in progress but he acknowledged aircrews' concerns about the quantity of RT at this critical juncture.

That said, it was evident that despite the level instruction being passed twice by two different controllers, repeated traffic information, AI radar contact from a range of 10nm and visual contact with the JS41 at 3½nm, the F3 leader reports that he had reached 17000ft before Boulmer instructed them to descend back to 15000ft RPS (1020mb). On balance the Board recognised that the apparent undetected read-back error not pick-up by DEPS had been

AIRPROX REPORT No 036/07

countered by the later altitude restriction reiterated after the 'check-in' by FC3. Therefore, after an extensive debate the Board concluded unanimously, that this Airprox had resulted because the crew of Tornado F3 (A) climbed above their co-ordinated altitude into conflict with the JS41.

Turning to the inherent risk: although the lead pilot of F3 (A) reports they had reached 17000ft when Boulmer instructed them to descend back to 15000ft RPS (1020mb), it was not clear from the recorded radar data whether F3 (A) actually climbed above 16000ft RPS. This would have equated on the recording to 16210ft Mode C (1013mb) – FL162 - and the highest level shown during the period of the Airprox on the Great Dun Fell recording. Though F3 (B) clearly exceeded the altitude restriction the ac was not shown as high as the lead ac, the recording reflecting that the wingman ascended to a maximum indicated level of FL153 – broadly 15510ft RPS (1020mb) - before a descent is evident. However, a couple of No Mode C indications (NMC) might hold the key here, suggesting perhaps a rapid RoD by both jets to their co-ordinated altitude. There was, however, no data to support that the pair climbed as high as the leader's candid report suggests.

From their perspective the JS41 crew had merely complied with ATC instructions and were aware of the approaching jets from the traffic information provided by CON4 under the RAS. Clearly the alert ScATCC (Mil) controller had identified the potential for a conflict from the outset and wisely taken decisive and early action to co-ordinate and separate these two tracks. Whilst any climb above FL148 Mode C should have indicated to the controller that the jets had exceeded their co-ordinated altitude restriction [FL150 when taking into account the rules for level occupancy based on SSR Mode C] CON4's sound plan was thwarted when he subsequently detected the F3's climb as the jets passed FL160. This gave little time to act but the avoiding action turn was promptly transmitted at 1041:32 by CON4 just as standard horizontal separation was being eroded. Clearly CON4 could have done little more as the avoiding action R turn was clearly the best resolution option available, backed up importantly with a further call of traffic information to warn the JS41 crews as to what had happened. The Board commended CON4 for his swift reaction but it was equally clear that FC3's query to the F3 leader followed only 6sec later and by 1041:44, FC3 was instructing the crew of F3 (A) to descend back to 15000ft, the descent being clearly evident on the recording 14 sec later. Given the data update rate of 8sec for the Great Dun Fell Radar and the effects of Mode C lag it was probable that the F3 crew had initiated this significantly earlier than might be suggested but it was evident they had also spotted the JS41 visually by this point. The F3 leader's account had stated he gained visual contact with the JS41 at 3½nm co-altitude to the L of the ac's nose and immediately descended his jet as instructed, the radar recording illustrating that F3 (A) was always passing astern of the JS41. Whilst the JS41 crew had not spotted the two F3's visually, they were also aware of the conflict from TCAS. Given the lead ac's CPA of 2.3nm to the JS41 whilst a minimum of 300ft below it, F3 (B) passed closer in azimuth but had achieved 1600ft of vertical separation at this point – again passing clear astern and possibly why no RA was enunciated by the JS41's TCAS, the latter's crew reporting that only a TA was received. Taking all these factors into account the Board concluded unanimously that no risk of a collision had existed in the circumstances conscientiously reported here for the benefit of the aviation community as a whole.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The crew of Tornado F3 (A) climbed above their coordinated altitude into conflict with the JS41.

Degree of Risk: C.

AIRPROX REPORT NO 037/07**Date/Time:** 14 Mar 1511**Position:** 5402N 00014W (7½nm SW of Flamborough Head)**Airspace:** Vale of York AIAA (Class: G)**Reporter:** CRC Boulmer**1st Ac****2nd Ac****Type:** Hawk x3

Typhoon x2

Operator: HQ AIR (Ops)

HQ AIR (Ops)

Alt/FL: 18000ft

FL180↑

RPS

Weather VMC NR

VMC NR

Visibility: 10km

Unrestricted

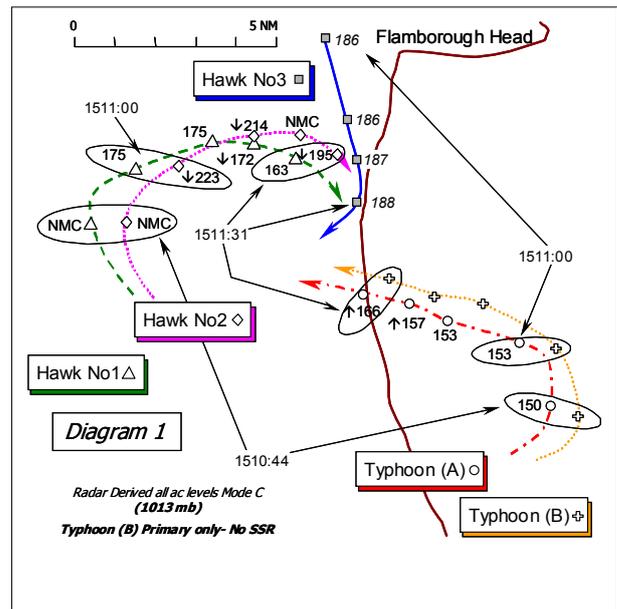
Reported Separation:

300ft V¼nm H

1000ft V½nm H

Recorded Separation:

Hawk No3 v Typhoon (B): <0.4nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE CRC BOULMER FIGHTER CONTROLLER (FC1) reports that he was controlling a 3-ship of Hawk ac in the Vale of York (VoY), operating within an altitude block of 7000ft – 24000ft TYNE RPS (1024mb). The weather in this airspace was good VMC and due to this the Hawk formation requested a RIS. The VoY was very busy and the traffic density caused him to have to 'knock-off' the first run. Furthermore, negotiations with various LATCC (Mil) control positions during all runs were increasing his workload further. Under guidance from his Fighter Allocator (FA), he limited the RIS but continued the sortie, pushing the intercept towards the coast where the traffic density was reduced. During the third inbound run the Hawks were aiming for a 'merge' in the vicinity of Flamborough Head. During this run, he observed an A6121 squawk [Typhoon (A)] about 10nm away heading towards their predicted 'merge' point and indicating 15000ft. When the Hawk crews were given a stranger warning under the RIS, they called "Tally, no threat well below" and continued into the 'merge'. At this point, as the A6121 track continued eastbound he felt that the ac was no longer a factor for the Hawks' merge.

After the Hawks had merged for their Air Combat Training (ACT), he observed the A6121 - which from traffic information he had earlier obtained was now known to be a pair of Typhoons - turn sharply NW straight towards the Hawk formations 'merge'. At range of around 7nm, he gave another RIS 'stranger' warning about the A6121 and shortly after that call - at about 3nm and under instructions from the FA - he 'knocked' the fight off due to the A6121. The radar plots merged and at that point he heard a 'pull high' call on the RT from one of the Hawk crews. This call led him to believe that separation had been eroded significantly which, at one point, he saw from his radar display was about 1nm horizontally and less than a 1000ft vertically.

THE CRC BOULMER FIGHTER ALLOCATOR (ALLOC) reports that he was supervising the 3-ship Hawk sortie in the Vale of York controlled by FC1, a student from the School of Fighter Control screened by a qualified instructor. The weather was relatively clear and a RIS was being provided as the pilots were flying under VFR. It became apparent very quickly that the VoY airspace was extremely busy with several VFR ac and up to 3 sorties working with LATCC (Mil) so he advised FC1 and the Instructor to try and negotiate some form of lateral separation with LATCC (Mil) to enable the Hawk formation to perform their ACT. However, the first run was knocked off due to the ac being unable to find clear airspace at their merge. Negotiations with LATCC (Mil) Controllers 12, 13 and 14 continued throughout the next 2 runs, while FC1 was instructed to vector the Hawk formation further E over the coast where the airspace was clearer. During this period he instructed FC1 to limit his service due to traffic density. As the third run commenced he believed that the area for the merge - around Flamborough Head - seemed to be remaining clear enough to perform ACT. He kept a close liaison with the instructor to ensure he was watching for potential conflicting traffic. When the Hawk formation were approx 20nm range he observed 2 ac working with LATCC (Mil) Controller 12 head E from the VoY towards the EGD323 complex. They were flying relatively straight

AIRPROX REPORT No 037/07

and level and 3000ft below the southerly pair of the Hawk formation that was flying N. FC1 called the conflicting traffic to the S of the Hawk pair who replied, "tally below, no factor", so he was satisfied that this conflicting formation would not be a factor at the merge. However, when the Hawk formation subsequently merged approx 15nm NW of the previously-called LATCC (Mil) track [the Typhoon pair], these 2 ac proceeded to turn sharply NW and climbed directly towards the merge point. FC1 called the traffic in at 7nm and was instructed to knock the fight off at 3nm. A "pull-high" call was heard from one of the Hawk formation, indicating that separation had rapidly eroded. Subsequently, in discussion with the instructor, he was told that information had been obtained previously from LATCC (Mil) on this traffic - a pair of Typhoons - that were going to operate in Operational Training Area (OTA) F, not the VoY. This traffic information was not updated by LATCC (Mil) or questioned by FC1 once it was apparent that these details were no longer correct.

THE HAWK PILOT reports he was No1 of a formation of 3 hi-conspicuity black Hawk ac carrying out a '2v1' air combat exercise under VFR in the VoY area. Operating under an Air Defence Information Service [but actually under a RIS from CRC Boulmer], the assigned code of A5111 was selected with Mode C on [No2 – A5112; No3 – A5113].

Whilst operating in company with Hawk No2 to intercept the 'bandit' – Hawk No3 - the FC called unknown traffic 10nm S of the 'merge'. Unseen by him at the time, the unknown traffic [the Typhoon pair] had turned N and climbed. During the 2v1 air combat at 300kt at 18000ft, a 'knock it off' was called [by FC1]. Simultaneously, having observed the proximity of the Typhoons, Hawk No2 called Hawk No3 to roll level and pull up. There was a "high" risk of collision. In his view, the miss distances reported by the lead Typhoon pilot might not be in respect of the actual Airprox ac – Hawk No3 - but rather on Hawk No1, the "free man". The Typhoon pair crossed obliquely ahead of Hawk No3 from L – R at a minimum range of ¼ nm about 300ft below it.

THE TYPHOON PILOT reports he was leading a pair of Typhoon jets outbound from Coningsby for a training sortie under VFR in VMC. A RIS was being provided by LATCC (Mil) and the assigned code was selected with Mode C; Mode S was off. TCAS is not fitted.

Some 40nm to the N of Coningsby over the VoY at about 1510:30, the Typhoon pair were heading E at FL150. During a left hand turn passing through 336° the LONDON MIL controller advised of "...traffic northwest 5nm tracking south indicating FL1-9-0". He, as the lead Typhoon [(A)], achieved an AI radar lock on traffic bearing 340° at 7nm as they rolled-out on their planned departure heading of 290°. When steady heading 290°(M) a climb was initiated to FL250 at 350kt maintaining radar contact on the reported traffic. Passing FL180 in the climb heading 290° at 1511:38, the reported traffic was spotted visually 4nm to the N and clear of the Typhoon pair. The reported traffic was identified as Hawk ac conducting a 3-ship visual ACT merge and were observed to continue manoeuvring no closer than 2nm to his Typhoon pair, separated vertically by 1000ft. No avoiding action was taken – the other ac were clear visually – so the climb was continued to FL250 and the other ac passed-by with a "low" risk of a collision.

UKAB Note (1): In a later telephone conversation the lead Typhoon pilot expressed concern at not being informed about the other 2 Hawk ac as he expected to see only one ac at FL190 and had planned to restrict his climb to FL180 until he was visual with the reported traffic. All three Hawk ac were however spotted visually by both the lead Typhoon pilot and his wingman. He reaffirmed his view that the nearest Hawk was no closer than 2nm from his formation.

LATCC (MIL) CONTROLLER 12 (LON12) reports that the Typhoon pair had been pre-noted out of Coningsby climbing to FL150 underneath Y70 as per SOP. After being handed over the pair were identified and though held low initially because of concerns over civil traffic, the Typhoon pair were given a climb. Following the instruction to climb the Typhoon leader informed him that his wingman No2 had a slight gear problem. Asked if he wanted to declare an emergency, the lead pilot declined but wished to maintain a northerly heading and remain at FL150. The Typhoon leader then requested to turn L to OTA F but he quickly changed his mind and requested if they could route over to the Sea to go 'feet wet'. No explanation was given for this request which was agreed and they were given 'own navigation'. It was at this point that the controller tried to establish if the Typhoon pair had sorted out the problem and were changing their sortie profile. The lead pilot replied that they wanted to continue with the sortie and climb to FL250 towards Appleby. At this stage a 'conflictor' was called to the NW of the Typhoon pair tracking S at FL190, upon which the lead Typhoon pilot called radar contact but not visual. The Typhoon pair were advised to climb at their own discretion and then later requested confirmation if they had a clearance to climb to

FL250 which was confirmed. The STCA alert was not seen to go off, the Typhoon pair continuing on a westerly track and descending to low-level in the Appleby Lakes area.

THE HAWK PILOTS' STATION COMMENTS that the Hawk leader's report was submitted some time after the event and in response to the CRC's report: it is acknowledged that the Hawk crew should have raised the initial report. This incident has highlighted the issues regarding the provision of ATC and AD services in the busy VoY airspace. The Hawk formation was carrying out a legitimate 2v1 air combat exercise in Class G airspace under a radar service from Boulmer. The CRC had declared that they were unable to continue with provision of an air defence information service [RIS] owing to high traffic density. Although the CRC controller's calls gave awareness of the Typhoons' presence in the area, the Hawk crews elected to continue with the visual element of their exercise. It is not clear whether the Typhoons had been given similar situational awareness on the proximity of the Hawk formation by their controlling ATSU. Indeed it is suspected that the Typhoon formation may not have been aware of all 3 Hawks and had thus passed extremely close to Hawk No3.

It is disappointing that this avoidable incident occurred between ac receiving radar services from an ATCRU/AD Unit - wearing squawks from the respective agencies - and that no coordination was achieved between those controllers. This regrettable incident should not have occurred, and we have been fortunate that we can try to pull some lessons out of the event.

MIL ACC reports that the formation of 3 Hawks - Hawks No1, No2 and No3 - were conducting air combat training over the VoY whilst receiving a RIS, limited due to high traffic density, from CRC Boulmer FC1. The Typhoon pair - Typhoons (A) & (B) - had departed from Coningsby and, having resolved an undercarriage problem, were routing to OTA F under a RIS from LATCC (Mil) Controller 12 (LON12). The Hawk Formation was already in contact with FC1 and receiving a RIS limited below 7000ft and a FIS below 5000ft. The very busy RT would suggest that the airspace was very congested with multiple fast jet formations manoeuvring in the area. Some 20min before the Airprox at 1449:21, FC1 stated, "[Hawk Formation C/S] *..plan is to run you on [to] the East Coast where the clear air is...*". Having deconflicted the Hawk Formation from a group of F15s, FC1 limited the service at 1458:30 stating, "[Hawk Formation C/S] *limited services my traffic density this time*", stating later at 1504:36 that there was "*...clear airspace Flamborough Head.*" FC1 passed traffic information at 1505:12, [over 6 min before the Airprox occurred] addressed to Hawk No1 and No2 "*..one stranger [the Typhoon pair] BRA 210/9, tracks north, 15000*", which Hawk No2 acknowledged, "*...looking.*" FC1 then instructed Hawk No1 and No2 to turn left Eastbound for the split. FC1 restated at 1505:39, "[Hawk Formation C/S] *clear airspace overhead Flamborough Head Left east planning will clear you east of stranger traffic to the West.*" A tactical conversation followed between the Hawk formation crews and FC1 during which, at 1506:06, FC1's Assistant (FCA1) spoke to LON12's Assistant (ASSTLON12) and requested, "*..traffic information, 6121 please?*" ASSTLON12 replied, "*It's a flight of 2 Typhoons. They are heading into OTA Foxtrot, FL150, Radar Information [Typhoon (B)] has a slight gear problem.*" After acknowledging this the conversation ended. [Meanwhile, Hawk No3 turned onto a Southerly heading, inbound "*..as bandit*" at 1506:12 over 35nm to the N of the merge.] FC1 restated that the Flamborough Head area was clear at 1507:32, but just over 1min later at 1508:42, FC1 then passed further traffic information to Hawk No2 and No1 [that were operating together] "*..further stranger [the Typhoon Pair] BRA 280/7, turns towards, 15000.*" Hawk No2 replied, "*..copied..*". [At this point Hawk No3 is Southbound some 31nm N by W of Hawk No1 & 2 and some 26nm N by E of the Typhoon pair]. FC1 passed the 'picture' and other tactical information to Hawk No2 and No1 [about the bandit - Hawk No3]. At 1509:14 [2½min before the Airprox], FC1 stated, "[Hawk No2 and No1 C/Ss] *previous called stranger [the Typhoon pair] now..BRA 340/2 tracks East Flight Level 1-5-0.*" Hawk No2 crew responded, "[Hawk Formation C/S] *looking.*" Moments later at 1509:25, Hawk No1 stated, "*tally below, no threat*" followed by an unreadable short transmission. There then followed tactical information [to Hawks No1 & 2 from FC1 about Hawk No3] for 1½mins.

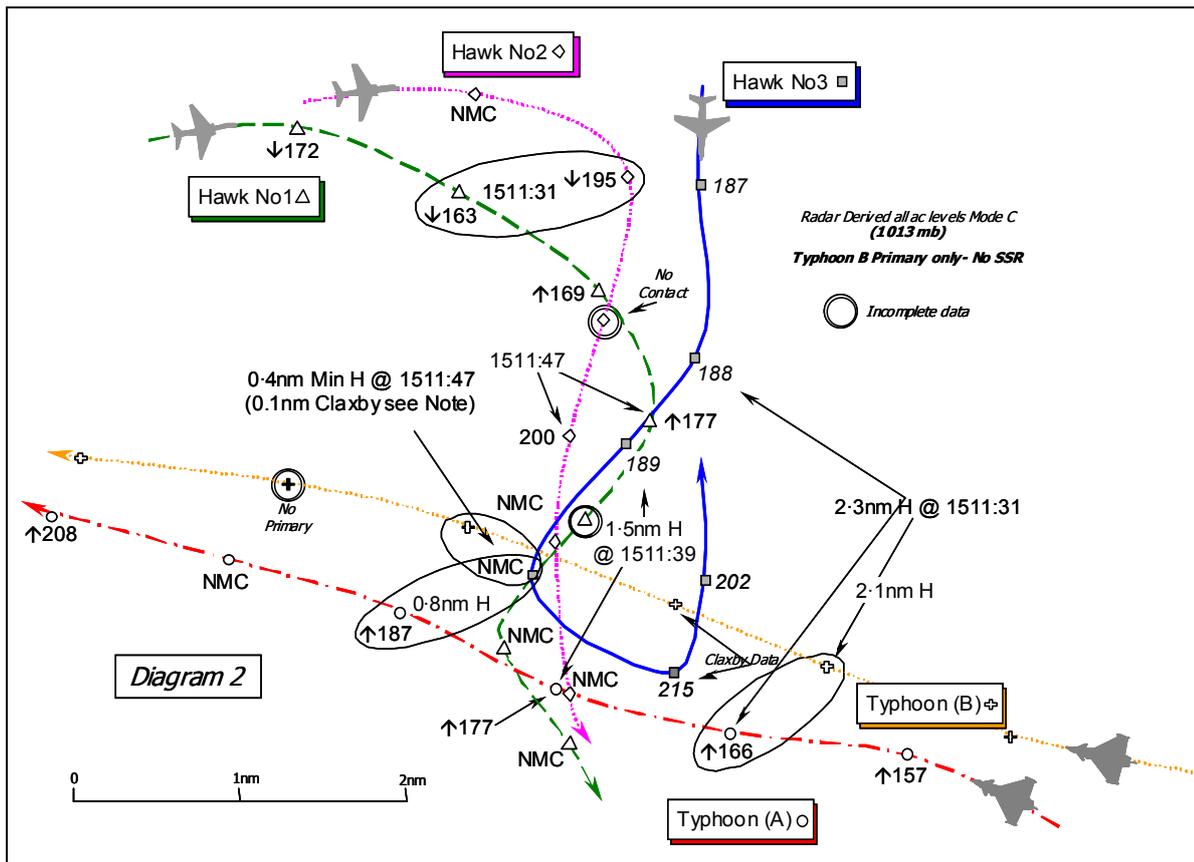
Just after 1510:44, LON12 queried the Typhoon pair "*..are you still trying to sort the [undercarriage] snag out at the moment.*" The Typhoon formation leader replied, "*..no we'd like to come left heading 292 for OTA F.*" LON12 responded, "*Roger, right turn is approved. Are you still looking to transit at FL150 or are you looking for higher?*" The lead Typhoon pilot stated at 1511:02, "*We are coming left at this time. Requesting FL250.*" In reply, at 1511:08 LON12 instructed the pair "*..roger left turn approved and traffic North West range of 5 miles tracking South indicating FL1-9-0. At your discretion climb FL2-5-0.*" The Typhoon lead pilot replied, "*Radar Information and climbing heading 291. Apologies, radar contact with that traffic*", which LON12 acknowledged.

The No1 Hawk reported "*..tally*" on the 'bandit' Hawk No3 just inside a range of 7nm at 1510:55, but the No2 reported "*2 no joy*". Whereupon FC1 [broadcast to Hawk No1 & 2] at 1511:02, "*One stranger [the Typhoon pair]*

AIRPROX REPORT No 037/07

BRA 160/7 turns towards 15000. Hawk No2 crew then reported “..tally” [probably meaning visual contact on the ‘bandit’ Hawk No3 and confirmed in a conversation with the lead Hawk pilot]. There was a further tactical interchange between the crews of Hawk No1 & 2 [as the latter engaged No3] until at 1511:24, FC1 transmitted, “[Hawk Formation C/S] knock it off knock it off.” The Hawk crews then all acknowledged, “2 knock it off”, “1 knock it off”, “3”, before at 1511:30 FC1 advised, “[Hawk Formation C/S] previous stranger manoeuvres towards, BRA 180/3”. Hawk No2 then transmitted at 1511:34, “3, roll out and pull high pull high pull high”, before adding “Eagles, just down your left hand side - pair.” There was then a distorted transmission before Hawk No2 clarified, “Sorry - Typhoons you’ve missed them both” whereupon Hawk No3 replied at 1511:44, “Yep visual.”

At 1511:57 the Typhoon leader asked, “LONDON [Typhoon Formation C/S] confirm we are cleared climb FL250?” LON12 replied, “..affirm Climb FL250”.



[UKAB Note (2) - See Diagram 1 at the top of this Report and Diagram 2 above. Analysis of the LATCC (Mil) Great Dun Fell (GDF) & Claxby (CLX) Radar recordings show the latter stages of the practice intercept between the Hawk formation as Hawk No3 is shown approaching from the N broadly level at FL185 before commencing a very gentle climb. Hawk No1 & 2 turn about – No1 about 1000ft beneath the No3 - with Hawk No2 descending from above as they prepare to engage Hawk No3 in ACM. Meanwhile the Typhoon pair – Typhoon (A) with Mode C but (B) as a primary contact only throughout about $\frac{3}{4}$ - 1nm apart - turned L from their short ‘loiter’ S of Flamborough Head and steadied WNW’ly in echelon starboard climbing from FL150 and converging on a point SW of Flamborough Head. Diagram 2 illustrates the close quarters encounter between Hawk No3 and Typhoon (B). At 1511:31, Hawk No3 turns right onto a track of 220°, indicating FL188, with No2 & No1 turning in astern, respectively above and below the ‘bandit’; Typhoon (B) is at L 10 o’clock - 2.1nm with Typhoon (A) climbing through FL166, 2.3nm away, 2200ft beneath Hawk No3. On the next sweep of the GDF at 1511:39, Typhoon (B) disappears but the CLX recording shows (B) in Hawk No3’s 10 o’clock 0.9nm, the latter indicating FL189; this is the last Mode C from Hawk No3 until after the CPA and perhaps indicative of a rapid climb. Typhoon (B) maintains course as it crosses through Hawk No3’s 12 o’clock from L to R – in between sweeps - and is shown at 1511:47, 0.4nm NW of Hawk No3 that meanwhile appears to be turning about L in response to the “pull up” warning from his playmate transmitted 13sec earlier. This is the CPA recorded on the GDF with Typhoon (B), the lead ac Typhoon (A) being 0.8nm to the SW climbing through FL187 – some 200ft below the last recorded Mode C

indication from the No3 8sec previously. However, the Claxby recording shows the No3 Hawk about 0.1nm due S of Typhoon (B) at this time - 1511:47 – but a code of A0000 is displayed suggesting unreliable data. Whilst this would correspond broadly with the geometry as reported by the Hawk pilot, the exact manoeuvre of the No3 Hawk at this moment as it is underflown by Typhoon (B) is thus difficult to determine with certainty. Nevertheless, Hawk No3 is shown at FL215 Mode C on the next sweep of the CLX – possibly just climbing above the Typhoon pair as (A) indicated NMC - whilst turning hard L onto a Northerly heading. The Typhoon pair is shown on the next sweep of the GDF still climbing steadily through FL208 as they clear to the WNW.]

Both FC1 and LON12 complied with JSP 552, 235.115 in respect of RIS. Both provided traffic information. In the case of LON12 this was 39 seconds before the CPA and was tied into the instruction to climb. However, this traffic information is somewhat inaccurate as Hawk No3, which is the nearest aircraft and fits the description best is in fact 10nm away [not as transmitted 5nm] and there is no mention of the fact that the confliction is with a formation of 3 ac. However, LON12's radar was set on 120nm range which may explain the range inaccuracy. This could have altered the perception of the Typhoon crews or drawn their lookout into the wrong area, whilst only searching for 1 ac. FC1 had passed traffic information to the Hawks on 5 occasions [but addressed to No1 & 2 in the main]. The traffic information was consistently accurate and may have lead to the spotting of the Typhoons by the crew of Hawk No2 who subsequently warned Hawk No3 of the hazard. However, it is worth noting that the traffic information was related to Hawks No1 & 2, which limited its usefulness to the crew of Hawk No3 who were operating independently [as the 'bandit'] from the other formation elements. This Airprox occurred under RIS and all crews were passed traffic information, but FC1's traffic information did not mention that the confliction was with a pair. The crew of Hawk No2 should be commended for their teamwork; their verbal warning may have prevented this incident becoming an accident. The ATM influences in this Airprox were contributory due to the incomplete nature of the traffic information. Neither controller mentioned that the conflicting traffic was a formation. The Station comments attached to the Hawk pilot's Airprox report are relevant. However, as both formations were under a RIS in uncontrolled and exceedingly busy airspace coordination may not have been achievable and the high rate of climb of the Typhoons could have limited the opportunity for their crews to see and avoid Hawk No3. Furthermore, crews are often reluctant to accept limitations on their activity when under RIS.

HQ AIR (OPS) comments that it would appear that, with hindsight, the Typhoon crews did not have situational awareness (SA) on all ac of the Hawk formation. Their SA could have been helped by more comprehensive traffic information from LATCC (Mil) LON12 prior to the climb.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the lead pilots of both formations, transcripts of the relevant RT frequencies, radar video recordings, reports from the air defence & air traffic controllers involved, together with reports from the appropriate AD/ATC and operating authorities.

The comprehensive reports conscientiously provided by all concerned here had shed considerable light on what was indeed a complex encounter between five fast-jet ac. Following discussions with the formation leaders involved, it was explained that both held an overarching concern about the level of service provided by their respective AD/ATS Units. This view was echoed by the Hawk pilots' Unit, which had stressed that even with both formations receiving a radar service these ac still flew into close quarters with one another. Indeed, Air Command had commented that more comprehensive traffic information from LON12 to the Typhoon pair about the three Hawk ac prior to their climb might well have had a significant impact on the eventual outcome of this Airprox. The Military ATC Area Control Member opined that when the traffic information on the Hawks was passed by LON12 to the Typhoon pilots, Hawks No1 & 2 were heading NE and probably not considered to be a factor: hence the traffic was not called as a formation with Hawk Nos1 & 2 separated from Hawk No3 by some 10-12nm. Nevertheless, it was disappointing that updated traffic information was not passed to the Typhoons by LON12 when Hawk Nos1 & 2 turned in towards the No3 and thus also towards the Typhoon pair. The CinC Fleet Member, himself an experienced area controller, questioned the wisdom of the wide split of LON12's traffic thus demanding the use of a large displayed range on his radar which might well have masked the presence of all of the formation elements. Nevertheless, all the Hawks were squawking sequential codes and should have been conspicuously apparent. However the Typhoon leader reported that he did have radar lock – apparently on Hawk No 3 - which was the ac to which Typhoon (B) got closest. It was clear to Controller Members that this was indeed a very busy piece of Class G airspace but the ASACS Force Command Advisor expressed a view that this was not always appreciated by aircrew who sometimes viewed their individual sorties aims, perhaps understandably, in isolation. But from the ASACS perspective, the Advisor stressed their goal was to draw, as much as possible, on the lessons

AIRPROX REPORT No 037/07

to be learned from this Airprox. Whereas the Hawk pilots' Station had commented that co-ordination might have been attempted, the LATCC (Mil) Member contended that fast-jet crews are very often reluctant to agree the imposition of any restrictions on their freedom of manoeuvre - such as a stop-off of level - which on a day such as this when the Vale of York was very busy makes co-ordination virtually impossible to achieve. The ASACS Advisor echoed this sentiment: clearly this was a training sortie and the Hawk crews were under remit to achieve the maximum benefit from it that, with ACT, can be very difficult. It might be that any restriction would not allow them to achieve their training aims: indeed, it had been shown that their ACT had been interrupted and the fight 'knocked-off' on several occasions. Nevertheless, under a RIS with manoeuvring traffic, co-ordination can only be achieved in the vertical plane. It seemed to a number of Members - controller and pilot alike - that crews did not fully appreciate the density of the surrounding traffic and the ATS/AD services provided, for if they adopted a slightly more flexible stance then the aims of the sortie might still be achieved to everyone's benefit - but here neither of the formations were asked to limit their levels nor did the controllers themselves attempt co-ordination.

The ASACS Advisor expressed a view that if the lead Typhoon pilot had known that the Hawks were engaged in ACT then he might well have delayed his formation's climb so as not to impede the Hawk's training. This would only be discovered through co-ordination or traffic information - yet clearly both the CRC and the ATCRU had spoken to one another about these two formation flights several minutes before the Airprox occurred albeit that nothing meaningful resulted. The Typhoons had been called to the Nos1 & 2 Hawk crews about 1½ min before the Airprox and they had reported seeing them, which led one civilian controller Member to question why the Hawk crews had not maintained situational awareness on them - a fair point. But another view was that controllers could be more proactive and the call from FC1's ASST could easily have mentioned the ACT to LON12 and perhaps co-ordination might have been mooted. However, at that stage with no immediate conflict evident to LON12 as the Typhoon pair progressed eastbound, it probably seemed unnecessary. As it was the Typhoon's subsequent about turn and climb resulted in a conflict and the subsequent 'knock-it off' call. It was most unfortunate that FC1's assistant had not stressed to LON12 that ACT was in progress with the three-ship formation that might have led the controller to appreciate more fully the potential for more widespread manoeuvring as the pair engaged the No3. As it was, with the traffic information provided by LON12 to the Typhoon pilots highlighting only one of the Hawk formation and the Typhoon leader apparently locking up only one ac, it was clear he had no warning of the three ac fully engaged in ACT at the time as the Typhoon pair climbed up towards them. But Members still could not reconcile this with flying his formation so close when apparently all three Hawks had been spotted. The Typhoon leader had reaffirmed that all three Hawk ac had been sighted by both his wingman and himself and they had passed about 2nm away at the closest point, but the radar recording actually reflected that this was not the case. There was evidently no more than 0.4nm between the No3 Hawk and Typhoon (B) with Typhoon (A) 0.8nm away as the pair crossed close ahead of the 'Bandit' Hawk. Thus the Command's view was that it appeared that the Typhoon pilots did not have situational awareness on all ac of the Hawk formation. Some Members suggested that holding the Typhoons below the Hawks for a little longer before permitting their climb was surely not too great an imposition. An Advisor, himself an experienced F3 air defence pilot, expressed the view that if the Typhoons had locked up one of the Hawks they should have soon found the other two on their AI radar very quickly. In his view, it seemed that the Typhoon pair had paid scant regard to the Hawks and just climbed steadily on up through the latter formation, perhaps unaware of the location of all of the trainer jets engaged in ACT until a late stage. Clearly if the traffic information from LON12 had been more descriptive it might have helped, but the Mil ACC Advisor explained here that military controllers are not mandated to pass traffic information about elements of formations and there was little advice to controllers in JSPs. The Board was pleased to note that as a result of this Airprox, the Command was reviewing the appropriate guidance on this topic.

The comprehensive Mil ACC report had shown that the traffic information given by LON12 to the Typhoon pair 39secs before the CPA was somewhat inaccurate and made no mention of 3ac operating along their desired route to the NW. On the other hand whilst the traffic information issued by FC1 to the Hawk crews was consistently timely and generally accurate, it was evident that this was addressed mainly to Hawks No1 & 2, which limited its usefulness to the crew of Hawk No3, who were operating independently from the other formation elements. Thus the crew of Hawk No3 were not well served under the RIS ostensibly provided and, moreover, FC1's traffic information did not mention that the conflict was with two ac. Clearly, the Typhoon pair's turn on track and climb was the catalyst that set up the conflict with the 3-ship of Hawks just before the No1 & 2 also turned and engaged the No3 in air combat. But it was not until 1511:02 that the Hawk crews received the message that a single jet was approaching, "One stranger." that was closing rapidly from some 7nm away as the No1 & 2 turned R towards them, illustrating that FC1 was obviously not aware of the non-squawking Typhoon (B) at that point. However, the fact that it was actually a pair was known to FC1's assistant before the Airprox through the information provided by LON12 but it would seem this fact did not get through to his controller, or if it did, it was forgotten. This call,

however, in all probability prompted the crew of Hawk No2 into looking for and spotting the Typhoons and subsequently warning the crew of Hawk No3 of the hazard. Controller Members concurred with the Command's view that the incomplete nature of the traffic information – from both LON12 & FC1 - had influenced this Airprox, leading the Board to agree that the omission of a key element of traffic information by both controllers involved here had been a contributory factor in this Airprox. However, under the RIS that pertained in this 'see and avoid' environment it was clearly the responsibility of the respective acs' crews to resolve any conflict that developed and avoid each other's ac by an adequate margin. Weighing all these points carefully for relevance, after a thorough debate the Board agreed that this Airprox had resulted from a conflict in the Vale of York AIAA resolved by the Hawk crews.

At these close quarters with the pair climbing up through the Hawk formation's ACT, it seemed that FC1 had barely passed the 'knock it off' in time. Fortunately the No2 had spotted the Typhoon pair in time to warn his playmate – perhaps a useful CRM teaching point - for it seemed that the crew of No3 had not spotted the Typhoons any earlier. Given the proximity of all 5 ac with only limited warnings given beforehand, the outcome of this mêlée could certainly have been very different indeed. Nevertheless, the No2's timely warning had come just in time to alert the crew of Hawk No3 and this prevented an actual collision. At these close quarters with a closing speed in the order of 650kt, in the Boards' view the safety of the ac involved here had certainly been compromised.

As this all occurred in the Vale of York AIAA so the DAP Advisor briefed the Board that the Directorate had written to HQ Air Command about the relevance of differentiating this Airspace as an AIAA in the dense traffic commonly encountered throughout UK airspace today. Whilst there was clearly potential for a Safety Recommendation from the Board to review the breadth & content of traffic information provided by military controllers, especially when dealing with formations of ac, it was clear that such action was already in hand by Mil ACC. It was requested, therefore, that the Board be apprised of the outcome of this review, which the Mil ACC Advisor undertook to provide to the Director UKAB in the fullness of time. This wide-ranging debate closed with suggestions that crews might not be entirely cognisant of the intricacies of the radar services provided. Some Members questioned whether a proactive campaign to highlight exactly what crews can expect might be beneficial. However, whilst close liaison between pilots and controllers was invariably fruitful and engendered mutual understanding of each other's difficulties, the overwhelming view of the military Members was that no further action need be recommended in addition to the publishing of this report. Accepting this, the Board expressed the sincere view that it was imperative that the important lessons contained herein were heeded.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in the Vale of York AIAA resolved by the Hawk crews.

Contributory Factor: The omission of a key element of traffic information.

Degree of Risk: B.

AIRPROX REPORT No 038/07

AIRPROX REPORT NO 038/07

Date/Time: 2 Apr 1141

Position: 5149N 00001W (10nm SW Stansted - elev 348ft)

Airspace: LTMA/Stansted CTA (Class: A/D)

Reporting Ac Reported Ac
Type: A319 C182

Operator: CAT Civ Pte

Alt/FL: 3000ft 2200ft

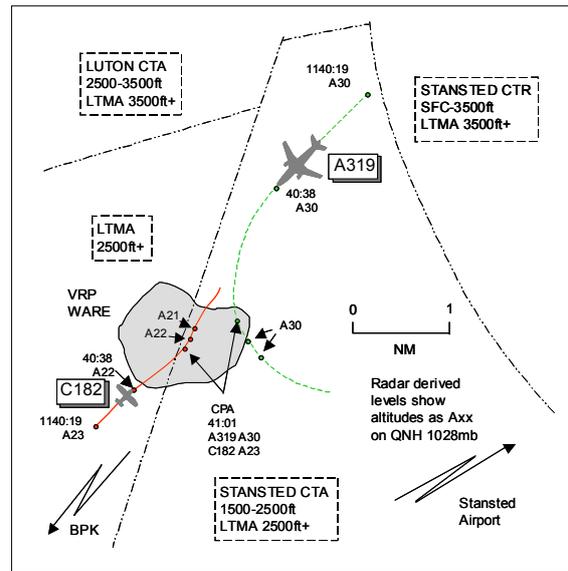
(QNH) (QNH 1029mb)

Weather VMC CLOC VMC HAZE

Visibility: 10km 6km

Reported Separation:
700ft V/NR H 2000ft V/few nm H

Recorded Separation:
700ft V/O-6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports that during vectoring for the ILS RW05 at Stansted heading 225° at 220kt just prior to turning base leg, they received a TCAS TA alert with traffic observed -700 and heading towards them. Almost simultaneously they received an RT call from Radar "avoiding action immediate left turn". The A/P was disconnected and bank angle was increased to slightly over 30° whilst turning onto the given radar heading. The A/P was re-engaged and the approach was continued to an uneventful landing. They were later advised by Radar that the other ac was uncontrolled GA traffic penetrating CAS. He assessed the risk as medium.

THE C182 PILOT reports flying enroute from Denham to Duxford, VFR squawking 7000 with Mode C. The visibility was 6km in haze and the ac was coloured white/blue with anti-collision and strobe lights switched on. Having thoroughly planned the flight and checked the NOTAMs, all went smoothly until after having exited the Elstree ATZ and passed BPK, he tried to contact Luton on 129-55MHz for a service. Heading NNE'ly at 120kt and 2200ft QNH 1029mb he was unable to establish contact so he tried Panshanger without success and after retrying Luton again he became aware that his radios might have become u/s. Using a spare handheld radio, he was in the process of setting it to the Luton frequency when he realised that he had strayed further E than he had planned. He immediately corrected his course to regain his track and saw an A319 turning in the distance, a few miles away and about 2000ft above, he thought. Eventually he got hold of Duxford who issued a squawk. After landing he went to the Tower and was told the squawk had been issued by Stansted ATC. He called the Stansted Duty Manager and apologised profusely for having just infringed CAS, explaining his problem with obtaining - without success - a service from Luton. The Manager told him that Luton had an unscheduled technical failure such that a service was not available during the period of his flight, the NOTAM being issued whilst he was airborne.

THE STANSTED FINAL DIRECTOR reports that whilst vectoring inbound ac towards final approach RW05, an unknown ac in the vicinity of BPK was seen to take up a track towards the Stansted CTA where the base level is 1500ft. Its progress was monitored and as soon as it crossed the CAS boundary line, avoiding action was given to the A319 which was descending to 3000ft on a conflicting heading before the usual base leg turn. The 'infringing' traffic was showing various altitudes between 2000 and 2300ft. The avoiding action was a L turn onto 090° with TI being given. The contacts did not merge and due to the size of airspace, the contacts were past each other quickly. The unknown ac was traced by the Group Supervisor (GS) N to Duxford and identified after being given a squawk. The pilot telephoned the GS N post flight and apologised for his actions - he was inside CAS for about 2-3min and as soon as realising his error, he turned out onto a N'ly heading. Also, the C182 pilot told the GS N that he had tried to contact Luton on 129-55MHz which was u/s at the time.

UKAB Note (1): Met Office archive data shows Luton and Stansted METARS as EGGW 1120Z 05012KT 5000 HZ SKC 14/06 Q1029= and EGSS 1120Z 06012KT CAVOK 15/05 Q1029=

ATSI reports that the A319 crew established contact with the Stansted FIN at 1136:20 when the ac was 10nm NE of Stansted passing FL86 for FL60. FIN advised the crew that they were No 2 in traffic and had 30 track miles to run to touchdown. At 1137:15, the FIN instructed the crew to turn L heading 225° and 50sec later cleared them to descend to 3000ft, to expedite the descent with no speed restriction. This was all correctly acknowledged. The A319 was now downwind LH for Stansted's RW05.

At 1140:20, the FIN instructed the crew to reduce to a normal ROD and slow down to 180kt. At this time, the A319 was 8nm WSW of Stansted level at 3000ft. The C182 was in the 11 o'clock position of the A319 at a range of 4.3nm, outside of CAS, displaying a Mode C reading of 2300ft. The FIN instructed the A319 crew to turn L heading 190°, when the C182 was still in the 11 o'clock position of the A319 at a range of 3.2nm and indicating 2200ft; still outside CAS and tracking NE.

At 1140:40, FIN transmitted "(A319 c/s) avoiding action I say again avoiding action turn left immediately heading zero nine zero degrees unknown traffic in your twelve o'clock range of two miles entering controlled airspace without permission indicating two thousand two hundred feet". The C182 had continued on its NE'y track, indicating 2200ft, and was less than 0.5nm outside of the Stansted CTA where the base is 1500ft. The C182 continued on its track and entered the CTA as the A319 followed the avoiding action and crossed from L to R across the nose of the C182. Analysis of the Stansted 10cm radar shows that as the A319 crossed through the 12 o'clock position of the C182 (1141:01), the distance between the ac was 0.6nm, with the C182 700ft below the A319. As the A319 continued with its avoiding action turn the C182 passed behind it and continued tracking NE bound before, at 1142:10, it turned L and tracked to leave CAS.

UKAB Note (2): AIS advise that a NOTAM was issued on 2nd April, following receipt of a request from LTCC at 1234UTC, promulgating frequency 129.55MHz as u/s until 9th April 1200UTC. This information was included within Pre-Flight Information Bulletin (PIB) including NOTAMs subsequently issued valid from 3rd April.

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 sympathised with the C182 pilot's predicament. Being unable to establish 2-way communications with Luton then Panshanger and again with Luton, he believed that his radio equipment had failed. Distracted whilst trying to resolve matters, the C182 pilot had unintentionally entered Class D airspace and flown into conflict with the A319 which had caused the Airprox. Pilot Members opined that instead of trying Panshanger – an A/G station which might not provoke an immediate response - a better alternative during this uncertain phase would have been a call to Stansted ATSU as the frequency is continuously manned. A Member noted that in situations such as occurred here, pilots should set priorities according to the old adage 'Aviate, Navigate, Communicate'.

Although this was in the event a slight penetration of CAS, the intentions of the C182 were completely unknown to the Stansted controller. Having noted the approaching radar return of the C182, the controller had monitored its track towards the CTA and then taken very prompt action by giving the A319 flight an 'avoiding action' L turn away from the conflicting ac. The A319 crew had already seen the C182 on TCAS and received a TA alert, continuing to monitor the situation as they followed the ATC instruction to turn L. The C182 pilot had noticed his navigation error and initiated a turn to vacate CAS whilst visually acquiring the airliner, he thought a few miles away and well above. The radar recording shows that separation reduced to 700ft vertically and 0.6nm horizontally at the CPA. Taking all of these elements into account, the Board concluded that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

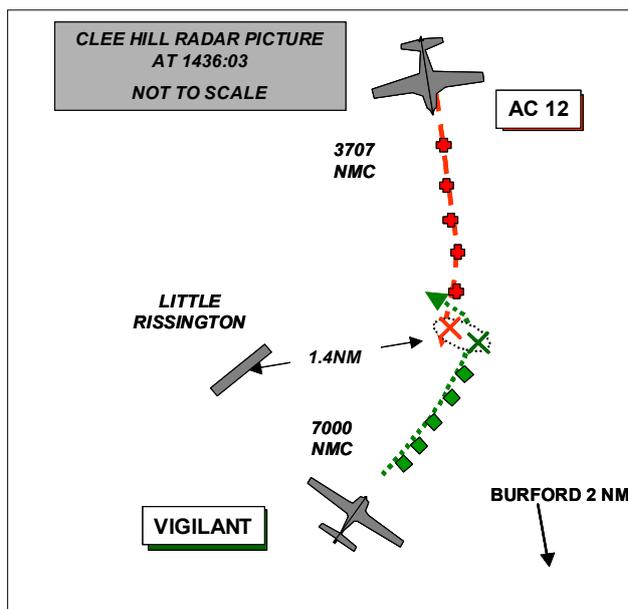
Cause: Whilst distracted by a radio problem, the C182 pilot unintentionally entered Class D airspace without clearance and flew into conflict with the A319.

Degree of Risk: C.

AIRPROX REPORT No 039/07

AIRPROX REPORT NO 039/07

Date/Time: 22 Apr 1436 (Sunday)
Position: 5152N 00142W (Little Rissington - elev 730 ft)
Airspace: Lon FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Vigilant T Mk1 AC12
Operator: HQ AIR (Trg) Civ Pte
Alt/FL: 800ft 1500ft↓
(QFE 994mb) (QFE 1009mb
Brize Norton)
Weather VMC CAVOK VMC HAZE
Visibility: 30km 7km
Reported Separation:
0ft V/250m H 100ft V/400m H
Recorded Separation:
NR V/0.2nm (380m) H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VIGILANT T MK1 PILOT reports that he was flying an instructional sortie at Little Rissington with an Air Cadet Trainee who was undergoing visual circuit training, as handling pilot. They were in a white ac with day-glo wing-stripes, with all lights switched on and squawking 7000, but Mode C was not fitted. They were downwind in the circuit for RW23 LH, heading 050° at 60kt, when a light ac crossed the end of the base leg from the N to S, at considerable speed, to track along the Stow-on-the-Wold to Burford Road (A424). The conflicting ac was seen just prior to the trainee pilot initiating the turn onto base leg. He (the instructor) took control of the ac in order to prevent a head on conflict and was about to take avoiding action but before he could do so the other ac made a sudden avoiding action turn to its right, into the airfield boundary, followed by regaining the A424 through the downwind leg of the visual circuit. An RT transmission was made to Rissington Radio which prompted the Duty Instructor to telephone Brize Radar to see if they were in communication with the ac.

He assessed the risk as being medium.

THE AC12 PILOT reports flying a private VFR flight returning from Wellesborne to Brize Norton [elev 288 ft] in a white ac with blue stripes, with strobes selected on, and squawking as directed with Mode C (he thought). At the time he saw the glider, 3/4nm away in his 11 o'clock, they were about 2nm NE of Little Rissington heading about 160° (into Sun) at 120kt on a standard Burford recovery which required them to be not above 1000ft QFE at Burford. Both ac made small adjustments of about 20° to the right (he thought) resulting in a low risk of collision.

UKAB Note (1): The incident shows clearly on the recording of the Clee Hill radar. The CPA occurs at 085°/1.4nm from Little Rissington. The AC12 can be seen tracking about 170° on a ground track that would have taken the ac about 1 1/2nm to the E of the centre of the airfield. It would seem that the pilot saw the glider as a right turn through about 20° is first evident when the ac are 1/2nm apart with the glider in the AC12's 1130 position. The glider is tracking 040° on his downwind leg about 1 1/2 nm from the centre of the airfield with the AC12 approaching from its 11 o'clock almost on a line of constant bearing. Neither ac displays Mode C data so the vertical separation cannot be determined positively.

UKAB Note (2): The METAR for Brize Norton was:

200704221450 METAR EGVN 221450Z 23007KT CAVOK 19/02 Q1018 BLU NOSIG=

UKAB Note (3): The glider reported being at 800ft on the Rissington QFE of 994mb; this equates to 1530ft amsl. The AC12 reported descending from 1500ft to 1000ft on the Brize QFE of 1009mb; this equates to descending from 1788ft to 1288ft amsl.

UKAB Note (4): Little Rissington is promulgated in the UKAIP (ENR 5-5-1-3) as a Glider Launch Site (by winch/ground tow and tug/motor glider). There are no horizontal or vertical limits published.

MIL ACC reports that a Vigilant T Mk1 was operating in the Little Rissington (gliding site) visual circuit in radio contact with Rissington Radio while an AC12, transiting from Wellesborne to RAF Brize Norton, was receiving a FIS from Brize LARS. At 1429:18, the AC12 pilot called LARS stating his callsign. LARS repeated the callsign and shortly afterwards the pilot transmitted '*Er good afternoon we're an AC twelve Rockwell Commander, two on board out of Wellesborne inbound to you request flight information, er, presently, er, Moreton in the Marsh*'. LARS replied '[AC12 C/S], *flight information squawk three seven zero seven*'. Eighteen sec later the AC12 pilot responded '*Three seven zero seven [AC12 C/S]*' and 5sec later LARS added, '*The Cotswold QNH one zero one four*', which the AC12 pilot acknowledged. After confirming the number of people on board the ac, LARS instructed the AC12 pilot to '*report Burford, field in sight for two six, er, left hand*'. The pilot repeated this instruction and at 1429:48 was told that '*The QFE one zero zero nine*', which is again repeated correctly. Several transmissions to other ac on frequency followed but were not related to the incident. At 1437:39, AC12 pilot called '[AC12 C/S], *er, Burford one thousand*', this being a standard VFR recovery to Brize from the North where ac will call overhead the town of Burford, not above 1000' QFE with the field in sight. At 1437:45, LARS responded saying '[AC12 C/S], *continue with tower one two three seven two five good day*', the pilot crew repeated the instruction 4sec later and switched to Brize TWR.

UKAB Note (5): An analysis of the Cleve Hill radar was provided but was the same as that above.

The LARS Controller had 3 speaking units on frequency when the incident occurred, one under a RIS and two on a FIS; consequently, the RIS was the priority track. From the tape transcript, the Controller was passing regular TI to the RIS track. The Controller complied with the rules of FIS in relation to the AC12, as laid down in JSP552 235.125.1 Para1. However, it might have helped the AC12 pilot's SA if he had been made aware that Little Rissington was active with motor-glidern. Although Brize ATC has the ability to select the Little Rissington Avoid 'on' or 'off' to reflect its status, the Controller did not tell the AC12 pilot that Little Rissington was active. HQ Air Command recommended that a review of the Burford VFR join be undertaken to see if inclusion of the status of Little Rissington would be beneficial. RAF Brize Norton agreed with HQ Air Command's recommendation: all controllers have been made aware via a standards bulletin of the need to pass the activity state at Little Rissington when controlling visual recoveries into Brize Norton via Burford.

HQ AIR (TRG) comments that from the moment of visual contact both crews had sufficient time to manoeuvre and avoid an actual collision. However, this type of occurrence is avoidable if pilots give a wide berth when operating near promulgated active glider launch sites and remain alert to the potential flying activity.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was noted that this incident occurred in Class G airspace but in the vicinity of a notified and active glider site. It was therefore the case that the see and avoid principle was the prime means of collision avoidance, the associated responsibility being shared equally between the pilots. Here, both pilots had seen the opposing ac but, as both reported, rather later than they would have wished. Members noted that the visibility into Sun had been reduced for the AC12 pilot and that although visibility down-Sun had been much better, the Vigilant instructor would most likely have been preoccupied with instructional aspects of his flight while turning base leg.

Specialist GA Members advised that it is always wise to give notified and active glider sites a wide berth since both powered ac and often very inconspicuous gliders operate almost anywhere in the vicinity. In this incident the AC12 pilot saw the glider in time to take late but effective avoiding action, so much so that Vigilant pilot who saw the AC12 as it was commencing its manoeuvre did not deem any further avoidance necessary.

AIRPROX REPORT No 039/07

The Board welcomed the review of the Burford VFR joining procedures and was informed by the HQ Air ACC Advisor that the review had been completed and the procedure amended to include the status of Little Rissington in the response to the joining request.

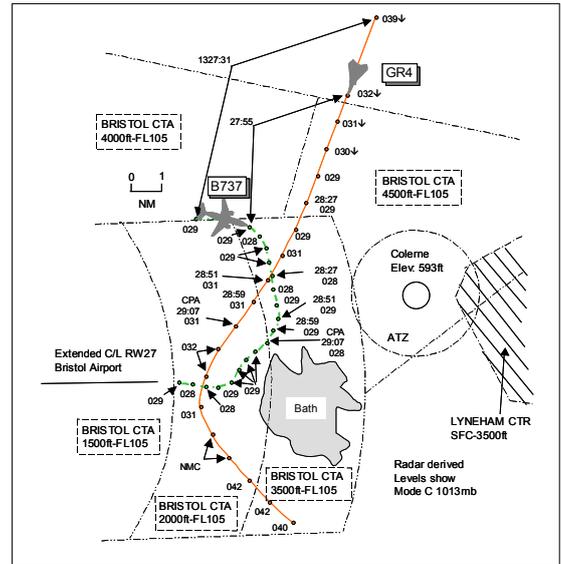
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both pilots.

Degree of Risk: C.

AIRPROX REPORT NO 040/07

Date/Time: 23 Apr 1329
Position: 5125N 00226W (11nm E Bristol International Airport - elev 622ft)
Airspace: CTA (Class: D)
Reporting Ac Reported Ac
Type: B737-700 GR4
Operator: CAT HQ AIR (Ops)
Alt/FL: 3000ft FL30
 (QNH 1018mb)
Weather IMC IICL VMC CLBL
Visibility: >10km
Reported Separation:
 200ft V/0.5nm H 500ft V/1nm H
Recorded Separation:
 300ft V/1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports inbound to Bristol IFR and in receipt of a RCS from Bristol Approach squawking an assigned code with Mode S. Level at 3000ft QNH on base leg to RW27 they were surprised by a TCAS TA alert as they never expected proximate traffic in CAS whilst receiving vectors for the ILS. Although flying mostly in IMC, the fighter, a Tornado, became briefly visible as it crossed the LLZ ahead of them, the CPA was 200ft vertically and 0.5nm horizontally. ATC issued an avoiding action vector after the crew had advised the controller of the traffic but by then they were visual with it. They assessed the risk as high. Apparently the military ac was incommunicado whilst flying through the Bristol FAT.

THE TORNADO GR4 PILOT reports that at 1321, following a transit through the Daventry Corridor at FL100 with Swanwick Mil, they were asked what type of service would be required for handover to Brize. A RAS was requested and acknowledged but following the handover, Brize stated a RIS but this was not acknowledged. Later, with busy RT, they offered to 'free call' Boscombe Radar and were given a squawk of 2651. Brize stated that a handover was underway so they told the controller "we will stay with you" which was acknowledged. By now they were flying at FL30 in VMC clear of cloud between layers with visibility >10km. He called 'tally' (inter-cockpit) on an ac on their nose, the subject B737 which was flying level on a similar heading, at 3nm at 1328:26 and following much RT chat at 1328:50 Brize asked "GR4 c/s are you still with me". They replied "Affirm and tally the B737 company" whilst the pilot increased separation by turning R. Minimum separation was 500ft vertically and 1nm horizontally. At 1329:44 Brize directed them to "Freecall Boscombe Down". He assessed the risk as low.

THE BRISTOL RADAR 1 reports the B737 was on base leg for RW27 at Bristol heading 180° at altitude 3000ft. Previously traffic had been seen operating to the NE of Bristol below the base of CAS and, owing to its position and altitude relative to the B737, was not reported. The B737 flight was given a closing heading of 230° and descent to 2500ft. She next coordinated airways traffic with Cardiff and then noticed traffic to the N of the B737 by approximately 2nm but labels were garbling. Simultaneously the B737 crew reported the traffic which appeared to be on a W'ly heading and fast moving, revealing to the controller a Boscombe SSR code and Mode C indicating altitude 3200ft and climbing. This was reported to the B737 flight which continued on its closing heading. The controller advised a heading of 180° if the B737 crew wished to avoid but they had the traffic visual and were happy to establish and continue the approach. The crew reported that the traffic was a Tornado and that they would be filing a report.

UKAB Note (1): Met Office archive data shows the Bristol METAR as EGGD 231320Z 22010KT 8000 BKN007 15/13 Q1018=

AIRPROX REPORT No 040/07

THE BRIZE LARS CONTROLLER reports that the GR4 was handed-over from LJAO 'Level FL100 RIS'. When the GR4 crew first called they had initiated descent to FL45 and requested further so LARS gave descent to 2000ft iaw the Radar Vectoring Chart. At this point the Tornado was coming into conflict with another ac which was in a climbing turn to join CAS 5nm N of MIMBI. TI was passed and on the 3rd time the GR4 crew reported visual. LARS asked the GR4 pilot to confirm if he was going to Salisbury Plain as this flight was taking a different route to the previous GR4 which had been on frequency not long beforehand; the pilot said he was. The GR4 pilot then called climbing to 4000ft 1009 to remain VMC which led LARS to believe that Wx may have prevented the GR4 from carrying out the whole transit at low level. At this point the GR4 was heading towards the Lyneham CTR so the Assistant rang Lyneham to arrange a procedural crossing or a handover, Lyneham agreeing to a procedural crossing at FL50. LARS instructed the GR4 flight to climb and report level at FL50 which was acknowledged and the flight continued its climb. However, LARS then saw traffic coming from the opposite direction at FL50 so the GR4 flight was stopped at FL45 to provide separation, assessing that there was enough time for the GR4 flight to achieve FL50 before transiting the CTR once it was clear of the approaching traffic or visual with it. TI was passed to the GR4 pilot who reported visual before stating that they were "*happy to freecall Boscombe Down*". This caused confusion as LARS had told the GR4 pilot that the climb was for a procedural crossing of the Lyneham CTR. LARS asked the pilot to confirm that he was transiting the CTR to which he replied that he did not intend to do so. As the flight had been pre-noted to Boscombe, LARS told the GR4 that his squawk would be 2651. After speaking to several other ac, LARS informed the GR4 pilot that he had been pre-noted and asked if he would prefer to stay on LARS frequency so that he could be handed-over - the pilot agreed. LARS believed that the GR4's intentions were to re-route through the gap between the Lyneham and Brize CTRs, as the previous GR4 had done, so the flight was given "*own navigation*". LARS then dealt with several other ac and in addition a landline call. On checking the GR4's progress no squawk was observed. At this point LARS thought that SSR filter over-ride was selected so that only Brize squawks were showing. LARS asked the GR4 pilot if he was still on frequency and he replied he was and was visual the B737 company ac in his L 10 o'clock at 1nm. LARS was still unable to see the GR4's squawk so the filter over-ride was deselected but the GR4's Brize squawk was still not seen. The Assistant spotted the GR4 now wearing 2651 within Bristol CAS. LARS asked the GR4 pilot to report his altitude and he replied FL30 to maintain VMC. LARS told the GR4 pilot that they were within CAS and asked if he wished to continue with Boscombe, feeling that it was better that they speak to Boscombe asap as the ac was wearing a Boscombe squawk and Bristol would already be in touch with Boscombe. LARS gave the GR4 pilot the Boscombe frequency and instructed him to remain outside CAS.

ATSI reports that the Bristol Radar 1 and Radar 2 positions were being operated in bandboxed configuration. The controller described her workload as light, consequently she did not consider the bandboxing to be a contributory factor to the Airprox.

The B737 flight established communication with Bristol Approach at 1320, when it was 28nm NW of Bristol Airport. The pilot reported descending to FL80, heading 135°. The flight was instructed to continue the heading and descend to 4500ft for positioning to the ILS RW27, No 2 in traffic. No 1 was another flight carrying out a training detail.

At 1325:30, the B737 flight was instructed to turn L heading 090°, for downwind (RH), and descend to 3000ft. At the time, the ac was level at 4500ft, 6.9nm NNE of the airport, within the Bristol CTA where the base is 4000ft. The radar at 1326:43 shows the B737 passing FL035 (3700ft QNH), tracking E along the northern edge of the CTA which extends from the CTR. An ac, subsequently traced as the Tornado, is 15.7nm NE of the B737, tracking SSW'ly, displaying a Brize Norton SSR squawk, with a Mode C readout equivalent to 4700ft. The controller commented that she had observed this ac out to the NE but there was no reason to suspect that it would, subsequently, approach Bristol's airspace.

The B737 continued to track along the CTA boundary and at 1327:30, the controller instructed the flight to turn R heading 180° for base leg, 15nm from touchdown. The radar shows the B737 at FL029 (3100ft QNH), still on the edge of the CTA, where the base to the S of the ac is 2000ft. However, by the time the turn commences the B737 is shown to have just left CAS (by approximately 0.5nm). It is level at FL029 (3100ft QNH), below the CTA where the base is 3500ft. As the R turn commences, the radar recording at 1327:55 shows the Tornado, now displaying a Boscombe Down squawk (2651), at FL032 (3400ft QNH), 5.3nm NE of the B737 and still tracking SSW'ly.

At 1328:30, the B737 flight, at FL028 (3000ft QNH) and still just outside CAS, was instructed to turn R heading 230°, to report established on the LLZ RW27. The radar shows the Tornado, at FL029 (3100ft QNH), 2.5nm behind the B737. Having acknowledged the instructions, the pilot commented (1328:51) "*we've traffic very close behind*

us and it appears to be the same level". The radar recordings show the Tornado, at FL031 (3300ft QNH), 1.3nm N of the B737, which is showing at FL029 (3100ft QNH). The controller responded *"affirm I'm just on the line to Boscombe now it's coming up as Boscombe traffic indicating altitude three thousand feet and climbing. If you wish to avoid turn left heading one eight zero degrees"*. The pilot replied *"Yeah left head one eight zero degrees B737 c/s and he doesn't appear to be climbing"*. By this time Bristol had contacted Boscombe by telephone and the Supervisor, having been asked about the 2651 squawk, advised *"we're not working that"*. The pilot of the B737 was informed and shortly afterwards reported visual with a Tornado.

The radar recordings show that the Tornado entered the Bristol CTA (base 2000ft) at 1328:59 (just after the B737's pilot commented about traffic behind at the same level and before ATC offered avoiding action). It was tracking SW'ly at FL031 (3300ft QNH). The B737 was in its R turn to establish on the ILS, 1.1nm to its SE, 200ft below.

[UKAB Note (2): The CPA occurs on the next radar sweep at 1329:07 as the Tornado at FL031 (3300ft QNH) overtakes the B737 at FL028 (3000ft QNH) on its RHS with 1nm lateral separation. Whilst the B737 continued on its closing heading for the ILS, the speed of the Tornado (ground speed in the region of 400kt) resulted in the horizontal distance between the ac increasing, with the vertical separation only changing by 100ft i.e. 1.2nm/200ft; 1.3nm/300ft; 1.6nm/300ft. By now the Tornado was passing ahead of the B737. The next sweep shows the Tornado tracking SSE'ly with NMC whilst the B737's track shows a slight L turn which may possibly be in response to the avoiding action turn offered by the Bristol controller or track jitter.]

