

ASSESSMENT SUMMARY SHEET FOR UKAB MEETING ON 20 JUN 2012

Total	Risk A	Risk B	Risk C	Risk D	Risk E
14	3	0	10	0	1

No	Reporting	Reported	Airspace	Cause	Risk
2012009	Tornado GR4 (MIL)	Typhoon FGR4 (MIL)	G (AARA 5)	Attempting to stow the probe while astern the VC10's left hose, the Typhoon pilot became disoriented and broke away into conflict with the joining Tornado, which he did not see.	A
2012019	S92 (CIV)	Tornado GR4 (MIL)	G (Scot FIR)	A non-sighting by the Tornado crew and effectively a non-sighting by the S92 crew.	C
2012020	A321 (CAT)	A340-600 (CAT)	C (UAR UL9)	The controller did not detect the A321 pilot's incorrect read-back. Recommendation: The CAA is recommended to review the 5-letter name code designators in this area to avoid potential confusion between BASET, BADSI and BAKUR.	C
2012021	HS125 (CIV)	SR22 (CIV)	D/G (CTR/Oxford ATZ)	The SR22 pilot did not fly the cleared procedure and flew into conflict with the HS125.	C

2012023	Falke 25 MG (CIV)	Unknown LA (CIV)	G (Sutton Bank Glider Launching Site)	The untraced light aircraft flew over an active glider launching site (below the maximum promulgated height of the winch cable) and into conflict with the Falke 25.	C
2012026	BA146 (CIV)	CL600 (CIV)	G (Farnborough ATZ)	The ADC cleared the BA146 to depart from the non-duty runway into conflict with the CL600 approaching the duty runway.	C
2012034	BE350 (MIL)	C525A (CIV)	G (London FIR)	A conflict in Class G airspace resolved by both crews.	C
2012041	Hawk TMk1 (MIL)	Ikarus C42 ML (CIV)	G (Vale of York AIAA)	Late sightings by the pilots of both aircraft.	C
2012044	PA28-151 (CIV)	VANS RV-7 (CIV)	G (London FIR)	The RV-7 pilot flew close enough to cause the PA28 pilot concern.	C
2012048	BE90 (CIV)	PA31 (CIV)	G (London FIR)	Effectively a non-sighting by the PA31 pilot and a late sighting by the BE90 pilot.	C
2012049	Tornado GR4 (MIL)	Schleicher ASW27 (CIV)	G (UKDLFS/LFIR)	Late sightings by the Tornado crews.	A

2012053	EMB190 (CAT)	AH64 (MIL)	D (London City ATZ/CTR)	A sighting report.	E
2012055	Merlin HM1 (MIL)	Tornado GR4 (MIL)	G (Scottish FIR)	The GR4 crew flew close enough to cause the Merlin crew concern.	C
2012057	MC130P (Foreign MIL)	Tornado GR4 (MIL)	G (Scottish FIR)	The Tornado crew climbed into conflict with the MC130P, which they did not see.	A

AIRPROX REPORT No 2012009

Date/Time: 25 Jan 2012 1814Z (Night)

Position: 5558N 00103E

Airspace: (AARA 5) (Class: G)

Reporting Ac Reported Ac

Type: Tornado GR4 Typhoon FGR4

Operator: HQ Air (Ops) HQ Air (Ops)

Alt/FL: FL200 FL200

Weather: VMC CAVOK VMC NK

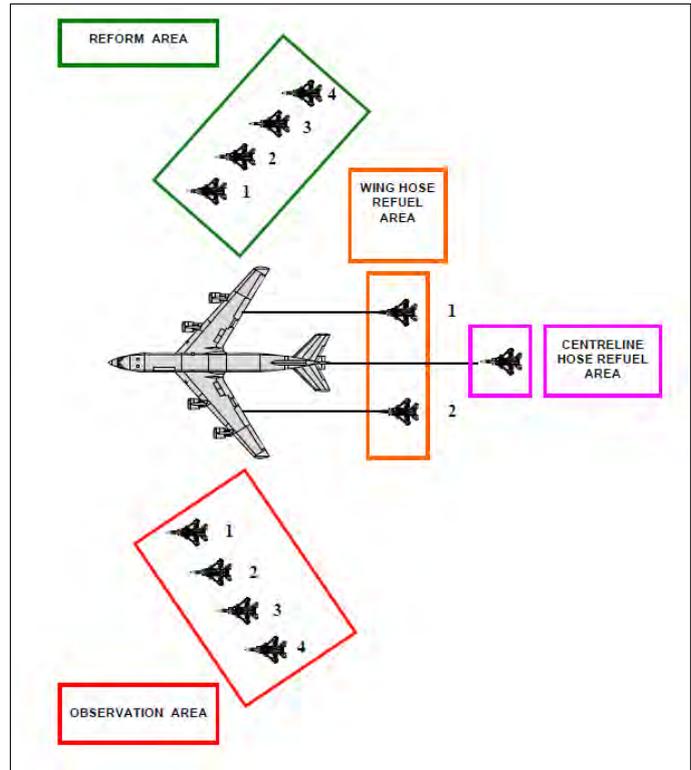
Visibility: 50km NK

Reported Separation:

30ft V/30ft H NK

Recorded Separation:

NR



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

UKAB Note (1): The above is a diagram taken from ATP56 (B), the NATO manual of AAR.

THE TORNADO GR4 PILOT reports conducting night AAR in AARA 5. He was visual with the VC10 tanker heading 265° at 280kt. The VC10 had 2 Typhoons in tow and he was cleared to join in the 'observation left' position on it. Typhoons 1 and 2 were in contact right and left respectively. When he was about three ac lengths back from the observation position and 50ft low, Typhoon 1 disconnected normally, was cleared to the 'reform right' position and was seen to begin moving.

As the Tornado crew continued forward towards observation left, they began the 'before contact checks' and Typhoon 2 was cleared to disconnect. They interrupted their checks while the pilot raised his NVGs and they heard Typhoon 2 cleared to the 'reform right' position. They stabilised just aft of the VC10 wing line then completed the checks.

The Tornado pilot then saw Typhoon 2 in plan form turning towards him and initiated an immediate pull up. The navigator who was still wearing NVGs also saw Typhoon 2 roll L towards them before passing below the Tornado. Typhoon (2)'s nose passed underneath the Tornado, mid fuselage, and the Tornado crew felt a moderate burble as the ac went below. The Tornado continued the climb to FL210 before discontinuing AAR and commencing RTB.

THE TYPHOON (2) FGR4 PILOT reports flying as No2 of a pair of Typhoons conducting night AAR training in AARA 5 with a VC10. Following a successful refuelling on the left hose, he disconnected and moved to a position about 30ft astern of the hose. Having satisfied himself using external visual cues that the ac was stable and in a safe position, he briefly looked down to locate the refuelling probe switch but was unable to locate it immediately due to the dim cockpit lighting. Within 2sec he looked back up to be presented with a picture of his ac climbing towards the trailing edge of the VC10 wing with what appeared to be significant closure rate. He executed a breakaway manoeuvre by rolling left to 95° AOB and applying full back stick.

Having stabilised the ac he informed the tanker and stowed the probe and at that point the Tornado called to say that they had experienced an Airprox with them. He did not see the GR4 until after the incident, and so he cannot comment on the separation.

HUD video analysis indicated the following:

- a. Four minutes prior to the incident, the Tornado called visual with the tanker and was cleared to join.
- b. At the time of the incident the GR4 had not reported 'Observation Left'.
- c. At the point the breakaway manoeuvre was initiated the Typhoon was positioned aft of the hose basket with a flightpath of just less than 1° above the horizon and 7kts closure.
- d. Displacement achieved from the tanker during the breakaway manoeuvre was 300 ft low, swept in the 7 to 8 o'clock position at approx 0.2nm slant range.

THE VC10 PILOT reports that two Typhoons and a Tornado were the second and third serial respectively of a night AAR sortie in AARA5. The Tornado GR4 joined the VC10 in a safe and controlled manner and settled into a steady position and, he thought, called 'Observation Left'. The join and position were witnessed and confirmed visually by the tanker captain.

Typhoon (1) completed a second dry contact, before being moved to the reform position [right echelon] then Typhoon (2) was given the order to disconnect, which the pilot acknowledged.

Once out of contact and astern the hose, Typhoon (2) was given the order to 'Go Reform right'; the pilot acknowledged and the [VC10] engineer saw on the CCTV Typhoon (2) begin to move. The engineer then lost sight of Typhoon (2), the captain looked left and saw Typhoon (2) about 0.5nm astern and low and in the 7 o'clock position.

After the incident the Tornado initiated a climb to FL210 as he elected not to refuel, but to RTB and was released by the tanker to contact Scottish Mill.

Typhoon (2) then regained leader and the Typhoon flight departed the tanker iaw published procedures. The VC10 crew continued its sortie without further incident.

UKAB Note (1): Since the incident was not reported on the frequency in use, ScATCC were informed of the incident after the event; however, they provided a comprehensive report. Following discussion with HQ Air BM SM it was agreed that there were no ATC aspects to this incident and for brevity the ScATCC report has not been included.

UKAB Note (2): HQ 2 GP (the VC10 operating authority) conducted a Non-Statutory Inquiry (NSI) into this incident. The Inquiry is 10 pages in length (plus additional Annexes) and is classified 'Restricted - Limited Distribution'; for brevity and to comply with the security caveats only the salient points are outlined below (disidentified).

REPORT INTO AIR SAFETY OCCURRENCE ON 25 JAN 12 – TYPHOON FGR4 REG XXX AND TORNADO GR4 REG YYY - [abbreviated and disidentified]

Description of Events.

The Typhoon flight, a 2 ship of Typhoons, was tasked to fly a night CT sortie from RAF Coningsby comprising a transit to AARA 5 for non-EO AAR with a VC10, followed by 1v1 intercepts. The sortie had originally been programmed as a 3-ship, but very early in the planning process this was reduced to a 2-ship.

The Tornado flight, a 2 ship of Tornado GR4s, was tasked to fly a night EO Close Air Support (CAS) sortie from RAF Lossiemouth as part of a Sqn pre-deployment trg package for an operation. During the planning process it became evident that the VC10 would be available for night AAR, and the plan was amended to allow the Tornado leader to conduct EO AAR at the start of their sortie while the No 2 conducted CAS in the Dufftown area. After takeoff, the Typhoon flight and the Tornado leader both routed direct to AARA 5 to RV with the VC10 at FL200 and 280kts. The Typhoon flight was the first of the 2 elements to join the VC10, although not the VC10's first receiver; Lossie XX (a single GR4) had already completed AAR and departed from AARA 5. The Typhoons' transit and join were uneventful and as the aircraft approached the observation left position (but before they were able to make their "observation left" R/T call) the VC10 cleared Typhoon 1 astern the right hose and Typhoon 2 astern the left hose. Typhoon 1 continued as directed but at this stage Typhoon 2 had indications of a minor fuel imbalance and maintained observation left for a further minute until the problem was rectified. Typhoon 2 then proceeded astern the left hose. Both Typhoons manoeuvred normally around the VC10 and had successful contacts. During this passage of flight the Tornado leader was cleared to join the VC10 and checked in on the boom frequency aware of the two Typhoons in contact.

Once fully refuelled Typhoon 1 requested disconnect and reconnect for a dry AAR contact and was cleared to do so. Upon completion of the dry contact Typhoon 1 was cleared to disconnect and subsequently cleared to the reform right position, and Typhoon 2 was cleared to disconnect. At this stage the Tornado was approaching the observation left position and with both crew on NVGs the VC10's external lighting began to interfere with the Tornado pilot's NVGs. He briefly halted his approach short of the observation left position to raise his NVGs; the WSO's NVGs remained down. At the same time that the Tornado pilot raised his NVGs and was about to drive forward to the observation left position, the pilot of Typhoon 2 disconnected and, once he assessed he was stabilised astern, looked inside the cockpit to identify the fuel probe switch. The VC10 crew cleared Typhoon 2 to the reform right position. Unable to immediately identify the probe switch, the pilot of Typhoon 2 looked up after approximately ½ second to be faced with a perception of an upwards closing vector towards the VC10 wing-tip. Instinctively he took evasive action by rolling to ~95° AOB and applying full back stick. The Tornado crew was able to glimpse this manoeuvre occurring, and the pilot pulled aft on the stick in an attempt to gain separation. The Tornado pilot does not believe this action took place quickly enough to have reduced the collision risk.

Typhoon 2 is assessed to have passed underneath the Tornado with a miss-distance estimated by the crew of the Tornado as 20 to 30ft (the proximity was such that the crew felt disturbed airflow as Typhoon 2 passed below them). Once the collision vector with the VC10 was broken, and unaware of having passed close underneath the Tornado, the pilot of Typhoon 2 rolled back on to the tanker's heading and stabilised 500ft low. The Tornado pilot continued climbing to FL210 and informed ATC of his change of altitude. Typhoon 2 pilot acknowledged his clearance to reform right and reported that he had "had to breakaway" and then, once stabilised, continued with his clearance to join Typhoon 1 in the reform right position.

From the reform right position Typhoon 1 had seen Typhoon 2 disconnect and stabilise astern the left hose, but had not perceived any drift from that position before he saw Typhoon 2 execute the evasive manoeuvre. Typhoon 1 did not see the Tornado until it began to climb away from him.

Based on the witness statements and the HUD footage, the Panel does not consider that the collision risk with the VC10 was as high as was perceived by the pilot of Typhoon 2. Nonetheless, given the perceived level of collision risk, the pilot of Typhoon 2 reacted instinctively and in an understandable manner.

The Tornado crew briefly discussed the incident in-cockpit and elected to terminate their sortie and RTB, passing their intentions to the VC10 (a full transcript of intercom and R/T calls is at Annex A [not published]). The R/T calls at this point made it difficult for any of the aircrew to gain a full understanding of what had taken place, although each crew had a picture of what they believed to have occurred which shaped how they continued with their sorties.

- a) Tornado. The Tornado crew felt that they had almost collided with Typhoon 2 and were sufficiently shaken to discontinue all tactical aspects of their sortie and return to RAF Lossiemouth. Airborne submission of an Airprox report was discussed but discounted, as the Tornado pilot wished to fully confirm his understanding of events before raising a report.
- b) Typhoon. The Typhoons were now both fully fuelled and needed to reduce weight before landing, either by continuing with the intercepts or in some other manner. Having confirmed that Typhoon 2 was content to continue the sortie, Typhoon 1 judged that continuing with the briefed serial was the most appropriate course of action, and the Typhoon flight departed AARA 5 and completed an uneventful 1v1 Intercept profile. Typhoon 2 did not consider airborne submission of an Airprox report as he was not fully aware of the proximity between the two aircraft. Once all aircraft had recovered to their departure bases the crews conducted telephone debriefs to ascertain the facts of the incident. The Tornado crew and Typhoon 2 pilot agreed to submit ASORs via ASIMS and the captain of the VC10 made a full note of the events prior to discussing his requirement for Airprox reporting with the Sqn leadership.
- c) VC10. The VC10 crew understood that there must have been a collision risk between Typhoon 2 and the Tornado and that they had not contributed to the incident in any way. The captain elected to continue with the sortie as planned and had no intention of submitting an Airprox report whilst airborne as he did not believe they had been directly involved.

Determine the Cause of the Occurrence and Examine Contributory Factors.

- a. Cause. The Pilot of Typhoon 2 became disorientated as to the left hand side of the VC10 whilst attempting to stow the probe.
- b. Contributory Factor. The pilot of Typhoon 2 assessed that avoiding action was necessary to prevent a collision with the VC10.
- c. Other Factor. The momentary pause in the Tornado's progress towards the observation left position put him in the flight path of Typhoon 2 during the latter's avoidance manoeuvre.

The Board reviewed the relevant Tornado and Typhoon publications and instructions and as a result made the following recommendations:

Recommendations:

- (1) Advice on disconnecting from the tanker in the TGRF HB and the TUG [respective ac type handbooks] should be amended to specify that: "when safely established in the reform position pilots should then commence the After Refuelling Checks". This wording is specifically intended to prevent pilots from attempting to stow the probe whilst in the astern position.
- (2) Advice on conducting pre-AAR checks in the TGRF HB and TUG are aligned to utilize the TGRF HB wording, which does not prohibit initiation of the checks before reaching the observation position.
- (3) Chapter 9 of the TGRF HB should be amended to include specific advice on mixed NVG and non-NVG AAR, with an emphasis on when to lift NVGs during a join so as to not interfere with a smooth join to the observation position.
- (4) Typhoon, Tornado GR4 and Brize Norton StanEval teams convene a meeting to discuss the NSI Panel's report and agree relevant amendments to the TGRF HB and TUG, to include agreement on use of the ATP-56(B) definitions for all AAR positions, and depiction of same in the TGRF HB and TUG.

(5) Typhoon StanEval should include advice on night AAR in the TUG, based on the advice in the TGRF HB and that in the Typhoon StanEval AAR Brief.

Initial Response to the Incident.

A full transcript of R/T calls during and immediately after the incident between the VC10, the Typhoon formation and the Tornado, along with cockpit intercom from the Tornado was provided. The Panel considered two aspects of the initial response to the incident to be worthy of comment.

a. Communications. A previous Aircraft Accident Report highlighted the compelling need to fully communicate any incident around tanker aircraft that is not immediately apparent to the formation leader, and the Panel believed that a few short calls to establish what had happened would have allowed all aircraft to make a fully informed approach to the conduct of the remaining sortie time. The Panel considered that the lack of precise terminology during the immediate aftermath of the incident was not conducive to building an accurate picture of events amongst the VC10, the Typhoons and the Tornado. Typhoon 2 used the term “breakaway” to describe the avoiding action he took to remove his perceived collision risk with the VC10. This is a specific term used during the conduct of AAR defined in ATP 56. Rather than conducting a breakaway, the Typhoon was taking avoiding action to stop a potential collision risk.

b. Airprox Reporting. As soon as possible after being involved in an Airprox, the pilot of a British Military aircraft is to make an initial report to ATC (MAA Regulatory Publication-Gen-RA1410(1) Para 45-49.). In the case of the incident under investigation, none of the pilots made an airborne filing of an Airprox report, and it was not until after subsequent discussion on the ground that initial reports were made. The Tornado and VC10 pilots both submitted ASORs linked to an Airprox, whilst Typhoon 2 submitted an ASOR not linked to an Airprox. The Panel detected a widely held belief that the current Airprox investigation system is regarded by aircrew as taking too long.

Recommendations.

- (1) The relevant sections of Air Staff Orders (ASO) for “Aircraft Accidents And Incidents” (ASO 425) be amended to incorporate a requirement to debrief, whilst airborne, all incidents considered likely to lead to submission of an ASOR and specifically all incidents occurring during AAR.
- (2) ASO 425 be added to 2GASOs in a similar format to 1GASOs and AWCASOs, incorporating the debrief requirement at sub-para (1) above.
- (3) Group Flight Safety Staff ensure that crews are refreshed on the requirements of MAA Regulatory Publication-Gen-RA1410(1) regarding Airprox reporting.
- (4) Group Flight Safety Staff investigate the utility and speed of the current Airprox investigation system.

HQ AIR (OPS) comments that units are required by MAA Regulation to investigate their own Airprox, although this is only possible in practice for the most serious incidents. UKAB assessment of risk and cause normally waits for the outcome of such investigation so that they may be considered, and to avoid duplication of investigative effort. Most are left for the UKAB, with Air BM SM support, to investigate, which HQ Air recognises takes time. Furthermore, HQ Air recognises the efforts of the UKAB to reduce this time lag as much as possible, and also distributes the outcomes immediately and performs some limited analysis of the results to assist the units involved.

The Recommendations should prevent recurrence as long as the revised procedures are followed rigorously. This incident highlights that AAR, like many military aviation activities, requires high levels of attention and that things can go wrong very quickly. The dangers of self-induced distraction in

close proximity to other aircraft, day or night, must always be considered; periods of 'heads-in' time in such scenarios must be minimised and much more time may be needed for any in-cockpit activity. Furthermore, the only safe breakout direction behind a tanker is directly backwards. Once the situation developed where a lateral movement was required, or was triggered instinctively, a conflict with joining traffic was always a possibility. The information that traffic was joining on the left was available in the Typhoon cockpit but was not able to be factored in at the time.

This incident serves as a salutary reminder that procedures need to be robust and rigorously applied when conducting such potentially hazardous activities.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all 3 aircraft, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved, a copy of the HQ 2 Gp NSI and reports from the appropriate ATC and operating authorities.

The Board was briefed that, following discussion with the UKAB Secretariat, HQ Air had recommended that an independent NSI be conducted since the UKAB Secretariat lacked the in-depth knowledge of current night AAR procedures.

The Board agreed that the NSI instructed by HQ 2 Gp and provided in full to the UKAB was comprehensive, had identified the cause and relevant factors and had made appropriate recommendations. The Board therefore accepted the report and the HQ Air comment without reservation or further remark; that being the case it was agreed that it would form the basis of the UKAB investigation. Subsequent Board discussion of this most serious incident was therefore confined to assessing the degree of Risk; Members agreed unanimously that there had been a serious risk of collision. Members observed and welcomed that most of the follow-up actions had already been initiated.

The UKAB agreed that there was a perception, identified in the NSI, that many pilots (not only military) believe that Airprox investigations take too long; this has already been identified and addressed both by the UKAB internally and partner organisations. This has resulted in a significant shortening of the process, from about 6 months to just over 3 months, with no reduction of investigation depth or quality.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Attempting to stow the probe while astern the VC10's left hose, Typhoon 2 pilot became disorientated and broke away into conflict with the joining Tornado, which he did not see.

Degree of Risk: A.

AIRPROX REPORT No 2012019

Date/Time: 20 Feb 2012 2008Z (Night)

Position: 5818N 00621W (CPA
4.1nm N Stornoway -
elev 26ft)

Airspace: Scot FIR (Class: G)

Reporting Ac Reported Ac

Type: S92A Tornado GR4

Operator: Civ Trg HQ Air (Ops)

Alt/FL: 2000ft 2000ft
QNH (1011hPa) NK

See radar snapshots below.

Weather: VMC CLBC VMC

Visibility: 20km 10km

Reported Separation:

0ft V/1-1.5nm H Not seen

Recorded Separation:

0V/1.3nm H

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE S92A (S92) PILOT reports that he was flying an IFR training flight from Stornoway, squawking 7000 with Modes C and S, transmitting blind simultaneously on the APP frequency (ATC was closed) and Scottish FIS who provided a BS; TCAS 1 was fitted.

During the outbound leg from SAY, heading 355° at 120kt following the NDB 18 Approach Plate at 2000ft in VMC (night), when about 3nm N from SAY, they received an audio warning 'Traffic Traffic'. A TCAS contact was indicated in the front left position (10 o'clock) of the ac at about 2-3nm. A second 'Traffic Traffic' warning was then heard and avoiding action was taken by immediately turning to the R and initiating a descent and turning the searchlight on. During the turn the other ac was seen paralleling them on an E'ly track at a similar height and about 1-1.5nm away. During the turn, Scottish Control informed them there was a radar contact 2nm on their LH side but by then they were visual with the contact. Had the avoiding action not been taken he believes there would have been a High risk of collision; this view was agreed by Scottish in a subsequent discussion.

Earlier in the flight, as they departed the airfield, communication was made with the other ac [Callsign given] who had called Stornoway ATC. The helicopter pilot relayed that ATC was closed but they would be conducting approaches to RW18 at Stornoway. The Tornado pilot informed them that they were 45nm SW of Stornoway, routeing to 15nm to the W before returning feet wet, low level to Lossiemouth [he thought]. There was no further communication between the ac but he (the S92A pilot) continued to transmit 'blind calls' on the Stornoway ATC frequency.

He reported the incident to the Supervisor at Scottish Control after landing and assessed the risk as being high.

THE TORNADO GR4 PILOT reports flying a night low-level tactical training flight in the UKNLFS, squawking 7001 with Mode C. The report was made after viewing the mission replay system; the RT excerpts are as recorded.

At 1954 they contacted Scottish West Coast FIS (127.275) and asked if there was any traffic in the [West Coast] area; they were informed "no traffic to affect". Then at 2001:50, a free call was made to

Stornoway APP (iaw Lossie SOPs) stating their intentions; Coastguard XXX replied stating the, "Tornado C/S from Coastguard XXX, Stornoway is closed. We're making blind calls on the frequency. We're operating an NDB 18, 3nm south of the field climbing to 2000ft". The Tornado crew replied, "Tornado C/S we are 40nm to the south, routeing inland to the west of Stornoway at low level before boxing to the north before recovering to Lossie feet wet".

The helicopter pilot replied S92A: 'Coastguard xxx that's copied, will continue blind calls on frequency'.

During a simulated attack (SAP) [TFR-Loft-TFR] run at 2006:25, a call was heard stating 'beacon outbound'. At about 2008 they completed the recovery from a loft manoeuvre, then climbed to level at 2000ft amsl, heading outbound on 105° at 450kt to point 24 on the map provided. As the crew passed point 24 at 2008.03, they began a descent back to low-level. At 2009:55 they made a blind call 'en-route', to which the helicopter pilot replied, "copied ??????" (word unreadable).

They were informed of the incident later by the SFSO; they did not see the helicopter and assessed the risk as being low.

THE SCOTTISH AREA CONTROLLER reports he was called on 127. 275 by a S92 helicopter, airborne from Stornoway who advised that he was going to do some practice NDB approaches but that ATC had closed at 1945; he requested and was given a BS. His position correlated with a 7000 squawk O/H Stornoway and the controller understood that to be him but did not give him a radar service.

He had been told about a Tornado ac that was operating in the area by the previous controller and he could see a 7000 squawk about 15/20nm SW of Stornoway, which he understood to be the Tornado. He told the helicopter that there was a Tornado operating in the area and passed the position of the traffic that he could see. Shortly afterwards he saw the Tornado turn N and he passed further information to the helicopter. The helicopter pilot advised him that he had spoken to the Tornado on the Stornoway frequency (123.5) and they had exchanged information. Sometime later the 7000 squawk turned towards the helicopter a couple of miles N of Stornoway airfield and he again passed TI and the pilot replied that he had it on TCAS. When they were within about 2 miles of each other the other traffic turned away to the NE. The helicopter then told the controller that in his conversation with the Tornado he had been told that he would not be coming within 15nm of Stornoway.

The S92 pilot did not say at the time that he was filing an Airprox and the controller only learnt of this sometime later.

ATSI reports that an Airprox was reported 5nm to the N of Stornoway in Class G airspace at 2008:02 between a Tornado GR4 (Tornado) and a Sikorsky S-92A helicopter (S92).

The S92 was carrying-out practice approaches at the Stornoway NDB (SAY) while the airfield was closed and was in receipt of a BS from Scottish Westcoast Sector on 127. 275 MHz whilst also transmitting blind on Stornoway APP frequency 123.500 MHz.

The Tornado was on a tactical low-level flight about to commence a return to Lossiemouth and was listening out on the Stornoway APP frequency.

CAA ATSI had access to recordings of RTF from Scottish Westcoast Sector (Scottish) and the Stornoway frequency, area radar recordings together with written reports from both pilots and the Westcoast Controller.