The CPA during the Airprox occurred after the Tornado entered the Bristol CTA and the B737 was just entering the airspace on its closing heading. The Bristol MATS Part 2, reiterates the procedures stated in MATS Part 1, whereby *'Radar controllers shall ensure that IFR traffic, flight planned to remain within CAS, shall be vectored to remain within the Bristol/Cardiff CTA'*. Additionally, MATS Part 1, Section 1, Chapter 5, Page 2, states that *'Pilots must be advised if a radar service commences, terminates or changes when: a) they are operating outside controlled airspace; or b) they cross the boundary of controlled airspace'*. The controller said that she had not intended to route the B737 outside CAS. The turn onto base leg was too late to ensure it remained within the CTA. She thought that she might have been discussing traffic with Cardiff on the telephone at the time and this may have delayed the action. This may also explain why she did not observe the confliction between the subject ac. Bristol is not equipped with Short Term Conflict Alert. It is possible that if the Tornado had continued on its initial routing it might still have conflicted with the B737, even if the B737 had remained within CAS

The action to be taken by controllers, in response to unknown ac, is stated in the MATS Part 1, Section 1, Chapter 5 (also UK AIP ENR 1-6-1-1). In Class G airspace *'Under a Radar Advisory Service, pass traffic information followed by advice on avoiding action'*. In Class D airspace *'If radar derived, or other information, indicates that an aircraft is lost, has experienced radio failure or is making an unauthorised penetration of the airspace-avoiding action shall be given and traffic information shall be passed.'* Additionally *'When avoiding action is issued to an aircraft under a Radar Control Service, controllers must seek to achieve the required minima and pilots must comply with the instructions given. In these circumstances, pilots must comply with avoiding action even if they report visual with the other aircraft.'* Prior to both ac entering CAS, the B737 crew, technically being provided with a RAS, should have been told this for the APR was responsible for issuing positive avoiding action to try and achieve standard separation (5nm radar separation). The avoiding action turn issued was not a positive instruction, giving the pilot the option of a turn. Under the procedures, whereby both ac were in Class D airspace, this was an option not available either to the controller or to the pilot. The same MATS Part 1 Chapter as above states *'Controllers who observe that an aircraft using an assigned SSR code is, or is about to, make an unauthorised infringement of their airspace should attempt to contact the relevant agency to identify the aircraft and agree a course of action.'* On this occasion, it was arguably a late attempt to co-ordinate with Boscombe which was unsuccessful due to the Tornado, although displaying a Boscombe squawk, not being under that ATSU's control.

MIL ACC reports the B737 was inbound to Bristol under control of Bristol ATC under Radar Control. The Tornado GR4 was receiving a RIS from the Brize Norton LARS Controller (LARS) descending from FL100; inbound to the Salisbury Plain area. The GR4 was pre-noted to the LARS assistant at 1309:25, Swanwick (Mil) stating, *"LJAO Central planner, pre-note on a low level let down out of the corridor for the Salisbury area, GR4 c/s."* LARS Assistant read back the c/s and Swanwick (Mil) continued, *"Single Tornado on a six four zero three."* LARS Assistant instructed, *"Roger, Brize squawk three seven one two."* Swanwick (Mil) read back the squawk correctly and signed off at 1309:41. There is then a period of unrelated RT until 1321:30 when Swanwick (Mil) calls with the handover and states, *"LJAO Central Planner, handover GR4 c/s flight."* LARS reads back the c/s and

AIRPROX REPORT No 040/07

Swanwick (Mil) states, "Brize three five five at fifteen miles tracking south west at the moment squawking three seven one two." LARS calls, "Contact." Swanwick (Mil) continues, "Flight Level one hundred, Radar Information." LARS confirms, "Flight Level one hundred, Radar Information, GR4 c/s flight identified, contact Brize Radar one two four decimal two seven five." Swanwick (Mil) read back the frequency and signed-off, LARS signs-off at 1321:55. Over the next 30sec there are 6 transmissions to other ac before the GR4 crew call at 1322:24, "Brize GR4 c/s." LARS responded, "GR4 c/s er good afternoon Brize radar identified descending Radar Information confirm your level descending to?" GR4 crew reply, "?Kay? we're cleared to er four five request lower GR4 c/s." LARS Assistant calls Boscombe Down (ZONE) who answers the line at 1322:35, "Boscombe Zone." LARS Assistant states, "Brize LARS, pre-note for low level let down Salisbury, GR4 c/s." LARS then transmits to GR4 c/s, "GR4 c/s Roger set the Brize QFE one zero zero nine descend report level two thousand feet." ZONE says to LARS Assistant, "Zone's on, go ahead." LARS Assistant continues, "Single Tornado, Marham to Salisbury on a three seven one two." GR4 crew transmit, "Two thousand feet one double oh nine GR4 c/s." ZONE replies to LARS Assistant, "GR4 c/s, Tornado, Marham to SPTA, ah three seven zero two was that?" LARS Assistant restates, "Three seven one two." ZONE confirms, "Three seven one two, beg your pardon, ah roger squawk please two six five one." LARS Assistant reads-back the correct squawk and signs-off, ZONE signs-off at 1323:04. There are then 3 unrelated transmissions until LARS calls unrelated traffic at 1323:18 and after no initial response once again calls the traffic at 1323:36, this time the GR4 crew reply. There are 2 more unrelated calls before further TI is passed at 1323:59 and the GR4 crew report visual. At 1324:22 LARS asks, "GR4 c/s, confirm you're going to Salisbury plain?" GR4 crew reply, "Affirm GR4 c/s." Benson then attempt to hand an ac over and there is a brief passage of RT before GR4 crew call at 1324:52, "Brize GR4 c/s climbing four thousand feet to maintain victor mike." After instructing Benson to standby, LARS responds, "GR4 c/s apologies on the er landline say again." GR4 crew re-state, "GR4 c/s climbing four thousand feet on one double oh nine." LARS replies, "GR4 c/s Roger report level." GR4 crew acknowledge. There are then 30sec of various unrelated calls until LARS states at 1325:39, "GR4 c/s for a procedural transit of the Lyneham control zone climb report level flight level five zero." GR4 crew reply, "Flight level five zero GR4 c/s." LARS then passes TI, "GR4 c/s er, apologies stop the climb flight level four five initially traffic twelve o'clock er six miles reciprocal heading at flight level five zero." GR4 crew answer, "GR4 c/s looking." There are then 4 more unrelated transmissions prior to LARS stating at 1326:24, "GR4 c/s the previously called traffic right two o'clock two miles crossing right left indicating four hundred feet above." GR4 crew acknowledge, "GR4 c/s tally." LARS speaks to another ac and then at 1326:52 GR4 crew state, "GR4 c/s is happy to freecall Boscombe." LARS asks, "GR4 c/s confirm you'll be er going through the Lyneham control zone?" GR4 crew reply, "We don't plan to." LARS then instructs, "GR4 c/s er roger your squawk for Boscombe is two six five one." GR4 crew read back the squawk correctly at 1327:07. After more unrelated RT, LARS states at 1327:33, "GR4 c/s I have pre-noted you to er Boscombe do you want to stay with me until I can hand you over?" GR4 crew replied, "Yer we'll stay with you thanks GR4 c/s." LARS then states, "Roger own navigation" and GR4 crew acknowledge. LARS spends the next minute on landlines and RT dealing with a handover and 2 ac. At 1328:49 LARS states, "GR4 c/s are you still with me?" GR4 crew respond, "Affirm and we tally the 'B737 company' in our left ten o'clock one mile." LARS then requests, "GR4 c/s request your er er altitude?" GR4 crew state, "GR4 c/s we're currently at er flight level three zero to maintain victor mike." LARS then states at 1329:22, "GR4 c/s believe you're er in Bristol controlled airspace" adding 19sec later, "GR4 c/s do you wish to speak to Boscombe this time?" GR4 crew respond, "Erm yep we'll er freecall Boscombe thanks." To which LARS adds, "Roger Boscombe er one two six decimal seven er remain clear of controlled airspace if you can." GR4 crew reply, "One two six seven."

Analysis of the Cleve Hill Radar shows the B737 8nm NE Bristol Lulsgate tracking 085°, indicating FL035C. The GR4 is in its left 10 o'clock 15.3nm, tracking 190° and indicating FL045C. Both ac carry out a slow descent and maintain track. The GR4's squawk changes at 1327:23. At 1327:55 the B737 begins a RH turn and is passing 100°, indicating FL028C. The GR4 is in the B737's L 9.30 position 5nm tracking 190° and indicating FL032. The B737 continues in the RH turn until steadying up on a track of 175° at 1328:27, whilst indicating FL028C. The GR4 is in its 7 o'clock, 2.6nm indicating FL 029C, tracking 190°. Both ac continue on these tracks and the GR4 climbs to FL031C. At 1328:59 the B737 commences a RH turn and is passing 190°, indicating FL029. The GR4 is in its R 4 o'clock, 1.1nm and has turned slightly R onto a track of 200° whilst indicating FL031C. The CPA occurs at 1329:07 with the B737 passing through 200°, indicating FL028C. The GR4 is in the B737's R 3 o'clock 1nm, tracking 210° and indicating FL031C. From this point onwards the separation increases as the GR4 turns and passes through the B737's 12 o'clock and departs to the SE. The B737 continues in the R turn until tracking 260° at 1329:47.

LARS did not comply with the requirements of RIS as stated in JSP 552 section 235.115.1 because with regard to the B737 they did not provide:

"...bearing, distance and, if known, the level of the conflicting traffic."

However, the same section also states that:

"The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information."

Apart from the relative responsibilities under RIS this incident was caused by a complex chain of events. The controller incorrectly assumed that the GR4 crew would follow the same flight profile as the 2 preceding similar c/ss which routed to the E of Lyneham. This led to confusion in the controller's mind over the intentions of the GR4 crew. A contributory factor was the controller's workload; although not overloaded, the controller was working hard and having to divide attention between several ac and landline inputs. The prevailing weather conditions prevented the GR4 crew from descending to low level and 'shooting the gap' between Lyneham and Bristol. The controller was a 'first tourist' who has held the LARS endorsement for approximately 9 months and may not have faced this particular scenario before. The Bristol CTA was extended considerably in 2006 which has resulted in a much smaller 'gap' between Bristol and Lyneham, leaving much less room for manoeuvre. The instruction "clear own navigation" allowed the GR4 crew to select their own route: however, they should have maintained a track clear of CAS. In mitigation, whilst ultimately responsible for their own navigation, it is not unreasonable for crews in receipt of a radar service to expect a warning if their track comes close to CAS. By instructing the GR4 crew to change to a Boscombe Down squawk, LARS inadvertently made it harder to maintain track identity due to SSR filter selections. Unfortunately, having lost radar contact with the ac, LARS did not inform the crew.

The incident has been publicised to all the personnel within the unit, with a list of lessons learned and advice for future conduct.

THE GR4 STATION comments that, as always, an incident like this is a result of a chain of events or circumstances which resulted in the crew inadvertently entering CAS in proximity to civil traffic. In mitigation, the crew were flying a mission in support of the Army and had planned the most expeditious route to SPTA via the assigned entry point to make a task. They had planned to transit at low level but bad weather prevented an earlier descent. The crew perceived they were under a RAS, missing the call they were under a RIS amongst heavy radio traffic and they stayed with Brize Radar when it would have been prudent to call Bristol because they thought a handover was being arranged. This is a particularly busy piece of airspace and this incident is a timely reminder to crews of the potential hazards when operating in this area.

HQ AIR (OPS) comments that it would appear that the crew had not planned any 'what-ifs' as they descended and routed towards the SPTA. They followed the 'Green Writing' which took them to their turning point, below the Bristol CTA. Unfortunately, they were not at low level! Notwithstanding any missed calls or misunderstandings, ac are not to enter CAS without clearance; this crew did. The Brize LARS controller tried best to anticipate the crew's thought processes and arranged for them to transit through Lyneham. However, having not let LARS know that their plan was not to do so, the controller could not assist them further.

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.

Although the CPA had occurred when the subject ac were both within the Bristol CTA, Members agreed that the Airprox had started much earlier. The RAD1 had vectored the B737 initially along the Northern boundary of the CTR/CTA and had allowed the ac to leave CAS during the turn onto base-leg. This is contrary to the guidance in MATS Pt1 where ac operating within CAS are deemed separated from unknown ac flying in adjoining uncontrolled airspace and controllers should aim to keep the ac under their control at least 2 miles within the boundary. This is particularly important owing to any unpredictable manoeuvres by unknown ac which can easily erode separation and controllers should take appropriate action with respect to the safety of the ac. In this incident, the RAD1 did not see the approaching GR4 in conflict whilst the B737 was on base-leg and both ac were outside of CAS. The controller, made aware of its presence when the B737 crew pointed out the traffic showing on their TCAS display, gave a R turn to the B737 crew onto 230° towards the ILS LLZ. ATCO Members could understand the controller's thinking in trying to position the B737 back into CAS by the shortest route with the unknown ac still

AIRPROX REPORT No 040/07

outside CAS, which ac the RAD 1 probably expected to turn away from the CTA or descend as no clearance had been issued to enter. However, ATCO Members opined that with the geometry that pertained, an early and large L turn with the B737 was required to resolve the confliction. Members agreed that the avoiding action L turn onto 180° issued by RAD 1 was ineffective and too late and that this had caused the Airprox.

The Mil ACC Advisor informed Members that RAF Brize Norton had completed a thorough and detailed investigation into the incident and discovered several Human Factors elements that contributed to the event. One factor was the relative in-experience of the controller in the position: this had been addressed as the Unit provided the controller with a short period of additional training as a result. Moreover, the Unit has publicised the incident to all of its controllers, through routine orders, to raise awareness of the dangers of controlling fast jets to the E of the Bristol CTR. The Board was advised that there is an on-going campaign, through DASC, to remind pilots that it is their responsibility to avoid CAS, whether or not an ATCO reminds them of their proximity to it. Members agreed that LARS had made various assumptions throughout the time that the GR4 was under a service. From the outset the easiest option open to the controller was to ask the GR4 crew their intentions and then act accordingly. There had been no agreement as to the type of service offered by Brize so a contract was not established and the crew did not state their request for a RAS. The LARS was apparently trying to 'second guess' the GR4 crew's intentions and it was only after having arranged transit clearance through the Lyneham CTR, which the crew accepted, that the controller queried the crew's call that they were 'happy to freecall Boscombe' and was told that the CTR clearance was not required.

From a flight operational viewpoint, Members considered that the GR4 crew had not helped the situation as they manoeuvred their ac vertically without informing LARS of their level change. Furthermore, the GR4 crew had continued to fly their planned route but not at low level so by flying at FL030 the GR4 crew had entered the Class D Bristol CTA without clearance which the Board considered had contributed to the Airprox. As the GR4 approached the Bristol area, LARS had given the GR4 crew the next agency's squawk, which they selected, but owing to the radar filter selections on the console LARS had lost the ac's squawk code and identity. The GR4 crew were not informed of this which led to a lack of TI being issued on the B737 ahead. Members concluded that the inappropriate application of RIS by the Brize LARS had also contributed to the Airprox.

Understandably, the B737 crew were surprised with the encounter, believing that they were within CAS when a TCAS TA alert was received on traffic behind their ac at the same level. They had told the controller about the GR4 and the RAD 1 issued an avoiding action turn. The B737 crew had monitored its flight path as it passed an estimated 0.5nm away to their R and 200ft above before sighting the GR4 as it crossed ahead of their ac before departing to the SE. Fortunately, the GR4 crew had visually acquired the B737, when it was 3nm ahead of their intended track, and had deviated to the R to increase lateral separation to 1nm during the overtake manoeuvre before turning L ahead of it whilst maintaining visual separation. This element was enough to allow the Board to conclude that the GR4 crew were always in a position to manoeuvre their ac further if necessary so that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Lack of effective avoiding action by the Bristol RAD 1.

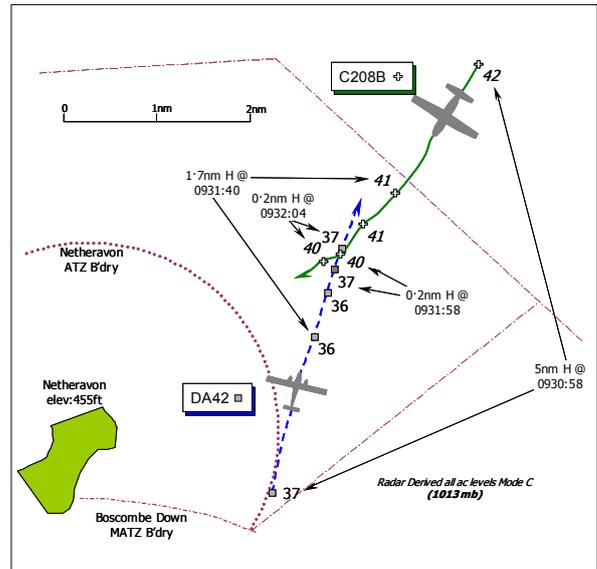
Degree of Risk: C.

Contributory Factors:

1. The Tornado GR4 crew entered Class D CAS without clearance.
2. Inappropriate application of a RIS by the Brize LARS.

AIRPROX REPORT NO 041/07

Date/Time: 19 Apr 0932
Position: 5117N 00141W (3¼nm NE Netheravon Aerodrome - elev 455 ft)
Airspace: London FIR (Class: G)
Reporting Ac Reporting Ac
Type: Cessna 208B DA42 Twinstar
Operator: Civ Club/Trg Civ Trg
Alt/FL: FL40 3500ft
 QFE (1007mb)
Weather VMC CAVOK VMC NR
Visibility: 10+km 20km
Reported Separation:
 50-100ft V/nil H 100-200ft V/nil H
Recorded Separation:
 300ft V



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CESSNA C208B CARAVAN PILOT reports his ac is coloured red & blue over white and the HISLs were on whilst operating in CAVOK conditions from Netheravon aerodrome, in receipt of a FIS from Boscombe Down on 126.7MHz. A squawk of A2650 was selected with Mode C; neither TCAS nor Mode S is fitted.

After executing a parachute drop, he had descended from 12000ft agl to FL40 to complete some engine monitoring checks, remaining between a position about 7nm NE and the overhead of Netheravon aerodrome.

Heading 200°(M), about 3-6nm NNE of Netheravon at 140kt, he had just completed his engine monitoring when he looked out to see another ac – a DA42 Diamond Twinstar in his 11 o'clock. To avoid the other ac he initiated a hard climbing turn to the R and within 1sec the DA42 had passed about 50-100ft directly beneath his aeroplane with a “very high” risk of a collision.

He believes the other ac was on a training NAVEX from Bournemouth to the NW at FL40 under a FIS, but neither ac had been given any traffic information by Boscombe Down ATC. An Airprox was immediately reported to Boscombe on RT and he later telephoned both the ATC Supervisor and the other pilot.

THE DIAMOND DA42 TWINSTAR PILOT reports that he was instructing a student pilot on a VFR NAVEX from Bournemouth in VMC. Boscombe RADAR was providing a FIS on 126.7MHz and the assigned squawk – A2650 - was selected with Mode C on; neither Mode S, TCAS nor any other form of CWS is fitted.

Operating VFR, they were heading 020°(M) at 140kt to their next turning point at Membury Services on the M4 Motorway. As part of the exercise, the second leg was not known by his student before take-off. Boscombe Down aerodrome was over-flown at 3500ft Boscombe QFE (1007mb), at their request, and RADAR warned them that Netheravon was active with parachuting so they were careful to avoid its overhead and associated ATZ. He stressed that a good VFR scanning technique is taught and practiced on all flights, including this one. Once certain of their position and having scanned to their L side and above for parachutes, where none were seen, he instructed his student to fly to the town of Shepton Mallet after Membury. However, his student in the LH seat could not locate this town on his chart so, whilst they were both looking at it and he indicated Shepton Mallet’s location, neither of them were looking forward outside of the ac. As he looked outside again he was immediately aware of another ac, a high wing single engine monoplane, ½ - ¾ nm directly ahead, but just above their level. He saw the other ac bank sharply to starboard and he believed it descended as they passed ‘port to port’. Minimum vertical separation was 100-200ft. His student pilot saw into the other ac through its open door on the portside and also

AIRPROX REPORT No 041/07

believed that the other ac was descending. No avoiding action was taken by himself – there was insufficient time – and the risk was assessed as “very high”. He added that neither ac’s position or proximity had been mentioned to the other by Boscombe RADAR.

His ac is coloured white with blue/yellow stripes and the white HISLs were on.

UKAB Note (1): The UK AIP at ENR 2-2-2-3 notifies the Netheravon ATZ as a radius of 2nm centred on RW11/29, extending from the surface to 2000ft above the aerodrome elevation of 455ft amsl.

UKAB Note (2): The UK AIP at ENR 5-5-3-3, promulgates that Netheravon Free-Fall Drop Zone is a radius of 1.5nm extending to FL150, active “as notified” but normally during daylight hours.

THE BOSCOMBE DOWN ZONE CONTROLLER (ZONE) reports that at the time of the Airprox the controller was screening an inexperienced trainee ZONE controller who was involved with a non-standard handover of traffic from Bristol under a RIS. Neither of the ac involved in the Airprox were identified and both were receiving a FIS. The C208 was believed to be general handling between 5 to 10 nm to the NE of Netheravon, with the DA42 believed to be tracking NE about 2.5nm to the E of Netheravon. At the time the confliction was noticed the C208 pilot reported a “near miss” with a Citation, before there was a chance to call the conflicting ac to each other. As the DA42 pilot had called ‘visual’ with the C208 and his trainee was busy with the handover, the C208 pilot was told to “standby”, but the pilot then responded as being visual with the traffic believed to be the DA42. Both pilots were flying VFR under a FIS.

The 0900 UTC Boscombe Down weather was reported as being visibility: 27km; nil weather; FEW @ 3200ft.

MIL ACC OPS reports that the C208B Caravan pilot was receiving a FIS from Boscombe Down ZONE; the DA42 Twinstar crew was also in receipt of a FIS from ZONE. The DA42 crew first made contact with ZONE at 0923:45 and 8sec later passed their details, “[DA42 C/S]...a DA42 Twinstar, Bournemouth to Bournemouth, currently..approximately..5 miles to the north of Bournemouth at 2800ft on 1022, sorry, correction, about 10 miles to the north of Bournemouth QNH 1022, 2800ft..we’ll be routeing..just on the side of Salisbury, and overhead..Boscombe up to Membury services, and if possible..requesting..clearance to do that and hopefully at..3500ft.” ZONE enquired, “..what type of service do you require”, to which the DA42 crew replied “..requiring Flight Information Service [DA42 C/S].” At 0924:24, ZONE confirmed “[DA42 C/S] Flight Information Service, set Boscombe QFE 1007”, to which the DA42 crew read-back the QFE. At 0924:50, in response to ZONE’s query about their height on the QFE, the DA42 crew responded “We’d like to actually climb up to 3500ft...and go over your Zone.” Whereupon ZONE replied, “..roger climb at your discretion, report level 3500ft. Squawk 2650”, which the crew read-back, “Squawk 2650, climb at my discretion wilco...”. [UKAB Note: A2650 is assigned to MoD Boscombe Down and is specified at UK AIP ENR 1-6-2-5 as a conspicuity code whereby the code and associated Mode C data must be considered as unvalidated and unverified.] Between 0925:25 and 0925:49, ZONE negotiated a MATZ crossing for the DA42, with Approach (APP), not below 2500ft QFE. The C208 pilot first called at 0925:50, but after being told to “..standby 1”, ZONE passed to the DA42 crew their “..MATZ crossing..approved...report overhead Boscombe”, which the crew read-back. ZONE then added at 0926:32, “[DA42 C/S] Netheravon paradropping site active to 14,000ft.” whereupon the DA42 crew advised, “that’s copied, and we’ll be routing to the east of..that..can you just confirm that D128 is still only active to 1400ft?”, which was confirmed. At 0926:53 ZONE instructed the C208 pilot to pass his details which he did, “..Cessna Caravan out of Netheravon, presently descending through 7000ft for 4000 for engine monitoring for 10 minutes, request Flight Information.” ZONE stated the type of ATS, “..Flight Information Service..Cotswold [RPS] 1017”, which the pilot read-back correctly. ZONE then instructed the C208 pilot to “..squawk 2650, report complete.” For the next 1min 45sec ZONE was busy with unrelated landline calls and a free-call from another flight. At 0929:17, the DA42 crew reported “...just overhead Boscombe now I’m routeing to Membury services”, whereupon ZONE requested they “..report abeam Hungerford”, which the crew acknowledged. From 0930:04 ZONE was very busy arranging a crossing of the Middle Wallop MATZ; handing over another ac and dealing with another free-call until 0932:03 when contacted by the C208 pilot. Initially the pilot was asked to standby but, at 0932:16, the C208 pilot reported, “..I’ve just had a very near close call with a - looks like a Citation jet”. However, the DA42 pilot interjected and advised “..that Citation is [DA42 C/S] we saw the Britton Norman Islander [sic – the C208].” ZONE was still very busy with landlines but at 0932:54 replied “[C208 C/S] roger, that’s copied”.

Analysis of the Pease Pottage Radar recording shows the DA42 2nm SE of Netheravon at 0930:57, tracking 015° indicating FL37 Mode C. The C208 is in the DA42’s R 12:30 tracking 210° indicating FL42. The DA42 remains

on a track of 015° throughout the incident. Both ac maintain track and level until 0931:40 when the DA42 indicates a descent to FL36 and the C208 turned R to track 230° and descended to FL41. The C208 is in the DA42's R 12:30 - 1.7nm. Over the next 2 radar sweeps the DA42 maintains its level and the C208 remains level but its track varies 20° left then 30° right. The CPA occurs at 0931:58; the DA42 tracking 015° indicating FL37 with the C208 indicating FL40 and tracking 200o. The C208 is in the DA42's 12 o'clock - 0.2nm crossing obliquely from R to L. The C208 then passed down the DA42's left hand side and separation continues to increase as the C208 indicates FL40.

ZONE complied with the conditions of a FIS regarding traffic information as per JSP552 para 235.125.1 which states:

c. Controllers are not responsible for separating or sequencing aircraft.

d. Where a controller suspects, from whatever source, that a flight is in dangerous proximity to another aircraft, a warning is to be issued to the pilot. It is accepted this information may be incomplete and the controller cannot assume responsibility for its issuance at all times or for its accuracy.

From the C208 pilot's report he was at FL40 which is reflected in the radar replay. The DA42 was at 3500ft QFE (1007mb) [about 3680ft (1013mb)] and this is also reflected in the radar recordings. Therefore, the controller would not have considered that the ac were in dangerous proximity to one another with 320ft vertical separation between the two ac, both operating VFR. Even if the C208 had descended to 4000ft on the COTSWOLD RPS (1017mb), there would still have been 200ft between the ac. Furthermore, both pilots were on the same frequency and communicating with ZONE at the same time and could have discerned each other's intentions quite easily from the RT exchanges. It can be seen from the complete RT transcript that ZONE was extremely busy with both radio and landline conversations and these 2 flights under a FIS would have been low on his priorities. Under such circumstances, it is entirely unrealistic for pilots requiring a FIS to expect any extra information above that of the service requested and agreed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ZONE controller's report had reflected that both of these two flights were in receipt of a FIS, the Mentor explaining that he was busily engaged monitoring his inexperienced trainee executing higher priority tasks associated with another flight under service in the moments before this Airprox occurred. Under the FIS that pertained here, the Mil ACC report had shown that "*Where a controller suspects...that a flight is in dangerous proximity to another aircraft, a warning is to be issued to the pilot.*" Whilst the Mil ACC report had suggested that the controller might not have considered these VFR flights to be in relatively "*..dangerous proximity..*", at the vertical separation evident here a highly experienced pilot Member disagreed and considered that a warning was warranted if the confliction had been spotted. But here it would seem that the ZONE Mentor had not recognised the potential for a confliction between these two ac and consequently had been unable to prompt his trainee to proffer a warning to the pilots involved. The Board accepted that higher priority tasks such as the provision of radar approach services to inbound traffic or to transiting flights that have requested a RIS/RAS could understandably result in incomplete information or no warning being passed at all to those that had merely asked for a FIS. Whilst 'see & avoid' prevails in Class G airspace, pilots should always bear in mind that a FIS is the basic ATS in the 'Open FIR' and it might be that under such a service little or no warning would be forthcoming from ATC about other flights.

A pilot Member questioned whether a FIS was the appropriate level of ATS whilst conducting engine monitoring checks, it being suggested that the C208 pilot might have been better served if he had requested a RIS to supplement his lookout during this period of 'heads in' the cockpit. It was also evident from the DA42 instructor pilot's laudably frank account that both he and his student were also distracted from their look-out scan at the critical moment as they checked the student's chart. It was evident to the Board, therefore, that the crux of this Airprox was sighting of the other ac by the respective pilots at the time. For his part the C208 pilot was perhaps somewhat surprised by the sudden appearance of the DA42 Diamond Twinstar in his 11 o'clock, an experienced pilot Member suggested. However, whilst the C208 pilot had sufficient time to initiate a turn to the R to avoid the other ac, which the radar recording clearly replicated, the reported climb was not apparent. When the DA42

AIRPROX REPORT No 041/07

instructor looked out, the C208 pilot was already taking appropriate action, sighting the C208 $\frac{1}{2}$ - $\frac{3}{4}$ nm directly ahead in a sharply banked turn to starboard, just above his ac. So it seemed that the DA42 crew had spotted the other ac a little later but had not seen the C208 in time to turn away themselves – effectively a non-sighting and part of the cause. Whilst the C208 pilot perceived that the DA42 passed about 50-100ft directly beneath his aeroplane, the latter's instructor was a little closer to the mark as the radar recording evinced some 300ft of vertical separation at the time. Recognising the inherent tolerances applicable to unverified Mode C, it also seemed that before the C208 levelled at FL40 it had been in a very shallow descent towards the DA42 which had been broadly maintaining a level cruise. Perhaps the descending attitude of the C208 had masked the DA42 under the nose in the reportedly CAVOK weather: nevertheless, it was evident to the Members that although the C208 pilot had spotted the DA42 late, it was in sufficient time to manoeuvre his ac out of the way. The Board concluded unanimously that this Airprox had resulted from effectively, a non-sighting by the DA42 crew and a late sighting by the C208 pilot. However, the C208 pilot's robust avoiding action ensured, fortunately, that any risk of a collision was averted in the circumstances conscientiously reported here.

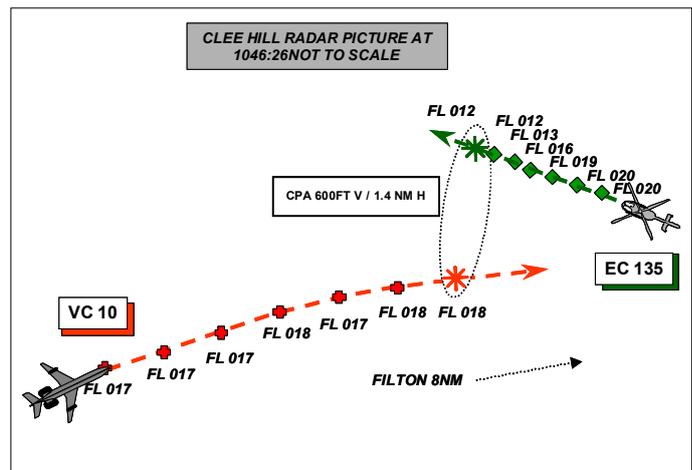
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively, a non-sighting by the DA42 crew and a late sighting by the C208 pilot.

Degree of Risk: C.

AIRPROX REPORT NO 042/07

Date/Time: 26 Apr 1047
Position: 5132N 00243W (8nm W of Filton - elev 226ft)
Airspace: Lon FIR (Class: G)
Reporting Ac **Reported Ac**
Type: EC135 VC10 C1K
Operator: Civ Trg HQ AIR (Ops)
Alt/FL: 2000ft↓ 2000ft
 (QNH 1022mb) (QNH 1023mb)
Weather VMC CLBC VMC CAVOK
Visibility: 40km 30-40km
Reported Separation:
 200ft V/½nm H 300ft V/2nm H
Recorded Separation:
 600ft V/1.4nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE EC135 PILOT reports flying a local training sortie in a red and yellow ac with HISLs switched on. He was heading 293° at 100kt on the outbound leg of a practice NDB/DME approach to RW09 at Filton, descending through altitude 2300ft at rate of descent 700ft/min, when he was warned by Filton Radar of high speed traffic approaching from the W at an altitude of 2000ft. On seeing the reported ac about 1nm away (he thought), it was apparent that it was on a steady bearing and that his level would very soon be co-incident with that of the other ac so he took control from the trainee pilot and increased the rate of descent to approximately 1500ft/min in order to ensure vertical separation from this traffic. The other ac appeared to make a shallow turn to its right as he passed through its level. He assessed the risk as being very high.

THE VC10 C1K PILOT reports flying a VFR training flight squawking 7000 with Mode C and with all lights switched on. They were heading 060° at 250kt having arranged with Cardiff to transit up the Bristol Channel at 2000ft to a position NW of Filton before turning onto a direct track for Brize Norton for recovery. Cardiff had agreed to coordinate, offering a transit height of 2000 or 3000ft. On reaching abeam Bristol, they were told to squawk 7000 and free call Filton. On switching frequency, there was some RT traffic and they heard TI being passed to the reporting EC135 regarding a 'fast mover' transiting up the Channel at 2000ft. They had both TCAS and visual contact and noted that the EC135 was descending through about 2500ft. They were unable to transmit initially due to the TI being passed but as soon as they could they then checked in and reported that they were visual with the EC135, easing right to ensure that they passed behind it. Filton instructed the EC135 to level at 2300ft. This instruction was ignored and the EC135 expedited descent to 1700ft and began the inbound turn on the NDB/DME for RW09 at Filton. The EC135 then declared that his 'emergency descent' had been required to avoid a collision and that he would be filing an Airprox and a serious incident report.

Although there could have been a risk of collision, early TCAS and subsequent visual acquisition meant that there was no significant threat. A late and uncoordinated handover from Cardiff would appear to have been the leading factor as they were given the impression by Cardiff that their transit had been coordinated with Filton: it had, however, only been coordinated with Bristol International. He assessed the risk as being low.

ATSI reports that the VC10 crew established communication with Cardiff APR at 1012, in CAS at FL140. When clear of CAS the flight was placed under a RIS and once outbound over the coast was cleared to descend to 2000ft. Approaching the edge of Cardiff's radar cover, the service was changed to a FIS. The pilot reported, "we'll actually be turning back east in about fifteen miles towards Swansea then we'll stay feet wet and then we'd like to transit back up the Bristol Channel please for recovery to Brize and two thousand feet would be great if you can". The Cardiff APR Controller responded, "that's understood Flight Information Service just as you leave Cardiff radar coverage and retain the squawk and that'll be no problem at all".

AIRPROX REPORT No 042/07

During the next 10min, information was issued about traffic, observed on the radar display, and a helicopter which had contacted the frequency. At 1036 the VC10 pilot reported heading southeast back up the Bristol Channel. He requested *“to come up the Bristol Channel at two thousand feet until we get north of Bristol then we’ll pick up three thousand transit Brize”*. The Controller replied, *“transit at altitude two thousand feet is approved”*.

The Cardiff APR Controller telephoned Bristol and identified the VC10. It was reported 5nm S of Cardiff at 2000ft. Bristol issued a squawk which was passed to the VC10 along with a frequency and a reminder to *“remain outside Bristol Controlled Airspace”*. Subsequently, Bristol telephoned Cardiff to inform them to transfer the VC10 to Filton. At 1044:30 the VC10 was informed *“change of plan squawk Seven Thousand and free call Filton please”*.

Meanwhile, the EC135 was being provided with a RIS by Filton. The helicopter was cleared for an NDB approach to RW 09 and was outbound, descending on the procedure. Filton APR reported observing a radar contact approaching from the SW at 2000ft, displaying a Bristol squawk. This changed to 7000 when the aircraft was 15nm SW. He transmitted to the EC135 *“could you just stop descent for a moment there’s high speed traffic coming up the Estuary mid Channel indicating altitude two thousand feet just about to go through the centreline about ten west of the field”*. The pilot reported maintaining 2300ft. The information was later updated *“traffic at the moment eleven o’clock to you five miles coming towards you up the Channel still indicating two thousand”* and the pilot replied, *“contact”*.

The VC10 then established contact with Filton reporting coming up the Bristol Channel at 2000ft *“visual the traffic”*. TI was issued about the helicopter and the pilot reported visual *“and we’re just turning right to keep clear”*. The pilot, subsequently, reported, *“we were under the impression we were coordinated with Cardiff”*.

Cardiff APR instructed the VC10 to *“freecall”* Filton, implying that no handover had been arranged. MATS Part 1, Appendix E, Page 5, defines ‘Freecall. Call...(unit). (Your details have not been passed.)’ The Filton APR Controller complied with the procedures for providing a RIS and passed appropriate TI to the EC135.

UKAB note (1): The recording of the Cleve Hill radar shows the incident clearly. At 1045:47 the VC10 is tracking 060° up the Bristol Channel, slightly displaced to the Welsh side, at FL017. Meanwhile the EC135 is heading about 280°, level at FL020 directly in the VC10’s 12 o’clock at a distance of 4.7nm. At this point the EC135 begins a rapid descent, through the level of the VC10, levelling at FL012 (600ft below it) at 1046:19. Meanwhile the VC10 turns just over 10° to the right to pass 1.7nm S (to the left) of the EC135. The CPA is on the next sweep when the ac are already on diverging tracks (1.4nm and 600ft).

HQ AIR (OPS) comments that both crews were aware of each other’s ac and visual. The gentle turn by the VC10 allowed it to pass behind the EC135 whose pilot may have been surprised by the size of the conflicting ac and, thus, manoeuvred more aggressively.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members noted that this incident took place in Class G airspace where ‘see and avoid’ is the prime means of collision avoidance, the pilots having an equal and shared responsibility to avoid other ac iaw the Rules of the Air. In this Airprox both pilots had opted to use a radar service to assist in this responsibility. Filton APR made the EC135 crew aware of the VC10 in good time when the separation was about 5nm, the pilot of the EC135 acknowledging this TI with ‘contact’. Although initially unable to communicate the fact as the RT frequency was in use, the VC10 pilot was aware of the EC135 early enough from TCAS and then visually to consider that only a small avoiding turn was required to ensure safe separation. However the EC135 pilot appears to have been sufficiently concerned about the respective acs’ proximity, tracks, levels and closing speed that he decided to expedite his slow descent. This action initially reduced the vertical separation before increasing it again after the helicopter had passed through the VC10’s alt. It was noteworthy that VC10 did not receive any TCAS alert.

The ATSI Advisor highlighted a useful reminder for pilots that the term ‘Freecall’ indicates that there has been no handover or coordination with the next ATC unit.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT No 044/07

AIRPROX REPORT NO 044/07

Date/Time: 4 May 0930

Position: 5438N 00545W (4nm E Belfast/City - elev 15ft)

Airspace: Belfast TMA (Class: E)

Reporter: Belfast/Aldergrove APR

1st Ac 2nd Ac

Type: LET410 A319

Operator: CAT CAT

Alt/FL: 3800ft↑ 4000ft

(QNH 1020mb) (QNH)

Weather VMC CLAC VMC CLAC

Visibility: 10km 5nm

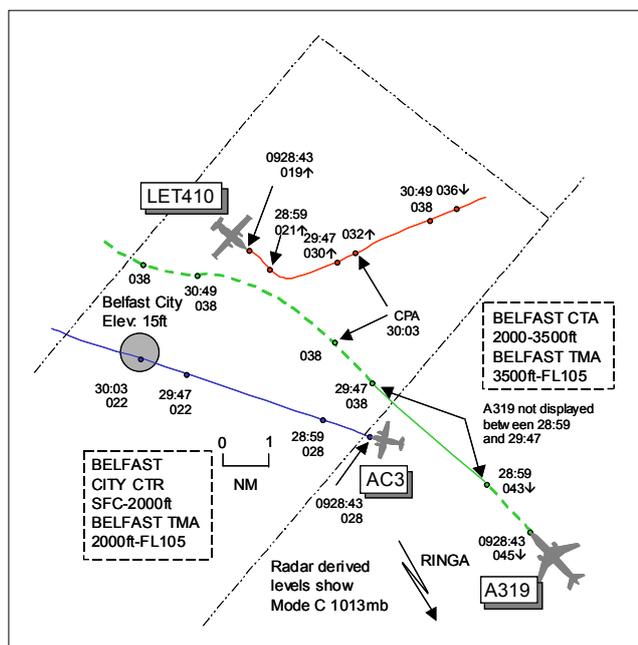
Reported Separation:

APR: 600ft V/2.5nm H

NK NR

Recorded Separation:

600ft V/2.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BELFAST/ALDERGROVE APR reports that the A319 was inbound level at 4000ft passing O/H Belfast City. Meanwhile the LET410 had been cleared to depart from City RW04 climbing 3000ft. The City APR told him that the LET410 had a problem with his navigational equipment and was therefore going to be on a heading of 165° as opposed to his clearance of direct RINGA at 3000ft: he, the Belfast/Aldergrove APR, agreed. The City APR also had a VFR overflight [AC3] at 2500ft which was going to be in conflict with the LET410. After the LET410 became airborne it was observed to be climbing towards the A319 and climbing above its cleared level so he told the A319 flight to turn away from the LET410 and maintain 4000ft whilst he tried to get the LET410 flight on his frequency. Whilst he did not use the phrase 'avoiding action', he would have had the LET410 not been turned away onto his heading that he had given the City APR.

THE BELFAST CITY APR reports a VFR ac, AC3, was transiting via the City O/H to the NW whilst he had coordinated with the ADC a standard noise departure to altitude 3000ft for the LET410. He then issued the LET410 flight, via the ADC, a R turn onto heading 160° after passing 1500ft but this was subsequently changed to continue on the noise track owing to AC3 and this was acknowledged by the LET410 crew. The LET410 was seen to commence a R turn to the SE and was told by the ADC to turn L immediately onto heading 070° (heading given by the APR) which was read back and followed. The ADC then transferred the LET410 flight to Aldergrove Radar on 128.5MHz. Aldergrove subsequently informed him that the LET410 had climbed to altitude 3900ft and that they were filing an Airprox against the A319 inbound. Note: Belfast City is not SSR equipped.

Belfast METAR EGAC 0920Z 03004KT 360V060 9000 FEW005 SCT009 BKN015 09/06 Q1020=

THE LET410 PILOT provided a brief report flying outbound from Belfast City IFR squawking 6014 with Modes C and S. Whilst heading 155° at 120kt they were given a heading change by City Radar to avoid traffic but this other ac [AC3] was not seen. This incident occurred after the ac suffered a GPS equipment/system failure. Climbing through 3800ft QNH 1020mb and just before making their initial call to Aldergrove on 128.5MHz, they heard the controller informing another flight [the A319] about their ac overshooting their altitude. A descent was commenced and the controller was informed. No TCAS alerts or warnings were received and the ac was not seen visually although they were flying in VMC 800ft above cloud with 10km visibility. They were unable to assess the risk.

THE A319 PILOT reports inbound to Belfast/Aldergrove IFR and in receipt of a RCS from Aldergrove on 128.5MHz squawking an assigned code with Modes C and S. Heading NW'ly at 200kt and 4000ft QNH they were informed by ATC of a Belfast/City departure. Two contacts were seen on TCAS, one of which was the departing ac. At the

time the visibility was 5nm 2000ft above cloud in VMC and this ac was seen visually as well and did not cause the crew concern; no TCAS TAs or RAs were generated. ATC gave two W'ly turns - neither were avoiding action - followed by an E'ly turn back onto base leg at Aldergrove from where an ILS approach was completed. After landing, the Approach controller asked the Captain if he wished to file an Airprox and the Captain made it quite clear that no Airprox would be filed and that no paperwork would be submitted. The controller stated that he believed the City departure had 'level bust'. Later, responding to the UKAB request, he – the A319 Captain - duly completed an Airprox report form but again reiterated that he was not classing this incident as an Airprox.

ATSI reports that just after the LET410 flight was cleared to taxi for RW04 at Belfast City Airport it was issued with its departure clearance *"cleared Ronaldsway Lima One Zero climb to maintain altitude three thousand feet squawk Six Zero One Four"*. The pilot read back the clearance correctly. This was in accordance with the Letter Of Agreement, between City/Aldergrove, which states *"In order to eradicate the number of level busts by Belfast City departures, the following procedure will be adopted. Whilst the aircraft is on stand, Belfast City ATC will pass the following clearance. "[c/s] is cleared to [destination] via [route], climb and maintain altitude 3A"*. On being issued with line up clearance, the LET410 flight was instructed *"after departure noise abatement right turn RINGA"*. This was read back correctly. The LET410 was cleared for take off at 0925 but before departure the pilot requested *"is it possible after our noise abatement to get radar vectors we have a GPS failure"*. The pilot was instructed to head 034° until advised. The noise abatement, RW04 for propeller ac of 13000kg or less is: *'On passing 500 ft QNH or 0.4 nm DME, whichever is the sooner-left turn TRACK 034°M and climb to altitude 1500 ft QNH before commencing turn. Thereafter as per ATC clearance'*.

At 0927:30, the LET410 flight was instructed *"on passing one thousand five hundred feet turn right heading One Six Zero degrees"*. The pilot read back the instruction correctly. This course of action was agreed between the Belfast City and the Aldergrove APRs. However, as soon as the instruction had been issued and acknowledged, the City APR instructed the ADC to continue the LET410 on the noise track because of a potential conflict with overflying traffic [AC3]. This message was passed to the pilot (0927:50) as *"and LET410 c/s amendment to that then continue on the noise track of zero three four degrees"*. This was correctly read back. Subsequently, the LET410 commenced a R turn off the noise routing towards AC3. After coordination between City and Aldergrove, the City APR instructed the ADC to turn the LET410 L heading 070° (0928:45). The LET410 flight was transferred to Aldergrove at 0930, no amendment to the initial clearance to 3000ft having been passed to the flight.

[UKAB Note (1): The Great Dun Fell radar recording at 0928:43 first shows the LET410 3.25nm NNE of Belfast City tracking 130° climbing through FL019 (2100ft QNH 1020mb) with the A319 8.5nm to its SE tracking NW'ly descending through FL045 (4700ft QNH). AC3 is 5.4nm SE of Belfast City tracking 290 at FL028 (3000ft QNH) which passes through the City O/H clear of both the subject ac. The A319 fades after the radar sweep at 0928:59 descending through FL043 (4500ft QNH) with the LET410 in its 12 o'clock range 6.7nm on a reciprocal track climbing through FL021 (2300ft QNH). Shortly after this the LET410 is seen to turn L and roll out on a track of 070°. The A319 reappears at 0929:47 still tracking NW'ly level at FL038 (4000ft QNH) with the LET410 in its 0130 position range 2.8nm climbing through FL030 (3200ft QNH).

[UKAB Note (2): The RT transcript reveals the following exchange after the LET410 crew readback the heading change onto 070° and prior to transfer to Aldergrove.

ADC: "LET410 c/s say again heading zero seven zero immediately please".

LET: "We are in a left turn passing heading one zero zero degrees LET410 c/s".

ADC: "Roger and confirm you were instructed to continue on the noise abatement track originally".

LET: "Till one thousand five hundred feet and there after we turned right".

ADC: "And then it was amended to continue on the noise track".

LET: "It was a misunderstanding sir sorry our mistake".]

Meanwhile, the A319 was being positioned, by Aldergrove Approach, for an ILS approach to RW25 descending to 4000ft, heading 315°. Observing that the LET410 had climbed through 3000ft, the A319 flight was instructed to turn L heading 280° (0930:00) and then 40sec later he turned the A319 R onto 350° informing the crew that the

AIRPROX REPORT No 044/07

City ac (LET410) was cleared to 3000ft but had 'bust its level' and climbed to 4000ft. Approximately 20sec later the LET410 flight established communication, reporting *"returning altitude three thousand feet passing three thousand six hundred radar heading Zero Seven Zero degrees"*. The LET410 flight was instructed to turn R heading 170° and the A319 was positioned towards the ILS.

[UKAB Note (3): The CPA occurs at 0930:03 with the LET410 in the A319's 2 o'clock range 2.1nm, the LET410 climbing through FL032 (3400ft QNH). The LET410 levels-off at FL038 (4000ft QNH) before a descent is seen 16sec later as the ac indicates FL036 (3800ft QNH).]

It is assessed that there are no ATC causal factors to the Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Following the LET410's release and just before takeoff, the crew reported a GPS equipment failure which led to ATC issuing them with a clearance to fly heading 034° until advised. The flight was subsequently cleared to turn R after passing 1500ft but this instruction was almost immediately changed back to continue on the noise track of 034°. Although this was acknowledged, the LET410 crew then turned R, contrary to the ATC instruction which was a part cause of the Airprox. This turn by the LET410 was seen by the City APR who then told the flight, via the ADC, to turn L onto 070°, away from AC3, with which the crew complied. However, the LET410 crew then climbed above 3000ft, their initial cleared level, into conflict with the A319 which was a second part cause. Pilot Members opined that both the heading instruction and level restriction should have been assimilated and implemented on the LET410 flightdeck through CRM - cross-cockpit checking - but for whatever reason this did not appear to happen.

Risk-wise, the City APR had turned the LET410 onto 070° to avoid AC3 which also led to it diverging away from the A319's projected track about 1min before the CPA. However, as the City APR did not have SSR data available, he was unaware that the LET410 had climbed above 3000ft shortly before he transferred the flight to Aldergrove. The Aldergrove APR saw the LET410 climbing through its cleared level and gave the A319 a L turn onto 280° at about the time the CPA occurred. Meanwhile the A319 crew had seen the LET410 on TCAS then visually and had monitored its flightpath, content that it did not pose any problem. No TCAS TA alerts or RA warnings were received on either of the subject acs' flightdecks. The Board agreed that the prompt actions of both APRs and the visual sighting by the A319 crew had been sufficiently timely to ensure that safety had not been compromised during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The LET410 crew did not comply with ATC heading instructions and then climbed above their cleared level into conflict with the A319.

Degree of Risk: C.

AIRPROX REPORT No 045/07

disused by two miles turning towards you it's indicating at one thousand feet fast moving". After receiving an acknowledgement from the pilot he continued "you are identified Radar Information Service the Yarmouth pressure one zero one three previously mentioned traffic left nine o'clock one mile about to converge". The pilot replied "we're visual the traffic and it's a jet about to go right below us". The radar photograph, timed at 0915:01, shows the subject aircraft 900ft vertically and 1.9nm horizontally apart. As they pass each other the Tornado has climbed slightly before descending again.

The other traffic observed on the radar photographs (the Tucano) subsequently contacted Norwich reporting at 250ft.

Norwich ATC issued TI to the S76 pilot about the presence of the unknown Tornado even before a RIS was established. This information was updated as the two flights conflicted.

UKAB Note (1): The recording of the Cromer Radar shows that the CPA occurs between sweeps at 1915:23. By interpolation the CPA was 900ft V and <0.1nm H.

MoD DE&S had no further comment.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Both ac were being operated in Class G airspace, the helicopter on HMR3, base 1500ft amsl, and the Tornado below the base on the route in LFA 5; that being the case, see and avoid is the primary method of collision avoidance. To assist with this responsibility both crews were in contact (at least partially) with Norwich ATC. Due largely to the ac being on the same frequency and accurate TI being passed to the S76 pilot by Norwich, both crews were aware of the presence of the other's ac and were, within the limitations of the weather, able to see the other ac in sufficient time to determine that only minimal avoiding action was required (by the Tornado only).

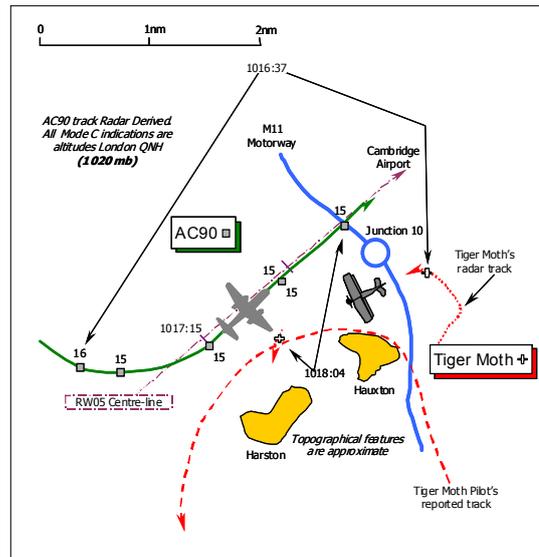
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.

AIRPROX REPORT NO 046/07

Date/Time: 5 May 1017 (Saturday)
Position: 5208N 00004E (5nm SW Cambridge - elev 50ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reported Ac**
Type: AC90 Tiger Moth
Operator: Civ Pte Civ Trg
Alt/FL: 1500ft↓ ↑1500ft
 QNH (1020mb) QFE (1017mb)
Weather VMC NR VMC Below cloud
Visibility: 10km+ 10km+
Reported Separation:
 Nil V/200m H Nil V/¼nm (>400m) H
Recorded Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE AC90 PILOT reports that he was inbound to Cambridge under IFR and in receipt of a RIS, he thought, from Cambridge ATC. The assigned squawk was selected with Mode C; TCAS and Mode S are fitted. Whilst executing an NDB/DME approach procedure for RW05, heading 051°(M) at 140kt descending through 1500ft Cambridge QNH [1020mb] at about 4½nm from touchdown, shortly after gaining VMC after coming out of cloud he saw a yellow Tiger Moth at a range of 200m. The biplane passed down his starboard side, 'co-altitude', approximately 200m away and appeared to be in a 20° AOB L turn. No avoiding action was taken – it was seen too late – and although the risk was assessed as "low" he believes they were fortunate not to have been on a collision course when he came out of cloud. ATC did not know the Tiger Moth was there and he had no indication displayed on TCAS of the presence of another ac.

Whilst he accepted that the Airprox occurred in Class G airspace he opined that it might be prudent for pilots to use the radio and/or SSR transponder to reduce the risk of a mid-air collision if operating close both to the cloudbase and an active IFR approach to an airport.

THE TIGER MOTH PILOT provided a very comprehensive account and included two chart fragments to supplement his report. He states that he was conducting a local air experience flight from Duxford, the 3rd such sortie of the day. A "listening watch" was maintained with Duxford INFORMATION on 122.075MHz whilst operating VFR in VMC, some 300ft+ clear below cloud (he had previously observed the cloud base to be 1800ft+) with an in-flight visibility of 10km+. SSR is not fitted.

After take-off from Duxford's RW06 he turned L at 700ft agl along the M11 to clear the Duxford circuit. The villages of Hauxton and Harston passed clear to port for noise abatement as he climbed to 1500ft agl for general handling NW of Duxford aerodrome whilst remaining S of the Cambridge extended C/L (which runs through the cement works chimney at Barrington) by about ½nm.

On skirting N of Harston Village at 65kt, in a slight climbing L turn passing 230° and just about to level at 1500ft agl, he observed at a range of 0.25 – 0.33nm what might have been a Light Twin – the AC90. The other ac passed abeam at the same height about ¼nm – 400m minimum - down his starboard side flying in the opposite direction - presumably on an NDB approach to RW05 at Cambridge. No avoiding action was taken as there was not considered to be any hazard by him at the time of sighting the AC90 – he assessed the risk as "low".

Stressing that the forward vision from his Tiger Moth's cockpit is not that good - hence his continuous climbing turn to the L - the position of his biplane S of the Cambridge RW05 centre-line by approximately ½nm was checked by

AIRPROX REPORT No 046/07

observation of the line through Barrington Chimney to Cambridge's RW. He added that the position of the other ac and other details of the flight were logged after landing on being informed of the Airprox report.

ATSI reports that they have little to add from the ATC perspective. The Tiger Moth pilot was in communication with Duxford and the AC90 pilot with Cambridge - both unknown to each other. Neither Duxford nor Cambridge were using radar: Duxford is not equipped and at present Cambridge does not have sufficient radar controllers to provide a radar service throughout the aerodrome's opening hours. Consequently, the availability of radar is subject to available staff. Cambridge does not issue NOTAMs to state availability of a radar service.

UKAB Note (1): Analysis of the Stansted Radar recording is inconclusive as the Tiger Moth is not shown, perhaps understandably, during the period of the Airprox. The AC90 is shown turning onto FINALS from the RW05 NDB/DME procedure at 1016:37. Up to this point the primary contact that is believed to be the Tiger Moth had been manoeuvring to the E of the M11 motorway - broadly in conformity with the biplane pilot's reported track - then fades and is not shown again until 1018:04 - to the W of the Motorway - after the Airprox has occurred. Meanwhile, the AC90 has established on FINALS, marginally R of the RW05 centre-line at a range of 6nm from Cambridge Airport at 1017:15, level at 1500ft London QNH (1020mb). The AC90 maintains this altitude throughout the period of the Airprox which is reported to have occurred at about 4½nm from touchdown - about 5nm from the Aerodrome Reference Point on the radar recording. The diagram reflects the Tiger Moth pilot's reported 'track made good' but it is not feasible to determine independently the horizontal separation as the two ac passed abeam one another.

UKAB Note (2): The 0950UTC Cambridge Weather was reported as: Surface Wind: 360/7kt, 310V030; Visibility >10km, nil weather; Cloud: OVC @ 1700ft; QNH1020mb.

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 a report from the appropriate ATC authority.

The concise comments from ATSI revealed that the AC90 pilot was mistaken if he thought he was in receipt of a RIS whilst approaching Cambridge. It was disconcerting that despite having a serviceable SRE, Cambridge does not have sufficient controllers to provide a radar service throughout the aerodrome's opening hours. If the radar had been manned and an appropriate service provided, as might reasonably be expected, perhaps the AC90 crew could have been forewarned about the presence of the Tiger Moth.

Whereas an ILS will provide the precision of a 'runway' approach aid, a controller Member emphasised the potential inaccuracy inherent in 'airfield' approaches such as the NDB/DME procedure flown here by the AC90 crew. Whilst the AC90 crew's approach had been entirely normal, the nature of an NDB/DME approach - with associated higher weather minima - creates the potential for ac to approach wide of the RW centreline in other circumstances. The Tiger Moth pilot was evidently aware of the exact location of the Cambridge RW05 centreline. Whilst he had planned his flight to remain clear and later verified the position of his biplane approximately ½nm S of the centre-line, Members were doubtful that this was enough to guarantee safe separation against IFR traffic that might not be seen until the last moment - especially if the latter had been flying a little wide of the mark - which fortunately the AC90 here was not.

This Airprox was an example of the difficulties that can ensue when pilots operating under VFR fly relatively close to the cloud base in the vicinity of an instrument approach where IFR traffic will undoubtedly be encountered. Even IFR traffic flying either a precision or non-precision 3° approach and penetrating an overcast can only be seen a maximum of 1nm away by a pilot flying 300ft clear below the cloud base before the other ac has descended to the level of the VFR ac, thus leaving little time for avoiding action or room for manoeuvre. Fortunately here the AC90 was virtually on the RW centre-line when the pilot obtained VMC below and then spotted the Tiger Moth.

The Board was briefed that analysis of the RT transcript for Cambridge at the time revealed that the AC90 was No2 in traffic to another Tiger Moth FINALS to the grass strip at Cambridge, which the twin's crew was told about moments before the AC90 pilot saw the subject yellow Tiger Moth off his starboard wing. Perhaps an element of momentary confusion might have resulted on the reporting pilot's part here. Nevertheless, the subject yellow Tiger Moth pilot's route did not give much room for manoeuvre if caught unawares so, in the Board's view, either giving the approach area a wider berth or communicating with Cambridge so that traffic information might be obtained

would have been a wiser move. However, a GA Member pointed out that not all Tiger Moths are radio fitted due to the absence of an electrical generator and many pilots still use handheld radios. Nevertheless, where RT is fitted the AC90 pilot's observation in this respect was not unreasonable and Members agreed that when flying at these levels in the vicinity of their RW centre-line, Cambridge ATC was far more likely to provide useful information about other traffic than Duxford INFORMATION. The Board also cautioned crews flying IFR approaches in the 'Open FIR' - without the benefits that CAS affords – to guard against over reliance on TCAS which is naturally rendered blind to ac that are not fitted with, or not operating, SSR. In this respect, whilst recognising entirely that the vintage Tiger Moth was not fitted with a transponder, nor amazingly that Cambridge is not equipped with SSR, the use of the available SSR conspicuity codes by pilots with Mode C where fitted will greatly assist adjacent ATSUs that are capable of interrogating transponders to see their ac.

As it was, in this 'see and avoid' environment the Tiger Moth pilot did not spot the AC90 until it was at a range of 0.25 – 0.33nm he reports. The crew of the twin – in the absence of any warning from TCAS or ATC - did not see the small biplane until a little later. Fortuitously, both were passing clear abeam on reciprocal but broadly parallel courses it would seem, albeit at the same level. Recognising here the legitimate right of each pilot to proceed about their lawful occasions, the Board concluded unanimously that this Airprox had resulted from a conflict in Class G airspace between IFR and VFR traffic in the vicinity of the instrument approach to RW05 at Cambridge. Whilst potentially the outcome could have been significantly different, the Board always deals with what actually occurred not what might have happened if the circumstance had been slightly different. The Members therefore agreed, unanimously, that in the circumstances conscientiously reported here no risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace between IFR and VFR traffic in the vicinity of the instrument approach to RW05 at Cambridge.

Degree of Risk: C.

AIRPROX REPORT No 047/07

AIRPROX REPORT NO 047/07

Date/Time: 7 May 1643

Position: 5004N 00544W (3nm SW Lands End
A/D - elev 401ft)

Airspace: LFIR (Class: G)
Reporting Ac Reported Ac

Type: SK61 C172

Operator: CAT Civ Comm

Alt/FL: 1500ft 1600ft

(QNH 1015mb) (QNH 1016mb)

Weather VMC CLOC VMC CLOC

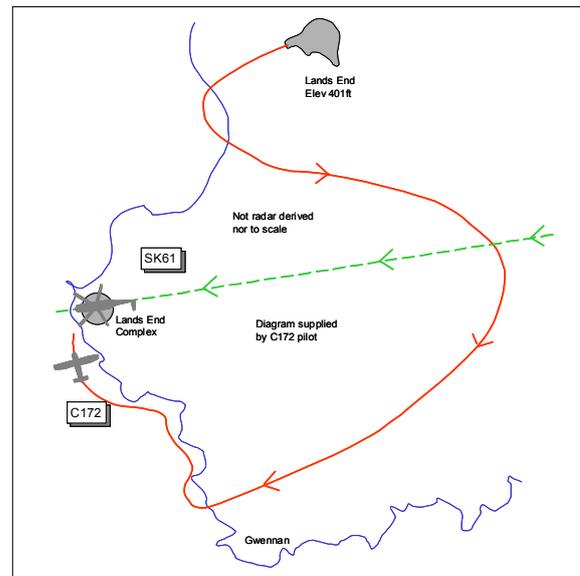
Visibility: >10km >10km

Reported Separation:

Nil V/200-300m H 100ft V/1500m H

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SK61 PILOT reports en route from Penzance Heliport to the Scilly Isles and in receipt of a FIS from Lands End Radio, he thought [actually Tower], on 120.25Mhz squawking 7046 (Culdrose Conspicuity code) with Mode C. The visibility was >10km in VMC and the helicopter was coloured red/white/blue with standard lighting plus anti-collision beacons all switched on. Lands End Radio told them of a Cessna which passed 2nm ahead R to L towards Gwennan Head (4nm S of Lands End aerodrome). The Cessna then turned back towards them, converging on what appeared to be a collision course, so he expressed concern to Lands End Radio. Approaching the coast, 2nm S of the Lands End Complex at 120kt and 1500ft St Marys QNH 1015mb, the controller called the Cessna pilot whose ac by now was 200-300m away at the same level. As they were about to take avoiding action, the Cessna banked R and passed behind. He opined that the Cessna pilot knew of his position at all times but this seemed to be a deliberate act which caused all of the flightdeck and cabin crew concern.