The Stornoway METARs for 1950 and 2020 were:

METAR EGPO 201950Z 21005KT 9999 FEW018 05/02 Q1012=
METAR EGPO 202020Z AUTO 23007KT 9999 FEW035/// 04/01 Q1012=

At 1946:40 the S92 was inbound to Stornoway and the pilot advised Stornoway APP that they would be dropping off two crew before departing again for some instrument training; Stornoway advised the pilot that ATC was closing and to continue with blind calls.

At 1959:40 the S92 reported departing from RW18 on the Stornoway frequency.

At 2002:00 the pilot of the Tornado called on the Stornoway APP frequency; the S92 pilot advised him that Stornoway was closed, and that they were transmitting blind on the frequency.

The written report from the S92 pilot stated that they were told by the Tornado pilot that the Tornado would be operating '45 miles Southwest of Stornoway, routing west by 15 miles before returning feet wet, low level to Lossiemouth'. The report from the Tornado pilot stated that they were '40 miles to the south, routing inland to the west of Stornoway at low level before boxing to the north before recovering to Lossie feet wet'. The ground-based RTF receiver at Stornoway only recorded the latter part of the conversation between the two ac which was "*Stornoway at er low level before boxing to the north and recovering er back to er Lossie feet wet*".

At 2003:20 the S92 pilot contacted Scottish and advised them that the ac was at 2000ft, operating overhead Stornoway and intended to do the NDB procedure to RW18; Scottish advised the S92 that there was a Tornado operating to the SSW of Stornoway by about 15nm heading N at about 1500ft. The pilot of the S92 advised Scottish that they were two-way with the Tornado on the Stornoway frequency and a BS was agreed.

The written report from the S92 pilot stated that during the outbound leg from SAY they received a TCAS traffic warning indicating traffic in their 10 o'clock position at a range of approximately 2-3nm. A second 'Traffic, Traffic' warning was given and avoiding action was taken by the pilot by turning to the right and initiating descent.

At 2007:40, as the S92 was in the turn, Scottish passed TI on the Tornado to the pilot of the S92, stating, "*Tornado in your vicinity now passing through your 12 o'clock range of about 2 miles showing you're the same altitude*". The S92 pilot obtained visual contact with the Tornado which was paralleling the S92's track. The minimum distance was 1.4nm [after the S92 had turned to the E] with both ac at 2000ft.

The Tornado subsequently tracked to the NE of Stornoway and advised on the Stornoway frequency that they were routing E at low level and were going en route.

As both ac were in Class G airspace, the respective pilots were ultimately responsible for collision avoidance.

In respect of a Basic Service, CAP774 the Manual of Flight Information Services, Chapter 2, paragraph 5 states:

'Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ)...on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot's situational awareness... A controller with access to surveillance-derived information shall avoid the routine provision of traffic information... However, if a controller/FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.'

The Scottish controller gave generic traffic information on the Tornado operating to the SSW to the S92 pilot and then passed a warning when the Tornado flew into proximity with the ac.

When the S92 pilot received a traffic warning on TCAS, avoiding action was taken. The Tornado was not TCAS equipped and the pilot of the Tornado did not see the S92.



Figure 1. Scottish Controller passes TI to Coastguard XXX. (2007:40)

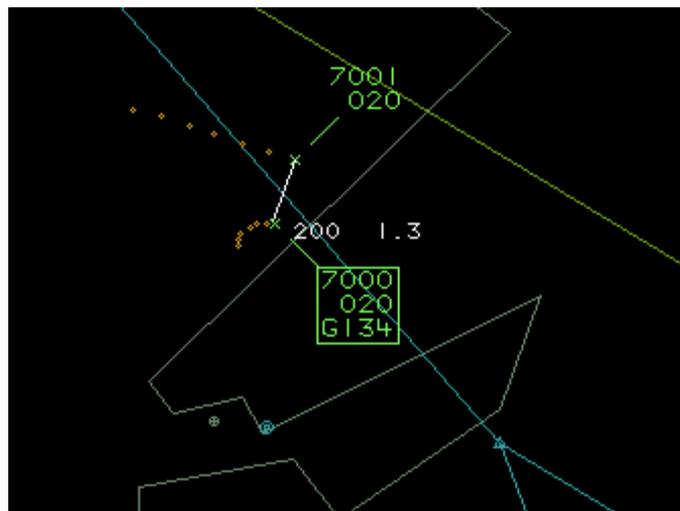


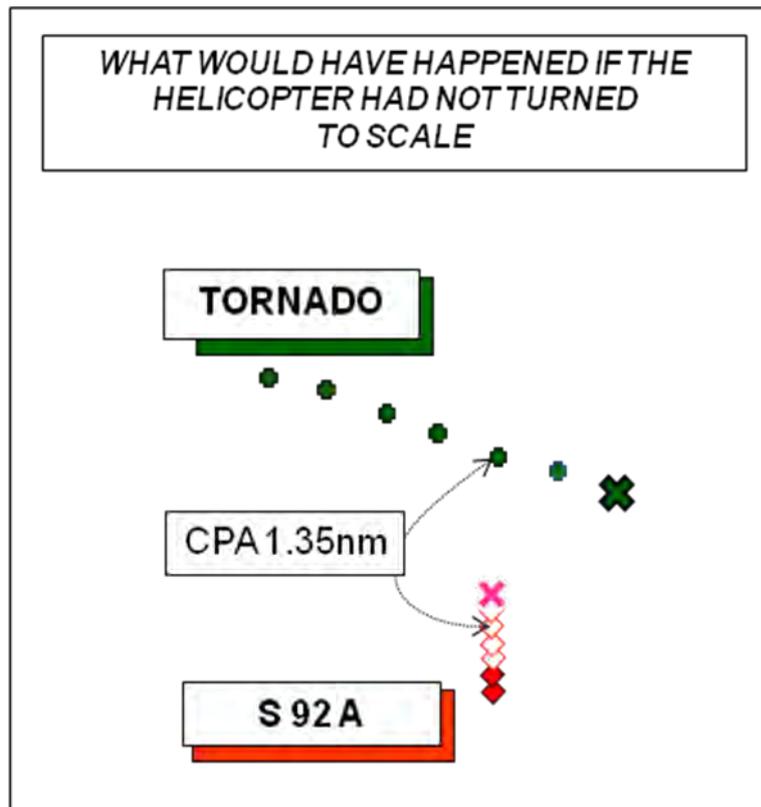
Figure 2. Closest point of approach 1.3nm & 0ft (2008:00)

HQ AIR (OPS) comments that the Airprox was a perceived conflict in Class G. Both parties took sensible precautions in establishing communications with other traffic, but neither was under a Traffic Service. This communication failed in that neither appeared to comprehend the intentions of the other. The Tornado crew did not appreciate that the S92 was actually routing to the north at 2000ft as they do not routinely carry NDB approach plates and had heard the report that the S92 was to the south of Stornoway. Equally, the Tornado crew's reference to "boxing" to the north appears not to have been understood by the S92 crew, who believed the Tornado would not approach within 15nm. In both cases, a longer but clearer description of routings may have assisted in the mutual understanding of the potential for conflict. It is interesting that neither crew felt the need to question the other's calls, apparently content that no conflict existed. The benefit of the S92's TCAS in this incident, coupled with the Tornado's requirement to operate IFF, is evident; fitment of TCAS to the Tornado fleet is still under consideration but is not yet funded, and it is very likely it would have increased the Tornado crew's SA on the S92.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was shown a diagram (below) depicting what would have happened had the S92 not turned to the right (using actual G/S and headings taken from the Stornoway SSR). It showed that the Tornado would have passed from left to right through the S92's 12 o'clock at a distance of 1.3nm at the same alt (2000ft amsl). That being the case Members agreed that the S92's turn had not had the desired effect of increasing the separation between the ac.



The Board agreed that both ac had been operating legitimately in Class G airspace where 'see and avoid' is the principal method of collision avoidance. Stornoway Airport was closed and the Tornado would not have anticipated any local traffic in the area. Nevertheless, the crew called Stornoway in accordance with SOPs and were made aware of the presence of S92 and that it was conducting IF approaches; they would not, however, have been aware that RW18 NDB pattern conflicted with their planned route.

Although aware that the S92 was in the area, the Tornado crew did not see it and therefore were not able to increase the separation (perhaps vertically). Members opined that this might have been due to the background of cultural lighting from the town. The S92 pilot, seeing the Tornado approach from their left, initially only on the TCAS, opted to turn right and remain at 2000ft, the minimum alt for that sector; having turned to parallel the Tornado they first saw it visually on their left when it was overtaking them.

Although Members considered the separation reasonable (1.3nm H) and they agreed that was no risk of collision, they observed that had there been more effective communication between the ac regarding each other's intentions when they talked on the APP frequency, the incident would most likely have been avoided.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the Tornado crew and effectively a non-sighting by the S92 crew.

Degree of Risk: C.

AIRPROX REPORT No 2012020

Date/Time: 25 Feb 2012 1102Z (Saturday)

Position: 5135N 00146W (21nm
WNW CPT)

Airspace: UAR UL9 (Class: C)

Reporting Ac Reporting Ac

Type: A321 A340-600

Operator: CAT CAT

Alt/FL: FL340 FL340

Weather: VMC CLNC VMC NR

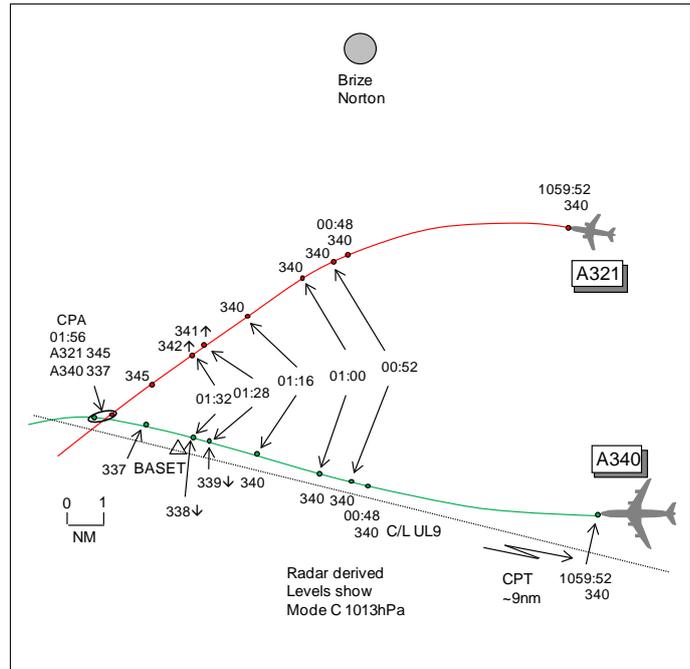
Visibility: NR NR

Reported Separation:

500ft V/1-2nm H 500ft V/1000m H

Recorded Separation:

800ft V/0.4nm H



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A321 PILOT reports cruising at FL340 heading 270° at 450kt near BASET intersection and in communication with London on 135.255MHz, squawking with Modes S and C. Behind them, also at FL340, was an A340. Both flights reported light to severe turbulence and since Met conditions were similar at both higher and lower levels they needed frequent heading changes for about 15min (Wx avoidance). They were cleared BASET – LIPGO, he thought, when the FO came back to the flightdeck after a short absence; the Capt had been alone for some minutes. The clearance read back was not challenged by the controller, the read back was supposedly correct. The crew were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes to them and the A340. Before the turn could be performed a TCAS RA 'climb' was received and this was executed; the A340 received a TCAS RA 'descend'. At the CPA there was 500ft vertical and 0.5nm horizontal separation and he assessed the risk as high.

THE A340 PILOT reports cruising at FL340 at 480kt near CPT routing direct to SLANY and in communication with London, squawking with Modes S and C. The Wx was VMC. There was dense traffic in the London area with several ac on ATC headings. They were aware of an A321 which approached from their R and behind which triggered a TCAS TA and then an immediate RA 'descend', which was executed. At the CPA 500ft vertical and 1000m horizontal separation existed and he assessed the risk as medium.

THE LAC S8/35T CONTROLLER reports the A321 was en-route to Dublin and the A340 was routing to N America both at FL340 and were transferred to him from London Upper Sector (LUS) on parallel headings; the A321 was on the N side of the A340. He sent the A321 direct to BADSI then LIPGO which involved a R turn and then he sent the A340 direct to SLANY which is also a R turn. He then noticed STCA flashing red [high severity alert] because the A321 had turned L towards the A340. He turned the A321 R onto heading 310° or 315° but thought the turn instruction was not acknowledged. He then gave avoiding action to the A321 to turn R onto heading 315° and gave avoiding action to the A340 to turn L onto 180°. He thought the A321 flight acknowledged but the A340 flight didn't. He then gave the turns again however, another flight checked-in immediately after the avoiding action was given but he ignored the call. The A321 flight reported a TCAS RA which he acknowledged.

ATSI reports that the Airprox occurred at 1101:56UTC, in Class C CAS, 12nm WNW of reporting point KENET. The 2 ac involved were in receipt of a RCS from LAC, Brecon (BCN) Sector 35 (S35). Both ac were being operated by the same airline.

The A340 was operating IFR on a flight from Europe to N America and had flight planned to route UAR UL9 between CPT and SLANY (Fig 1).

The A321 was operating IFR on a flight from Europe to Dublin and had flight planned to route UAR UL9/UL18 between CPT and DIKAS then UL18 DIKAS to LIPGO (Fig 1). UL18 is classified as a conditional route which was available on the Saturday of the Airprox.

LAC BCN S8 and S35, 2 of 4 Brecon sectors, were combined and manned by a tactical controller (T) and planner controller (P), utilising the interim Future Area Control Tools Support (iFACTS) system, which uses Trajectory Prediction, Medium Term Conflict Detection, and Flight Path Monitoring. The ATSA position was not manned and the other two BCN Sectors S5 and S23 were also operating combined. The S35(T) controller had been operational at Swanwick for 2.5yr and the S35(P) controller for 6 months.

CAA ATSI had access to RT recordings and area radar recordings together with written reports from the controllers and pilots. The Eurocontrol Automatic Safety Monitoring Tool (ASMT) recorded four messages related to this encounter.

The 2 ac were maintaining FL340, radar heading 280° and established on parallel tracks. As the ac passed N abeam the WOD NDB, the A340, squawking 2514, was in the centre of the UAR and the A321, squawking 2515, was offset to the N, separated by 8.4nm. As the 2 ac approached the CPT VOR the ac were transferred from LUS to the S35(T) controller with an instruction to 'report heading'.

At 1058:41, the A340 flight contacted the S35(T) controller, *"London (A340 c/s) level flight level three four zero"*. This was acknowledged, *"(A340 c/s) Roger"* and there followed a discussion regarding turbulence about 40 to 50 miles ahead.

At 1059:22, the A321 flight contacted the S35(T) controller, *"Hello London (A321 c/s) level three four zero heading two eight zero."* The S35(T) controller replied, *"(A321 c/s) good afternoon route direct to BADSI then LIPGO."* The A321 pilot responded, *"(A321 c/s) direct BASET er after to er LIPGO."* The S35(T) controller acknowledged, *"Affirm."* The incorrect read back was not detected by the controller.

The A321 pilot's written report stated, '(A321 c/s) was cleared BASET – LIPGO when FO came back to cockpit after short absence (Capt alone for some minutes). The clearance read back, however was not objected by controller (read back supposedly correct).'

At 1059:52, the S35(T) controller instructed the A340 flight, *"(A340 c/s) route direct to SLANY"* and the A340 pilot replied, *"(A340 c/s) direct to SLANY thank you."* The lateral separation between the 2 ac was 7.9nm. The S35(T) controller's expectation would be that the 2 ac would establish on tracks to SLANY and BADSI (Fig1), diverging by approximately 20°. The iFACTS system showed that the S35(T) controller had placed the 2 ac on their own navigation and that the diverging tracks were not in conflict.



Fig 1

At 1100:48, the radar shows the A321 had commenced a L turn towards BASET. At 1100:52, the distance between the ac was 6.4nm. The S35(T) controller instructed the A321 to turn R 'now' to BADSI and at the same time STCA activated. The S35(T) controller immediately gave avoiding action to both ac. The three transmissions occurred in quick succession, with 1sec between each, as shown below:

- “(A321 c/s) er turn right now to BADSI, right now to BADSI.”
- “(A321 c/s) avoiding action turn right heading two correction turn right heading three two five.”
- “(A340 c/s) avoiding action turn left heading one eight zero degrees.”

The A321 pilot mistakenly replied to the avoiding action given to the A340, “(A321 c/s) turn left heading one eight zero degrees.” The S35(T) controller responded, “(A321 c/s) negative right heading three two five.” The A321 pilot replied, “Right heading three two five (A321 c/s).” However, during this conversation a TCAS TA was recorded by the Eurocontrol ASMT at 1101:01, followed by a TCAS RA at 1101:15. The A321 received a ‘climb alert’ and the A340 a ‘descend alert’.

The A321 pilot’s written report stated that, ‘Pilots were about to confirm the turn to BASET when ATC changed the clearance to another waypoint followed by heading changes given to (A340 c/s) and (A321 c/s). Before turn could be performed TCAS RA came up with climb for (A321 c/s) and descent for (A340 c/s).’

At 1101:16, (distance 3.9nm) the S35(T) controller instructed the A340 flight, “(A340 c/s) left heading one eight zero degrees now.” There was no response and the S35(T) controller made 2 further transmissions to the A340 flight:

- “(A340 c/s) left heading one eight zero degrees.”
- “(A340 c/s) left heading one eight zero degrees” and after this third transmission the pilot responded, “(A340 c/s) left heading one eight zero TCAS descent.” This was followed with a transmission from the A321 pilot, “(A321 c/s) we have TCAS climb.”

The S35(T) controller responded with “Roger.”

The A340 continued on the W'yly track as it responded to the TCAS RA.

At 1101:32, radar shows the 2 ac converging with a lateral separation of 2.4nm. The A340 is at FL338 descending and the A321 at FL342 climbing. The A340 levels-off at FL337 and the A321 at FL345.

[UKAB Note (1): The CPA occurs at 1101:56, the A321 passing 0.4nm behind the A340 with vertical separation of 800ft].

The Local Area Supervisor (LAS) arranged for the S35(T) controller to be relieved by the adjacent S35(P) controller and an oncoming supervisor took over the planner position. Additional staff was called to provide relief. At this point, it was not clear to the S35(P) controller, what clearances were valid as the electronic strip marking was no longer up to date.

At 1102:06, the A340 crew reported, "...clear of conflict returning to as assigned erm clearance." The A340 commenced a L turn to the previously assigned heading of 180°. The S35(P) controller instructed the A340 flight to stop the turn heading 220°. Radar shows the 2 ac tracking SW, separated by a distance of 2.2nm. The A340 flight, being the W'yly of the 2 ac, was then instructed to route direct to SLANY.

At 1102:37, the A321 crew reported clear of conflict and the S35(P) controller instructed the A321 flight to descend to FL330 on the S'yly heading. At 1103:36, lateral separation has increased to 5.5nm and the S35(P) controller instructed the A321 flight to turn R heading 280°.

At 1104:55, the S35(P) controller was also relieved from the operational position and the oncoming controller continued to provide a service to the 2 flights.

Within 2min of the ac coming on frequency the S35(T) controller had issued direct routeings to both flights with an expectation that their tracks would diverge by approximately 20°. (Fig 1).

The A321 crew was instructed to, "*route direct to BADSI then LIPGO*", but gave an incorrect read back "*direct BASET er after to er LIPGO.*" This was not detected by the S35(T) controller and resulted in the A321 commencing a L turn to intercept the UAR C/L at BASET, bringing it into conflict with the A340. A number of contributory factors may have caused the pilot to mistake BASET for BADSI and the S35(T) controller to miss the incorrect read back:

The next waypoint in the A321 Flight Management System (FMS) after KENET was 'BASET' and this may have influenced the pilot's mindset/ perception of what he heard and his belief that BASET was the next way point, despite the controller's reference to BADSI.

It was not clear if the reported absence/return of the FO to the flightdeck, was a distracting factor which may have contributed to the incorrect read back.

CAA ATSI considered that the pilot's accented read back of BASET, with an emphasis on phonetics 'B' 'A' and 'S', could easily have been misconstrued by the controller in the operational environment as BADSI. It was only with the benefit of a number of recorded playbacks that CAA ATSI was able to identify the waypoint as BASET.

The controller's bias of expectation, (hearing what he expected to hear or half hearing) together with the phonetic similarities, very likely predisposed the S35(T) controller into believing that the read back was correct, which he acknowledged with "*Affirm.*"

Once the controller was alerted to the error and potential conflict, the S35(T) controller instructed the A321 to turn R 'now' for BADSI but almost immediately, probably as a result of the STCA activation and the urgency of the situation, gave avoiding action to both ac. This resulted in the 3 rapid transmissions with only 1sec interval between each:

“(A321 c/s) turn right now for BADSI – right now to BADSI.”

The A321 crew indicated that they were about to confirm the routing to BASET when ATC changed the clearance to another waypoint. The A321 crew would not have been familiar with BADSI, previously affirmed as BASET and there was insufficient time for the pilot to assimilate the information before immediately being given avoiding action:

“(A321 c/s) avoiding action turn right heading two correction turn right heading three two five.”

“(A340 c/s) avoiding action turn left heading one eight zero degrees.”

The A321 crew mistakenly responded to the heading instruction meant for the A340, which was corrected by the S35(T) controller, but it was then too late as both crews reacted to the TCAS RA. The rapid delivery of these instructions to the 2 flights with the same company callsign-prefix was very likely confusing and did not afford the crews the opportunity to assimilate or acknowledge them. The flightdeck workload was likely to have been very high in response to the TCAS RA alerts.

The Manual of Air Traffic Services (MATS), Part 1, Appendix E Pages 1/2 state:

‘Radiotelephony provides the means by which pilots and ground personnel communicate with each other. Used properly, the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. However, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology. **The importance of using correct and precise standard phraseology cannot be over-emphasised.**’

‘Be aware that the mother tongue of the person receiving the message may not be English. Therefore, speak clearly and use standard radiotelephony (RTF) words and phrases wherever possible.’

‘It should be noted that standard phraseology with clear enunciation and an urgent tone must be used for collision avoidance instructions.’

The avoiding action did not contain the word ‘immediately’ or provide TI. MATS Part 1, Appendix E (Attach), Page 11, specifies the phraseology to be used when giving avoiding action:

“(A/c identity) avoiding action, turn left/right immediately heading (three digits) traffic (left/right) (number) o’clock (distance) miles opposite direction/crossing left to right/right to left (level information). (*Clear enunciation and an urgent tone must be used.)”*

The Airprox occurred as a result of the incorrect read back by the pilot of the A321, which was not detected by the S35(T) controller and resulted in the 2 ac coming into conflict with a loss of separation. The situation was resolved by the interaction of the TCAS RA.

A number of factors were considered to be contributory;

The A321 was cleared to route direct BADSI-LIPGO when coincidentally BASET was the next waypoint in the FMS. This may have caused the A321 pilot’s misperception and response, ‘BASET-LIPGO.’ It is considered likely that neither of the reporting points BASET or BADSI would have been familiar to the pilot.

The A321 pilot’s accented read back, together with the controller’s bias to hear what he was expecting to hear, caused the controller to accept the read back as being correct.

The speed of events, the use of same company callsign prefix and the rapid succession of RT transmissions from the S35(T) controller in attempting to recover the situation was very likely confusing to the crews.

The avoiding action phraseology was non-standard and did not allow the crews to acknowledge or respond. This resulted in the A321 crew acknowledging the heading meant for the A340. It was then too late as the 2 crews responded to the TCAS RA alerts.

Recommendations:

CAA ATSI recommends that NATS Swanwick ATSU include this or a similar scenario, together with lessons learned in controllers' Training in Unusual Circumstances and Emergencies (TRUCE) module.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

It was clear that that there were several human factor elements underlying the primary cause of this incident. When the A340 flight first called on frequency, the crew did not report their radar heading, as instructed by the previous controller on the LUS, and the S35T did not confirm this fact which was essential to ensure that the radar separation from the A321 was maintained. That said, Members agreed the crucial point occurred when the A321 flight made its initial call on frequency. The S35T controller intended that the A321 and the A340 should take up divergent tracks. He instructed the A321 flight to take a direct routing to BADSI that should have placed the ac onto a more NW'ly track away from the A340 flight, which was given a direct track to SLANY; this track divergence was confirmed by iFACTS. However, the A321 crew did not assimilate the 5-letter name-code designator given and had read back BASET, the next waypoint on the ac's FMS. This incorrect read back went undetected by the S35T controller, which had led to the A321 turning towards the A340 and caused the Airprox. Members sympathised with the S35T's predicament, as the accented reply by the A321 crew had made the controller's recognition of the BASET waypoint read back more difficult. However, the onus is on a controller to ensure an accurate read back of instructions passed. The RT recorded playback, analysed by ATSI, had found the waypoint read back to be unclear i.e. open to misinterpretation. This, when combined with the controller's expectation bias had led to him believing that the read back was correct. The BADSI waypoint was apparently not expected by the A321 crew and, as their read back of BASET had gone unchallenged, the crew believed that it was correct. Notwithstanding that their read back was not challenged, the crew was unsure about the instruction but by the time they were ready to query it, the controller was transmitting avoiding action. A CAT pilot Member stated that the FMS would list several waypoints on a page for the intended route and that BADSI could have been off the bottom of the page listing and the list may have needed scrolling to bring the waypoint onto the FMS page. Around this time, the FO was returning to the flightdeck which would have meant there was no cross-cockpit confirmation of RT transmissions while the flight was operating single crew. While accepting that "needs must", a CAT pilot Member opined that single pilot operation in such busy airspace, particularly when Wx avoidance and turbulence was reported, was unfortunate timing.

Although the A321 crew had started the L turn to BASET, Members agreed that the situation was recoverable. However, when S35T noticed it, he gave the A321 flight a R turn to BADSI and then avoiding action to both flights in rapid succession. This left insufficient time for A321 crew to assimilate the waypoint information ahead of the avoiding action heading instructions and for either crew to acknowledge. The A321 crew read back the heading instruction meant for the A340 flight, which was corrected by the controller, however this delay had resulted in the ac flight paths breaching the ACAS 'safety bubble' leading to TCAS RAs on both flightdecks. Neither crew acted on the avoiding action issued but both reacted promptly to the coordinated RAs which resulted in the ac

passing with 800ft vertical separation at the CPA of 0.4nm. These actions were enough for the Board to conclude that any risk of collision had been effectively removed.

Owing to the close similarities between BASET and BADSI waypoints, and noting another waypoint BAKUR in the same area, Members were minded that a safety recommendation was required to ensure that the 5 letter name-code designators were reviewed by the CAA to avoid potential future confusion.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The S35T controller did not detect the A321 pilot's incorrect read back.

Degree of Risk: C.

Recommendation: The CAA is recommended to review the 5-letter name-code designators in this area to avoid potential confusion between BASET, BADSI and BAKUR.

AIRPROX REPORT No 2012021

Date/Time: 25 Feb 2012 1235Z (Saturday)

Position: 5148N 00120W (Final approach to RW01 @ Oxford/Kidlington - elev 270ft)

Airspace: CTR/ATZ (Class: D/G)

Reporting Ac Reported Ac

Type: HS125 SR22

Operator: Civ Comm Civ Pte

Alt/FL: 700ft↓ 1200ft↓
QNH (1027hPa) QNH (1027hPa)

Weather: VMC CLOC VMC NR

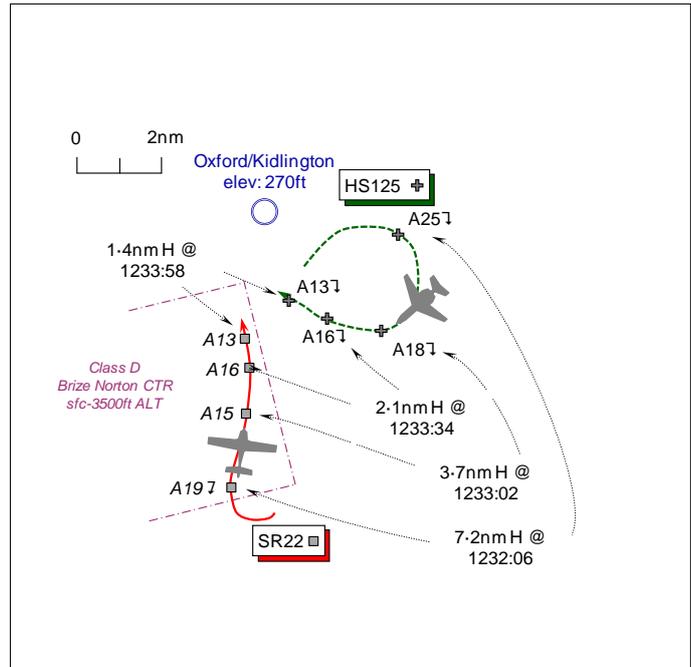
Visibility: 10km+ >10km

Reported Separation:

NK 5-700ft V/1nm H

Recorded Separation:

<1.4nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE RAYTHEON HAWKER 800XP (HS125) PILOT reports that they were on a short VFR positioning flight from Farnborough to Oxford/Kidlington following a charter flight that had terminated at Farnborough. The in-flight weather was good and reported at Oxford as: visibility 10km+, with FEW clouds at 2900ft. They had opted for a visual join and the 1st Officer was the PF at the time of the Airprox. Oxford TOWER was providing a PS/BS on 125.325MHz. A squawk of A7000 was selected with Modes C and S on; TCAS II is fitted.

From overhead, they made a descending right hand orbit to the E of the A/D to join on a R base for RW01. ATC reported their ac was in sight from the Tower during this period and they were cleared to land as they commenced their turn onto final approach. There was no other traffic reported in their vicinity at this point. On short final, heading 010° at 140kt descending through 700ft less than 1min before landing, ATC transmitted on the RT 'Aircraft on finals identify?' He assumed they meant his HS125, but this confused them because they had been cleared to land and previously reported as 'in sight' by ATC; he answered with '[HS125 C/S] short finals to land'. ATC then replied; 'no, the other aircraft on finals, identify?'

By this time they were less than half a mile from the threshold, so it was clear the other ac was behind them. ATC asked the pilot of the other ac – the Cirrus SR22 - if he was visual with their HS125, who replied that he was. He believes ATC then instructed the SR22 pilot to go-around and he remembers hearing the pilot acknowledge this transmission.

After landing they listened to the RT as ATC told the SR22 pilot that he had mistakenly flown the wrong procedure and had not only come close to their HS125 on their final approach but had also, more than likely, infringed the Brize Norton CTR. As they taxied-in, his 1st Officer asked ATC how close to them the SR22 had been when first sighted by ATC, the controller replied 'approximately half a mile'.

The HS125 has a final approach speed of about 140kt and being a light single engine ac the SR22 must be closer to 70kt [100kt reported]; therefore, as they made their turn onto final the SR22 must have been extremely close to them to have flown to within half a mile astern as they pulled ahead

onto short final. TCAS gave them no warning - neither a TA nor RA was enunciated. Neither he nor his colleague saw the SR22 during the period of the Airprox and he assessed the Risk as 'medium'.

He suggested that a radar installation at Oxford would have prevented this Airprox as ATC would have known the SR22 pilot was flying the wrong procedure as soon as he started. His ac is white with blue stripes; the HISLs, anti-collision beacon nav and landing lights were all on.

THE CIRRUS SR22 PILOT reports he was flying solo in VMC and in receipt of a BS from Oxford APP on 125.325MHz. His ac is coloured white; he did not report the status of his aeroplane's lighting.

He was descending on the ILS for RW19 when ATC called to advise of a RW change due to the surface wind backing. He misheard the instruction from the controller, which was for him to use the RW100 (*sic*) procedure, and changed his approach to that for the NDB procedure to RW01.

On final descent through 1200ft QNH (1027hPa) heading 010° at 100kt, bearing 190° from the OX NDB at 1.5 – 2nm DME, he saw a business jet – the HS125 - on final approach about 1nm ahead and 500-700ft below his aeroplane, so he immediately broke off the approach and turned R to avoid it. His TCAS did not activate and the controller also reported the HS125 ahead of his ac. Minimum separation was 1nm horizontally and 500-700ft below his ac; he assessed the Risk as 'low'.

THE OXFORD COMBINED AERODROME AND APPROACH CONTROLLER (APP) reports that the ADC position was bandboxed with APP operating on 125.325MHz. The SR22 pilot was booked in for 2 ILS training approaches on RW19. After the 1st approach the RW in use was changed to RW01 and the SR22 pilot elected to continue training by flying the NDB 100 Procedure and circling to land on RW01. She checked that the pilot had the correct approach plates to which he replied 'affirm'. After 8min in the hold she cleared the SR22 for the NDB 100 Procedure, again emphasising the circle to land on RW01. When the SR22 pilot reported 'beacon outbound' the DF indication was to the N of the OX. Meanwhile, the HS125 crew called SE of the A/D requesting a VFR R base-leg join for RW01; she approved the R base-leg join for the HS125 and the ac continued inbound towards the A/D. The SR22 pilot reported 'base turn complete' and was instructed to report at 4 DME; the pilot's intentions were obtained, which was a missed approach and depart the area. Missed approach instructions were issued to the SR22 pilot, which involved the ac flying overhead the A/D W to E and departing to the E, which was acknowledged. When the HS125 crew reported on right-base for RW01, she cleared the flight to land and was awaiting the 4DME report from the SR22 pilot, which she believed was on the FAT of 100° as per the procedure.

As she watched the HS125 on final for RW01 an ac was observed about half a mile behind it, which by checking the DF and pilot report she established was the SR22. A 4DME report had not been passed by the SR22 pilot, who had flown the wrong procedure and flown the NDB RW01 procedure not the 100° procedure for which they had been cleared.

The SR22 was sent around immediately and TI was passed. The HS125 crew continued inbound for a normal landing; no TCAS RA or TA was reported. The SR22 went around and she advised the pilot that he had flown the incorrect procedure. The SR22 pilot departed to the E and changed frequency to Denham at 1239 upon leaving the ATZ. She contacted Brize Norton to advise them that the SR22 crew had flown the RW01 NDB Procedure by mistake (Oxford ATC is required to obtain permission from Brize Norton ATC to clear ac for this procedure as it infringes the Brize Norton CTR). Brize Norton reported they had no traffic to affect the ac on this occasion.

UKAB Note (1): The UK AIP at AD 2-EGTK-1-5 promulgates the Oxford/Kidlington ATZ as a circle radius 2nm centred on the midpoint of RW01/19, extending from the surface to 2000ft above the aerodrome elevation of 270ft and active in Winter, daily, from 0630 – 2230.

ATSI reports that the Airprox occurred about 1.9nm SSW of Oxford Airport on final approach to RW01 at the boundary of the Oxford ATZ; the HS125 was inside the ATZ and the SR22 just exiting

the Brize Norton CTR. The HS125 was inbound VFR to RW01 on a positioning flight from Farnborough and in receipt of a BS from Oxford APPROACH. The SR22 was inbound IFR from Denham for training, having pre-booked two ILS approaches for RW19. After the SR22 completed the first hold and ILS for RW19, the runway in use changed to RW01. On the second approach the SR22 was cleared for the NDB (L) DME100 hold and approach to the A/D, which required the SR22 to extend the hold to the W, letting down in the procedure. The SR22 was in receipt of a PS.

There are two holds at the Oxford NDB (OX):

- a) A one-minute racetrack pattern approaching the NDB (L) OX on a track of 100°(M) turning L at the 'OX', used for the NDB (L) DME 100° and the NDB (L) DME RW01 approach.
- b) A one-minute racetrack pattern approaching NDB (L) OX on a track of 339°M, turning right at the 'OX', used for the NDB (L) DME RWY 19 and the ILS/DME/NDB (L) RWY 19 approach.

There are five published procedures at Oxford:

- a) ILS/DME/NDB(L) RW19.
- b) LLZ/DME/NDB(L) RW19.
- c) NDB(L)DME RW19.
- d) NDB(L)DME 100° to Aerodrome.
- e) NDB(L)DME RW01.

The Oxford Manual of Air Traffic Services, Part 2, Page 4-7, states that: 'when any runway other than RW19 is in use, the active procedure will be the NDB (L) DME 100°.

The AIP entry for the NDB(L)DME RW01 procedure requires the permission of Brize RADAR as it transits their CTR. The AIP page (10 Mar 11) AD 2-EGTK-8-1, Instrument Approach Chart states that the 'procedure is not available for training'.

The Oxford controller reported operating a combined Aerodrome and Approach service, without the aid of surveillance equipment. Workload was considered to be medium/heavy.

The Unofficial Oxford weather for 1210Z: 30008KT 9999 BKN027 10/03 Q1027
The Brize Norton METAR for 1212Z: 32005KT 9999 SCT025 09/02 Q1027 BLU NOSIG=

At 1204:45, the SR22 was established in the hold waiting to commence the first of two ILS approaches for RW19. The controller informed the pilot that due to the wind, the runway was soon to be changed to RW01 and requested the pilot's intention after the ILS. The SR22 pilot replied, *"..after the ILS..can I do an NDB approach on runway 0-1."* The controller responded, *"you can do an NDB approach for the 1 hundred procedure it's the same as the 0-1 hold but it's procedure out to the west of the airfield just let me know you've got the correct plates for that."* The pilot acknowledged, *"..affirm I have the correct plates so..you would I will do a..NDB approach for..0-1."* The controller responded, *"Affirm I'm happy for you to fly the first ILS but..I may have to break you off early and send you into the visual pattern just let me know your intentions."* At 1206:25, the controller broadcast the runway change with RW01 in use.

At 1211:21, the controller asked the SR22 pilot if he was still in the hold. The SR22 pilot replied, *"..sorry negative..I'm just er localiser established apologies."*

At 1213:57, the SR22 pilot reported at 4 DME and the controller replied, *"if you break off to the left and then you can establish a climb to altitude 3 thousand 5 hundred feet back to the OSCAR XRAY and report entering the 1 Hundred Hold."* The pilot replied, *"..breaking off to the left climb to 3 thousand feet and then returning to Oscar report in the 1 Hundred Hold ?????? ??????"* The controller corrected the level, *"[SR22 C/S] 3 thousand 5 hundred please and how many holds do you require."* The pilot gave a correct readback and requested one hold.

At 1220:52, the controller asked if the SR22 had taken up the hold and the pilot responded, “*..just outbound to pick up the hold [SR22C/S]*”. The pilot was instructed to report ready for the procedure. Recorded radar data shows the SR22 outbound and correctly positioned in the NDB (L) DME 100° hold. At 1225:34, the SR22 pilot reported ready for the procedure and the controller instructed the pilot to continue in the hold. At 1226:22, the controller gave the following clearance, “[SR22C/S] *cleared NDB Locator 1 Hundred procedure with a circle to land for Runway 0-1 report beacon outbound.*” The pilot acknowledged, “*..cleared for the Locator Procedure for er the One Hundred report beacon outbound [SR22C/S].*”

At 1228:02, the SR22 pilot reported beacon outbound and shortly afterwards reported descending with the procedure. Recorded radar data shows the SR22 tracking eastbound from the ‘OX’ and that instead of making a L turn for the NDB (L) DME 100 procedure, the SR22 turned R for the NDB approach for RW01.

The SR22 pilot indicated that after the approach he required a low approach and return to Denham. The controller responded, “[SR22C/S] *roger be the low approach then off the 1 Hundred Procedure to fly low level over the airfield and track eastbound remaining clear of Weston on the Green and then a VFR departure to Denham.*” The pilot replied, “*..low approach and then fly eastbound and..then departure to Denham [SR22C/S].*” The SR22 was instructed to report base turn complete.

At 1229:20, the HS125 crew contacted Oxford, reporting VFR inbound and requesting a visual join for RW01. The HS125 pilot was instructed to remain outside the Brize CTR routing to the E and then R base for RW01. This was acknowledged by the HS125 pilot. Radar shows the HS125 descending to the E of the A/D.

At 1232:12, the SR22 pilot reported base turn complete and the controller replied, “[SR22C/S] *roger report..commencing the..go around on the 1 Hundred Procedure.*” This was acknowledged correctly. Radar recording shows the SR22, S of the airfield on a 6.3nm final for RW01 and inside the Brize Norton CTR. The controller’s expectation was that the SR22 would be approximately 6.5nm W of the airfield. At this point no TI had been provided to either the SR22 or HS125. At 1233:22, the HS125 reported on right base and the controller issued a landing clearance with surface wind 310/07kt.

At 1234:18, radar shows the SR22 fading from radar, on a 2.5nm final for RW01, with the HS125 turning onto final 0.6nm ahead of the SR22. The HS125 also fades from radar. The indicated ground speed of the SR22 was 106kt and the HS125 as 126kt. The controller’s written report indicated that an ac was sighted half a mile behind the HS125 and at 1234:44, the controller transmitted, “*Aircraft on final for 0-1 report yourself.*” The controller believed that the SR22 was to the W of the airfield.

At 1234:50, the HS125 pilot reported short final and the SR22 pilot reported going around. The controller responded, “[SR22C/S] *the wrong procedure you were instructed to fly the 0 the 1 Hundred Procedure with a circle to land for 0-1.*”

After the HS125 landed, the pilot reported that there wasn’t a problem, he didn’t have the other traffic on TCAS and having been cleared to land, continued the approach to land. The SR22 pilot returned to Denham VFR.

The SR22 pilot’s written report stated that, “*I misheard the instruction (which was for me to use R/W 100) and changed my approach for R/W 01*”. Brize Norton were advised of the incident and reported that they had no traffic to affect and that on this occasion there wasn’t an issue.

The SR22 pilot had mistakenly carried out the NDB (L) DME **RW01 procedure**, instead of the NDB (L) DME **100° to Aerodrome procedure**. This resulted in the SR22 infringing the Brize Norton CTR and turning onto final for RW01, bringing it into conflict with the HS125.

It was not clear if the SR22 pilot was familiar with the NDB (L) DME 100° to Aerodrome procedure or fully understood that this was the procedure specified by ATC. The SR22 pilot had pre-booked and planned for two ILS approaches.

When the controller explained the runway change the following RT exchange occurred:

SR22 pilot: *“erm after the ILS erm can I do an NDB approach on runway 0-1.”*

Controller: *“you can do an NDB approach for the 1 Hundred Procedure it’s the same as the 0-1 hold but it’s procedure out to the west of the airfield just let me know you’ve got the correct plates for that.”*

SR22 pilot: *“Er affirm I have the correct plates so erm you would I will do a er NDB approach for er 0-1.”*

The pilot’s last response mentioned having the correct plates, but refers to the NDB approach for RW01. This was not challenged by the controller. However, when the SR22 pilot reported ready for the procedure, the controller gave the following clearance:

Controller: *“[SR22C/S] cleared NDB Locator 1 Hundred Procedure with a circle to land for Runway 0-1 report beacon outbound.”*

SR22 pilot: *“er cleared for the Locator Procedure for er the 1 Hundred report beacon outbound “[SR22C/S].”*

The controller used the term ‘the 1 Hundred Procedure’ on a number of occasions. The SR22 pilot’s written report stated, *“I misheard the instruction (which was for me to use RW 100) and changed my approach for RW01”*. The pilot’s reference to runway 100 rather than the 100 procedure also indicated unfamiliarity with the procedures at Oxford.

The SR22 pilot had flight planned and prepared for two training ILS approaches on RW19. When the runway changed the pilot requested an NDB for RW01. It is considered that it was very likely that at this point the pilot believed he was to expect the NDB approach for RW01. When the pilot was subsequently cleared for the NDB Locator 1 Hundred procedure he may have been predisposed into thinking that the clearance was for the NDB approach to RW01.

The controller was not aware that the SR22 pilot had carried out the incorrect procedure and entered the Brize Norton CTR. No warning was received from Brize Norton who subsequently reported that they did not have any conflicting traffic.

The controller had an expectation that the SR22 pilot would be letting down and approaching the airfield from the W. The SR22 pilot reported base turn complete (normally 6.5nm W), whilst the HS125 was joining on R base for RW01 from the SE. The controller did not believe at that point that a confliction existed.

CAP774 Procedural Service, Chapter 4, Page 5, Paragraph 5, states:

‘The controller shall provide traffic information, if it is considered that a confliction may exist, on aircraft being provided with a Basic Service and those where traffic information has been passed by another ATS unit; however, there is no requirement for deconfliction advice to be passed, and the pilot is wholly responsible for collision avoidance. The controller may, subject to workload, also provide traffic information on other aircraft participating in the Procedural Service, in order to improve the pilot’s situational awareness.’

The Airprox occurred when the SR22 pilot was cleared for the Oxford NDB (L) DME 100° to Aerodrome procedure and mistakenly flew the NDB (L) DME RW01 procedure. This resulted in the

SR22 incorrectly turning onto final approach for RW01 into conflict with the HS125, which was also turning onto final for RW01.

A number of factors were considered to be contributory:

The pilot had prepared for two training approaches using the ILS for RW19 and may not have been fully prepared for the short notice change of runway.

The pilot misunderstood and may not have been familiar with the Oxford NDB 100 procedure referring in his written report, to an approach for RW100.

The SR22 pilot had requested and was likely predisposed into thinking that he was cleared for NDB approach for RW01.

The controller missed the opportunity to challenge the pilot's initial misunderstanding that he had the 'correct plates' and would do an NDB approach for RW01. However the pilot was subsequently given a specific clearance for the "*..NDB Locator 1 Hundred procedure..*" and the controller used the term "*..1 Hundred procedure..*" a number of times.

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 appropriate ATC authority.

It was evident to the Board that this Airprox had stemmed from the SR22 pilot's incorrect selection of the appropriate approach procedure to use at Oxford following the RW change. However, it was unfortunate that APP had missed an opportunity to correct the SR22 pilot when the pilot advised that, "*..I have the correct plates so..I will do a..NDB approach for..0-1*". Nevertheless, the subsequent clearance issued by APP for the NDB (L) 100° to A/D procedure albeit that it was issued as, "*..cleared NDB Locator 1 Hundred Procedure with a circle to land for Runway 0-1..*" should have made it evident to the SR22 pilot the approach he was being cleared to fly by the controller. Undoubtedly the similarity in the nomenclature of the two procedures did not help and a pilot Member suggested that if the controller had emphasised that the NDB (L) DME RW01 procedure was not available to the SR22 pilot, for example, it might have given him a clearer understanding of what approach he was being cleared to fly. It seems the SR22 pilot did not appreciate that training NDB approaches are not permitted on RW01 and a GA pilot Member suggested that there was probably an element of unfamiliarity with the Oxford procedures here. However, the fact that the NDB (L) DME RW01 procedure is not available for training is clearly marked on the TAP chart. The GA pilot Member stressed that it was important to conduct thorough pre-flight planning when contemplating IFR training, so it seemed that the SR22 pilot might have been caught out by the RW change onto RW01 and had not briefed himself adequately on the specific detail of the Oxford procedures when the other RW was in use.

Controller Members noted that the APP controller had not mentioned the use of VDF; this often under-rated aid is very useful in the procedural environment and could have highlighted to the controller that the SR22 pilot was approaching the A/D from the S and not the W when he reported base turn complete. A controller Member emphasised the importance of accurate DME calls from pilots during procedural approaches as these are the only means the controller has of deducing at what stage the ac is on the approach and upon which any TI will be based. A pilot Member questioned why TI had not been passed to the HS125 crew about the SR22 earlier, but controller Members suggested that APP might normally ask for a 4 DME call from the SR22 pilot to gauge the position of the instrument approach against the HS125 on final. However, here APP had asked the SR22 pilot to advise when he was commencing his go-around, which was after APP recognised what had occurred. As it was, APP was unaware that the SR22 pilot was executing the wrong procedure and believed the SR22 pilot was to the W of the A/D, flying the NDB (L) DME 100° to Aerodrome

until the controller identified the SR22 on final visually, behind the HS125, just after 1234:44. The last opportunity the HS125 crew might have had to sight the SR22 was when the latter was 3.7nm away and 300ft below them as they turned R through W. However, it was the controller's transmission that alerted them to the presence of the SR22 astern a little later as they were on short final to land. For their part the HS125 crew had little impact on the outcome of this Airprox at all, which the Members agreed resulted because the SR22 pilot did not fly the cleared procedure and flew into conflict with the HS125. Unfortunately both ac contacts fade on recorded radar data as they descend below 1300ft and the CPA is not apparent. However, neither ac received TCAS alerts and the HS125 on final had been spotted by the SR22 pilot, who reports seeing the executive jet about 1nm ahead. Consequently, the SR22 pilot elected to break off the approach and turn R out of the pattern, which convinced the Members that no Risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The SR22 pilot did not fly the cleared procedure and flew into conflict with the HS125.

Degree of Risk: C.

AIRPROX REPORT No 2012023

Date/Time: 26 Feb 2012 1155Z (Sunday)

Position: 5414N 00113W (Sutton Bank GLS - elev 920ft)

Airspace: London FIR (Class: G)

Reporting Ac Reported Ac

Type: Falke 25 MG Unknown LA

Operator: Civ Club Civ Pte

Alt/FL: 300ft NK
aal

Weather: VMC CLBC NK

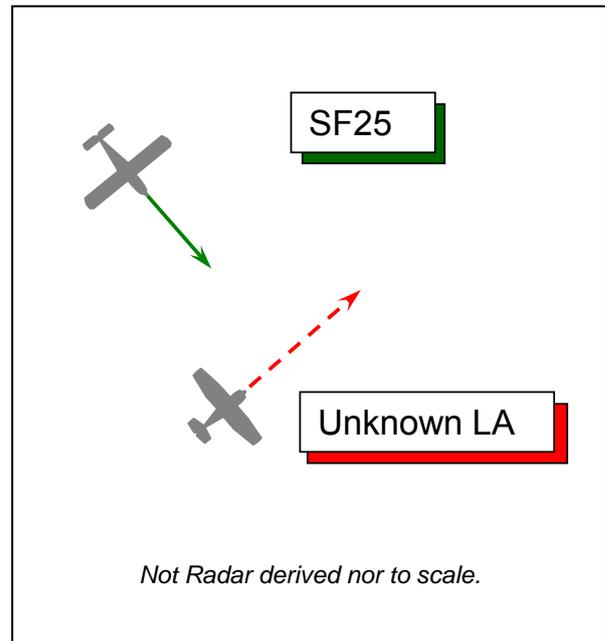
Visibility: 4nm NK

Reported Separation:

35ft V/80m H NK

Recorded Separation:

Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE FALKE SF25 SELF LAUNCHING MOTOR GLIDER (SF25 MG) PILOT reports he was airborne to establish the prevailing cloud base for the club's duty officer-in-charge of gliding operations, but also to practise bad weather ccts at 500ft QFE. He was in communication with Sutton Bank on the A/G Station frequency of 129.975MHz. SSR is fitted, but selected 'off' and the Mode C was unserviceable. His SF25 MG is coloured green and white; a HISL is not fitted.

After take-off from RW24 at Sutton Bank glider launching site (GLS), once clear of the escarpment, he commenced a climbing turn to the L on to the cross-wind leg heading 150° at 60kt climbing through 300ft aal (about 1220ft ALT), some 300ft clear beneath the overcast cloud with an in-flight visibility of 4nm. At this point [he did not specify the sighting distance] an unknown high-wing single-engine light ac (LA) flew from R to L about 80m ahead and 35ft above him, so to avoid it he lowered his MG's nose. When the unknown LA (coloured red and white) had passed, he continued his climb and turned LH downwind for RW24 at reduced speed in order to monitor the LA's flight path. The LA flew along RW02 in a gentle climb until it reached the base of cloud O/H the threshold of RW20, whereupon it turned R through about 160°. He called the pilot of the unknown LA on the Sutton Bank A/G frequency requesting his intentions but received no reply before it departed from the vicinity heading SE'ly.

He assessed the Risk as 'medium' but his main concern in reporting this Airprox is that without prior radio contact the pilot of the unknown LA flew across the downwind leg and departed via the final leg of a prominent glider launching site, ignoring standard cct joining procedures. It was fortunate that the 3 gliders awaiting aerotows were precluded from launching by the low cloud base. However, a group of four ac comprising one microlight and three flexwings had landed at the site shortly before the incident, having first established radio contact, stated their intentions and followed standard cct joining procedures. Had their arrival coincided with the other ac's radio silent transit the consequences could have been more serious.

Fortunately winch-launching operations, (the wind being W'ly) were not possible due to the low cloud base O/H the site. He reported the Airprox to the club safety officer on landing.

THE GLIDING CLUB'S FLYING DIRECTOR commented that the 'big sky' theory saved the day again. Sutton Bank is a busy glider launching site without an ATZ. The pilot of the other ac displayed poor airmanship and lack of common sense during this incident.

UKAB Note (1): The UK AIP at ENR 5-5-1-6 promulgates the glider launching site at Sutton Bank as active from Sunrise to Sunset, for aerotows and winch launches to 2000ft above the site elevation of 920ft amsl.

UKAB Note (2): A primary contact that might be the SF25 MG 'pops up' WSW of the reported Airprox position for 3 sweeps and is last shown heading ESE before fading. The Radar Analysis Cell (RAC) at LATCC (Mil) detected 4 potential ac tracks on the Swanwick radar recording that might be the reported ac, however, none of these tracks were displayed consistently throughout the period of the Airprox. One of the recorded intermittent tracks is a microlight (ML) resembling the description of the high-wing Cessna-type monoplane reported by the Falke SF25 MG pilot. This white high-wing ML with the registration written in red down each side departed from Bagby A/D to the SE and was initially perceived to be the reported ac. However, subsequent receipt of the ML pilot's comprehensive report and analysis of the attached GPS flight data, comparison with the recorded radar data revealed that this ML was not the reported ac. Further attempts to trace the reported ac have subsequently proved fruitless; consequently, the identity of the reported ac remains unknown.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included a report from the SF25 MG pilot and radar video recordings.

It was unfortunate that despite the best efforts of the RAC, the reported LA remains untraced. While the SF25 MG pilot's report was comprehensive, it was difficult for the Board to arrive at meaningful conclusions on the Cause and Risk with just one pilot's report and only very limited radar data that did not illustrate the relative geometry and minimum separation. Some Members perceived that there was insufficient information available; nonetheless, the overwhelming majority considered that this Airprox could be assessed on the basis of the SF25 MG pilot's report alone.