THE C172 PILOT reports flying a local sortie from Lands End in receipt of a FIS from Lands End Tower on 120.25MHz squawking 7000 with Mode C. The visibility was >10km in VMC and the ac was coloured white/blue with nav, landing and anti-collision lights all switched on. He was flying a scenic route [route map provided], with 2 passengers, which started with a departure from RW25 and climb to 1600ft QNH 1016mb followed by a turn downwind at which point he saw the SK61 and reported this to Tower. He commenced a R turn to follow the scenic route and decided to go further S over land than is usual to allow the helicopter to reach the Lands End Complex reporting point before he himself would. Whilst flying the S'y part of the route he was approximately paralleling the helicopter's flight path and pointed this out to his passengers. He coasted-out S of the normal position and then turned to follow the coast NW'ly towards the Complex, remaining visual with the helicopter at all times. The SK61 then appeared to slow down (indicated by the nose pitching up) approaching the Complex so he reduced his speed to about 100mph on seeing this. Taking his position from the ground he believed he was no closer than 2000m from the Complex and he reported to Tower that he was still visual with the SK61. He then heard the helicopter pilot state that they were on a collision course. He called visual and stated that he would pass behind the helicopter which appeared to accelerate (nose pitched down) and continue en-route. At no time was he closer than 1500m from it as it passed 100ft vertically below his level.

THE LANDS END ADC reports that both flights were VFR in Class G with both pilots visual with each other's ac. The C172 pilot reported separation as 1600m whilst the SK61 pilot reported 200m which was too close.

The Lands End METAR was EGHC 1620Z 28017KT 9999 FEW005 13/11 Q1016=

THE LANDS END SATCO reports that the incident occurred on a Bank Holiday when Culdrose Radar was closed.

ATSI reports that the C172 flight was cleared for take off from RW25 at Lands End Airfield, at 1638, with a L turn out for a local flight around Lands End. Just afterwards the SK61 flight contacted Lands End en route to Saint Marys (from Penzance), reporting at 1500ft. Information was issued about the C172 *“there’s a Cessna One Seven Two just airborne from the field routeing towards the Lands End complex believe he’ll be operating at one thousand five hundred feet also”*. The SK61 pilot reported *“got an aircraft visual in my one o’clock this time going right”*. Information was then passed to the C172 flight *“traffic a Sixty-one southwest bound you’re in his one o’clock same level”*. The C172 pilot replied *“I am visual with him and I’m turning right now to make sure I pass behind him”*. Approximately 2min later the SK61 pilot commented *“Your Cessna I don’t know what his intentions are but he seems to be on a collision course with us at the moment”*. The controller asked if the C172 flight had the SK61 in sight. The pilot responded that he had the SK61 *“in sight and as I say I’ll pass behind him”*. No further comments about the encounter were made on the frequency.

The controller issued appropriate TI to the subject flights which were operating VFR in Class G airspace. Both pilots reported visual with the other traffic.

UKAB Note (1): The Airprox occurred outside of 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 and operating authorities.

It was clear that both crews had seen each other throughout the encounter which occurred in Class G airspace where there was equal responsibility for collision avoidance through ‘see and avoid’. In the end and in accordance with the Rules of the Air Regulations, the C172 pilot visually avoided the SK61 - and this was stated on the RT - but the C172 pilot’s chosen flightpath had caused concern to the SK61 crew. This had caused the Airprox to be filed. Notwithstanding the requirements of the Rules of the Air Regulations, Members opined that a flight having right of way should not always assume that their ac has been seen by the other flight and should not leave any avoidance manoeuvre too late to resolve a potential confliction. In this case, the SK61 crew did confirm that the other ac’s pilot had seen their helicopter when the C172 was closing from their L. It appears that the C172 pilot was endeavouring to complete his ‘sight-seeing’ flight, affording his passengers a good view of the ‘Complex’ on their R, which may have introduced reluctance on his behalf to turn R early, behind the SK61. The GA Member opined that light ac pilots should be reminded that flying close to a helicopter, particularly large types, in any phase of flight was not a good idea, owing to vortex wake generation, and that any avoidance should be by a good margin.

Members could not resolve the disparate separation distances reported. Only the crews know how close the subject ac passed; the C172 pilot selected the miss distance which he thought was adequate but this was perceived to be too close by the SK61 crew. That said, the Board agreed that the visual sightings and actions taken by all parties were enough to ensure that safety had not been compromised during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C172 pilot’s chosen flight path caused concern to the SK61 crew.

Degree of Risk: C.

AIRPROX REPORT No 049/07

AIRPROX REPORT NO 049/07

Date/Time: 9 May 1016

Position: 5204N 00210W (Strensham Helipad - elev 82ft)

Airspace: Lon FIR/UKDLFS (Class: G)

Reporting Ac Reported Ac

Type: EC135 T2 Harrier T Mk10

Operator: Civ Comm HQ AIR (Ops)

Alt/FL: 100ft RadAlt↓ 350ft
(RPS 1009mb) (QNH 1000mb)

Weather VMC NR VMC NR

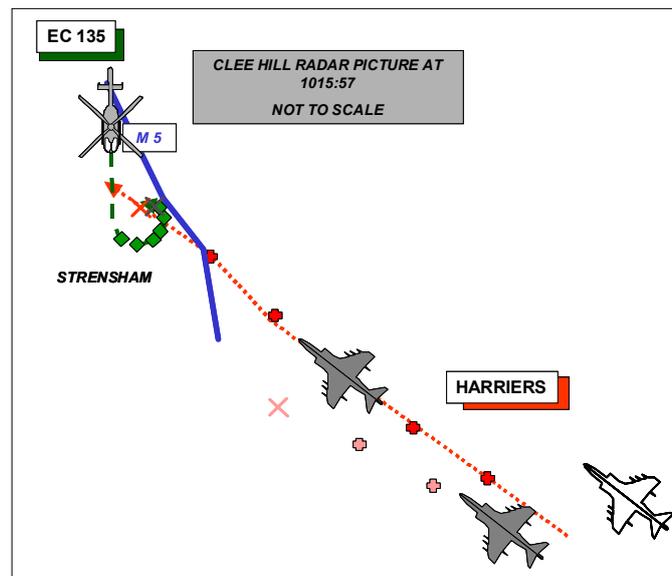
Visibility: 40km >10km

Reported Separation:

150ft V/250m H 250ft V/1nm H

Recorded Separation:

500ft V/ 0.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC135 T2 PILOT reports that his ac is operated on behalf of the County Air Ambulance charity and that TCAS is not fitted.

He departed Oswestry Hospital at 0945Z and returned directly to his base at Strensham at an altitude of 3500ft with a RIS from Shawbury then a FIS from Gloucestershire, squawking 0020 (Air Ambulance Helicopter Emergency Medevac) with Mode C and with all lights switched on. Radio communications with Gloucestershire ATC were ended as they were descending through 800ft to land. He then executed a left-hand 270° turn to position onto final approach into wind (~250°/5kt). (This procedure is adopted in order to avoid flying over the M5 Motorway below 500ft).

Just prior to attaining straight and level flight, heading 260° at 45kt and the AVAD (Automatic Voice Alerting Device) announcing 100ft, a Harrier was seen flying Northbound (he thought) in a steep right-hand bank turn around 250m to their W and crossing in front of his ac from left to right. This occurred at 1015 and a further two Harriers were seen to follow it, one passing behind them and the other well clear to the SW.

Since they were already below the Harrier and descending, he assessed the risk as being Medium.

THE HARRIER T MK10 PILOT reports flying in a two seat ac with another pilot in the rear on a tactical training sortie, squawking 7001 with Mode C, with HISLs selected on and listening out on the low level monitor frequency. He was heading 330°, out of sun, at 420kt when he saw a red helicopter. Although it was spotted relatively late, there was no risk of collision as the helicopter was very low and close to the ground. Although a small horizontal correction was made to increase the separation with the other ac, this was not in the event required.

The ac were in 'open' airspace operating under see and avoid and he was not aware that an Airprox existed until he was informed that the helicopter pilot had made a report. He assessed the risk as being low.

UKAB Note (1): Strensham is marked as an emergency services helicopter landing site on the UK Low Flying Chart (UKLFC).

UKAB Note (2): The incident shows on the recording of the Clee Hill Radar. However, only the Harrier involved (the leader) and the one tracking to the S of the incident position are seen to be squawking; the 3rd Harrier does not paint at all (a primary contact is seen 1 min before). The lead Harrier tracks 310° along the NW edge of the HLS as depicted on the UKLFC (The symbol is 1nm in diameter and is informative not an avoidance). No track deviation of the lead Harrier is evident on the recording.

HARRIER STN comments that in planning this sortie the crews of all 3 ac noted the presence of the HLS and ensured that their track did not take them directly over it. With the crews operating in 'open' airspace, under the see and avoid principle this incident reaffirms the need for all aircrew to maintain a good lookout. As the low flying chart lists the HLS as being informative and not an avoid, there is very little else they could have done to avoid the incident.

HQ AIR (OPS) comments that this was a late spot by the Harrier crew of a contact which was already below the horizon. It would have been equally difficult for the helicopter crew as the Harrier would have been some distance away when they turned left and started to concentrate on the approach to the landing site.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that this incident took place near a published Helicopter Landing Site (HLS), in Class G airspace where see and avoid is the prime means of collision avoidance, the associated responsibility being shared equally between the pilots in accordance with the Rules of the Air.

In this case both pilots saw the other ac and neither deemed any significant avoidance necessary due primarily to altitude difference between their ac, which was radar verified as being 500ft, and the horizontal separation generated by the Harrier pilot's small right turn.

The Board was pleased to note that following a call by HQ Air, the Standard Route to be flown by the Harriers from this OCU had been amended to give this HLS a wider berth.

PART C: ASSESSMENT OF CAUSE AND RISK

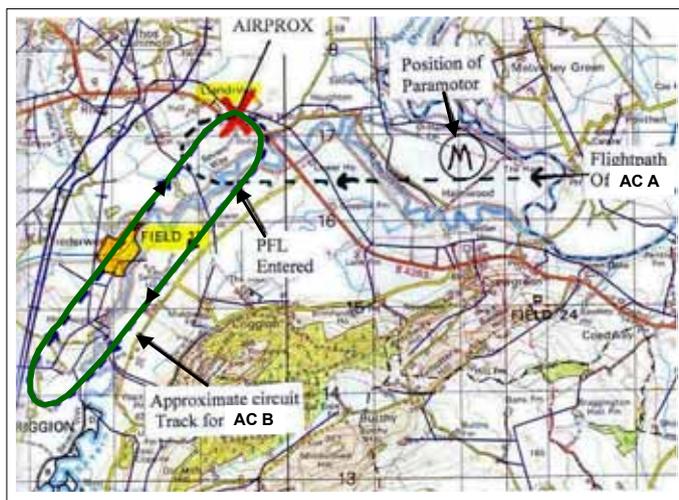
Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 050/07

AIRPROX REPORT NO 050/07

Date/Time: 4 May 1119
Position: 5245N 00304W(14.5nm W Shawbury)
Airspace: UKDLFS (Class: G)
Reporting Ac Reported Ac
Type: Griffin HT1 Griffin HT1
Operator: HQ Air (Trg) HQ Air (Trg)
Alt/FL: 550ft ↓ 300ft
(QNH 1015mb) (QNH)
Weather VMC Haze VMC
Visibility: 6nm NR
Reported Separation:
150ft V/20m H NR
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GRIFFIN HT1 (A) PILOT reports flying a black and yellow ac with HISLs, landing lights and nav lights selected on, on a training flight with a student pilot. Following a formation section of the sortie, the 3 ac split to carry out individual GH. His ac (Griffin (A)) was climbed to 2000' amsl and positioned to commence a Practice Forced Landing (PFL) in receipt of a FIS from Shawbury and squawking 0221. The weather was hazy with a cloud base of about 2200ft amsl. They positioned downwind to fly a 180° PFL in a suitable area: however, a powered para-glider was seen operating at about 200-500ft agl in the selected area so they transited further downwind until they found another suitable area. The new position that they selected was about 1-2km NNE of the field where the formation had originally split as that field was still being used by the lead ac (Griffin (B)) for GH. He looked for the lead ac and saw it making an approach to the field and judged it safe to complete their PFL. The student pilot initiated the PFL, heading 070° at 70kt, and the instructor brought the throttles to idle in accordance with normal operating procedures. As they approached the site at about 500ft agl, the instructor commenced opening the number 2 throttle at the same time as the crewman called to overshoot and break left. The student pilot reacted to this call but with the throttles still not open the instructor had to block the collective and open the throttles fully before climbing away. As the instructor was seated in the LHS he did not see the other ac but the crewman informed him that an ac he thought to be Griffin (B) had passed behind and beneath them by about 100ft and rotor span displaced. The crew of the other ac apparently had not seen them at all. He assessed the risk as being high and reported the incident on landing.

THE GRIFFIN HT1 (B) PILOT reports that they were conducting GH in the area in receipt of a FIS from Shawbury, squawking 0221, with HISLs, landing lamp and nav lights selected on. He conducted various manoeuvres and landings at the field where the formation had split up (Field 11). At the time of the incident he was unsure of his heading or speed but thought that they had been at about 300ft agl. He did not see the other ac at any time but was informed of the Airprox by the other captain on their return to base.

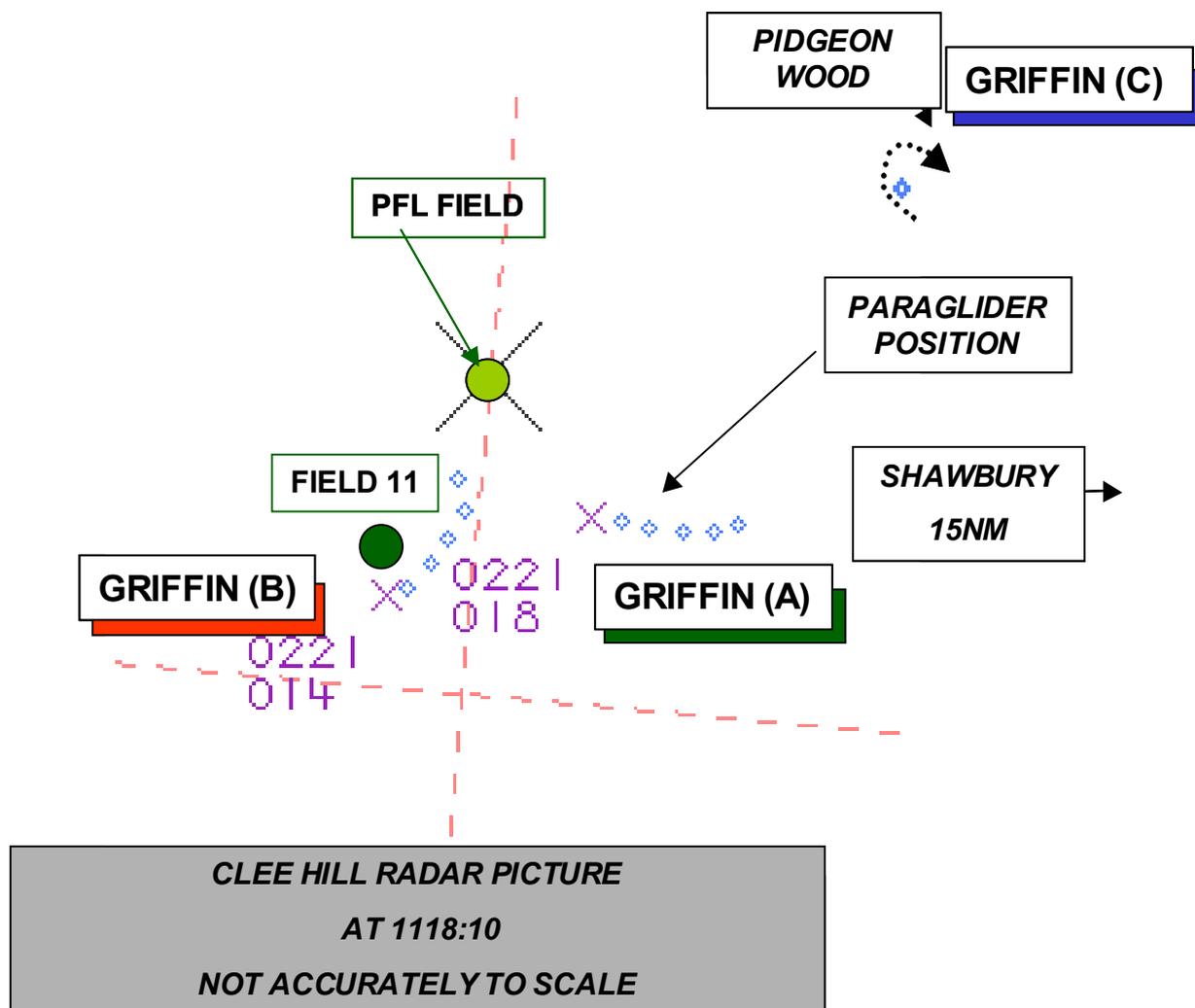
UKAB Note (1): The Unit concerned conducted a full flight safety (including human factors aspects) investigation into this incident, a copy of which was forwarded to the UKAB.

The report concluded that this incident highlighted the importance of maintaining an effective lookout during all phases of flight and of taking all reasonable steps to ensure that an area is clear before manoeuvring into it. DHFS consistently operates at a very high tempo and, as a result, LFA9 has become increasingly busy. Due to the time constraints of long transits and the relative suitability of particular types of terrain for rotary training, certain areas within the LFA have become particularly congested. The area where this Airprox occurred is one such area. The report also made several recommendations and observations all of which have been considered. These recommendations are being actioned, where supported, by the Unit and its parent Command and no further action

is required by the UKAB. The UKAB thanks the Unit for its openness in providing a copy of the report of their internal inquiry into this incident.

UKAB Note (2): The recording of the Clee Hill radar at 1117 onwards shows the lead up to the incident clearly but the CPA occurs at about 1119 when both ac are below radar cover. The formation leader (Griffin (B)) can be seen flying circuits to Field 11. The formation No3, Griffin (C), can be seen operating at Pigeon Wood to the NE of the incident area having departed Field 11 at 1111:48: Griffin (C) played no part in the incident. Griffin (A) is presumed to have departed Field 11 at about 1115 as the pilot reported the paraglider to Shawbury Low Level on the RT at 1117. Diagram 2 shows the relative positions of the ac 1min later as Griffin (A) is setting up for the PFL and Griffin (B) has just commenced a base turn inbound to Field 11. Shortly after this, both ac disappear from radar and do not reappear until after the event at 1121 when Griffin (A) can be seen positioning further to the N for another PFL and Griffin (B) is in the transit E to training area Nescliffe B. The event therefore is not seen on recorded radar.

Diagram 2.



UKAB Note (3): Both ac were operating on the Barnsley RPS of 1015. The weather was hazy but otherwise good with a wind of 080/05.

AIRPROX REPORT No 050/07

MIL ACC reports that they were content that the unit had fully investigated this incident and that there were no ATC aspects revealed.

HQ AIR (TRG) comments that the Flight Safety Investigation into this Airprox revealed areas that required closer study to mitigate the risks of carrying out PFL training. This work is nearly complete and is part of a wider study. The issue of LFA congestion has been taken forward and it has been agreed that the area of LFA 9 is to be increased and is expected to be in place by the end of Oct 07.

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 was informed that this incident took place a few months after a mid-air collision by 2 ac from the same unit: the Airprox was thus viewed as being very serious by both the Unit and the Command. As a result of both incidents, extensive procedural follow-up action had been put in place and the human factors aspects publicised. Also of note, the Board was briefed that measures to reduce the traffic density in LFA9 and to even out the activity over the whole LFA are being pursued.

Turning to the Airprox, Members were surprised that the Formation Leader did not positively ensure that the ac operated in geographically deconflicted areas for the GH portion of the flight even though this was planned to take place after the formation had split into 3 singletons. The 3 crews knew that the intentions of the other instructors was to conduct GH but apparently they did not implement any positive measures, at the planning stage or in the air, to ensure that they did not come into conflict. Since it is well known to crews from this Unit that LFA9 is very busy, Members considered this to be a significant omission which had contributed to the incident. Notwithstanding the Microlight, the pilot of Griffin (B), the formation leader, was, from his report, apparently unaware of Griffin (A)'s intentions or operating area. The pilot of Griffin (A) pilot was however aware that Griffin (B) was remaining at Field 11 to conduct approaches. Additionally, although the ac were operating on the same frequency, clear and unambiguous intentions were not passed by either crew.

Members were also surprised that the pilot of Griffin (A), who had visually acquired Griffin (B) and had been aware that it was conducting circuits and approaches to Field 11, apparently incorrectly considered it not to be a risk then lost sight of the ac while performing the PFL, a manoeuvre that necessarily involves a high rate of descent with very limited downward visibility, at least from the cockpit. One very experienced helicopter pilot Member considered this to be poor technique by an instructor.

Nonetheless, both ac involved had been operating in an LFA where the see and avoid principle applies. Neither instructor had seen the opposing ac and only a vigilant crewman in Griffin (A), albeit a full and integral member of the operating crew, had seen, assessed and very quickly and accurately verbally communicated the danger to the handling pilots. Despite there being little horizontal separation, this action had allowed the handling pilots to initiate action to mitigate any actual risk of collision. In the Board's view, however, the safety of the ac involved in this Airprox was clearly not assured.

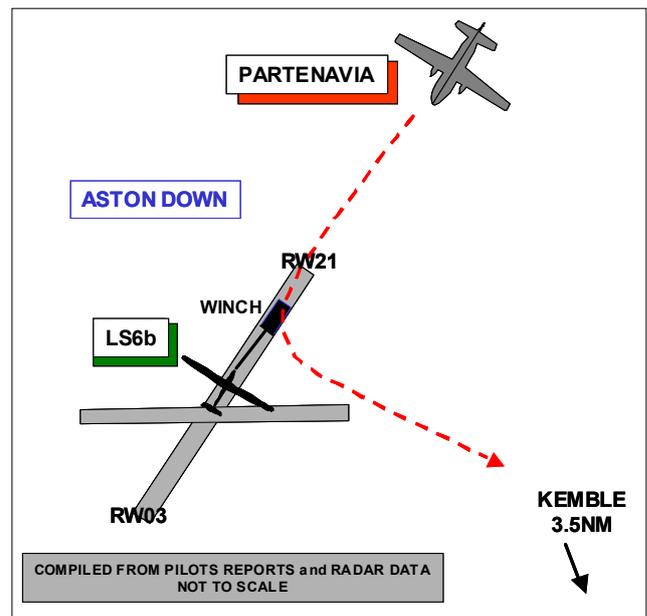
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the crew of Griffin (B) and a very late sighting by the crew of Griffin (A).

Degree of Risk: B.

AIRPROX REPORT NO 052/07

Date/Time: 5 May 1225 (Saturday)
Position: 5142N 00212W (Aston Down Airfield - elev 600 ft)
Airspace: Lon FIR (Class: G)
Reporting Ac **Reported Ac**
Type: LS6 Glider Partenavia Twin
Operator: Civ Club Civ Pte
Alt/FL: 1000ft agl↑ 1000ft
 (QFE NR mb) (N/K)
Weather VMC CAVOK VMC NR
Visibility: 6-10nm 10km
Reported Separation:
 Not Seen 300ft V/200m H
 (See UKAB Note (2))
Recorded Separation:
 NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE LS6 GLIDER PILOT reports that he was launching by winch at 70kt to 1500ft agl in a white single seat glider from the S end of RW03 at Aston Down Airfield. The launch crew reported the sky clear above and behind and he saw nothing airborne ahead. The glider was approaching 1000ft agl in the normal winch launching attitude (nose up 45°) when observers on the ground noticed an oncoming twin-engined ac one mile away on the reciprocal course of 210° lined up on the RW, estimated (by the observers) to be at approximately 4-500ft agl. As the oncoming ac reached the threshold of RW21 it banked hard to the L above the winch and left the airfield in the direction of Kemble at the same height.

The CFI telephoned Kemble Ops and it was confirmed that an ac matching the description was just landing at Kemble.

He saw and heard nothing of the other ac because of the very nose-up attitude and high noise level during winch launching but from what was reported to him, had he launched a few seconds later or the intruding ac been a few sec earlier, there could well have been a collision.

Since he did not see the other ac much of the content of his report relating to the other ac was based on the comprehensive evidence of ground witnesses. Based on the information passed to him, he assessed the risk as being very high.

THE CHIEF FLYING INSTRUCTOR reports that on the current CAA Aeronautical chart 1:500 000 scale, Aston Down is clearly marked as a Gliding site, elev 600ft, with a cable launch capability to 3600ft amsl and it is also denoted as an area of Intense Gliding Activity. Pilots planning to fly through this area on a Bank Holiday Saturday in clear, warm weather at low level should expect to encounter significant glider activity.

Several times every year, pilots of ac inbound to Kemble appear to misidentify Aston Down for Kemble and enter a circuit or even line up on one of the two RWs, ignoring the different RW direction; the wind; the winch; the gliders - both in circuit and on the airfield - and a double-deck control bus parked at the launch point on the runway. It is often the case that these same pilots are in communication with Kemble throughout and only realise that they are mistaken when Kemble reports no sight of them on approach.

Efforts need to be made to bring to the attention of the GA community the great danger inherent in overlying a winch launch site below the advertised cable launch height.

AIRPROX REPORT No 052/07

UKAB Note (1): The UKAB does not normally accept reports based on witness observations or from ground staff (other than Air Traffic Controllers). In this case however, due to the seriousness of the incident and the fact that all of the witnesses were closely involved with the gliding operation, one being the Chief Flying Instructor, a composite ground witness/pilot report was submitted and accepted.

UKAB Note (2): The separation was estimated by the CGI as being 600ft V/ 200ft H

THE PARTENAVIA PILOT submitted a comprehensive, candid report describing the event. He reports that he was flying a VFR return journey from Gloucestershire to Kemble with one passenger. His ac is capable of cruising at 180kt so this was a 10min trip and consequently one of high workload with takeoff, cruise, radio changes and set up for landing all occurring in very quick succession. After takeoff, he set course for Kemble by programming his GPS and engaging the autopilot, heading, he thought, 170°. He called Kemble at 10nm and was told to position for 08R so he planned to fly over the airfield at 1000ft and join the circuit at midfield downwind.

At 8nm he thought he had the airfield in sight but although he was expecting it to be straight ahead, the airfield was actually to his right. Although he questioned this, he could see a large asphalt RW which appeared to be of the correct orientation so he considered it must be Kemble. Contributory factors that led to him making this decision were:

He had noted that the autopilot did not always track a course with 100% accuracy – being slightly left of track would not be a complete surprise.

He was not familiar with the area and had assumed that both South Cerney and Aston Down would be smaller landing strips and most probably grass.

He was so intent on avoiding both Aston Down and South Cerney and, believing them to be small fields, he turned towards the large asphalt RW that he had convinced himself was Kemble, disengaging the autopilot and flying the ac manually. From this point he set himself up to join from the dead side by overflying the RW and positioning downwind. At about one mile from the RW, he called Kemble radio and told them he was about to overfly the airfield to position downwind.

At that point he noted a glider about 300ft above and climbing. He also noted a winch wire (trailing from below the glider) and realised that he was approaching the wrong field so he executed a steep left turn to avoid going underneath the glider. He then called Kemble Radio and told them he had approached the wrong airfield and about one minute later they advised him that Aston Gliding had called them and so he asked them to apologise on his behalf.

After positioning to the S of Kemble to re-orientate himself, he joined the Kemble circuit and landed without further incident. He then got a message to call the CFI at Aston, which he did, agreeing that the CFI would file an Airprox.

He was very disappointed with himself for allowing this potentially fatal situation to occur. He generally prides himself on his airmanship and takes a keen interest in aviation safety. His ac is based elsewhere in England and he is very aware of the glider sites in his home area, ensuring that he gives them a wide berth. His home base has a sample of winch wire on display; a warning of what it might do to a light ac and furthermore he had read a magazine that month which had an article highlighting the dangers of parachute and gliding sites.

Despite self-briefing on the need to avoid both Aston Down and South Cerney, he allowed himself to get convinced he was at the right airfield despite it being to his right and not straight on, simply because he saw what he wanted to see. With hindsight he should have cross-referred his position with other sources available – such as the GPS.

UKAB Note (3): The Kemble entry in the UK/AIP states at 2.20 warnings:

Be aware of proximity of Aston Down gliding centre 4nm NW, winch launching to 3000ft agl.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

There was no doubt that this had been a very serious incident that warranted a full investigation. The Board was informed by the specialist gliding Member - who was familiar with the incident - that there were several very experienced gliding instructors on the ground, all of whom witnessed the occurrence and corroborated the CFI's report which stated that the Partenavia had come very close to the winch cable. It was also pointed out that the winch driver at the time of the incident had been the CFI and that he had seen the Partenavia which necessarily meant that it had been forward of him - i.e. between the winch and the cable - as there is no visibility rearwards due to the structure of the winch cab. The specialist gliding Member was of the opinion that the Partenavia had actually been making an approach to RW21 at Aston Down, overshooting over/round the winch.

The symbol on the CAA ½ million chart (and to a lesser extent the ¼ million since the symbol is similar but twice the size) for a gliding airfield (with no other collocated activity which also required promulgation) although clear is not prominent and one GA Member considered that this might be a reason for the high number of overflights by GA ac of Aston Down. In addition, although Aston Down is annotated on both maps as a 'Glider Launch Site', it is also annotated on the ¼ million as a 'Disused or Abandoned Aerodrome' which could be confusing since it is far from disused or abandoned and very active, primarily with gliders, motor gliders and occasionally tugs. That said, it is not obvious from the charts that although the **main** runways at Aston Down and Kemble are not in the same direction, Aston appears to have 3 runways all the same length, one in roughly the same direction as 08/26, the main runway at Kemble. None of these factors however nor his unfamiliarity with the area nor his (self-imposed) high workload were considered by the Board to excuse the Partenavia pilot's poor navigation and resulting misidentification of his destination airfield. The comment in his report stating the he "saw what he wanted to see" was considered as a most important Human Factor that all aviators would do well to note. Bearing this in mind it is most important to check all available information before changing one's plan rather than acting on a single source.

Another Member pointed out that there are now a number of large airliners being dismantled on Kemble, easily visible from all directions, which provide a good and unique 'marker' for the airfield, although the Partenavia pilot, who normally operated in and from another part of the country, would not necessarily have known this.

There was much discussion regarding the degree of risk. As there was no externally verifiable information such as transponder Mode C recordings, Members decided that as the Partenavia pilot had seen the glider, albeit very late, his avoiding action had been enough to remove any actual risk that the 2 ac would collide. The proximity of the Partenavia to the winch cable meant that the safety of both ac had however been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Partenavia pilot entered a promulgated and active glider site and flew into conflict with the glider on a winch launch.

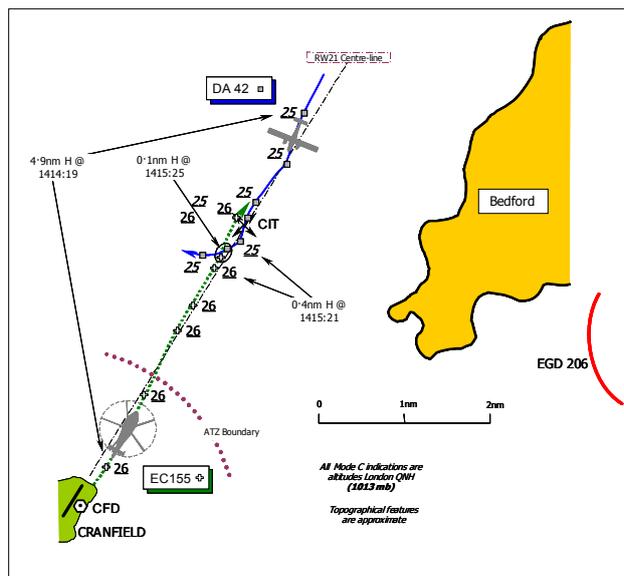
Degree of Risk: B.

Post Meeting Note: The Military Low Flying Advisor to the Board pointed out that for military ac Glider sites attract a mandatory avoidance of 2nm (normally), up to 2000ft agl. The size and number of such avoidances is currently under review.

AIRPROX REPORT No 053/07

AIRPROX REPORT NO 053/07

Date/Time: 16 May 1415
Position: 5207N 00034W (3½nm NE of Cranfield
- elev 358ft)
Airspace: London FIR (Class: G)
Reporting Ac **Reporting Ac**
Type: EC155 B1 DA42
Operator: Civ Pte Civ Trg
Alt/FL: 2600ft 2500ft
QNH (1013mb) QNH (1013mb)
Weather VMC CLBC VMC CLBC
Visibility: 10km 5km
Reported Separation:
100ft V/Nil H 50ft V/Nil H
Recorded Separation:
100ft V contacts merged



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EC155 B1 HELICOPTER PILOT reports he was in transit under VFR direct from COMPTON (CPT) VOR to the CRANFIELD (CFD) VOR, en-route to Norwich. Whilst in contact with Cranfield APPROACH on 122.85MHz he was receiving a FIS, flying in VMC some 400ft clear below cloud with an in-flight visibility of 10km. A squawk of A7000 was selected with Mode C. TCAS is not fitted.

Overhead the CFD at an altitude of 2600ft Cranfield QNH (1013mb) flying at 140kt, APPROACH called to inform him that they should avoid Danger Area EGD206 - Cardington. This RT message was difficult to read but his co-pilot – the PNF - informed APPROACH that they would route via the northern [aerodrome] boundary to the edge of Bedford so as to avoid the Danger Area before turning on a direct track for Norwich. The PNF then asked APPROACH to confirm that his last message was simply for them to avoid D206 and tried tuning the radio and calling Cranfield APPROACH on the other VHF set to see if it would improve the readability of the controller's transmissions. They reached the town of Bedford and he was about to turn R to follow its outline when he noticed a twin piston-engined fixed wing aeroplane – the DA42 - in his half-past-one about 1nm away heading towards them. To avoid the twin he turned L off of his heading of 050°(M) and climbed as this appeared to be the fastest means of taking them away from the other ac's track and altitude. The twin passed just under the starboard side of the helicopter about 100ft below them with a "high" risk of a collision. He then turned his helicopter R back towards the northwestern edge of Bedford Town. At about the same time, the pilot of the twin passed a message to Cranfield APPROACH saying that he wished to report an Airprox. Prior to sighting the DA42, neither he nor his co-pilot were aware that there was another ac at 2500ft making an ILS approach into RW21 at Cranfield.

Continuing on their route direct to Norwich, he agreed to telephone the Cranfield APPROACH controller after landing. His helicopter is white & blue with red stripes.

THE DA42 PILOT in a frank and concise account reports he was conducting an IFR instructional sortie with a student PF in the LHS and another student occupying the rear seat. IF screens were in place but they were flying in VMC, some 1000ft clear below cloud with an in-flight visibility of 5km. Cranfield ATC was providing an Approach Control Service on 122.85MHz and a squawk of A0247 was selected with Mode C on. TCAS is not fitted.

Overhead the CIT in a level R turn passing through 350°(M), he thought, at 105kt, he allowed himself to become distracted as the student PF turned 'BEACON OUTBOUND' so he did not see the conflicting traffic beforehand. He only became aware of the white & red helicopter as it flew 50ft directly overhead in a level attitude - no avoiding action was taken as there was no time. Assessing the risk as "very high", he had been aware of the helicopter on frequency being advised by APPROACH to avoid EGD206. He added that the position and design of his ac's IF screens was a major contributory factor during this Airprox and action is being taken to improve their design.

UKAB Note (1): The UK AIP at AD2-EGTC-1-3 notifies the Cranfield ATZ as a radius of 2nm centred on RW03/21, extending from the surface to 2000ft above the aerodrome elevation of 358ft amsl.

THE CRANFIELD COMBINED TOWER & APPROACH CONTROLLER (APP) reports that at about 1410 the EC155 helicopter crew called SW of the aerodrome routeing VFR through the overhead en-route to Norwich requesting a FIS. The overhead transit was approved at 2500ft QNH (1013mb) and traffic information was passed to the helicopter crew about a PA34 conducting instrument training under IFR at Cranfield. When the EC155 crew reported in the overhead further traffic information was passed on the PA34, which was routing back to the CIT. A warning was given about EGD206 – Cardington – SE of Bedford. At 1416 the DA42 pilot inbound to Cranfield IFR reported an Airprox with a helicopter passing 50ft above his ac. APP then passed traffic information on the EC155 to the DA42 crew and then also to the helicopter crew about the DA42. The EC155 crew advised that they had routed N of Bedford to avoid D206, before turning E for Norwich.

ATSI reports that at the time of the Airprox both flights were in communication with the Cranfield APPROACH controller (APP) whose workload and traffic loading were both described as 'medium - high'. The controller was operating both the TOWER and APPROACH (procedural) functions in a bandboxed configuration. Radar is not available to ATC at Cranfield.

Due to the proximity of Luton's CAS, it is normal practice for Cranfield APPROACH to hold traffic at altitudes above the published transition altitude of 3000ft. The transition altitude within Luton's CAS is 6000ft and so it is easier for Cranfield controllers to identify and resolve conflicts between IFR traffic if they are using a common datum.

The DA42 crew contacted APP at 1401:50. The pilot reported that he was still working Cottesmore and requested the Cranfield weather. This was passed and the controller advised that RW21 was in use with the QNH (1013mb). At 1404:20, when the ac was 14.5nm NW of Cranfield, the pilot reported that they were released by Cottesmore and requested an APPROACH CONTROL SERVICE. At the time a PA34 was established in the 'CIT' hold (located on the final approach to RW21 at a range of 3.68nm from the threshold) and undertaking instrument training. APP asked the pilot of the PA34 his altitude which was confirmed as 2500ft. The controller then cleared the DA42 crew to descend to 3500ft QNH (1013mb) and to route direct to the CIT. This was correctly acknowledged and the controller instructed the crew to squawk A0247, the code allocated to Cranfield for IFR conspicuity purposes.

Shortly afterwards the pilot of the DA42 was asked his level and he reported maintaining 3500ft. The pilot was then asked to confirm that he would be making a hold followed by an NDB approach and then 'circle to land', which was confirmed. At 1409:05, the controller asked whether the DA42 crew was in the hold to which the reply was "*Half a mile to run [C/S]*". The PA34 was now inbound on the procedure and so the controller instructed the DA42 crew to descend to 2500ft and to report when level. The PA34 crew was instructed, following the missed approach, to track 210° and climb to 2500ft. At 1410:10, the EC155 crew called and advised: "*We're currently 10 miles southwest of Cranfield at 2600 feet requesting overhead and then a right turn en route to Norwich remaining just north of Bedford at 2600 feet - 2 souls on board [C/S]*" whereupon the APP passed the QNH and requested the ac type. Traffic information was passed about the PA34 to the pilot of the EC155, advising that the aeroplane would be climbing to 3500ft, and the helicopter crew was instructed to report any change of altitude and also to report at 3nm to run to the Cranfield overhead, all of which was correctly acknowledged. The controller then transmitted to the PA34 crew: "*...continue climb now to altitude 3500 feet southwest bound, traffic is an EC 1-5-5 southwest of you 2600 feet and VFR routeing into the overhead*". The pilot of the PA34 read back 3000ft, incorrectly, and asked the controller whether he could accept the ac for a second approach. APP corrected the level to 3500ft and confirmed that a second approach could be accommodated.

The controller then asked the DA42 crew to report their altitude. After it was confirmed the flight was maintaining 2500ft the pilot was instructed to report 'BEACON OUTBOUND'. The PA34 crew, having reported passing 2500ft, was instructed to resume their own navigation to the CIT and to be level at 3500ft by the CFD. (ATSI Note (i): This was to make use of a unit deemed separation thus ensuring separation between the PA34 and the DA42). At 1413:05, the EC155 crew reported 3 miles to run to the overhead whence the controller instructed the crew to report 'overhead'. APP then transmitted traffic information to the PA34 about the EC155 helicopter which was repeated adding "*...Cranfield overhead from the southwest VFR 2,600 feet outbound eastbound*". The pilot of the PA34 acknowledged this and traffic information was passed to the EC155 crew in respect of the PA34. At 1413:50, the EC155 crew reported overhead and the controller cautioned them that Danger Area 206 (Cardington), located on the SE side of Bedford, was active. (ATSI Note (ii): EGD206 is promulgated as active from the surface to

AIRPROX REPORT No 053/07

6000ft). The controller asked the crew of the DA42 their position and they replied 'BEACON OUTBOUND'. Just before 1415:30 the controller cleared the DA42 crew for an NDB approach to report 'BASE TURN' complete, which was read-back. At 1415:45, the DA42 crew reported that they had had an Airprox with a helicopter which had flown about 50ft above them.

At the time of the Airprox the weather at Cranfield was reported as: 250/9kt; 7km visibility in slight rain; scattered cloud at 1800ft; broken at 2900ft; QNH 1013mb QFE 1000mb. A light ac had requested to taxi for a circuit detail but, because of the weather, the controller declined this request. Cranfield operates a system of training slots which regulates the number of ac carrying out holds and instrument approaches, as well as those within the circuit, at any one time. Both the PA34 pilot and the DA42 crew were booked into the training system. When the EC155 crew called, the controller assumed the ac was operating under VFR even though the pilot neither volunteered nor was asked for his flight rules or conditions. Although no level of service was requested or offered, the controller was of the opinion that he was simply providing a FIS to the EC155 crew. He believed that if the pilot had wanted a higher level of service he would have requested it.

Although the pilot of the EC155 stated on his initial call that he was planning to route just N of Bedford, APP mistakenly believed that the helicopter would be routeing S of Bedford. He therefore concluded that the helicopter was not [conflicting] traffic to the DA42, which was in the CIT hold NE of the Cranfield overhead. From the report submitted by the pilot of the EC155, they were, in fact, operating under VFR and routeing from CPT to CFD, which is a track of approximately 035°. On reaching the Cranfield overhead a direct track to Norwich is 063° and so would account for the statement that they would be making a right turn towards Norwich. However, a track of 063° would take them over the southern part of Bedford and close to D206 and so it would be reasonable to deduce that the turn onto the new track would be made a short time after passing overhead Cranfield. This situation clearly differed from the mental picture the controller had constructed as when he passed traffic information to the PA34, at 1413:25, he stated that the EC155 would be "...outbound eastbound". The mental picture that the controller had was that the EC155 crew would route to the Cranfield overhead, turn right and route out S of Bedford town, clear of D206, and accordingly would not be [conflicting] traffic to the DA42 which was in the CIT hold.

The London Heathrow radar recording shows that when the EC155 was overhead at 2600ft, the DA42 was in its 12 o'clock at a range of 5.3nm still maintaining 2500ft. At the time that the DA42 crew was cleared for the NDB approach, the EC155 was in its 12 o'clock - 1nm on near reciprocal tracks. The EC155 passed virtually overhead the DA42 with a difference of 100ft indicated on Mode C readouts.

[UKAB Note (2): The Airprox occurred moments after 1415:25 – in between sweeps - as the EC155 which maintained 2600ft QNH (1013mb) throughout, overflew the DA42 that was maintaining 2500ft QNH and turning R outbound after passing over the CIT. A slight L 'jink' by the EC155 is apparent replicating his reported avoiding action turn after the contacts cross.]

MATS Part 1, Section 3, Chapter 4 page 1, para 3 states the following:

"Although in Class...G airspace separation standards are not applied, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to see and avoid each other. It is accepted that occasionally when workload is high, the traffic information passed on aircraft in Class...G airspace may be generic rather than specific".

The DA42 crew was operating in accordance with the clearances issued by the Cranfield APPROACH controller. The EC155 crew had stated the routeing that they intended to follow but this was mis-interpreted by the controller. Accordingly, APP did not believe there was any conflict between the two ac and no traffic information was passed to either the EC155 crew or the DA42 crew about the presence of each other's ac, as is required by MATS Part 1.

Following this Airprox the unit has issued a memorandum to all controllers reminding them of the importance of establishing the flight rules under which flights are operating. Furthermore, it goes on to emphasise the importance of passing traffic information about transit traffic to crews operating IFR in the instrument approach pattern. If the routeing of a VFR transit is in doubt then clarification of route and intentions should be sought and appropriate traffic information passed.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was evident to the Board from the comprehensive report helpfully provided by ATSI that this Airprox stemmed from a misunderstanding by APP of the EC155 crew's routeing. The report had made plain the controller's mistaken belief that the helicopter would fly to the Cranfield overhead, then turn R to route out S of Bedford town towards Norwich. This misunderstanding was fundamental to the cause, despite the helicopter crew reporting that they were "...en route to Norwich remaining just north of Bedford at 2600 feet...". Believing therefore that the EC155 would be remaining S of the CIT hold, no traffic information was passed either to the EC155 or the DA42 crews about each other's ac. It was clear that the combined APP/TOWER controller did not have the benefit of radar to assist him in formulating his mental model in this procedural APPROACH CONTROL environment. Nevertheless, even turning from overhead the aerodrome directly eastbound would have placed the helicopter just over 3½nm away from the CIT to which the DA42 crew were flying their procedure. Moreover, both ac were operating within 100ft of one another's altitude so it was surprising that the controller had missed the conflict. Whilst the helicopter crew's stated routeing should have been plain to APP, this Airprox illustrated well the absolute necessity to ensure that intentions are made as straightforward and as clear and unambiguous as can be: crews accustomed to operating under a radar service should be in no doubt of the difficulties that can ensue when operating in a bare procedural ATC environment. Thus no traffic information was forthcoming, which the ATSI report had shown the DA42 crew could reasonably have expected from APP as is required by national procedure. In the Board's opinion this was the crux of the issue and it was concluded that this Airprox was caused because the Cranfield combined APPROACH/TOWER controller misunderstood the EC155 crew's route and did not pass traffic information to either flight about the other.

For the helicopter pilot's part, it was clear that whilst working APP he was operating VFR in Class G airspace, unconstrained by promulgated IFR procedure levels where 'see and avoid' also prevails. Flying at an intermediate altitude of 2600ft, rather than transiting at a level equating to whole 500ft or 1000ft intervals was a wise precaution – apparently common practise amongst helicopter crews, a Member observed – but nevertheless demonstrating sound airmanship and a good lesson worth highlighting here for the benefit of others. This probably provided the only inherent vertical separation as the radar recording evinced that the DA42 was operating exactly at the promulgated altitude as the instructor pilot ensured that his student was flying the procedure accurately. Thus it was left entirely to both crews' visual scan to sight one another's ac and then afford appropriate separation. Whilst some would contend that the EC155 crew spotted the DA42 at a late stage at the reported range of 1nm, the helicopter pilot's account reveals he had time to take avoiding action by turning and climbing. Although the climb is not reflected by the radar recording the Board was briefed that a later conversation with the EC155 pilot had revealed that this was a short duration climb – only about 50ft – so given the limitations of Mode C this would not have been readily apparent on the recording. Nonetheless, he managed to climb above the twin but it was not until he passed directly above the DA42 that the latter's instructor safety pilot – also engrossed in monitoring his student's turn outbound - saw the helicopter but too late to take any action. Effectively, this was a non-sighting on the DA42 instructor's part: however, he had commented about the efficacy of the IF screens. In his view, this was a major contributory factor so Members were reassured that action was being taken to improve the design of the IF screens. Fortuitously, the radar recording showed that 100ft of vertical separation existed when the contacts merged. In the Board's view, therefore, the EC155 pilot's sighting and avoiding action was just in time to prevent an actual collision, but at these close quarters with only one crew able to take avoiding action Members agreed that the safety of the ac involved had indeed been compromised.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Cranfield combined APPROACH/TOWER controller misunderstood the EC155 crew's route and did not pass traffic information to either flight about the other.

Degree of Risk: B.

AIRPROX REPORT No 054/07

AIRPROX REPORT NO 054/07

Date/Time: 17 May 1231

Position: 5315N 00256W (12nm SE WAL)

Airspace: Manchester TMA (Class: A)

Reporting Ac Reported Ac

Type: JS41 B757

Operator: CAT CAT

Alt/FL: FL170 ↓FL150

Weather VMC CLNC VMC CLNC

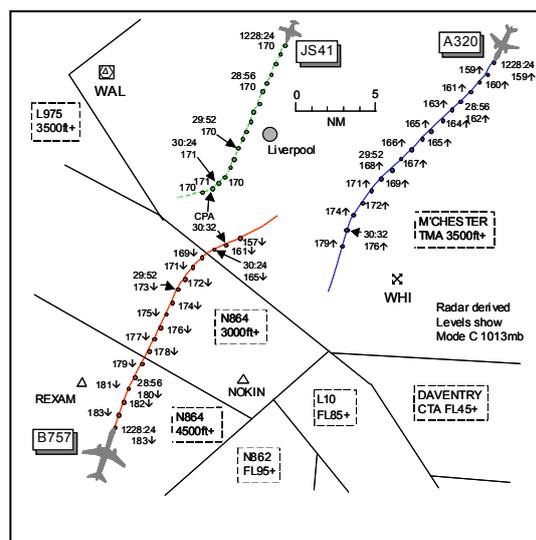
Visibility: 40km 40km

Reported Separation:

Nil V/1500m H 1000ft V/4.5nm H

Recorded Separation:

600ft V/4.1nm H OR 1000ft V/3.6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE JS41 PILOT reports heading 215° at 288kt cruising at FL170 under a RCS from MACC on 124.05MHz squawking with Mode C. As a TCAS TA was received in their 12 o'clock range 6nm at FL162 descending, ATC told them to "turn R now". They were unable to respond to the call owing to radio congestion and looking for the traffic but the Captain, PF, disconnected the A/P and started the R turn. ATC called again, instructing them to "turn R now onto heading 270°" and during the turn they saw a low wing twin engine jet descending through their level passing 1500-2000m clear on their LHS. He assessed the risk as high.

THE B757 PILOT reports heading 010° at 280kt and in receipt of a RCS from MACC squawking with Mode S. Whilst trying to manage their CDA (continuous descent approach) into Leeds/Bradford they were cleared to FL150 on a radar heading. Passing FL180 they were asked to increase their ROD until level at FL150. Shortly after this the controller transmitted "...avoiding action turn R immediately heading 090". This transmission was acknowledged, the A/P was disconnected and the ac was turned onto 090°. The other ac was seen on TCAS and visually about 5nm ahead crossing the nose and it passed 4.5nm away and 1000ft above. No TCAS alerts or warnings were received and he assessed the risk as low.

THE MACC WALSY TACTICAL CONTROLLER reports the JS41 was on frequency at FL170 tracking SW through MIRS1 on a parallel heading against slow climbing traffic, an A320, not on frequency. The B757 was opposite direction descending to FL150. Initially the tracks/headings were achieving lateral separation but in anticipation of achieving vertical separation fairly soon, he turned the B757 R for a more expeditious routeing. It now became traffic to the JS41 but not the A320 [to its E] which he anticipated would take longer to be vertically separated owing to its climb profile. To further assist his plan, he told the B757 flight to expedite its ROD but during the Sector handover that ensued he became aware that the B757's descent profile was not achieving vertical separation in time. Conflict Alert activated and he gave both flights avoiding action and TI to the B757 flight: the conflict was resolved before TI could be given to the JS41 flight.

ATSI reports that the controller reported that he had been operating as the Wallasey (WALSY) Sector Planner Controller for approximately 1hr before taking over the Tactical position to assist in sector manning. He only expected to be operational for 10min but this period had to be extended due to high workload elsewhere in the Control Room. He had been the Tactical Controller for about 30min before the Airprox occurred. For the first 15-20min, he described the workload as high but added that it then dropped to low. He said that after the workload decreased he had allowed himself to be distracted by talking to his colleagues. Additionally, he was in the process of handing over the sector when the incident occurred.

The B757 flight established communication with the WALSY Sector at 1224, reporting descending to FL200. The flight was instructed to descend to FL150. The B757 was N'bound on Airway N864, inbound to Leeds, and the

JS41 - not yet on frequency - was tracking SW at FL170, 74nm NE of it. The controller assessed that the level drop through would be achieved with horizontal separation being maintained. Approximately 2min later, the B757 flight was instructed to turn R heading 015°. The controller commented that the standard inbound routing to Leeds was via Wallasey. However, it is usual, as on this occasion, to position the flights towards Leeds before this point. Shortly afterwards the JS41 flight contacted the sector, reporting at FL170 on radar heading 230°. The controller advised that he would turn him L as soon as possible. The controller explained that the radar heading was to ensure separation from an outbound A320 from Leeds which was on a parallel radar heading, climbing to FL190. It had been decided, by the Planner, that this flight would not contact the frequency as it was expected, with reference to usual operation, to climb quickly through the sector's level. In the event, the A320 climbed slower than anticipated and required closer monitoring to ensure separation was maintained with the JS41 (and the B757). At 1227:40, the JS41 flight was instructed to turn L heading 215°, still tracking parallel to the A320 which was passing FL153 12nm to its E. At 1228:20, the B757 was instructed to turn R heading 025°, again to route it towards Leeds and to keep it W of the A320's track. The radar timed at 1228:24 shows the B757 passing FL183, just before turning R heading 025°, 25.9nm from the JS41. As a result of the respective turns to the subject ac, they were now on reciprocal tracks without vertical separation being assured. The controller explained that he still anticipated that the B757's ROD would provide the required vertical separation before horizontal separation was lost: His main concern was to ensure separation between the B757 and the A320.

Realising that the B757's ROD was less than he expected, at 1229:00 the Tactical Controller instructed its pilot *"just increase your rate of descent until level at Flight Level One Five Zero please"*. At about this time he commenced handing over the sector. The controller commented that during the handover process he would necessarily have turned his attention away from the radar display whilst handing over the appropriate information. However, returning his scan to the radar display he realised that the B757 was still not descending as quickly as he expected and he would have to take further action to control the situation. At about this time he was also warned of the conflict by another controller and STCA activated. At 1229:53, he instructed the B757 flight *"avoiding action turn right immediately heading Zero Nine Zero degrees"*. The radar shows that the subject ac were 9.7nm apart with the B757 passing FL173. Although the B757 was still higher than the A320 on its R, vertical separation between these two ac was quickly established. The controller then instructed the JS41 flight to turn but not using the avoiding action phraseology *"turn right immediately heading two seven zero degrees expedite the turn"*. Because the pilot did not read back the instruction he repeated *"turn right immediately heading Two Seven Zero degrees this is avoiding action"* which the pilot acknowledged. TI was passed to the B757 flight *"you've got traffic in your left ten o'clock it's about four and a half miles it's at Flight Level One Seven Zero it's turning away to the west"*. The pilot reported visual with the traffic. In accordance with the MACC MATS Part 2 procedures whereby the Manchester Watchman radar was not being used, the required radar separation was 5nm. The minimum separation occurred at 1230:24, the B757 passing FL165, 4.1nm S of the JS41 which was showing at FL171 on the radar. By this time both ac had commenced their respective avoiding action turns. Once the flights were clear of each other they were instructed to resume their own navigation to Pole Hill and RETSI respectively.

UKAB Note (1): The CPA occurs at 1230:32 as the subject ac pass port to port separated by 1000ft and 3.6nm.

UKAB Note (2): The B757 is seen to descend 700ft between 1228:00 and 1229:04 then 800ft between 1229:04 and 1230:08 after which time the ac descends 1700ft during the next 48sec which equates to a ROD 2125fpm.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that there was a full complement of staff on duty for the shift and a number of learning points had been published at the unit after this incident. These highlighted the appropriate use of 'expedite' phraseology, the dangers of handover distraction and the use of rates of climb/descent to achieve separation. Additionally the unit training section had designed a 20min simulator session to give controllers practise in the correct use of 'avoiding action' phraseology and all controllers at the unit would be required to undertake this.

Moving on to the Airprox, the WALSY TC had formulated a plan which involved descending the B757 down to FL150, through the JS41's cruising level of FL170. Although the situation was made slightly more complicated

AIRPROX REPORT No 054/07

owing to the A320, he had twice turned the B757 for a more direct routeing to Leeds and also turned the JS41 which resulted in the subject ac being on conflicting flightpaths: the controller was now basing his provision of separation on ac performance. Pilot Members noted that the B757 flight profile (low ROD) was indicative of the ac being below the VNAV profile whilst trying to manage a CDA into Leeds. That said, the ac's calculated ROD 1min before and 1min after ATC requested the flight to 'increase ROD' shows a marginal rise but not in line with what the controller was expecting. Thereafter, the B757's ROD shows a marked increase after being given avoiding action. ATCO Members agreed that the WALSY TC should have used the word 'expedite' to elicit the appropriate response from the B757 crew to ensure that his intended plan was fulfilled. The TC had then commenced handing over the Sector which had taken his attention away from the traffic situation. ATCO Members agreed that with the controller relying on ac performance, he should have monitored the traffic situation more closely to ensure that his plan was going to work, possibly before commencing the handover. These events led Members to assess that the cause of the Airprox was that the MACC WALSY TC had vectored the JS41 and B757 into conflict.

Looking at risk, the TC had seen the deteriorating situation at about the time he was warned of it both by a colleague and STCA. He had issued avoiding action turns to both flights and TI to the B757 crew who reported seeing the JS41. The JS41 crew had received a TCAS TA on the approaching B757 when the controller had given them an immediate R turn which was repeated with 'avoiding action' phraseology when no response was received to the initial call. The JS41 crew had reported seeing the B757 passing 1500m away although the radar recording shows the ac passing 3.6nm away and 1000ft below. Both flights had executed their turns promptly as well as the B757 descending more rapidly during the turn. All of these elements when combined were enough to allow the Board to conclude that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MACC WALSY TC vectored the JS41 and B757 into conflict.

Degree of Risk: C.

AIRPROX REPORT NO 055/07

Date/Time: 17 May 1752

Position: 5443N 00259W (13nm E DCS)

Airspace: N615/N57/N601 (Class: A/C)

Reporter: ScACC TLA SC

	<u>1st Ac</u>	<u>2nd Ac</u>	<u>3rd Ac</u>
<u>Type:</u>	C551	EMB145	EMB135
<u>Operator:</u>	Civ Pte	CAT	CAT
<u>Alt/FL:</u>	↑FL195	FL220	FL200
<u>Weather</u>	VMC NR	IMC	NK

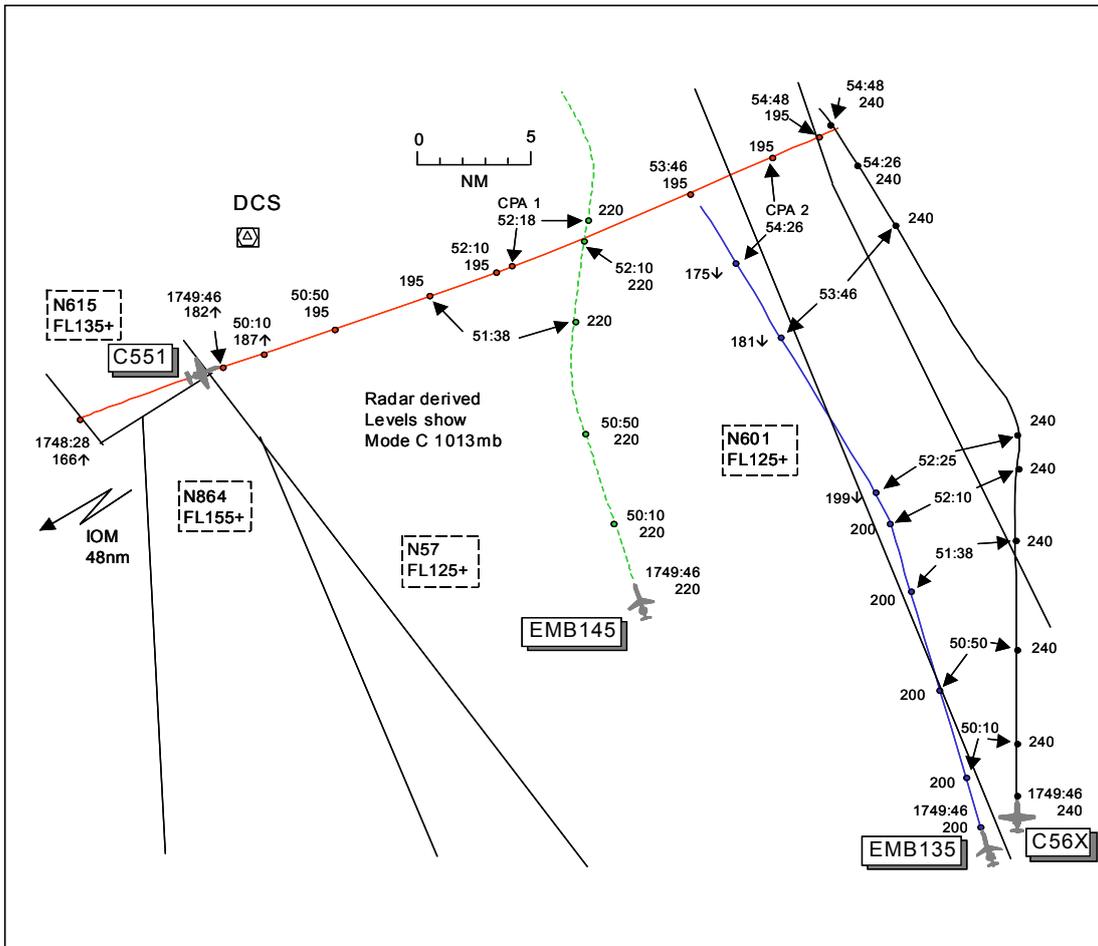
Visibility:

Reported Separation:

NR NR NR

Recorded Separation:

C551vEMB145: 2500ft V/3.9nm H C551vEMB135: 2000ft V/5.2nm H



AIRPROX REPORT No 055/07

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SCACC TLA SC reports that the Galloway RC pointed out to him a 7000 squawk 5nm SW of DCS tracking NE and climbing through FL170. At the time he, the TLA SC, had 4 ac N'bound at levels 180, 200, 220 and 240, all were in potential conflict. As the 7000 squawk approached FL195 he decided to issue the EMB145 flight avoiding action and then the EMB135 was given an expeditious descent and he gave TI to a C56X. The 7000 squawk maintained FL195 and the flight contacted Scottish Antrim Sector on 123.775MHz.

THE C551 PILOT reports outbound from IOM RW26 VFR routeing to DCS and NEW VORs to pick-up IFR clearances to Denmark. IOM Tower cleared him to FL65 NE'bound and after leaving their TMA [actually CTR] he continued his climb to FL195. According to his electronic Jeppesen VFR map there was no restriction on his routeing NE to DCS VFR whilst he remained clear of Danger Areas EGD405A, 406C, 406B and 406.

UKAB Note (1): The C551 pilot was contacted on several occasions post incident as part of the investigation phase. He had planned his flight using a commercially available flight planning/moving map software package displaying an electronic VFR map on a standalone 'tablet' PC, and his flight plan form was sent by his Flt Ops dept at his destination aerodrome. Attached to the pilot's CA1094 was a 'picture copy' section of the electronic map used by the pilot. Although airspace boundaries are shown, not all airway boundaries were depicted on the picture supplied, only the W'y edge of airway N615/N864 was marked 11nm SW of DCS. No information regarding CAS classification nor base/top levels were apparent although Danger Area activity levels were marked. The commercial company were contacted and were furnished with the C551 pilot's software version and serial number and replied with the following information:- *The package used by the C551 operator is a legacy flight-planning/moving-map software that has since been superceded by a newer software product. We continue to support customers with NavData updates and software patches. Charts displayed in the package can be either vector or raster images. Vector charts are generated by data. SUA [special use airspace] and airways can be displayed in vector charts. The raster image is a digital image of VFR charts. In the UK these would be the as the commercially available VFR+GPS charts which include controlled airspace information. The raster image map displayed would be the same as the paper VFR + GPS chart but using the vector type chart display features are pre-set by selecting the chart theme. When "Euro VFR" is selected SUAs are displayed.*

The paper 1:500000 VFR + GPS map is clearly titled "*Designed for flight in VMC and effective below Flight Levels: Ireland FL75, United Kingdom FL195*". Also, the CAS is annotated with name, classification, base levels with all top levels showing FL195. The C551 pilot confirmed that his electronic map was indeed similar to the paper chart – having obtained a paper chart recently post Airprox - and from the electronic map it seemed that flight was good up to FL195 with no indication about Class C airspace above, which had influenced his planning to fly VFR at that level.

THE EMB145 PILOT did not submit an ASR as he believed it was not a reportable incident. A subsequent request for a report from the UKAB was unsuccessful however the Capt was eventually contacted 5 months post incident by the Flt Safety Dept. He recalled flying in IMC and following the ATC turn instructions. TCAS showed 'proximate' traffic whilst turning – no other alerts/warnings were received.

THE EMB135 PILOT reports level at FL200 at 300kt when they were asked by ATC to descend owing to an unknown ac which had entered CAS. At no time did they sight the ac or did TCAS alert them to its proximity. They did not consider an Airprox had occurred but probably would have done had they not descended.