It was not clear if the reported LA pilot was aware that he had overflown Sutton Bank GLS or seen the SF25 MG. If he had been aware of the GLS beforehand, then this Airprox illustrated poor airmanship on the part of the reported LA pilot as he would not necessarily be aware that winch launching had been curtailed because of the prevailing weather. The danger of overflying an active GLS below the maximum promulgated height of the winch cable was self-evident and pilots should plan their flights to ensure that they give active glider launching sites as wide a berth as feasible. Members understood the SF25 MG pilot's main concern that the reported LA pilot had flown through the cct area of the GLS without prior radio contact. If he had strayed off his planned track, or was lost, then a call on the RT (if the ac was radio equipped) could have alerted the GLS operator and other pilots operating in the vicinity to his presence. However, such advice was predicated on foreknowledge of the RT frequency in use at the specific GLS and Members were not confident that these were well known to GA pilots. Whilst the frequency for Sutton Bank (129.975 MHz) could be easily found on their website - <http://www.ygc.co.uk/oursite.php>— and is shared with nearby Rufforth, those in use by the other various GLSs in the UK might not be so easy to determine. The question of the promulgation of GLS frequencies was discussed further and the GA gliding Member advised that there are only a limited number of frequencies that are commonly used for gliding within the UK and he helpfully agreed to provide them.

On the limited information available, however, the Board could only conclude that this Airprox had resulted because the untraced light aircraft pilot flew over an active GLS (below the maximum promulgated height of the winch cable) and into conflict with the Falke SF25 MG.

Turning to the inherent Risk, there was no reason to doubt the veracity of the SF25 MG pilot's report where he had estimated the minimum separation at about 80m when the unknown LA flew from R to L ahead and 35ft above him. Whilst these distances suggested to some Members that safety had

been compromised, it was evident that the SF25 MG pilot had time to lower his ac's nose to avoid the unknown LA, which did not suggest to other Members that robust avoidance action had been necessary. The Board was fairly evenly divided on this point and so on the basis of the limited information available and following a vote, it was concluded by a majority that there was no actual Risk of collision.

[Post meeting Note: Gliding in the UK is allocated a small number of simplex frequencies at 25KHz spacing which are available for use by all glider pilots and all gliding sites throughout the UK. The frequencies below are assigned on a shared basis and are not afforded any protection against mutual interference.

129.900MHz Ground to ground safety management
129.975MHz Common Field Frequency. Safety and sporting use within 10nm and 3,000' of a gliding airfield

130.100MHz Gliding safety/sporting use
130.125MHz Gliding safety/sporting use
130.400MHz Gliding safety/sporting use

When using Common frequencies, it is necessary to correctly address the airfield concerned as other sites in the area could answer if not.]

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The untraced light aircraft flew over an active glider launching site (below the maximum promulgated height of the winch cable) and into conflict with the Falke SF25 MG.

Degree of Risk: C.

AIRPROX REPORT No 2012026

Date/Time: 2 Mar 2012 1619Z

Position: 5116N 00050W (2nm WSW
Farnborough - elev 238ft)

Airspace: ATZ (Class: G)
Reporting Ac Reporting Ac

Type: BA146 CL600

Operator: Civ Comm Civ Exec

Alt/FL: 1300ft↑ 1200ft↓
QNH (1023hPa) QNH

Weather: VMC CLBC IMC HZBL

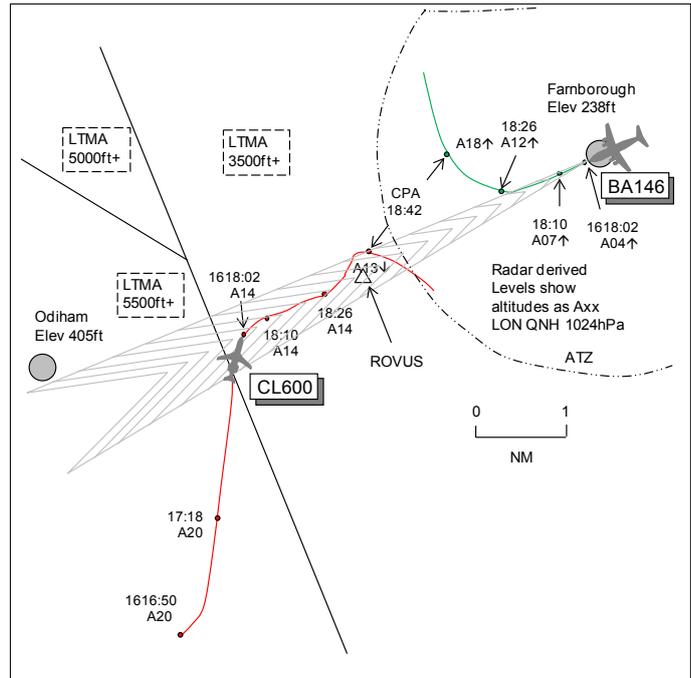
Visibility: 5000m 2nm

Reported Separation:

200ft V/4.5nm H 800ft V/2nm H

Recorded Separation:

500ft V/1.4nm H



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BA146 PILOT reports outbound from Farnborough, IFR and in communication with Farnborough ATIS on 134.35MHz, he thought, squawking 6020 with Modes S and C. The visibility was 5000m in VMC and the ac was coloured white/blue; ac lighting was not reported. On taxiing out they were issued with a departure clearance of 'climb on RW heading to altitude 2400ft and at 2.5DME turn R heading 285°, squawk 6020. They were then cleared for take-off RW24. About 1.5nm SW of Farnborough heading 244° into sun at 150kt, climbing through 1300ft QNH 1023hPa, they switched to Radar, he thought [actually still with Tower], and were instructed to make an immediate R turn for avoiding action onto 360°, which they executed. On looking at their TCAS display they could see an ac about 5nm ahead and closing, about 200ft above. TCAS then issued a TA but no RA was generated. Once clear of the traffic they were turned back onto heading 270°. He assessed the risk as medium. Had the controller not been able to contact them immediately as they changed frequency then the 2 ac were heading directly towards each other and he would have then assessed the risk as high.

THE CL600 PILOT reports inbound to Farnborough, IFR and in receipt of a DS from Farnborough ATIS on 134.35MHz, squawking with Modes S and C. The visibility was 2nm between cloud layers in IMC and the ac was coloured white/gold; lighting was not reported. While established on the ILS RW24, he thought [actually RW06] they were cleared for the approach after reporting "established on LOC". Upon descending on the G/P at 160kt at about 1200ft QNH they were told by the controller to make a hard L turn onto 120° [actually 330°]. After complying with the instruction they were then told to make a hard turn onto heading 300° [actually R 180°] so the FO, PF, disconnected the AP and complied with the instruction. While breaking R they saw an ac on their LHS turning to its R about 800ft above climbing at a very steep angle and 2nm away. After they were clear of conflict they were given a parallel course to the LOC and were asked to climb to 3000ft before being vectored back to the ILS. Neither a TCAS TA or RA was generated during the encounter and he assessed the risk as high.

THE FARNBOROUGH ADC reports he took over the position at 1610Z following a RW change and started the process of cancelling the safeguarding that was in force. The BA146 flight had been

given start approval by the outgoing controller. During the process of making telephone calls on the check list to cancel safeguarding several vehicle drivers called to enter RW24 which was the outgoing RW. Owing to the RW designator strip still indicating RW24 he cleared the vehicle drivers to enter and vacate accordingly. The BA146 flight called for taxi at 1615Z during his phone calls to the various parties needing to know about safeguarding being cancelled. Owing to him being distracted by the phone calls he cleared the BA146 flight to taxi for holding point 'W' for RW24 while observing the RW designator strip, and issued departure instructions for a RW24 CPT departure and then instructed the flight to enter and backtrack the RW. He observed a CPT inbound, the CL600, on the ATM passing 5000ft S'bound towards the ROVUS direction with about 5nm to run to ROVUS so he called Radar for a release on the BA146, which was given. He then saw the CL600 turning E a few miles S of Odiham onto what he thought would be a downwind leg [RW24]. The BA146 flight was cleared for take-off. His attention was taken away from the ATM as he was watching the RW and the departing BA146, which was airborne at 1618Z. He watched the BA146 climb as it passed the aerodrome boundary and was about to transfer control to approach when he noticed the CL600 establishing on the RW06 ILS with about 5nm to run. He gave the BA146 flight a voiding action immediately with a R turn onto heading 360°. He called Radar to advise that the BA146 was taking an avoiding action R turn and he heard the Radar controller also issue an avoiding action R turn. He confirmed with the BA146 crew that they were turning R onto 360° and advised the crew to report the heading to Radar on 134.35MHz.

THE FARNBOROUGH APR reports having taken control of the position towards the end of a Flight Check for RW24 ILS. Once the check was completed, in consultation with the Air controller, after 1 last RW24 departure [not the BA146], a RW change was completed in accordance with the local procedures to RW06 due to the E'ly wind. The first arrival for RW06, the CL600, was seen approaching CPT shortly afterwards. At this point, planning ahead, he saw a 3650 squawk SW of CPT tracking towards Odiham indicating 3000ft. He telephoned Odiham Approach to agree a course of action regarding the ac squawking 3650 and the CL600, which was still under the control of LTC. The Odiham controller told him the 3650 was a CH47 and it was carrying out a C OPTAC/ILS to RW27 and it had commenced the procedure. He asked if the Odiham controller could delay the CH47 by some means but this was not accepted. On closing the line he pointed out to the Watch Manager, plugged in beside him, that he felt that this was somewhat inflexible given that the CH47 was making an approach to the non-duty RW, the CL600 was much faster and would be significantly delayed by this action. He re-contacted Odiham Approach and, after some protracted negotiation, it was agreed that the CL600 would be No 1 for the approach and the CH47 would complete 1 hold. He contacted LTC to arrange for the CL600 to be transferred on heading 180° keeping clear of the CH47. When the CL600 crew called on frequency the flight was instructed to descend to 2000ft QNH immediately and was given the aerodrome details. It was quickly apparent that it would be necessary to take the CL600 through the LOC and vector the ac in from the S so the crew was informed of this. Shortly after this the ADC rang and asked for the BA146 to be put 'on request'. The CL600 passed through the FAT at about 7nm and, after a short period, was turned L onto heading 010° to intercept the LOC. This was quite a severe turn with the intention of intercepting the LOC at about 5nm to stay ahead of the CH47. As the CL600 was approaching the LOC and was within the final approach quadrant, he descended the CL600 to 1400ft QNH to assist with the approach as he felt the whole approach had been rushed. This was an error on his behalf as it should have been 1500ft. At about this time the Air controller rang and requested release on the BA146 which was given. The CL600 established on the LOC at about 4.5nm and he was just about to transfer the flight to Tower when an SSR contact popped-up on the radar display O/H the aerodrome, directly ahead of the CL600. He realised immediately the BA146 was departing of RW24 and gave the CL600 flight an avoiding action L turn just as the ADC telephone line rang. He immediately answered the call to hear the Air controller apologising and at the same time he observed the BA146 turning R. He immediately stopped the CL600's turn and instructed the crew to turn hard R. The CL600 crew complied with his instructions and reported visual with the BA146. He estimated separation as 1.5nm. The BA146 flight eventually came on frequency and was given a service before transfer to LTC. The CL600 was vectored away to the S and delayed against the CH47 before landing.

ATSI reports that the Airprox occurred in Class G airspace within the Farnborough ATZ, at 1618:40UTC, between a BA146, which had just departed from RW24 at Farnborough Airport and a CL600, which was established on the ILS at 3nm from touchdown for RW06 at Farnborough. The Farnborough ATZ is a circle radius 2.5nm centred on the longest notified RW (06/24) 511631N 0004639W, except that part of the circle N of the M3 motorway from SFC to 2000ft aal, aerodrome elevation 238ft.

The CL600 was on an IFR flight from Berlin-Schönefeld to Farnborough and was working Farnborough Approach on 134.350MHz.

The BA146 was on an IFR flight departing Farnborough for Warton and was in receipt of an Aerodrome Control Service from the Farnborough Tower Controller on 122.5MHz.

ATSI discussed the incident with ADC (A), who had previously handed over, and ADC (B) on duty at the time of the incident, and had access to radar recordings of the incident and RT from the Farnborough Tower and Approach frequencies.

The Farnborough METARs are provided for 1550 and 1620UTC:

METAR EGLF 021550Z 06008KT 4900 HZ FEW021 11/07 Q1023=
METAR EGLF 021620Z 07008KT 4900 HZ FEW022 10/06 Q1023=

Prior to the incident, although the wind had favoured use of RW06, RW24 was in use in order to facilitate flight calibration of the ILS on RW24. Safeguarding was also in place due to marginal Wx conditions and to assist in the protection of the ILS as required during calibration.

At 1605:30, following completion of the calibration, ADC (A) and the APR had a conversation regarding changing the RW in use. ADC (A) had 1 ac to depart which was given a radar release by the APR and an agreement was reached that after the departure the RW in use would change to RW06.

At 1608:10 ADC (A) broadcast that RW06 was now in use. The ATIS was broadcasting information 'S' which gave the RW in use as RW24.

At 1608:30 Fire 1 called the Tower to request to enter RW06 at A1 for a RW inspection which was approved. ADC (A) used the Tower RW change checklist to complete the RW change procedure but did not change the RW designator strip, which was not on the checklist. ADC (A) later stated that he felt that the existing checklists were often cumbersome and distracting and involved some tasks that were not appropriate to the ATCO role and were carried out by the ATSA. While ADC (A) was completing the checklist another controller, ADC (B), arrived to give ADC (A) a break.

At 1610:10 the BA146 called for start having received information 'S' and the outgoing Tower controller, ADC (A) gave start-up clearance. After this transmission the ATIS was changed to reflect the RW change to RW06 but the designator was not changed and remained 'S'.

As part of the handover the outgoing Tower controller, ADC (A), used the PRAWNS checklist and stated that RW06 was in use on a number of occasions. The oncoming Tower controller, ADC (B), recalled being told that RW06 was in use several times. Neither controller noticed that the RW designator strip still showed that RW24 was in use.

ADC (B) was nearing the end of a day shift which had been fairly standard, working both in the tower and on radar. RW24 had been in use for the previous part of the day due to the ILS calibration.

At 1612:10 a call was received from Tech 3 requesting clearance into the cleared and graded area for RW24 which was approved by ADC (B).

At 1612:50 ADC (B) started the procedure to cancel safeguarding. While ADC (B) was making the telephone calls required by the checklist the BA146 flight requested taxi and was given taxi instructions to holding point Whiskey for RW24 followed by departure instructions, *“(BA146 c/s) after departure runway two four climb straight ahead to two point five D M E then a right turn heading two eight five climb to altitude two thousand four hundred feet squawk is six zero two zero”*; this was read back correctly. ADC (B) stated that he referred to the RW designator strip which showed RW24 in use before giving taxi instructions. ADC (B) also stated that the operator of the BA146 regularly requested RW24 for departure. ADC (B) telephoned the Approach controller to cancel safeguarding and to give a departure warning on the BA146 on course for Compton (CPT). During this conversation neither controller specified the RW in use.

At 1614:10 the CL600 flight contacted Farnborough Approach descending to 5000ft on a heading of 180°, W of Farnborough, which had previously been coordinated with TC due to conflicting Odiham traffic. The CL600 was descended to 2000ft with a request to expedite descent and informed that it would be vectors for the ILS RW06. The APR anticipated that, constricted by the position of the Odiham traffic, the CL600 would have to be vectored through the FAT and re-positioned from the S in order to lose sufficient height for the approach and informed the pilot of the CL600 as such.

ADC (B) stated that he looked at the ATM to ensure that there was sufficient gap to depart the BA146 and assumed that the CL600 was being vectored for a standard LH radar cct for RW24. The unit advised that Farnborough receive strips for inbound traffic that are worked by TC prior to Farnborough approximately 30min before arrival. The Farnborough Manual of Air Traffic Services Part 2, Annex B, states that in the VCR position:

‘If an aircraft is planned to utilise the non-duty RW e.g. will be using the 'new' RW after a RW change or carrying out an opposite end approach, the RW to be used is to be recorded in the Heading and Level box and circled. This is to be done for both departure and arrival fps until any RW change has been completed.’

The VCR fps for the inbound CL600 was not made available to ATSI but both controllers stated that the fps was not marked with the new RW to be used and it was unclear if this procedure was regularly followed.

ADC (B) instructed the BA146 flight to enter RW24 via Whiskey to backtrack and line-up and advised the pilot that there was a vehicle to vacate ahead.

At 1614:10 ADC (B) initiated a phone call to Ively Gate to cancel safeguarding. Whilst the phone was ringing Fire 1 reported, *“vacated RW06 at A1, RW surface inspection result for 06, the RW is dry, dry, dry.”* During the transmission from Fire 1 the phone call was answered and ADC (B) asked the recipient to standby. The Tower controller replied to the vehicle driver, *“Fire 1 roger, copied, dry, dry, dry”*, before continuing with the phone call.

At 1615:10 ADC (B) broadcast that safeguarding was cancelled. A call was then made to the Tower from Tech 3, reporting, *“vacated the 24 critical area”*.

At 1615:40 the APR instructed the CL600 to turn L onto a heading of 010° in order to position the traffic onto R base.

At 1616:10 ADC (B) initiated a phone call to the APR requesting a radar release on the BA146. Neither controller specified the RW in use. At the time the release was agreed, radar recordings show the CL600 still S of the extended C/L tracking S.

At 1616:50 ADC (B) instructed the BA146 flight, *“(BA146 c/s) runway two four clear for take-off...”*.

[UKAB Note (1): At 1617:16 the APR transmitted, *“(CL600 c/s) descend to altitude one thousand four hundred feet and you are closing the localiser from the right report established”* which was read

back correctly. The CL600 crew reported established on the ILS at 1618:00 and was cleared to descend with the G/P which was acknowledged.]

ADC (B) stated that he watched the BA146's take-off roll and did not look at the ATM again until the BA146 was airborne. When the BA146 was airborne ADC (B) saw the CL600 on final at approximately 5 nm, opposite direction to the BA146. ADC (B) instructed the BA146 flight, at 1618:10, "(BA146 c/s) avoiding action turn right immediate, turn right immediately heading three six zero degrees". This was read back correctly. TI was not given. At 1618:10 the CL600 was indicating altitude 1400ft and the BA146 was indicating altitude 700ft climbing in the opposite direction, 3.6nm apart.

At almost the same time the APR instructed the CL600 flight to contact the Tower advising the crew "there is departing traffic just airborne ahead of you" (as the APR had just released traffic from, as he believed, RW06). As the CL600 crew read back the instruction the departing BA146 just airborne from RW24 became visible on radar and the APR immediately gave avoiding action to the CL600 flight, at 1618:20, "(CL600 c/s) avoiding action hard left hard left heading three three zero departing traffic coming off the reciprocal runway". This was read back correctly.

Following a brief conversation with ADC (B) the APR changed the avoiding action, at 1618:26, to the CL600 flight, to turn hard R onto 180°. The CL600 crew reported having the BA146 in sight. The CPA occurs at 1618:42, the BA146 turning R through heading 330° and climbing through altitude 1800ft with the CL600 1.4nm to its SW, having turned sharply R onto a SE'ly track descending through altitude 1300ft, 500ft below.

The avoiding action given by both controllers resolved the situation and the CL600 was subsequently re-vectored for the ILS.

ADC (B) returned from a break in order to relieve the previous Tower controller, ADC (A), and prior to that had spent the day working on RW24 which may have predisposed him into a subconscious bias towards the use of RW24.

Where normally the prevailing wind at the time of the incident would have acted as a prompt to indicate that RW06 was in use, ADC (B) had spent the majority of the shift prior to the incident operating against the prevailing wind.

Although the ADC (A) clearly stated to the oncoming Tower controller, ADC (B), that RW06 was in use, neither controller changed the RW designator strip to RW06. Changing the designator strip was not on the checklist and, as the oncoming controller had arrived, the need to conduct a handover is likely to have interrupted ADC (A)'s thought process. Although other equipment in the Tower also has displays that indicate the RW in use (IRVR, ILS, Met display system, lighting panel) they are visually indistinct and are not sufficiently obvious to draw attention to any difference in information to that displayed by the RW designator strip.

The first call made to ADC (B) after he took over was from a vehicle requesting to enter RW24. This action may have prompted the thought process that led ADC (B) to believe that RW24 was in use.

ADC (B) then started the procedure to cancel safeguarding – a procedure that had remained in place to assist in the calibration of RW24. This may have further reinforced the controller's mindset that RW24 was in use.

The BA146 was the first ac movement after the RW change. The ATIS 'S' received by the BA146 gave the RW in use as RW24. As the designator letter did not change with the RW change there was no indication to either the controller or the pilot that the information received was out of date.

The BA146 was operated by a company that regularly request RW24 for departure.

When ADC (B) called the APR to give a departure warning on the BA146 and then to subsequently request a release the RW in use was not stated by either controller.

When ADC (B) called for a radar release on the BA146 the inbound CL600 was S of the extended C/L for RW06 and looked as if it was being positioned downwind LH for the standard radar cct pattern for RW24. There was no indication on the CL600's fps that it would be landing on RW06.

Although Fire 1 called vacating RW06 ADC (B) was in the middle of a phone call so his full attention was not on the report from the vehicle. The controller read back the RW state but not the RW in use. When Tech 3 called vacated from RW24 ADC (B) had finished the phone calls required to cancel safeguarding so it is likely that he devoted more attention to this transmission than the one made by Fire 1.

Having judged that there was a sufficient gap to backtrack and depart the BA146 ahead of the CL600, which he believed to be landing on RW24, the Tower controller had no further need to consult the ATM until the BA146 was airborne and the position of the CL600 became clear. When the Airprox became evident both controllers took immediate and appropriate action to re-establish separation.

The Airprox occurred after ADC (B) mistakenly departed a BA146 from RW24 bringing it into conflict with a CL600 established on final approach for the correct RW in use - RW06.

Contributing factors were considered to be:-

The RW designator strip, as the most visually dominant indication of the RW in use, still displayed RW24.

The first call received after ADC (B) took over was from a vehicle referring to RW24.

The controller was distracted by the cancellation of safeguarding (which had remained in place partly because it assisted in the calibration for RW24).

The company that operated the BA146 often requested RW24 for departure.

The ATIS received by the BA146 stated that RW24 was in use and the designator letter did not change with the RW change.

The inbound fps for the CL600 was not marked to indicate RW06 and the vectoring pattern looked appropriate for RW24.

There is no procedure in place to specify the RW in use for departure on release or departure warning following a RW change.

Recommendations:

ATSI recommend that the ATSU review their procedures for changing RW, in particular the procedures for the first arrivals and departures following a RW change and including the procedures for display and marking of fps.

ATSI further recommend that the ATSU review their equipment and consider integrating a more prominent visual indication of the RW in use either as part of their existing layout or during any future equipment changes.

ATSI further recommend that the ATSU review their checklist procedures to ensure that they are appropriate to the task being discharged.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both aircraft, 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 controller Member expressed concern that during the time leading up to the incident, the ADC position was busy with 2 checklists being actioned (RW change and safeguarding/LVPs) and a position handover. This had undoubtedly distracted the ADCs and resulted in the absence of the clues that would normally have alerted and reminded ADC (B) about the in-use RW. First, the ATIS information serial should have changed when the RW in use was changed, as this is an important indicator for controllers and pilots that a change has occurred. Second, the RW designator strip should have been changed by ADC (A) when RW06 was declared as the duty RW and should have been picked up by ADC (B) during the PRAWNS checklist at the handover, even though it was not included in the RW change checklist. Third, the annotation of the BA146 fps with the RW to be used, following a RW change, should have prompted the ADC but his mindset was apparently firmly set that RW24 was the duty RW. Neither ADC (B) nor the APR mentioned the RW to be used when safeguarding was cancelled, or when ADC (B) warned the APR of the impending BA146 departure and again when the radar release was requested. It was noteworthy that the inbound CL600 was not established at the usual range from touchdown, its flightpath under vectoring by the APR appearing to place the flight through the extended C/L towards the downwind leg of RW24. Usually the inbound would have been established on final approach at about 8nm and transferred to the Tower frequency. Without the requirement for the APR to give the ADC a range check on inbound traffic or for the ADC to monitor the APP frequency, SA on the traffic situation was reduced. Although any one of a number of these factors could have broken the chain of events leading up to the Airprox, in the end, none did. This left Members in no doubt that, in the cold light of day, the cause of this Airprox was that the ADC cleared the BA146 to depart from the non-duty RW into conflict with the CL600 approaching the duty RW.

Looking at the risk element, it was noted that the BA146 flight was in a critical phase of flight, close to changing configuration to accelerate after take-off with limited manoeuvrability. Also, the CL600 was in its final descent phase, when TCAS RAs are inhibited below 1100ft agl (rad/alt), such that no resolution guidance would be generated. These two elements lead CAT pilot Members to believe that safety had been compromised. Other Members thought that ATC team had acted well, once the situation had become evident, and had resolved the conflict before safety margins were compromised. Upon seeing the CL600 established on final for RW06, the ADC had quickly issued the BA146 flight an avoiding action turn to the R before telephoning the APR to inform him of his actions. Meanwhile, the APR was in the process of transferring the CL600 flight to Tower when he saw the BA146 pop-up on radar ahead of the CL600 and issued the CL600 flight a hard L turn onto a NW'ly heading and gave TI. As he was speaking to the ADC on the telephone, the APR saw the BA146's R turn begin to take effect and reversed the avoiding action given to the CL600 flight by turning it hard R. The BA146 crew had reacted promptly to the R turn issued and, although TI had not been given, their SA was enhanced as they saw the approaching CL600 on TCAS ahead and above before a TA was generated. The CL600 crew had also reacted promptly to their L turn issued and again when the turn was reversed to the R, during which they visually acquired the BA146 about 2nm to their L, turning sharply away and 800ft above climbing. The radar recording shows both flights reacting to the turn instructions given, in particular the CL600 crew's robust R turn after having already started to turn L. In the end, Members could not agree a risk unanimously which prompted the Chairman to call a vote. This resulted in a majority decision that the combined action taken by all parties had been effective such that the risk of collision had been removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The ADC cleared the BA146 to depart from the non-duty RW into conflict with the CL600 approaching the duty RW.

Degree of Risk: C.

AIRPROX REPORT No 2012034

Date/Time: 13 Mar 2012 1748Z

Position: 5256N 00002W (3nm S Boston)

Airspace: LFIR (Class: G)

Reporting Ac Reported Ac

Type: BE350 C525A

Operator: HQ Air (Ops) Civ Pte

Alt/FL: FL100 FL100↓

Weather: VMC CLAC VMC NR

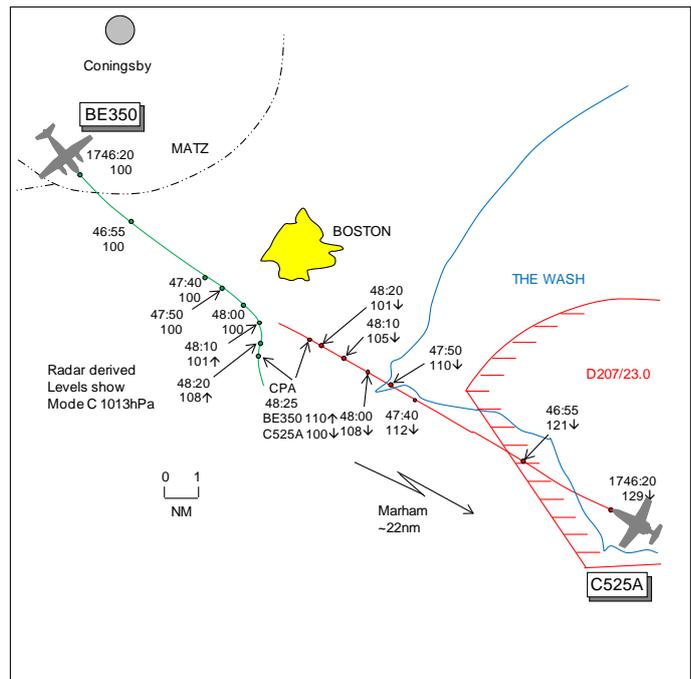
Visibility: 30km >10km

Reported Separation:

Nil V/0-25nm H NR

Recorded Separation:

1000ft V/1-6nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE350 PILOT reports en-route to Marham and in receipt of a TS from Marham Approach on 233-075MHz, squawking 3660 with Modes S and C. The visibility was 30km flying clear above cloud in VMC and the ac was coloured grey with HISLs, nav, anti-collision and recognition lights all switched on. The flight was transiting to Marham for a PD and instrument approach heading 130° at 220kt and at FL100. A TCAS contact was observed by the PF at range 6nm and both pilots commenced an intensified visual scan. ATC subsequently reported “traffic 12 o'clock 5nm” but the conflicting ac was not visually acquired. They commenced a R turn to deconflict and a TCAS TA was generated with the conflicting traffic seen on TCAS on a reciprocal track 900ft above and descending. A TCAS RA was received when the conflicting traffic was about 300-400ft above descending. They turned R 90° and climbed 1000ft in accordance with the RA instruction to ‘climb, climb’. The L wing was then dropped and the conflicting ac was visually acquired by the PF passing approximately 800ft below on a reciprocal track 0.75nm laterally displaced to their L. The PF was unable to positively identify the other ac type. The Marham controller later passed the crew the details of the other ac involved. He assessed the risk as medium.

THE C525A PILOT reports flying solo inbound to Gamston, IFR and receipt of a TS from London Mil, squawking an assigned code with Modes S and C; TCAS 1 was fitted. The visibility was >10km in VMC and the ac was coloured white/blue with strobe, nav and recognition lights all switched on. Heading NW'yly at 250kt he recalled that traffic was reported in his 12 o'clock at around FL100 and he agreed to increase his ROD in order to pass below it. He didn't remember whether a TCAS warning was generated. He did see the other ac in his 10 o'clock, well above his level. Even with his good eyesight and excellent ac recognition the other ac was too far away for him to identify its type. At the time he did not consider an Airprox had occurred so did not make a record of the details for reference. He assessed the risk as none.

THE MARHAM APPROACH RADAR CONTROLLER reports the BE350 flight was in receipt of a TS at FL100 and was given TI on traffic 12 o'clock 5nm opposition direction indicating FL110 but descending; the ac was wearing a Lon Mil squawk. The BE350 crew did not declare they could see the traffic but as the other ac arrived in the vicinity the crew took evasive action on advice from his TCAS; they were not happy with its proximity. On enquiry to Lon Mil, the other ac (C525A) had been told of the BE350, its pilot had reported visual and had continued to descend.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a BE350 in receipt of a TS from Marham APP, reduced as Marham were operating SSR only, and a C525A operating IFR, in receipt of a TS from LJAO E/NE.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Both aircrews report VMC, with the BE350's pilot reporting 30km visibility in nil weather with an undercast of CU and SC cloud with tops at 2500ft.

APP reported that their workload and the task complexity at the time of the incident were low, with only the BE350 on frequency. LJAO E/NE did not report their workload nor task complexity at the time of the incident; however, analysis of the RT transcript showed a moderate taskload with 3 ac on frequency.

The C525A at FL210 was identified by LJAO E/NE at 1733:32, exiting CAS at BANEM and was given own navigation en-route to Gamston [D207, Holbeach Range, was not active]. The incident sequence commenced at 1739:37 as LJAO E/NE instructed the C525A flight to descend to FL100. At this point, the BE350 was 54.3nm NW of the C525A, tracking SSE'ly, climbing through FL097. Whilst the provision of a TS to the C525A outside CAS was agreed, it was not applied by LJAO E/NE; this was neither a causal nor contributory factor in this Airprox.

At 1743:45, LJAO E/NE instructed the C525A flight to descend to FL050. At this point, the C525A was descending through FL168, the BE350 was 37.6nm NW of the C525A, tracking N'ly, at FL099. Based upon their report, LJAO E/NE was aware of the BE350 and utilised a predictive level function to assess the C525A's ROD with reference to the BE350, concluding that the C525A would be 'well below' the BE350 as they passed.

At 1746:17, the BE350 flight called APP on handover from Waddington, was identified and placed under a TS that was reduced on the grounds that Marham were operating SSR only. At this point, the BE350 was 19.1nm NW of the C525A, tracking SE'ly under their own navigation at FL100; the C525A was descending through FL129. From this point, until 1747:50, APP was involved in a continuous exchange of RT with the BE350, completing the initial administrative functions required for the BE350 to conduct their PD to Marham.

At 1746:55, LJAO E/NE passed TI on the BE350 to the C525A stating, "*Traffic 12 o'clock, two-zero miles (radar replay shows 14.1nm), opposite direction, at Flight Level 100*" which was acknowledged; the C525A was descending through FL121. LJAO E/NE's decision to pass TI was based upon their further use of the predicted level function, which showed that the C525A's ROD had reduced, introducing a confliction with the BE350. At 1747:42, LJAO E/NE updated the TI to the C525A stating, "*previously reported traffic, 12 o'clock, 9 miles (radar replay shows 7.3nm), opposite direction at Flight Level 100.*" The C525A was descending through FL112. Shortly after, at 1747:49, the C525A pilot acknowledged the TI, stating that he would, "*expedite through Flight Level 100.*" The C525A had been descending at around 1200fpm; however, at 1748:00 with 4.2nm lateral and 800ft (indicated) vertical separation existing, the ROD increased to approximately 1700fpm, reaching a maximum of approximately 2200fpm at 1748:20. At 1748:25, following the CPA (1000ft/1.6nm), the ROD began to reduce.

CAP 774 Chapter 3 Para 1 states that, in providing a TS, 'the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.' The guidance material for CAP 774 Chapter 3 Para 6 states that:

'When providing headings/levels for the purpose of positioning and/or sequencing or as navigational assistance [to ac in receipt of a TS], the controller should take into account traffic in the immediate vicinity, so that a risk of collision is not knowingly introduced by the instructions passed. However, the controller is not required to achieve defined deconfliction minima.'

The BE350's crew reported that they were first aware of the C525A when it appeared on their TCAS display at a range of approximately 6nm, which caused them to intensify their visual scan. APP subsequently passed TI on the C525A to the BE350 at 1747:50 stating, "*traffic 12 o'clock, range of 5 (radar replay shows 6.1nm) opposite direction, Flight Level 110 but looks as if it might be in the descent.*"

At 1747:59 the BE350's crew acknowledged the TI stating that they were, "*coming right to avoid that traffic.*" APP asked the BE350's crew whether they had, "*got it on TCAS?*" to which the BE350 crew replied, "*Affirm (2sec gap) 500 feet above (inaudible) going into him.*" During this exchange, at 1748:06, the C525A pilot informed LJAO E/NE that he was, "*visual with that traffic.*" At this point, the BE350 was 3.6nm NW of the C525A, with the latter descending through FL107. However, the C525A pilot subsequently reported seeing the BE350 in '*my 10 o'clock and well above my level*' which appears to describe the position of the BE350 at around the point of the CPA.

At 1748:10, APP instructed the BE350 flight to, "*continue right turn heading 210 degrees, he's maintaining a north-westerly heading, just currently left of your nose.*" During this transmission, at 1748:14, the BE350's R turn and climb in response to a TCAS-RA becomes evident on the radar replay. At 1748:26, co-incident with the CPA, APP informed the BE350 flight that, "*the ac is ah now passing down your left hand side, indicating Flight Level 95, descending.*" Minimum lateral and vertical separation was 1.6nm and 1000ft. The BE350 crew did not declare on frequency that they had received a TCAS RA until 1749:36.

Through extrapolation of the radar replay, without the BE350's R turn and TCAS RA response at 1748:14, the CPA would have occurred at 1748:30, as the C525A passed 0.2nm down the BE350's port side, indicating 100ft below, descending through FL99. Although the C525A was equipped with TCAS 1, the pilot did not recall whether they received a warning of the proximity of the BE350.

Based upon the available information, the Airprox occurred as a result of a confliction of flight paths within Class G airspace. Whilst the C525A did increase its ROD in response to LJAO E/NE's updated TI at 1747:42, the extrapolation of the radar data suggests that this did not markedly affect the outcome of the Airprox. The confliction was resolved, primarily, by the BE350's turn and response to the TCAS RA.

Marham APP passed timely and accurate TI to the BE350 flight which, alongside the information from their TCAS, allowed the BE350's crew to take decisive action to break the confliction. Marham APP then continued to provide TI to the BE350 to facilitate the maintenance of the crew's SA. LJAO E/NE, informed by the level prediction tool available to them, assessed the ROD of the C525A with reference to the BE350, passing and updating TI accordingly. Notwithstanding that the range information in the initial TI was inaccurate, LJAO E/NE discharged their responsibilities for the provision of TI to the C525A, allowing the pilot of that ac to decide on a course of action to avoid a collision; in this case opting to increase his ROD.

HQ AIR (OPS) comments that the potential for a conflict was spotted early by both controllers and appropriate TI was passed. Both crews actioned this TI as early as reasonably possible and in an effective manner, one by descending and the other by turning. TCAS assisted by providing the initial indication of a conflict to the BE350 crew. As they were in receipt of a TS and the other traffic was descending they sensibly held their lateral avoiding action until the azimuth of the other traffic was confirmed by ATC.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

As the incident occurred in Class G airspace, both crews were responsible for maintaining their own separation from other traffic through see and avoid. Both flight crews had asked for and were provided with a TS and were given timely TI by both ATSU's. LJAO E/NE had used the predictive level function to assess the C525A's ROD, updated the TI and the pilot had reported increasing his ROD. The C525A pilot had then reported on the RT being visual with the BE350, the radar recording showing separation as 3.6nm with the C525A 700ft above. The BE350 crew had seen the approaching C525A on TCAS in a descent and after receiving TI from Marham APP had instituted a R turn to avoid. While turning R a TCAS RA was generated and the guidance was followed, the crew visually acquiring the C525A as it passed down their LHS by 0.75nm and 800ft below. Both controllers had applied the ATS correctly and updated the TI when they both believed that a collision risk existed. One controller Member expressed surprise that neither of the controllers had telephoned the other to determine the intentions of the other flight and to agree coordination if required; notwithstanding that such coordination was beyond the provisions of a TS, he considered it would have been good defensive controllership. However, this was a minority view. Another controller Member opined that there was always the option open to both crews to request an upgrade to a DS if they were unhappy with the service or the situation as it unfolded. At the CPA, the C525 was descending through FL100 and passing 1.6nm E of the BE350, which was climbing through FL110 in response to its TCAS RA. As all parties had acted appropriately during this incident and given the separation distances that pertained, Members agreed that this incident could be classified as a conflict in Class G airspace which was resolved by the crews of both ac.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G airspace resolved by both crews.

Degree of Risk: C.

AIRPROX REPORT No 2012041

Date/Time: 21 Mar 2012 1335Z

Position: 5407N 00034W (3½nm
W of Eddsfild A/D –
elev: 525ft

Airspace: Vale of York AIAA (Class: G)

Type: Hawk TMk1 Ikarus C42 ML

Operator: HQ Air (Ops) Civ Trg

Alt/FL: 2000ft 2300ft
RPS (1030hPa) QNH

Weather: VMC CLBC VMC In Haze

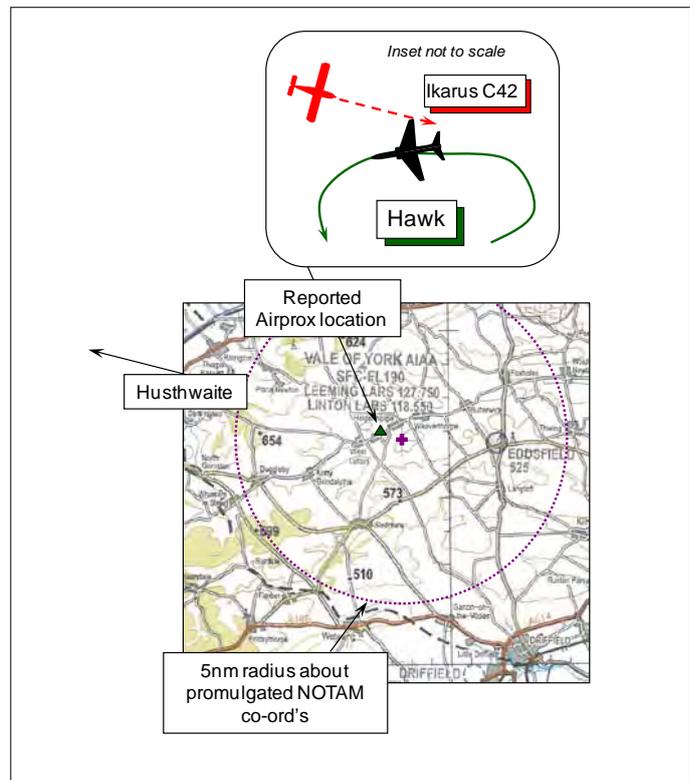
Visibility: 10km 7km

Reported Separation:

50ft V/500ft H 200ft V/500m H

Recorded Separation:

Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe HAWK T Mk1 PILOT reports he was flying a dual training sortie for the Joint Forward Air Control (FAC) Training Support Unit (JFACTSU) under VFR in VMC, clear of cloud with an in-flight visibility of 10km. He was not in receipt of an ATS, but in communication with the FAC on 280.725MHz and 137.600MHz.

Flying level at 2000ft BARNSELY RPS (1030hPa), in a 60° AOB L turn through 250° at 300kt whilst receiving an RT briefing from the ground team for a close air support task, a light ac – the C42 ML - was spotted 500ft away in the RH quarterlight at a similar altitude. The PF immediately rolled wings level as the other ac passed about 50ft above and slightly behind the Hawk with a 'medium' Risk of collision. He estimated the closest horizontal separation was 500ft.

A NOTAM had been issued for the Exercise (Y0964/12), which included contact frequencies for the FAC - C/S JACKPOT CONTROL – on VHF of 137.600MHz and for UHF 335.700MHz. The FAC had not received any calls from the C42 ML pilot and the Airprox occurred towards the centre of the 5nm diameter NOTAM'd airspace. An information RT call was made to the nearby Eddsfild A/D at the start of the sortie, but with no response. A further call was made to Eddsfild after the Airprox without response. The C42 ML was observed departing the area to the E, but it did not appear to make an approach to Eddsfild A/D.

UKAB Note (1): Eddsfild is an unlicensed A/D situated 2¾nm E of the notified NOTAM co-ordinates at an elevation of 525ft amsl. The Eddsfild website indicates that an 800m x 20m grass strip is orientated RW09LH/27RH with an A/G Station – C/S Eddsfild RADIO - operating on 134.00MHz.

THE IKARUS C42 MICROLIGHT (C42 ML) PILOT reports he was flying his 2nd solo NAVEX as a student ML pilot with a total of 7 hours solo flying time at that point. Departing from Husthwaite he was inbound to Eddsfild whilst in communication with Husthwaite RADIO on 118.600MHz. The ML is coloured white and the tail mounted strobe was on; no SSR is fitted.

Heading 105°, flying straight and level at about 2300ft amsl and 65kt some 15min into the flight he noticed a Hawk ac in his 11o'clock position >500m away, which crossed his flight path from his

11o'clock to 2o'clock as it banked to port and descended, passing about >500m in front of his ML at the closest point. No avoiding action was necessary on his part, as the Hawk pilot had already taken the necessary action so he carried on and landed at Eddsfield.

UKAB Note (2): The Y series NOTAM Y0964/12 referred to by the reporting Hawk pilot was issued by LF Ops for the benefit of military aircrew. NOTAM H0726/12 was issued by the UK NOTAM Office promulgating the following warning for civilian aviators:

EGTT/QWELW/IV/BO /W /000/190/5407N00032W005

A) EGTT B) 1203210905 C) 1203211635

E) FORWARD AIR CONTROL EXER. A 2 FAST JET ACFT WILL CONDUCT HIGH ENERGY MANOEUVRES WI 5NM RADIUS OF 5407N 00032W (YORK WOLDS, N YORKSHIRE). ACFT MAY OPR OUTSIDE THE GIVEN AREA. MAJORITY OF ACTIVITY 5000FT AGL AND BLW. CREWS WISHING TO TRANSIT THE AREA SHOULD CTC JACKPOT CONTROL 335.700MHZ OR 137.600MHZ. CTC 01677 456161 OR 07785992496 AND 07770855367. 12-03-0332/AS 3 F) SFC G) 19000FT AMSL).

UKAB Note (3): The LATCC (Mil) radar recording does not illustrate this Airprox. The Hawk is shown squawking A7001 and established in a LH orbit within the NOTAM'd airspace. At 1333:12, the Hawk is shown at 1500ft unverified Mode C (1013hPa) - about 2000ft (1030hPa) - turning L through 250° before descending further and tightening the orbit. The Ikarus C42 ML is not shown at all. The reported Airprox location lies on a direct track from Husthwaite to Eddsfield about $\frac{3}{4}$ nm WNW of the promulgated NOTAM co-ordinates.

UKAB Note (4): A subsequent telephone conversation with the C42 ML pilot's instructor revealed that he and his student had reviewed applicable NOTAMs before the flight and were aware of the NOTAM promulgating the FAC training exercise with the contact frequency/telephone number. The Instructor stated that he preferred to maintain continuous contact with his student on the Husthwaite frequency, rather than brief the student to switch to JACKPOT.

UKAB Note (5): Further discussions with the Hawk PIC revealed that the VHF frequency assigned to the Unit to permit air-to-ground co-ordination by non-exercise players is at the very extremity of the air VHF spectrum. Frequency 137.600MHz cannot be accessed by 760 channel VHF sets nor older 720 channel equipments, which has been a continuing source of difficulty for the Unit. Requests for a lower frequency allocation accessible by all commonly used VHF DSB AM radio sets has so far proved fruitless. It was also revealed that there is no formal routine procedure for contacting A/Ds in the vicinity of their notified Exercises – in this case Eddsfield - prior to operating there other than the publishing of a NOTAM, which contains telephone contact numbers and frequencies. However some of the FAC instructors do telephone the A/D on the day of the activity using the contact details on websites etc. and also using the A/D's published frequency. The Hawk pilot advises that other than his own two attempts to contact Eddsfield from the air by VHF during the sortie on 21 Mar, he believes no other attempt to contact them was made on this day. However, subsequent to this Airprox, when using this location the Unit has elected to implement a formal procedure to contact Eddsfield by telephone on the day before and on the actual day of the Exercise.

HQ AIR (OPS) comments that the Hawk crew saw in time to assess any collision risk and take appropriate action, although none appears to have been required in this case. The NOTAM process serves two purposes; primarily, it highlights to other users of the specific airspace the high likelihood of encountering military flying activity in the hope that their awareness is increased and to allow them to minimise their risk by focussing lookout or avoiding the area; secondly it mitigates the slight loss in lookout effectiveness necessitated by the close air support tasking. The ML pilot does not mention any consideration of the NOTAM and does not report attempting to contact the FAC on the frequency provided. Had he done so, a degree of coordination would have been possible in order to reduce the risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Notwithstanding the existence of a NOTAM promulgating the Hawk pilot's Exercise, Members understood that each of the pilots involved here was flying legitimately in Class G airspace where 'see and avoid' prevailed. Evidently the Hawk pilot had played his part in trying to contact Eddsfield at the commencement of the sortie; however, Members were concerned that the Exercise had been planned to operate only 3nm to the W of another A/D without prior co-ordination being effected by the directing staff beforehand. Irrespective of whether it is a small unlicensed A/D or not, Members perceived that a courtesy telephone call to the A/D operator to ascertain the activity at the A/D before the Exercise took place was a helpful prerequisite to mutually safe operations in the Vale of York AIAA. Consequently, the Board was reassured to learn that as a result of this Airprox improvements have subsequently been made to the co-ordination arrangements for FAC training exercises.

It was apparent that, despite the NOTAM advising pilots to contact the FAC on the RT whilst in transit, the Ikarus C42 pilot's instructor wished to maintain RT contact with his inexperienced student throughout the latter's transit to Eddsfield. Some Members understood the instructor's desire to monitor the C42 student pilot closely, which would allow the student to communicate quickly if he encountered any difficulty, although it seemed that the student pilot would have to leave the frequency anyway and switch to Eddsfield RADIO prior to landing. Whilst encountering military ac at low-level in the Vale of York AIAA might be commonplace, and indeed the C42 pilot's base at Hushwaite is close to Topcliffe and Linton-on-Ouse, the Board considered that the instructor could have heeded the advice contained in the NOTAM more conscientiously. However, Members recognised that the NOTAM was advisory in nature and did not compel the instructor to take any action, or that the C42 Student pilot need remain outside the promulgated airspace, so this was entirely a matter of airmanship. Experienced pilot Members were more concerned that the instructor had tasked his student to fly through an area where potentially two fast-jet ac might be encountered conducting high-energy manoeuvres, albeit that only one flew this day. Clearly the 5nm radius around the published co-ordinates had to be penetrated in order to arrive at Eddsfield, but some Members wondered if it might not have been more sensible to dispatch the Student to another A/D this day, where there was not such a high probability of encountering an unpredictable, manoeuvring fast-jet. Alternatively it would have been advisable to liaise with the JFACTSU on the telephone number given in the NOTAM before the flight to determine whether there were suitable periods during the day when the Hawks would not be airborne and/or to alert the FAC and the Hawk pilots to the planned timing of the Ikarus' flight.

It had not been possible to ascertain if the radio available to the C42 student pilot was capable of selecting JACKPOT CONTROL's frequency, but Members recognised that a student pilot of very limited experience might find calling a FAC a daunting prospect and shy away from it. Furthermore, the Board was concerned that the Unit's allocated VHF frequency was not the most suitable if it was deemed desirable for civilian pilots to have the facility to call JACKPOT CONTROL; the ability of civilian pilot's to contact the FAC was severely impaired by this high frequency outwith the selectable range of a significant proportion of civilian GA transmitter/receivers. The Board was briefed that the JFACTSU supported by HQ AIR Cmd had requested the allocation of a lower VHF frequency to facilitate deconfliction with civil traffic. The DAP Advisor explained to the Board the difficulties of VHF frequency allocation in the UK and that there was a chronic shortage of any spare frequencies within the VHF 'air' band. Therefore this was not an easy problem to solve, but advised that work was continuing with the aim of finding an alternative frequency for use by the Unit.

The Student C42 pilot reports seeing the Hawk manoeuvring – banking to port and descending - at a range in excess of 500m. However, in the Board's view he might well have seen the jet a little later than he estimates as he also states that no avoiding action was necessary on his part as the Hawk crew was already taking action. As the Hawk PIC reports the PF saw the smaller C42 ML 500ft away, pilot Members agreed this was less than ideal and the Board concluded that the Cause of this Airprox was a late sighting by the pilots of both ac. Despite the late sighting by the Hawk PF, he saw

the C42 in time to assess the situation and was prepared to take robust action should it have been needed. However, this was not necessary in this case as he rolled wings level whilst the C42 passed above and astern. The Board concluded, therefore, that no Risk of a collision had existed in these circumstances.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the pilots of both aircraft.

Degree of Risk: C.

AIRPROX REPORT No 2012044

Date/Time: 23 Mar 2012 1745Z

Position: 5051N 00219W (Vicinity of Bulbarrow Hill Masts – 16nm SE of Yeovilton)

Airspace: London FIR (Class: G)

Reporting Ac **Reported Ac**

Type: PA28-151 VANS RV-7

Operator: Civ Club Civ Pte

Alt/FL: 2000ft 2200ft
RPS (1026hPa) QFE

Weather: VMC CLBC VMC CAVOK

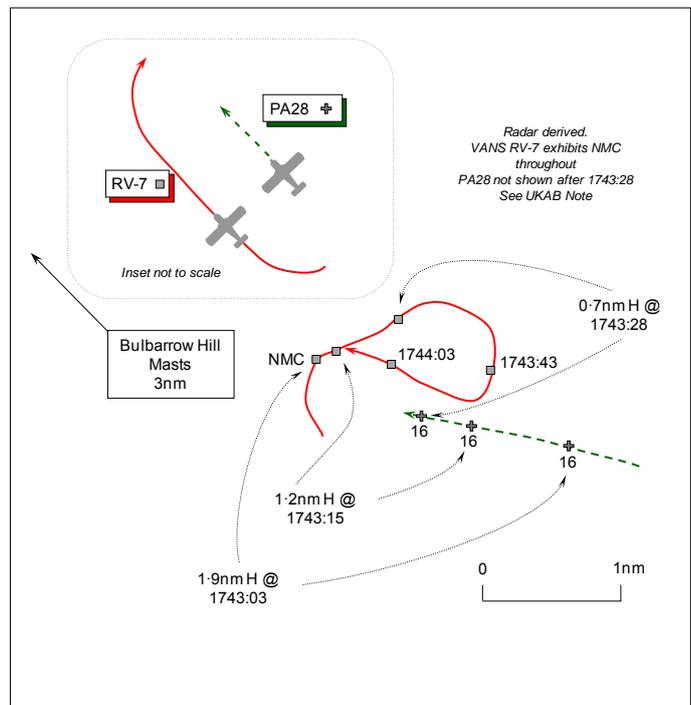
Visibility: 15km 35km

Reported Separation:

Nil V/40m H Nil V/150m H

Recorded Separation:

Not recorded



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PIPER PA28-151 PILOT reports he was the co-pilot and PNF during a dual local flight originating from Yeovilton. The PF was navigating, whilst he as the PNF was operating the RT and acting as safety pilot. Bournemouth RADAR was providing a BS on 119.475MHz, that had been downgraded by ATC from a TS prior to the Airprox because of radar coverage. A squawk of A7000 was selected with Mode C initially and then the code changed to A7365 at the request of Bournemouth ATC; neither TCAS nor Mode S is fitted.