ATSI reports that the C551 flight contacted Ronaldsway Tower, at 1720, requesting to start up for a flight to Roskilde. The pilot commented that he had filed a flight plan VFR to Newcastle, then IFR to destination. IOM ATC did not have the flight plan but suggested the ac starting up on a 'book out' of the CTR. Shortly afterwards, the IOM received a squawk for the ac from ScACC. At 1725 the IOM telephoned ScACC to discuss the C551's flight. Following the discussion, ScACC agreed, because the flight had been filed VFR to Newcastle, that it was not necessary for the IOM to request the C551 to squawk the assigned code. This message was passed to the ADC and it was agreed with the APP that the flight would be issued with an IOM squawk (4651).

Whilst the C551 flight taxied to the holding point for RW26 it was passed its clearance "*maintain VFR in the Zone squawk Four Six Five One after departure it's a right turn out direct towards Newcastle*". The pilot read back the clearance correctly. The C551 flight was cleared for take off at 1734, the pilot requesting a climb to 3000ft. This was approved, VFR. Once airborne, the pilot was asked his intended cruising level. The pilot replied "*I with er go*

up at One Nine Five". He was instructed *"not above Flight Level Six Zero until advised please"*. At 1740, the pilot was informed *"you're clear of my controlled airspace now there's no known traffic to affect your climb to One Niner Five"*. The pilot replied *"Okay excellent (one word unintelligible) do you have a frequency I can contact to get my IFR clearance"*. The pilot was instructed to *"squawk Seven Thousand now contact Scottish One Two Three Decimal Seven Seven Five"*. The squawk and frequency were repeated and then read back by the pilot. The pilot was not instructed to remain clear of CAS but it would appear, anyway, he was not aware of the airway boundaries.

The frequency passed by the IOM was for the Antrim Sector. However, the flight did not contact that frequency until 1758, approximately 18min after the pilot had been informed about it. After leaving the IOM CTR the C551 commenced climbing above FL60, routeing just to the R of the C/L of ADR W911D (Class F, FL50-FL190). Operating VFR, the pilot did not require an ATC clearance for the route. The flight entered CAS (Class A Airway N615, base FL135) approximately 11nm SW DCS, at 1748:28, whilst passing FL166, levelling at FL195 after passing south of DCS.

The ScACC TLA Sector Controller reported that he was warned by another sector of a 7000 squawk about 5nm SW of DCS, tracking NE, passing FL170. At the time he had 4 ac routeing northbound between FL180-FL240. These included the subject EMB145 and EMB135 and a C56X (Citation). At 1749:50, the EMB145 flight at FL220 was warned *"Yeah we got penetration of our controlled airspace at the moment unknown traffic just keeping your heads up at the moment ten o'clock range eighteen miles heading northeast at the moment unverified One Eight Five climbing I'll keep you advised"*. The pilot queried the range, which was then given as 15nm, with the ac passing FL187 (1750:10). At 1750:40, the controller transmitted *"that traffic's still climbing in your half past ten range ten miles for avoidance I suggest you turn right on to a heading now of north please"*. The pilot reported a TCAS return.

At 1751:40, the EMB135 flight at FL200 was informed of the unknown traffic at FL195 and was instructed to descend now to FL160. It was then instructed to turn L heading 330°. The C56X at FL240 was then instructed to turn L heading 330°. The EMB145 passed 4.2nm ahead and 2500ft above the unknown (1752:10) with the horizontal distance decreasing just after they passed to 3.9nm (1752:18). The EMB135 passed more than 5nm clear behind the unknown [CPA 1754:26 2000ft/5.2nm] and the C56X passed 0.8nm ahead of the unknown, 4500ft above (1754:48).

The unknown, the subject C551, established communication with the Antrim Sector at 1758:30, reporting *"we're shortly coming up to Newcastle to open up our IFR flight plan back to Echo Kilo Romeo Kilo"*. The flight was then changed to another ScACC frequency to ascertain its requirements.

Several attempts were made to contact the C551 by the ScACC (Mil) D&D Controller. Initially at 1752, when it was 210°/15nm from Carlisle and then when it was at 10nm. Subsequently, at 1757:57, when the c/s of the unknown ac was assumed, this was used by D&D on a number of occasions to try and establish contact. At one point the pilot responded but two-way did not appear to be established as he did not contact the ScACC frequency given by D&D. The MATS Part 1, Section 1, Chapter 5, Page 15 states *'The action to be taken by controllers when they observe an unknown aircraft, which they consider to be in unsafe proximity to traffic under their control, in various types of airspace'. In Class A, C and D 'If radar derived, or other information, indicates that an aircraft is making an unauthorised penetration of the airspace, is lost, or has experienced radio failure – avoiding action shall be given and traffic information passed'. Additionally, 'When avoiding action is issued to an aircraft under a Radar Control Service, controllers must seek to achieve the required minima and pilots must comply with the instructions given'. Page 11 states 'Unverified Mode C data may be used for separation purposes provided a minimum vertical separation of 3000 feet for aircraft in receipt of a RAS and 5000 feet for aircraft in receipt of a radar control service is maintained and radar returns, however presented, are not allowed to merge'.*

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of 3 ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Looking at the controlling aspects first, ATCO Members sympathised with the TLA SC's predicament when faced with an unknown ac crossing through his Sector airspace at a busy time when he had several ac in potential conflict. His options were limited because of Sector constraints with N'bound traffic routeing up the E side of the airway structure and opposite direction traffic S'bound on the W side. Indeed, Members agreed that the TLA

AIRPROX REPORT No 055/07

SC had done well in the circumstances as there had been little chance in achieving 5000ft vertical separation and he had attempted to resolve the situation by manipulating his traffic to afford both vertical and horizontal against the 'unknown' C551. Military Members wondered why IOM ATC had not 'pointed out' the CAS ahead to the C551 pilot when he requested climb to FL195. Although military ATCOs would normally be expected do this with traffic under their control, civil controller Members opined that this was not always possible. The IOM APR had cleared the C551 flight to leave the IOM CTR and then informed the pilot that there was no traffic known to affect his climb to FL195. With hindsight, perhaps a reminder call about the CAS ahead would have been prudent but it seems the APR had judged that the quickest and easiest option was to transfer the flight to the appropriate controlling ATSU as the flight had about 8min flying time towards DCS before reaching the CAS boundary, enough time for the pilot to call on the given ScACC frequency.

Turning to the piloting aspects, it was clear that the cause of this Airprox was the C551 pilot had entered Class A CAS without clearance. The pilot had planned his flight using an electronic VFR planning tool but had assumed that cruising at FL195 was above the CAS structure. However, the ac's radar return can be clearly seen crossing the boundary of the Class A airway N615 to the SW of DCS climbing through FL166 prior to levelling-off at FL195. Members agreed that this whole incident had been as a result of inadequate pre-flight planning by the C551 pilot, who had shown a poor appreciation of UK airspace. The C551 pilot's chosen cruising level had, in fact, placed the ac at the upper level of Class A CAS, with Class C airspace commencing above FL195. Even a cursory review of a chart would have revealed to the C551 pilot that a positive ATC clearance was needed to fly within this airspace whilst transiting towards Newcastle at that level. Moreover his IFR flight plan should have commenced at the boundary of Class A CAS to the SW of DCS.

With regard to the inherent risk, the TLA SC had been warned of the C551's position by a colleague shortly after it entered CAS SW of DCS. He elected to vector the EMB145 to pass ahead of it and pass TI, the crew reporting a TCAS contact (proximate traffic). The SC then had descended the EMB135 and turned it L which ensured that it passed well behind and below the C551, the EMB135 crew reporting that no alerts were received on TCAS. These actions were timely and effective, allowing the Board to conclude that no risk of a collision had existed during the encounter.

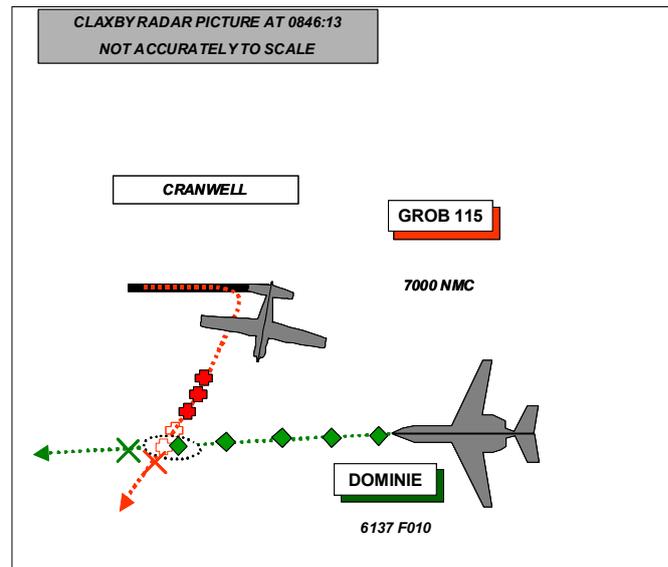
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The C551 pilot entered Class A CAS without clearance.

Degree of Risk: C.

AIRPROX REPORT NO 056/07

Date/Time: 21 May 0846
Position: 5302N 00029W (Cranwell circuit RW09
 - elev 218 ft)
Airspace: Cranwell ATZ (Class: G)
Reporting Ac **Reported Ac**
Type: Dominie T Mk1 Grob 115
Operator: HQ Air (Trg) Civ Club
Alt/FL: 1000ft ↑1000ft
 (QFE 1011mb) (QFE 1011mb)
Weather VMC CAVOK VMC CAVOK
Visibility: >10km 10km
Reported Separation:
 200ft V/200m H NR
Recorded Separation:
 NR (See Mil ACC report below)

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE DOMINIE T MK1 PILOT reports that he was conducting a pre-notified Engine Failure After Take-Off (EFATO) to join the visual circuit and then overshoot and depart on a SID. At some point after initiating the simulated engine failure, ATC informed him there was a light ac 'crosswind'. On rejoining the circuit at 1000ft QFE [having extended upwind to handle the simulated engine failure] he did not see the other ac; while continuing to look for it, he called "downwind sim asymmetric to overshoot and depart SID 2". He was part way through the pre-landing checks, heading 265° at 160kt, when the Grob suddenly appeared in his 12 o'clock, very close, so he took immediate avoiding action. He pushed hard, descending to between 700-800ft QFE. Since the other ac did not appear to take any avoiding action, he thought its pilot had not seen their ac.

The ac were on different Tower frequencies; he was on UHF and the Grob was on VHF. He notified ATC that he would be filing an Airprox, assessing the risk as being high.

THE GROB 115 PILOT reports that his flight was planned from Cranwell to Middle Wallop and then onward to Guernsey with one passenger and the ac was loaded to its maximum all up weight. His selected route required transiting the Barkston, Cottesmore and Benson MATZs.

He waited at the holding point with info "Delta" in a queue of mixed military traffic and, after a moderate delay, was given clearance to line up and hold on RW09; the circuit seemed extremely congested at that time so he assumed that the local controller would be very busy. After being cleared to take off he climbed to 500ft and turned (right) crosswind, continuing to climb slowly to level at 1000ft (he began this turn approximately at the intersection of the Runways and passed directly over the Tutor Sqn buildings). During the climb he turned slowly at 70kt onto his outbound track of 208°, his intention being to depart from crosswind and clear the circuit as soon as possible. He judged that he was well clear of any circuit traffic before reaching 1000ft: however, having seen the Dominie pilot's report, he accepted that he might not have been. Immediately after levelling off and setting course, he changed to APR [VHF] frequency to confirm their clearance, requested earlier when passing their flight details, through the Barkston MATZ. With hindsight he thought that he could have confirmed this with GND at the holding point, then following any departure instructions they might give. The previous Friday he spoke to the ATC Supervisors at Cottesmore and Cranwell to discuss the MATZ crossing and also to the Waddington Controller to verify the temporary height restrictions in force near to Barkston. On the day of the flight he confirmed the joining instructions at Middle Wallop and passed his flight details to Cranwell ATC.

Neither he nor his passenger saw the other ac and he was unaware of the incident until he called back as instructed.

AIRPROX REPORT No 056/07

THE DOMINIE UNIT COMMENTS that this Airprox occurred between two locally based ac and with pilots subject to the RAF Cranwell procedures contained within their Flying Order Book (FOB). Operations by the RAF Cranwell Flying Club, under whose auspices the Grob operated, are restricted during periods of 3 FTS operations and thus the pilot's familiarity with the dissimilar visual circuit operations in force will have been limited. In this instance the Grob pilot sought dispensation in advance to operate while 3 FTS were flying and this was approved [by Ops].

OC Ops conducted an internal investigation of the events that led to this Airprox to determine if any procedural factors had contributed to the proximity of the ac and the late sighting. The Grob pilot contacted ATC by telephone prior to departure and requested a VFR departure to the S, but ATC interpreted this to mean that he would carry out a visual departure from the end of the downwind leg, as required by the FOB. As he was carrying out a visual departure, the Grob pilot received no departure information from ATC on the RT prior to take-off. However, after take-off from RW09, the Grob pilot performed a non-standard departure, turning right onto 208° and levelling at 1000ft. Had he continued the right turn and rolled out onto the downwind heading, he would have had lateral spacing from the rejoining Dominie even though he elected to level at the multi-engine circuit height of 1000ft - instead of the light-aircraft circuit height of 800ft - or even continuing the climb. In flying the non-standard departure he increased the risk of the ac tracks conflicting and thus placed an increased reliance on the pilots achieving visual separation. In the event, the Dominie pilot achieved this, albeit much later than ideal, but there was no sighting by the Grob pilot. OC Ops has directed that in future ATC will ensure that pilots who might be unfamiliar with local procedures are only cleared to carry out standard arrivals and departures; exceptions will only be made by prior agreement and under special circumstances. This will mitigate the risk of dissimilar types coming into conflict and aid the predictability of operations.

The Dominie pilot was concerned about the coincident use of UHF and VHF. While not ideal, in this Airprox, appropriate proximity advice was given by air traffic to the Dominie crew. While neither pilot was able to hear the other's real-time calls, it is the station's view that the Airprox would probably still have occurred even had both pilots been working on a single frequency.

UKAB Note (1): The UK MIL AIP AD2 at EGYD-1-10 states:

NOISE ABATEMENT PROCEDURES

All Runways:

On departure, climb straight ahead to 1000ft QFE before turning.

There are no further VFR departure procedures.

MIL ACC reports that a Dominie was under the control of the Cranwell ADC, operating on UHF, and was executing a pre-planned EFATO from RW09; thereafter it was planned to join the visual RH circuit before departing on a SID. Simultaneously a [civilian club] Grob115, operating on VHF, was departing Cranwell en-route to Middle Wallop, also under the control of the ADC. At 0838:35 the Dominie pilot called the ADC, "*Dominie C/S ready for departure, remaining*", the ADC replied, "*Dominie C/S Cranwell Tower, hold*" and the pilot acknowledged as "*Hold Dominie C/S*"; the ADC then dealt with 5 other ac and 2 min later stated, "*Dominie C/S line-up*" which the pilot acknowledged. The ADC then spoke to an ac after landing and another departing from the downwind leg before saying "*Dominie C/S clear take-off surface wind 030/10*" at 0841:28 and the pilot again correctly acknowledged [all on UHF]. The ADC first made contact with the Grob pilot on VHF [only] 30sec after clearing the Dominie to take-off. He cleared the Grob pilot to line up which he acknowledged [prior to that he had been with GND on the same VHF frequency]. The Dominie pilot called [on UHF Tower frequency] at 0842:47 "*Practice Pan Dominie C/S, simulated engine failure, climbing up to a thousand, will call rejoining*" but the ADC initially replied to this call on VHF with the Dominie C/S only. Two sec later he repeated the callsign on UHF and went on to say, "*Practice Pan is acknowledged*". On completion of this call the ADC then instructed [on VHF only] "*Grob C/S, clear take-off, surface wind 020/5*", the pilot acknowledged and then the Dominie pilot said at 0843:36 [on UHF only] "*Practice Pan Dominie C/S request re-join simulated asymmetric downwind to overshoot*". The ADC approved this and the pilot acknowledged. Almost one min later the ADC stated, "*Dominie C/S there is er a light aircraft on victor departing, just turning crosswind, departing to the south*". The pilot acknowledged and a further 30sec later [the VHF frequency was being shared with GND and a number of VHF radio checks took place] the ADC transmitted on VHF "*Grob C/S there's 1 aircraft departing downwind this time*" [at the same time another ac reported ready for departure on UHF]. The Grob pilot replied, "*Departing now on the downwind leg and err, holding at a thousand*".

feet" and the ADC replied by saying "Grob C/S roger, err, there's a fast moving aircraft err is in your 6 o'clock range half a mile". Two sec after this transmission ended the Dominie pilot reported [on UHF only] "Dominie C/S downwind simulated asymmetric overshoot SID2." and a further 3sec later at 0845:18 the Grob pilot requested [on VHF only] "Grob C/S say again please" but the controller appeared to miss this request as he was transmitting on UHF to the Dominie "Dominie C/S roger, surface wind 030/10." Almost straight away, the Dominie pilot replied to this transmission and said [at 0845:25], "Dominie C/S, not impressed by this light aircraft, I've just had to dive underneath him" and simultaneously the ADC stated on VHF, "Grob C/S roger". At 0845:32 the ADC said on UHF, "Dominie C/S roger" and 2sec later the Dominie pilot stated, "I'd like to file". The ADC acknowledged the call and then the Dominie crew continued, "Affirm. It would have been a collision if I hadn't dived."

Analysis of the Claxby radar at 0843:02 shows the Dominie departing RW09 at RAF Cranwell and maintaining track until 3.5nm when it enters a right-hand turn. The Grob first shows on radar at 0844:22 initially on RW track but it has no Mode C throughout the incident. The Dominie passes through 100°, indicating FL011, with the Grob in its 4 o'clock 3.8nm and the Dominie continues the right turn and passes through 220° (at the same height) at 0855:56. By then the Grob has turned right and is passing 100° and is in the Dominie's 2 o'clock at 3.6nm. Both ac continue in the right-hand turn until 0845:29 when the Dominie is steady on 275° and indicating FL010 and the Grob is tracking 190°, in the Dominie's 1 o'clock at 1.9nm. At 0845:42 the Grob is in the Dominie's right 1 o'clock at 1.2nm and the Dominie has turned left onto 270° by this time. The Grob then disappears from radar but the Dominie descends to FL009 at 0846:05, before climbing back to FL010 at 0846:12 when the Grob reappears in the Dominie's 7 o'clock at 0.2nm. The CPA is in this period while the Grob does not show on radar but by estimating its position at 0846:05 the separation would have been less than 0.1nm.

The visual circuit operates under the "see and avoid" principle. However, in a dynamic environment it is essential that all crews be given sufficient TI to establish and maintain a good level of situational awareness. By using only one frequency at a time rather than broadcasting on both VHF and UHF, the ADC did not enable the crews of either ac to establish a complete picture of the traffic around them. The ADC passed accurate TI to the Dominie on 2 occasions; however, when he passed TI to the Grob pilot at 0845:03, the ADC appears to pass the wrong information, transposing the positions of the 2 ac. The ADC passed TI to the Grob pilot 9sec later. However, as the traffic was in his 6 o'clock the Grob would have had the right of way as an ac being overtaken. The Grob pilot however had already stated that he was 'departing now on the downwind leg' but as this was probably interpreted by the ADC as a normal departure from the end of the downwind leg rather than directly to the S from the airfield; in any case the ADC did not acknowledge the transmission and furthermore, although the Grob pilot had asked the ADC to repeat the information he did not do so.

UKAB Note (2): The ADC was under training and was being supervised by a screen controller; they had been in position for about 1hr.

UKAB Note (3): The Grob pilot had advised ATC of his departure details via e-mail.

HQ AIR (TRG) comments that the departure profile of the Grob did not conform to the Cranwell FOB or the ADC's expectations. The new procedures introduced by OC Ops will mitigate the risk of similar Airprox occurring in the Cranwell circuit. In VFR conditions, when safety margins have been eroded, for whatever reason, nothing can take away the value of good lookout to help avoid the mid-air.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

In common with many incidents, this Airprox was complex. Notwithstanding that both ac were operating under a mandatory ATC environment the pilots were also operating under VFR where see and avoid pertains. In these circumstances, one of the main functions of ATC is to prevent collisions by ensuring the safe, orderly and expeditious flow of air traffic, in this case in the vicinity of the airfield. The Dominie had effectively departed the circuit to conduct a simulated EFAT drill and the Grob pilot had no intention of entering the circuit, wishing only to depart VFR to the S. Both pilots thought that they had informed ATC of their intentions, the Dominie clearly on the RT (UHF only, which the Grob pilot could not hear) and the Grob pilot previously by e-mail. Members considered that the Grob pilot should have confirmed his e-mailed departure details with Cranwell Ground after start. Although

AIRPROX REPORT No 056/07

the Dominie pilot would not have heard the exchange, it would have given the controllers (who were unaware of the e-mail) an opportunity to instruct the pilot to depart from the end of the downwind leg at 800ft, in accordance with weekday flying orders, rather than directly to the S as he was probably accustomed to doing at the weekend when 1FTS (and ATC) was not operating. Since the Grob pilot appeared to be unaccustomed with operating during the week in a very busy military environment, some Members thought that a thorough briefing - before granting the exemption to operate during the week - would have ensured that he was aware of the relevant sections of the Flying Order Book, in particular departure and integration procedures.

There was much discussion regarding the coincident use of UHF and VHF frequencies and notwithstanding the Station comment, most Members considered this to be have been a significant factor. This procedure not only denied both pilots vital items of information but it significantly increased the workload on the trainee controller, possibly to the extent that he had to 'loadshed' and was making errors. Advisors explained that there were technical difficulties that prevented UHF/VHF cross coupling at RAF airfields but several experienced controller Members considered this a significant deficiency resulting not only in pilots receiving a degraded air picture but also placing a marked increase on controllers' workload. One SATCO Member said that he considered this to be such an important factor that he discourages the practise at his unit.

Although it was accepted that the Dominie pilot was passed TI on 2 occasions, this did not enable him to acquire the Grob until very late (due largely to the controller's misunderstanding regarding its departure flightpath). The Grob pilot was unaware of the Dominie and was not given any information that would have enabled the pilot to 'see and avoid' it.

Military and civilian controller Members expressed surprise that the mentor (screen) controller did not step in and take control when it was apparent that the trainee was becoming overloaded, resulting in errors and omissions (possibly caused by working simultaneously on 2 frequencies). Such an intervention, controller Members thought, might have prevented the incident.

The Board spent some time in trying to analyse the cause of this incident to get to the root cause. One opinion was that the Dominie – as the overtaking ac - had flown into conflict with the Grob and another that the Grob pilot had caused the Airprox by departing in an unauthorised and un-notified manner (Members did not consider an e-mail to be an appropriate way to notify ATC of departure details as there is no assurance that it will go to the controller concerned (in this case it did not)). It was the Board's unanimous view that the Dominie pilot had a responsibility to see and avoid the Grob; he had been warned of its presence, albeit not its altitude albeit its position (passed as being *'just turning crosswind'*) was not totally accurate. For whatever reason, possibly due to the ac's turns or the poor cross-cockpit view from the Dominie, its pilot did not see the Grob until late. Ultimately he did, however, see and avoid it by a reasonable margin. The Grob pilot on the other hand, departed the airfield in a manner contrary to the procedures published in the Station FOB and therefore his actions were unexpected by both the controller(s) and the Dominie pilot. Without the benefit of TI or from hearing any RT transmissions made by or to the Dominie pilot, the Grob pilot was not warned of the latter's presence and presumably did not direct his attention and lookout towards it; he therefore did not see it as it approached and overtook from behind his left wing at the same altitude. Although there was considerable sympathy with the Grob pilot's situation, the Board concluded that his chosen departure track, and his selected altitude as he passed through the downwind position of the circuit, had been the principal cause of this incident and had caused an erosion of normally accepted safety standards.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Grob pilot departed in a non-standard manner and flew into conflict with the Dominie.

Degree of Risk: B.

AIRPROX REPORT NO 057/07

Date/Time: 25 May 1549

Position: 5130N 00100W (5nm E CPT)

Airspace: Airway L9 (Class: A)

Reporter: London ACC

	<u>1st Ac</u>	<u>2nd Ac</u>	
<u>Type:</u>	FK70	Unidentified Balloon	No radar data showing this Airprox

Operator: CAT N/K

<u>Alt/FL:</u>	FL220↓	NR	(N/K)
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Weather: VMC NR NR NR

Visibility: NR NR

Reported Separation:

10m V/O H	NR
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Recorded Separation:

NR

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FK70 PILOT reports flying a scheduled passenger flight inbound Bristol under the control of London ACC. The ac was heading 284° at 300kt along Airway L9 and passing FL22vb0 in the descent when the captain saw a very small dot which was approaching them [closing] very rapidly. Before he had time to initiate any action it passed about 10m below and slightly to their right. The object appeared to be an orange balloon. He reported the incident to London but did not assess the risk.

LONDON ACC reports that the FK70 was approaching Compton at FL220 when it was nearly in collision with an unidentified object. The pilot reported seeing the object when it was 200m away; it was thought to be about 2m in size but the pilot could not tell what it was (e.g. a weather balloon etc). There were no other ac in the vicinity. Wind at that level was thought to be approximately 230/25kt.

UKAB Note (1): There were several primary contacts seen on the recording of the Heathrow Radar in the area but none within 5nm at the reported time of the incident. Extensive procedural tracing action was conducted by the UKAB. There were no civilian or military balloons reported missing or breaking their mooring on that day. Bearing in mind the description, reported size and colour, most (but not all) of the tracing effort was based on the assumption that the object was a Met Balloon. The UK Met Office were most helpful, contacting all civil and military Met Stations in the area but none reported launching any balloons in the period of 1hour before the incident. A very accurate wind profile was provided which indicated the wind was variable in strength and direction but basically SW'ly at just over 20kt (average). Further, the incident took place at 1649 local time on a Friday afternoon when most military activity had ceased for the weekend. As a precaution however, military units in the area were contacted but again to no avail. Reading University also launch met balloons for research purposes but they had no launches on that day. One Army based Met Station, upwind of the incident position launched a balloon at 1417UTC but it stopped sending data, indicating that it had burst (as is normal), about 1 hour before the incident. Had the sonde merely stopped sending data at that time and the balloon not burst, it would have been very much higher than FL220 at the time of the incident (they ascend in the upper air at about 5m/s). Expert opinion was that it could not have survived, either intact or in large pieces, for a further hour until the incident time.

Again bearing in mind the description, the UKAB concluded that it was most likely the object was a Met Balloon b

Without doubting the captain's reported miss-distance, expert opinion is that Met Balloons are specifically designed such that neither the balloons themselves nor the sonde suspended below them, present any significant risk to aircraft. In any case, although no actual studies can be found, it is thought by experts that the bow-wave of an aircraft would deflect a balloon away from the aircraft structure.

AIRPROX REPORT No 057/07

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the FK70 pilot, radar graphs and video recordings and a report from the air traffic controller involved.

Taking account of the pilot's description, the Board agreed that the object concerned was probably a met balloon. Noting the considerable efforts already made, Members also agreed that it was unlikely that further tracing action would determine the agency that launched the balloon. In any case, the Board accepted that if it was indeed a met balloon then although this would have been startling for the aircrew, it was very unlikely that the balloon would actually have impacted their ac.

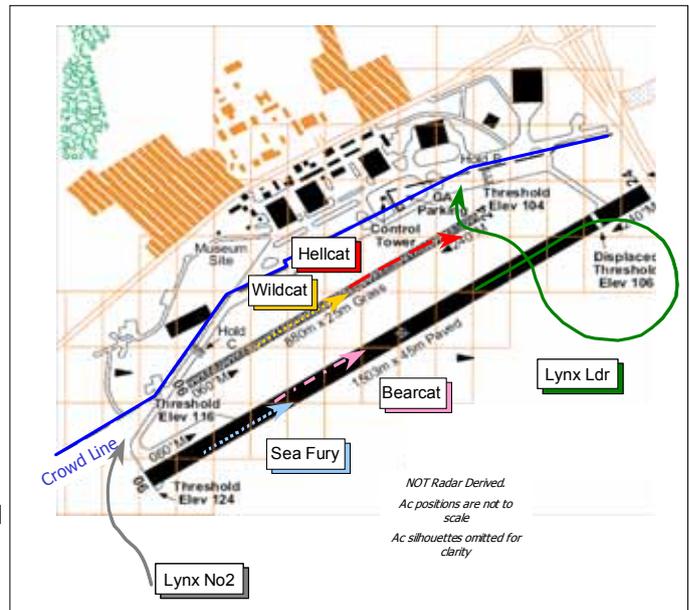
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class A CAS with an unidentified balloon.

Degree of Risk: C.

AIRPROX REPORT NO 059/07

Date/Time: 20 May 1402 (Sunday)
Position: 5205N 00008E (Duxford Aerodrome - elev 125ft)
Airspace: Duxford ATZ (Class: G
Reporting Ac **Reported Ac**
Type: Lynx HMA Mk8 Grumman F6F
 Hellcat
Operator: CinC FLEET Civ Pte
Alt/FL: 50ft 50ft↑
 aal aal
Weather VMC VMC
Visibility: >10km 25km+
Reported Separation:
 Nil V/30-90m H 10-20ft V/30-50m H
Recorded Separation:
 Not recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE WESTLAND LYNX HMA Mk8 HELICOPTER PILOT reports that he was leading a pair of grey Lynx helicopters during a flying display at Duxford and in communication with the FISO - C/S Duxford DISPLAY - on 132.9MHz. On completion of their part of the display, he as the lead pilot executed a 'wingover' manoeuvre onto a heading of 260° to clear the display line and reposition for landing to the NE of the grass RW06 at <40kt when his Observer (Navigator) in the LH front seat noticed the Grumman Hellcat rotating from the grass RW and ordered the pilot to "break right". He complied immediately and 'broke' R at 50ft aal as the Hellcat passed to the L of his helicopter at an estimated distance of 30-90m at the same height, but because of the nose-up attitude of the Lynx in the 'flare', he as the lead pilot was not visual with the Hellcat at any stage. He perceived that the Hellcat pilot took no avoiding action and in his view "extreme danger" existed with a "high" risk of a collision.

Earlier, during the morning brief for the airshow, he as leader of the Helicopter Display Team informed the Display Director and Hellcat pilot that no ac should be rolling or airborne until both Helicopter Display Team ac had landed after their display. This was accepted without caveat by both the Display Director and the Hellcat pilot. Reinforced by a personal brief between the Helicopter Display Team and the Hellcat pilot, the latter assured the lead Lynx pilot that he would remain 'lined-up' until both Lynx helicopters had landed. However, this was blatantly disregarded by the Hellcat pilot who rolled and took off before either of the helicopters had landed, causing a near mid-air collision between his lead helicopter and the Hellcat at the upwind end of the grass RW06 at about 50ft aal. HISLs are not fitted.

UKAB Note (1): It was subsequently established that the No2 Lynx was at the western end of the aerodrome as the leader completed his display at the eastern end of the grass RW06. Consequently, the No2 Lynx was not in conflict with the fixed wing ac as they took-off.

THE GRUMMAN F6F HELLCAT PILOT provided a very comprehensive and candid account reporting that he was flying the historic Grumman Hellcat F6F – finished in a WW2 USN Sea Blue camouflage scheme - at the Duxford Airshow. The display programme included the Hellcat in a formation display as the lead ac with two similar tailwheel types – a Wildcat & Bearcat. They had requested to take-off 20min before their programmed display slot, between completion of the Lynx Pair's display and the start of the Chinook's slot; both of these display slot times were inclusive of the helicopters' take-off and landing. The Flying Display Director agreed to their take-off at this point in the programme subject to approval from the Lynx and Chinook crews. The Lynx crews specified that there could be no ac taking off or landing during their display but they agreed that the historic formation ac could 'LINE-UP' on both the grass and hard runways during the Lynx display and then take-off when the Lynx pair was

AIRPROX REPORT No 059/07

complete. Prior to their 'start-up' it was agreed that the ac in the display slot immediately before theirs - a Sea Fury - would take-off with them as well.

He was also in communication with Duxford DISPLAY on 132.9MHz and in receipt of a FIS as he taxied for RW06 and 'lined-up' his Hellcat on the northern edge of the grass RW06, with the second ac of the formation on his R – the Wildcat - and the third ac in their formation – the Bearcat - plus the Sea Fury lined up on the hard RW, which was to the right (S) of the grass RW06. A stream take-off was planned with a safe spacing between each ac at the ac Captain's discretion. The Lynx completed their display at approximately the middle of the hard RW and he believed called on the RT "[Lynx pair C/S] complete, hover taxiing to dispersal". The Lead Lynx then proceeded towards the eastern end of the aerodrome at a height of approximately 50ft and (as it appeared to him) to the S of the hard RW. Upon hearing "...complete..." he started his take-off roll and called "Hellcat rolling". However, very soon afterwards he saw the Lead Lynx decelerate and start to turn N across the hard and grass RWs, and thus across his flight path, towards the helicopter pair's parking slots at the eastern end of the flight line. He judged that the safest option was for him [as the LH element of his formation] to continue to take-off, then turn slightly R and pass behind the helicopter in a controlled manner. He immediately discounted the other option of aborting the take-off, as this was a higher risk option due to the poor forward field of view of the Wildcat pilot behind him and the possibility of a ground collision. To avoid the Lead Lynx he turned 10° R onto a heading of 070°(M) at 90kt and estimated that he passed between 100-150ft behind the Lynx and slightly above - 10-20ft - its main rotor. At no stage did he lose sight of the Lynx and he does not consider that a collision risk existed as he maintained visual contact throughout. However, due to having the three other historic ac taking off in a stream behind him and to his R he felt that it was unsafe for him to turn further R in an attempt to avoid the Lynx by a greater distance after 'unstuck'. It would also have been unsafe to have attempted to climb more steeply at such a low airspeed.

After he landed he discussed the incident with the Chairman of the Flying Control Committee and with the Lead Lynx pilot. In his view, this Airprox resulted because he did not take into account that the Lynx display was not complete until they had hover taxied back to their parking slot on the flight-line after completing their display. Thus he started his take-off roll based on the lead Lynx pilot's "Complete" RT call, rather than when he saw that they had completed hover taxiing. In retrospect, he said that he had misinterpreted the briefing that the helicopter crew had given him regarding deconflicting his formation take-off and the Lynx display slot. No external lighting was on.

ATSI reports that the FISO commented that he did not get a clear view of how close the ac were.

UKAB Note (2): A review of the RT transcript for the event reveals that the Lynx leader reported one minute before completion of his display at 1357:26. Later at 1358:28, the leader advised the FISO "...complete repositioning for dispersal", whereupon the surface wind was given as 110°/5kt. About 10sec later at 1358:38, the Hellcat pilot reported "rolling", following by the Grumman Wildcat and then the Bearcat at 1359:02.

UKAB Note (3): This Airprox occurred outwith the coverage of recorded radar.

CINCFLEET comments that there are a few areas that may merit further investigation. Firstly, did the lack of positive Air Traffic 'Control' for this air display contribute to the Airprox? Allowing the Hellcat pilot to interpret when it was safe to take-off led to the incident. Secondly, in such circumstances, is the Display Director supervising the FISO? If so, is this safe? And in this instance, was there a failure of Supervision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed that the aerodrome operator had been very helpful during the investigation of this Airprox. Moreover, they had taken a positive and proactive stance as a result of this occurrence and had promulgated the 'lessons learned', which were highlighted to the Members. These included: stricter control over requested changes to the planned programme and the introduction of a 5sec pause after the mandatory 'rolling' call is made to enable an RT warning if necessary. It was also suggested that either the Display Director or the FISO could halt a take-off if there was a dangerous situation, which seemed to some outwith the FISOs remit. Members were advised that the level of AFIS provided is not a conventional service during the display period, where up to 3 FISOs are on duty, with one manning the Display frequency and a supervising FISO, in addition to the Display Director who was 'running' the programme.

It was explained to the Members that liaison between UKAB staff, the aerodrome operator and the Display Director involved had confirmed the agreement between the lead Lynx pilot and the Hellcat pilot leading his fighter formation on a stream take-off after completion of the Lynx pair's display. It was clear from the Lynx pilot's own report that he had specified that neither the Hellcat nor any other element of his mixed ac formation should be rolling or airborne until both Lynx helicopters had landed after their display. This fact was established beyond doubt as it was also confirmed within the Hellcat pilot's candid submission where he mentioned that the lead Lynx pilot had specified that there could be no ac taking off or landing during their display, but it had been agreed that the historic formation ac could 'LINE-UP' on both the grass and hard runways during the Lynx display.

The C-in-C FLEET Member explained that the Lynx display was their standard routine and had been well rehearsed. He stressed that there should have been no surprises for the Hellcat pilot over the manoeuvres flown by the two Lynx helicopters at the completion of their display – which for the lead Lynx was a 'wingover' manoeuvre onto a westerly heading to clear the display line and then reposition for landing at the dispersal to the NE of the grass RW06. Similarly, the No2 Lynx had to land before the Historic formation took-off. It was evident from the transcript that the Lynx leader had reported *"..complete repositioning for dispersal"*, and the Board discussed the use of this phrase. It might be that an element of confusion arose here, since the two helicopters still required to hover taxi clear of the runways and land at the dispersal before the Hellcat pilot could depart with his formation. Some Members contended that the *"..complete..."* call made by the Lynx leader might not have been appropriate at that point; perhaps he should have waited until he had crossed the climb-out lane and was back at dispersal before making this highly significant call. An experienced fast-jet pilot Member, who also acts regularly as a Display Director at a number of air shows, explained that the timing of these 'complete' calls is crucial. Without positive ATC applied, eg an Aerodrome Control Service, the display sequence relies totally on pilots reacting correctly to RT cues and strict compliance with the pre-briefed programme overseen by the Display Director. Whilst an Aerodrome Flight Information Service (AFIS) was provisioned here, AFISOs are not empowered to give 'Instructions' to pilots in the air, reliance being placed on pilot's own RT calls in this visual environment where the usual aspects of an AFIS would not be strictly applied during the display. It was suggested that radios fitted to vintage ac might result in poor quality RT, but this was not a factor here, as it seemed the Hellcat pilot had heard the Lynx leader's transmissions clearly. Whilst it should have been evident to the Hellcat pilot that the two helicopters were still airborne he seems to have misunderstood what they were going to do at the conclusion of their actual display. Where he reports that - he saw the Lead Lynx proceed towards the eastern end of the aerodrome at about 50ft...to the S of the hard RW. It appeared to the Members that this was probably the final 'wing-over' manoeuvre at the end of the Lynx display and the helicopters still had to return to the dispersal, before the climb-out lane was clear for the historic fighter formation to take-off. Possibly the helicopters had not been continuously visible to the Hellcat pilot as he waited to take-off whilst lined up on the runway. Indeed the large radial engine and 'tail-dragger' configuration of this historic WW2 fighter could well have significantly obscured the pilot's view of the small grey lead Lynx helicopter as it turned R on the S side to cross the runways at the upwind end towards the dispersal. The Hellcat pilot reports hearing *"...complete..."*, which he mistakenly took as his cue to start his take-off roll, but it was evident that he had misjudged the situation. Furthermore, he should also have been waiting for the No2 Lynx to clear down his port side towards the dispersal before the Lynx pilot's stipulations could be complied with. The Hellcat pilot's candid account included his own honest admission that he did not take into account that the Lynx display was not complete until they had hover taxied back to their parking slot on the flight-line. Thus he started his take-off roll based on the lead Lynx pilot's "complete" RT call, rather than when he saw that they had completed hover taxiing. The Board concurred, and it was evident to the Members that having misinterpreted the face-to-face briefing with the Lynx Formation leader, the Hellcat pilot took-off into conflict with the lead Lynx helicopter, which was the cause of this Airprox.

Turning to the inherent risk, the Board was aware that the lead Lynx pilot could not see the Hellcat taking off toward his ac when alerted by his Observer in the LH seat. His instinctive reliance on his crew member's instruction to 'break right' out of the fighter's way, in the Board's view, had played a significant part in establishing the resultant horizontal separation. Clearly, the Hellcat climbed up through the helicopter's height of 50ft as the fighter departed, but both Lynx crew members would have been 'blind' to the Hellcat as it passed astern. Whereas both pilots involved reported the horizontal separation as no closer than 30m, the Hellcat pilot who should have had the helicopter clearly in view as soon as he 'rotated' suggested the separation was 30-50m and somewhat less than the Lynx Leader's account of 30-90m as he passed 10-20ft above the helicopter – much closer than ideal. The Board agreed however, that the Hellcat pilot's prompt avoiding action R turn to pass astern of the Lynx had effectively removed any actual risk of a collision. Whilst there was still some danger astern of the Hellcat pilot from his own No2, which complicated the scenario, pilot Members were quick to point out that, even in a stream take-off, there should be sufficient room for the following Wildcat pilot to avoid his leader or abort his take-off - a point

AIRPROX REPORT No 059/07

that would have been emphasised in the formation briefing. However, the Members agreed that the safety of the ac involved had certainly been compromised.

Following their assessment of the Cause and Risk, there was considerable debate by the Members over the level of 'Air Traffic Control' exercised during such large displays, as had been commented on by C-in-C Fleet. The Board considered whether or not a more positive Aerodrome Control Service, provided by a licensed ATCO, would be a worthwhile safeguard during an intensive air display scenario, such as this, and preferable to the unconventional FIS provided in this case. The Board was advised by ATSI that this subject had arisen in the past, when the topic of passenger carrying pleasure flights was examined. Here, standard aerodrome/cct 'information' was understandably not provided in this display scenario, but it is understood that some FISOs involved at air shows are themselves qualified ATCOs from other ATSUs. Evidently, no one in the Control Tower had stepped in on RT to warn either of the pilot's – either the FISOs or the Display Director who was monitoring the RT - when a cautionary warning could have been warranted after the Hellcat pilot reported "rolling". Clearly the Board was not being at all disparaging whatsoever about the service provided by FISOs, merely pointing out the limitations of what a FISO is empowered to do. Nevertheless, if positive ATC had been in force then the Hellcat stream take-off would have been subject to a take-off clearance, which an ATCO, with an overall view, would not have issued unless the Lynx had been clear. There were clearly arguments for and against this; many air shows operated very efficiently with the benefit of an ATCO able to take charge and issue 'instructions' to pilots in the air and thereby avert potential difficulties. A Member quoted two aerodromes that normally provide a FIS where he is the Display Director at an annual air show, but an ATCO is co-opted as an ADC and provides the additional safety net of an Aerodrome Control Service for the period of the display. Alternatively, the Board recognised that many large air shows - such as Duxford – have operated very efficiently for some years under an AFIS. Fortunately, air displays figure little in Airprox statistics and here the Board stopped short of making a Safety Recommendation on the basis of this singular risk-bearing event.

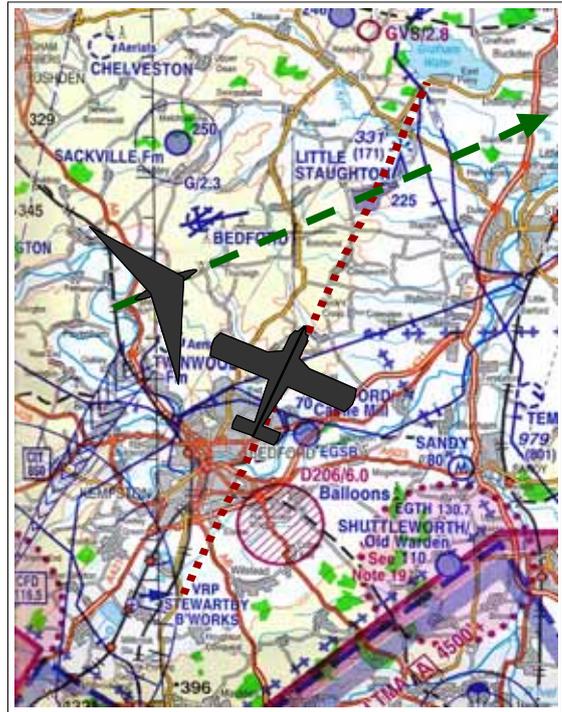
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having misinterpreted the face-to-face briefing with the Lynx Formation leader, the Hellcat pilot took-off into conflict with the lead Lynx helicopter.

Degree of Risk: C.

AIRPROX REPORT NO 060/07

Date/Time: 31 May 1629
Position: 5214N 00022W (5nm E Bedford Disused)
Airspace: Lon FIR (Class: G)
Reporting Ac **Reported Ac**
Type: Pegasus M/Light PA28R
Operator: Civ Pte Civ Trg
Alt/FL: 2850ft 2000ft
 (QNH 1008mb) (N/K)
Weather VMC CLBC VMC CLBC
Visibility: >10km 10km
Reported Separation:
 0ft V/100-150ft H NR
Recorded Separation:
 NR (see UKAB Note (1))

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE PEGASUS MICROLIGHT PILOT reports that he was flying a yellow and white flexwing microlight, with no radio fitted, from Craysmarsh Farm in Wiltshire to Sutton Meadows in Cambridgeshire as personal training for future long distance microlight flights in another country. He had checked the NOTAMs and the forecast weather prior to the flight as there had been high winds and rain for several days preceding. He took off at 1548 and established a track of 060° flying at 65mph until reaching Didcot. His next track was 030° to Milton Keynes where he changed back to 060° for the remainder of the flight. (Planned route and a GPS trace were provided). The cloud base was variable between 3 and 4000ft.

Although he had a GPS on board he was confirming his position from his map, compass and stopwatch and was checking landmarks en-route. When confirming his position on the map he was looking down for about 5sec and when he looked up to scan the horizon again he immediately saw a PA28 in his 2 o'clock about 300ft away at the same altitude and approaching very fast. It then passed directly in front of him about 100-150ft away and he was able to identify the registration clearly. He did not take any evasive action as there was no time between his first sighting and the ac passing in front. The pilot of the other ac appeared not to have seen him as there was no apparent change of altitude/heading.

He continued on after the incident to Sutton Meadows where he landed at 1758, reporting the incident to the UKAB by telephone the following day. He assessed the risk as being very high.

THE PA28R PILOT provided a report seven weeks after the event stating that he was flying a local training flight under VFR from Cranfield in a white and green ac with strobes selected on, in receipt of a FIS from Cranfield APP and squawking their conspicuity code with Mode C. They took off on RW21 VFR and completed a left turn onto heading 040° to Stewartby VRP climbing to 2000ft cruising alt (he thought) then changed to a heading of 030° for Grafham Water. The heading change was to avoid overflying Bedford town and avoiding IF traffic. They were flying at a TAS of 110Kt and workload was light. To the best of his and the student's ability a good lookout was maintained but they did not see the other ac. Cranfield ATC was also not aware of the incident as none was filed with them and the other ac was not in communication with them.

AIRPROX REPORT No 060/07

UKAB Note (1): The PA28 can be seen on the recording of the Stansted radar throughout the incident squawking 7000 with Mode C and indicating 3100ft QNH and tracking about 030° but the contact suffers from some track jitter. A primary-only contact heading 060°, presumed to be the microlight, can be seen until 3 sweeps (18sec) before the tracks cross when it disappears at 1628:46. The incident is therefore not recorded.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that both ac were flying VFR in Class G airspace and therefore the pilots had an equal and shared responsibility to avoid collisions, primarily by the see and avoid principle. In this incident the PA28 pilot did not see the Microlight and, although the Microlight pilot saw the PA28, his sighting was too late for him to be able to take any meaningful avoiding action. Although the Microlight pilot was busy and preoccupied with his navigation in the period leading up to the CPA, the PA28 instructor reported that he was not busy but might have been looking across the cockpit instructing his student. The microlight was being overtaken and the ac were virtually on a line of constant bearing: also, by happenstance, they were at roughly the same altitude of about 2800ft agl so sighting would have been difficult. Fortunately however the ground tracks of the ac were such that they were separated by about 50m; although uncomfortably close, there had not been any collision risk but normal safety standards had been compromised.

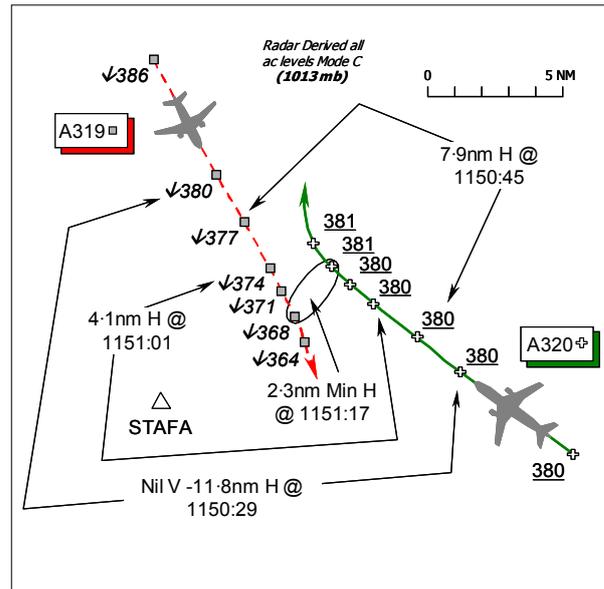
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the PA28 pilot and an effective non-sighting by the microlight pilot.

Degree of Risk: B.

AIRPROX REPORT NO 062/07

Date/Time: 29 May 1151
Position: 5256N 00206W (7nm NE of STAFA)
Airspace: UAS (Class: C)
Reporting Ac Reported Ac
Type: A320 A319
Operator: CAT CAT
Alt/FL: FL380 FL260↓
Weather VMC NR VMC NR
Visibility: NR 10+km
Reported Separation:
 400ft V/3nm H 700ft V/3.5nm H
Recorded Separation:
 900ft V/2.5nm H
 [Nil V @ 11.8nm H. 1300ft V @ Min H 2.3 nm]



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT provided a brief account reporting that he was in transit for Dublin in a level cruise at FL380 in VMC at 425kt, in receipt of a RCS from London CONTROL on 132.86MHz. Heading 300°, he thought about 20nm SE of PENIL, a low wing ac – first sighted some 10nm away – passed about 3nm down the portside after it had crossed diagonally ahead from R – L some 400ft below his ac. LONDON CONTROL issued avoiding action of a R turn onto a heading of 360°. He assessed the risk as “medium”: both ac were at the same level and the other ac was under control on a different frequency.

THE A319 PILOT-IN-COMMAND provided a brief account on an ASR stating that he was enroute from Aberdeen to London Heathrow when a loss of separation occurred at 1130UTC with another ac due to an ‘ATC mistake’. ATC issued avoiding action resulting in minimum separation of 3½nm/700ft. No TCAS RAs or TAs were enunciated.

UKAB Note (1): Following a request for a more detailed account, the 1st Officer provided a report some 3 months after the reported Airprox. However, the location of the event he described was some 5nm E of HONILEY whilst heading 150° at 300kt and descending through FL260. He added that another ac, which had been displayed on TCAS from a range of 15nm, was seen but he thought it was climbing. As he and his Captain were discussing this, ATC issued avoiding action with a change of heading. Vertical separation was 700ft as the other ac passed some 3½nm away to port with a “low” risk of a collision. In their view the event was not considered to be serious at the time - it was not an Airprox ‘as no TA or RA was received’ - but as ATC informed them they would be filing a report they decided to file a company ASR. He had not seen the original filed ASR so the foregoing comments rendered some 3 months after the Airprox were to the best of his recollection.

ATSI reports with RT transcript that at the time of the Airprox, the southbound A319 crew was in communication with the LACC S27/32 (DAVENTRY SOUTH) Tactical controller whilst the northbound A320 was in communication with the LACC S4 (LAKES) Tactical controller. Both the workload and traffic loading of the DAVENTRY SOUTH Tactical controller were described as “light”. The DAVENTRY SOUTH controllers were sat on one suite with the S28/34 (DAVENTRY NORTH) controllers on a separate suite arranged in a ‘back-to-back’ configuration.

The A320 was northbound at FL380 and, when in the vicinity of Stansted, the DAVENTRY NORTH Planner contacted the LAKES Planner and requested to route the aircraft to PENIL – 309° WAL 23nm. The LAKES Planner agreed and the flight was cleared accordingly. At this time, the A319 was southbound, cruising at FL390, some 60nm NNW of Manchester. The DAVENTRY NORTH Planner then walked over to the DAVENTRY SOUTH Planner and co-ordinated the rerouting of the A320 with them. Normally the A320 would have remained within

AIRPROX REPORT No 062/07

DAVENTRY NORTH airspace until it entered LAKES airspace: however, the direct routeing would result in the A320 crossing part of DAVENTRY SOUTH's airspace.

At 1146:10, the crew of the A320 contacted the LAKES Tactical controller and reported maintaining FL380, routeing direct to PENIL. At this time the northbound A320 was 17nm E of Birmingham and the southbound A319, which was also on the LAKES Tactical's frequency, was 18nm NW of Manchester Airport, still maintaining FL390. Exactly 1min later, when the two ac were some 60nm apart, the LAKES Tactical controller instructed the crew of the A319 to contact the DAVENTRY SOUTH Tactical controller. During this period, the DAVENTRY SOUTH Tactical controller 'A' handed over his position to an OJTI - Tactical controller 'B' - and his trainee. The first transmission the trainee made was to acknowledge the initial call from the A319 crew and to clear the flight direct to TOBID - 143° HONILEY 11nm. At 1149:10, the DAVENTRY SOUTH trainee instructed the crew of the A319 to descend when ready to FL200 to be level by TOBID, the standing agreement level for Heathrow inbound. At the time this instruction was passed, the two ac were on reciprocal tracks 32nm apart. At 1150:45, the trainee transmitted "[A319 C/S] expedite the descent through flight level 3-5-0". The A319 crew acknowledged this and then the OJTI Mentor took over the frequency, instructing the A319 crew at 1151:00, to "[C/S]..avoiding action turn right heading 1-8-0 degrees please traffic just..going down the east..of you at [FL]3-8-0". This was read-back and the crew reported TCAS contact with the other ac.

At virtually the same time – 1150:45 - the crew of the A320 asked LAKES Tactical "do you have that traffic..12 o'clock 5 miles 400 below?". In reply the controller instructed them to "[C/S] turn right heading of 360 degrees avoiding action", which was read-back by the A320 crew. The two ac passed port-to-port at a minimum horizontal range of 2.3nm. Minimum separation occurred at 1151:09, of 2.5nm and 900ft.

[UKAB Note (2): The Cleve Hill Radar recording shows the A319 descending through FL380 - the level of the A320 – at a range of 11.8nm at 1150:59, whilst crossing through the A320's 12 o'clock and drawing slowly L as the range decreases. Just after the A319 descends through FL371 at a range of 2.5nm the two ac pass abeam. The point of minimum horizontal separation of 2.3nm shown on the Cleve Hill recording occurs as the A320 commences the avoiding action R turn and climbs very slightly to FL381 at 1151:17, thereby marginally increasing the indicated vertical separation at this point to 1300ft above the A319 shown descending through FL368.]

The DAVENTRY SOUTH Tactical 'A' controller reported that the DAVENTRY NORTH Planner had walked over to their sector in order to coordinate the direct routeing of the A320. This was achieved in a 'light-hearted' manner and face-to-face rather than on a recorded line. Both the DAVENTRY SOUTH Planner and Tactical controller 'A' listened to the conversation and were aware of the co-ordination agreed. Tactical 'A' reported that such requests are not very common and his Watch do not routinely approve such routeings whereas other Watches, including the parent Watch of the DAVENTRY NORTH Planner, did. Tactical 'B' advised that in his experience some routeings are only requested and approved when it is very quiet. A strip on such flights can be requested manually or a hand written one used. However, the flight only transits part of the DAVENTRY SOUTH airspace and so it is, in the opinion of both subject Tactical controllers, not common practise to produce a strip. Use of the 'point-out' facility is the more typical method employed. On this occasion neither a strip was produced nor the point-out used to highlight the flight.

There is no specific requirement in the Unit's MATS Part 2 to utilise a strip or the electronic point out feature in such circumstances. However, MATS Part 1, (Appendix D, para 2.3) states: '*The flight data display shall be updated immediately to reflect the current traffic and control situation whenever necessary. In order to ensure that all relevant air traffic control actions are reflected in the data display, it is essential that agreements made during controller to controller communication, whether this is effected by the use of recorded telephone lines or intercom systems or by 'face to face' verbal co-ordination, are indicated on the flight data display. All items such as levels, pertinent traffic, heading and/or speeds must be recorded on the data displays of both controllers involved*'. It is clear that this requirement was not met and so the data display was incomplete when the handover of the sector, from Tactical 'A' to Tactical 'B' and his trainee was undertaken. The handover was given to the trainee, who plugged into the sector, whilst the Mentor was close by, monitoring the situation, and plugging into the Mentor communications box. All three controllers – Tactical 'A', 'B' and his trainee - agreed that no mention of the [co-ordination agreed] for the A320 was made during this handover of the position.

Both Tactical 'A' and 'B' made the point that it was unusual for LAKES to have transferred the A319 when it was known that a potential confliction existed between it and the A320. As the A319 was inbound to Heathrow it would have to commence descent soon after the frequency change in order to achieve the agreed level of FL200 by

TOBID. With the A319 at FL390 above the opposite direction A320 cruising at FL380, the potential for a confliction was apparent. The controllers advised that a more typical course of action would have been to descend the A319 to FL340 and then transfer it to DAVENTRY SOUTH when below the A320. However, as the A320 had been correctly coordinated with DAVENTRY SOUTH it was therefore 'known traffic' to them and should have been taken into account when clearing the A319 for descent. LAKES would not have known whether or not a strip on the A320 was in place on DAVENTRY SOUTH.

Analysis of the radar recording shows that the A320 changed to a foreground 'intruder' at 1146:51, 24sec before LAKES Tactical instructed the A319 crew to change frequency. Tactical 'B' advised that, on the DAVENTRY Sector, many ac are displayed as foreground intruders and so the facility does not serve as an effective 'attention getter'. As there was no information on the DAVENTRY SOUTH data display about the A320, and neither the trainee nor his Mentor (Tactical 'B') would have expected to find an ac routeing northbound through DAVENTRY SOUTH's airspace, the trainee issued descent clearance to the A319 at 1149:11. The Mentor reported hearing the instruction and checking the crew's read back but did not notice the A320 in his scan of the radar. He added that shortly afterwards the trainee said words to the effect of "what's that?" and 'hooked' the Track Data Block of the A320. Almost immediately afterwards he instructed the crew to expedite their descent. STCA activated at this point, as the two ac were 6nm apart with the A319 already 400ft below the A320. The Mentor saw the situation and decided that avoiding action was required and so he took control of the frequency, issued avoiding action as well as passing traffic information.

Both Tactical 'A' and 'B' agreed that the use of the point-out facility should be mandatory, as a minimum, and activated by the Sector initiating the request for co-ordination. The use of a fps could be made as well if felt necessary. The difference in operating practices between watches led to an unfamiliar situation being presented to the trainee. The lack of guidance in LACC's MATS Part 2 resulted in co-ordination being effected but no strip or electronic point out being utilised. This meant that the DAVENTRY SOUTH data display was incomplete from the time that the co-ordination was agreed until the Airprox occurred.

In the first instance DAVENTRY SOUTH Tactical controller 'A' did not provide information on all the traffic in his Sector when he handed over the position to Tactical 'B' and his trainee. Nevertheless, as the data block for the A320 had been displayed as a foreground 'intruder' since before the A319 crew called on the DAVENTRY SOUTH frequency, a scan of the radar by the Tactical 'B' Mentor and/or trainee should have detected the A320. DAVENTRY SOUTH Tactical 'B' was responsible for the safety of the Sector at the time the Airprox occurred when his trainee issued an unsafe descent clearance to the crew of the A319, which brought it into confliction with the opposite direction A320. There was no information displayed on the data display in respect of the A320 and no mention of the flight [co-ordinated to transit the DAVENTRY Sector whilst working LAKES Tactical] was made during the handover between Tactical 'A' and 'B' controllers.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The comprehensive analysis by ATSI had made plain the essential elements that contributed to this Airprox and it was evident that the two ac's crews involved played little part in this occurrence. It was clear to Members that the initial co-ordination effected for the A320 to transit the DAVENTRY SOUTH Sector, without being in RT contact with that Sector and instead being switched directly to LAKES, was sound. What went awry, however, was that DAVENTRY SOUTH Tactical 'A', did not record this nor pass the co-ordination on when he handed the position over to his colleague, the Tactical 'B' Mentor and his trainee. The Board recognised that the absence of a fps to highlight that co-ordination had been effected was crucial in this case, if a fps had been produced this would have acted as a reminder to Tactical 'A' to pass on this co-ordination. If basic procedures - as specified in the MATS Pt 1 - had been followed, then it could have forestalled this Airprox, since even if Tactical 'A' had missed explaining the co-ordination, the presence of a fps in the display would have alerted Tactical Controller 'B' and his trainee to question what it was for. Experienced 'Area' controller Members explained that it was a simple matter to annotate a fps and place it in the display as an aide-memoire. Another method also available to the controllers at LACC was the electronic point out facility: it was explained that this can be used to highlight the Track Data Block (TDB) [SSR label] on the radar display associated with any ac under control, this makes the subject ac's TDB stand-out with a blue box around it. Thereby enabling controllers to pick-out individual ac on the display more easily amongst the myriad of other tracks displayed when controllers request co-ordination. It was explained by the NATS advisor

AIRPROX REPORT No 062/07

that the use of this facility was not obligatory at the time this Airprox occurred. However, he also briefed the Board that following their investigation, a Supplementary Instruction (SI) has been issued to control staffs at LACC and the Unit's MATS Pt II revised to mandate that controller's initiating co-ordination should now use the electronic point out facility – a point suggested by both the DAVENTRY SOUTH Tactical controllers involved. Clearly the absence of any reference to the A320, which was legitimately transiting the DAVENTRY SOUTH Sector whilst working LAKES Sector, when the operating position was handed over to the next controller was an element of the cause. An experienced Controller Member stressed that if the Tactical 'B' Mentor and his trainee had been made aware of the transit of the northbound A320 through their Sector at FL380, then they would have been aware of the potential for a conflict with the southbound A319. Other Members agreed entirely with this view and recognised that the Tactical 'B' Mentor and his trainee had no fps relating to the A320 to highlight its presence, nevertheless, the ac was displayed to them on their radar display and had been before the A319 was switched to them and issued with a descent clearance. Notwithstanding that Tactical 'B' and his trainee would not have expected a northbound track to conflict with their traffic, Members agreed that a routine scan of the radar should have revealed the presence of the A320 to both the Mentor and his trainee earlier than had occurred here and was, therefore, another part of the cause. The Board agreed unanimously that this Airprox had resulted following an incomplete handover of the agreed co-ordination by the off-going Daventry SOUTH Tactical Controller 'A' and that the Tactical 'B' Mentor had allowed his trainee to descend the A319 into conflict with the A320.

Turning to assessment of the inherent risk, it was evident that under 2min had elapsed between the trainee issuing the decent clearance to the A319 crew and the DAVENTRY SOUTH control team spotting the conflict and taking remedial action. The radar recording showed that the A319 had passed through the A320's level whilst the two ac were just under 12nm apart. Fortunately, the track of the A319 had taken the ac clear to port of the A320 as it descended below the latter. Vertical separation of 900ft was evident when the ac were 2-5nm apart, just before the point of minimum horizontal separation and just as the avoiding action R turn issued by the Daventry SOUTH Tactical 'B' Mentor began to take effect. Thus the A319 was some 1300ft below the A320 at the closest horizontal range of 2-3nm, which occurred after the two ac had passed. The avoiding action initiated by the Tactical 'B' Mentor was mirrored by his colleague on LAKES Sector, who turned the A320 R onto N but only when prompted by the A320 crew, who it would seem had detected the other ac on TCAS, but had not received an RA and spotted the A319 passing below them. It seemed that the A319's rate of descent had more effect than the turn instructions and had certainly forestalled any TCAS alerts. Taking all these factors into account the Board agreed, again unanimously, that no risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

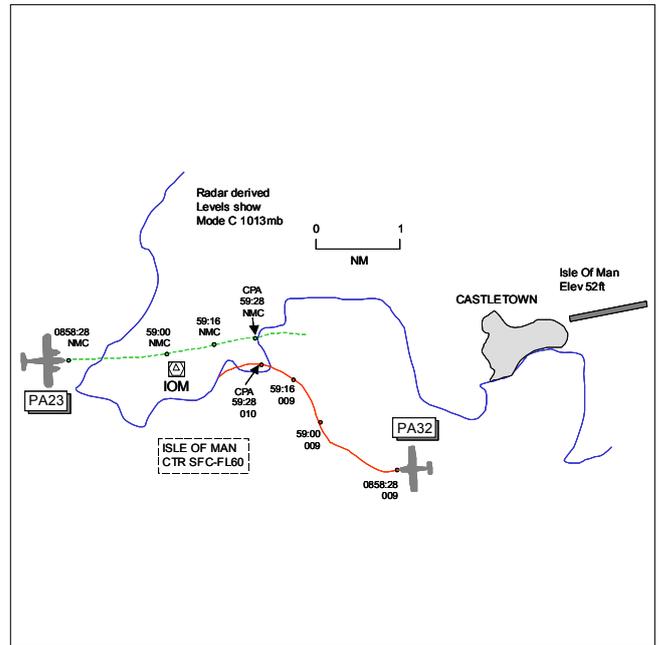
Cause: Following an incomplete handover of the agreed co-ordination by the off-going Daventry SOUTH Tactical Controller 'A', the Tactical 'B' Mentor allowed his trainee to descend the A319 into conflict with the A320.