Returning to Yeovilton at 97kt, aiming to pass to the W of Bulbarrow Hill Masts (1129ft amsl) in a level cruise at 2000ft Portland RPS, the PF called visual with an ac crossing from L – R 500m ahead of their intended flight path at a higher altitude – some 500ft above. Both he and the PF observed the ac – a white VANS – as it descended rapidly and turned S before passing down their starboard side at a safe distance. Shortly afterwards he as the PNF called that he had lost sight of the VANS [an RV-7] and the PF drew his attention back to the ac that had now rapidly formed off their port wing. The RV-7 pilot flew at the same altitude on a parallel course no more than four wingspans – about 40m away – for about 10secs. There was no communication visually or by radio and the occupants of the RV-7 were not looking in their direction, but whilst the RV-7 was alongside he noted the ac's registration. As the PNF he recommended they maintain their altitude and heading of 316° as the RV-7 accelerated rapidly away and made a climbing turn to the R across their flight path before rolling onto a S'ly heading and passing astern. He assessed the Risk as 'medium'.

At this point he informed Bournemouth RADAR of the RV-7 and stated his concerns regarding the behaviour of the ac's pilot. The controller informed him that he had radar contact on the RV-7, but he was not in RT contact; both ac were in the 'Open' FIR and therefore able to fly unrestricted. Maintaining a good lookout, they continued on to their next waypoint on the same heading.

Both he and his colleague were a little shaken by the suddenness of the incident and were concerned that although the RV-7 was flying parallel to their course it appeared the other pilot was not aware of their PA28 nor looking out. In the PNF's opinion, the pilot of the RV-7 flew in a manner that made him doubt the RV-7 pilot's intentions; if he was aware of their ac he positioned himself too close without any form of consent or communication and manoeuvred in a way that compromised the safety of their flight.

The remainder of their flight back to Yeovilton was uneventful; the Airprox was reported to the club's CFI later that evening.

The ac has a blue and grey colour scheme and the fin mounted strobe was on.

THE VANS RV-7 PILOT reports that he was operating VFR just to the NE of Bagber; the ac is based at a private farm strip in the vicinity. He was not in receipt of an ATS but listening out on 118.00MHz. [No Squawk was specified but the radar recording shows the ac squawking A7000 without Mode C and Mode S fitted.]

Whilst conducting basic aerobatics the ac's TCAS displayed an ac contact 3nm away which was seen visually at a range of 1nm. Whilst looping he noticed the PA28 about 1000ft below his aeroplane flying in the opposite direction. About 3nm SE of Bulbarrow Hill Masts he continued the manoeuvre to arrive about 150m off the PA28's port side flying in the same direction at a height of 2200ft. He thought the PA28 pilot was not visual with his aeroplane. Continuing past the PA28 at 155kt, when well clear he commenced a climbing turn to the R. He assessed the Risk as 'none'.

UKAB Note: This Airprox is not captured on LAC radar recordings – see the ATSI report for local Bournemouth recorded radar data. The PA28, identified from its assigned squawk of A7365, is shown on the Jersey SSR at 1743:03, maintaining a steady track of about 285°(M) level at 1600ft verified Mode C (1013hPa). The contact perceived to be the RV-7 is shown squawking A7000 but no Mode C is indicated at all throughout. The RV-7 executes a manoeuvre back and forth 1.9nm – 1.2nm ahead of the PA28 until 1743:15, then flying NE'ly before turning SE'ly to pass 0.7nm to starboard of the PA28 at 1743:28. Thereafter the PA28 contact fades at a position 3nm SE of Bulbarrow Hill Masts - the position of the AP as reported by the RV-7 pilot - and is not shown again. The RV-7 turns about onto a course of about 290°(M) and follows the last known track of the PA28 in the direction of Bulbarrow Hill Masts.

The PA28 pilot reports that he was heading 316°(M) when the RV-7 passed abeam to port of his aeroplane at a position 2nm NW of Bulbarrow Hill Masts, however, the local Bournemouth recorded radar data shown within the ATSI report illustrates the Airprox occurred SE of Bulbarrow Hill Masts in the location reported by the RV-7 pilot.

Both pilots' accounts agree that the RV-7 passed to port followed by a climbing turn to the R across the PA28's flight path. Although not captured on the radar recording it seems from the Bournemouth recorded radar data that the contacts merged in azimuth.

ATSI reports that an Airprox was reported 2nm W of Bulbarrow Hill Masts, Dorset, in Class G airspace. The PA28 crew was operating VFR at 2000ft on a local flight from Yeovilton and was in receipt of a BS from Bournemouth RADAR on 119.475MHz.

The VANS RV-7 was operating VFR conducting aerobatics on a local flight from a private strip and was not in communication with an ATS unit. CAA ATSI had access to RT and radar recordings from Bournemouth RADAR, area radar recordings together with written reports from both pilots.

The Bournemouth METARs:

231720Z 15005KT CAVOK 15/08 Q1026=
231750Z 16004KT CAVOK 15/08 Q1026=.

At 1718:40 UTC the PA28 crew contacted Bournemouth RADAR and reported O/H Dorchester at 2000ft, requesting a TS. The PA28 was given a squawk of A7365, identified and a TS agreed. The PA28 crew was intending to route to Swanage and then back to Yeovilton.

At 1727:50, when the PA28 was 18.7nm WSW of Bournemouth Airport, the controller downgraded the service to a BS due to the radar contact from the PA28 becoming intermittent. At 1742:57, when the PA28 was 14.2nm WNW of Bournemouth, a radar contact squawking A7000 with no Mode C, was shown 2nm WNW of the PA28. The A7000 squawk was identified as the RV-7 using the Bournemouth Radar Mode S function during the replay. Photographs of the Bournemouth Radar data (reproduced below) show the RV-7 turned to the R and orbited about the PA28.



The written report from the pilot of the RV-7 stated that he manoeuvred his ac to arrive 150m on the PA28's port side. The pilot of the RV-7 did not believe that the PA28 crew was visual with his RV-7; he continued past the PA28 and 'when well clear commenced a climbing turn to the R'.

The written report from the pilot of the PA28 stated that they saw the RV-7 formate on the PA28's port wing. The RV-7 paralleled their course for a short time before it was observed to accelerate rapidly and make a climbing turn to the R. The pilot of the PA28 was concerned about the behaviour of the RV-7 and informed Bournemouth RADAR about the traffic, but did not report an Airprox on the frequency.

The UK AIP at ENR 1.6.2, paragraph 2.2.2 describes the use of squawk A7004 which may be selected at a pilot's discretion:

*7004 Aerobatics and Display. For use by civil or military aircraft conducting solo or formation aerobatic manoeuvres, whilst displaying, practising or training for a display or for aerobatics training or general aerobatic practice. Unless a discrete Mode A code has already been assigned, pilots of transponder equipped aircraft should select *7004, together with Mode C pressure-altitude reporting mode of the transponder, five minutes before commencement of their aerobatic manoeuvres until they cease and resume normal operations. Pilots are encouraged to contact ATS Units and advise them of the lateral, vertical and temporal limits within which they will be operating and using *7004. Controllers are reminded that *7004 must be considered as unvalidated and the associated Mode C pressure-altitude reporting data a unverified. Traffic information will be passed to aircraft receiving a service as follows:

'Unknown aerobatic traffic, (number) o'clock (distance) miles opposite direction/crossing left/right indicating (altitude) unverified (if Mode C pressure altitude reporting data is displayed).'

The RV-7 was squawking 7000 with no Mode C information and was not in contact with Bournemouth RADAR. As both flights were operating in Class G airspace, VFR, the pilots of both ac were ultimately responsible for collision avoidance.

The PA28 was in receipt of a BS. Under a BS there is no requirement to monitor the flight and TI is not routinely passed. As the RV-7 was squawking A7000 without Mode C the radar controller had no indication that any unusual activity was taking place.

The pilot of the RV-7 believed that he manoeuvred well clear of the PA28. The pilot of the PA28 was concerned by the behaviour of the RV-7. The pilot of each ac was visual with the other ac although both reported that they believed that the other did not have them in sight.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board noted that it was unfortunate that the RV-7 pilot had not selected the A7004 Aerobatics and Display conspicuity squawk, for use by pilots conducting solo or formation aerobatic manoeuvres. Had he done so, this might have alerted the Bournemouth RADAR controller to the presence of an ac conducting high-energy aerobatic manoeuvres along the PA28's route. The Board recognised that under the BS there is no requirement for the controller to monitor the flight and TI is not routinely passed because the controller might be dealing with other higher priority traffic. However, it could potentially have resulted in an earlier 'warning' to the PA28 pilots if RADAR had been able to appreciate what was happening. In this respect Members urged pilots to select the aerobatics conspicuity squawk, when appropriate, as it is a valuable warning to radar controllers that an ac is about to commence, or is engaged in, unpredictable high-energy manoeuvres.

Nevertheless, it was evident that in the see and avoid environment of Class G airspace the PA28 pilots had spotted the RV-7 at a range of 500m crossing ahead of their intended flight path about 500ft above them and were content with the separation as the RV-7 pilot descended and turned to pass down their starboard side on a reciprocal course. Both the PA28 crew and the RV-7 pilot were incorrect in surmising that the other pilot had not seen their ac and it was apparent from the RV-7 pilot's account that he had seen the PA28 whilst looping and had having passed it elected to close on it from astern. Pilot members considered that a 'wing-waggle' by either would have reassured the other pilot that his ac had been spotted. Nevertheless, the Board agreed it would have been difficult for the PA28 pilots to judge what the RV-7 pilot was doing once his ac had passed behind the PA28's wing and was turning astern; once the geometry changed it became an overtaking situation and thus the PA28 had right of way at that point. The RV-7 pilot reports he arrived off the PA28's port side 150m away, before accelerating away in his higher performance aeroplane and executing a climbing turn to the R ahead of the PA28. The GA pilot Member considered this manoeuvre unwise; the RV-7 pilot could have exhibited better airmanship by giving the PA28 a wider berth and certainly not overtaking to port nor crossing ahead. The Board recognised that it was the RV-7 pilot that had engineered the eventual separation here and the Members agreed unanimously that this Airprox had resulted because the RV-7 pilot flew close enough to cause the PA28 pilot concern.

The RV-7 pilot was entirely cognisant of the PA28 before he had flown at the same altitude on a parallel course off the PA28's port wing; this was about 40m away the reporting pilot had estimated. The Bournemouth radar photographs provided by ATSI reflect the RV-7 pilots overall manoeuvre; given the scale of the pictures however, it was not feasible to judge the minimum separation at close quarters with any certainty and the Board was unable to resolve the differing estimates reported by both pilots of the minimum horizontal separation at this point in the incident. However, with the PA28 pilot having re-established visual contact and the RV-7 pilot watching the PA28 closely throughout, coupled with the RV-7 pilot's ability to haul-off rapidly in his nimble aeroplane, the Board concluded unanimously that, in these circumstances, no Risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The RV-7 pilot flew close enough to cause the PA28 pilot concern.

Degree of Risk: C.

AIRPROX REPORT No 2012048

Date/Time: 2 Apr 2012 0903Z

Position: 5322N 00050W (8.5nm SE
Doncaster/Sheffield)

Airspace: LFIR (Class: G)

Reporting Ac Reporting Ac

Type: BE90 PA31

Operator: Civ Comm Civ Comm

Alt/FL: 1900ft 2000ft
QNH (1011hPa) QNH (1012hPa)

Weather: VMC CLBC VMC CLBC

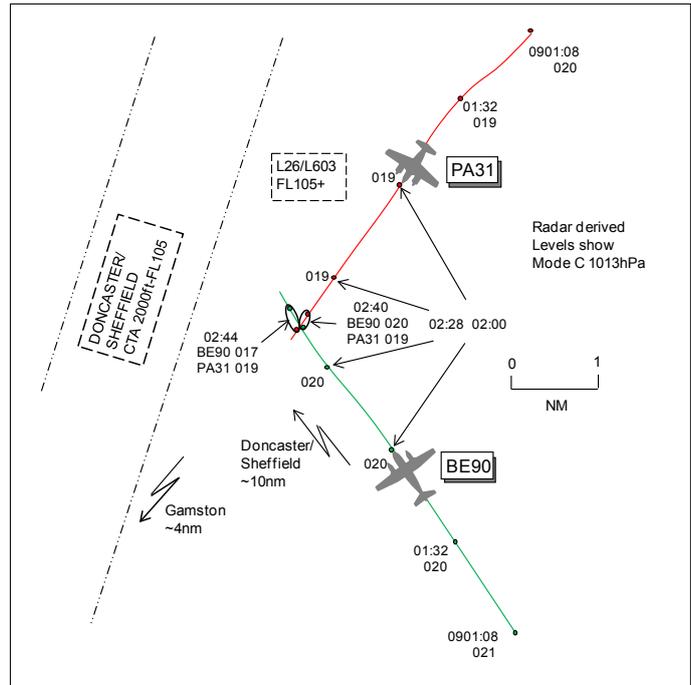
Visibility: 20km >10km

Reported Separation:

300ft V/50m H 200ft V/Nil H

Recorded Separation:

50ft V/<0.1nm H [see Note (1)]



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BE90 PILOT reports flying solo en-route to Doncaster/Sheffield, VFR, and in receipt of a B S from Doncaster on 126.225MHz squawking an assigned code with Modes S and C; TCAS was not fitted. The visibility was 20km flying 1200ft below cloud in VMC and the ac was coloured white/grey with strobe, beacon and nav lights all switched on. After his initial call he was told to standby and, owing to his late release from the previous agency, as he was approaching the CTR boundary he turned R to remain outside CAS. After receiving clearance to enter the CTR VFR and a B S he turned towards Doncaster Airport. Soon after establishing on heading 310° at 150kt, level at 1900ft QNH 1011hPa, he looked R to see a light twin-engine ac about 800m away on an approaching/converging heading and a little above his level. He descended 200-250ft to increase separation while maintaining visual contact with it, estimating he passed 300ft below and 50m clear of it at the CPA. He assessed the risk as medium.

THE PA31 PILOT reports flying a survey flight from Gamston, VFR, monitoring Gamston frequency 130.475MHz and squawking 7000 with Modes S and C; TCAS was not fitted. The visibility was >10km flying 1500ft below cloud in VMC and the ac was coloured white/purple; ac lighting was not reported. He departed Gamston for a survey in the East Midlands area. In order to prepare the ac for the survey he had to fly straight and level for 2min at 2000ft and elected to do this to the NE of Gamston where he knew it would not interfere with anybody, just monitoring the Gamston frequency as he was not far from the aerodrome. When complete he headed back towards the East Midlands area heading 200° at 150kt maintaining 2000ft QNH 1012hPa while getting closer to Gamston. Although the Wx was good in the area, he was looking further towards East Midlands where clouds were building up. About 8-10nm on the GAM 050°R he first noticed a twin-engine ac, possibly a King Air, passing below very close, about 200ft; this ac had been hidden by his ac's LH engine nacelle. It was already too late to take any kind of avoiding action. He was initially unsure if it was an ac as it was 3sec after that he saw it already on his R rear quarter of his ac. He assessed the risk as high.

THE DONCASTER RADAR CONTROLLER reports the BE90 flight called on frequency requesting joining instructions VFR. The flight was given a BS and instructed to join not above 2000ft routing towards L base RW20. Two minutes later the BE90 pilot requested to report an Airprox, stating he

was flying straight and level on a NW'ly track at altitude 1900ft when he saw an ac, possibly a PA31, on his R tracking SW about 50ft above and that he had descended 200ft to avoid.

ATSI reports that the Airprox occurred at 0902:41 UTC, 8.7nm to the SE of Doncaster/Sheffield Airport, within Class G airspace, between a BE90 and a PA31.

The BE90 was inbound VFR from Southend Airport and was in receipt of a BS from Doncaster Radar. The PA31 was operating from Retford/Gamston Airport on a VFR survey flight, monitoring Gamston Radio (A/G) frequency 130.475MHz and not in receipt of an air traffic control service.

Controllers at Liverpool provide the Doncaster Approach Radar service. The Doncaster 10cm radar is situated on the airfield at Doncaster/Sheffield and the PSR data is transported to Liverpool via a dual data communication channel link. The Claxby SSR data feed is provided by NATS. The workload was assessed as light/medium.

CAA ATSI had access to RT and radar recordings from Doncaster together with NATS area radar recordings and written reports from the controller and both pilots.

METAR EGCN 020850Z 24008KT 9999 FEW024 10/06 Q1011=

At 0900:18, the BE90 flight established contact with Doncaster Radar and, after being allocated the Doncaster/Sheffield Conspicuity squawk 6160, was instructed to standby. Doncaster Radar showed the BE90 positioned 16nm SE of Doncaster with the PA31 12nm N of the BE90.

At 0901:07, the BE90 pilot was asked to, "*pass your message*" and the following RT exchange took place:

BE90 "*(BE90 c/s) is a Beech ninety inbound to you from Southend er VFR currently er one two miles to the southeast at er two thousand feet er VFR requesting a VFR join.*"

Controller "*(BE90 c/s) Doncaster roger and operating er Runway two zero the Doncaster QNH is one zero one one what service are you looking for when you're outside.*"

BE90 "*One zero one one just a Basic Service will be fine (BE90 c/s) we've got Charlie copied.*"

[Doncaster radar showed the distance between the 2 ac as 5nm (0901:32) with both ac indicating an altitude of 1900ft.]

Controller "*(BE90 c/s) roger Basic Service you have cleared to enter the Doncaster control zone not above two thousand feet VFR routeing left base runway two zero.*"

BE90 "*Clear to enter not above two thousand feet VFR er and for left base runway two zero (BE90 c/s).*"

[UKAB Note (1): At 0902:28, using Claxby SSR data (at short range), the BE90 is tracking NW with the PA31 in its 2 o'clock at a range of 1 nm. The BE90 is indicating FL020 (altitude 1940ft QNH 1011hPa) and the PA31 at FL019 (1840ft QNH). The 2 ac maintain their levels and tracks until 0902:40, with the PA31 in the BE90's 0230 position at a range of 0.2nm. The CPA occurs before the next radar sweep at 0902:44, which shows the ac having crossed, the PA31 is passing 0.3nm behind the BE90 which was indicating FL017 (altitude of 1640ft). At the CPA it is estimated that lateral separation was <0.1nm. However the vertical geometry shown on the radar recording does not accord with that reported by BE90 pilot who stated that the PA31 was first seen slightly above and his avoiding action descent increased the separation between their ac. The radar recording shows the BE90 100ft above the PA31, until just before the ac cross, and then 200ft below on the sweep

after the CPA. By interpolation this would put vertical separation as about 50ft however both pilots reported vertical separation of about 200ft.]

At 0903:08, as the BE90 entered CAS the following RT exchange occurred:

- Controller *“(BE90 c/s) just entering controlled airspace Radar Control report the field in sight.”*
- BE90 *“Entering controlled airspace er Radar Control wilco and er can I just report an Airprox.”*
- Controller *“(BE90 c/s) that is understood you were on a Basic Service there was seven thousand traffic observed in your vicinity but on a Basic Service you don’t pass traffic information - pass the details.”*
- BE90 *“I realise that just er saw quite late on my right slightly higher a light twin and I think maybe a P A thirtyone or similar and yeah I just say it’s for paperwork purposes I yeah so I descended a few hundred feet to keep well clear.”*

The controller, when asked about the observed 7000 squawk, indicated that it was not unusual to have 12 or so ac operating in the area on a BS and it was not normal practice to identify or monitor such flights. Had the pilot requested a TS, the controller’s normal practice would be to identify the flight, projecting a 1 min predictive line from the ac label and passing appropriate TI when necessary. The controller indicated that the BE90 pilot had commented that he was fine with a BS and given the good weather conditions, the controller was content that the pilot was keeping his own lookout.

The controller remembered observing the 7000 squawk but had judged at the time that, given the distance between the 2 ac, there was no need to pass any information. The controller was not monitoring the 2 flights and indicated that given the operating range of the radar display and the label overlap of the 2 ac, it was not immediately clear that the 2 ac were in very close proximity.

The BE90 pilot and controller had agreed a BS and the controller allocated the Doncaster conspicuity code. CAP774 UK Flight Information Services Chapter 2, Paragraph 1 states:

‘A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot’s responsibility.’

When the BE90 flight contacted Doncaster Radar, the distance between the 2 ac was 12nm, the weather was good and the controller was content that the pilot was maintaining his own lookout. There was no requirement for the controller to monitor the flight or pass any TI. When the BE90 flight was given a joining clearance, the distance between the ac was 5nm. The controller believed that the SSR labels had started to overlap as the range between the 2 ac had reduced and the controller had not been aware of the close proximity of the 2 ac. CAP774 UK Flight Information Services Chapter 2, Paragraph 5 & 6 states:

‘Pilots should not expect any form of traffic information from a controller/FISO, as there is no such obligation placed on the controller/FISO under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller/FISO may provide traffic information in general terms to assist with the pilot’s situational awareness. This will not normally be updated by the controller/FISO unless the situation has changed markedly, or the pilot requests an update. A controller with access to surveillance-derived information shall avoid the routine provision of traffic information on specific aircraft, and a pilot who considers that he requires such a regular flow of specific traffic information shall request a Traffic Service. However, if a controller/FISO considers that a definite risk of collision exists, a warning may be issued to the pilot.’

'Whether traffic information has been passed or not, a pilot is expected to discharge his collision avoidance responsibility without assistance from the controller/FISO.'

The PA31 flight, operating VFR in Class G airspace, was monitoring Gamston A/G Radio and was not in receipt of an air traffic control service. The BE90 pilot was content with a BS. Neither of the 2 pilots had requested a higher level of service, such as a TS, which would have provided TI and a better situational awareness of the traffic environment. CAP774 UK Flight Information Services Chapter 1, Paragraph 8 states:

'Fundamental to the provision of the UK FISO outside controlled airspace is the standard application of the services to prevent the boundaries between the services becoming confused. Agreement to provide a service and acknowledgement of that level of service by a controller/FISO and pilot respectively, establishes an accord whereby both parties will abide with the definitions of that service as stated herein. Once an accord has been reached the controller/FISO shall apply that service as defined...'

The controller and BE90 pilot agreed the provision of a BS and the controller was not required to monitor the flight or provide any TI. The controller was not aware that the 2 ac were in close proximity and was not able to provide a warning.

The Airprox occurred in Class G airspace when the pilot of the BE90 became concerned by the close proximity of the PA31. The BE90 flight was in receipt of a BS and there was no requirement for the controller to monitor the flight.

The situation was resolved when the pilot of the BE90 sighted the PA31 and descended to increase the vertical separation between them.

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.

As the incident occurred in Class G airspace, both crews were responsible for maintaining their own separation from other traffic through see and avoid. Although the Wx was suitable for VFR, a pilot Member thought that the PA31 pilot would have been better served talking to Doncaster while operating to the E of the CTA/CTR, particularly when he had been setting up his onboard equipment. He advised that survey ac frequently have additional instrumentation in the cockpit that can physically interfere with pilots' lookout and/or draw their attention into the cockpit; although it was not clear whether these were factors in this incident, he would always recommend a TS for survey flights. It was also unclear why the BE90 pilot had requested a BS. That said, a controller Member opined that as the inbound BE90 flight had been cleared to enter CAS, 1min before the CPA and was about to receive a RCS, he would have expected the controller to give a traffic warning on the converging PA31. The ATSI Advisor informed Members that the controller had seen the PA31's squawk when the subject ac were 10nm and 5nm apart but then did not monitor the flight's progress. Although under a BS a controller may pass a traffic warning under Duty of Care, in this case the controller judged that there was no need to pass a warning. The PA31 pilot reported looking ahead at Wx in the E Midlands area when he first saw the BE90 as it passed about 200ft below, too late to take any avoiding action, which Members agreed was effectively a non-sighting and part cause of the Airprox. The BE90 pilot saw the converging PA31, which had right of way under the RoA Regulations, about 800m away and slightly above, which was thought to be a late sighting and other part cause of the Airprox. He commenced an immediate descent to increase separation, estimating he passed 300ft below and 50m clear of it at the CPA. The visual sighting and prompt action taken by the BE90 pilot was enough to persuade the Board that any risk of collision had been quickly and effectively removed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Effectively a non-sighting by the PA31 pilot and a late sighting by the BE90 pilot.

Degree of Risk: C.

AIRPROX REPORT No 2012049

Date/Time: 16 Apr 2012 1236Z

Position: 5305N 00350W
(30nm SE RAF Valley)

Airspace: UKDLFS/Lon FIR (Class: G)

Reporting Ac Reporting Ac

Type: Tornado GR4 Schleicher ASW27

Operator: HQ Air (Ops) Civ Pte

Alt/FL: 1500ft 2500ft
RPS QNH (1022hPa)

Weather: VMC CLBC VMC CLBC

Visibility: 30km >50km

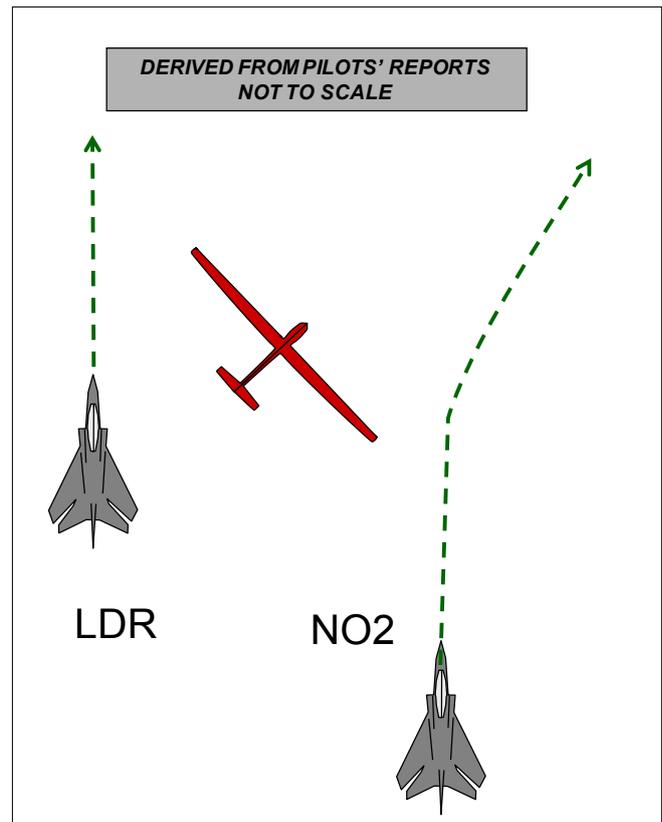
Reported Separation:

20ft V/50ft H 50ft V/30m H

Recorded Separation:

NK

BOTH PILOTS FILED



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports flying a grey ac as No 2 of a pair on a tactical low-level sortie, squawking 7001 with Mode C. While heading 061° at 430kt conducting a rejoin after a simulated attack, they were flying at about 1500ft agl, in a 'sanctuary level', with much of their lookout focussed on regaining visual contact with their leader in the 30sec up to the CPA; they became visual with him as his ac passed below and in front of them. Upon looking out to turn L for the rejoin, the pilot saw a white glider in level flight about 400m away in their 12 o'clock position, co-height and flying from their L to R. He took immediate avoiding action by bunting and rolling to the R.

Once clear of the glider they positioned to confirm the glider was unaffected and re-acquired the ac about 2nm to the S in the vicinity of the Airprox location. The sortie was then continued without any further incident. Although he assessed the risk as being high, he did not report it on the radio at the time as he was unsure of what frequency the glider would be operating on.

After landing the nearest gliding clubs to the incident location were contacted to find out if one of their ac had been involved.

THE SCHLEICHER ASW27 PILOT reports flying a white glider on a cross-country task from Lleweni Parc, Denbigh listening out on a glider common frequency; SSR and TCAS were not fitted. Initially soaring conditions were good with a cloudbase of about 5500ft alt but were forecast to deteriorate mid-afternoon with an approaching warm front. Approaching his first turn point at Blaenau Ffestiniog at about 1200 the soaring conditions were deteriorating with the approaching front so after rounding the turn point he retreated to better conditions across the Conwy Valley, with a downwind track of about 045° at 65kt. When he was S of Betws y Coed at an alt of 2500ft he became aware of a fast jet passing R to L behind and below his left wing immediately followed by another passing much closer (first seen about 100m away) and below his right wing while in a right turn; he estimates that at the closest point it was 30m away.

He took no avoiding action as there was no time but assessed the risk of collision as being high.

He reported the incident on landing.

UKAB Note (1): The Valley METAR was:

EGOV 151250Z 34019KT 9999 FEW028TCU 10/02 Q1020 BLU NOSIG

UKAB Note (2): One of the Tornados can be seen on the Prestwick combined radar. The other ac and the glider do not show at any stage, although another very intermittent primary contact shows about 5nm to the E of the reported incident position. Two other RAF Valley recoveries can be seen in the area.

HQ AIR (OPS) comments that this Airprox highlights the need for military pilots to continue to lookout in all sectors during a formation rejoin; lookout must not be concentrated solely in the sector where the other formation member is expected to be.

This part of LFA 7 is an area of intense low level military flying training; on any given day many fast jet aircraft will be operating in the area where this Airprox took place. Military aircrew conducting training in the area are aware of the glider site at Lleweni Parc and tend to plan not to operate as far E as the glider site, but recognise the possibility of encountering gliders almost anywhere. Equally, glider pilots must understand where military aircraft activity is concentrated and where their chance of an encounter with a military fast jet is significantly increased. Recognising that the main risk will be from a Valley-based Hawk, it has been suggested by members of this Board that a representative from the gliding club visits RAF Valley where he might see at first-hand the level of activity that takes place on the area known as the 'northern plain'; advice may then be considered for glider pilots flying from the club during weekdays, on the best way to manage their risk. Increased liaison between the Station and the club would be welcomed and improve awareness and safety for all users of the airspace. The use of a Transponder in this case would not have helped the Tornado crew with an earlier detection of the glider as TCAS is not yet fitted to Tornado, although it is under consideration. However, the use of Mode C by gliders should be encouraged given that most Valley-based fast jet ac have TCAS II fitted.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members were briefed that the Tornado station and the gliding community co-operated well and quickly identified the glider involved in this incident, facilitating speedy and accurate reporting.

The Board noted that this incident took place in a busy part of Class G airspace where pilots have a responsibility to see and avoid other ac. The gliding Member informed the meeting that Lleweni Parc is a regenerated site and that visitors who might not be familiar with local conditions are frequent. Even in deteriorating weather he was surprised that a glider would be operating at such a low altitude; that being the case he opined that the Tornados too would not have expected to see a glider at that alt and position where the terrain in Snowdonia (10nm to the W) is over 3500ft.

Nevertheless 'see and avoid' pertained and the (unpowered) glider had right of way under the RoA. Although the No2 Tornado crew did see the glider, they recognised that the sighting was late and the Lead crew, who also had a lookout responsibility, did not see the white glider at all. The Tornados were approaching the glider from the rear quarter at about 400kt closing speed and it would have taken about 2sec to cover 400m, the estimated range that the No2 pilot saw the glider. That being the case, the Board agreed that the effectiveness of the avoidance taken by the Tornado would have been marginal. The glider pilot, understandably due to the geometry of the incident, did not see either Tornado until after they had passed.

A majority of Members believed that due to the high closure rate and uncertainty regarding the small separation extant, there had been a risk that the ac would have collided.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Late sightings by the Tornado crews.

Degree of Risk: A.

AIRPROX REPORT No 2012053

Date/Time: 17 Apr 2012 1612Z

Position: 5131N 00001E (1.5nm W
London/City - elev 19ft)

Airspace: ATZ/CTR (Class: D)

Reporting Ac Reported Ac

Type: EMB190 AH64

Operator: CAT HQ JHC

Alt/FL: 1500ft↑ 1500ft
QNH QNH

Weather: VMC NR VMC CLBC

Visibility: >10km 20km

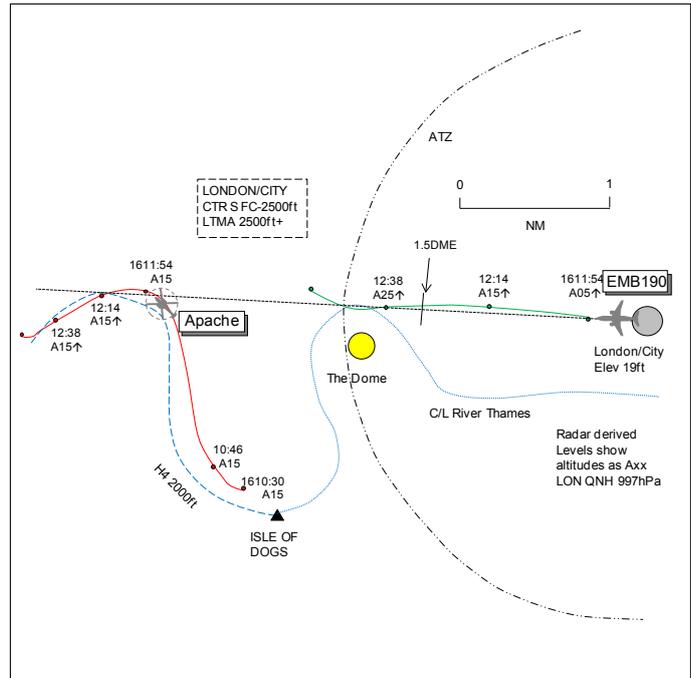
Reported Separation:

300ft V/1nm H NR

Recorded Separation:

Nil V/2.6nm H

OR 1000ft V/2.2nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE EMB190 PILOT reports on departure from London/City, IFR, and in communication with City Tower on 118.075MHz squawking with Modes S and C. While lining-up RW27 ATC informed them of an army helicopter holding at the Isle of Dogs VFR not above 1500ft. ATC then informed them this traffic would be routing directly W'bound staying S of the C/L. They confirmed the traffic in sight over the Isle of Dogs well S of the climb-out and they could also see it on their TCAS display showing 1400ft. They were cleared for take-off and as they rotated the Capt, PNF, noted the traffic was not tracking directly W but NW, still at 1400ft. The Capt reported this to ATC as they passed through 500ft however ATC did not speak to the helicopter flight. The helicopter continued closer to the RW27 C//L at 1400ft and the FO, PF, followed the departure flight guidance while the Capt searched for a visual reference; both crew monitored the TCAS display. Heading 274° at 128 kt the FO called for 'climb sequence' at 1000ft aal however the Capt announced that the intention was to delay acceleration owing to the proximity of the traffic. The FO confirmed he had the traffic on TCAS and both crew agreed the safest course of action was to continue at V2+10kt to out-climb the helicopter. The climb sequence/acceleration was completed at 2000ft aal with all other SOPs adhered to. He estimated the helicopter was within 1nm and 300ft below as they followed the SID passing 1500ft climbing straight ahead to the 1.5nm turn point on the CLN departure. No TCAS TA or RA was generated and he assessed the risk as high.

THE AH64 APACHE PILOT reports en-route from Wattisham to Middle Wallop VFR and in communication with London/City Tower on 118.075MHz squawking with Modes S and C. Earlier he had been cleared by Heathrow Radar direct from QE2B ridge to the Isle of Dogs. As they approached they were transferred to City Tower and the controller gave them clearance to enter heli-route H4 with a clearance limit London Bridge at standard operating altitudes. ATC subsequently provided TI on an ac shortly to depart London/City, the EMB190, which they were visual with on the RW. ATC then informed the EMB190 flight of their helicopter and then cleared the ac for take-off. At this point they turned N following H4 from the Isle of Dogs at 70kt and as they reached the bend of the river the EMB190 crew advised ATC that the previously called traffic, their helicopter, was on the C/L going N. This statement was absolutely correct as that is where the heli-route H4 is. The controller acknowledged the call but passed no comment or instructions. They continued to follow the river as it turns W and then S towards London Bridge. He believed that there was no conflict at

any time and thought the EMB190 crew were under the mis-apprehension that his helicopter was somewhere where it shouldn't have been. The fact the controller didn't pass comment or instructions to either flight suggested that he didn't understand why the EMB190 crew has passed comment on his helicopter's position, presumably as he could see his helicopter was where it should have been and that the route would shortly turn W and S again. The EMB190 crew may not have known this and perceived that a collision was possible. After being passed the T I on the EMB190 he had maintained 1500ft instead of climbing to 2000ft which had increased separation. SA could have been improved if ATC had responded to the EMB190 crew's call by informing them that his helicopter would be turning W and then S. If he had perceived a risk, not knowing the EMB190's departure route or what other traffic was a factor, his only option would have been to maintain his cleared route knowing that the controller was aware of both ac's positions and had provided adequate separation. Subsequently they continued along the route as cleared, no comment was passed on the RT or was an Airprox notified on any of the frequencies he used en-route. He was unaware there had been a perception or actual risk of collision until being contacted 1wk post incident. He assessed the risk as none.

ATSI reports that the Airprox was reported by the crew of an EMB190 when it came into proximity with an AH64 Apache helicopter as the EMB190 departed London City's RW27.

The EMB190 was departing London City RW27 on a CLN7T SID for an IFR flight to Amsterdam and was in contact with London City TWR on 118.075MHz. The Apache was on a VFR flight from Wattisham to Middle Wallop and at the time of the incident was in contact with London City TWR on 118.075MHz.

[UKAB Note (1): The UK AIP at AD 2-EGLC-6-3 CLN7T SID RW27 states 'Climb and maintain 3000 – straight ahead until I-LSR d1.5 turning right (MAX 210KIAS) onto LON VOR R076 to be level by LON D18 (7.94%). Resume normal speed. At LON D25.5 turn right onto BNN VOR R106. At BNN D32 turn left onto CLN VOR R246 to CLN VOR.']

ATSI had access to pilot and controller reports, recorded area surveillance, recordings of the London City TWR frequency, Heathrow SVFR frequency and the London City Coordinator's telephone line. In addition ATSI received the London City unit investigation report.

The prevailing weather for London City was: METAR EGLC 171550Z 26021K T 9999 –SHRA FEW022 SCT030 09/05 Q0997=

At 1551:40UTC the Apache pilot called LTC Heathrow SVFR (SVFR) on 125.625MHz. The Apache was identified and given a BS. The SVFR controller instructed the Apache to route direct from the Queen Elizabeth II Bridge to the Isle of Dogs, VFR, not above altitude 1500ft.

The EMB190 crew called London City TWR at 1557 and was issued with squawk and clearance, then the ac's start-up was approved.

At 1559:20 SVFR called London City TWR and notified TWR of the Apache, which was, "...going direct to the southern tip of the Isle of Dogs not following the river".

The EMB190 crew called for taxi at 1603:40 and was instructed to taxi to holding point 'Delta'.

At 1605:40 SVFR spoke to the London City Coordinator to enquire as to whether or not they wished to work the Apache. The London City Coordinator elected to work the Apache and details were passed. SVFR informed the London City Coordinator that the Apache intended to route along H4 from the Isle of Dogs to London Bridge. At the same time, the TWR controller informed a departing C510 that, "...an Apache helicopter about a mile south of the field will be holding two miles southwest." Shortly after, at 1606:40, the EMB190 flight was instructed to backtrack and line-up.

At 1607:34 the SVFR controller re-iterated the Apache's clearance limit as the southern tip of the Isle of Dogs and the Apache flight was instructed to contact London City TWR. The Apache was 2.2nm E of the Isle of Dogs VRP at 1100ft.

The Apache flight called TWR at 1608:20 as it approached the Isle of Dogs. The Apache pilot was instructed, "...you can continue westbound H four to London Bridge" and was instructed to operate at 'standard altitudes'.

At 1610:29 the Apache flight, having just passed the Isle of Dogs VRP, was passed TI, "...shortly to depart from runway two seven is an Embraer one ninety will be turning north roughly abeam the Dome climbing three thousand feet." The Apache pilot acknowledged the TI with, "...copied the traffic".

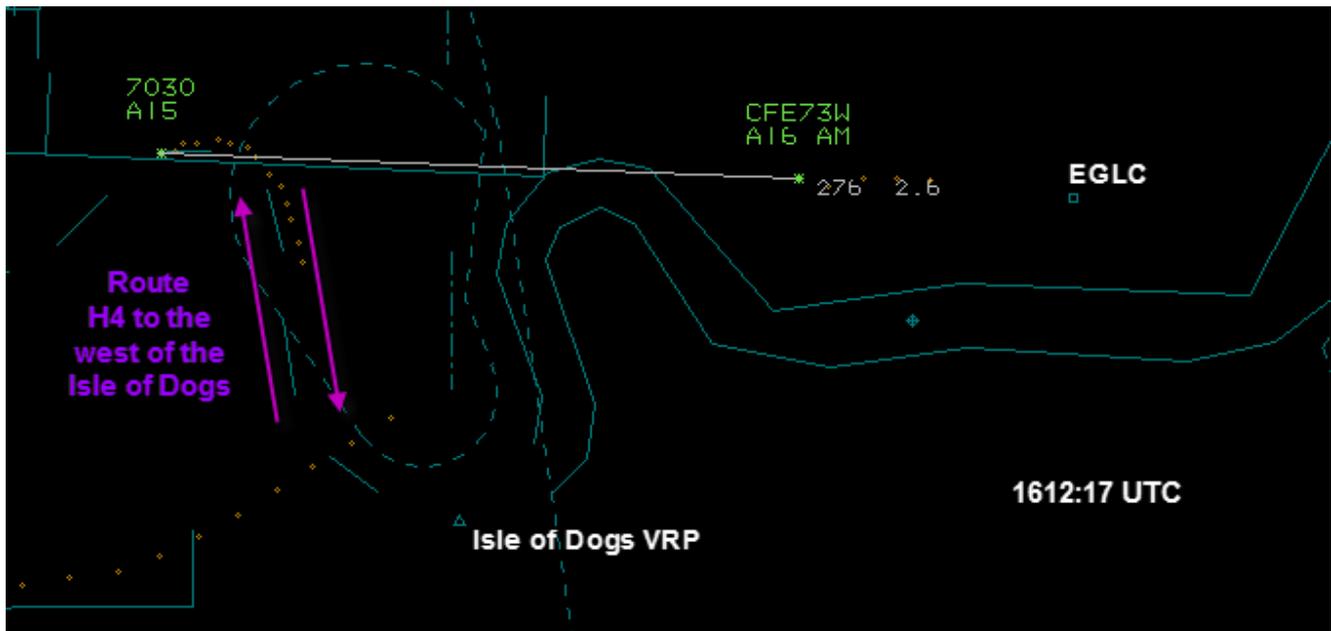
At 1610:45 the EMB190 crew was informed, "...traffic information for you there's an Apache helicopter approximately two and a half miles southwest of the field indicating fifteen hundred feet continuing westbound." The EMB190 pilot reported visual and was then cleared for take-off. The Apache was 3nm WSW of the London City ARP at altitude 1500ft and turning on to a N'y track as it joined the H4 heli-route inbound London Bridge.

By 1611:49 the Apache had reached a position on H4 concomitant with the extended C/L/climb-out track for the London City RW and was turning onto a W'y track at altitude 1500ft.

At 1611:53 the EMB190 crew reported, "...that traffic's (the Apache) directly on the centreline now." The TWR controller responded, "Roger."

[UKAB Note (2): The EMB190 first appears on the radar recording at 1611:54 0.4nm W of London/City climbing through altitude 500ft, 2.9nm E of (and behind) the Apache, which is turning through W, level at altitude 1500ft.]

By 1612:17 the EMB190 was passing 1600ft 2.6nm E of the Apache (see screenshot below).



[UKAB Note (3): As the EMB190 climbs through altitude 2500ft at 1612:38, the Apache is 2.2nm ahead and 1000ft below.]

The Apache flight was instructed to contact Heathrow SVFR at 1612:40.

The EMB190 commenced a RH turn on its allocated SID having reached 3000ft at 1612:57. The Apache was 2nm W of the EMB190 at 1500ft continuing on a W'ly track in the vicinity of Wapping.

The EMB190 flight was instructed to contact LTC NE at 1613:00.

The incident occurred in Class D CAS, within which there are no prescribed separation standards between IFR and VFR flights. Controllers have a responsibility to prevent collisions between known flights; therefore in Class D airspace controllers pass sufficient TI to IFR and VFR flights to assist pilots in avoiding each other.

The London City TWR controller passed TI to both the Apache and the EMB190 crews. To the EMB190 the controller stated, "...an Apache helicopter approximately two and a half miles southwest of the field indicating fifteen hundred feet continuing westbound." The TI passed allowed the EMB190 crew to form an expectation that the Apache would, literally, continue W'bound. This is amplified in the EMB190 pilot's report, 'this traffic would be routing westbound staying south of the centre line. The Apache was to fly from the Isle of Dogs in an 'upstream' direction along H4, which could be considered as an overall W'bound direction. However, in that position, the upstream heli-route/river direction marks an almost 90° degree turn to the N and intercepts the London City RW extended C/L/climb-out track. Whilst the Apache was continuing as cleared it was not going to continue truly W'bound at that time.

When the EMB190 crew called visual with the Apache, the Apache was only in its turn and not established on a N'ly track. Then, sometime during the EMB190's take-off roll and rotation, the Apache reached the limit of that N/S stretch of the heli-route before turning W. Therefore there was a difference between the expectation of the EMB190 crew with regard to the Apache and the actual flight path of the helicopter, causing the EMB190 crew to amend their SOP as described in their report.

An Airprox was reported by an EMB190 departing London City's RW27 when an Apache - operating in the vicinity as cleared - did not manoeuvre as the EMB190 crew had expected, causing the EMB190 crew to amend their SOP on departure.

Contributory to the Airprox was the TI formulated by the London City TWR controller, which informed the EMB190 crew that the Apache would be continuing W'bound, when its flight path would actually be taking it initially on a N'ly track towards at the extended C/L/climb-out track.

Further to the incident London City ATC recorded the following learning point to be disseminated across the unit and also shared with other units:

"Traffic information must be clear and correct in order to give pilots situational awareness. Simply meeting the requirements of IFR-VFR separation is not enough ... and judgement must be used in regards to pilot awareness..."

HQ JHC comments that the Apache crew correctly operated their ac in accordance with the clearance given from ATC, with standardised London helicopter routing and, given that the radar derived CPA was 1000ft/2.2nm, is in agreement with the helicopter crew in there being no conflict at any time.

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 the EMB190 crew had a different expectation of the Apache's flightpath from that which was actually flown. The City ADC had informed the crew that the helicopter would route

W'bound but the Apache had proceeded in accordance with its ATC clearance to continue W'bound on H4 which involved a turn onto a N'ly track at the Isle of Dogs before turning W and then S following the river while on the extended C/L RW27. The EMB190 crew thought the Apache would stay S of the extended C/L so were concerned when, after visually acquiring the helicopter prior to departure as it commenced its turn at the Isle of Dogs, it then appeared on T CAS in potential conflict immediately after take-off. The crew monitored the helicopter's progress and elected to delay acceleration so as to out-climb it. Members thought that the 'whole picture' would have been painted better to the EMB190 crew had the ADC said the helicopter was 'following the river'. The minimum ATC services requirement for Class D airspace is for TI to be passed to both the IFR (EMB190) and VFR (Apache) flights and to give traffic avoidance advice to the IFR flight if requested; no separation minima are specified. The NATS Advisor informed Members that the turn at the Dome (d1.5 on the CLN7T SID) and the promulgated climb gradient to be followed assists in deconflicting departures from helicopters routing on heli-route H4. After TI was passed to the Apache pilot he saw the EMB190 on the RW and he was aware of its intended flightpath. The radar recording shows the EMB190 climbing out on the SID to 3000ft, 'in trail' of the Apache, and turning R when over 2nm distant and 1000ft above. Whilst conscious of the EMB190 crew's concern, with both flights flying in accordance with their clearances and safety margins having been maintained, the Board concluded that this had been a sighting report where normal procedures, safety standards and parameters pertained.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting report.

Degree of Risk: E.

AIRPROX REPORT No 2012055

Date/Time: 19 Apr 2012 1612Z

Position: 5740N 00630W (Mouth of Loch Snizort - Isle of Skye)

Airspace: Scottish FIR (Class: G)

Reporting Ac Reporting Ac

Type: Merlin HM1 Tornado GR4

Operator: HQ Navy HQ Air (Ops)

Alt/FL: 500ft 610ft
QNH (985hPa) QNH (985hPa)

Weather: VMC NK VMC CLBC

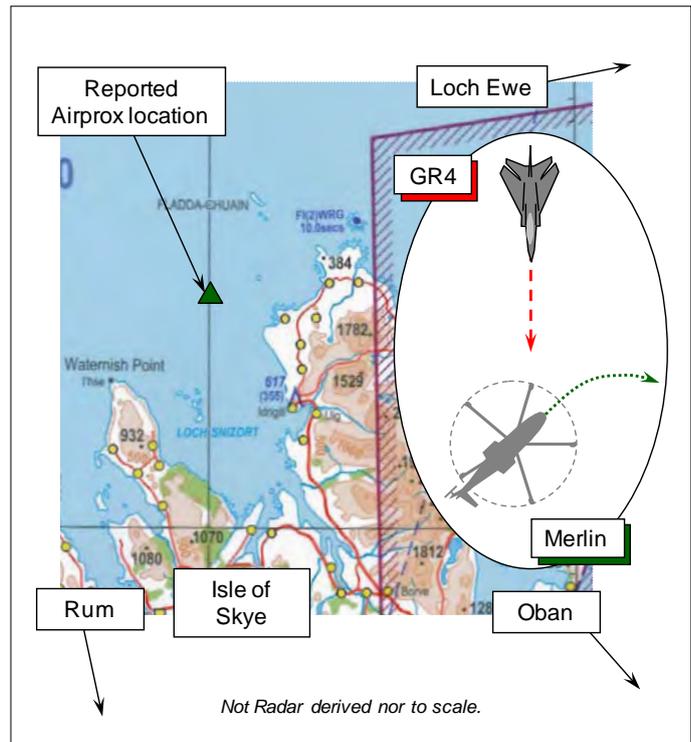
Visibility: 20km 20km

Reported Separation:

250ft V/¼nm H 400ft V/½nm H

Recorded Separation:

Not recorded



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA WESTLAND MERLIN HM1 HELICOPTER PILOT reports he was flying a VFR transit with passengers on board from Oban to a warship in the vicinity of Loch Ewe during Exercise JOINT WARRIOR. After departing Oban at 1520Z he routed through the Sound of Mull, E of Rum and W of the Isle of Skye at 135kt, 500ft RAD ALT with the BAR ALT set to the Force QNH (985hPa).

They were in communication with the embarked Air Safety Cell - C/S EAGLE - on the UHF safety frequency of 313.175MHz to assist with deconfliction from an Air Defence Exercise (ADEX), which had commenced at 1530Z; they were also passing 'Ops Normal' calls to the warship via HF. Unable to speak directly to EAGLE because of high ground until they were NW of Skye, traffic could be heard on the frequency so they asked the HF radio operator aboard the warship to relay their helicopter's position to EAGLE so that the Air Safety Cell could deconflict the Exercise fast-jets. This was confirmed on HF as being done and EAGLE was heard to impose a 'hard deck' [lower operating limit] of 1500ft FORCE QNH for all participating fixed-wing ac because of multiple helicopters in the vicinity. Participating helicopters were limited to operating not above 500ft FORCE QNH to allow 1000ft separation.

As his Merlin rounded the NW side of the Isle of Skye, direct communication was established with EAGLE on UHF. Approaching a position 57°40'N 006°30'W on a heading of about 045° EAGLE warned of low-level traffic ahead. About 30secs later EAGLE repeated the warning and a Tornado GR4 was spotted in their 10 o'clock 5-6nm away heading towards them at a similar altitude, but on an approximate heading that would take the jet slightly astern. Initially the GR4, heading approximately 200°, looked to be passing clear astern, but it was then seen to turn onto a heading, he thought of about 150°, towards his Merlin and remained on a steady bearing. To avoid the GR4, he was forced to turn hard R and initiate a rapid descent to 250ft RAD ALT as the GR4 passed ¼nm astern and 250ft above his Merlin with a 'high' Risk of collision.

Some 20secs later the crew of an unidentified ac [reported by the GR4 crew to be another Exercise callsign] was heard to ask EAGLE if an altitude restriction had been imposed on fixed-wing ac. EAGLE reiterated that a 'hard deck' of 1500ft was in force for fixed-wing ac due to multiple rotary-

wing contacts in the area. The GR4 was then seen to climb rapidly and proceed towards the SE. An Airprox was reported on landing aboard the warship.

The Merlin has a maritime grey low-conspicuity camouflage scheme; the white HISLs were on. TCAS is not fitted.

THE TORNADO GR4 NAVIGATOR reports with HUD recorder transcript that he was flying as the bounce (No3) against a pair of GR4s during an evasion training sortie. Two Tornado GR4 ac – Nos 1 & 2 – had departed from Lossiemouth independently as a pair and transited to the W coast of Scotland [S of Skye], which was the only area with suitable weather for their sortie. Descending to low level with Scottish MILITARY he then switched to EAGLE Safety on 313.175MHz [no ATS was established]. A squawk of A7001 was selected with Modes C and S on.

After switching frequency and listening [since 1606:01] they heard the Merlin crew on frequency, together with two other callsigns. Before contact was established with EAGLE he heard another callsign being 'cleared' to operate not below 1500ft QNH in a position 57° 53'N 005° 49' W [a point of land W of Loch Ewe], with the Merlin inbound at 300ft and not above 500ft from Waternish Point. Two-way RT contact was then established with EAGLE [at 1609:23, "*Eagle Safety, (GR4 formation C/S) formation of two GR4s currently low-level to the south end of Isle of Skye transiting to the south..training request if there is any exercise traffic in the local vicinity to affect*". The No3 GR4 navigator perceived that EAGLE advised of rotary traffic north of the Isle of Skye between Stornoway and Loch Ewe and 'south [of Skye] no immediate traffic to effect', the controller believing another ac to be 'south west of Benbecula approximately 30nm'. [The Merlin's position was, however, some distance S of that reported by EAGLE and was ahead of rather than behind the GR4]. Based on this information they elected not to carry out any evasion training until S of the Isle of Skye and to remain above 500ft to deconflict from the Exercise rotary-wing traffic; the No1 and No2 were then advised there was no traffic to affect to the S of Skye. Just before the Airprox EAGLE passed TI to the Merlin crew [at 1611:21, "[Merlin C/S] *EAGLE 1..heads up..traffic north east of your position range 10 miles southbound believed to be GR4 indicating unintelligible non exercise*". This TI was updated to the Merlin crew at 1612:07, "*..previously reported traffic now north approximately four and a half miles tracks south-west indicating low-level*".]