Degree of Risk: C.

AIRPROX REPORT NO 063/07

Date/Time: 2 Jun 0859 (Saturday)
Position: 5404N 00444W (3.5nm FIN APP RW08
 IOM Ronaldsway - elev 52ft)
Airspace: CTR (Class: D)
Reporter: IOM APR + ADC

<u>1st Ac</u>	<u>2nd Ac</u>
<u>Type:</u> PA32	PA23
<u>Operator:</u> Civ Pte	Civ Pte
<u>Alt/FL:</u> 1200ft (QNH)	1200ft↓ (QNH)
<u>Weather</u> VMC CLBC	IMC KLWD
<u>Visibility:</u> >10km	
<u>Reported Separation:</u>	
APR+ADC: 200ft V/0.5nm H	
100ft V/600m H Nil V/400-500m H	
<u>Recorded Separation:</u>	
c0.3nm H	

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE IOM APR reports that the inbound IFR PA23 was established on the ILS and had been transferred to Tower. The inbound VFR PA32 was heading 245° for sequencing and maintaining VMC. He told the PA32 flight *“you are No 2 to a PA23 just coasting in O/H the I-O-M, do you have the traffic in sight”*. The pilot replied *“Affirm”* to which he replied *“Roger, you are No 2 to that ac, follow it in”*. Another flight called on frequency before he noticed that the PA32 was turning towards base in front of the PA23. When the frequency was clear he transmitted *“PA32 c/s avoiding action turn L heading 180° immediately”* believing that this was the best direction of turn owing to the ac’s track and other traffic in the vicinity. The PA23 was approx 1000ft QNH as he was 3nm final RW08 on the ILS (but NMC) whilst the PA32 was indicating 1200ft QNH. He estimated the subject ac came within 0.5nm and 200ft of each other.

THE IOM ADC reports that the PA23 was established on RW08 ILS on his frequency at 3nm from touchdown when he saw another ac (the PA32) on the ATM turning towards it. The PA32 was showing 1200ft QNH Mode C. He gave TI to the PA23 pilot who declared that he was IMC. The PA32 was seen to be in a L turn to avoid the PA23. After passing this information to the PA23 flight its pilot reported that he had broken out of the bottom of cloud and now had the PA32 in sight. Separation distances were estimated to be 200ft vertically and 0.5nm horizontally.

The IOM METAR shows EGN5 0850Z 16008KT 9999 BKN012 BKN020 14/11 Q1022 NOSIG= Remarks: CLOUD ON HILLTOPS.

THE PA32 PILOT reports inbound to Ronaldsway VFR with another pilot and in communication with Tower, he thought [actually Approach Radar] squawking with Mode C. The visibility was >10km flying 200ft below cloud in VMC and the ac was coloured white/red with strobe lights switched on. Heading 245° at 100kt with 2nd stage flap downwind RH for RW08 SW of the aerodrome he was visual with an ac on final approach O/H Castletown (1-2nm on final approach). At this time he was told that he was No2 to the ac he believed to be the one on short final. He started his turn onto base-leg but was then told to *“turn L onto 180° avoiding action”*. About halfway around the turn he became visual with a 2nd ac, a low wing twin engine ac coloured blue/white, which was descending with its gear down as it broke out of cloud on a straight-in approach which passed about 100ft above and 600m to his R. After this manoeuvre he then re-positioned to the R behind this 2nd ac for landing. He went on to re-iterate that the 2nd ac was in fact the one which ATC understood he was visual with and not the ac on short finals as mentioned before. Later he discussed the incident with his pilot colleague and they both agreed that they were not visual with the correct ac owing to cloud at the time.

AIRPROX REPORT No 063/07

THE PA23 PILOT provided a brief report for his inbound flight to Ronaldsway IFR and in receipt of a RCS service from Approach, he thought [actually Aerodrome Control Service from Tower] squawking with Mode C inop. Established on the ILS RW08 at 3nm and 1200ft QNH he was told of traffic but owing to IMC flying in cloud he could not see the ac. He continued his approach, as Radar told the other ac to turn, and it was then seen as he broke cloud in his 3-4 o'clock: a low wing single engine ac possibly a PA28 passing 400-500m to his R already turning away at about the same level.

ATSI reports that the PA23 flight was inbound to the IOM on an IFR flight plan. It was being re-positioned to the ILS for RW08 and had been issued heading 225° at 1500ft. The PA32 flight, inbound VFR from Oxford then established communication with the IOM, its pilot reporting *"ten miles to run"*. At 0853, the PA23 flight was instructed to turn L heading 180° for base leg. Approximately 2min later the APR instructed the PA32 pilot to *"fly heading now Two Seven Zero degrees maintaining VMC"*. This was to position the PA32 downwind RH. The PA23 was still on base leg and its pilot asked whether he was to establish on the LLZ and was issued a L turn heading 055°, now to establish from the R. To widen the cct the PA32 was turned onto 245°. The PA23 pilot reported established on the LLZ, was cleared for the ILS and transferred to the Tower frequency. The PA32 flight was informed *"you're number two to a P A Twentythree just passing just coasting-in just before the India Oscar Mike do you have it in sight"*. The pilot replied *"Affirm"* and was instructed (0858:30) *"roger position yourself number two"*. The APR realised shortly afterwards that the PA32 was turning base leg ahead of the PA23. As soon as another flight had finished transmitting he issued the PA32 pilot [just before 0859] with an *"avoiding action turn left heading One Eight Zero degrees now"*. Information was passed about traffic [the PA23] passing overhead the India Oscar Mike on the ILS.

Meanwhile, the PA23 pilot was informed, by the ADC, *"...there's a light aircraft cutting in front of you in your two o'clock at a range of two miles"*. He reported IMC. The information was updated as *"Okay he's turning left now going south of you to avoid"*. The pilot responded *"that's copied we've just broke out and traffic copied"*. The PA23 flight continued its approach and was cleared to land. The PA32 flight was given a R turn to position back to the airfield, with it in sight.

The PA32 was positioned downwind to follow the PA23. The pilot reported the traffic insight and was instructed to position No2 to that ac. There was no reason to believe that it would turn in front of the PA23. As soon as possible the PA32 flight was given an avoiding action turn which resolved the situation. Minimum separation reported locally as approximately 0.5nm/200ft.

UKAB Note (1): The IOM ILS FAT is offset 3.75° N of the RW08 C/L.

UKAB Note (2): The only recorded radar available showing the Airprox was St Annes (60nm to the E) with both ac being displayed on secondary radar. The subject acs' tracks suffer from track jitter throughout the scenario. The PA32 is seen level at FL009 (1170ft QNH 1022mb) turning R onto baseleg shortly after 0858:30 with the PA23 coasting in 1.25nm W of the IOM VOR showing NMC. The PA32 is seen to have commenced a L turn, as instructed by the ADC, at 0859:16 with the PA23 1nm to its NW. The CPA occurs at 0859:28 as the subject ac pass each other, starboard to starboard, with the PA32 turning through W showing FL010 (1270ft QNH) passing in the region of 0.3nm S of the PA23 tracking E.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The ATSI Advisor informed Members that further to the report in Part A above, there was a PA28 ahead of the PA23 in the traffic sequence. This led pilot Members to opine that the traffic sequence issued by the APR had been open to interpretation. The PA32 pilot was told he was No 2 to the PA23 coasting in W of IOM (VOR) at which time the PA28 was in the area of Castletown. The PA32 pilot had acknowledged TI on the PA23 but had actually seen the PA28 'coasting in' on 1-2nm final and had turned in, not assimilating the PA23's given position further to the W. A pilot Member thought that the APR should have realised that with the prevailing Wx conditions the PA23 would probably be in cloud and therefore not be visible to the PA32 pilot until a later stage on the PA23's approach. From the APR's viewpoint the PA32 was No2 in his sequence to the PA23: the PA28 was working the ADC and may not have been known to the APR. ATCO Members thought that had the TI given by the APR to the

PA32 flight been relative to its range from touchdown on the ILS (5nm), this might have alerted the PA32 pilot that the PA28 on short final was not the ac that ATC wished him to follow.

ATCO Members wondered why the APR had vectored the PA32 downwind to integrate it into the sequence. The PA32 pilot was operating VFR and could have been transferred to the ADC for sequencing, possibly being placed in an orbit downwind for spacing. A better situational awareness of the visual cct traffic would have been available from being on the Tower frequency as well as updated TI and clarity on the PA32's actual sequence number (No3). Members agreed that the combination of the sequence number and the PA23's position given in the TI had been confusing and following this the PA32 pilot had turned into conflict with the PA23 on final approach which had caused the Airprox.

The APR had noticed the PA32 flight's turn towards final approach and issued TI and an avoiding action L turn away onto S. During this turn the PA32 pilot had seen the PA23 as it broke cloud 600m clear out to his R, 100ft above and descending. Meanwhile the ADC had passed TI on the PA32 to the PA23 pilot who, although initially reporting IMC, saw it as it descended out of cloud at about the same level 400-500m to his R. Both visual acquisitions were as the subject ac were passing abeam each other and diverging. The prompt actions taken by the APR and PA32 pilot were enough to allow the Board to conclude that any risk of collision had been effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: As a result of confusing TI, the PA32 pilot turned into conflict with the PA23 on final approach.

Degree of Risk: C.

AIRPROX REPORT No 064/07

AIRPROX REPORT NO 064/07

Date/Time: 1 Jun 1717

Position: 5106N 00332W (8¼nm SW of EXMOR)

Airspace: FIR/Airway N864 (Class: G/A)

Reporter: Cardiff ATC

1st Ac 2nd Ac

Type: DHC-8-300

BE58

Operator: CAT

Civ Pte

Alt/FL: FL110

FL110

Weather NK NR

VMC NR

Visibility: NR

30km

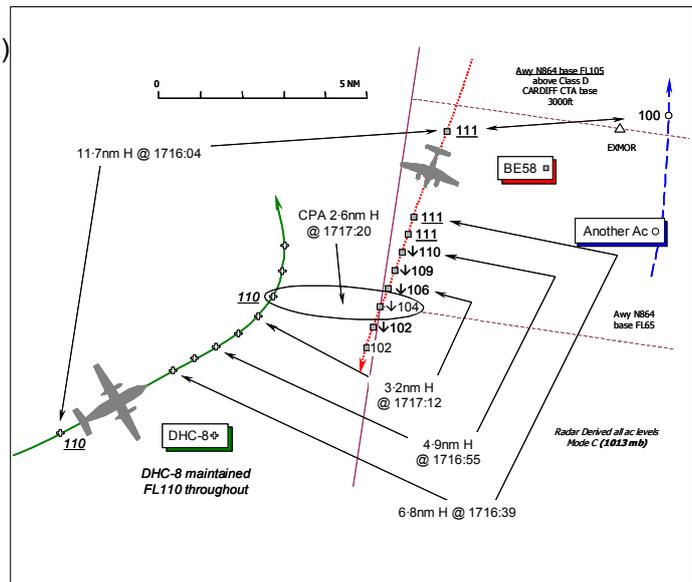
Reported Separation:

Cardiff Radar: 700ft V/2.5nm H

NR 1000ft V/5km H

Recorded Separation:

600ft V/2.6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CARDIFF APPROACH RADAR CONTROLLER (APR) reports that at the time of the incident the RADAR 1 & 2 positions were 'bandboxed' together as RADAR. He assessed the workload as medium but he stressed an ATSA was present.

The DHC-8 was inbound to Bristol under IFR and in receipt of a RAS outside CAS at FL110 squawking A5040, with the crew under their own navigation northeast bound cleared to join CAS at EXMOR. The BE58 was southbound level at FL110 on the westside of airway N864 within Class A CAS under a RCS squawking A7263, flying a radar heading against a further ac [squawking A7471 and shown as 'Another Ac'] inbound to Bristol from the S. Airway N90 [a Cat 1 & 3 Conditional Route (CDR)] was active this Friday evening and he was 'streaming' two departures - one from Bristol [A2236] and another leaving Cardiff [A2271] - southbound on N90. When the subject ac were approximately 5nm apart he noticed that the DHC8 and the BE58 were in conflict at FL110. An avoiding action L turn onto heading 350° was issued to the DHC8 crew and he instructed the BE58 to descend to FL100. No traffic information was issued and STCA activated after he gave the avoiding action instructions as the ac passed each other. Minimum separation was estimated to be 2.5nm horizontally and 700ft vertically.

THE DE HAVILLAND CANADA DHC-8-300 PILOT reports that he was the PF whilst routeing from St Mawgan to Bristol, working Cardiff ATC on 125.85MHz. Flying at 210kt in a level cruise at FL110, heading 065° towards EXMOR with the autopilot engaged, they had been cleared to join CAS at FL110 when Cardiff ATC issued an avoiding action L turn onto a radar heading of 350°. This was given against conflicting traffic within Airway N864. The other ac was not known but he subsequently learned that following the avoiding action, which was actioned without delay, an erosion of separation resulted. No TCAS alerts were enunciated.

THE BE58 PILOT reports he was en-route to Santander in a level cruise at FL110 in VMC, whilst in receipt of a RCS from Cardiff ATC on 125.85MHz; Mode S was on. Southbound at 190kt, the incident occurred approximately 6nm SW of EXMOR involving a DHC-8, which was spotted about 10km away some 15sec before receiving an avoiding action instruction of, he thought, a 10-20° L turn. He informed the controller that they had the DHC-8 visual, whose pilot was also given avoiding action by ATC and duly complied. The pilot of the Dash 8 also informed ATC that he had visual contact with their ac and he assessed the minimum separation as 1000ft and 5km [2.7nm], with the risk of a collision as "Low". The ac was crewed by two pilots.

ATSI reports that in accordance with the agreed Cardiff ATC manning arrangements for 'after 1800 local', the Cardiff RADAR 1 & 2 positions were operating in bandboxed mode. Before these positions were combined the controller concerned had been operating as RADAR 2. The APR's Workload was described as "medium".

The BE58 crew established communication with Cardiff RADAR at 1653, reporting at FL110, 18nm west of AMMAN and requesting an airways joining clearance. The APR stated that he had an fps for the flight which indicated that the ac was experiencing pressurisation problems and was requesting to join airways at FL110. Consequently, the flight was cleared to join CAS - Airway L9 - from AMMAN at FL110, where the base of L9 is FL125 at AMMAN, reducing to FL95 some 5nm to the E. This portion of Class A CAS is delegated from LACC Swanwick to Cardiff ATC. Just over 2min later, the BE58 crew was instructed to squawk A7263. [The pilot was not informed that he was identified nor advised when he entered CAS as is required MATS Part 1, Section 1, Chapter 5, Page 9 and Section 1, Chapter 5, Page 2 respectively.] At 1701:09, with the BE58 having entered L9, the crew was instructed to turn R 10° onto a new heading of 115°. Some 5min later, as the ac approached the junction of airways L9 and N864, the flight was instructed to turn R heading 180°, to establish on airway N864. Two further heading changes were issued, the second at 1711, when the BE58 crew was instructed to turn R heading 200° to position the ac to the W side of the airway to separate it from northbound traffic, descending for Bristol [shown on the diagram as 'Another Ac'].

At 1712:30, the DHC-8 crew contacted Cardiff RADAR and reported “..flight level 1-1-0 direct to EXMOR and requesting a Radar Advisory” (RAS). The flight was identified 40nm SW of Cardiff and placed under a RAS. The DHC-8 crew was then issued with their clearance by the APR: “you are clear to join controlled airspace and report ready for descent”. [The DHC-8 crew read back the clearance at 1712:50, “clear to join controlled airspace and wilco”.] MATS Part 1, Section 1, Chapter 4, Page 1, states that: ‘An air traffic control clearance shall include the following items: Aircraft identification; clearance limit; route; levels of flight and changes of level’. The clearance issued to the DHC-8 crew did not fulfil these conditions. The radar photograph, timed at 1712:20, as the DHC-8 crew were making their initial call, shows this ac tracking NE towards EXMOR, some 38½nm SW of the BE58: both ac are maintaining FL110. The APR commented that his intention was to monitor the DHC-8’s progress and issue its crew with descent to FL90 (the agreed level with Bristol) prior to it entering the airway. The APR did not recognise the potential confliction between the subject ac at the time, he said because he had inexplicably overlooked the presence of the BE58 although he confirmed that fpss for both ac would have been displayed under the same designator on the fps display. The APR added that he was concerned with separating the DHC-8 from the northbound Bristol traffic which would be descending to FL90 in the EXMOR area.

After the controller had issued the DHC-8 crew with an airways joining clearance, he turned his attention to other traffic. This included streaming an ac from Cardiff 15nm behind a Bristol departure southbound on Airway N90 [parallel to and conjoining N864 to the E] - this airway being active from 1500 on Fridays. After carrying out a scan of the radar display and prior to STCA activating, the APR then realised the situation between the subject ac and instructed the BE58 crew at 1716:40 to “..turn er descend now er flight level 100” - the term ‘avoiding action’ was not used. The radar recording, timed at 1716:39, shows the BE58 close to the western edge of N864 with the DHC-8 6-8nm to the SW on a conflicting track. Straight after the pilot of the BE58 crew read back the instruction “descend level 100 [C/S]”, the controller transmitted to the DHC-8 crew at 1716:50 “[C/S] avoiding action turn..left heading..zero correction 3-5-0 degrees” [which was immediately read-back by the crew]. [UKAB Note (1): At exactly 1717:00, the RT transcript reflects at line 164 a transmission from the BE58 crew, “traffic [BE58 C/S]” probably reporting visual contact on the DHC-8 in conformity with the BE58 pilot’s account as no other recorded transmission appears to reflect this.] About 30sec after instructing the BE58 crew to descend to FL100, the instruction was repeated “descend flight level 100 avoiding action”. By the time the distance between the two ac reduced to 3-5nm, the BE58, now very close to the western airway boundary, had commenced descent and was passing FL107. The Clee Hill Radar Recording showed that horizontal separation decreased to 2.4nm when vertical separation was 700ft. This occurred just after the ac had passed each other by which time the DHC-8 had almost completed its turn onto heading 350° and the BE58 was at the western boundary of the airway. At 1717:28, the DHC-8 pilot reported visual with the traffic passing in his 6 o’clock as they turned. The DHC-8 remained outside CAS during the Airprox. [UKAB Note (2): The Burrington Radar recording available to UKAB showed 2.6nm horizontal separation at 1717:20, with 600ft of vertical separation evident as the BE58 descended through FL104 with the DHC-8 abeam as the latter turned L maintaining FL110.]

In accordance with the provision of a RAS, the controller should have provided advice necessary to maintain prescribed separation between the subject ac. In accordance with the Cardiff MATS Part 2, the required radar separation was 3nm. The MATS Part 1, Section 1, Chapter 5, Page 13, states that ‘radar controllers should aim to keep the aircraft under their control at least two miles within the boundary’ (of CAS). Whilst it is recognised that the APR positioned the BE58 on the W side of the airway, because of opposite direction northbound traffic passing to the east, had it been 2nm from the western boundary, separation would probably not have been lost. The APR

AIRPROX REPORT No 064/07

explained that, if the Bristol inbound had not been in the airway, the BE58 would have been routed to the E earlier, to join airway N90.

The airways joining clearance issued to the DHC-8 crew did not comply with MATS Part 1 procedures and did not ensure that vertical separation would be provided between it and the BE58, which was already in the airway. The Airprox occurred with the DHC-8 outside CAS and the BE58 on the western boundary of Airway N864, both flights being under the control of the Cardiff APR. Under the RAS being provided to the DHC-8 crew, standard separation should have been provided between the subject ac. [UKAB Note (3): The stipulated horizontal separation here was 3nm]

ATSI Recommendation. In accordance with the Cardiff MATS Part 2, Page APR-72, the Cardiff Approach Radar Control service area extends within applicable CAS and the Cardiff LARS area. 'A LARS is provided by Cardiff Approach Radar Control to ac flying between altitude 3000ft and FL95 within certain parts of the airspace contained by a circle 40nm radius centred on the aerodrome reference point.' It would appear that the DHC-8, operating outside CAS at FL110, was not within the currently stated radar service area. It is understood that there are several services that route outside CAS, above FL95, that contact Cardiff. Consequently, ATSI made the following recommendation:

It is recommended that the Cardiff Radar Service Area is reviewed, with the provision of allowing a radar service to be provided by the ATSU to aircraft, in a defined area outside CAS, above FL95.

The APR explained that there were some issues which may, he believed, have affected his performance in the period leading up to the Airprox. One of these involved carrying out non-operational work related tasks during his ATC breaks. He commented that part of his non-operational duties was the issue of Supplementary Instructions (SI). He added that earlier that morning he had been occupied at home preparing the issue of an SI that had to be introduced that day. He had arrived at the airport some 2 hours earlier than rostered to continue this work and had been involved with it during his SRATCOH [Scheme for the Regulation of Air Traffic Controllers Hours] breaks. He commented that he did feel some pressure to finish the SI but, with hindsight, he realised that he should have ensured that he took appropriate breaks away from work related tasks. The following recommendation was made, following the NATS investigation of this Airprox:

"It is recommended that Cardiff review and clarify to controllers the appropriateness of work-related activities being undertaken in SRATCOH breaks in operational duty".

This local recommendation was accepted by local NATS management and action was in progress. The circumstances of this Airprox reinforce the importance, despite any other pressures, of ensuring that appropriate SRATCOH breaks are taken.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The very comprehensive ATSI report had laid bare the essential background to this Airprox which although at face value this seemed relatively straightforward, it possibly masked some underlying complex aspects. It was plain that the acs' crews themselves had not sown the seeds of this Airprox which evidently stemmed from the controller's concerns over ATC issues. The Board made a point of commending the Cardiff APR for raising this honest and frank report which, whilst highlighting some basic slip-ups had also drawn attention to other topics, to wit: the provision of radar services outwith the Cardiff RSA and, importantly, non-operational work-related tasks conducted during periods of rest.

The first topic – radar services outwith the Cardiff RSA - seemed a relatively straightforward problem and the Board was surprised that these responsibilities had not been delineated correctly as Cardiff's area of responsibility had expanded. The ATSI Recommendation on this topic was entirely appropriate and would certainly 'regularise' the status quo.

A lively debate ensued on the second topic of controllers accomplishing extraneous yet work-related tasks during breaks from their demanding operational duties whilst satisfying the necessity of taking appropriate periods of rest during the period of their watch. An experienced 'area' controller Member questioned what constituted a 'break' – for example a training debrief whilst away from the operating position did not constitute a 'break' as such - and the Member contended that more guidance was needed from the Safety Regulator on this complex topic suggesting that a review was warranted. However, the ATSI Advisor then explained that a review of CAP670 – the regulations covering SRATCOH - was already in progress in consultation with ANSPs. Thus it was agreed that a Safety Recommendation from the Board was somewhat superfluous at this stage. However, it was agreed that the ATSI Advisor would keep the Board apprised of any developments subsequent to this helpful review. Members considered whether this controller had perhaps placed undue pressure on himself to complete these extraneous duties. Controller Members stressed that 'management' had an implicit responsibility to ensure that controllers did not do too much in this respect, which required constant and conscientious supervision. It was explained that this controller had himself drafted an SI for the benefit of his colleagues about taking appropriate breaks from operational duties during the overall period of the watch – a laudable accomplishment. Similarly, 'management' had to keep a check on controllers' workload whilst at operational positions and Controller Members were keen to explore this aspect during the period of this Airprox. The APR had himself opined that his workload was of "medium" intensity and notwithstanding assurances that the manning at this point was in accord with agreed norms, some questioned if the controller's view was correct. But in the ATSI Advisor's opinion independent evaluation of an individual's workload was very much a "personal assessment" and he opined that this was a very difficult aspect to quantify. The Unit investigation might give a useful view on this aspect and here the recorded RT had been reviewed but there appeared to be nothing untoward in this respect and nothing to suggest that bandboxing the two RADAR positions into one had been in any way contributory to the Airprox. The underlying human factors issues here were worthy of wider dissemination and the NATS Advisor briefed the Board that a booklet covering Human Factors issues had recently been published and circulated to all NATS Units - the Board agreed that this was a helpful and proactive stance. Nevertheless, it was primarily the controllers themselves who had to judge what level of traffic they could safely cope with in specific circumstances. Even so, this was a fine line to draw and the Board was keenly aware that Unit Supervisors and Watch Managers played an essential role here and had an intrinsic responsibility to ensure that an individual controller's workload was kept within acceptable limits.

In the light of the overarching factors revealed by the investigation of this Airprox by the Unit, the Company and the Safety Regulator, it seemed clear to the Board that the fundamental catalyst was the CAS joining clearance issued to the DHC-8 crew whilst they were heading towards their joining point in the vicinity of EXMOR. The ATSI report had made it plain that the content of the clearance was incomplete and not in accord either with promulgated procedures or accepted practice. Perhaps more stringent compliance with procedures might have highlighted the controller's mistake at an earlier stage, for it was clear that a review of the fps display available to him should have revealed the conflict. As it was, the APR instructed the DHC-8 crew to join CAS at a level that was already occupied by the BE58 which, as the controller was controlling both flights, he might reasonably have deduced beforehand would create a conflict in the vicinity of EXMOR. An honest mistake, a controller Member opined, for it was evident that the Airprox occurred with the DHC-8 outside CAS under a RAS at FL110 and the BE58 on the western boundary of Airway N864 just within Class A CAS at the same assigned level under a RCS. Thus separation was not assured between the joining ac and the BE58 unless the APR applied vectors to ensure horizontal separation was maintained. Whilst the APR was dealing with a complex situation he had patently not monitored it sufficiently closely as it was clear that the controller had made little attempt to turn the BE58 southbound to remain safely within Class A CAS beforehand. If he had, the ATSI report had made it plain that horizontal separation might not have been eroded. In the provision of a RAS to the IFR DHC-8 flight, its crew could reasonably have expected the controller to have provided advice necessary to maintain prescribed separation – which was stipulated to be 3nm horizontal separation in the unit MATS Pt II, ATSI advised. Similarly, the crew of the BE58 inside Class A airspace should have been afforded standard separation over all other IFR traffic. Whilst some Members suggested that the cause was that the APR did not comply with the provisions of a RAS, it was clear that he had attempted to effect avoiding action and indeed both pilots had reported visual contact with each other's ac. But none of this would have occurred if separation had been effected between the DHC-8 joining CAS and the BE58 in the airway beforehand. Therefore the Board agreed unanimously that the cause of this Airprox was that the Cardiff APR did not ensure separation between the DHC-8 and the BE58.

Turning to risk, it was clear from the radar recording that when the APR had realised what was happening between the DHC-8 and the BE58 and transmitted the descent instruction to the BE58 crew, the ac were a little under 7nm apart - the BE58 marginally above the DHC-8, the Mode C indication revealed. Although the APR promptly issued

AIRPROX REPORT No 064/07

an avoiding action descent, he did not prefix his transmission as such and Members were keen to point out the importance of getting a pilot's attention in this way. Reluctance to use such a phrase – which might engender in some controllers a misplaced sense of 'failure' - was a recurring feature in Airprox reports. The Board was reminded of previous Safety Recommendations where the use of the term 'avoiding action' had been stressed. Discussion revolved around the differing perceptions of the use of the phrase by military and civilian controllers: where a military controller will routinely use the phrase quite liberally to ensure that separation is achieved, a civilian controller will generally only use it to prevent a collision. However, pilot and controller Members alike emphasised that if controllers wanted to ensure a prompt and robust response from the pilot its use was imperative to get their attention – an important message here. In this instance the BE58 crew's rate of descent subsequent to the APR's instruction was not high but ensured that 600ft of vertical separation had been achieved in the 41sec it took the two ac to close to the point of minimum horizontal separation of 2.6nm. Evidently the avoiding action L turn instruction correctly issued to the DHC-8 crew was effective and the crew's prompt compliance ensured that TCAS was not required to act. So both crews' compliance with the APR's instructions had ensured that the situation did not deteriorate further. This coupled with their visual acquisition of each other's ac ensured that any risk of a collision was effectively removed and the Board agreed unanimously that no risk of a collision had existed in the circumstances conscientiously reported here.

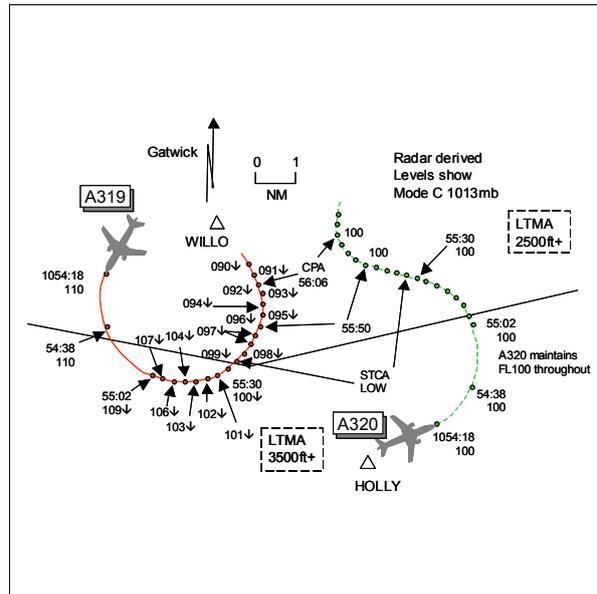
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Cardiff APR did not ensure separation between the DHC-8 and the BE58.

Degree of Risk: C.

AIRPROX REPORT NO 065/07

Date/Time: 28 May 1056
Position: 5058N 00008W (11nm S Gatwick)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: A320 A319
Operator: CAT CAT
Alt/FL: FL100 FL100↓
Weather VMC CLAC IMC KLWD
Visibility: >20km NR
Reported Separation:
 <700ft V/1-2nm H 500ft V/4nm H
Recorded Separation:
 600ft V/2-4nm H OR 800ft V/2-3nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports heading 290° at 210kt inbound to Gatwick IFR and in receipt of a RCS from Gatwick Approach/Director on 126.825MHz squawking with Mode S. Whilst established in the WILLO Hold at FL100 and having just completed the inbound turn back to WILLO, they received a TCAS TA on traffic showing in their 10 o'clock range 3nm which was perceived to be also established in the hold at the same level but descending. However it quickly became apparent that the traffic was on a NE'ly course towards them. Almost immediately ATC issued an instruction "A320 c/s avoiding action turn R heading 360°" but this instruction was not acknowledged immediately as they were carrying out the avoiding action manoeuvre using 40° AOB. ATC repeated this instruction and following completion of this manoeuvre, the other ac was seen on TCAS to pass close behind (within 1-2nm and 700ft vertically below). Once clear of traffic normal ATC instructions were resumed. The other ac was not seen visually as they were only 100ft above a cloud layer but with >20km visibility.

THE A319 PILOT reports flying in the WILLO hold and in receipt of a RCS from Gatwick. Descending in steps they became aware that the controller was calling another flight repeatedly but it was some time (3-4calls later) before the other ac's crew responded. By that time a TCAS return was noticed intruding into the holding pattern about 6-7nm away from a NE'ly direction, he thought, at FL100 as they were approaching FL100 in the descent at 210kt and in a LH turn inbound towards WILLO. ATC then instructed the other flight to turn R immediately for traffic avoidance. They closely monitored the separation between their ac so when TCAS generated a TA alert they were primed to take avoiding action if it should progress to an RA situation. It was clear that separation, even though below minimum, would not become critical such that avoiding action would be necessary unless in a response to an RA warning. In the end no RA was generated with minimum separation estimated to be 500ft and 4nm. The other ac was not seen visually as, at FL100, they were only 300-500ft above cloud but were descending at the time of the incident. No comment was made to them on the incident and as there was no RA they concluded that it was not a reportable incident.

THE LTCC GATWICK INTERMEDIATE APR reports that whilst trying to organise a RW change, he descended an A319 in the WILLO stack through the level occupied by an A320. He noticed his error and gave the A320 flight an avoiding action turn onto 360°.

UKAB Note (1): The STAR for Gatwick via WILLO Hold from the MID or GWC directions requires ac to route to HOLLY entry fix before turning L to intercept MID VOR R107 to WILLO (LH hold).

ATSI reports that at the time of the Airprox, both ac were in communication with the Gatwick INT APR. The workload and traffic loading were both described as 'busy'.

AIRPROX REPORT No 065/07

The Gatwick Approach facility has three positions; FIN, INT and Support. At the time of the Airprox, FIN and INT were manned but there was no one in the Support position. A member of staff had been allocated for this position and was available if required.

The A320 flight established communications with the Gatwick INT controller at 1045:05 reporting maintaining FL110 and inbound to HOLLY reducing speed to 220kt. The controller instructed them to take up the Hold and to expect a delay of less than 5min. At 1046:35, the A319 flight reported on the controller's frequency at FL120 inbound to HOLLY, which the controller acknowledged and told the crew to take up the hold with a delay of less than 10min. When the A320 was 16nm S of Gatwick, just approaching HOLLY, the controller instructed the crew to descend to FL100 and at 1051:10, he instructed the A319 flight to descend to FL110. At 1053:20, the crew of the A319 reported taking up the hold at WILLO to which the controller replied: "A319 c/s roger take up the hold delay not determined".

Very shortly after this (1053:50) the crew of the A320 asked whether the delay was due to congestion or whether something was going on. The controller instructed the crew to standby before instructing the crew of the A319, which was turning towards HOLLY in the hold, at 1054:20, to turn L heading 020°. At this time the A320 was turning L at HOLLY, maintaining FL100 and tracking towards WILLO. The controller responded to the query from the A320 flight but the crew replied; "Disregard". Some 15sec later (1054:40), the controller instructed the A319 flight to descend to FL80. At 1055:30, the controller instructed the A319 flight to turn L heading 275° downwind. At that time the A319 was passing FL100 for FL80 with the A320, which was level at FL100, in its 1 o'clock at a range of 5.4nm crossing from R to L. Three seconds later STCA activated at 'low severity' and the controller transmitted: "A320 c/s avoiding action turn right heading three six zero degrees". There was no response and so the controller repeated the instruction but still there was no response from the crew. The controller repeated the instruction for the third time, at 1055:50, and the crew replied "Heading north A320 c/s". Separation reduced to a minimum when the A319 was passing FL94 already in a L turn onto 275° with the A320 to its NE in its 3 o'clock at a range of 2.4nm and 600ft above in a R turn. Standard separation was soon restored as the effect of the turns took the subject ac away from each other.

[UKAB Note (2): The CPA occurs at 1056:06, horizontal separation reduces to 2.3nm as the A319 descends through FL092, 800ft below the A320.]

In a very frank dialogue, the controller advised that prior to and during the Airprox he was involved in trying to arrange a RW change at Gatwick. The unit MATS Part 2 (GAT Chapter 2, GAT-4 para 2.3.1) details this procedure as follows: 'When Gatwick AIR considers that a runway change is necessary, the Gatwick Watch Manager is to be informed. The Gatwick Watch Manager will liaise with the TC GS A (Group Supervisor Airports). Based on their joint assessment of the traffic situation they will agree a time, at least 15 minutes ahead, when the runway change will take place. The TC GS A will inform KK FIN, KK INT, TC South East and TC South West of the agreed time. Gatwick AIR, in consultation with KK FIN, will tactically decide the last landing and departing ac prior to the runway change. This must be planned as to be as close as practicable to the agreed time'. The controller reported that although he had experienced RW changes in the past none had been like this one. First of all the GS Airports had come down and started to discuss the RW change. There was no support controller in place which, according to the INT, was not unusual at this time of day. Having had the discussion, as well as dealing with the RT, telephone and face-to-face conversations with the Gatwick FIN, who was sitting alongside, he then found that the GS South arrived and started asking the same questions in respect of the RW change. Furthermore, the controller designated to be the support controller, if required, entered into the conversation. The INT found himself looking away from the radar in order to hold the conversation that took place and this became a major distraction. MATS Part 1 (Appendix E page 2 para 2 'Distracting conversations') makes it clear that controllers should not become involved in discussions whilst at operational positions. Had the RW change been conducted in the manner detailed by the MATS Part 2 then the simple exercise of informing the INT of the time the change would take effect would not have been a distraction. However, the involvement of two other parties generated a lot of discussion, which directly distracted the INT.

The INT had only been valid for a year and so there was a degree of reluctance, on his part, to be assertive and tell these people not to distract him from his operational tasks. Analysis of the telephone conversations showed that the FIN had agreed to 'pack' the traffic until the runway change was made which would clear the traffic in the stacks. At 1050:45, the conversation showed that the A319 would be the last ac to land on RW08, but shortly afterwards this was changed to another ac. It is apparent that the Gatwick tower controllers wanted to change RWs quickly as they had started sending traffic to the holding point of RW26 in preparation. At 1052:10, the FIN

and AIR controllers agreed that an ac in the hold at WILLO would be the first to land on RW26 and soon afterwards, at 1052:50, AIR and INT agreed that the last ac to land on RW08 was also one holding at WILLO which was number 11 in the sequence for RW08. The INT controller believed that it was he who made the decision as to which would be the last to be vectored for RW08. He went on to say that the designated support controller was challenging this decision.

The strips were arranged in 1 bay with 2 designators, each representing the relevant stack i.e. WILLO and TIMBA. Under each of the designators the strips would be arranged in vertical order with the lowest at the bottom. The controller would vector and descend traffic from the stack and, when appropriately positioned, hand the flight strip to the FIN as well as transferring the ac. Although the vertical stack window facility was available, at the time of the Airprox the INT was not using it. Having decided which ac was going to be the last to land on RW08, the INT controller turned his attention back to the radar in order to 'pack' the traffic and clear the stacks quickly. It was at this point that he looked at his radar display, saw the position of the A319, but did not see the A320 on the other side of the hold, and decided this was his next ac. Having instructed the crew to turn L heading 020°, as soon as he determined it appropriate to do so, he instructed the crew to descend to FL80. Shortly afterwards he instructed the crew to turn L heading 275° downwind. From his description of the event it would seem that the conversation regarding the RW change was just about finished at this time and he was trying to concentrate on the traffic situation. His instructions to the crew of the A319 were, inadvertently, written on the strip for the A320, which was at the bottom of his strips in the WILLO stack. This reinforced his mental picture that the ac he was issuing clearances to was the next in the sequence.

Just before STCA activated, he saw his error and so decided to pass avoiding action to the A320 flight. He had seen that the Mode C from the A319 indicated it had just descended through the level of the A320 and so the most effective course of action was to instruct the crew of the A320 to turn R. When there was no response from the crew to the avoiding action instruction the controller repeated it. He explained that earlier during the shift some crews had reported background noise and interference on the frequency when in that area. He was concerned that the crew of the A320 might not have heard the instruction and so repeated it for a third time, which the crew acknowledged. Both the INT and his Watch Manager were of the opinion that the crew of the A320 had not turned quickly enough and, had they responded to the avoiding action instruction immediately it was passed then standard separation would have been maintained. The radar recording and the associated RT transcript were viewed by the appropriate Flight Operations Inspector. Analysis of the Mode S data showed that the heading of the A320 settled on 289° at 1055:35, as it tracked inbound to WILLO and the avoiding action was issued at 1055:37. By 1055:50, the heading was passing 294° in a right turn. Discussions between the airline and the Flight Operations Inspector revealed that the Captain was the PNF at the time and when the instruction was given the PF commenced a turn. The Captain believed that more bank should be used and so took control, applying maximum side stick, achieving 40° of bank. This explained why there was a delay in responding on the RT to the instruction although the ac was well established in the turn when the acknowledgment came.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed the Board that the use of the vertical stack window facility was not mandated on either the Gatwick INT or FIN positions, being an optional selection by the controller. Also, the GS Airports was a relatively new position at the time of the incident, having taken over the RW change responsibility from the GS South about a month before.

From the ATSI report it seems that had the MATS Part 2 procedure been followed then this incident would probably not have occurred. However, the INT believed that he was the controller who decided which ac was the last to be vectored for RW08 although the MATS Part 2 procedures state that the FIN makes the decision in agreement with the AIR. Prior to this both the GS A and GS S had entered into conversation with the INT, the nominated Support controller then challenging the INTs 'last landing ac' decision. This breakdown in TRM had led to the INT becoming overly involved during the decision process and allowed him to become distracted from his primary task immediately prior to the Airprox. Thereafter, when the INT decided to 'pack the traffic' for landing RW08, he had seen on radar that the A319 was in a position to fill a gap in the sequence so issued a heading before descending the flight through the level occupied by the A320 which had caused the Airprox. ATCOs familiar with LTCC operations opined that the fps display would have shown the potential conflict between the subject ac but, as

AIRPROX REPORT No 065/07

was seen here, the FIN reinforced his decision by writing the descent clearance issued to the A319 on the A320 frequency which was at the bottom of the bay. Pilot Members were surprised that the A320 crew did not query the ATC descent clearance issued to the A319. The A320 flight was on frequency before the A319 called so the A320 crew should have been aware through subsequent RT exchanges that the A319 was in the same hold above their aircraft before being dropped by ATC through their level.

Turning to risk, STCA had alerted the INT to the potential confliction and he had reacted promptly with avoiding action to the A320 flight. The A320 crew had been given the 'heads-up' by a TCAS TA alert followed by an avoiding action R turn onto N from ATC. They had executed the turn using 40° AOB, estimating the A319 passed 1-2nm away and 700ft below. Similarly, the A319 crew had seen the approaching A320 on TCAS and heard ATC issue a R turn to the A320 flight for traffic avoidance whilst monitoring the situation closely as a TA alert was received. The A319 crew continued their turn and descent, estimating the A320 passed 4nm away and 500ft above. The radar recording shows the CPA as 800ft and 2-3nm with the subject aircraft both turning and diverging. When combined, all of these elements were enough to allow the Board to conclude that safety had been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

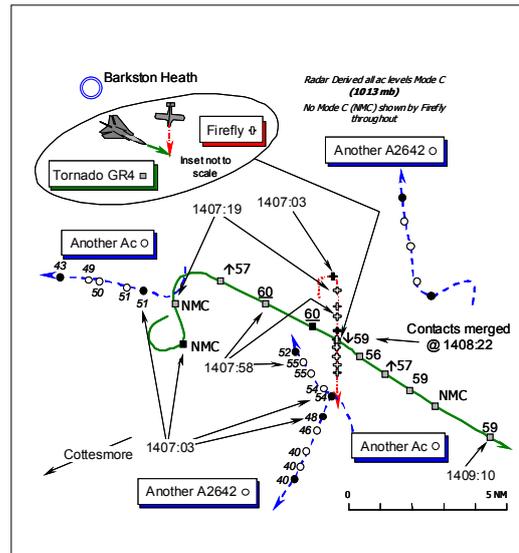
Cause: The LTCC Gatwick INT descended the A319 through the level occupied by the A320.

Degree of Risk: C.

AIRPROX REPORT NO 066/07

Date/Time: 6 Jun 1408
Position: 5250N 00018W (1½nm ENE of Cottesmore)
Airspace: Lincolnshire AIAA (Class: G)
Reporting Ac Reported Ac
Type: Tornado GR4 Firefly 260
Operator: HQ Air (Ops) HQ Air (Trg)
Alt/FL: FL60 FL60

Weather VMC CLAC VMC NR
Visibility: 30km >10k
Reported Separation:
 300ft V/Nil H 100ft V/Nil H
Recorded Separation:
 Contacts merged in azimuth



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports that he was inbound to Marham VFR and in receipt of a RIS from LATCC (Mil) squawking the assigned code of A6113 with Mode C. Neither TCAS, Mode S nor any other form of CWS is fitted.

Whilst recovering to RAF Marham some 4000ft clear above cloud at 390kt LONDON MIL informed them of a contact 3nm ahead “on the nose indicating 5500ft”. At the time he was in a level cruise at FL60 and elected to maintain this level and prioritise his lookout. Whilst approaching a position some 14nm ENE of Cottesmore [lat. & long. given] heading 117°, a yellow aeroplane was spotted at a range of about 1nm – he thought at the time it was a civilian-registered biplane possibly a Tiger Moth but it was actually the Firefly - in his 11:30 position at the same level. At 1408:20, to avoid the yellow aeroplane he bunted his jet which resulted in the other ac passing about 300ft directly above him with a “medium” risk of a collision. The incident was reported to LONDON MIL on RT before he recovered to base.

THE FIREFLY 260 PILOT, a QFI, reports he was operating VFR on a quiet frequency teaching pre-stall HASELL checks to his student pilot flying some 2000ft above and 20km clear of cloud. The ‘Lincolnshire Agreed Airspace’ conspicuity squawk of A2642 was selected with Mode C: Mode S is not fitted.

Flying at 120kt, straight and level at FL60, heading 185°(M) some 14nm SE of Barkston Heath a Tornado was first seen 50m away as it appeared from under his port wing flying away from his ac on a perpendicular heading. The Tornado had crossed from R - L about 100ft directly below his aeroplane with a “high” risk of a collision but both he in the LHS, and his student in RHS, had been unsighted on the jet before the occurrence.

His aeroplane has yellow upper surfaces and is black underneath: HISLs and the landing lights were all on.

THE FIREFLY 260 PILOT’S UNIT COMMENTS that this Airprox was a close call and at an undesirable stage of flight for the Firefly. The incident has been related to all pilots on the Unit to remind them of the risks inherent in flying in the ever-more-restricted area of the Lincolnshire airspace.

This is the second reported fast-jet/Firefly Airprox [the other was 032/07 Harrier v Firefly] that has occurred in recent months and the Firefly instructor did not gain visual contact until after the event. Although the Tornado pilot gained visual contact and took avoiding action, it was still flown in very close proximity to the Firefly. The Lincolnshire AIAA is crowded with elementary flying training (EFT) light ac with Fireflies from Barkston Heath and Tutors from Cranwell. To the S there are more Tutors flying from Wyton. All these ac are operating below FL100

AIRPROX REPORT No 066/07

and are mostly VFR. It is of concern for all operators in this area that as the increases in CAS restrict the available "VFR airspace", congestion will significantly increase the risk of collision, particularly with transiting fast-jet ac.

LATCC (MIL) CONTROLLER 11 (CONT11) reports working the subject Tornado GR4 conducting general handling NE of Cottesmore by about 20nm, operating between FL50-240. The controller was also working 2 Typhoons general handling N of Humberside and was utilising the Claxby Radar head. Traffic had just been called to the Typhoons that were on a different frequency to the Tornado when he went back to the primary UHF frequency to call traffic to the Tornado crew. After this traffic information had been transmitted the Tornado crew reported that they were returning to Marham at FL60. The crew then asked what the last ac called was squawking. Although he was unsure of what the squawk was, he told the Tornado crew that it was believed to be an A7001 squawk [but it was actually squawking A2642]. The GR4 then flew on towards Marham.

MIL ACC OPS reports that the Tornado GR4 crew was receiving a RIS from LATCC (Mil) Controller 11 (CONT11) on recovery to Marham. The Firefly crew was operating autonomously NE of Cottesmore. At 1402:09 the GR4 crew called CONT11 and stated, "*LONDON MIL good afternoon [GR4 C/S] on handover FL140 Radar Information.*" In reply CONT11 advised that the GR4 was identified at FL140 under a RIS. There was then an exchange of calls before the GR4 crew stated, at 1403:45, that they were, "*...looking for a block between 5 and 18 thousand on the RTB for some general handling on the way back.*" CONT11 responded, "[GR4 C/S] *roger do you require to general handle this time?*" The GR4 crew stated, "*If we can we are looking to do it on the RTB.*" CONT11 then advised, "[GR4 C/S] *roger you can manoeuvre between 5000 feet and 18000 feet on the Barnsley 1017 report 1 minute to completion*" which the GR4 crew acknowledged. Over the next 3 minutes CONT11 spoke to 2 other ac before at 1407:20 the controller advised, "[GR4 C/S] *traffic [another ac and not the subject Firefly] south east 5 miles tracking north climbing FL50 further traffic [another ac and not the subject Firefly] west 3 miles indicating FL50.*" The GR4 crew acknowledged, "*Copied [GR4 C/S] and we are complete at this time and we will stay at 6 er FL60.*" CONT11 then stated, "[GR4 C/S] *own navigation Marham FL60*" which the GR4 crew acknowledged. After speaking to another ac, CONT11 gave further traffic information at 1407:58, "[GR4 C/S] *traffic [another ac and not the subject Firefly] 12 o'clock 3 miles similar heading indicating FL55.*" The GR4 crew acknowledged but then CONT11 corrected the previous traffic information, "[GR4 C/S] *apologies that's reciprocal heading.*" The GR4 crew acknowledged with their C/S but 1 minute later at 1409:10, CONT11 said, "[GR4 C/S] *clear of previously reported traffic squawk 3646*", which was read back. After ascertaining the type of approach required and speaking to another ac at 1410:34, CONT11 instructed the GR4 crew to "*...contact Marham Stud 5.*" However, in response the GR4 crew stated, "*Stud 5 for [GR4 C/S] and just be advised that last that you did call we actually got quite close to that, probably within 2 or 300 feet [GR4 C/S].*" CONT11 acknowledged this message.

Analysis of the Claxby Radar recording shows the GR4 at 1407:02, 7.5nm NE of Cottesmore making tight turns with no Mode C indicated. The Firefly is shown squawking A2642 bearing 070° at a range of 6nm from the GR4, the former in a right-hand turn passing 070°. The Firefly displayed no Mode C at all throughout the incident. At 1407:19, the GR4 was turning R through N with no Mode C indicated, the Firefly at 5.2nm due E of the GR4 tracking 170°. The GR4 steadies on a track of 120° (which is broadly maintained throughout during the incident) and at 1407:58 is indicating FL60 Mode C. The Firefly is shown in the GR4's 11:30 position - 2.5nm away tracking S with NMC. The Firefly continues on this track for the remainder of the incident. At 1408:15, the Firefly is in the GR4's 12 o'clock 0.8nm crossing from L – R, the latter indicating FL60. The ac tracks merge in azimuth at 1408:22, with the GR4 indicating FL59 Mode C. [UKAB Note (1): However, A0000 is indicated at the merge suggesting the data might be unreliable. On the next sweep the GR4 is shown 'bottoming out' at FL56 reflecting the reported avoiding action bunt before climbing back through FL57 at 1408:37, and subsequently levelling at FL59 as the Firefly draws directly astern].

JSP552 Section 235.115 states that:

"RIS is an air traffic radar service in which 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. The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information."

Whilst traffic information was passed on 2 separate occasions to the GR4 crew [about traffic to the E of the GR4], this information did not relate to the Firefly but to other ac. However, by transmitting traffic information at 1407:58 [which was about another ac indicating FL55 on a broadly reciprocal heading that was actually R of the nose], the GR4 crew's attention might have been focussed in the right area to spot the Firefly. In fact from the GR4 crew's RT comment, they incorrectly believed that they had come close to the traffic that had been called to them.

However, that particular ac passed down their right-hand side 0.8nm away 800ft below the GR4. As the crew stated in their written report that they had to bunt to pass below the conflicting traffic, this was not the ac concerned. At the time of the incident the controller's display was very cluttered with several SSR labels overlapping due to the proximity of various ac in the vicinity. This may have led to the controller omitting to call the slow moving ac without Mode C [the subject Firefly]. Whilst the GR4 crew remained responsible for their own separation under the terms of a RIS, this Command believes that the controller's omission of traffic information [about the subject Firefly] contributed to this Airprox.

HQ AIR (OPS) comments that had the Tornado GR4 crew delayed their GH until a little closer to Marham they would have been outside the busiest area of the AIAA. However, the traffic information provided reminded them that the area was busy and got their eyes out of the cockpit.

HQ AIR (TRG) comments that although the Tornado GR4 pilot was flying in Class G airspace, under VFR and in receipt of a RIS he correctly maintained his lookout which allowed him to see and avoid the Firefly, albeit at a late stage. Had the ac involved been observing the quadrantal rules the avoidance manoeuvre might not have been necessary.

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 ACC Advisor stressed to the Members the intense level of traffic commonly encountered in the Lincolnshire AIAA on an average day: it was evident from both the RT transcript and the radar recording that there were a lot of training ac operating in this vicinity around the time of this Airprox. Whilst recognising that the AIAA was not the exclusive preserve of military training units, Members agreed with the Command's comment that the GR4 crew might well have delayed their GH until outside of the immediate vicinity of this notified area of intense activity and perhaps the controller might have been more circumspect with the guidance given about operating in this location. The Mil ACC report had made it clear that, at the time of the Airprox, several SSR labels were overlapping on the controller's display, making it quite cluttered because of the proximity of various other ac in the vicinity. Consequently, CONT11 had omitted to call the slow moving subject Firefly to the GR4 crew. However, because the former's Mode C was not evident, controller Members observed that any traffic information that might have been provided by CONT11 on the subject contact would not have given the GR4 crew any indication of its level and therefore would have been less than comprehensive. The military area controller Member opined that CONT11 had just not seen the Firefly's contact in amongst the myriad other ac around - the radar recording showed 3 other ac within 1000ft of the GR4's level; another clear above; another at low-level [not on the diagram], which was all in addition to the subject Firefly. Nevertheless, the omission of traffic information was, in Mil ACC's view, contributory to the Airprox. It was plain to the Members that the GR4 crew was ultimately responsible for their own separation under the terms of a RIS in the 'see and avoid' environment of Class G airspace. However, with CONT11 transmitting traffic information about another ac - which although R of the nose on the opposite side of the jet clearly indicated it was at FL55 at the time and thus equally relevant conflicting traffic to the Tornado - just before the Airprox occurred, it was indeed fortunate that the GR4 crew's attention focussed on the Firefly to port in time for them to bunt below it. The GR4 crew's command had also suggested that the traffic information provided had at least got the crew's eyes out of their cockpit, which was indicative of a good lookout scan regime, albeit that the small Firefly training ac was seen at a late stage by the GR4 crew which, the Board agreed, was part of the cause. However, the Air Cmd (Trg) pilot Member astutely observed that if the Tornado crew had been flying in conformity with the 'quadrantal rule' - as is recommended for flights operating VFR above the transition altitude - then at least some vertical separation might have existed.

Members were concerned that the Firefly's Mode C was not evident which, it had been shown, denied CONT11 a vital element of radar data. It was unclear why this was so as the Firefly pilot stated it was selected on with the Mode A conspicuity squawk. However, the lack of Mode C altitude reporting data clearly denied both ATC and other acs' ACAS [where so fitted and not the case with the GR4 here] safety critical information thereby significantly inhibiting the effectiveness of traffic information and other acs' collision avoidance equipment. An important lesson here was therefore to ensure that Mode C 'ALT' was selected at any time the transponder was 'on'.

AIRPROX REPORT No 066/07

Discussion moved to the provision of a radar service to the Firefly whose instructor was clearly under remit to maintain an effective lookout scan but was without any assistance from ATC here. The Member from Fleet opined that to operate in such a dense traffic scenario without the benefit of a radar service was not making the best use of an ATSU's capabilities. However, a fast jet pilot Advisor contended that it is not feasible to conduct a training sortie - such as the Firefly pilot's here - under, for example, a RIS where the demands of the instructional aspects of the sortie are such that it is incompatible with a stream of traffic information on the RT and requires a quiet frequency. Nevertheless, the Naval Member's comments were well founded - the Firefly crew had no situational awareness of the proximity of the jet at all and this Airprox illustrated the difficulties of detecting other ac in good weather despite the Firefly pilot operating VFR under 'see and avoid' where he was, with the GR4 to his right, indeed responsible under the 'Rules of the Air' for 'giving way' to the other ac. The Naval Member suggested the lack of an ATS to the Firefly was a contributory factor, but this remained a solitary view. The Board concluded that as neither the Firefly instructor nor his student had seen the GR4 until after it had flown underneath their ac, they were clearly not in a position to materially affect the outcome. Therefore, non-sighting by the Firefly crew was agreed to be the other part of the cause of this Airprox.

Turning to risk, with only the GR4 crew aware of the presence of the other ac beforehand as a result of their own lookout scan they clearly had little time to effect avoiding action and it was perhaps fortuitous that the Firefly was spotted, in time, at these close quarters. The GR4 pilot's candid report gives the sighting range as 1nm and it was evident to the Members from the recorded radar data that the Tornado jet was still at FL60 at a range of 0.8nm. Given the jet's speed of 390kt, a distance of 1nm translated to just over 9sec for the crew to effect their avoiding action bunt and fly beneath the Firefly - apparently level at FL60. However, the absence of Mode C data from the Firefly also prevented any independent determination of the minimum vertical separation that pertained here, which was apparently no more than 100ft according to the Firefly instructor pilot's own account. The Board noted that as the radar contacts merged in azimuth the GR4 indicated FL59 but Mode C lag might have been a factor here as the next return shows the GR4 at FL56. Notwithstanding the potentially unreliable Mode C indication at this point the available data certainly gelled with the Firefly pilot's perception of the encounter and the GR4 pilot's account was not wide of the mark either. All these factors led the Board to conclude that whilst the Firefly had been seen in time for the GR4 pilot to take effective action to avoid an actual collision, the safety of the ac involved had indeed been compromised.

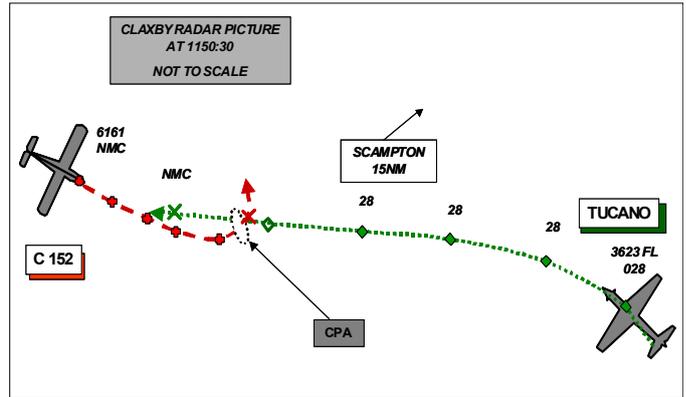
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Firefly crew and a late sighting by the Tornado GR4 crew.

Degree of Risk: B.

AIRPROX REPORT NO 067/07

Date/Time: 6 Jun 1151
Position: 5311 N 00054 W (Scampton TAC HOLD - elev 202ft)
Airspace: London FIR (Class: G)
 Lincolnshire AIAA
Reporting Ac Reported Ac
Type: Tucano T Mk1 Cessna 152
Operator: HQ AIR (Trg) CIV Pte
Alt/FL: 3000ft 3500ft
 (RPS 1020mb) (QNH NR)
Weather IMC CLAC NR CLAC
Visibility: >10km >30km
Reported Separation:
 200ft V/0m H 150ft V/0 H
Recorded Separation:
 NR V/0H (estimated)



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUCANO T MK1 PILOT reports that he was conducting a pilot training sortie practising an IFR approach to RAF Scampton, in receipt of a RIS from Waddington APR and squawking as directed with Mode C. At the time of the incident they were in the Scampton Tacan Hold at 3000ft on the QNH of 1020mb, heading 285° at 180kt when APR passed TI on a contact passing from left to right with no height information. Both pilots then looked into the area but no ac was seen. TCAS then gave a TA with no height, so both pilots again looked into that direction but still nothing was sighted. An ac, identified as a white Cessna 150, then appeared in the 10 o'clock high position and passed approximately 200ft above. A brief message was passed to ATC. No avoiding action was taken and he assessed the risk as being medium.

THE CESSNA 152 PILOT reports flying a local training flight from Netherthorpe in a white and blue ac, in receipt of a RIS from Doncaster Radar and squawking as directed by them, but Mode C was not fitted. He was climbing through a 1500ft layer of stratus cloud with a PPL student in the left-hand seat and himself in the right and they were carrying out basic flying instruction in the general proximity of GAM VOR. At the time of the incident they were heading N at 70kt and had only just emerged from the cloud layer when his student reported that a dark ac had passed directly underneath them from their 3 o'clock to their 9 o'clock. He looked to the 9 o'clock and saw a black, low wing ac skimming the cloud tops at fairly fast speed.

He had requested a RIS from Doncaster Radar and this had been agreed before they entered cloud. They had been climbing up through the cloud layer for several minutes, at about 500fpm and had just emerged into VMC on top when the incident happened and as he was given no warning of the other ac, he did not have time to see and avoid it; he thought the other pilot would have been in the same situation. He believed that under a RIS he should have been advised of the conflicting traffic.

Although he did not file an Airprox on the radio but did inform ATC and also telephoned them on landing and followed this up with a letter which resulted in a meeting with them.

He assessed the risk as being high.

UKAB Note (1): The Waddington (nearest available) METAR was:

METAR EGXW 061150Z 01008KT 9999 OVC018 13/08 Q1023 WHT NOSIG=

AIRPROX REPORT No 067/07

MIL ACC reports that a Tucano was receiving a RIS from Waddington APR inbound to Scampton. The Tucano crew contacted APR at 1140:57 and APR immediately replied as follows: *“Wadd APR identified FL55 Radar Information. Faint contact left 11 o'clock 4 miles tracking south slow moving no height.”* And the Tucano crew acknowledged. Over the next 5min there were various administrative R/T calls related to the Tucano approaching and then entering the hold. At 1146:49 APR passed TI, *“Tucano C/S, traffic north 5 miles tracking southeast slow moving no height information.”* And the Tucano crew acknowledged. The Tucano pilot reported entering the hold and then at 1149:33, further TI was passed as, *“Tucano C/S traffic NW 3 miles tracking SE, no height information.”* and the crew again acknowledged. Then at 1150:26 the Tucano crew stated, *“Waddington, Tucano C/S has just had a light aircraft pass over us about 300ft no squawk identified.”* and APR responded, *“Tucano C/S that was the traffic previously called not indicating on charlie.”* and the Tucano crew replied, *“That’s copied, no we missed him.”*

Analysis of the Claxby Radar shows the Tucano 16nm SW of Scampton at 1148:02, squawking 3623 indicating FL028 and tracking 090°. The Cessna is in the Tucano’s 8 o’clock at 4.1nm, squawking 6161 with NMC and tracking 100°. Both ac maintain track for the next 54sec with the Tucano’s speed increasing the relative range to 4.6nm. At 1148:56 the Cessna, which is in the Tucano’s 7 o’clock at 4.6nm, commences a right turn to a track of 120° which it maintains until the incident. At 1149:04 the Tucano commences a left turn at the end of the hold on to a reciprocal track of 270°, rolling out at 1150:06. The relative position of the Cessna from the Tucano during the Tucano’s turn changes from 7 o’clock at 4.6nm to its 12 o’clock at 1.4nm. The Tucano maintains track and crosses the Cessna from its right to left passing directly under it (estimated between sweeps) 1150:26 as it is in a left turn onto N.

Due to the time lapse between the incident and notification to the Unit, there were no recollections by ATC staff and therefore no reports provided. Conclusions have been drawn solely from the radar and RT recording. As APP passed and updated TI 3 times, it is considered that the actions of APP were consistent with current regulations and therefore, Waddington ATC did not contribute to this incident.

Doncaster APR reports that a C152 was on an IMC training detail, general handling near GAM. He (APR) had previously noted fast moving traffic eastbound approximately 8nm to the N of the C152, but did not pass any TI since it was not conflicting with the C152. He was subsequently distracted by other calls on the RTF and the C152 pilot then advised that he had traffic pass very close beneath him. At this point he recalled there had been some callsign confusion on his part and checked the area of the FNY (Doncaster overhead) as he also had traffic in that area and he believed it was that traffic which had called him. He could see no immediate intruder but noted some primary returns to the W of the FNY traffic which was routeing NE. It was only after this exchange that his attention returned to the C152 and he realised that was the traffic which had called him.

ATSI reports that after delays because of Doncaster’s recording equipment, ATSI only received the transcript on 29 November (It was however, only requested on 14 September due to misidentification of the ac involved.)

The Tucano pilot contacted Doncaster Approach Radar (APR) at 1133:10 and reported being on handover from Linton at FL55 and APR informed him that they were identified and placed them under a RIS; at the time the ac was 20nm NNW of Doncaster airport tracking S. APR then enquired whether the ac was routeing via Gamston for Scampton to which the pilot replied that they were routeing direct to the Scampton hold. At 1139:45, when the Tucano was approximately 3nm S of Doncaster airport, the pilot was instructed to change squawk to 3623 and passed TI on a flight operating to the S and at 1140:20 he was instructed to contact Waddington APP.

Forty sec later at 1141:00, the C152 pilot established contact with the Doncaster APR and he advised that he was operating to and from Netherthorpe and intended to conduct some IMC handling between Netherthorpe and Gamston; having been given a squawk, the pilot requested a RIS. APR enquired as to what level the C152 would be operating up to and the pilot advised: *“If it’s the same as it was an hour ago we’ll be up to three thousand feet altitude on top of cloud”* and APR informed the pilot that he was identified 3nm S of Netherthorpe, confirmed a RIS would be provided and passed the QNH which the pilot read this back and advised that he would report VMC on top. At this time the C152 was tracking S, squawking 6161 with no Mode C, and the Tucano was in its 8 o’clock position at a range of 7.6nm also tracking S and indicating FL55. At 1145:40, the C152 pilot reported VMC on top at 3500ft, which APR acknowledged.

The C152 was then on a SE track while the Tucano was in a right turn, eventually to roll out on an E track, indicating FL029 and in the 1 o’clock position of the C152 at a range of 9.2nm. The Tucano stopped his right turn at 1147:45, when it was 4.1nm due S of the C152. At 1149:17 the Tucano commenced a left turn, when it was in

the 12 o'clock position of the C152 range 4.5 nm and rolls out on a Wly heading at 1150:05, when it was in the C152's 11 o'clock at a range of 2nm. The ac converge on near reciprocal tracks and pass at 1150:25, as the Tucano went down the port side of the C152 at less than 0.2nm.

Although the event showed clearly on radar, APR passed no TI to the C152 as is required under the terms of a RIS. The C152 pilot made no comment until 1151:20, when he transmitted: "*Doncaster just for your information an aircraft's just passed about two hundred feet beneath us tracking to the west*". The APR simply acknowledged this but used the wrong callsign.

Although the Tucano pilot stated that they were routeing direct to the Scampton hold, enquiries with Doncaster showed that, although the APRs were aware of the Church Fenton and Waddington TAC holds, they did not know of the existence of the Scampton TAC hold.

HQ AIR (TRG) comments that a lack of accurate, timely TI allowed these 2 training ac to have a close encounter. Since the Cessna was not Mode C equipped, the TI passed to the Tucano pilot lacked height information, and the effectiveness of the Tucano's TCAS was, for the same reason, also reduced. The Cessna pilot did not receive any TI at all on the Tucano ac. By the time the crews saw each other it was too late to take any avoiding action but good fortune prevailed and the occurrence was reported as an Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was briefed on the technical problems that had resulted in this investigation taking substantially longer than usual; the Board was however, content that the correct ac had been identified, albeit belatedly.

Both ac involved in this incident had been operating legitimately in Class G Airspace, but both were also in or just above significant cloud. Due to the cloud structure, both pilots opted to make use of a radar service to assist with their responsibility to see and avoid other traffic, as required in Class G airspace. The Tucano pilot was given accurate and timely TI by Waddington APP but, since he was flying a TACAN holding procedure, his options for avoidance were limited. Additionally, since the Cessna was not Mode C equipped, the TCAS information displayed to the Tucano pilots was limited. Although both pilots in the Tucano were looking in the direction advised by the TI and confirmed by the TCAS, they did not see the C152 until very late, probably shortly after it had emerged from the cloud tops, in their 10 o'clock. Notwithstanding the holding pattern being flown and the absence of any altitude information regarding the Cessna, Members considered that the Tucano instructor should have considered a horizontal solution to the developing conflict. Further, one Member noted that the Tucano pilot reported that he was IMC (although out of the cloud) which was most likely due to his proximity to the cloud tops; in that case it might have been wiser to fly the holding pattern at a higher level so that he could better discharge his 'see and avoid' responsibility.

The C152 pilot had also requested a RIS to assist him to 'see and avoid'; he however, was climbing slowly for several minutes through solid cloud until he emerged just before the incident. Members suggested that in these circumstances a RAS would have been more appropriate; had he chosen this option, avoidance on the Tucano would have been provided or co-ordination offered (the Tucano was using a Waddington Squawk). In either case the incident would have been prevented. They also noted that Waddington APR (the unit being operated by the Tucano) was the nominated LARS provider for that area.

Turning to the part played by the Controllers, one very experienced (Controller) Member suggested that, notwithstanding that both ac were under a RIS from different units, if faced with similar circumstances he would not have allowed the 'blips to merge'; it was however, pointed out by military controllers that under a RIS avoidance is not required and traffic density and controller workload often precludes it.

As identified in the Controller's and ATSI reports, the C152 pilot was not provided with any TI whatsoever on the Tucano. This put the C152 pilot in a very poor position to see the opposing ac and take avoiding action as he emerged from cloud. Since the Doncaster Controller had worked the Tucano shortly before the incident, determined its intention to route to the Scampton TACAN hold, handed it over to Waddington APR with a squawk,

AIRPROX REPORT No 067/07

he should have known of its presence and that it would present a problem to the C152. If the Controller was uncertain as to the position of the hold, as appears to have been the case, he should have asked the pilot for more information.

Although the flightpaths of the ac were such that they were not going to collide, a majority of Members noted that neither pilot had seen the other ac in time to take any avoiding action but considered that they could not reasonably have been expected to due to the cloud structure, making this incident 'FIR conflict'. Further, since the ac had been separated by only 150ft vertically, in this case safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G Airspace.

Degree of Risk: B.

Contributory Factors: A lack of TI from Doncaster APR to the C152 pilot.

AIRPROX REPORT NO 068/07

Date/Time: 5 Jun 1656

Position: 5340N 00245W (7 SE Warton -
elev 55 ft)

Airspace: Lon FIR (Class: G)

Reporting Ac Reported Ac

Type: Jetstream 31 Untraced Microlight

Operator: Civ Comm N/K

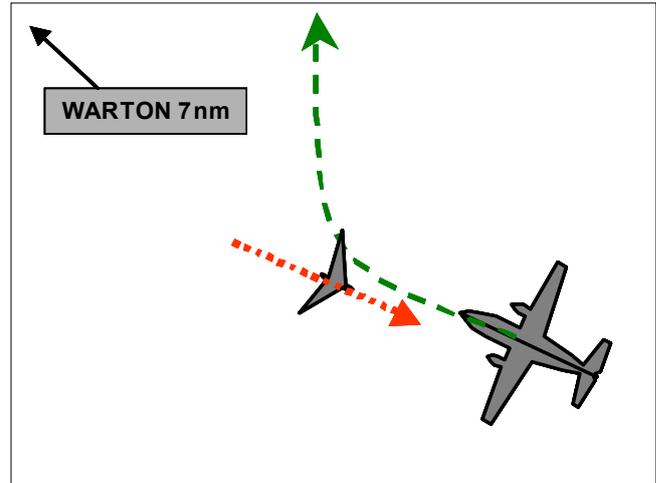
Alt/FL: 3500ft↓ NR
(N/K)

Weather VMC NR NR NR

Visibility: 10k NR

Reported Separation:
20ft V/10m H NR

Recorded Separation:
NR V/ <0.1nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE JETSTREAM (JS) 31 PILOT reports flying a non scheduled passenger flight from Marham to Warton with all lights switched on. They were in good VMC, squawking as directed and were in receipt of a RAS from Warton Radar. Shortly after they had been cleared direct to Warton for visual approach they descended from 3500ft heading NW at 230kt towards R base when the FO pointed out traffic on the nose less than 1nm away. The traffic was difficult to see due to the position of the Sun. A hard 40° AOB avoidance turn to the right and a 1½ G pull-up were performed, arresting the descent. A white-winged microlight was seen to pass down the left side slightly below. During the turn APR informed them that the TWR could see traffic visually in their area. Warton APR then informed them that nothing was seen on the radar. The separation from the Microlight was such that they could see the pilot and wing support wires clearly.

He assessed the risk as being high.

The incident was initially reported as an MOR 2 days after the event due to their operating away from their main base.

UKAB Note (1): Despite extensive tracing action including contacting all known microlight sites in the Warton area, the subject microlight could not be traced.

THE WARTON APR CONTROLLER reported that a JS31, arriving from Marham via POL, was descending to ALT 3500ft in receipt of a RAS. It was being vectored for the downwind leg of an approach to RW 08; the pilot called visual and was cleared for a visual approach. The ADC called on the intercom informing him of a Microlight that he had seen in the area of the Jetstream but the call was interrupted by the Jetstream pilot calling that he was turning away from the traffic. He advised the pilot that the ADC had just called, seeing Microlight traffic in his vicinity at a similar altitude. As the ac turned, a primary contact was observed in its position but it lasted for only one sweep and was not observed either before or after the incident. There was the occasional spurious contact on radar during the afternoon watch which she assumed was because of the atmospheric pressure. She called Blackpool who said that they could see a contact on their radar but not on the St Annes. The Microlight had not called either APR or Blackpool and could not be traced by Warton.

UKAB Note (2): The recording of the St Annes radar showed at 1654:26 an intermittent primary pop-up contact appear 6nm SE of the Airfield heading SE. At that time the JS31 was 11nm SE of the Airfield descending slowly through FL34 and heading NW directly towards the intermittent primary. The contacts continue to head directly towards each other until 1655:40 when the JS31, which was at FL27, could be seen making a hard right turn and stopping its descent.

AIRPROX REPORT No 068/07

ATSI reports that the JS31 crew established contact with the Warton Radar controller (APR) at 1651:35 and reported passing 8,600ft for 3,500ft. The controller advised them that they were identified 20nm SE of Warton and it would be a RAS when leaving controlled airspace; the pilot acknowledged this before the controller confirmed the RW in use as 08 and anticipated that the crew would become visual with the airfield shortly.

At 1654:45, the pilot reported visual and requested a visual approach which was approved. At 1655:25, APR instructed the JS31 pilot to contact Warton TWR to which the pilot responded with "Standby". The ADC then advised APR on the intercom "*There's some (non-pertinent word) out there*" and APR then transmitted "*(JS31 callsign) I've just been told by the tower that there may be an aircraft in your vicinity I'm afraid it's not showing on radar at all*". The pilot advised that he had to take avoiding action against a microlight. When asked, the pilot informed ATC that they did not want to take any action. APR then added "*I'm sorry there's nothing there was a very just as you turned there was a square but I'm afraid it's faded again from radar cover my apologies for that it's I'm afraid it's a symptom with these microlights*".

The Radar controller was using the St Annes radar coupled with the Great Dun Fell SSR and utilising a 40nm displayed range. A replay of the tape showed an intermittent return which might have been the other ac: however, it is not possible to say that the picture shown on the recording was the same as that seen by the Radar controller. When the JS31 was 13.7nm SE of Warton, at 1653:25, an intermittent return can be seen some 4nm SE of Warton. However, by 1654:11 it has completely faded, returning at 1654:31 but fading again by 1655:02 when the Radar controller cleared the JS31 pilot to make his visual approach. At the point the APR instructs the pilot to change frequency to TWR, there is one faint return in the 1 o'clock position of the JS31 at a range of 1nm; the return is shown in the 10 o'clock position of the JS31 at a range of 0.1nm when the JS31 is turning right to avoid it.

Given the intermittent nature of the return it is quite possible that APR did not see the response on her radar display - hence her comment to the JS31 pilot. However, with the benefit of hindsight the passing of TI to the JS31 pilot would have been prudent even taking into account the intermittent display of the return.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the JS31 pilot, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

The Board was disappointed that, despite the best efforts of the Secretariat, the microlight pilot could not be traced; without a report from its pilot, the investigation was incomplete.

Although it cannot be determined positively whether the microlight showed on the Warton radar display and if so for how long, in this case - and unusually for approach radars - the recording came from the same processed digital radar source(s) as the Controller's display; it can therefore be assumed that they should have been the same. That being the case, the microlight should have been displayed on the Controller's display for two periods of about 30 sec before the CPA. If the controller, as she reported, did not see the contact, she would not have been able to offer any information or avoidance. Given the information from the recording however, some Controller Members were surprised that she had not seen the intermittent contact which was most likely there to be seen.

In this Airprox, as in several others, it would seem that the microlight was neither radio nor SSR equipped (it was not in communication with nor showing on radar of any local ATC units). One simple radio call to Warton, or indeed Blackpool, or the use of SSR would have made the microlight 'visible' or 'known' to the controller who would then have been in a position to offer avoidance or information to the JS31 pilot. Had this been the case, in all probability this very close encounter would have been averted.

Specialist Members commended the ADC who had seen the microlight at a considerable distance and reported its presence to APR; it was unfortunate that this report was not made early enough to prevent the incident.

Notwithstanding the factors above and that the JS31 was operating under IFR and in receipt of a RAS, both ac were operating legitimately in the Class G airspace to the S of Warton where see and avoid is the principal means of collision avoidance. Even allowing for the very close proximity of the ac, well within audible range, it could not be determined positively whether or not the microlight pilot saw or reacted to the JS31. Since it was unclear what the microlight pilot saw or did, the Board decided, albeit reluctantly, that the cause of this incident had been a

'conflict in the FIR'. However, due to the very late avoiding action taken by the JS31 pilot and the uncertainty regarding the microlight pilot's actions, Members were convinced that safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G Airspace with an untraced microlight resolved by the JS31 pilot.

Degree of Risk: B.

AIRPROX REPORT No 069/07

AIRPROX REPORT NO 069/07

Date/Time: 6 Jun 1559

Position: 5439N 00613W (O/H RW07 Belfast Aldergrove - elev 268ft)

Airspace: ATZ (Class: D)

Reporting Ac Reported Ac

Type: B737-700 Puma

Operator: CAT JHC

Alt/FL: GL 400ft ↓

(QNH 1023mb) (QFE)

Weather VMC CLBC VMC CLBC

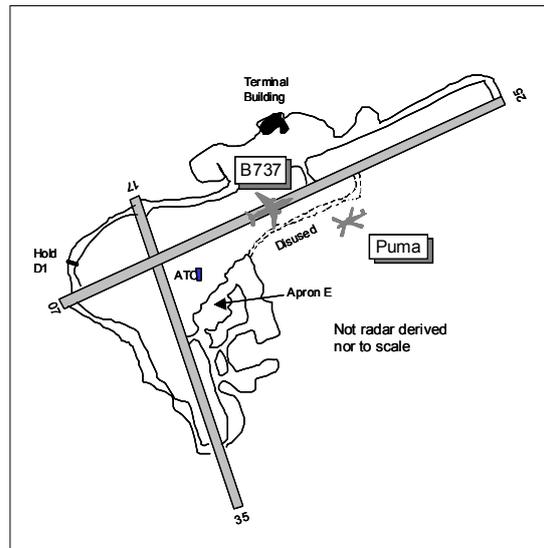
Visibility: >10km >15km

Reported Separation:

400ft V/200m H 400ft V/200m H

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE B737 PILOT reports outbound from Belfast RW07 and in communication with Tower on 118.3MHz squawking 7701 with Mode S. They were cleared for take-off with a helicopter in sight whose crew had been told to remain S of the Control Tower. They accepted the clearance with the helicopter in the cct, it being about 1nm from their position. During the take-off roll the Puma turned to complete his cct back to the apron S of the Control Tower and whilst it was downwind its crew were again told to remain S of the Control Tower. As the B737 reached rotation speed of 135kt the Puma was in their 2 o'clock position at 400-500ft but not S of the Tower having overshot his turn towards the Apron. It was only at this late stage did they realise that an Airprox would occur, the Puma passing 200m laterally to their R and 400ft above. The helicopter was behind them by the time they climbed through its level. They assessed the risk as medium.

THE PUMA PILOT reports flying a local sortie from Belfast and in communication with Tower on 118.3MHz squawking 7000 with Mode C. They positioned at the 'load park' at the end of 'Echo' taxiway which is about 200m SSW of the ATC Control Tower, to 'hook-up' a 500kg load. Conditions were VMC with no cloud below 2000ft in good visibility. Once established in the hover with the load, they called the Tower requesting a LH cct at 1000ft with load and were told to standby. They were aware of a B737 ac positioning for a departure RW07 with the active RW stated on the ATIS as RW17. Tower came back with clearance for a RH cct but as this was not as they had previously discussed they again requested a LH cct. ATC then cleared them for a LH cct remaining S of the Tower at all times which they read back. Their intentions were to align the cct with RW25 and make the final approach on, or S of a line through the Control Tower aligned with RW25. They transitioned almost parallel to RW17 as this was into wind and would avoid overflying the hangars on the W side of the aerodrome and positioned into an approximate LH downwind leg orientated with RW25 at 1000ft QNH. Tower again confirmed that they should stay S of the Tower at all times which they understood to mean staying S of a line through the Control Tower parallel to RW07/25; they again read this back. Tower then asked the B737 crew if they were happy with his helicopter's position and they replied that they were so ATC cleared the B737 for take-off with his helicopter in sight. By this time, they were turning finals back towards their take-off point and descending with the aim of passing as close as possible to the Officers Mess without actually overflying it. Their track was aligned with RW25 on or S of a line that extended from the Control Tower. Heading 250° at 40kt they were visual with the departing B737, which was rolling on the RW, from about 1nm and they continued their descent. The B737 rotated in front of them and passed abeam them 200m on their RHS and 400ft below. At no time was there a risk of collision and at all times both pilots were visual with each other's ac. The B737 crew stated that they thought their helicopter was to remain S of the Control Tower and that they intended to file an Airprox.

THE BELFAST ADC reports that RW17 was in use with RW07 available for departure only. The Puma was on the 'Echo' pans S of the Control Tower preparing to fly a short cct manoeuvre to the S of the aerodrome with an

underslung load whilst the B737 was preparing for departure RW07. He cleared the Puma flight to lift into its cct and the crew elected to fly a LH pattern aligned with RW17, he thought. The Puma crew were told to remain S of the Control Tower as jet traffic, the subject B737, would soon be departing RW07. He passed 'after departure' instructions to the B737 flight of 'climb straight ahead RW07' which he had previously coordinated with Approach. By now the B737 was lined up on RW07 and he informed the crew about the Puma to the SE of their position, adding that it would remain S of the ATC Control Tower, and asked if they were happy to depart; the crew replied 'affirm'. The B737 flight was issued with take-off clearance but as the ac climbed away he observed that the Puma had flown further N than the Control Tower although it had turned inside the track of the departing jet and was still S of the B737 and the RW. He estimated that the Puma had completed manoeuvres S of the perimeter road which equated to the old 'Echo' hold. The B737 crew commented that the Puma had not remained S of the Tower and stated that the helicopter had caused them concern. When questioned if they wished to file a report, the B737 crew replied 'yes' and it would be an Airprox and this fact was passed on to the Puma flight.

ATSI reports that the B737 was taxiing to holding point D1 [N abm threshold], for departure from RW07 at Aldergrove. As the ac approached the holding point, the Puma, which was situated SSW of the VCR, reported *"ready for departure just one lefthand circuit one thousand feet with load"*. The pilot was instructed to standby, whilst the B737 was cleared to line up, to wait for a vehicle to vacate the RW. The Puma pilot confirmed requesting one cct and was instructed *"...you may lift for the er a righthand circuit then remain south of the Control Tower please"*. Although a RH cct was read back, the ADC then offered a LH, which was accepted. *"Okay you're clear lift then for the left circuit and er remain south of Control Tower please"*. The pilot read back *"...clear into the lefthand circuit remaining south of Control Tower"*.

At 1557, the B737 was informed, after departure, to climb straight ahead until instructed. The Puma pilot was then asked to *"...just confirm er can you remain er south of the Control Tower at all times jet traffic about to depart Zero Seven"*. The pilot confirmed he would be remaining S of the Control Tower at all times. The ADC then transmitted to the B737 pilot *"...if you look out of your right side er Puma aircraft er just in an orbit south of the field but south of the Control Tower if you're happy enough you can depart straight ????"* (one word unintelligible). The pilot replied *"Affirm B737 c/s traffic in sight"*. The B737 flight was then cleared for take off but once airborne, the pilot commented *"...I thought that Puma was er supposed to remain south of the Control Tower it was a bit close"*.

Both crews were made aware of each other's presence and the B737 pilot reported he would depart with the Puma in sight.

UKAB Note (1): The Belfast radar recording shows the Puma's flightpath broadly as described by the Puma crew. The Puma is seen to depart to the S before turning L 1nm S of the aerodrome onto a 030° track at FL008 (1100ft QNH 1023mb). When passing 0.6nm SE of the aerodrome the Puma commences a descent before turning L onto a NW'ly track at 1558:30 descending through FL006 (900ft QNH). This NW'ly track is followed for just over a 0.25nm before a L turn onto a SW'ly track is made when it is about 0.3nm E of the aerodrome descending through FL004 (700ft QNH). Shortly after this, as the Puma descends through FL003 (700ft QNH) just to the E of the aerodrome, the B737 appears on radar airborne from RW07 at 1558:52, 0.25nm to the NE of the Puma, climbing through FL001 (400ft QNH). Although the subject ac have already passed, the B737 is seen to track approximately 0.1nm (c200m) to the N of the Puma's radar trail history, corroborating the estimated horizontal separation distances proffered by both crews.

HQ JHC comments that this incident occurred due to a number of personnel making assumptions without clarifying their intentions. Furthermore, we believe that the evident confusion may have been compounded with the active RW being declared as RW17 whilst the B737 was departing on RW07. It is worth noting that the Officers' Mess rejoin is a standard procedure for helicopter traffic recovering to the airfield when RW07/25 is active and it is apparent that the Puma aircrew understood their clearance to mirror this; unfortunately, this did not maintain the aircraft's position S of the control tower as directed by the ADC.

The Unit have confirmed that the situation has been clarified with Belfast ATC and any request to fly around to the N of the Officer's Mess will be made by the crews whilst undertaking LH ccts.

AIRPROX REPORT No 069/07

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 that both ATC and the Puma pilot had different perceptions of what was going to happen during the Puma cct. The ADC had assumed that the helicopter would fly a LH cct on RW17 but had placed a caveat on this cct, instructing the pilot to remain S of the Control Tower. The Puma pilot was constrained by the necessity both to avoid built-up areas to the SE of the aerodrome and to avoid overflying the Officers Mess. Civil and Military pilot Members agreed that the Puma flight could not have remained S of the Tower whilst flying a LH cct orientated on either RW17 or RW25 to then land on Apron E owing to the landing area being so close to the RW. The Military pilot Member stated that the cct flown by the Puma flight was in accordance with SOPs: however, the pilot had not assimilated the ATC caveat and flown a standard LH cct turning in parallel to, and S of, RW25 towards the Control Tower. By not following ATC instructions, the Puma pilot flew close enough to the RW to cause concern to the B737 crew which had caused the Airprox.

Understandably the B737 crew were concerned because when they had accepted take-off clearance "with the Puma in sight", the helicopter was well SE of the aerodrome and its pilot had been instructed to remain S of the Control Tower. However, whilst reaching the critical 'rotate' phase of the take-off, the B737 crew then saw that the Puma was a lot closer to the RW, being in their 2 o'clock position 400-500ft above flying in the opposite direction before quickly passing 200m clear to their R. Conversely, the Puma pilot was not concerned by his chosen flightpath as he had seen the B737 rolling on the RW and monitored its take-off, watching it rotate and then pass 200m to his R and 400ft below. Although the separation distances were less than both ATC and the B737 crew would have liked, the Puma pilot was always in a position to manoeuvre his helicopter which allowed the Board to conclude that safety had been assured during the encounter.

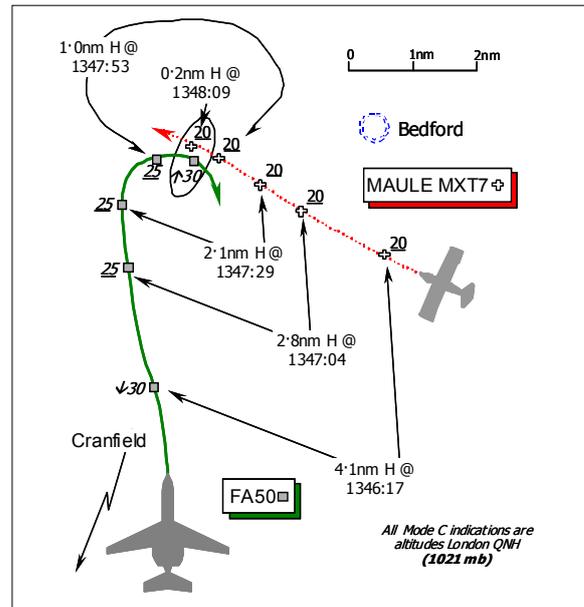
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Puma pilot did not follow ATC instructions and flew close enough to the runway to cause concern to the B737 crew.

Degree of Risk: C.

AIRPROX REPORT NO 071/07

Date/Time: 6 Jun 1348
Position: 5213N 00034W (9½nm NNE of Cranfield - elev 358ft)
Airspace: London FIR (Class: G)
Reporting Ac Reported Ac
Type: Falcon DA50 Maule MXT7
Operator: Civ Comm Civ Pte
Alt/FL: 2500ft 1200-1500ft
 QNH (1022mb) QNH
Weather IMC In cloud VMC HAZE
Visibility: Nil 8km
Reported Separation:
 400ft V NR
Recorded Separation:
 500ft V/0.2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FALCON DA50 (FA50) PILOT reports he was inbound to Cranfield from Palma de Mallorca, operating under IFR. Cranfield APPROACH (APP) was providing an ATS on 122.85MHz during the approach and the assigned squawk was selected with Mode C. Mode S & TCAS are fitted. Whilst flying the Cranfield NDB to ILS procedure for RW21 at 160kt, turning R though 120° onto the LLZ [at a position 010° CIT 7nm] level at 2500ft Cranfield QNH and IMC in cloud, a TCAS CLIMB RA was enunciated. Another ac was displayed on TCAS at 2100ft from a range of about 1nm; the RA was complied with and he executed a go-around into a further successful approach. The other ac was not seen at all and minimum vertical separation displayed on TCAS was 400ft. He assessed the risk as “high” and added that no information about any other traffic had been provided by APP.

THE MAULE MXT7 PILOT reports that he was unaware that there had been an Airprox during this VFR flight to Perth until contacted by telephone.

Following departure from Lashenden, he confirmed flying a heading of 315° from the BKY VOR at 120kt with the intention of passing overhead Northampton/Sywell. Calling Sywell INFORMATION on 122.7MHz at a range of about 12nm, the AFISO asked him to route at least 2nm N of their field. He altered his track to achieve this and passed about 3nm to the N [which would result in a track passing below the approach to RW21 at about 10-11nm in the vicinity of Bedford disused aerodrome.] He maintained VMC at an altitude of 12-1500ft QNH, flying some 100-300ft below the cloud-base with an in-flight visibility of some 8km. The ac flown by the reporting pilot was not seen at all.

A squawk of A7000 was selected with Mode C.

THE CRANFIELD APPROACH CONTROLLER (APP) reports that at about 1350, TC NW called to “co-ordinate” the FA50 and he was told the ac was about 5nm NE of Cranfield. He “gave” TC 3500ft QNH (1022mb) at the CIT, with a squawk of A0247 and to call APP on 122.85MHz.

The FA50 pilot called within 1min and the DF initially showed the ac to the W - 290° - but the next call showed 030° - with the ac through the overhead. A clearance was issued for the ILS approach to RW21, to expect to circle to land on RW03. The FA50 pilot was then asked to report beacon outbound. The next RT call received from the FA50 pilot was almost unreadable, but understood to be a TCAS RA – which was acknowledged. With no knowledge of any other ac in the vicinity of the CIT, the next RT call was when the FA50 pilot reported inbound to

AIRPROX REPORT No 071/07

the CIT, which he took to be the localiser established call. The FA50 crew were foreign and speaking heavily accented English. The aircraft was then switched to TOWER, where details of an Airprox were passed.

ATSI reports that the FA50 pilot established contact with the TC NW DEPS controller, when it was passing W abeam Heathrow, and the pilot reported descending to FL140. TC NW DEPS instructed the crew to descend to FL130 and thence progressively to FL80. Following coordination with Luton, it was agreed that the FA50 pilot would be instructed to route direct to Cranfield and to leave CAS by descent. At 1342:40, the TC NW Co-ordinator contacted Cranfield and advised that the FA50 was approximately 5nm NW of Cranfield descending to 3500ft QNH. The Cranfield Airport IFR conspicuity squawk of A0247 and the Cranfield QNH were passed as well as the frequency.

The FA50 pilot contacted Cranfield and was cleared to the CIT at 3500ft Cranfield QNH, followed by clearance for an ILS approach to RW21 and instructed to report 'beacon outbound'. Shortly afterwards, the Cranfield controller informed the pilot that it would be an ILS approach to RW21, thence to 'circle' to land on RW03, as the surface wind was 010° - 11kt which was acknowledged.

As Cranfield do not have radar and the Maule MXT7 pilot was not in communication with Cranfield APP, it was there without the controller's knowledge. No ATC errors were disclosed.

[UKAB Note (1): When the FA50 was 1nm N of Cranfield at 3500ft London QNH (1021mb), the radar recording shows an ac squawking A7000 - the Maule MXT7 - at 11o'clock-9nm tracking NW with a Mode C readout of 2000ft London QNH. As the FA50 commenced the outbound leg of the procedure the Maule was at 2o'clock-5nm. Whilst tracking outbound on the procedure, the FA50 and the Maule MXT7 continued to converge, until at 1347:29, the FA50 commenced a R turn to intersect the inbound track, now level at 2500ft London QNH, with the Maule MXT7 maintaining 2000ft QNH at 3o'clock-2.1nm. At 1347:53, broadly when the FA50 pilot reported a TCAS CLIMB RA, his ac is shown turning R through E and indicating 2500ft London QNH - whilst the Maule MXT7 indicated 2000ft London QNH 1nm due E of the FA50. The two ac passed, port-to-port, and closed to a minimum range of 0.2nm as the Maule MXT7 drew aft indicating 1800ft (1013mb) – about 2040ft London QNH with the FA50 now level at 3000ft London QNH following the pilot's prompt response to the reported CLIMB RA.

This Airprox occurred just on the boundary of the 'radar box' delineated for conversion of ac Mode C indications from the SAS to the London QNH below the TA of 6000ft – hence the switch from QNH to the SAS on the Maule's indicated Mode C just as the 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, together with reports from the air traffic controller involved and the appropriate ATC authority.

The succinct reports from both pilots involved revealed that each was proceeding legitimately on their respective flights within Class G airspace when this Airprox occurred. As the Maule MXT7 pilot – flying under VFR - had no need to communicate with Cranfield APP, so the controller was unaware of its presence. Furthermore, Cranfield is neither equipped with primary radar nor SSR, so APP was oblivious to the developing conflict as the two ac approached one another. The comprehensive ATSI report had shown, therefore, that unfortunately the APP controller was unable to provide the FA50 pilot with any warning at all. Some Members thought that perhaps it might have been wiser for the Maule pilot to have called Cranfield APP whilst passing underneath their instrument approach and through the extended centreline to RW21. This would clearly have alerted the APP controller to the presence of the MXT7 and allowed the controller to pass on traffic information to the FA50 pilot - flying under IFR – about the VFR traffic and vice versa. However, it was pointed-out that the Maule pilot was transiting past Cranfield at a range of nearly 10nm and under no obligation to call APP on the RT at all, so Members recognised that this was probably unrealistic at this distance. Indeed, the Maule pilot had chosen to call Sywell, an aerodrome he was passing much more closely than Cranfield.

On a different 'tack', the Board's view was that this Airprox was a very good example of why it is advantageous to squawk both an SSR conspicuity code and moreover, to select Mode C where fitted. The Maule's A7000 SSR code and altitude reporting facility clearly indicated the presence of the light ac below the cloud layer, both to the FA50's TCAS equipment and to other radar equipped ATSU's. This was an excellent example of the tangible benefits and effectiveness of SSR equipment and the FA50 pilot, flying in cloud, was only able to avoid the MXT7

safely because his ac's TCAS detected the SSR transponder fitted to the light ac. Moreover, the received Mode C from the Maule allowed the FA50's TCAS to determine a course of action to avoid the other ac in the vertical plane and generate a Resolution Advisory (RA), commanding the FA50 pilot to climb clear above the MXT7's level, which he complied with. The radar recording evinced that the FA50 pilot had responded robustly to the enunciated RA and climbed his ac rapidly above the Maule. Thus the FA50 pilot flying in IMC under IFR was able to avoid the Maule flying quite legitimately below cloud in VMC under VFR. The Board concluded, unanimously, that this Airprox had resulted from a conflict in Class G airspace resolved by the Falcon DA50 crew responding to TCAS.

Assessing the risk, it was clear that the FA50 crew was maintaining 2500ft in compliance with the instrument procedure, fortunately some 500ft above the Maule pilot's chosen transit altitude. Whilst there might have been potential for the FA50 to descend on top of the Maule, the Board could only assess what actually occurred, not what might have happened if circumstances had been different. Here, the FA50 pilot was flying level as he made his procedure turn, so the risk was mitigated entirely by the Maule's SSR fit as the FA50's TCAS detected the light ac and the FA50 pilot responded to the RA. Pilots should be in no doubt that merely operating SSR Mode A & C is potentially a lifesaver, because here the Maule pilot was completely unaware of the FA50 flying above him. With the FA50 flying 500ft above the Maule and the FA50 pilot managing to climb his ac rapidly – 500ft in the period of one radar sweep the recording showed – it transpired that the jet was 1000ft above the light ac as they passed abeam some 400yd [0.2nm] apart horizontally. This was enough to convince the Board that the FA50 pilots prompt response to the TCAS RA had removed any risk of a collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict in Class G airspace resolved by the Falcon DA50 crew responding to TCAS.

Degree of Risk: C.

AIRPROX REPORT No 072/07

AIRPROX REPORT NO 072/07

Date/Time: 8 Jun 0828

Position: 5431N 00600W (8nm FINALS RW04)
Belfast City Airport - elev 15ft)

Airspace: CTA/CTR/FIR (Class: D/G/E)

Reporting Ac Reported Ac

Type: BAe 146-200 Rutan Varieze

Operator: CAT Civ Pte

Alt/FL: 2400ft↓ [1200ft]

QNH (1020mb) QNH

Weather IMC In cloud VMC In haze

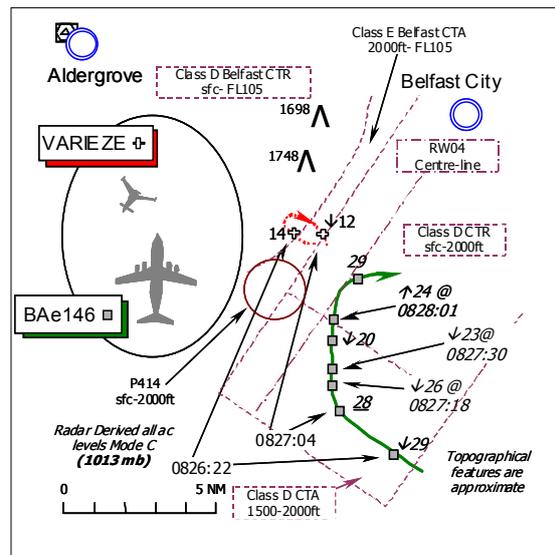
Visibility: Nil 5-8km

Reported Separation:

From TCAS: 400ft V/nil H Not seen

Recorded Separation:

Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAE 146-200 PILOT reports he was inbound to Belfast City from Birmingham and was approaching the Airport from the S for the LLZ/DME procedure to RW04. He was in receipt of a RCS from Belfast City APPROACH on 130.85MHz whilst flying IFR, in cloud, with no in-flight visibility at all. A squawk of A3277 was selected with Mode C. Navigation lights HISLS and landing lights were all selected on.

Heading 320° approaching the final approach track from the R at 180kt at an altitude of 3000ft QNH (1020mb), ATC had cleared them to establish on the LLZ and to descend to an altitude of 2000ft. During this descent he was aware that another ac was holding in the vicinity of the high ground, between Belfast City and Belfast Aldergrove awaiting clearance to cross the Belfast City CTR - he had heard another pilot on the RT asking for clearance and Belfast City ATC had instructed the pilot to maintain position due inbound traffic. The other pilot [subsequently identified as flying the Varieze] seemed to be now slightly impatient and again requested clearance. Belfast City ATC eventually authorised this other ac to be flown SW but on two occasions the Varieze pilot incorrectly read-back W before the correct clearance was finally read-back correctly. Around this time they established on the LLZ to RW04 and this was reported to ATC, who then reminded the Varieze pilot to remain clear of the extended centre-line of RW04 at Belfast City because of inbound IFR traffic. The Varieze pilot acknowledged this transmission from ATC, but it was at about this time that he became aware of closing traffic now displayed on his TCAS about 1nm away to port and about 600ft below his ac. ATC again warned the Varieze pilot on the RT about his position as his BAe146 descended on the approach and he continued to monitor the developing unsatisfactory situation to the point that he elected to initiate a 'go-around'. TCAS enunciated a TA - "TRAFFIC TRAFFIC" - whereupon he observed that the conflicting traffic displayed on TCAS was indicating 400ft - it seemed directly below their ac - at the closest point. No RA was enunciated or followed. He informed ATC that they were "going around due traffic" and they were instructed to maintain an altitude of 3000ft, but by a different controller [the APP Mentor]. Their ac was then vectored around for another approach to a successful landing. As all this was happening he heard further RT exchanges between ATC and the Varieze pilot. At an appropriate point he informed ATC of his intention to file an Airprox. He assessed the risk as "medium".

THE RUTAN VARIEZE VZ10 PILOT reports he had departed Belfast Aldergrove on a VFR flight plan filed for a flight to Ronaldsway IOM. Approaching the Belfast CTR boundary to the SE of Aldergrove where there is high ground, radio contact was made with Belfast City APP on 130.85MHz, who asked him to hold for about 1min - so he started orbiting immediately at an altitude of about 1500ft QNH. The situation was very difficult due to the high ground, the low overcast cloud base and poor visibility. Whilst he tried to keep a safe distance between the hills and cloud to maintain VFR, the proximity of masts was also another worry and the RT was so busy it was hard to find a gap for a transmission. The cloud seemed to be forming over the ridge and possibly lowering. After 3 to 4 orbits he received a message from City APP, which he understood to be to expect to hold for 45min: this would

have been challenging in the extreme with high ground and lowering cloud but he now realises that it was more probably 4–5min that the controller had said - he stressed that at this point the RT had become indistinct, needed to be repeated and the controller's voice was an unfamiliar one. He requested onwards clearance to the IOM to get away from this very difficult orbiting. Clearance was given, he thought, but it took several repeats before he understood this to be to the SW - initially he thought that City APP said W. Leaving the orbit flying at 130-140kt, he headed as instructed in a generally southwesterly direction not realising that this could cause any conflict. He still had no idea that City were using RW04 at this stage as, he thought, he had not been told this - if he had known this he would have requested an alternative route and the loss of separation would probably not have occurred. Mention was made by City APP of avoiding the RW centre-line, but as he tried to check this using maps and other aids in this difficult situation, whilst still flying his aeroplane, this was impossible to confirm with any certainty. As he believed his heading was good this should have been sufficient for separation - he bemoaned that if a waypoint or VRP had been given or a radar vector onto 240° it would have been more helpful. The next thing that happened was that a pilot mentioned TCAS and that an Airprox would be filed. Despite keeping a good lookout he never saw the other ac - probably as it was above cloud and he was below it. He did not comment on the risk.

THE BELFAST CITY APPROACH RADAR CONTROLLER (CITY APP) reports that following co-ordination from Belfast/Aldergrove APPROACH the VFR Varieze pilot contacted CITY APP en-route from Belfast-Aldergrove to the IOM, was instructed to remain outside the Belfast Control Zone and to expect a 10min delay due to IFR traffic inbound to RW04 at Belfast City. This was acknowledged by the Varieze pilot. Two commercial ac completed their approaches and the subject BAe146 was on intermediate approach when the Varieze pilot again requested CTR transit clearance. Whereupon, the Varieze was told to expect a further 5min delay. The Varieze pilot then reported that he then required onward clearance to leave the high ground and so was told to route SW bound to parallel the RW04 final approach. However, the Varieze pilot read back route W. Three more times the Varieze pilot was instructed to route SW bound, but read back route W bound each time before finally correctly reading back route SW. Traffic information was issued to the Varieze pilot about the reporting pilots ac - "traffic BA146 turning onto runway 04 localiser in the Lisburn area about 10 miles south of the aerodrome", which the Varieze pilot acknowledged. Very shortly afterwards an unidentified primary radar contact was seen tracking S directly towards the RW04 final approach. This was believed to be the Varieze. Twice, the Varieze pilot was instructed in an 'urgent tone' to route away from the RW04 final approach, which was acknowledged. Traffic information was also passed to the BAe146 crew - "traffic Varieze believed to be 11o'clock opposite direction turning away from final approach". The BAe146 crew acknowledged the traffic information and almost immediately reported climbing having received, he believed, a TCAS RA.

The 0820UTC Belfast City Metar was reported to be: 010/04kt; 9000m; FEW@900ft SCT@1600ft 14/11 QNH1020mb=.

ATSI reports that the Belfast City Approach Radar position was being operated by a Mentor and a trainee. The trainee had completed approximately one fifth of the time usually needed to achieve a local Certificate of Competence. Belfast City ATC is not yet equipped with SSR.

The Varieze pilot established communication with Belfast City at 0820, outbound VFR from Aldergrove. The latter ATSU's MATS Part 2 states: 'Details of VFR departures to the East/South-East/South must be prewarned to City and should route either via Glengormley, Divis (South of TV mast or Lisburn). Additionally, airborne times on such traffic must also be passed. On this occasion, Belfast City were aware of the Varieze pilot's flight but it is not known what routing it had been given by Aldergrove.

The Varieze pilot was instructed to *"..remain outside the Belfast Control Zone call you back stand by number two"*. At the time there were three inbounds to Belfast City, of which the subject BAe146 was No3 in the sequence. Just under 1min later the Varieze pilot was instructed again to remain outside CAS to *"..expect onward clearance in approximately 1-0 minutes"*. The delay was because of the inbound traffic to RW04. Although it is not a requirement to separate VFR/IFR traffic in Class D/G airspace, the Mentor commented that it is his usual practice to separate such flights.

The BAe146 crew contacted City APP at 0822 and was advised that it would be vectored for a Localiser/DME approach to RW04 as No3 in the pattern. For the next 2½min the BAe146 was positioned towards the approach. At 0824:56, the crew was instructed to turn R heading 310°, for RIGHT BASE and was informed that the flight was 18nm from touchdown. Shortly afterwards the BAe146 crew was cleared to descend to 3000ft QNH. The pilot of the Varieze requested onward clearance at 0825:40 and was advised by APP [in a broken transmission the

AIRPROX REPORT No 072/07

transcript notes] “..roger expect about a further 4 to 5 minutes delay due inbound traffic [RW] 0-4”. Although the Varieze pilot reports he believed at the time he was told the wait was 45 minutes. Accordingly, he continued “confirm we’re routeing Belfast Aldergrove to Isle of Man we’re expecting just to cross and coasting very shortly”. The Varieze pilot was then asked [in another broken transmission the transcript notes] if he was near the high ground and reported “..we’re just at the edge of the high ground we need to continue to get away from the high ground now please”. The Varieze pilot was informed 3 times he could “ route southwest bound” but on the first 2 occasions [between 0826:20 - :30] he read back the routeing as west, before repeating it correctly. The SW route was to parallel the RW04 final approach path. There are no radar recordings of the event [which show the Varieze at the moment of the Airprox - see UKAB Note (1)] but the Mentor recollected that the Varieze pilot was approximately 7nm SW of Belfast City airport, clear of the RW04 approach, at the time. He added that radar returns in the area to the W/SW of the high ground [N of the Airprox location] are, at best, intermittent.

At 0826:43, the BAe146 crew was instructed to turn R onto a heading of 010° to close the LLZ at a range of 12nm and further descent to 2000ft was issued. Information was then passed to the Varieze pilot about “..traffic One Four Six turning onto the localiser Lisburn area at 10 miles”. As the pilot was responding to this message, an unidentified primary return was observed on the radar display, tracking S towards the BAe146. Consequently, the Varieze pilot was instructed to “route away from the final approach route away from the final approach to runway 0-4”. The pilot replied at 0827:20, “Ah that’s understood staying clear of the centre line 0-4 [Varieze C/S] we’re currently 1200 feet”. At 0827:29, information was issued to the BAe146 “..traffic believed 11 o’clock 2 miles is that VFR traffic turning away from final approach opposite direction”. The Mentor said that, by then, the Varieze pilot was tracking SW. When the BAe146 crew was requested to report their level the pilot replied “climbing”. The Mentor then took over the frequency (the trainee had been transmitting up to that point, following prompting by the Mentor) and instructed the pilot to maintain 3000ft in order to remain separated from any Aldergrove traffic. This message was repeated and the pilot reported levelling at 3000ft at 0828:00. The flight was then repositioned for the LLZ. The pilot of the BAe146 reported the minimum separation as nil horizontal and 400ft vertical (by TCAS), the Varieze pilot did not sight the other aircraft.

The Belfast City mentor/trainee believed that the instructions issued to the Varieze pilot, flying VFR, would ensure that the ac would remain clear of the approach path to RW04. It was only when a primary return was observed tracking south towards the BAe146, were they aware of the confliction between the subject ac. At that time an avoiding ‘action instruction’ passed to the Varieze pilot might have helped to resolve the problem quicker than a general message to turn away from approach. Nevertheless, in the reported position of the Airprox, 8nm SW of the airport, the Varieze pilot, at its last reported altitude of 1200ft, would have been below CAS. Consequently, standard separation was not required, the pilot could even have transited without contacting ATC. In the area the base of the Belfast Class D CTA is 1500ft. No clearance was ever issued for the Varieze pilot to enter CAS.

UKAB Note (1): An analysis of the recorded Belfast Radar data is inconclusive. Only the BAe146 is shown continuously throughout the period of the Airprox as it closes the RW04 centre-line on a R base-leg and descends within the Class E Belfast TMA - base 2000ft amsl. A contact believed to be the Rutan Varieze – squawking A7030 - is shown in a RH orbit on the boundary of the Class D Belfast CTR indicating 1400ft Mode C (1013mb) – about 1610ft QNH (1020mb) - at 0826:22, as the BAe146 descends through 2900ft Mode C (1013mb); it was at this point that the Varieze pilot was instructed to “ route southwest bound”. The Varieze continued turning R in the Class G airspace between the two Class D CTRs, but the Varieze’s radar contact then fades after 0827:04 as the Varieze descends through 1200ft (1013mb) – about 1410ft QNH (1020mb). The Varieze is not shown again on the recording. Meanwhile, the BAe146 is shown level at 2800ft Mode C – about 3010ft QNH – before turning R to intercept the LLZ on a closing track of N and descending further. Just as the Varieze pilot advised at 0827:20, “..staying clear of the centre line 0-4 [Varieze C/S] we’re currently 1200 feet”, the BAe146 is shown descending through 2000ft (1013mb) – about 2210ft QNH as the ac approaches the 2000ft vertical division of the Class E TMA above Class D CTA/R. The BAe146 pilot’s reported ‘go-around’ is then evident as the airliner climbs through 2400ft (1013mb) – 2610ft QNH. Thus the Airprox is believed to have occurred with the BAe146 in the Class E TMA as the latter approached the upper limit of the Belfast City CTR but the BAe146 never actually entered this Class D CAS. The exact position and track flown by the Varieze during this Airprox cannot be determined because of the lack of radar data, neither can the relative geometry and minimum separation. Moreover, neither pilot acquired the other ac visually. Therefore the relative disposition of the two ac shown on the diagram is the best estimate available.

UKAB Note (2): In a separate telephone conversation with UKAB staff, the Varieze pilot advised that been able to retrieve some GPS data for this flight, which suggested that he had tracked S to the E of P414 that day. He stated

his firmly held belief that he had been cleared to enter the Belfast City CTR. He was dismayed that he had been routed by Belfast Aldergrove to leave their CTR to the SE when Belfast City was operating on RW04. Furthermore, he expressed concern that Belfast City ATC was not equipped with SSR and unable to receive his ac's Mode C data.

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 stills, reports from the air traffic controller involved and a reports from the appropriate ATC authority.

It was evident to the Members that this Airprox had been filed as the result of the BAe146 pilot's concern over the proximity of the Varieze, relative to the RW04 approach, as he descended IMC in cloud in Class E airspace and turned onto the LLZ. The Board agreed that the BAe146 pilot acted entirely reasonably in executing a 'go-around' if he was at all concerned – even if no TCAS RA was enunciated. It was clear that the Varieze pilot's difficulties lay firstly in holding on the edge of the Aldergrove CTR, near high ground in questionable weather, having been previously cleared to leave the Aldergrove CTR to the SE by Aldergrove ATC, whilst a stream of IFR flights inbound to Belfast City completed their approach to RW04. Secondly, in the Varieze pilot's understanding of the APP controller's RT instructions, specifically, his misunderstanding regarding what APP was 'clearing' him to do and whether he could cross into the Class D Belfast City CTR and route toward the final approach to RW04.

A controller Member suggested that the Varieze pilot had been operating in a very difficult scenario whilst flying under VFR and endeavouring to maintain VMC. Other Members were concerned that the prevailing weather might have been poorer than indicated by the METAR - 9000m, with FEW@900ft and SCT@1600ft. This weather should not have come as any surprise to the Varieze pilot who should have been cognisant of the potential for such conditions from his own pre-flight brief prior to departing Aldergrove. It seemed however that it might have been worse than he expected – possibly barely suitable for flight under VFR in the vicinity of the high ground where the Varieze pilot had been holding and Members understood entirely why he would want to vacate that vicinity as soon as feasible. The RT transcript evinced the Varieze pilot's own concern over the poor weather S of the masts and he seemed impatient to move on and get away from the high ground. However, it was evident that APP anticipated only a 4-5 min delay before the BAe146 would have been clear - not the longer 45min period the Varieze pilot apparently believed at the time. It was stressed by a controller Member that, under normal circumstances, ATC will invariably afford priority to IFR traffic over VFR flights and the ATS provided would be in accord with SOPs unless something occurs to alter the norm – hence the request to hold. The Member pointed out that, *in extremis*, if pilots are concerned about their situation and believed that they might be 'standing into danger' then a 'PAN' call might be appropriate. In such circumstances, a controller's priorities would change significantly, so that appropriate assistance could be rendered. Whilst it was not suggested that this was a substitute for good flight planning, sound airmanship and compliance with normal operating practices, pilots should be in no doubt that assistance can be obtained in this manner – far better to ask plainly for help at an early stage, before the situation deteriorates to a point where it might not easily be recoverable. Whilst an 'Urgency' RT call might not have been warranted here, a general reminder on this point was nonetheless worthwhile.

The ATSI report made it clear that no CAS entry clearance was issued to the Varieze pilot and if the pilot was under the impression that he had been cleared into the Class D CTR by APP, then he was mistaken. Poor RT might have played a part here and Members recognised that the RT transcript had revealed some broken transmissions, possibly adding to the Varieze pilot's uncertainty over what he believed APP wanted him to do. Furthermore, he had evidently been told by City APP, soon after initial RT contact, that inbound traffic was using RW04, contrary to his recollection after the event. A pilot Member, very familiar with operating in this airspace, was of the view that a routeing N or S of the high ground was acceptable, but either would need a positive clearance to cross the CTR onwards to the IOM. It was clear that the Varieze pilot had questioned what APP wanted him to do when the controller advised him to “*..route southwest bound*”. Perhaps his insistence on initially reading back west might have been indicative of his confusion at the time rather than difficulties with the RT, as a SW track would take him toward P414 below 2000ft amsl. Had the weather been suitable, it would have been theoretically possible to route W from his holding point, passing to the N of P414 and thence turning anticlockwise around the edge to cross underneath the approach to RW04 heading SE beneath the 1500ft base of the Class D Belfast City CTA. Thus he could have remained outside CAS and clear of the final approach - a point perhaps that the Varieze pilot should have recognised at the time. But it was clear that he did not question this further on the RT and instead tracked S from his holding point on towards the RW04 centreline. It was evident to the Board that any transmission to “*..route southwest bound*” did not constitute a clearance to track S and enter the Class D CTR. Consequently,

AIRPROX REPORT No 072/07

when APP observed a contact on his display that he believed might be the Varieze, the pilot was instructed to “route away from the final approach..to runway 0-4” and the contact was then seen to turn SW'ly. The Varieze had not been positively identified on radar and without SSR, APP rely upon pilots' reports for their ac altitude. In this respect, the ATSI advisor provided a helpful update and reported that Belfast City ATC are to be provisioned with a brand new Mode S SSR installation in March 2008. This new SSR source should be operational by August and will provide a great improvement to the information available to the controllers at Belfast City ATC, who should be able to identify ac more rapidly, have the benefit of more ac data displayed to them and thus allow a more complete understanding of the overall traffic scenario.

It was unfortunate that the available recorded radar data did not show this Airprox, but it appeared to the Members from APP's report and the Varieze pilot's own comments, that he had tracked S, E of P414, and thereby into the CTR toward the final approach, hence the conflict and the root of the BAe146 pilot's concern – whilst he was listening to all this on RT - when TCAS detected the other ac below his airliner. Whilst the Varieze pilot had suggested that a radar vector or an instruction to fly to a VRP would have been preferable here, an experienced controller Member advised that civilian controllers will not, as a rule, provide radar vectors to VFR traffic and would certainly not expect to route a pilot operating VFR through the CTR, where they might penetrate the area of the final approach path, without a positive clearance. Another controller Member suggested that APP had been trying to get the VFR flight out of the way of the IFR BAe146, but questioned why APP had not simply provided avoiding action to the BAe146 crew against another ac that they might reasonably have believed had infringed Class D airspace. In the Member's view, APP should have been more positive and taken the BAe146 out of the pattern rather than relying on the crew to initiate the 'go-around' themselves when they detected the Varieze was flying toward the centre-line and approaching airliner. A GA Member reiterated that there was no recorded data to support this, but all agreed there was no reason to doubt the veracity of either the Varieze pilot's subsequent comments from his GPS data, or that of the BAe146 pilot, who observed the other ac pass directly below his airliner on TCAS. The controller's report was sufficient to convince the Members that the Varieze pilot had flown into the CTR without clearance and thus close enough to the FAT to RW04 to cause concern. This was confirmed by the BAe146 pilot's subsequent actions, when he quite reasonably initiated a 'go-around' to forestall the developing conflict. Taking all of the foregoing points into account during a wide ranging debate the Members agreed that this Airprox had resulted from a conflict near the Belfast City instrument approach to RW04 resolved by the BAe146 crew.

Although this go-around was initiated at a relatively early stage, it was not possible to substantiate independently the BAe146 pilot's estimate of either the minimum horizontal or vertical separation of 400ft without radar data. Whilst the BAe146 pilot might have observed the Varieze at such a level previously on his TCAS, as the airliner is shown no lower than 2000ft (1013mb) – about 2210ft QNH (1020mb) thus within Class E airspace - and the Varieze pilot had advised moments beforehand on RT that “..we're currently 1200 feet” QNH it would seem that vertical separation might have been nearer to 1000ft at that point. Whilst there was clearly potential for the situation to get much worse, the BAe146 pilot's prompt action in executing the go-around had, in the Board's view, ensured that any risk of a collision had been effectively removed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict near the Belfast City instrument approach to RW04 resolved by the BAe146 crew.

Degree of Risk: C.

AIRPROX REPORT NO 073/07

Date/Time: 7 Jun 1507
Position: 5214N 00141W (3nm NW Wellesbourne
 - elev 158ft)
Airspace: Lon FIR (Class: G)
Reporting Ac **Reported Ac**
Type: A109E Ask 21
Operator: Civ Comm Civ Club
Alt/FL: 1300ft 1000ft↓
 (QNH 1020mb) (QFE NR)
Weather VMC CLBC VMC In Haze
Visibility: 6-8km 2km
Reported Separation:
 20ft V/30m H 20ft V/30m H
Recorded Separation:
 Not Recorded

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE A109E PILOT reports flying a VFR transit flight from Sywell to Carmarthen at 1300ft QNH 1020mb, in receipt of a FIS from Wellesbourne Info and squawking 0032 with Mode C. His route was planned to pass 2nm N of Wellesbourne and S of the Snitterfield Gliding site [elev 375ft] with which he was familiar. When they were 3nm NW of Wellesbourne, heading 265° at 140kt, with his Observer looking for TCAS contacts to their left whilst he was conducting his usual scan, he identified Snitterfield and saw gliders on the ground but none in the air. When Snitterfield was back in their 4 o'clock at 3nm he was adjusting his helmet for comfort when the Observer shouted as a white glider flashed past, filling the window while it was in a left turn belly up towards them. He did not see the glider at long range and he thought that it might have been obscured by the roof throttle quadrant at close range. He thought that the glider pilot did not see them and assessed the risk as being high.

THE ASK 21 PILOT provided a brief report which stated that he was flying with another pilot, heading E at 50kt entering a turn in the usual position onto the downwind leg at 1000ft QFE, prior to landing, when a helicopter passed from their 12 o'clock to 7 o'clock very close and slightly below so he tightened the left turn. He assessed the risk as being very high.

UKAB Note (1): The glider is not seen on any recorded radar. The helicopter is however seen on the recording of the Clee Hill radar tracking about 260° at FL011 (1300ft alt). Its route takes it about 1½nm to the S of the centre of the Glider Site.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted solely of reports from the pilots of both ac and a radar recording.

The Board noted that both ac were flying VFR in Class G airspace and therefore the pilots had an equal and shared responsibility to avoid collisions, primarily by the see and avoid principle. Members noted that the airspace in which the incident took place is congested, affording reduced options to avoid the glider site by a greater margin other than by a significant lateral deviation. In this incident neither pilot saw the opposing ac until it was too late to initiate effective avoidance. Members also noted that, although the pilots' estimates of the visibility differed, both agreed that it was reduced which would have made the white glider - in almost a wingtip-on aspect - very difficult for the A109 pilot to visually acquire. The glider pilots were probably looking into the circuit, towards the landing point and away from the direction of approach of the head-on A109, as they commenced the base turn. Unusually both pilots reported the same estimated separation and, as there was no radar confirmation, Members accepted the estimate as being reasonably accurate. Since the ac had missed by such a small margin and neither pilot had

AIRPROX REPORT No 073/07

been in a position to take any avoidance, Members thought that there had been a significant risk that their ac could have collided.

Members pointed out that lookout by pilots of transiting ac should be extra vigilant in the vicinity of known glider sites and glider pilots should be aware that other ac can pass very close to them when in the circuit: they should not therefore confine their attention only to the landing.

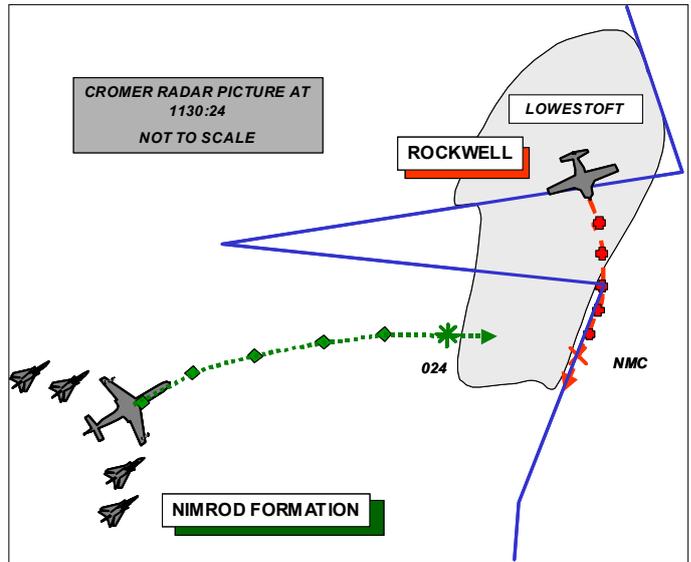
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: An effective non-sighting by the A109E pilot and a late sighting by the ASK21 pilot.

Degree of Risk: A.

AIRPROX REPORT NO 074/07

Date/Time: 13 Jun 1131
Position: 5226 N 00145 E (off Gt Yarmouth)
Airspace: London FIR/RC(T) (Class: G)
Reporting Ac **Reported Ac**
Type: Nimrod MR2 Rockwell
 Commander 114
Operator: HQ AIR (Ops) Civ Pte
Alt/FL: 2000ft 2500ft
 (QNH 998mb) (N/K)
Weather VMC CAVOK VMC CLBC
Visibility: >30km 8km
Reported Separation:
 0ft V/400m H ~100ft V/1.5kmH
Recorded Separation:
 0 V/0.3nm (550m) H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE NIMROD MR2 PILOT reports that he was the leader of a formation for the Queen's Birthday Flypast [practise]. The formation was the subject of an AIC, NOTAM and airspace reservation. [See UKAB Note (1)]. His formation consisted of a Nimrod MR2 leading 4xTornado GRA4s, two on either wing in close formation, was established in a holding area at 2000ft on the QNH and was an element of a much larger trail formation. While in the holding area and prior to joining up with the other elements of the main formation he was in a 20° AOB right turn at 280kt when passing through a heading of 090°, he saw a light ac passing through his 1 o'clock from left to right at the same level about 600m away. He recorded the position and time of the incident. The light ac was in a right turn and did not appear to have seen their formation. Shortly after the incident, an E3D which was also part of the larger formation, reported that they had the ac on their radar to the N of the holding area and sent a Tornado F3 to identify the infringing ac.

They took no avoiding action, due to the late sighting and since the ac was going to pass about 400m down their starboard side. After landing he was informed that the ac had been positively identified. He assessed the risk as being high. (NOTAM area J2446-07)

THE ROCKWELL COMMANDER 114 PILOT reports that he was flying a white ac, with all lights on, on a flight for his passenger to photograph Oulton Broad, Lowestoft and Great Yarmouth harbours and Brundall marina.

On arrival at his departure airfield the CFI reminded him of the restricted airspace between Southwold and Marham that was scheduled for that day. On departure, they were reminded again of the restricted area, which was due to come into effect at 11:35UTC [See UKAB Note (1)]. They departed in good VMC conditions at about 11:15 and headed E; once clear of the ATZ he changed frequency to Norwich APR and requested a RIS which they declined and offered a FIS. He levelled at about 2500ft on the Yarmouth RPS, which was passed by Norwich, and routed to the N of Seething, before heading direct to Oulton Broad/Lowestoft. On reaching Oulton Broad/Lowestoft they started circling in a clockwise direction and Norwich APR asked what his intentions were, to which he replied that they would be circling for a few minutes before routing up the coast towards Great Yarmouth.

During the second or third orbit, just after passing through a heading of 180°, he saw a military formation in their 2 o'clock and heading directly towards them. He estimated that the formation was about 1.5km away and a similar level. He pointed them out to his passenger and turned back towards a Southerly direction, keeping the formation in sight, while his passenger took a photograph of them (supplied). As the formation passed them he resumed the gentle turn, again still keeping the formation in sight. He does not recall any information being passed by Norwich APR regarding the formations and this surprised him. He checked the time to ensure that they were not within the timeframe for the restricted area (and he thought that they were also not in the geographical area notified); the

AIRPROX REPORT No 074/07

time was 1130 UTC. Following the encounter he routed N towards Great Yarmouth and continued the flight as planned.

He thought that the ac strobes and transponder were selected on but he cannot be sure as he could not actually recall turning them on prior to take off.

He assessed the risk as being medium.

UKAB Note (1): The flypast was the subject of AIC48/2007 (Mauve 229 of 24 May) and a NOTAM (J2446/07). Both the actual flypast and the planned rehearsals were the subject of a Restricted Area (Temporary) RA (T) which prohibited non-participants from entering. In order to minimise the time of the restriction, the area was split into 3 sections which were closed for different time periods. The AIC gave clear diagrams of the geographical areas with the associated closure times for both the actual flypast and the rehearsals from 13-15 Jun and the actual flypast on the 16 Jun.

UKAB Note (2): The recording of the Cromer radar shows numerous ac squawking 24 operating to the SE of Southwold. At 1123 these contacts start to head towards Southwold in trail, with the Nimrod formation being the 3rd element. At 1128:49 the Nimrod (formation) squawking 2423 and indicating FL025 is 4.0nm NNW of Southwold turning right through N having reached the W end of their hold (just inside the RA(T)) and the Rockwell in their 12 o'clock, 10nm NNE of Southwold, heading ESE. At 1130:09, due to the formation's turn, the Rockwell is still in its 12 o'clock and the latter commences an orbit to the right while the ac are separated by 3.3nm and it is 300ft above the formation. At 1130.21 the Rockwell is still in the formation's 12 o'clock at a distance of 1.3nm and 200ft above their alt. The lateral separation between the Nimrod, at FL024, and the Rockwell, also showing FL024 (before the Mode C drops out), reduces to 0.3nm at 1130:32 and the CPA is shortly after the Rockwell passes through the Nimrod's 12 o'clock into its 4 o'clock. At this point the ac are about 4nm inside the lateral boundary of the RA(T) which, in that area, extended up to 8000ft amsl.

ATSI reports that the pilot of the Rockwell Commander contacted Norwich APR at 1119:55. He informed them that he was operating VFR, was just S of Wymondham at 2300ft, on 1000mb, was routeing to Lowestoft and was requesting a RIS. The APR declined the provision of a RIS due to his workload and traffic complexity and instructed the pilot to maintain VFR. He added that he would provide a FIS and passed the Yarmouth QNH as 1001mb. The ac was not identified and no squawk was allocated however, the radar recording indicates that the pilot had selected 7000 with Mode C.

The radar recording shows that there were a number of ac operating in the RA(T) established to the SE of Southwold (about 10nm south of Oulton) at various levels between 2000 and 3000ft. These ac were apparently following a right holding pattern aligned approximately NW – SE with the town of Southwold as the holding fix.

Once the Rockwell reached the vicinity of Oulton and Lowestoft it performed a number of right hand orbits. At 1130:10, the radar recording shows the Rockwell indicating FL026 in a right hand orbit and passing through SSW with the Nimrod formation 2.3nm to the W in a right hand turn to route outbound in the hold indicating FL024. At 1130:35 the radar shows that the formation passed behind the Rockwell at a range of 0.3nm with both ac indicating FL024; the formation and the Rockwell then track away from each other.

The pilot made no transmission on the RTF until at about 1134:30, when Norwich APR asked him what his intentions were, to which the response was that he would circle in that area for a few min before routeing back towards the Brundall area (6nm SE of Norwich Airport) for a couple of minutes.

A FIS is defined as a non-radar service provided for the purposes of supplying information useful for the safe and efficient conduct of flights. It is incumbent upon the pilot to request any such information, other than traffic information, and this was not done; however, given the size and location of the airspace reservation, and with the benefit of hindsight, a timely remainder by Norwich APR would have been prudent.

HQ AIR (OPS) comments that it is difficult to marshal the number of ac required for the Queen's Birthday Flypast which is why the RA (T)s and NOTAMs are in force. The Rockwell pilot was, perhaps, brave in deciding to fly in such close proximity in time and space to the restricted airspace. Perhaps delaying the sortie or flying elsewhere might have been more prudent. However, having made that decision, and then seeing the formation heading

towards him, he could have made more of an attempt to move away. Finally, it was useful to have the capability of the E3D and the Tornado F3 to safely identify the intruder.

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.

Restricted Airspace (RA(T)s) for such flypasts have been advocated and their importance emphasised by the Board as a result of several previous Airprox; Members were pleased to note that in this instance the AIC and associated NOTAM promulgating the flypast practise, were clear, accurate, unambiguous and correctly promulgated. The Board also noted that the structure and timing of the RA(T) were such that disruption and inconvenience to non-participants was minimised, commensurate with safety. It was however, equally clear to Members that notwithstanding this, the Rockwell pilot had not been aware of the detail or extent of the airspace restriction.

Although the existence of the Restricted Airspace [RA(T)] had been briefly mentioned by the CFI to the Rockwell pilot before he took off, that comment had apparently only referred to the overland transit corridor section and not the more extensive (both in time and area) holding area which although predominantly over the sea, also had an overland portion; this was the area in which the incident had taken place. Members were surprised that the CFI's comment regarding the restriction had not prompted the pilot to check the NOTAMs since they clearly had applied to his flight. One Member pointed out that it was a legal obligation under the ANO [Part 5 Chapter 52(a)] for ac commanders to take all reasonable steps to satisfy themselves that the flights can be made safely taking into account the 'latest information'. Further, RA(T)s are mandatory airspace closures and the CAA only implements them for events when there is a real danger to non-participant ac.

It was not clear to some Members whether the Nimrod formation had remained inside the RA(T) lateral boundary as it was not marked on the diagram; however, the boundary was off the diagram to the W and the Members were informed that the radar recording clearly showed that, although they had come close to the edge, they had not gone outside the area; in any case this was not relevant as the incident had taken place about 4nm inside the RA(T). One Member questioned the Tornado F3 departing to identify the Rockwell but the HQ Air (Ops) Member informed the Board that the F3 ac involved had been a formation spare that was not involved in the flypast and that AWACS and F3 crews are fully trained, proficient and regularly practice air policing which necessarily includes 'visual indents' of small and slow moving ac. Although the Board does not normally condone pilots 'chasing' other ac to ascertain their identity, they accepted that in this case it was conducted in an entirely safe and professional manner and had most likely streamlined the process of identifying the intruder.

While agreeing the ATSI view that Norwich APR had not played any material part in the incident, they also agreed that existence of the RA(T) was a safety issue and a timely reminder to the Rockwell pilot might have prevented his incursion into it.

Members were surprised that, having seen the large military formation from a distance of 1.5km and identified that they were turning towards his intended track, the Rockwell pilot did not immediately turn away from them [to the N] and not continued to close to a distance when they could be photographed. Although some Members considered that the pilot had thereby flown his ac into conflict with the formation, this was not the majority view, although all agreed it had not been a wise course of action and had caused the formation leader considerable concern. Although perhaps ill-considered, since the Rockwell pilot had maintained visual contact with the formation throughout, there had not been any risk that the ac would have collided [with any of the Nimrod formation members]; the Nimrod Captain however, had no way of knowing this.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Due to inadequate flight planning, the Rockwell pilot flew into an RA(T) and into conflict with the formation led by the Nimrod pilot.

Degree of Risk: C.

AIRPROX REPORT No 075/07

AIRPROX REPORT NO 075/07

Date/Time: 13 Jun 0928

Position: 5201N 00112W (½nm NE of RW24 threshold Hinton-in-the-Hedges - elev 500ft)

Airspace: London FIR (Class: G)
Reporting Ac Reported Ac

Type: Vans RV4 R44

Operator: Civ Pte Civ Pte

Alt/FL: 800ft 1700ft

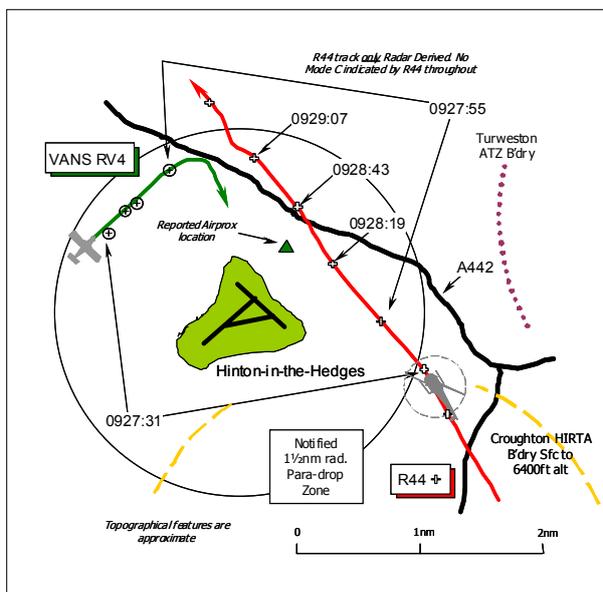
QFE (988mb) amsl

Weather VMC Clear Air NR NR

Visibility: 20nm >20km

Reported Separation:
Nil ft V/50m H Nil V/500m H

Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VANS RV4 PILOT reports that he had joined the visual circuit at Hinton-in-the-Hedges aerodrome and was listening out with HINTON RADIO A/G station on 119.45MHz. SSR was off; Mode C was not fitted but the aeroplane has subsequently been equipped with a Mode S transponder. Whilst DOWNWIND R for RW24 in clear air he was in visual contact with another aeroplane that was backtracking along the RW prior to departure. He called DOWNWIND right hand for RW24 on the RT whilst level at the cct height of 1000ft QFE (988mb) and the pilot on the RW indicated that he was about to depart. He could see the aeroplane at the threshold of RW24 and so he checked his position and prepared to turn onto a R BASE-LEG for RW24. As he completed the R turn onto BASE steadying on 150°(M), he checked his airspeed at 85kt, height as he descended through 800ft QFE [broadly 1300ft amsl], temperatures and pressures before returning his attention to the aeroplane on the RW as its pilot had indicated he was starting his take-off run. Upon visually confirming the aeroplane was moving on the RW he then looked forward and spotted a Robinson R44 helicopter at the same height 800m directly ahead and flying straight towards him. It looked to him as though the R44 pilot was tracking S of the A422 Brackley to Banbury road (heading about 330°) and as the helicopter was not changing direction he immediately banked to starboard and descended towards the RW to avoid the helicopter. The dark blue R44 – with “front” lights on - passed 50m away to port with a “medium” risk of collision and looking back over his shoulder he could see the helicopter pilot had maintained his course following the road and had made no deviation from his track. He was able to settle his ac onto a short FINAL for RW24 and called “HINTON traffic final for 24”, from which a successful landing was accomplished without any further problem.

Hinton-in-the-Hedges is an active aerodrome and about 5min after landing the parachuting ac took off to deploy another group of parachutists over the aerodrome. He added that it is very dangerous to fly through the cct of any aerodrome at cct height even if it looks inactive but even more so when the airfield is marked on charts as a parachuting [and winch launch glider] site.

THE ROBINSON R44 HELICOPTER PILOT reports he was in transit from Denham to a private HLS in the vicinity of Birmingham under VFR and in receipt of a FIS from London INFORMATION. A squawk of A7000 was selected with Mode C off, HISLs were on. Approaching Hinton-in-the-Hedges from the SE heading 315°(M) at 95kt, flying at an altitude of 1700ft, [broadly 1200ft aal] the low-wing single engine monoplane had been first sighted >2nm away. Both he and his observer watched the progress of the aeroplane passing from L to R ahead (on a heading approximately 45° left of the reciprocal of their heading). The aeroplane [the RV4] was clearly on a track that represented no collision risk and it would have passed well clear. No avoiding action was taken, because turning R at any sensible rate was inappropriate since this would have caused “undue proximity of the ac”. They were, therefore, perplexed to watch the pilot of the monoplane execute a “violent and unnecessary” diving turn to the R,

initially causing momentarily reciprocal tracks which would have resulted in a vertical proximity of 100ft – 150ft. The RV4 passed about 500m away at the same level [the R44 pilot reports “0ft” vertical separation] as it turned to starboard; the risk was assessed as “none”.

In their view, a R turn might have unduly alarmed the other pilot since it would have increased any risk of a collision. Furthermore he considered it inappropriate to “illegally” turn L and increase the separation of their tracks since there would always be the risk that the other pilot might “inappropriately” choose to turn R and an “illegal” turn to the L would cause the two to collide.

The R44 pilot opined that the safest course of action was to watch the erratic manoeuvres of the RV4 monoplane and be ready to take evading action if the pilot flew too close. It seemed to him that the RV4 pilot was trying to make a point about Hinton-in-the-Hedges not having an ATZ. His helicopter is coloured blue.

UKAB Note (1): The UK AIP at ENR 5-5-3-2, promulgates that Hinton-in-the-Hedges Free-fall parachute drop zone as a radius of 1½nm centred on 520136N 0011216W up to FL65 – drops may be made up to FL150 with permission from LTCC - and active normally during daylight hours Tuesday to Sunday & Public Holidays.

UKAB Note (2): The UK AIP at ENR 5-5-1-3, promulgates that Hinton-in-the-Hedges Glider launching site is active during daylight hours for aerotow and winch launches which may attain a height of 2000ft agl, above the site elevation of 500ft amsl.

UKAB Note (3): The Clee Hill radar recording does not illustrate this Airprox as only the R44 helicopter is shown continuously as it transits the vicinity of the Airprox location. Moreover, no Mode C is shown by the helicopter at all as the pilot declared in a subsequent telephone conversation with UKAB staff that it was switched off, albeit that he normally flies with it selected on. The R44 is shown approaching from the SE of Hinton-in-the-Hedges and crosses the lateral boundary of the 1½nm radius notified free-fall parachute drop zone just after 0927:31 on a broadly NW'ly track. A primary radar contact, which might or might not be the Vans RV4 aeroplane flown by the reporting pilot, is shown at the same time to the NW of the aerodrome. A number of primary contacts are shown thereafter at positions commensurate with a RH DOWNWIND leg for RW24, but radar contact is then lost on what might be the RV4. Therefore, the absence of reliable radar data on the Vans RV4 does not allow this ac's track to be replicated accurately on the diagram. The R44 tracks NW and crosses the approach to RW24 just after 0928:19, about 0.9nm out, before passing abeam the reported Airprox location - ½nm NE of RW24 threshold. A slight R turn is apparent as the helicopter crosses the location of the A442 road. The slight 'jink shown after 0929:07 might well be 'track jitter' on the large scale depicted. The absence of Mode C does not allow anomalies between the reported levels of the two ac involved to be independently resolved.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was unfortunate that the available radar data did not show the Vans RV4 more clearly as it was evident that there was a marked disparity between both pilots' accounts of the horizontal separation that pertained and of the helicopter's altitude. Whereas the RV4 pilot reported that he was passing a height of 800ft aal on BASE-LEG with the R44 helicopter at the same level, the helicopter pilot stated that he was transiting at 1700ft amsl - about 1200ft aal. It was evident to the Members that were this the case then the R44 helicopter would have been some 400ft above the Vans RV4 pilot's reported height - yet the R44 helicopter pilot reported seeing the aeroplane at his level, with “0ft” vertical separation. The regrettable lack of Mode C data from the R44 had prevented independent verification of the pilot's reported altitude as, although fitted with altitude reporting Mode C, it was not apparently switched on. The Board was briefed that attempts to resolve this anomaly had been unsuccessful as the R44 pilot could not recall his transit altitude exactly. Nevertheless, he had reaffirmed that the RV4 was at the same level. Given that the Vans RV4 pilot made a successful landing after the avoiding action turn and descent from BASE-LEG at 800ft, it seemed to the Board that the R44 helicopter was more probably at an altitude of about 1300ft amsl – equating to a height of around 800ft above the aerodrome - as it flew past Hinton-in-the-Hedges.

Members commended the Vans RV4 pilot for his acquisition of a Mode S transponder subsequent to this event. Whilst pilots might never realise it at the time, advertising their ac's presence and level to ATC and other ac equipped with TCAS can quite literally be a 'life saver'. Whilst not directly applicable here, as the R44 is not fitted with TCAS, the recent change in National policy promulgated through AIC 9/2007 (Yellow 230) - USE OF SSR IN

AIRPROX REPORT No 075/07

THE VICINITY OF THE AERODROME TRAFFIC PATTERN - which took effect from 15 March 2007 was relevant and worth highlighting. Whilst a change from previous practice, the current policy now entreats pilots of transponder-equipped ac when operating in the vicinity of an aerodrome traffic pattern to ensure that SSR transponders remain ON with Modes A and C [Mode S where fitted] selected. The lack of Mode C altitude reporting data clearly denies both ATC and other acs' ACAS safety critical information thereby significantly inhibiting the effectiveness of collision avoidance equipment. At the majority of UK aerodromes, pilots operating in the vicinity of the aerodrome traffic pattern should continue to operate using the discrete code allocated by the appropriate ATS unit or, where no discrete code is allocated, the VFR conspicuity code of A7000 can be used – as the R44 pilot did here. The 'vicinity of the Aerodrome Traffic Pattern' being defined as within the ATZ boundary or, at aerodromes without an ATZ - as here - within a distance of 2nm from the aerodrome. But the important lesson here was to ensure that Mode C ALT was selected at any time the transponder was 'on'.

That the Vans RV4 pilot had not spotted the helicopter before he turned onto BASE-LEG was of concern as clearly the blue R44 was there to be seen in the prevailing good weather. Members recognized that the RV4 pilot was busily engaged in setting up for his landing and judging the spacing from the ac departing the RW but clearly this did not absolve him from maintaining his look-out scan. The Board was however aware that helicopters of this type are notoriously difficult to spot – especially when approaching head-on with little crossing motion to draw attention to themselves, albeit that the helicopters H1SL was on and the Vans RV4 pilot had eventually spotted the helicopter at a range of 800m.

A controller Member who is also a GA pilot commented that the parachuting activities at Hinton-in-the-Hedges are well known amongst the GA community. This and the winch launch gliding activity, in addition to the potential of encountering aerodrome cct traffic, should all have been readily apparent from a cursory examination of a CAA 1:250000 VFR chart. Whilst it was apparent from the Vans RV4 pilot's report that parachuting was not in progress at the time the R44 passed by, it did indeed commence very shortly afterwards. In this respect Members viewed the helicopter pilot's choice of route as inappropriate. To fly a helicopter through a notified free-fall parachute drop zone without communicating on the A/G Station frequency to ascertain activity at the time seemed most unwise. The same would hold true if gliding was taking place and Members were well aware of the intrinsic dangers of winch wires to other ac. The Board was briefed that the R44 pilot had advised that he does normally communicate with ATSU's along his route, with twin VHF boxes available in the helicopter for this purpose. Whilst the R44 pilot had correctly noted the absence of any notified ATZ at Hinton-in-the-Hedges, obviating any compulsion under Rule 45 to communicate with the A/G Station, this did not absolve him from keeping clear of the cct pattern. In the Board's view the R44 pilot flew too close through the final approach and the associated visual cct – apparently at cct height and moreover in opposition to the cct direction in use - which was questionable airmanship. Indeed, Rule 12 of the Rules of the Air Regulations 2007 - Flight in the vicinity of an aerodrome – entreats pilots of a *“...flying machine...flying in the vicinity of what the commander of the aircraft knows, or ought reasonably to know, to be an aerodrome shall...conform to the pattern of traffic formed by other aircraft intending to land at that aerodrome or keep clear of the airspace in which the pattern is formed...”* [UKAB emphasis]. The manoeuvres of the Vans RV4 had been described by the helicopter pilot as “erratic” but were possibly no more than might be expected of an ac circuiting to land at an uncontrolled aerodrome. However, the helicopter pilot might not have recognised the Vans RV4 as aerodrome cct traffic, as although he had seen the other ac from a range of >2nm he still pressed on to within 1nm of the aerodrome. Recognising that Turweston was just to the E – with its associated ATZ – Members noted that the choice of routes was constricted at this point by several features, but it would certainly have been feasible to have given Hinton-in-the-Hedges aerodrome a wider berth. Alternatively, communicating on the A/G station frequency might well have confirmed the cct activity with the added benefit of alerting cct traffic at Hinton-in-the-Hedges to the presence of the helicopter earlier. Weighing all these factors carefully for relevance, the Board concluded unanimously that the cause of this Airprox was that the Robinson R44 pilot flew through a notified free-fall parachute drop zone, glider winch launch site & aerodrome cct into conflict with the Vans RV4.

Turning to risk, the R44 pilot had spotted the Vans RV4 aeroplane from >2nm away but was apparently unaware of the potential that it was going to turn R in the cct for RW24: if he had then he might not have considered that the aeroplane would pass clear ahead on a steady course in the first instance. Although the R44 pilot had perceived that turning R would not have resolved the issue, this clearly illustrated the unanimous view of the Members that giving aerodrome cct traffic as wide a berth as feasible – either horizontally or vertically - was sound airmanship. As to the separation it was not feasible to determine the horizontal separation but evidently the helicopter pilot had the aeroplane in sight for some time, was thus always able to turn away if need be and had himself asserted that the risk of a collision was “none”. As it was, the RV4 pilot spotted the R44 and took his own

avoiding action by turning R and descending, still managing, nevertheless, to land safely off of this approach. Whilst he should not have been placed in that position, clearly the RV4 pilot was able to turn away without undue difficulty in his nimble aeroplane. Therefore, the Board agreed unanimously that no risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

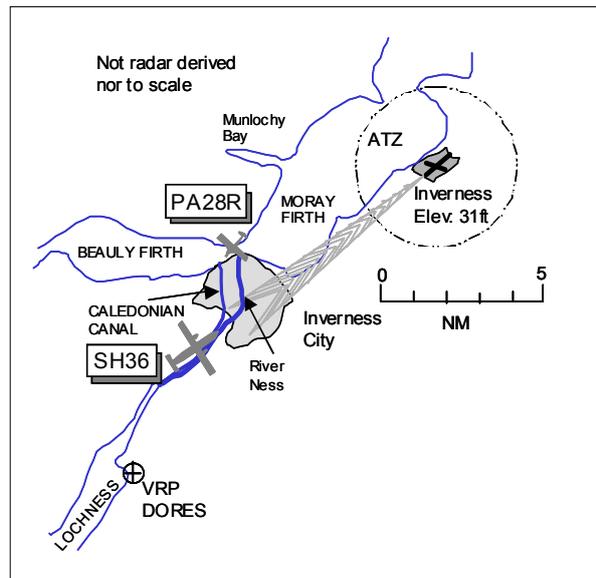
Cause: The Robinson R44 pilot flew through a notified free-fall parachute drop zone, glider winch launch site & aerodrome cct into conflict with the Vans RV4.

Degree of Risk: C.

AIRPROX REPORT No 076/07

AIRPROX REPORT NO 076/07

Date/Time: 16 Jun 1431 (Saturday)
Position: 5726N 00416W (9nm FIN APP RW05
Inverness - elev 31ft)
Airspace: SFIR (Class: G)
Reporting Ac Reported Ac
Type: SH36 PA28R
Operator: CAT Civ Pte
Alt/FL: 2700ft 1500ft
(QNH 1005mb) (QNH 1005mb)
Weather IMC KLWD VMC CLBC
Visibility: 10km
Reported Separation:
NR 1400ft V/2.8nm H
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SH36 PILOT reports inbound to Inverness from Stornoway IFR and in communication with Inverness on 122.6MHz squawking with Mode C. During the approach ATC warned them there were several VFR ac in the area and whilst on the VOR/DME arc a TA alert was received on traffic [a PA38 not the subject PA28R] in the SW position. Later, on final approach at 9nm heading 050° at 135kt and commencing descent from 2700ft, a TA alert was received on another ac followed by an RA 'climb'. The guidance was followed from 2600ft until reaching 3100ft and this manoeuvre was reported to ATC. Owing to IMC the other ac was not seen visually and he assessed the risk as low.

THE PA28R PILOT reports flying with another pilot outbound from Inverness to Belfast, VFR and in receipt of a FIS from Inverness Tower on 122.6MHz squawking with Mode C. The weather was VMC and the ac was coloured white/blue with nav, wing-strobes and anti-collision lights all switched on. After take-off RW05 he climbed ahead to 400ft QNH into a stiff breeze (NE'ly at 17kt) before initiating a L turn within the aerodrome perimeter in an arc onto the downwind track, initially heading 280° remaining clear of the RW05 approach, as a SH36 was known to be approaching. Passing 1000ft at a fairly gentle climb rate of 500fpm at 100kt, a turn onto heading 240-245° was made and maintained until reaching the City of Inverness at 1500ft and 125kt. ATC advised him of the SH36 intending to make a 12nm DME instrument approach during his climb-out phase (280° and 950ft QNH) and he acknowledged this TI with "will keep a good lookout". At 1100ft he was requested to "remain North of the 05 approach path" before he levelled at 1500ft, the maximum safe attainable level under VFR. He complied with the ATC instructions within the terrain limitations of his intended track down the Great Glen and having to cross the City. He elected to transit the City via the Caledonian Canal to comply with ATC instructions on the basis that he would cross the least populated area as far N of the extended C/L as safely possible whilst achieving the shortest practical crossing to open ground in compliance with his 'ability to land clear' obligation. This track was much closer to the surrounding high ground than normally taken for flights down Loch Ness. About 4min into the flight whilst O/H the Caledonian Canal sea basin intending to follow the general direction of the canal, the SH36 crew reported "we have had an advisory resolution". The PA28R was the only other ac known to be in the vicinity and he, the PA28R pilot, made comment to that effect. ATC then asked the SH36 crew if they wished to follow the TCAS advice and after some hesitation the crew elected to continue their approach. At this stage he noted his PCAS (Portable Collision Avoidance System) indications - range 2.8nm and +1.4(thousand feet) - and made a brief visual scan to the S and above. Both directions offered limited effective visibility (approximately 3000m to S and cloud 100ft above) whilst ahead and to the N of his track the visibility was >10km but the SH36 was not seen. It was clear that both ac were diverging and the 'reported conflict' time period would have been short owing to the relative reciprocal nature of the 2 ac's headings. No further ATC communications were exchanged on the report

or situation and he was transferred to Scottish Information about 3min later. He was later asked to contact Inverness which he did after landing.

THE INVERNESS ADC/APP reports that the PA28R pilot had booked out VFR to Belfast electing not to file a flight plan. Prior to issuing take-off clearance, he told the PA28R pilot of the IFR SH36 inbound from the NW which had been previously cleared for the direct arrival procedure to intercept the ILS for RW05; this was acknowledged. He then informed the SH36 crew that the PA28R was departing to the SW under VFR before then clearing the PA28R flight for take-off with a L turn, mindful of the high terrain to the S of the aerodrome and the prevailing meteorological conditions. The PA28R departed at 1426 and in view of the potential conflicting flightpaths, he further requested its pilot remain to the N of the FAT RW05. The PA28R pilot then requested 'clearance' to climb to altitude 3000ft so he reminded the pilot of the potential conflicting IFR traffic on the LLZ. The PA28R pilot responded in such a way as to suggest that he, the ADC/APP, had issued a clearance to climb to 3000ft, so he re-emphasised that he had not received any clearance, only TI. Several attempts were then made to alert the SH36 crew that the PA28R was intending to climb to 3000ft but no responses were received. A short while later the SH36 crew reported that they had responded to a TCAS RA and had climbed to 3100ft. He asked the crew to report returning to their assigned clearance and they duly responded that they were in the process of doing so. Given that his last instruction was 'descend on the ILS' and they had subsequently been compelled to climb, he asked them if they were able to continue with the ILS approach which they confirmed, landing without further incident at 1436. Thirty minutes later, the SH36 Captain telephoned and reported an Airprox.

The Inverness METAR shows EGPE 1420Z 04014KT 9999 FEW013 SCT016 BKN026 11/08 Q1005=

ATSI reports that at 1422 the SH36 flight was cleared for the direct arrival DME arc procedure for the ILS RW05, to report turning R onto the arc. Meanwhile, the PA28R flight had taxied to the holding point for RW05 and at 1423:50 was instructed to line up and wait. The controller informed the PA28R pilot about other VFR traffic [a PA38 operating at Munloch Bay not above 1500ft] and "*...also a Shorts Three Sixty inbound from the northwest for the direct arrival runway arc runway Zero Five*". The pilot replied that he would keep a lookout. Approximately 30sec later the pilot of the SH36 was informed "*...further traffic is a P A Twentyeight departing VFR southwestbound down the Great Glen*" which the crew acknowledged. At 1424:58 the PA28R flight was cleared for take-off with a L turn out. Just afterwards the SH36 crew reported turning R and was requested to report established on the LLZ.

At 1428:20, the PA28R pilot was informed "*...the Shorts Three Sixty aircraft will shortly be turning on to the Localiser requesting that you remain to the north of the final approach*". The pilot replied "*wilco this time...*". The SH36 crew reported established at 1429:30 and were cleared to descend on the ILS. The PA28R pilot was requested to report at or abeam Dores (a VRP situated 13nm SW of the airport) and, in response, he asked to climb to 3000ft. The controller replied "*...the only traffic to affect is the Shorts Three Sixty aircraft currently established on the Localiser for Zero Five*". The pilot replied "*...copied that and we're clear*" to which the controller transmitted "*I'll not give you clearance as such it's just to maintain VFR*".

The controller then attempted to pass further TI to the SH36 flight but received no response. After two more attempts to establish communication the crew reported "*...we've just had a Resolution Advisory and we're climbing to three thousand one hundred feet*".

The procedure carried out by the SH36: '*Arrival on VOR INS R306 (QDM 126°) not below 5200. Request ATC approval for DME arc arrival when within INS DME 40. After passing INS DME 25, with ATC approval, descend not below 4900, and after passing GARVA (INS DME 17) descend not below 3600. From INS DME 14 (I-LN DME 13-4) turn right to establish on INS DME12 (I-LN DME 11-4) arc anticlockwise. When established continue descent to 2700 (2670), then from lead VOR INS R244 (IVR NDB(L) QDM 064°) turn left onto the localizer. From FAF I-LN DME 8-3 (INS DME 8-9) at 2700 (2670), continue with ILS/LLZ/DME final approach.*'

The Inverness Controller issued TI to both flights and requested the PA28R pilot to route clear of the RW05 approach.

UKAB Note (1): The incident occurred outside of recorded radar coverage.

UKAB Note (2): The PA28R pilot was contacted during the investigation phase to clarify the sequence of events with the benefit of the Inverness RT transcript. The pilot stated that he did not commence a climb immediately

AIRPROX REPORT No 076/07

after requesting 3000ft as he was maintaining visual contact with the surface and positioning O/H the sea basin of the Caledonian Canal. After the TCAS RA event (1430:40), the SH36 crew reported at 8.5nm DME [SW outskirts of City centre] 30secs later. The PA28R pilot said that he commenced a climb about 1-2nm short of Dores reaching 2500ft shortly thereafter. The RT transcript reveals the PA28R pilot at 1432:00 requesting to continue the climb to 4000ft. The controller asks him to say again and he responds “...request may continue climb to four thousand and approaching Dores this time”. The controller replies “...roger you’ve certainly passed the inbound traffic now and er no further er traffic to affect that climb maintaining VFR”. Ninety seconds later the PA28R pilot reports level at 4000ft QNH 1025mb.

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.

Members could add little to this report. The incident occurred in Class G airspace involving VFR traffic and a TCAS-equipped ac, the crew of which were flying an instrument approach under IFR. Both crews were responsible for their own collision avoidance through ‘see and avoid’ supplemented in this case by an ATS. Although TCAS was introduced some years ago, no guidelines have been published as to how close VFR ac can fly to an ac on the FAT without triggering TCAS alerts and/or warnings. That said, proximity is only one element of the ACAS equation as TCAS senses relative flight paths and calculates closure rates before issuing appropriate alerts or warnings at a ‘time-to-go’ to the CPA. Inverness ATC had given TI to both crews on each other acs’ positions and intentions as well as attempting to deconflict the subject acs’ projected flightpaths. The PA28R pilot reported flying at 1500ft QNH remaining N of the ILS FAT, as requested, whilst flying under VFR until reaching Inverness before then following the Caledonian Canal towards Dores. The IFR SH36 was IMC in cloud. Whilst approaching the canal entrance, the PA28R pilot requested climb to 3000ft and was again told about the SH36 on the ILS. Shortly thereafter the SH36 crew reported a TCAS RA climb to 3100ft. Piecing together the timeline of events, it was after this transmission that the PA28R pilot reported that his PCAS indicated the SH36 at 2.8nm and 1400ft. Members opined that this may suggest a slight climb by the PA28R pilot above 1500ft had occurred which, when combined with a slight descent by the SH36 and their opposite direction tracks, would explain the TCAS RA being triggered.

Pilot Members opined that this type of event should be expected as no protection is offered to IFR flights in Class G from VFR traffic which may be flying through the area not talking to the local ATSU and therefore unknown to the controller. That said, in this case all of the safety nets available had worked. The PA28R pilot saw the SH36 on PCAS passing well clear with the SH36 crew following TCAS RA guidance as the equipment had sensed a potential confliction as the system’s parameters were breached. The SH36 flight was able then to descend and re-establish on the ILS G/P. Taking all of these elements into account, the Board was able to conclude that this event had been a TCAS sighting report in Class G and that safety had not been compromised during the encounter.

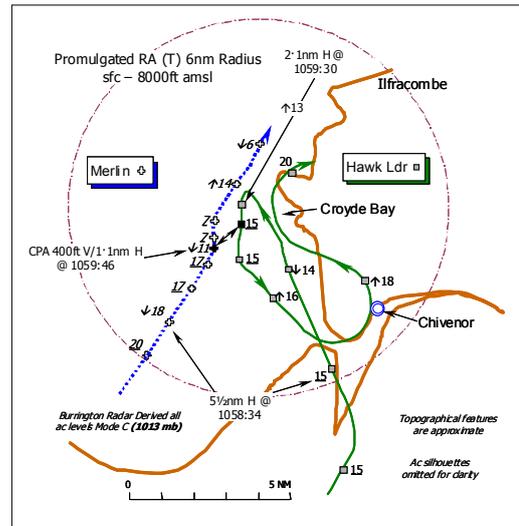
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report (TCAS) in Class G.

Degree of Risk: C.

AIRPROX REPORT NO 077/07

Date/Time: 15 Jun 1059
Position: 5107N 00415W (Croyde Bay Devon)
Airspace: London FIR/RA(T) (Class: G)
Reporting Ac Reported Ac
Type: Hawkx9 Form Merlin HM Mk1
Operator: HQ AIR (Trg) C-in-C Fleet
Alt/FL: 500ft 800ft
 asl RPS (994mb)
Weather VMC RASH VMC RASH
Visibility: 15km 2km
Reported Separation:
 200ft V/?nm H Nil V/1000m H
Recorded Separation:
 400ft V/<1.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK PILOT provided a comprehensive account reporting he was leading a formation of 9 Hawk ac at the start of their flat aerobatics display at Croyde Bay, N Devon. HISLs were off. A RIS, he thought, was being provided by St Mawgan RADAR and their allocated display squawk of A7003 was selected with Mode C on; neither TCAS, any other form of CWS nor Mode S is fitted. They were operating below 8/8 cloud with a base of 3000ft, some 1500ft clear below cloud and rain showers. No sun was visible but they had a good horizon and the in-flight visibility was 15km.

With Red White & Blue coloured smoke 'on' during the run-in, heading 340° towards the display datum the formation was in 'big battle' – all 9 ac in a large V echelon flying off the leader - and had just selected all white smoke in a L turn. Turning L through 333°, he thought at 500ft (1002mb) at 360kt he - the formation leader – spotted a light grey Merlin helicopter in his R 1 o'clock about nm away. Simultaneously, ground safety observers sighted the Merlin helicopter as it appeared at 'crowd datum' some 2nm off the coast, heading about 350° co-altitude just beyond the formation. The leader rolled the formation out of the L turn onto a heading of S, inside the Merlin and stopped the display; the Merlin passed to starboard about nm away some 200ft above the 9-ship formation. Calls were made on VHF (St Mawgan RADAR) and UHF GUARD – 243MHz - but the helicopter continued NNW, he thought on a non-deviating track along the coast apparently unaware of the display. The lead pilot's view was that if he had not rolled out from his L turn there would have been a high risk of a collision between his formation and the Merlin. The display was resumed once the helo had exited the Restricted Airspace (Temporary) - RA (T) - established for their display.

It was stressed that the light grey helicopter was not seen by the formation pilots' during the run-in, which was surprising considering its direction and that it was co-altitude. Emphasising that neither was the helicopter spotted by the safety observers on the ground beforehand, he surmised that the Merlin might have descended through cloud, appearing at 'crowd front' at an unfortunate time.

The RA (T) co-ordinates and times were double-checked and found to be correct.

UKAB Note (1): AIC 33/2007 (Maue 218) issued on 26 Apr 2007 promulgated under Article 96 of the extant Air Navigation Order 2005 to civilian aviators the establishment of a RA(T) for this display. It was specified that no aircraft shall fly within the area bounded by a circle of 6nm radius, centred on the position 510756N 0041446W – Croyde Bay - below an altitude of 8000ft (amsl), on this day during such periods of time as may be notified by NOTAM: 1055 – 1133UTC.

AIRPROX REPORT No 077/07

It was further specified that “*military aircraft should comply with JSP552 201.135.9*”, which entreats crews of Military aircraft not to fly in a RA (T) promulgated by NOTAM, which in the interest of flight safety...are also established to protect jet aircraft formation teams carrying out aerobatics displays at venues throughout the UK.

UKAB Note (2): The following NOTAM was issued warning both military and civilian aircrews of the event and specifically the RA (T):

Q)EGTT/QRTCA/IV/BO/W/000/080/5108N00415W006

B)07/06/15 10:55 UTC C)07/06/15 11:33NAVW (J2598/07)

E)AUS 07-06-0150/1952/AS1

RESTRICTED AREA (TEMPORARY) HAS BEEN ESTABLISHED UNDER ARTICLE 96 OF

THE ANO 2005 (MIL ACFT SHOULD COMPLY WITH JSP552.201.135.9) FOR A RED

ARROWS DISPLAY WI 6NM RADIUS 510756N 0041446W (CROYDE BAY - N DEVON)

AIC 33/2007 (MAUVE 218) DATED 26 APRIL 07 REFERS.

F)SFC G)8000FT AMSL

THE CAPTAIN OF THE MERLIN HM Mk1, the observer, reports that his helicopter was crewed with two pilots, an aircrewman and himself. They were in transit under VFR from Culdrose to Valley and after crossing the St Mawgan MATZ they switched en-route from St Mawgan ATC to London INFORMATION on 124.75MHz and requested a FIS using a standard PHAIR RT call [Position; heading; altitude; intentions; request]. The appropriate London INFORMATION squawk was selected with Mode C and S on and the ‘contract’ for a FIS was made. Whilst passing Bude at 1500ft RPS London INFORMATION requested their next turning point – Ilfracombe - which was passed and they were then asked to report when they reached that point. Flying out into Bideford Bay they encountered a very large shower of rain with a subsequent reduction in visibility and cloud base from the main cloud base. The ac was slowly descended to remain 200ft vertically clear of any cloud and in sight of the surface at all times, with an estimated visibility of 2-3km laterally. Ahead and forward of the beam the visibility may have been less due to the effects of the rain on the windscreens, despite the use of the wipers. On exiting the shower heading 030° (T) at 120kt, some 6nm W of Chivenor the 9-ship Hawk formation was spotted in their 1 o’clock about 1000m away crossing from R to L and in a turn. It quickly became clear that the formation was turning L, which would bring them towards the Merlin, so a rapid descent down to 300ft asl was initiated in order to increase the separation as quickly as possible. A slight turn to port was made during the manoeuvre in order to remain visual with the formation. The decision was taken not to remain level and turn R due to the relative geometry of the situation and the much slower speed of the Merlin compared to that of the formation, which was seen to roll with about 500ft of vertical separation. The risk was assessed as “*medium*”.

During the transit after the incident the lead Hawk pilot was heard calling on GUARD requesting that they clear the area and asking for their callsign, which was replied to by the first pilot. Attempts to call London INFORMATION to report and clarify the situation failed until the ac was considered clear of the area when they climbed to an altitude of 1500ft, at which point they were told that they were well clear of the RA (T). This was the first time that they had been aware of the established RA (T), having missed it when checking the NOTAM board for their whole route (Culdrose to Prestwick) in the Tower at Culdrose.

THE LACC LONDON FIR FLIGHT INFORMATION OFFICER (FISO) reports that when the Merlin crew called up for a FIS their routeing was checked but no activity was apparent on that route. Cardiff then called to warn them that the Hawk formation was displaying in Croyde Bay. The FISO tried to contact the Merlin crew to warn of the activity, but RT contact was intermittent. By the time two-way RT was established again, the Merlin was clear of the activity. When the routeing was looked at again later, it became apparent that the numbered pin next to the Formation Display RA (T) pin did not correspond with information on the Daily Navigation Warnings and Notices Board.

MIL ACC reports that the formation of 9 Hawk ac was conducting a pre-authorised display, for which a RA (T) was established. Approximately 20min before the Airprox the Merlin helicopter, on a VFR transit from Culdrose to Prestwick, had received a FIS from St. Mawgan APPROACH (APP). At the time of the incident, the Merlin crew was receiving a FIS from London INFORMATION, although it appears from the London FISOs report that RT contact was intermittent. The Airprox took place overhead Croyde Bay (N5107 W00415).

At 1032:18, after one previous attempt, the Merlin crew informed St Mawgan APP that they were flying “..VFR to Prestwick...currently Truro, 1000ft, 994, heading 030, requesting a flight information service and MATZ crossing...2 miles South of your field”. APP advised “[C/S] Flight Information Service, Squawk 1750 Scillies Wessex 994” which the crew correctly acknowledged. Between 1032:43 and 1039:04, APP approved the MATZ crossing. At 1042:47, the Merlin crew advised APP that “..we will now chop enroute to..London INFORMATION”. APP acknowledged this saying “[C/S] squawk 7000, good day”. The Merlin’s final call to APP, at 1042:52 was “7000 thanks”.

The Hawk formation called APP exactly 7min later at 1049:52. APP initially provided the Hawk formation with a RIS, but this was downgraded to a FIS at 1055:13, when APP lost radar contact with the Hawk formation. At 1056:06, RT contact between APP and Hawk formation was also lost until 1113:35, when the Hawk formation re-established radio contact with APP. However, the RT dialogue was solely about the weather and recovery state at St. Mawgan and no mention is made of the Airprox at all.

[UKAB Note (3): The Mil ACC report also contained an extensive analysis of the Burrington Radar data that has been omitted here to avoid duplication.]

This Command considers that the St Mawgan Approach Controller was under no obligation to inform the Merlin pilot of the active RA (T) as it was outside of the area of responsibility of St Mawgan (Croyde Bay is 52nm NE of St. Mawgan aerodrome). Indeed, SATCO St Mawgan quite correctly states in her report that:

‘...once the Merlin pilot went en-route, at 1042:52, he was some 10nm North of St. Mawgan tracking North-East.....it was not until...some 17 minutes later that the CPA occurred.’

Had the controller broken the chain of events by advising the Merlin pilot that the RA (T) was active it would have been above and beyond what might reasonably be expected under a FIS from St Mawgan.

ATSI reports that the Merlin crew contacted the London FIR FISO situated at LACC at 1045:05 and reported flying under VFR from Culdrose to St Mawgan, their current position 12nm SW of Bude at 1500ft and requesting a FIS. This transmission was broken and the FISO asked for the crew to repeat their destination and level. This was done and the FISO requested they squawk A1177 [an unvalidated and unverified conspicuity code assigned to LACC FIS] and placed them under a FIS. Again, the transmissions from the Merlin were rather broken. At 1053:15, the FISO called the Merlin crew and asked for their next reporting point to which they replied ‘Ilfracombe’. This was acknowledged and the crew were asked to report there.

The next transmission received by the FISO was at 1103:10, when the crew reported passing Ilfracombe. They were asked for their next reporting point and reminded that the Pembrey Danger Areas were active. This was acknowledged by the crew who advised that they were now routeing direct to Valley. Shortly afterwards the FISO asked the crew if they were aware that the Red Arrows display was about to start at Croyde Bay. This had to be repeated but the FISO did not get an acknowledgement other than the crew calling with their callsign.

The FISO reported that on initial contact with the Merlin crew, their route was checked for any notified activity but none could be seen. It later transpired that the numbered pin representing the Red Arrows display on the FIR map was positioned incorrectly. Information received from the unit explained that the AIS Pre-Flight Information Bulletin is received during the afternoon or evening of the day before its validity. The morning FISO then annotates the FIS 1:500,000 map displays with coded pins according to the type of activity.

The unit investigation found that a trainee FISO had done the updating of the map with data from the Daily Navigations and Warnings Board. At the time, the mentor was engaged in providing the FIS and had not checked to see if the map had been accurately updated. When the subject FISO took over the position she, not unreasonably, believed the map information to be correct

AIRPROX REPORT No 077/07

UKAB Note (4): Meteorological Office archive data confirms the Wessex RPS for the period 1000 – 1100UTC was 994mb and for 1100 - 1200UTC 993mb.

The 1050UTC St Mawgan METAR was: 27007KT 9999 7000NW - SHRA FEW006 FEW012CB SCT015 14/13 Q0997 WHT TEMPO 4000 SHRA BKN010CB GRN.

UKAB Note (5): The radar recording shows the Merlin squawking A1177 (code-callsign converted to show FIS on the radar display) tracking NE and the Hawk Ldr squawking A7003 following a similar track but further inland as the helicopter crosses the RA (T) boundary indicating a level cruise at 2000ft (1013mb) – about 1430ft WESSEX RPS (994mb). At 1058:34, the formation complete a L turn to commence their ‘run-in’ to the display area, apparently with coloured smoke already selected ‘on’. At this time they are in the 3 o’clock position of the Merlin at a range of 5.5nm with the Merlin indicating 1800ft unverified Mode C (1013mb) and the formation leader maintaining 1500ft unverified Mode C (1013mb) – about 1230ft & 930ft Wessex RPS (994mb) respectively. The tracks continue to converge and at 1059:30, the formation crosses from R to L in front of the Merlin indicating 1700ft (1013mb) whilst turning L and closing to a range of 2.1nm some 400ft below the helicopter - but climbing. With the formation heading S, separation reduces to a minimum of 1.1nm and 400ft as the Merlin makes a L turn onto N and descends below the formation whilst the two flights pass starboard-to-starboard in between sweeps. Separation then increases rapidly as they draw aft of each other.

HQ AIR (TRG) comments that large display formations rely on set flying sequences to maintain spatial awareness. Any intrusion into a notified formation display/practice area by an unknown aircraft has the potential to be catastrophic. This Airprox started in the planning room when the helicopter crew, for what ever reason, did not assimilate the RA (T) NOTAM detail and the effect it would have on their flight. A further lesson to be taken from this incident is not to assume when operating in a restricted piece of airspace that you do not need to lookout, human errors do occur and sometimes lookout is the final defence.

CINCFLEET comments that there appear to be a number of ‘Human Factor’ links in the chain of events that led to this Airprox. Firstly, and primarily, although the crew of the Merlin self-briefed their flight in the Culdrose Flight Planning Section, they did not take adequate notice of the relevant NOTAM about the formation aerobatics display, which was properly displayed and annotated on the relevant maps and Hazard Sheets - this is probably the direct cause of the Airprox. Secondly, the LACC FISO also omitted to provide information about the activation/location of the RA (T), which under the conditions of a FIS could be considered to be “*..information pertinent to safety*”.

As a result of this Airprox Culdrose ATC are reviewing their briefing facility procedures to see if there is a mechanism to ensure aircrew have briefed all information that may affect their route. Additionally, the Merlin Squadron is reviewing crew-briefing procedures.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Mil ACC report had made it plain that a FIS was afforded to the Hawk leader - not a RIS as he had thought – hence no accurate warning was possible from St Mawgan APP about the Merlin, as it penetrated the RA (T) and approached the area of their display from the SW. St Mawgan APP could not hope to provide a RIS in this vicinity some 52nm NE of St Mawgan and thus well below their nominal primary and secondary surveillance radar coverage. Moreover, Members agreed it was understandable that APP had not seen any need to mention the RA (T) to the Merlin crew when they crossed the St Mawgan MATZ, some 17min before the Airprox occurred and well before the commencement of the aerobatics display at Croyde Bay.

From the Hawk formation leader’s perspective, Members understood entirely the difficulties associated with manoeuvring a large formation of jet ac, indeed one of the pilot Members was highly experienced in this role. It was suggested that the formation leader might have spotted the Merlin somewhat late. However, this was countered by the HQ AIR (Trg) Member, who pointed out that the presence of showers in the area at the time and the Merlin’s grey maritime camouflage had evidently masked the presence of the helicopter, until the lead pilot spotted the Merlin himself – he thought about nm away – whilst turning L after the run-in to Croyde Bay from the SE to commence the display. Since the CPA was calculated at over 1nm, the radar recording confirmed that the leader had spotted the Merlin further away than he thought at the time, this type of helicopter being deceptively

large. Nonetheless, having spotted the helicopter, the Hawk leader was able to successfully manoeuvre his formation of nimble jets away from the helicopter and temporarily suspend his aerobatics display until the Merlin was safely out of their way. Neither was the helicopter apparent to shoreside observers beforehand and so there was clearly little else the Hawk leader could have done to prevent this close quarters situation.

The formation leader should not have had to interrupt his display because of another ac infringing the RA (T) – a portion of restricted airspace established exclusively for the use of the formation during the period of their display. The establishment of RA (T)s is aimed at preventing such incidents as occurred here and it was evident that the details of the RA (T) had been correctly promulgated and that the display was commencing exactly on time. It was evident from the Merlin Captain's frank account that neither he nor any members of his crew were aware of the establishment of the RA (T), even though the NOTAM was available to them at their departure airfield. Neither was it mentioned to them beforehand by the FISO at LACC who was providing a FIS at the time. The comprehensive ATSI report had revealed that a simple human error had played a part here. Coincidentally, the numbered pin representing the Red Arrows display on the FISO's chart was positioned incorrectly and thus the activation of the RA (T) along the Merlin's intended route was not evident to the FISO following a routine scan of the map display after the Merlin crew called and passed their position at Bude and next intended turning point at Ilfracombe. Some Members were concerned about the accuracy of the information displayed to the FISO and suggested this might be a contributory factor. Evidently checks on the accuracy of the information displayed to the FISO on this occasion were not all encompassing, as the preceding FISO Mentor had not detected his trainee's error. However, the ATSI view was that any information supplied under the FIS should have been supplemental to a crew's own briefing and whilst the FISO had endeavoured to call the Merlin crew after the formation display at Croyde Bay had been pointed out by Cardiff, this occurred after they had reported passing Ilfracombe and thus after the helicopter was already clear of the RA (T). Therefore, the helicopter crew was unaware of the impending conflict with the aerobatic display team until they belatedly spotted the 9-ship Hawk formation running in from the SE some 1000m away – again potentially a late sighting - after the Merlin had just exited a large shower. However, the C-in-C Fleet Member considered poor flight planning was the catalyst for this Airprox. The Merlin crew should have been aware of the RA (T) from the outset, as C-in-C Fleet had confirmed that this information was properly displayed and annotated on the relevant charts and Hazard Sheets and NOTAMs available to them at the pre-flight briefing stage. Therefore, the Merlin crew should have taken note of it and planned their route around this temporary airspace restriction accordingly. Other Members agreed that the Merlin crew did not take any notice of the relevant NOTAM about the RA (T) whatsoever and human fallibility had clearly played its part here again. The Members agreed unanimously that this Airprox had been the result of inadequate pre-flight planning by the Merlin crew, who flew into the active RA (T) and into conflict with the Hawk Formation.

Whilst it seemed surprising to some that the Hawk formation's smoke trail was not acquired visually by the Merlin crew earlier, the formation was spotted as they entered the Merlin pilots' field of view, forward of the ac's beam. It was explained that the showers and effects of the rain on the windscreens, despite the use of the wipers, was also a factor. Nevertheless, once the formation was spotted the helicopter pilot took effective avoiding action by descending immediately, the radar recording illustrating that 400ft of vertical separation existed at the CPA. Moreover, the L turn made by the Merlin pilot onto N mirrored the southerly turn by the formation leader ensuring that they both turned away from each other to increase the horizontal separation. Although the individual ac in the Hawk formation did not show on the radar recording and the width of the airspace within which the 9 Hawks were turning was not apparent, it was presumed to be less than 200yd. Hence, horizontal separation in the order of 1nm was preserved at the closest point. This, coupled with the combined actions of the pilots involved led the Members to agree unanimously, that no risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

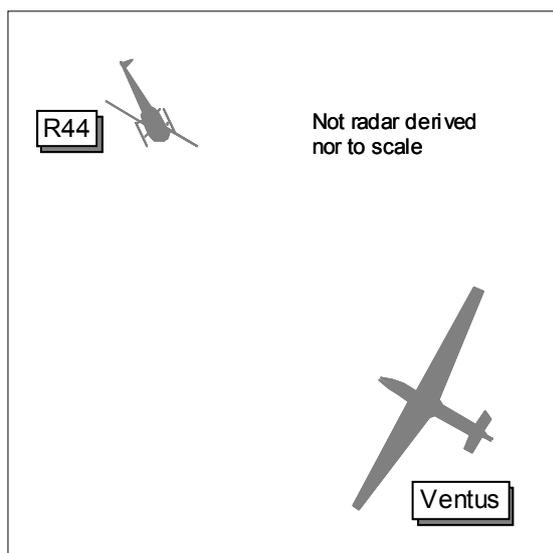
Cause: Following inadequate pre-flight planning, the Merlin crew flew into the active Restricted Area (Temporary) and into conflict with the Hawk Formation.

Degree of Risk: C.

AIRPROX REPORT No 078/07

AIRPROX REPORT NO 078/07

Date/Time: 21 Jun 1412
Position: 5158N 00122W (2nm SSW Barford St John)
Airspace: Oxford AIAA (Class: G)
Reporting Ac1 Reporting Ac2
Type: Ventus2CT Glider R44
Operator: Civ Pte Civ Pte
Alt/FL: 1335ft 1500ft
(1013mb) (QNH)
Weather VMC CLBC VMC CLBC
Visibility: 25km >10km
Reported Separation:
10ft V 100ftV&H
Recorded Separation:
NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE VENTUS 2CT GLIDER PILOT reports flying solo on a local cross-country sortie from Bidford Gliding Site and listening out with Bidford on the Glider Common frequency of 130.1MHz. The visibility was 25km, flying 1700ft below cloud in VMC, and the ac was coloured white/blue. He was circling to the L in a 10/15° turn at 50kt when he saw a helicopter coloured army green, he thought but it was only a glimpse, in his 0130 position about 75yd away, flying straight and level towards him at the same level. He immediately dived his glider whilst still turning and the helicopter flew almost directly O/H, with vertical separation of 10ft, without altering course. It was clear to him that the other pilot had not seen his glider: he thought the tail of his ac would be removed. From his GPS log, the time (1412:07), coordinates (515816N 0012158W) and level (1335ft on SAS) at the time of the encounter were accurately established. He assessed the risk as critical.

THE R44 PILOT reports that he was flying with another pilot, their ac heading 150° at 100kt en route from Wellesbourne to Wycombe Air Park VFR and in communication with Wellesbourne on 124.025MHz squawking 7000 with Mode C. The visibility was >10km, flying 1000ft below cloud in VMC, and the ac was coloured red [ac lighting was not mentioned]. Near to Barford St John at about 1500ft QNH he saw a white glider at the last minute immediately ahead at the same level crossing L to R as it turned and descended away from him. He avoided it by turning L immediately, the glider passing about 100ft laterally displaced to his R appearing to be just below his level. The incident was over in a matter of seconds and he cited that the slim profile and all-over white colour against the white cloud background had contributed to his late sighting of the glider. He assessed the risk as high.

UKAB Note (1): The closest aerodrome providing a METAR was Brize Norton, 15nm SW of incident position. Met Office archive data gave the Brize METAR as EGVN 1350Z 20008KT 9999 VCSH FEW020CB SCT025 BKN040 16/14 Q1009 BLU TEMPO 6000 SHRA SCT020CB WHT=

UKAB Note (2): The incident is not captured on recorded radar. The R44 is seen tracking 155° at altitude 1600ft London QNH 1010mb approaching the incident position. As the R44 transits the reported position of the Airprox it is seen to descend to 1400ft before turning onto an ESE'ly course shortly afterwards. The Ventus glider does not paint on radar, its pilot reporting that his level was 1335ft on 1013mb which equates to 1245ft QNH 1010mb.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add little to the analysis of this incident which occurred in Class G airspace where there was equal onus on both pilots to discharge their responsibilities for maintaining their own separation from other traffic through

'see and avoid'. The R44 pilot had cited the size and profile of the glider as well as a lack of contrast (white glider against a white cloud background) causing the Ventus to appear ahead suddenly at the last minute. The Ventus pilot had reported circling L and glimpsing the R44 late, approaching head-on: the helicopter would have been presenting a small target aspect at the time. The radar recording shows the R44 approaching the Airprox position on a steady track and although the opportunity to visually acquire each other was there for some time prior to the Airprox, on this occasion both pilots reported flying into close proximity before seeing each other's ac and these late sightings had, without doubt, caused the Airprox.

Turning to risk, both pilots reported seeing each other and taking avoiding action but it appeared the R44 pilot probably did so slightly later than the Ventus pilot. Although both pilots reported a very close encounter, the Board believed that their actions had been timely enough to avert an actual collision albeit the subject ac had passed uncomfortably close whilst manoeuvring to the extent that safety had not been assured during the encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by both pilots.

Degree of Risk: B.

AIRPROX REPORT No 079/07

AIRPROX REPORT NO 079/07

Date/Time: 21 Jun 0909

Position: 5306N 00036W(6nm NW of Cranwell)

Airspace: Lincs AIAA (Class: G)

Reporting Ac Reported Ac

Type: Firefly C130J

Operator: HQ AIR (Trg) HQ AIR (Ops)

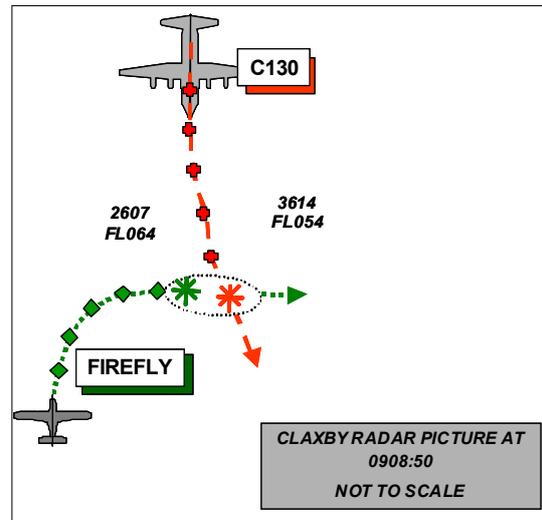
Alt/FL: 6000ft ↑FL40
(QFE)

Weather VMC NR VMC NR

Visibility: >5km 20km

Reported Separation:
50ft V/250m H 500ft V/1000m H

Recorded Separation:
1000ft V/0.4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FIREFLY PILOT reports flying a dual local training sortie under VFR in a yellow ac with strobes and nav lights switched on in receipt of a Procedural Service from Cranwell DIR and squawking as directed. Whilst recovering for an NDB/DME approach to RW09, heading 100° at 120kt and 6000ft (QFE, 1002mb), a grey C130 was seen 250m away, crossing left to right and performing a climbing left turn apparently avoiding them. The C130 rolled wings level once clear of them to their right and continued en-route to the S. He took no avoiding action but assessed the risk as being medium.

THE C130J PILOT reports flying a transit from Waddington to Lyneham in a grey ac with TCAS fitted and with all lights switched on. On departing Waddington Zone (sic), heading 160° at 180kt, climbing through FL40 and just on the handover from TWR to Departures, a TCAS contact was seen above their level. They were initially on a radar heading from WADD DEP but were then cleared 'own navigation' to the Daventry corridor. They commenced a left hand turn towards Daventry when the traffic became visual to them in their 2 o'clock high. The traffic was level and tracking towards them as they continued their climb. The TCAS gave them a TA and they were visual so to avoid an RA they levelled the ac and turned more sharply to the left. He assessed the risk as being low.

MIL ACC reports that a Firefly was in receipt of a Procedural Service from Cranwell DIR whilst operating in the Cranwell radar overhead while a C-130 was departing from Waddington under a RIS. The C-130 pilot's report (stating that he was working Waddington) was delayed due to operational requirements and therefore ATC recordings had been returned to service before it was known that Waddington ATC were involved and further there was no recollection of the incident by the controllers involved. The Firefly pilot first made contact with Cranwell DIR at 0844:15 and was given a RIS in the climb. From 0850:25 four TI transmissions were made to the Firefly pilot and acknowledged but apparently none (based on the positions and heights passed) concerned the subject C130. At 0853:44 DIR stated, "Firefly C/S, Procedural Service now at 6000ft as you enter the hold." The Firefly pilot acknowledged this transmission and subsequently at 0855:48 reported in the hold. DIR responded, "Firefly C/S, roger, previously mentioned traffic, Cranwell north west 3 miles, southbound, indicating FL70. Report final turn inbound for the procedure." The Firefly pilot replied, "Wilco, Firefly C/S." Once again, at 0900:24, the Firefly crew reported, "Firefly C/S, holding CWL, 6000ft." In reply DIR stated, "Firefly C/S, previously mentioned traffic, Cranwell south west 2 miles, north bound, indicating FL70." Firefly crew replied, "Firefly C/S looking." One and a half minutes later at 0902:10 DIR called, "Firefly C/S, previously mentioned traffic, Cranwell south 4 miles, manoeuvring, indicating FL70, 500ft above." Firefly crew acknowledged. There was then a period of unrelated R/T until DIR stated at 0907:51, "Firefly C/S, traffic Cranwell north west 5 miles, south bound, indicating FL55." And the Firefly pilot acknowledged. None of these messages apparently were in respect of the subject C130.

Analysis of the Claxby Radar shows the Firefly 5.5nm W of RAF Cranwell at 0908:01, passing through 270° in a right-hand turn and indicating FL063 with the C130 in its 3 o'clock at 3.1nm, tracking 225° and indicating FL041. The Firefly continues in a right-hand turn onto an Easterly track and maintains its level while the C130 turns left onto a track of 150° and climbs steadily to FL055 by 0908:36. The relative movements of the ac take the C130 into the Firefly's 12 o'clock. The CPA occurs at 0908:52 with the C130 crossing from left to right through the Firefly's 12 o'clock at 0.4nm with the C130 indicating 1000ft below the Firefly's indicated level of FL064.

Due to the incomplete nature of the information available, this report is not comprehensive, portraying only one side of the ATC situation. The Firefly had been correctly placed under a Procedural Service upon entry to the radar overhead and, from the tape transcript, it appears that DIR provided TI in accordance with JSP 552, Section 235.120.1 which states that:

"Procedural Service is a non-radar ATS in which the prescribed standard separation minima, based on reported levels and positions are applied between participating aircraft. Procedural Service is applied:

Sub para b of this order is particularly pertinent due to the positioning of the ac in the radar overhead:

b. When it is impracticable to provide a radar service due to radar failure or reduced radar performance.

However, because the TI passed by DIR applied to participating ac under control of RAF Cranwell, it did not cover the C130 which was under the control of RAF Waddington ATC. It would have been beneficial if information had been passed to the Firefly regarding the C130 although it is not mandatory when operating under a Procedural Service. It is possible that DIR may not have seen the climbing C130 as a confliction if the Firefly was not showing on radar. The C130 crew did not mention any TI from Waddington in their report. However, they were VFR, visual with the Firefly and used TCAS effectively to avoid it.

HQ AIR (OPS) comments that without the benefit of the Waddington transcript it is difficult to determine the full facts. However, the C130 crew responded to TCAS and this resulted in a recorded separation of 1000ft.

HQ AIR (TRG) comments that if Waddington had been advised that there was procedural traffic in the CWL hold at 6000ft, the C130 could also have been told and a wider separation could have been achieved. However, both pilots saw each other and the C130 pilot took appropriate avoiding action resolving the confliction such that the pilot of the Firefly did not think it necessary to take any further 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.

Notwithstanding some less than ideal ATC aspects that were identified in the Mil ACC report above, both ac were in Class G airspace where see and avoid is the principal method of collision avoidance. However, both flights were in receipt of an ATC service, from adjacent but independent units, and although not mandated during a procedural service, it would have been beneficial if TI had been passed to the Firefly on the C130. A Military Controller Member pointed out that Cranwell and Waddington are both very busy units with completely independent APR services and the mutual exchange of TI is frequently impracticable. In this case however, both pilots had seen the opposing ac in good time and reacted accordingly.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: C.

AIRPROX REPORT No 081/07

AIRPROX REPORT NO 081/07

Date/Time: 6 Jun 1631

Position: 5155 N 001 08 W (Bicester Airfield - elev 267ft)

Airspace: Lon FIR (Class: G)

Reporting Ac Reported Ac

Type: Ask 13 Glider Slingsby T67M

Operator: Civ Club Civ Pte

Alt/FL: 1200ft ~2000ft
(QFE) (N/K)

Weather VMC CLBC VMC HZBC

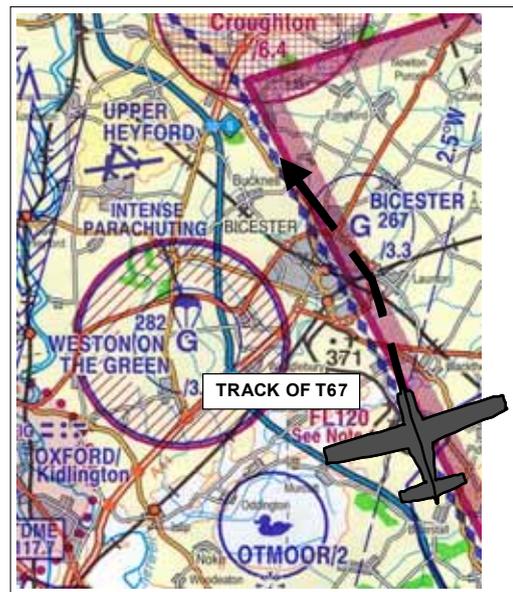
Visibility: >10km HAZE

Reported Separation:

50ft V/10m H NR

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE ASK 13 GLIDER PILOT reports that during a normal local training flight he was teaching thermalling technique while soaring with another glider. He was climbing through 1200ft at 45kt in a thermal with the other glider 100ft below him on the opposite side of the thermal circle so he was maintaining a good lookout with respect to it. He then noticed a landing light about 200m away on his right side, at the same level and approaching rapidly. He took control from his student, dived the glider and rolled his wings level to get out of the way and the ac passed just to their side, 50ft above them. He noticed that it was yellow with a blue spinner and was a Slingsby T67, possibly with a blue underside. The T67 maintained straight and level flight, heading approximately 270° at about 1200ft AGL. The ac then flew directly overhead Bicester airfield where winch launching up to a height of approx 1400ft AGL. He assessed the risk as being very high.

THE SLINGSBY T67M PILOT reports that at that time the incident was reported to have taken place he was flying from Redhill to Wellesbourne at 100kt and squawking 7000 with Mode C. His track was over Bicester town, avoiding the Weston on the Green and Bicester gliding sites. He has no recollection of seeing any gliders at any time during the flight.

He added an addendum to his original report the following day:

He was notified of the incident 3 weeks after it had taken place and it took him some time to recollect and reconstruct the possible sequence of events.

The flight, planned on the previous day, was a private one from Redhill to attend an aerobatic instructor seminar at Wellesbourne Mountford. The route was Redhill – Bagshot – Woodley and then from a point S of Wescott direct to Wellesbourne. This point, which was programmed into his GPS, was N 51 46.500 W 000 58.000, on the W side of Thame gliding site. The track from there to Wellesbourne was marked on his map and the proximity of various gliding sites (5) was noted but, in retrospect, not noted sufficiently. Although he had frequently flown the route Redhill-WOD-WCO and then further N, he had not flown before in the area N of Oxford or Wellesbourne.

He cannot remember the weather exactly but it is his impression that it was hazy with a cloud base of around 2000': he was VFR/VMC throughout.

He dislikes flying over towns, both for safety reasons and to avoid annoyance and he recalled that he approached Bicester, debating whether to pass left (SW) or right (NE) of it. He thinks he must have looked at the map and subconsciously registered the more 'dangerous' left side (D129, parachutes etc) and did not register the danger

on the right side (the Bicester gliding site). He thought that it might have been partly obscured by his black contour pencil track mark which, along with the town, AIAA and airspace markings, might have rendered the Bicester site difficult to see. He must have flown close to, or over the site, and it was presumably hereabouts that the Airprox took place. He still had no recollection of seeing any gliders, or indeed the glider site itself.

With hindsight, he thought that he had displayed poor airmanship but took the following lessons from the incident:

The route should have been planned to avoid that area, or at least 'dangerous places' that might be difficult to see should have been noted more carefully.

He tends not to use Flight Information Services routinely because he feels that they can lead to a false sense of security that does not actually exist. However, here it would have been sensible to ascertain the status of D129 from Brize which, if it were inactive, would have allowed the 'safer' SW route to be taken round Bicester.

He noted that as the Airprox Board has said many times in the past – gliding sites should be treated with the utmost caution and given as wide a berth as possible.

Two observations have occurred to him as a result of the episode:

Might gliding sites be better represented by a symbol of a glider, rather than a G? There are already symbols representing various hazards: parachutes, hang gliders, masts and ducks.

Might it be possible for GPS database providers to represent glider sites on their maps?

He tendered his apologies to the Board for taking up their time with an incident that could and should have been avoided. He also tendered his sincere apologies to the glider pilot, extending his thanks for his/her good airmanship which avoided an accident while this example of bad airmanship blundered through their airspace (sic).

UKAB Note (1): The recording of the Clee Hill Radar at 1528 shows a contact, presumed to be the Firefly, SSE of Bicester squawking 7000 with Mode C indicating 1700ft alt, tracking about 340°. At 1529:31 a primary contact appears in its 12 o'clock at ½nm but disappears on the next sweep. The Firefly turns about 20° to the left and tracks ½nm to the W of Bicester Airfield datum. No other contacts are seen until after the Firefly passes to the W of the airfield and then not in close proximity to the Firefly. The incident is therefore not seen on recorded radar.

UKAB Note (2): Bicester is promulgated in the UK AIP ENR 5-5-1-1 as a Glider Launching Site (by winch/ground tow (W) and tug aircraft/motor glider (T)) up to 3000ft agl.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board commended the T67 pilot for his comprehensive, open and honest report which stated that he had unwittingly flown very close to the Bicester gliding site. Members noted his analysis of why the incident had happened and in many respects were sympathetic to his explanation, agreeing that his report (above) had identified the key issues in this Airprox. The root cause of the incident had been inadequate planning, Members trying to determine why this had occurred with such an experienced pilot.

The Oxford area is very congested and is not easy to transit due to the proliferation of hazardous and prohibited areas. Great care must be taken therefore and even then mistakes are sometimes made. A Member with an in-depth knowledge of the area in which the incident occurred noted that, given the complexity of the area and with no prior knowledge of the relative danger presented by the various hazards, the T67 pilot's selected track was reasonable (other than in its proximity to the glider site). Although it probably had no bearing on the incident, Members considered however that it is unwise not to use a FIS routinely.

[UKAB Note (3): It was pointed out that the black and white photocopy of the CAA VFR ¼ million chart reproduced in the diagram above is not fully representative and that the actual chart should be used to judge any charting issues in this Airprox.]

AIRPROX REPORT No 081/07

The Board noted that on a similar but more serious incident (Airprox 052/07) there had also been criticism of the depiction of glider sites on CAA VFR charts. The Board examined the relative hazard of the activity at various areas depicted on the ¼ and ½ million CAA VFR charts. Members considered that the relative prominence of the areas in the vicinity of the incident (on the ¼ million chart) appeared to be almost the reverse of the degree of hazard that the activity therein presented to aviators. The Board observed that gliding - particularly winch, and to a lesser extent aerotow launch - sites present a very significant hazard to all ac that are operating below the maximum launch altitude, much more so than say areas of bird concentration. That being the case, Members unanimously considered that the relative conspicuity of the depiction of glider launch sites on VFR charts should reflect these different degrees of hazard. The Board noted that different map/chart producers depict the activities presenting a hazard to ac, as listed in the UK AIP, in different ways. Since there are many such producers marketing electronic and/or paper charts, it would not be practicable to locate them all so that the UKAB could offer comment on all their charts. Members were informed, and agreed, that glider launch sites stand out much more clearly on the UK Military Low Flying Charts where they attract a **mandatory** avoidance, normally of 2nm.

There was discussion regarding the use of paper or electronic mapping, both having their merits; there is no substitute for meticulous flight planning and route study.

In the event however it had been an error of route planning that had led to a degradation of the normally acceptable safety standards.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The T67 pilot flew through a notified and active glider launch site and into conflict with a glider which he did not see.

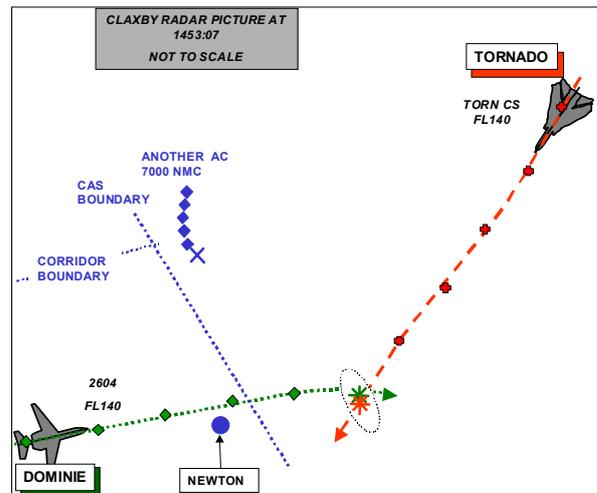
Degree of Risk: B.

Recommendation: The CAA should review the depiction of glider launch sites on VFR charts with a view to making them more conspicuous.

AIRPROX REPORT NO 082/07

Date/Time: 26 Jun 1453
Position: 5257 N 00057W
 (20nm W of Cranwell)
Airspace: London FIR (Class: G)
Reporting Ac Reporting Ac
Type: Tornado F3 Dominie
Operator: HQ AIR (Ops) HQ AIR (Trg)
Alt/FL: FL140 FL140

Weather: VMC CAVOK VMC CAVOK
Visibility: Unlimited NR
Reported Separation:
 150-200ft V/Nil H 200FT V/0 H
Recorded Separation:
 100ft V<0.1nm H

**BOTH PILOTS FILED****PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE TORNADO F3 PILOT reports that at 14:50:51 they had completed a handover from Cranwell APR to Swanwick Mil to enable a transit of the Lichfield Radar Corridor (RC) at FL140 and 300kt. Prior to the handover, they had been requested by Cranwell APR to hold to the E of the corridor by taking up a right-hand orbit. At 1450:55, Swanwick Mil identified them and put them on a RIS, requesting a right turn onto a heading of 180°. They had just initiated a left turn to hold, so this turn was continued in preference and Swanwick informed. A further request from Swanwick Mil to turn left onto 160° was given at 1451:25.

At 1452:01 a Dominie was given a RIS as it left the RC. Immediately afterwards, Swanwick Mil cleared them on 'own navigation' for the corridor, with a TI call given at 1452:10 as: 'Jetstream, South West at 10nm heading east under his control'. They then came right onto 240° and established at FL140 for the corridor entry. During this turn, their AI radar automatically promoted a contact at 5nm (the Dominie [he thought]) but because both crew were looking out at the time the contact was not noticed until the post-sortie review of the DDVR tape. Further TI was passed on the Dominie at 1452:41 as '4nm south-west, heading east at a similar level' and this transmission was continued to give the Dominie pilot TI on them (at 1nm). He then gained tally on the Dominie in his 2 o'clock at 1452:50 during the transmission and this was closely followed by the navigator also becoming visual.

Although visual with the Dominie for several seconds, it took a finite time for both crew members to assimilate the aspect, relative motion and range of the ac. Both crew members suddenly became aware that the ac were on a perfect collision course so at 1452:56 he initiated a bunt followed by a roll to the right, resulting in some vertical separation being gained but minimal horizontal. The HUD video showed the altimeter bottoming at 13767ft (SPS), although when the Dominie pilot called 'Tornado, right underneath me' at 1452:59, the HUD height was 13850ft.

He assessed the risk as being very high.

Immediately after the incident, the Dominie was cleared to call Cranwell Stud 6 although a brief discussion of the event ensued between the Dominie pilot and Swanwick Mil.

THE DOMINIE PILOT reports flying a routine aircrew training flight with all lights switched on. They were squawking 2601 and in receipt of a RIS from Swanwick Mil having just left the Lichfield Radar Corridor at FL140 to the N of the Nottingham NDB, just about to commence their recovery to Cranwell. The pilot had just accepted a RIS, followed by a squawk change, from Swanwick Mil ATC ready for recovery into Cranwell for a PAR to RW27. They were heading 085° at 290kt and were good VMC. The pilot recalled acknowledging a traffic call in the

AIRPROX REPORT No 082/07

Syerston area but since no height was given and nothing was seen by the 3 crew members in the flight deck area, he presumed it to be low level traffic. The ac had just rolled out from a 10° right turn when the handling pilot saw a Tornado F3 in their 10.30 position, inside 400m, at the same level and closing fast (i.e. stationary in the window). Since the F3 pilot seemed unsighted he initiated an immediate climb and they passed above the F3 by an estimated 200ft and just behind it. The entire event lasted a little over 5sec. The crew recalled hearing Swanwick giving the first warning of this confliction just as the pilot became visual. The frequency change to Cranwell was then made and the pilot informed the APR that he intended to file an Airprox.

He assessed the risk as being very high.

THE DOMINIE UNIT COMMENTS that having only just exited the Lichfield RC, the crew of the Dominie were surprised by the appearance of the unannounced Tornado which was apparently about to enter the corridor at their level but in the opposite direction. With no TCAS fitted, the crew did well to spot the Tornado which appeared stationary in their canopy and acted very quickly to avoid a collision. This incident reinforces the need for diligent lookout, careful control and the vital importance of TCAS. Details of this incident have been widely circulated at RAF Cranwell to ensure that crews are aware of the risk and remain vigilant.

MIL ACC reports that a Dominie was transiting to RAF Cranwell Eastbound in the Lichfield Radar Corridor while a Tornado F3 was positioning to transit the Corridor Westbound. Both ac were receiving a RIS from the LJAO overload Controller (LIC).

The tape transcript of the land line shows that Cranwell APR started to hand the F3 to LIC at 1450:11 and 4 sec later they passed its position to the controller as *'Cranwell Northwest 12 miles in a right-hand orbit to roll out heading 180 to position for the South side of the corridor squawking 3314'* and LIC responded quickly saying *'contact'* which APR followed up 7sec later with *'FL140 Radar Information'*. LIC replied by confirming *'FL140 Radar Information, F3 C/S's identified contact Swanwick 256 decimal 57'*. APR correctly read-back the frequency and both Controllers then closed the landline. At 1450:51, the F3 pilot checked in with LIC and the controller responded saying, *'F3 C/S Swanwick identified FL140, turn right heading 180'*.

Mil ACC Note (1): The Controller should have confirmed the type of service (RIS) at this point, but did not.

The F3 pilot replied at 1450:59, *'F3 C/S is in the turn, left 180'*, which LIC confirmed as acceptable by saying *'Roger, turn left heading 180'*. At 1451:08 LIC asked *'Dominie C/S what type of service on leaving the corridor?'*, the pilot replying *'radar information'* which LIC confirmed. Two sec later LIC turned his attention to the F3 saying *'F3 C/S you'll be routeing for the south side of the corridor initially'*. Twenty sec later at 1451:23, LIC said *'F3 C/S turn left heading 160'* and at 1451:26 the pilot transmitted *'160, weapons contact Dominie C/S, F3 C/S'*.

Mil ACC Note (2): In this transmission, the F3 pilot stated that he had radar contact on the Dominie. The radar replay showed that at 1451:26, the two ac were 14.5nm apart: however, in his report, the F3 pilot gives first radar contact with the Dominie as 5nm. At 1451:26 however, the radar recording shows that there were several contacts squawking 7000NMC in the F3's forward sector, including one at 5nm, but none were the Dominie concerned.

At 1451:35 LIC instructed the Dominie pilot to squawk 2604 which he acknowledged and actioned and there then followed a conversation between LIC and the LJAO Central Controller that is not related to this incident. At 1452:00, LIC transmitted *'Dominie C/S leaving controlled airspace radar information'*, the pilot acknowledged saying *'Radar information Dominie C/S'* and LIC then immediately informed the F3 pilot that he should take up *'own navigation for the corridor'*. At 1452:11, LIC said *'F3 C/S there's traffic south-west 10 miles tracking east, err, Jetstream under my control, flight level 140'*, but does not receive a response. Fourteen sec later he gave the Dominie pilot TI on an unrelated ac. LIC commenced the handover of the Dominie to Cranwell at 1452:31 and the Supervisor (SUP) decided to take the handover on behalf of APR. At 1452:36 LIC said on the landline to SUP *'Err, Newton west 1 mile tracking east squawking 2604'*; SUP replies *'contact'* and LIC continued *'flight level 140 radar information'*, which SUP read back. LIC then transmitted on both the RT and the landline saying *'Abbreviated F3 C/S, Dominie C/S is south-west 4 miles tracking east similar level'*; although there was no reply from the F3 pilot, SUP said, *'contact'*, followed by *'Err, 3314'* and LIC quickly replied [incorrectly] saying *'Yeh I've called the 3314 to err, I've called them to each other'*. At 1452:52, Cranwell SUP asked *'Are they visual with each other?'* and again both on the landline and on RT and LIC transmitted *'Dominie C/S there's traffic 12 O'clock 1 mile crossing err left right at similar level'*. At 1452:56 Cranwell SUP stated *'When they're clear they are identified Cranwell Approach stud 6'*. At 1452:58, the Dominie pilot transmitted *'Dominie C/S affirm that's a Tornado right'*

underneath me! and LIC immediately said to SUP *'Roger, yeh, they've seen each other'*, then acknowledged the Dominie pilot's transmission and then said *'Dominie C/S contact Cranwell stud 6'*; the pilot responded by saying, *'Dominie C/S would have appreciated more warning of that, stud 6 thanks bye-bye* and LIC replied saying *'Dominie C/S roger, sorry, I was trying to call you to the Tornado'*.

Analysis of the Claxby radar shows the Dominie 2.1nm W of Newton [the corridor entry/exit point] at 1452:25, tracking 085° (which it maintains throughout) and indicating FL140 with the F3 in its 11 O'clock at 7.1nm, tracking 190° and indicating FL140. On the next sweep (1452:32), the ac have closed to 5.6nm with the F3 in a slow right turn and passing through 200°. At 1452:41, the Dominie is 0.6nm W of Newton, still indicating FL140 with the F3 in its 11 O'clock at 4.2nm, tracking 200° and also still indicating FL140. At 1452:49, the Dominie is 0.2nm NE of Newton, indicating FL140 and the F3 is in its 11 O'clock but now at 2.7nm, tracking 200°, with its altitude unchanged. At 1452:57, the Dominie is 080° /0.9nm from Newton, indicating FL141 with the F3 in its 11 O'clock at 1.3nm, tracking 215° and indicating FL141. The CPA is 1453:04 when the Dominie is 085°/1.6 from Newton but its height read-out is obscured [UKAB Note: FL140]; the F3 is in its 3 O'clock at 0.1nm [just after the Dominie's 10° right turn can be seen] tracking 215°, indicating FL139.

Mil ACC Ops considers that there are several ATC aspects to this incident; the first chronologically, but probably the least significant, is that the LJAO LIC did not comply with JSP 552, 240.105.2d in that, on first contact, the type of service was not agreed with the pilot of the F3. Notwithstanding this omission, it was clear that the F3 pilot was receiving a RIS. Although the Controller passed the F3 pilot TI on the Dominie twice, it was not acknowledged on either occasion and no TI was passed to the Dominie pilot regarding the F3. Although the Controller was technically not responsible for separation, the Dominie, heading 080° through the corridor had not been released 'own navigation'. The F3 was instructed to track towards the corridor (from which the Dominie was emerging) also at FL140 thus the controller implicitly putt the ac on conflicting tracks at the same level.

Further, the Controller did not comply with JSP 552, 235.115.1b which states that:

*'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 conflicting traffic continues to constitute a **definite hazard.**'*

The radar recording shows clearly that there was a 'definite hazard' and the Controller should have identified this. Moreover, it is considered that the Controller could and should have done more to avoid placing the two ac under his control in such close proximity. It is not unreasonable to expect the Controller to have anticipated that the ac were going to come into conflict considering that he was experienced in the position, both ac were under his control and he was not busy at the time; notwithstanding any regulations he had a legal duty of care.

As a minimum, HQ Air considers that the Controller could have checked that the F3 had received the TI and in addition he should have told the Dominie crew that there was an F3 joining the corridor from the E at the same level. Finally, he could have improved the F3 pilot's SA by adding a phrase such as *'shortly to exit the Lichfield corridor at FL140'* when passing information on the Dominie.

Swanwick (Mil) provided this Command with an accurate and thorough Unit investigation. One pertinent comment therein was:

'It is best practice at the Unit that, where possible, aircraft in the LIC RVC travelling eastbound are descended to FL110 prior to departing. If not possible it is again best practice to descend an aircraft departing the LIC RVC immediately, especially when inbound to a unit located close to the exit point, such as RAF Cranwell.'

HQ Air supports the follow-up action taken by the unit.

HQ AIR (OPS) comments that there are some worrying aspects to this Airprox. Although the LIC may have planned for lateral separation for the two ac by his initial call to the F3, the follow-up gave the crew no indication that this was still the plan. Therefore, the two ac were going to the same point in space. During the handover of the Dominie to CWL it was apparent from the landline that SUP was concerned with the proximity of the two ac and prompted LIC whose issuing of further TI didn't help hugely. Had the unit's 'best practice' of descending the Dominie been followed then this Airprox could have been avoided. Notwithstanding the length of time ac have been using the RC it does not seem appropriate to fly ac down the same line, in opposition, at the same height.

AIRPROX REPORT No 082/07

HQ AIR (TRG) comments that this close encounter was entirely avoidable. Allowing the aircraft tracks to converge and the lack of good TI to both ac is of concern. Had the avoiding action taken by both pilots been less aggressive this could have been a mid-air: as it was the radar recorded separation of only 100ft. Perhaps the 'best practice' of descending eastbound traffic to FL110 prior to departing the corridor should be made mandatory to prevent similar Airprox in the future.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board regarded this as a most serious incident which highlighted the very different expectations of the aircrews and controller concerned. There was general agreement amongst Members that despite that both crews were operating under a RIS (in the case of the F3, implicitly), both were being vectored - at the same altitude – and were entitled to believe that regardless of who was actually responsible for collision avoidance, the vectoring provided would not put them in conflict. It is commonplace to have 2 ac/formations using the corridor at the same time but this requires the active participation of the controller so that the requisite spacing can be achieved. Further, if – as here – both ac are maintaining the same level then a sound entry exit/plan is needed to ensure that the respective ac are horizontally spaced but remain within the lateral confines of the corridor. One controller Member experienced with corridor operations pointed out that the corridor was 12nm wide and, given a good plan, it is possible to take 3 ac through simultaneously without any erosion of the separation required. In this Airprox, had the Dominie been routed to the N side of the corridor and the F3 been positioned (as it would seem was the controller's initial intention) to the S and had both crews been informed that this was the plan then there would not have been any conflict.

There was agreement amongst aircrew and some controller Members that in order to achieve correct positioning (and separation in the CAS of the corridor) in these circumstances, the controller must vector the ac involved and must therefore accept responsibility for collision avoidance. One controller Member suggested that this would often be the case when ac were joining CAS from Class G - the fact that ac were operating under a RIS may give controllers a false sense of security.

Since the F3 crew did not acknowledge the TI that was passed on either occasion, the controller should have challenged this as there was no way for him to know whether or not the crew had received it and could react accordingly. Furthermore, the Dominie crew were not passed any TI so therefore it was not practicable to expect the respective crews to effect their own separation. Even had TI been passed the crews had no effective way in these circumstances to maintain separation due to the heading/track and airspace constraints.

The Board noted the Unit best practise but had no means of determining whether the use of FL110 was practicable in the circumstances here.

Due to the lateness of the sightings by both crews; that the ac were closing at about 8nm per minute giving the crews very limited time to react; that any reaction needs time to take effect and further that both pilots agreed that the risk had been very high, Members unanimously agreed that there had been a definite collision risk.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having vectored both ac into conflict, LJAO LIC did not comply with the provisions of a RIS in that TI was not passed to the Dominie crew nor acknowledged by the Tornado crew.

Degree of Risk: A.

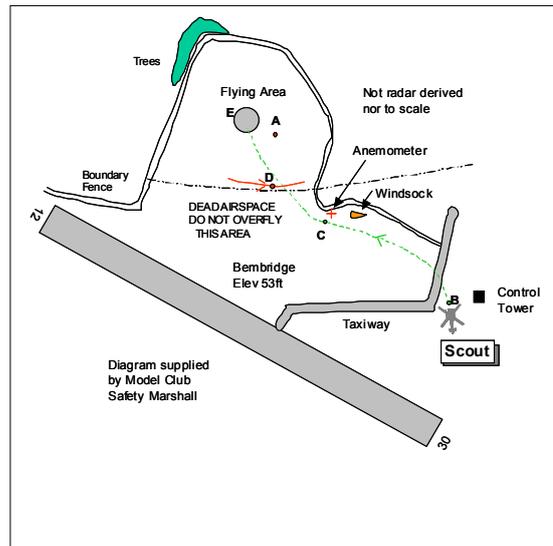
Recommendation: The MoD should direct a review of the ATC procedures for the entry/exit into/from the Lichfield Radar Corridor.

AIRPROX REPORT NO 083/07**Date/Time:** 7 Jun 1745-1800**Position:** 5041N 00107W (O/H Bembridge A/D - elev 53ft)**Airspace:** FIR (Class: G)**Reporting Ac** **Reported Ac****Type:** Scout Model Ac**Operator:** Civ Pte Civ Club**Alt/FL:** 10ft (agl) (agl)**Weather** VMC CLNC VMC**Visibility:** 6km**Reported Separation:**

50m H NR

Recorded Separation:

NR

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE SCOUT PILOT reports that his helicopter was parked immediately in front of the Control Tower. After starting up he made an open broadcast on 123-25MHz of his intentions and hover taxied towards RW30, converging towards the mid-point of the RW on a W'ly heading. He maintained a height of about 10ft and allowed the speed to build to 20kt, intending to accelerate to climbing speed on RW heading at the point of interception. He suddenly became aware of a yellow model ac at a similar height crossing from L to R in front of him. It appeared to be about to clear his flightpath to the R when it turned R onto an E'ly heading and was now heading straight towards him, exacerbating the risk of collision. As it continued to turn R it began to cross his flightpath R to L so he broke hard R onto a N'ly heading, the model passing about 50m away, and he landed near the designated Model Flying Area so that the matter could be discussed. The model was operating at least 250yd S of the authorised model operating area.

THE MODEL AC OPERATOR reports carrying out normal safety checks as per club rules and preparing his yellow lightweight model ac for flight. The most senior member of the club not flying was acting Safety Officer. After receiving agreement from other members flying he executed a take-off, the wind was NNE'ly 6kt or less. He flew a series of ccts to the NE of the flying site until at 1855A the Safety Officer reported a light ac approaching from the N. He positioned his model ac to the S of the flying circle and commenced ccts up to the edge of the area of published 'dead air space'. Almost immediately the Safety Officer reported a helicopter (the subject Scout) starting up. Bearing in mind 2 days previously the same helicopter took off and followed a track along the main RW, he decided to complete the cct that he was on and then land. At the end of the downwind leg and when turning to port for a landing, the helicopter turned sharply around the windssock and radio mast and almost forced him to crash his model. He continued his approach (extremely shaken) and managed to land his model approximately 4m short of the flying circle. By the time he had walked to his model (about 10m) a man approached him from the helicopter which had landed adjacent to the flying circle and public footpath. The man asked for his name and told him that he was filing a 'near miss' before returning to his helicopter (engine and rotor running) and departing. By now he was extremely shocked and speechless. At no time during the flight did he exceed the parameters laid down in the Club rules.

THE MODEL FLYING CLUB SAFETY OFFICER reports being positioned in the model pits area at point A and saw a helicopter at point B power-up so he passed this information to 3 model pilots who were flying. The helicopter lifted to a low height and started to follow a NW'ly path indicated by line B-C (see diagram). Simultaneously another observer warned the model flyers of a light ac passing to the N of the area. He continued to observe the helicopter, being somewhat puzzled by its routing as it flew very close to the S of the radio mast at approximately half-mast height. As it reached position C a model flew a curved W to E path at the same height but then at point D the model flyer took evasive action by diving his ac below the helicopter height and continuing

AIRPROX REPORT No 083/07

on the same path, passing to the N of the mast. He estimated separation as 50m. At least 1 other model was still airborne as the helicopter landed at point E and then the occupant of the front LH seat exited the helicopter, rotors running, to remonstrate with the model pilot.

UKAB Note (1): The UK AIP at AD 2-EGHJ-1-2 promulgates Bembridge ATZ as a circle radius 2nm centred on mid-point of the longest notified RW (12/30) 504041N 0010634W except that part of the circle SW of a line joining 504100N 0010939W and 503851N 0010748W active Summer 0730-1700Z. Section AD 2.20 Local Traffic Regulations –Warnings states at para (e) *“Tug launched glider flying takes place outside published operational hours”*.

UKAB Note (2): The Model Flying Club rules states that when flying at Bembridge all members must abide with the Club Rules and safety rules which include:- 1) No overflying hangars or parked aircraft (see ‘Dead’ Airspace on map), 2) No flying above 500ft, additional height restrictions apply to models weighing more than 7kg, 3) There will be a minimum of two adult club members at any flying meeting. Approved flying times for flying are:- Saturday and Sunday mornings (9:00am to 1:00pm); Tuesday, Thursday and Friday evenings 6:00pm until sunset. The members will fly their models from a mown grass area situated on the north side of the airfield at a distance of approximately 300m from the northern edge of the main runway. At all times on the airfield there should be at least one adult club member keeping a lookout for any potential hazards (low flying full size aircraft, walkers etc) and if necessary warn those still flying. The Safety Code for General Flying quotes Articles 73 and 74 from the ANO:-

Art 73) *“A person shall not recklessly or negligently act in a manner likely to endanger an aircraft, or any person therein”*. Art74) *A person shall not recklessly or negligently cause or permit an aircraft to endanger any person or property”*.

UKAB Note (3): The Bembridge Aerodrome Manual extant at the time of the incident at SOP6.7 Safe Integration of Aerodrome Activities states:-

Bembridge Airport operations integrate many diverse activities on a daily, occasional or rare basis, such as:- iii) *...The model-flying club operate model aircraft on a prepared strip at the northern corner of the aerodrome (crash map reference J6). This normally takes place on weekday evenings (during the dry season) and weekend mornings (predominantly Sundays). However the club retain the right to carry on their activities at any day or time so long as they comply with air traffic advice and safety management. In pursuance of that statement the Club shall provide a pair of two-way hand-held PMR radios in order that communications with the control tower is established before model flying begins and is maintained throughout [during airport operational hours]. All other Model Flying Club procedures shall be as stated in ‘Model Flying Operational Procedures dated 22/04/04, a copy of which is attached as Appendix A to this SOP.*

UKAB Note (4): Following this incident the Aerodrome Manual was revised after discussion between the Model Flying Club, the Aerodrome Licence Holder and the Aerodrome Operator responsible for operations during normal hours. Section SOP6.7 was rewritten and para 6.7iii.5 Model Flight Operational Procedures includes the following.

vii) *The first B certificate holder to arrive at the operational area shall be the Safety Marshall until relieved by another member meeting the criteria for this role.*

viii) *Outside airport operational hours the Safety Marshall must oversee not only the safety and application of procedures, but also consider the movements of full size aircraft, as there will be no duty air ground operator present to make these considerations.*

xiv) *In respect of the above statement club members shall endeavour to deconflict with full size aircraft.*

xv) *In support of the above considerations, the Club shall provide and have available at all times outside airport operational hours, a hand-held receiver for which the Safety Marshall can maintain a listening watch on the Bembridge Radio frequency 123.25MHz. As OFCOM license holders for this frequency, the Airport Operator shall impart a devolved responsibility to the Club to receive this frequency for the objective of maintaining safety.*

UKAB Note (5): In addition to the revised section SOP6.7 in the Bembridge Aerodrome Manual, an Appendix to section SOP6.21 details the procedures to be followed by pilots operating outside normal hours. This part is on

permanent display in the aerodrome terminal building and pilots wishing to operate out of hours are referred to the laminated copy and/or handed a paper copy for reference which states: -

1. Transmit all calls that you would normally send to the Air/Ground Operator, prefixed with the phrase 'Bembridge Traffic'.
2. Observe circuit height and patterns as applicable during operational hours.
3. Only use the hard runway.
4. Do not under any circumstances use grass runway 23
5. Movement between the parking areas and runway shall only be via the dedicated taxiways as applicable to the preferred runway orientation.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilot and operator of both ac and reports from the appropriate aerodrome operating authorities.

The Chairman reminded Members that equal weight should be given to the Scout pilot's account and the Model Ac Operator's viewpoint when, as in this case, disparate descriptions of the event were reported. The Scout pilot had reported hover-taxying in a W'ly direction towards the RW at 10ft when a model ac flew towards his helicopter, in his opinion well outside the Model Flyer's normal operating area, which had caused him to take evasive action. Conversely, the Model Ac Operator had reported flying just inside the Southern edge of the published area when the helicopter hover-taxied towards the Model Flying area and into conflict. Even with promulgated segregated areas, Members opined that with such diverse operations, due regard should be taken by all the operators involved to ensure that adequate safety margins are maintained at all times. Members commended the actions taken by the Aerodrome Operator and Aerodrome Licensee post incident to address this issue in the Aerodrome Manual but agreed that the 'notifying' document (the AIP) should also be amended to include model flying activity and its integration with other aerodrome operations for the benefit of pilots unfamiliar with local procedures at Bembridge. In this vein, the Board charged the Director with writing to the Aerodrome Licensee to invite him to review the AIP entry.

Although both parties agreed that the minimum separation distance was about 50m, only those who were there at the time know exactly what had occurred. Without any further corroborating information available, with such disparate viewpoints about the incident reported by the individuals involved, the Board could not resolve this apparent anomaly and could only conclude that this had been a conflict over Bembridge aerodrome, which was resolved by both the Scout pilot and the Model Ac operator. Furthermore, in the Board's view, their combined actions had quickly and effectively removed any risk of collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Conflict over Bembridge aerodrome resolved by the Scout pilot and the Model Ac operator.

Degree of Risk: C.

AIRPROX REPORT No 085/07

AIRPROX REPORT NO 085/07

Date/Time: 30 Jun 0843 (Saturday)

Position: 5109N 00012W (0.5nm W Gatwick - elev 202ft)

Airspace: ATZ (Class: D)

Reporter: Gatwick AIR

First Ac **Second Ac**

Type: B737-800 B767

Operator: CAT CAT

Alt/FL: 200ft agl↓ ↑
(QNH 1012mb) (QNH)

Weather IMC CLBC IMC KLWD

Visibility: 10km

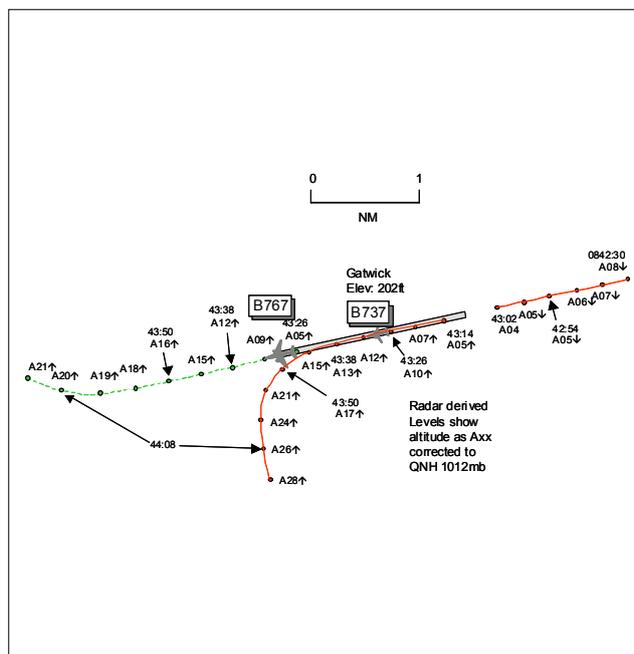
Reported Separation:

AIR: 400ft V/NR H

200ft V/1nm H NR

Recorded Separation:

500ft V/0.9nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GATWICK AIR reports that a previous inbound ac missed Rapid Exit Taxiway 'Echo' and vacated at FR whilst the B767 flight had been given line-up clearance and been told to be ready when instructed. The B737 flight was told to expect late landing clearance. The B767 was slow to roll, he thought, and when the B737 flight was at about 0.5-1nm it was sent around and was given a L turn heading 180° to maintain 3000ft. After a short time he repeated this instruction, as he had not heard a read back. It was only after repeating this for the third time did the B737 flight acknowledge the heading. Owing to catch-up, decreasing vertical separation and lack of visual separation, he elected to turn the departing B767 R onto heading 310° which was acknowledged.

UKAB Note (1): Met Office data shows the Gatwick METAR as EGKK 0820Z 19007KT 6000 -RA FEW002 BKN004 15/15 Q1012= and 0850Z 19005KT 150V220 7000 FEW004 BKN006 16/16 Q1012=

THE B737 PILOT reports fully established on the ILS RW26 under ATC speed control in IMC and in communication with Gatwick Tower squawking 1417 with Mode S. Tower advised them to expect late landing clearance owing to departing heavy traffic whose crew missed the first take-off clearance from ATC, he thought. Heading 260° at 145kt they became visual about 500-600ft QNH at range 1.5nm identifying the traffic on the roll, a B767 – it was very tight. ATC advised them to continue and once again expect a late landing clearance. At about 200ft agl and range 0.8nm from touchdown ATC called 'go-around' which was carried out immediately. During the very initial missed approach they received a turn command from ATC to turn L heading 180° and this was initiated shortly thereafter but their reply was delayed, owing to cockpit workload, until ATC issued the heading for a second time. They climbed to 3000ft and normal SOPs were resumed and a new approach to RW26L was carried out. The Capt listed some relevant factors: a) They had been instructed twice to expect late landing clearance by ATC but no notification of the likely direction of turn in the event of a go-around was provided, b) The PF was a cadet pilot new to the line, c) The controller did not allow opportunity for a read back of the first vector and d) TCAS was inhibited due to their low altitude. He estimated the minimum separation as 200ft vertically and 1nm horizontally and assessed the risk as low.

THE B767 PILOT reports outbound from Gatwick RW26L and in communication with Gatwick Tower squawking with Mode S. They followed Tower instructions to "line-up and wait behind landing traffic" but this traffic was slow to vacate the RW, which delayed their T/O clearance. Shortly after receiving T/O clearance and initiating their roll they were not surprised to hear Tower give a 'go-around' call to landing traffic behind them which involved a turn onto 180°. At rotation initiation, they were then surprised to hear a second strong call to the go-around traffic to

turn L which led them to assume the other traffic was directly behind and above, if not right above them. TCAS was inhibited during this phase and it was not known if the traffic was displayed. Whilst climbing on RW heading at 180-220kt they then became uncomfortable with Tower's next call to them which included 'turn R (approximately 90°), change frequency to' followed by the words '3000ft'. This transmission was quick and included the unexpected frequency change, which neither crewmembers completely copied and were left wanting to clarify the 3000ft call. It took a number of calls and many seconds to recontact Tower to clarify altitude and frequency. It was an uncomfortable few seconds and they did hear a third party call on frequency saying '..that got my heart going'. They had no idea how close the B737 came to them during a phase of flight where workload was extremely high and where TCAS is inhibited.

ATSI comments that the B737 flight was established on the ILS for RW26L and contacted the AIR controller at 0839:50. The crew were instructed to continue approach. Ahead of them was a BA46, which had been cleared to land and at the holding point was the subject B767. The controller's plan was that the BA46 would land and vacate and the B767 depart prior to the arrival of the B737. The crew of the B767 had been issued with a conditional line up clearance subject to the landing BA46.

The BA46 did not vacate by the exit the controller had hoped it would but the plan was continued with. The B767 crew had been told to be ready when instructed. At 0841:10, the B737 crew were instructed to reduce to minimum safe approach speed and expect a late landing clearance. At 0842:00, the controller transmitted "*B767c/s expect to take it on the roll*" to which the crew replied "*B767 c/s clear for take off*". The controller transmitted "*B767c/s you're now clear for take off Two Six Left surface wind one nine zero degrees five knots*" which the crew acknowledged. The controller did not use the phrase 'immediate take off' although this is what his plan required.

At 0842:30, the B737 crew were again told to continue and expect a late landing clearance but at 0842:55, the controller realised his plan would not work and so they were instructed to go around and turn L heading 180° climbing to 3000ft. The crew acknowledged this with "*B737 flight number going around*". Some 25sec later the controller instructed the B737 crew to report in the L turn but this was changed, only 3sec later, to an instruction to turn L now. This too was repeated and at 0843:40, the B737 crew responded with "*Left turn heading one eight zero B737 c/s*". Analysis of the radar recording Mode S data shows that the aircraft's heading started to change at 0843:50.

The controller then turned his attention to the B767 as, due to the low cloud, he would not be able to maintain visual contact with both ac. At 0843:50, he transmitted "*B767c/s turn right heading turn right heading three one zero degrees now*" and this was acknowledged by the crew. The controller then instructed the crew "*B767 c/s report the heading and the altitude please to Gatwick Director one one eight decimal nine five maintain three thousand feet*". This caused a degree of confusion to the crew, as it was not clear what altitude should be reported (passing level or cleared level) and so they responded with "*Understood going to three thousand feet switching to which frequency B767 c/s*". The controller did not answer the B767 crew but issued a take off clearance to another flight and dealt with several calls made by other crews. The B767 crew called the Tower again and the controller repeated the instruction to report their level and heading to Gatwick Director on frequency 118-950. The crew read back the frequency and asked to confirm the altitude, which the AIR controller did as being 3000ft.

[UKAB Note (2): The radar recording at 0842:30 shows the B737 1.75nm from touchdown RW26 descending through altitude 800ft QNH before fading from radar, after the sweep at 0843:02, on short final at 400ft QNH. Twelve seconds later the B737 is seen again over the threshold climbing through 500ft QNH. The B767 first appears at 0843:26, the CPA, over the upwind end of RW26 climbing through 500ft QNH with the B737 0.9nm behind climbing through 1000ft QNH. The lateral separation increases slowly until time 0843:50 when the distance has increased to just over 1nm as the L turn by the B737 is evident as it climbs through 1700ft QNH with the B767 showing 1600ft QNH. Thereafter the tracks diverge as the B737 steadies on a S'ly track and the B767 commences its R turn, as instructed by ATC.]

MATS Part 1 Appendix E page 10, para 7.2 states: '*Transfer of communication instructions should be passed in a single message. Items which require a read back should not precede the frequency or channel change instruction*'.

The controller stayed with his plan even though it was becoming apparent that it would not work. This resulted in the B737 being instructed to go around at a late stage. The crew were reluctant to turn until they had the ac stabilised and their workload under control. The controller then sought to resolve the situation by instructing the

AIRPROX REPORT No 085/07

B767 crew to turn as well, however, his RT transmission was delivered rapidly, was non-standard and not expected by the crew at that stage in the flight.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The NATS Advisor informed Members that following this incident Gatwick unit management had invited NATS Division of Safety to review the 'go-around' procedures at Gatwick. Members endorsed this pro-active stance and requested that the Board be informed of the outcome.

ATCO Members familiar with Gatwick procedures opined that the L turn given, instead of the standard 'go-around' of climbing straight ahead to 3000ft, was the usual direction unless the preceding traffic was also on a L turn. The B737 was under speed control to 4nm DME from touchdown to maintain separation from following traffic, before reducing speed further for landing. The B767 crew would not have been expecting a frequency change to Gatwick Director or a stop-off at 3000ft, as it is usual to be transferred directly to the LTCC TMA controller whilst following the SID profile. The AIR controller believed that the B767 had been slow to depart, a point which Members were unable to establish from the RT timings and radar, but if this had been so the AIR did have the option of sending the B737 around earlier as the situation deteriorated. The AIR controller was undoubtedly worried when his plan became very tight as the circumstances unfolded and, having given the B737 crew a go-around and a L turn, no turn was evident or acknowledgement of these instructions forthcoming until some time afterwards (55sec). The initial 'go-around' instruction and L turn was not fully read back, the crew merely called 'going-around', and the AIR controller asked the crew 25sec later to report turning L before immediately instructing the flight to 'turn L now'; this was correctly read back and the L turn became evident shortly afterwards. With uncertainty as to the safety of the subject ac at this stage – both ac were not visible to him nor the B737 turn seen - AIR told the B767 crew to turn R onto 310°.

Pilot Members were not surprised by the scenario. The UK AIP promulgates special landing procedures for Gatwick when the RW in use is occupied by other traffic. Landing clearance will be issued to an arriving ac provided that at the time it crosses the threshold of the RW in use, the separation distance existing is at least 2000m between the airborne ac and the threshold or if not airborne, 2500m exists. The B737 crew on short final at about 200ft agl were expecting a late landing clearance but were eventually told to 'go-around' late. It would not be unusual for an ac at this late stage to descend perhaps another 100ft, depending on its flap setting as the crew reconfigured the ac and executed their missed approach. This is a demanding manoeuvre at low level, particularly in this case as the Capt reported the PF was a cadet pilot new to the line, but the usual priorities are to fly the ac first and make RT calls second. Also, depending on the company procedures, the crew would be expected to delay any turn until the ac was at a safe height and in a stabilised steady climb, especially where the crew had transitioned from VMC into the low cloud and into solid IMC. As this turn was not executed straight away, the separation distances were always going to be close, but pilot Members agreed that the B737 crew's actions were entirely appropriate and reasonable in these circumstances. However, some ATCO Members expressed concern about the 55sec 'void' before the B737 crew acknowledged and executed the L turn, which had created a period of unease for the AIR, when only a brief RT call from the crew would have gone some way to allay his fears.

Single RW operations are known to work well when everything goes according to the 'master plan' but on this occasion the 'seeds were sown' for this to go awry when the BA46 flight had missed the RET expected by the AIR controller. AIR had given the B767 flight a conditional clearance to enter the RW so that the RW was now effectively blocked to landing traffic. The subsequent delay to the B767's crew's take-off clearance had further reduced the separation distances involved but the controller had taken his plan as far as possible before giving the B737 flight a 'go-around'. With hindsight, holding the B767 or an earlier 'go-around' with the B737 would have been an ideal way to resolve the situation more quickly but, at the time, AIR believed that his plan would be successful. All of these factors led Members to agree that the Gatwick AIR controller instructed the B737 crew to go-around late, which resulted in a conflict with the departing B767 and this had caused the Airprox.

During the initial part of the missed approach the B737 flight understandably did not turn immediately as instructed, this had resulted in it following the B767 as both ac climbed with safety margins eroded and with both ac not visible to the AIR controller. The radar recording shows the B767 airborne climbing through 500ft QNH at the CPA only

0.9nm ahead of the B737 which was climbing through 1000ft QNH. During this phase, the B767's ROC is higher than the B737's and over the course of the next 3 sweeps the vertical separation decreases until the ac are co-altitude, 1500ft, before the B737's L turn becomes evident 6sec later at 0843:50 when separation has increased to 100ft and 1nm. This increase in horizontal separation had been purely fortuitous as the departing B767's GS was slightly faster which allowed it to draw ahead of the B737 slowly. These elements were enough to convince the Board that these ac's safety had been compromised during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

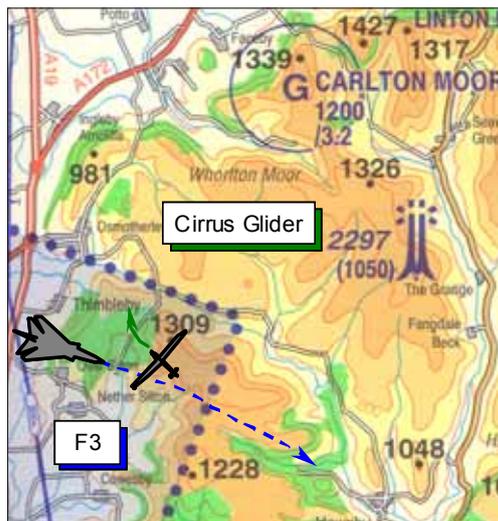
Cause: Gatwick AIR instructed the B737 crew to go-around late, which resulted in a conflict with the departing B767.

Degree of Risk: B.

AIRPROX REPORT No 087/07

AIRPROX REPORT NO 087/07

Date/Time: 29 Jun 1404
Position: 5420N 00116W (9nm ENE of Leeming)
Airspace: UKDLFS-LFA11 (Class: G)
Reporting Ac Reported Ac
Type: Cirrus Glider Tornado F3
Operator: Civ Club HQ AIR (Ops)
Alt/FL: 1466ft 250ft
QNH Rad Alt
Weather VMC CLBC VMC CLBC
Visibility: 50km+ >10km
Reported Separation:
Nil V/20m H 150ft V/700m H
Recorded Separation:
Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE CIRRUS GLIDER PILOT reports that he had launched from Sutton Bank and had been flying along the westerly ridges of the North Yorkshire Moors using both ridge lift and thermals within a height band of 1200 – 4500ft QNH. Operating on the glider frequency of 130.4MHz he was ridge soaring fairly low along Black Hambleton, behind another 15m glider and climbing slowly from ground level. Heading 319° at about 1466ft amsl – about 180ft agl - some 80m behind the other glider and slightly to the left (10m) flying at about 47kt, he was concentrating on keeping his glider in the best lift and also keeping an eye on the glider in front. A Tornado - which he recognised instantly due to the square engine intakes - was then sighted “about 5 sec away” head on (if slightly to his L) but exactly at his height. To avoid the jet he rolled R and dived slightly to speed up the roll rate by increasing his speed. Estimating the minimum horizontal separation to be 20m, he heard the jet very clearly as it passed to port and astern with a “high” risk of a collision.

It seemed that the Tornado was heading from the Vale of York toward the North Yorkshire Moors, flying very fast. He was not sure if his avoiding action achieved any separation in distance due to the immense closing speed, but he believes the Tornado would have missed if he had not taken avoiding action: however, it would have been very close.

He added that at one point when flying close to the Leeming ATZ over Northallerton he had contacted Leeming for a FIS and also later when flying back towards Thirsk/Sutton Bank he had called Leeming ATC, but he changed back to the glider frequency at about 1328 UTC – about 32min before the Airprox occurred. His glider is coloured white with a blue fin.

THE TORNADO F3 PILOT reports that after transiting southbound through the Leeming/Durham Tees Valley Gap at 500ft, talking to Leeming ZONE on 262.95MHz they descended to 250ft RAD ALT, towards a point S of Bilsdale Mast and switched from ZONE to the LFS frequency at about 1403. About 1 minute later as they approached a position 5421N 00119W heading 115°(M) at 420kt, they spotted one white glider 30° L of the nose about 3nm away. Some 10sec later, a second glider was seen 20° left of the nose about 1½nm away offset to the N. No avoiding action was required but as they were approaching the high ground of the North Yorkshire Moors they were happy to avoid the glider to the S and fly below it. The second glider passed about 700m to the N down their port side about 150ft above their jet at a position 5420N 00115W, and he wing-waggled to indicate that they had spotted the glider whilst maintaining “collision avoidance throughout”. The risk was assessed as “low”.

MIL ACC reports that the Tornado F3 crew was in receipt of a FIS from Leeming Zone (ZONE) in the lead-up to the Airprox. At 1358:30, the F3 crew called ZONE who subsequently provided a FIS, passed the BARNSELY RPS of 998mb and confirmed that the ac would not be above 500ft through the ‘Gap’. After ZONE broadcast the new

RPS of 999mb the F3 crew advised ZONE at 1402:26, “..clearing Northallerton en-route” and following the F3 crew’s correct read-back of the new RPS switched to their en-route frequency [LFS] at 1402:33.

This Airprox was not shown on recorded radars and occurred after the F3 had left the Leeming ZONE frequency. Because the ac was flying very low and in receipt of a FIS the controller would not have expected to pass traffic information unless they were aware of a confliction. As the gliders were non-squawking and not in receipt of an ATS their presence was unlikely to be of note to Leeming ATC. This Command considers that ATC played no part in this Airprox.

UKAB Note (1): The track of the Tornado F3 is shown on the Great Dun Fell Radar recording as it passes about 1/3nm to the SW of the reported Airprox location - climbing from 1500ft to 1700ft (1013mb) unverified Mode C at 1403:47. An indicated level of 1700ft Mode C would equate to about 1280ft BARNSELY RPS (999mb). One primary return is shown in the vicinity for one sweep only, which might or might not be the glider flown by the reporting pilot or that flying just ahead of him. Consequently, little else of value can be deduced from the radar recording. A copy of the IGC data file for the gliders flight log was helpfully supplied by the Cirrus glider pilot, upon which was plotted the Latitude & Longitude of the Great Dun Fell radar returns for the period the Tornado F3 passed abeam the glider. Comparison of the respective track plots would suggest that the Tornados track passed in the order of 295m S abeam the glider between 1403:45 & 1403:54.

HQ AIR (OPS) comments that it may well be that the Tornado F3 crew did not see the reporting ac at 180ft agl as the contacts they saw appeared to be above them. The crew would undoubtedly have been looking for gliders, as this is a well-known gliding area. However, crews may not routinely expect to encounter gliders so low.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequency, radar video recordings, data from the glider pilot’s logger and reports from the appropriate ATC and operating authorities.

Evidently in the ‘see and avoid’ environment of the ‘Open FIR’ gliders could be encountered anywhere. However, the reporting glider pilot’s main concern in raising this Airprox was to publicise to other operators that glider pilots will always be using westerly facing ridges when the wind is from the west so that other aviators might take into account in their overall sortie planning where gliders might be commonly encountered. Moreover, this ridge, roughly 12 miles long, is often used as a ridge cross-country flight between Sutton Bank to the S and Carlton Moor. The BGA Member reinforced this view and went on to explain in more detail exactly where gliders could be found. The key point here was that when ridge soaring gliders could potentially be encountered up to 2½ times the height of the ridge and pilots will be operating up to the cloud-base if it is low. Moreover gliders will often be encountered close to the ground as here or even below a ridgeline particularly when the wind direction is not optimal or the windspeed is low. The highest point of the ridge here at 1309ft amsl was clearly inside the Topcliffe MATZ – where the base of the stub is 1092ft amsl – and glider pilots should be aware that most fast jet crews conducting low-level cross-country sorties will invariably endeavour to stay below the MATZ stub where feasible. But glider pilots should also be aware that this is a commonly used route where fast-jet crews are compelled to comply with the mandated UKDLFS unidirectional flow system through the choke-point specified for the East Midlands Directional Control System and illustrated in the UK AIP. It is stipulated that when flying through the airspace of the Leeming/Teesside gap, it must be flown only in a SE’ly direction and no higher than 1000ft agl. It follows, therefore, that FJs will invariably be encountered heading this way below this height – a point that should be borne in mind by glider pilots. To this end the BGA Member and the Air Cmd (Ops) fast-jet pilot Member agreed to review the liaison between gliding clubs in this vicinity and fast jets operators in an effort to make each other more aware of the other’s ‘modus operandi’ and to identify and de-risk the critical crossing points as much as possible. The intention being to ensure common guidelines and practices are in place.

Given that the Tornado F3 was an air defence variant and equipped with AI radar Members questioned whether this device could detect a glider. The Air Cmd (Ops) Member’s view was that F3 crews will invariably fly with their AI radar on, but in a ‘Pulse-Doppler’ mode, so fibreglass gliders flying at the speeds commonly flown here - ~48kt - would not be detected sufficiently well to provide any reliable warning of their presence at all. So it was entirely up to the crew of the F3 to sight the other ac and afford appropriate separation as needs be. Whilst it is axiomatic that ‘flying machines’ will give way to ‘gliders’, in the Command’s view it seemed that the Tornado F3 crew might not have seen the actual glider flown by the reporting pilot when he was soaring at some 180ft agl, as the F3 pilot perceived that the glider was about 150ft above his jet when flying at 250ft Rad Alt as they passed by. However,

AIRPROX REPORT No 087/07

the glider pilot had not mentioned any other gliders in the vicinity when questioned apart from that ahead of him flown by his colleague. Nevertheless, he might not have been aware of a third unseen gliders presence at the time. Whilst it seemed to other Members that the F3 crew had probably spotted the right glider - especially as the F3 pilot had mentioned the two being spotted in quick succession – this could not be established beyond all doubt. Clearly each pilot was legitimately entitled to be flying here, but whilst the reporting glider pilot had been compelled to take avoiding action the F3 pilot felt no need to do so, albeit that there was sufficient room to manoeuvre to the S it would seem. This, coupled with the great disparity between the horizontal separations reported, suggested that the crew might not have seen this glider. The Board could only conclude, therefore, that this Airprox had resulted from a conflict in the military UKDLFS/FIR.

The absence of radar data from the glider made independent determination of the minimum separation here somewhat problematic. The IGC data file derived from glider's GPS data logger suggested that when the Latitude & Longitude of the Great Dun Fell radar returns was plotted on the IGC file, the horizontal separation was in the order of 295m - broadly midway between the two pilots assessments. However, the Board was briefed that others more familiar with the IGC data set suggested it was somewhat closer – nearer to 100m. Whatever the distance the reporting pilot's account had stated that the Tornado would have missed if he had not taken avoiding action. Therefore, the Board concluded unanimously that no risk of collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

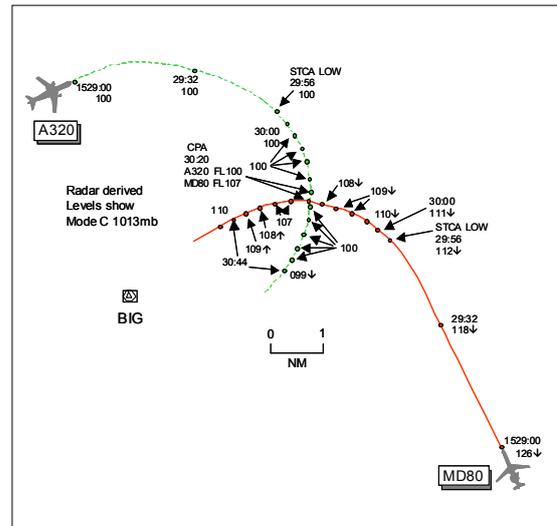
Cause: Conflict in the UKDLFS/FIR.

Degree of Risk: C.

AIRPROX REPORT NO 090/07

Date/Time: 22 Jun 1530
Position: 5122N 00008E (4nm NE BIG)
Airspace: LTMA (Class: A)
Reporting Ac Reported Ac
Type: A320 MD80
Operator: CAT CAT
Alt/FL: FL100 FL110↓

Weather VMC CLOC IMC NR
Visibility: 8km NR
Reported Separation:
500ft V 700ft V
Recorded Separation:
700ft V/0.2nm H

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE A320 PILOT reports after weather avoidance they entered the BIG hold at FL100 and 220kt and subsequently asked Heathrow DIR to move to the OCK hold owing to weather; ATC told them to return to BIG. As another ac, the subject MD80, entered the hold descending to FL110 they received a TCAS TA. Both ac were heading towards BIG so ATC gave both flights avoidance vectors, however their given turn onto 150° was too late. The MD80 was seen visually to cross slightly in front and 500ft above (TCAS display) before climbing back to FL110.

THE MD80 PILOT reports in the BIG hold descending to FL110 at 230kt and in communication with Heathrow Approach [actually LTCC BIG] squawking with Mode S. Owing to an A/P altitude capture malfunction or mishandling (not determined), 300ft altitude loss occurred in the holding pattern which was immediately recovered.

THE LTCC BIG RADAR CONTROLLER reports working the MD80 which was turning back to BIG after avoiding weather descending to FL110 on top of the A320 at FL100 working Heathrow INT S. As she went to transfer the MD80 she noticed a 'level bust' had occurred with the ac at FL106 so she told the flight to climb immediately back up to FL110. Once level, she asked the crew to confirm why they had 'level bust' and they replied that their equipment had failed to capture the level.

THE HEATHROW INT S reports the A320 was maintaining FL100 and turning R to BIG to leave on heading 270°. The MD80 was on the TMA frequency and looked to be joining the BIG hold from the SE. She noticed in the VSL (vertical stack list) as STCA flashed red (high severity alert) that the MD80 was at FL107 and almost on top of the A320. She gave an immediate descent to the A320 flight to FL90, informing the crew that this was an avoiding action descent and to turn L onto heading 150°, as it appeared the MD80 was still turning R and this would be the best resolution. The A320 crew reacted quickly and informed her that they had received a TCAS Advisory and the separation was 500-600ft. The A320 flight then continued their approach and the MD80 flight then called on frequency in the BIG hold maintaining FL110.

ATSI reports that the A320 crew established contact with the TC Biggin controller at 1518:20, and reported heading 315° and descending to FL150. Weather was affecting the sector and so the crew asked whether they could hold short of Biggin, which was approved. Further descent clearances were issued, firstly to FL140, then FL110 and finally FL100. Meanwhile, the MD80 flight called on frequency at 1523:30, and was instructed to descend to FL140. At this time the two ac were in trail some 21nm apart. Again, the A320 crew asked if they could take up a weather avoidance heading, this time of 330°, which was approved. Shortly afterwards the crew confirmed that they could now route to Biggin, which they were then cleared to do and instructed to contact the Heathrow Director.

AIRPROX REPORT No 090/07

At this point the A320 was passing FL115 for FL100, with the MD80 17nm behind passing FL149 for FL140. At 1526:40, the MD80 crew were instructed to route direct to Biggin, but they requested to take up a heading of 335°, which was approved. The A320 crew informed the Heathrow Director that they were between two cells and asked if they could hold further W, perhaps at Ockham. The Director instructed them to turn R to Biggin and he would call them back. At 1527:40, the MD80 crew were instructed to descend to FL110 and some 90sec later whether they could route to Biggin yet. The crew requested to continue for another 5nm before turning, which the TC Biggin controller approved.

Soon after this the Heathrow Director instructed the A320 crew to leave Biggin heading 270°, which was acknowledged. At this time the two ac were on reciprocal tracks, 2.7nm apart with the A320 maintaining FL100 and the MD80 indicating FL111. The radar recording shows the Mode C of the MD80 indicating 109, then 108 and finally 107, as the two ac converged. At 1530:20, the TC Biggin controller instructed the MD80 crew to contact the Heathrow Director but the crew asked for a repeat of the frequency. The TC Biggin controller then instructed the crew to climb to FL110, to which the crew replied that they “...have One One Zero Madam”. The controller advised that they had passed their cleared level and the crew explained that they had recovered their level and this was due to a failure in the altitude capture system.

Whilst these exchanges were taking place the Heathrow Director transmitted to the A320 crew “(A320 c/s) descend now flight level Niner Zero that’s avoiding action and turn right now heading One Five Zero degrees”. The radar recording shows that the MD80 was in a L turn and opposite direction to it was the A320 turning R onto its assigned heading of 270°. The MD80 passed 0.2nm ahead of and 700 feet above the A320. STCA had activated at ‘low severity’ when the MD80 was passing FL112, against the A320 maintaining FL100, before stopping 25 seconds later when the MD80 was indicating FL107. It then came back on 3 seconds later, which coincided with both controllers taking action against the level bust. STCA changed to ‘high severity’ 3sec later and stayed in this state for 4sec before returning to ‘low severity’ and then ceasing 5sec later.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members could add little to this incident. Although the MD80 A/P did not capture the flight’s cleared level, cross-cockpit procedures should have ensured that the ac’s descent was monitored as it approached FL100 and the ac levelled-off before this ‘level bust’ had occurred. However, owing to either a malfunction or mishandling of the A/P, the MD80 crew descended below their cleared level and into conflict with the A320, which had caused this Airprox.

LTCC BIG had noticed the situation as the subject ac crossed and told the MD80 crew to climb back to FL110. Simultaneously, Heathrow INT S gave the A320 flight a turn away and an immediate descent. The A320 crew had received a TCAS TA as the MD80 descended through FL110 and watched it visually as it crossed just ahead, 500ft above, before it climbed back to its assigned level. This visual sighting, coupled with the actions taken by the other parties led the Board to conclude that no risk of a collision had existed during this encounter.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The MD80 crew descended below their cleared level and into conflict with the A320.

Degree of Risk: C.