Flying at 610ft amsl, 2000ft clear below cloud with an in-flight visibility of 20km, hearing this information the No3 started a L turn to remain N of the Merlin which was first sighted at a range of 2nm, to the NW of Skye flying straight and level. The Merlin crew then called on the RT visual [at 1612:26, adding 8sec later "*..we are visual he's [the No3 GR4] just passed approximately half a mile astern of us*". At 1612:33, the No3 GR4 crew reported to EAGLE visual with the Merlin. The response from EAGLE was "*..roger believe he did call but..thought they would be..further south than the called position*".]

The No3 crew was visual with the Merlin and did not feel that any avoiding action was necessary, passing ½nm away and 400ft clear above the helicopter at the closest point with a 'low' Risk of collision. Another pilot with an Exercise callsign then called on the RT asking if there were any flight restrictions, to be told Exercise fixed-wing assets had a 'hard-deck' of 1500ft.

The ac's white strobes were on.

UKAB Note (1): Despite being requested, to date no report has been received from the EAGLE Safety controller who was aboard a foreign warship participating in Exercise JOINT WARRIOR.

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

UKAB Note (3): Several Y Series NOTAMs were issued by LF Ops relating to Ex JOINT WARRIOR 121. These NOTAMs warned military crews of 'intense aerial activity involving multiple fast-jet and rotary wing aircraft.....'. However, these NOTAMs all referred to Exercise airspace blocks further E than the Airprox location, extending no further W than 005°50'W.

AUS also issued an Airspace co-ordination notice - ACN 2012-04-0066 – applicable to this Exercise, within which it is stated at para 7:

'Eagle Safety. Two ATC Safety Cells will be established and will operate from the most appropriate ships subject to exercise requirements. Callsigns are Eagle One and Two and Eagle Safety frequencies are 313.175 MHz (North) and 362.250 (South).'

HQ NAVY comments that Eagle Safety is an ATC function that is established during JOINT WARRIOR and NATO exercises that have significant aviation input. The benefit from an Air Safety Cell (ASC) being embarked within the force that has no exercise role is that it can concentrate solely on Air Safety. This Airprox is an example of exactly why the ASCs are established and serves to highlight the requirement for there to be third party deconfliction, primarily of exercise players but also against non-participants. The frequencies for ASCs (callsign EAGLE) are promulgated in exercise instructions; in this instance it is noted that the Tornado crew had the frequency and were monitoring it. EAGLE frequencies are safeguarded from exercise jamming and are not encrypted at all; indeed the ASC has the authority and ability to order cease jamming of any frequency, if required for Air Safety purposes.

Due to the nature of the terrain in the vicinity of this Airprox, the Merlin could not establish 2-way comms with the ASC embarked aboard the foreign warship. During these exercises it is normal for the ATC team on an aircraft carrier to also monitor the EAGLE frequency and to provide assistance where necessary in order to deconflict their own aircraft operations. The communications fit within a warship is somewhat limited and in this instance the ship's SATCO was liaising with the ASC via the standby radio, whilst the ship's on-watch ATCO was using their own HOMER frequency. SATCO relayed information to the Merlin using the EAGLE frequency in order to overcome the terrain masking difficulties.

A 1500ft hard-deck was imposed for exercise traffic, but the Tornado formation ac were non-participants and had not asked for a service from EAGLE. In Class G airspace it would not have been possible for EAGLE to impose the hard-deck on the Tornados, however the call to the other participants of multiple rotary-wing traffic operating up to 500ft should have prompted a requirement for appropriate altitude separation to be applied. Formal identification of the Tornados did not take place, however timely traffic information was passed to the Merlin in order for them to take avoiding action.

It is noted from the HUD tapes attached to the ASIMS report that the initial sighting of the Merlin was in the Tornado's 12 o'clock, crossing R-L, and the pilot maintained a left hand angle of bank with the Merlin drawing left across the HUD and below, showing the GR4 passing behind the Merlin and above it. Had the Tornado not turned left the separation would have been greater.

An exercise such as JOINT WARRIOR will always create scenarios where differing types of aircraft will be attempting to operate in the same airspace as either red or blue participants, or as no-play strangers. There is an enduring need for the embarkation of ASCs in order to provide real world Air Safety as far as possible. This safety net was in place, and worked in this instance. Margins could have been greater though had the Tornado crew not flown so close to the Merlin once it was sighted, or had honoured the hard-deck imposed on participating FW aircraft.

HQ AIR (OPS) comments that the lack of a report from the EAGLE ASC controller makes conclusions hard to draw, except from the information provided in the No3 GR4 HUD recording. Based on the evidence from the crews involved it appears that the non-exercise No3 GR4 transited the vicinity under normal Rules of the Air and the crew was aware of the Merlin from listening out on the EAGLE SAFETY frequency. The No3 GR4 was a non-exercise aircraft and so the exercise altitude restriction would not have applied, and there is no evidence that EAGLE SAFETY attempted to impose an altitude restriction on the GR4. The crew report hearing snippets of information regarding other aircraft receiving altitude restrictions but none that applied to them, although this is at odds with the understanding of the Merlin crew, which was that the restriction applied to "all fixed-wing aircraft".

The GR4 crew's position and intentions call to EAGLE before the Airprox was somewhat confused and did not assist the controller's SA. In any case, the controller was able to call TI to the Merlin based on radar data and the reciprocal of this was used by the GR4 crew to gain 'tally' and avoid the conflict. The GR4 crew's 'left turn to maintain north of the Merlin' did not achieve its stated aim and continued after they reported having gained visual contact at 2nm. This exacerbated the situation by reducing the horizontal separation distance and triggering the Merlin pilot's avoiding action. The turn initially placed the Merlin in the centre of the GR4 HUD but was eased at closer range ensuring that no actual risk of collision existed.

Considering the Merlin's reported altitude of 300ft, the transit altitude selected by the GR4, which would normally be at 250ft, was reasonable [610ft RAD ALT]. Although the GR4 navigator reports receiving a BS from EAGLE this was not the case and no service was agreed. Nevertheless, EAGLE could have requested the GR4 crew to maintain above 1500ft for deconfliction purposes but this would have required explicit agreement, which was not requested. The incomplete and misleading position reports in this instance contributed significantly.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the crews of both ac; a transcript, still photos and video of the relevant GR4 HUD recording, together with comments from the appropriate operating authorities.

The Board discussed the issue of the NOTAM'd Exercise airspace and the applicability of any 'hard deck' for fixed-wing ac; Members agreed with HQ Navy Command's contention that the GR4, as a non-participating ac, remained outwith the Exercise JOINT WARRIOR scenario and whilst in transit in Class G airspace was not compelled to abide by any Exercise 'hard-deck' limitation. Nevertheless, aware of the EAGLE Safety frequency, the GR4 crew had wisely listened out and then subsequently called the controller as they transited S toward their intended RV with other elements of the formation. The Board was briefed on the difficulties of producing an accurate transcript from the HUD recording, but the GR4 pilot's Station had reaffirmed that it was the No3 crew that made the RT call to EAGLE at 1609:23, which described the position of the No1 & 2 but did not describe the position of the No3 bounce GR4. This call, Members agreed, would have subsequently confused the EAGLE Safety controller as the information given did not make it plain that their's was a single GR4 – the No3 - southbound to the N of Skye to join up with the two GR4's to the S. The absence of a report from the EAGLE Safety controller aboard the foreign warship was unfortunate; it could have assisted greatly here and the Navy Command Member apologised for its lack of availability to the Board. However, it was plain that EAGLE did not perceive a conflict between the Merlin and No3 GR4 beforehand based on the information given by the No3 GR4 crew. Fortunately, the No3 crew was already aware from listening to the RT that a helicopter was operating at 300ft, and below 500ft from Waternish Pt. Hence the No3 GR4 crew's decision to transit at an altitude greater than 500ft. The Navy Command Member contended that the GR4's recorded level of 610ft RAD ALT was not a sufficient margin above the reported altitude of the Merlin. However, an HQ Air fast-jet Member explained that whilst operating in the 'see and avoid' environment of Class G airspace, outside the NOTAM'd area over open water where they would normally select a low-level transit altitude of 250ft, the No3 GR4 crew had taken due account of the presence of the Merlin below 500ft by flying higher than normal. With information gleaned from listening to RT calls from exercise traffic and EAGLE Safety, the GR4 crew saw the Merlin at a range of 2nm they report. However, the HQ Air (Trg) Member remained unconvinced that the GR4 pilot had seen it this early because of the continued L turn shown on the HUD recording; he perceived that the No3 GR4 navigator saw it first at closer range after the Merlin pilot's avoiding action descent. Nonetheless, the HUD 'shots' convinced the Members that the GR4 had passed clear above and astern of the Merlin, which was unmistakably evident on the recording clearing to port and below.

Within the promulgated airspace the Merlin crew would quite reasonably not have expected to encounter participating fixed-wing at their level at all, with Exercise JOINT WARRIOR ac operating above the 1500ft 'hard-deck' where specified by EAGLE Safety, so the helicopter crew was probably

quite surprised to see another fixed-wing ac in the area below this altitude. The Ops LF Advisor added an important point of advice here for Exercise planners; if they wish to exclude other non-participating military ac from the lower reaches of the LFS during major exercises then, subject to relevant staff approval from Ops LF/Air Staff, it is feasible to overlay an Exercise area with a blanket LFS restriction for non-exercise participants.

The ATS provided to the Merlin crew by EAGLE was not specified in their report, nonetheless, it was evident from the GR4 HUD recording that EAGLE Safety had spotted the No3 GR4 'stranger' at a range of 10nm, called it to the Merlin crew and provided an update at a range of 4½nm. This enabled the Merlin crew to acquire the GR4 heading towards them in their 10 o'clock 5-6nm away. As the Merlin was operating below 500ft, with the GR4 shown to be at 610ft – both operating on RAD ALT – vertical separation was not less than about 110ft, but the Board understood that where they might have thought this was Exercise traffic and expected greater separation of about 1000ft from it, this would have been a concern to the Merlin crew. The Members agreed unanimously that this Airprox had resulted because the GR4 crew flew close enough to cause the Merlin crew concern.

In considering the inherent Risk, the Board perceived that after sighting the GR4, the Merlin pilot's robust avoiding action of a hard R turn and rapid descent to 250ft RAD ALT would have been highly effective in quickly increasing the vertical separation clear below the GR4 to 360ft. The Merlin pilot estimated in his written account that the Tornado passed ¼nm astern. The GR4 crew's own horizontal estimate was ½nm astern, which was also that passed on the RT to EAGLE by the Merlin crew at the time. The GR4 crew saw no need for avoiding action when they saw the Merlin, probably because of the prompt and robust avoiding action already taken by the Merlin pilot, which would have placed the helicopter beneath them at slightly less than their own estimate of 400ft. Nonetheless, with separation in the order of 360ft vertically and the GR4 passing ¼ - ½nm astern, this was enough to convince the Members that no Risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The GR4 crew flew close enough to cause the Merlin crew concern.

Degree of Risk: C.

AIRPROX REPORT No 2012057

Date/Time: 24 Apr 2012 2103Z (Night)

Position: 5731N 00349W
(23nm SW Lossiemouth)

Airspace: Scot FIR (Class: G)

Reporting Ac Reporting Ac

Type: MC130P Tornado GR4

Operator: Foreign Mil HQ Air (Ops)

Alt/FL: 5800ft↓ >2680ft↑
SPS (29.92in) RPS (994hPa)

Weather: IMC BL VMC CLBC

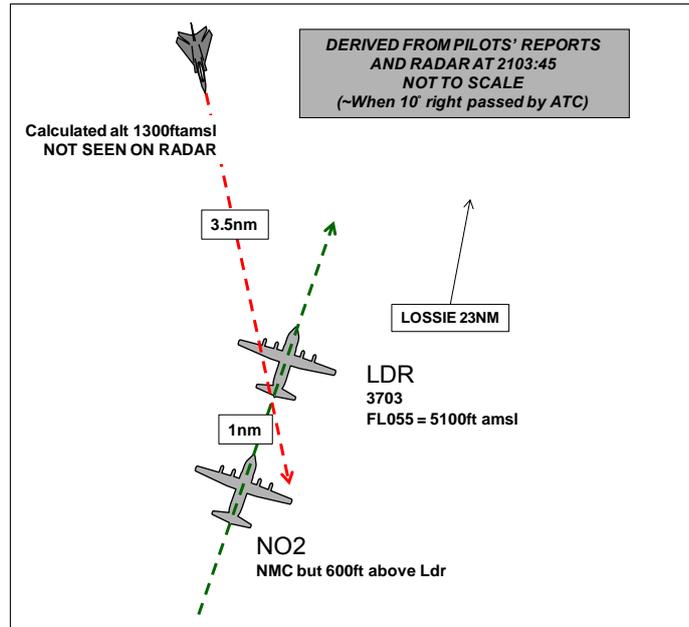
Visibility: 1nm 8km

Reported Separation:

25ft V/70m H NK

Recorded Separation:

NK



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MC130P PILOT reports flying as No2 of a flight of 2, on a night formation, exercise support mission; TCAS was fitted but was set to TA only in accordance with their (formation) SOPs. They were heading of 057° on an en-route descent at 230kt while in receipt of a TS from Lossie APP on VHF when they experienced an Airprox with a single Tornado, seen ¼nm away, displaying nav lights, and climbing through their level from L to R. The incident occurred while they were descending through 5600ft amsl to 4000ft amsl, in 1nm radar trail and 600ft above their leader while on a vector from Lossie APP for a visual low-approach at Lossiemouth to depart at low level.

They were given TI by Lossie on a Tornado and when reporting visual, Lossie gave them a heading of "10 degrees right" for traffic deconfliction. The Tornado passed from L to R from No2's 10 o'clock position to their 4 o'clock, about 25-50ft above and about 100-300ft away. No RA was given because of wing TA-only TCAS configuration.

Both the Tornado and their formation were under TS from Lossie and were in IMC.

They [No2] pushed forward on the flight controls when the Tornado was first observed in their 10 o'clock position about ½-⅓nm away to increase the RoD and therefore, increase the separation between the two ac. An Airprox notification was passed to their leader, who in turn passed it to Lossie APP.

They assessed the risk as being high.

THE TORNADO GR4 NAVIGATOR reports departed Lossiemouth at 2057 on a training flight and were climbing to FL50 following a SID 05 West under a TS [see BM SM report] while squawking as directed with Mode C. When they were 15nm NW of the airfield, they informed ATC that they were coming left onto S and requested a descent to 3000ft on the Lossiemouth QFE of 999. They were in a high workload situation while engaging and monitoring the TFR heading 177° at 378kt, (they were not using NVGs at the time).

They were aware of a C130 C/S XXX to the west on recovery, via a Radar-to-Visual approach. Upon coasting in at the 'Nairn Gap', they reported that they were good VMC and going en-route and at that time ATC informed them of the 2xC130s on recovery in their right one o'clock, 15nm going right to left and descending to 4000ft. They then heard ATC report their position to the C130s as being "North, 10nm crossing left to right". Believing that there was sufficient vertical separation between ac, their current heading would put them behind the recovering ac and the fact the C130s were under a radar service, they went en-route, set the RPS of 994hPa, levelling at 3000ft and transferred to the low-level common frequency.

They were VMC, in sight of the surface but were not visual with the C130s due to a thin layer of cloud at about 4000ft.

After completing the TFR checks, they proceeded to engage the TFR system from the leg MEA of 3000ft. They descended to a BARO alt of 2680ft at 2103:45 (verified by RAIDS) at position N5726 W00346 when the system reacted to what was assumed to be weather returns and started to climb the ac. The ac went almost immediately through the leg MEA of 3000ft and the climb was continued to 5740ft BARO alt at 2104:10 (verified by RAIDS) at position N5723 W00345 while the crew assessed what had happened before then descending back to 4600ft for the next leg's MEA.

The whole event had happened very quickly and they were good VMC again above the thin layer of cloud, 30nm SW of Lossiemouth heading S and they elected to continue the sortie rather than return to the Lossiemouth ATC frequency.

They were unaware of any Airprox incident until they were informed by the Duty Authoriser upon their return to the Ops desk after landing at 2200z.

They took no other avoiding action as they were unaware of the incident at the time and assessed the risk as being low.

Having analysed the incident post flight with hindsight, applying sound airmanship would have lead to the pilot changing three things to try and avoid a similar situation in the future:

1. If near an airfield with recovering traffic then it would be worth staying with ATC until it is absolutely certain that the traffic is well out of the way before going en-route.
2. Try to avoid routing at 3000ft through the extended centreline, albeit over 20nm out on the extended centreline, when on RW05 with ac potentially undertaking GCA recoveries.
3. If there is traffic close to or above the route, ideally wait until it is well away from track and heading away before engaging TFR that has the potential to pull up into their track.

BM SAFETY MANAGEMENT reports that this Airprox occurred at night, between a MC130P (C130), operating IFR in receipt of a TS from Lossiemouth APP, and a Tornado operating VFR; the Tornado went en-route from APP's freq at 2102:39, just before the CPA.

All heights/altitudes quoted are based upon S SR Mode C from the radar replay unless otherwise stated. The Airprox was not captured on the radar replay, the Tornado having descended below recorded radar coverage at 2102:22 and re-appearing shortly after the CPA at 2104:24.

The Tornado crew reported that they were VMC with 8kms visibility with a thin layer of BKN cloud at 4000ft and the C130 (2) crew reported IMC with 1nm visibility between layers of cloud.

The C130 was operating as the trail ac of a pair inbound to RAF Lossiemouth for a self-positioned visual approach. The Tornado had departed RAF Lossiemouth, in receipt of a TS from APP and was positioning to enter the UKLFS in the vicinity of the 'Nairn Gap'. The incident sequence commenced at 2100:56 as the Tornado turned onto SSE'ly track at FL50, not yet having commenced an

instructed descent to 3000ft QFE 999hPa; the C130 [No2] was 33.4nm SSW of the Tornado, tracking NE'ly and descending through FL81.

At 2102:17, the Tornado reported to APP that they were, "*victor mike below and going on route*"; this was acknowledged by APP and they then passed TI to the Tornado on the C130 flight stating, "*traffic right, one o'clock, one-five miles, crossing right left, two Charlie one thirties, descending to height four thousand feet.*" The Tornado had just coasted in, indicating descent through 3500ft; the MC-130P (2) was 18.9nm SSW descending through FL67. There was approximately 140° angular difference between the ac's respective tracks. The TI passed by APP was co-incident with the Tornado descending beneath the base of NATS radar coverage and thus disappearing from the radar replay, not reappearing until after the CPA (squawking the Lossiemouth assigned SSR code). Based upon the Tornado's track after the CPA and the lack of a contradictory statement in the crew's report, it is reasonable to argue that the Tornado maintained its SSE'ly track throughout the incident sequence.

The Tornado acknowledged the TI and APP then passed them the RPS and instructed them to, "*squawk as required, change en-route*" which was acknowledged at 2102:39. The Tornado crew subsequently reported that they decided to 'go en-route' because they believed that "there was sufficient vertical separation between aircraft, a current heading that should put them behind the recovering aircraft and the fact that the [C130 (2)] were under a radar service."

At 2102:49, APP passed TI to the C130 flight on the Tornado as, "*traffic north, one-zero miles, crossing left-right, a Tornado at three thousand feet*" which was acknowledged. Based upon the Tornado crew's report, it is evident that they were still monitoring APP's freq as they report having heard this TI.

At 2103:24, APP updated the TI on the Tornado to the C130 flight as, "*previously reported traffic, left eleven o'clock, five miles, crossing left-right*". The C130 lead replied that the formation was, "*India Mike Charlie*" which APP acknowledged. At 2103:41 when prompted by the Supervisor, APP instructed the C130 flight to "*turn right ten degrees*" which was acknowledged. Although the turn was not formally phrased as deconfliction advice, it was meant as such by APP and interpreted as such by the C130 crews, as highlighted in their report. Although the turn was aimed to 'ensure that a gap was maintained between the contacts', this was not achieved. It is worthy of note that the C130 crew were operating in IMC, having received TI on a conflicting aircraft, when a DS would have been available.

Based upon the Tornado crew's report, at 2103:45 they descended to a BARO altitude of 2680ft, in a position approximately 2.6nm N of lead C130, which was descending through 5300ft, and 3.6nm NNE of C130 No2. Their TFR then reacted to what the crew believed was weather returns and initiated a climb to a BARO altitude of 5740ft, levelling at that altitude at 2104:10. This position was approximately 1.6nm SSE of the lead C130, which was descending through 5100ft, and 1.2nm SE of C130 No2; consequently, the CPA occurred between 2103:45 and 2104:10 as the Tornado climbed through the C130 flight's height.

The No2 C130 crew stated that they first sighted the Tornado at around $\frac{1}{2}$ to 1nm and increased their RoD to increase separation. The Tornado crew did not visually acquire the C130 and stated that at the time of the incident they were conducting reversionary night flying, with a transition to NVG planned later in the sortie. The No2 C130 crew assessed minimum separation as 25 to 50ft vertical and 100-300ft horizontal.

ATC provided a good level of service to the C130s. Although a little over 1000ft vertical separation existed, cognisant that the Tornado was VFR en-route (albeit squawking a Lossiemouth code) and that the C130s were IMC, ATC stepped beyond the bounds of a TS to attempt to provide a measure of deconfliction between the C130s and Tornado.

APP's description of the relative motion of the C130 relative to the Tornado however has greater relevance. Based upon the Tornado crew's report, the use of the word "*crossing*" by APP indicated

to the Tornado's crew that they would pass behind the C130 formation. As has been stated in previous Airprox investigations, many aircrews interpret the word "*crossing*" as a motion at approximately 90° to their track; in this instance, around 140° angular difference existed between the respective tracks; however, in the absence of a definition of "*crossing*" the term is interpretable and, arguably, the C130 flight was on a track that would cross that of the Tornado. Whilst CAP413 permits the use of "*converging*" as a descriptor for relative motion, again there is no definition and perceptions of its meaning amongst ATCOs appear to differ. Moreover, the wording of CAP413 suggests that "*converging*" and "*crossing*" are mutually exclusive terms. What is clear from the evidence is that the Tornado crew linked the TI passed by APP with their expectation to shortly be within the UKLFS and thus below the height of the C130 formation and elected to change to their en-route frequency. Unfortunately, the unexpected reaction of the TFR to what the crew believed to be weather returns conspired to climb their aircraft into the thin cloud layer at 4000ft and through the level of the C130.

Accepting the part that the TI played in the Tornado crew's initial decision making process, it remains that the Tornado had gone en-route approximately 80 seconds prior to the CPA and as such was responsible to 'see and avoid' other aircraft. An equally likely course of events could have been for ATC to issue a vector to the C130 formation which would have markedly changed the event geometry and rendered the Tornado's previously obtained TI worthless. On that basis, the Airprox was caused by a conflict of flight paths within Class G airspace. Given the separation reported by the C130 crew, it is reasonable to argue that the conflict was resolved by ATC and the C130 and that without the 10° right turn, coupled with the increased RoD, the outcome could have been much worse.

RAF ATM Force Command, in association with RAF Farnborough, is reviewing the issues highlighted in this report.

HQ AIR (OPS) comments that the supervisor in the GR4 crew identified several key learning points from this incident. The incident formed the basis of a flight safety discussion amongst the staff with a view to educating other crews who might face similar circumstances in future. There are a myriad of ways in which the situation could have been prevented but the primary cause was the automatic pull up generated by the TFR. The potential for a TFR pull up in this scenario was one of the hazards identified in hindsight by the crew. The activation of the pull-up feature of the TFR is much like an autopilot actioned TCAS RA and as such must be followed as it can indicate an undetected failure of the TFR system; hence, it was reasonable for the crew to permit the pull-up to proceed but there was clearly no concern over a potential conflict, as the pilot reports. With the TI provided by the controller, particularly the use of the phrase "*crossing*", and the increasing height separation being generated by their intended profile, the decision to go en-route was not unreasonable. However, the call they heard to the C130s that they (the GR4) were crossing left to right, which by the same token should have implied they were passing ahead not behind the C130s, was not fully processed. If the "*crossing*" call is to relate to a track crossing angle an additional descriptor of "*passing/tracking ahead*", "*passing/tracking behind*" or "*converging/conflicting etc*" is required to communicate an appropriate level of SA. Therefore, the GR4 crew's SA regarding the potential for conflict and the decision to engage TFR were contributory.

HQ USAF-UK comments that there is little to disagree with the post flight analysis by the Tornado crew. Furthermore, we endorse the above comments with regard to phraseology used for certain types of conflicts; CAP413 cannot cover every eventuality so, where applicable, controllers should surely "tell it how it is" rather than feel constrained by the inadequacy of permitted phrases.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both aircraft, a recording of the Tornado Head Up Display (HUD), transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board agreed that this was a most complex incident. Murphy's Law (Capt Ed Murphy USAF Edwards AFB 1949) – "If anything can go wrong, it will".

In an attempt to determine whether the controller had played any part in the incident it was important to determine when the Tornado had disappeared from his display; the display is not recorded. Initially only the Prestwick combined radar recording was examined which showed the Tornado descending below radar cover at 2102: 25. In order to try to determine when the Tornado disappeared from the controller's display the Aberdeen single source radar recording was also examined but it too showed the ac disappearing at the same time. Although displaying height (Rad Alt) and Alt, Tornado HUDs do not display real time or position other than from a 'bullseye', so it was not possible to use this information to assist in making an estimation. However, it was considered most likely that the Tornado remained on the APP controller's radar display for some time after disappearing from the recording but, since the Tornado crew declared that they were going en-route (though not at that time changing frequency or squawk), the controller would have been unable to provide the crew with more information regarding the position or track of the C130s (notwithstanding the HQ Air comment about the descriptive terminology regarding their relative tracks). Although the controller informed the Tornado crew that there were 2 C130s, he did not inform them that they were in 1nm trail and it seems that the Tornado crew assumed that they were in 'closer' formation as is often the case when flying night missions; it appeared that they were never aware that the C130s were flying in 1nm trail. Further, although they were passed TI and overheard the TI regarding them being passed to the C130s, they did not assimilate that the C130s presented a significant collision risk on their Southbound track if the Tornado climbed above their intended operating height of 500ft agl.

One advisor commented that a DS might have been more appropriate for the C130s while in IMC; however, they were formation flying on a tactical exercise sortie, self-positioning for an 'internal aids' approach to Lossiemouth and a DS might not have allowed them sufficient tactical freedom to accomplish their mission requirements. In any case, the only other traffic on the Lossie APP radar picture was the Tornado, apparently descending to low level, of which they were aware. It was clear to Members that the avoidance passed to the C130s by the APP controller after the Supervisor intervened, was too little and too late to have had any meaningful effect.

The Secretariat's assessment of the Tornado HUD video was verified by an independent expert; unfortunately there was no audio recording and the TFR E-scope is not recorded. The Board acknowledged that the Tornado pilot was a student and that the entire sequence of events happened very quickly (the ac were closing at about 660kt (11nm/min) and the maximum detection range of the Tornado TFR is 6nm. The Board accepted that:

- a. As far as can be determined from the video the Tornado TFR was operating correctly with no failures at the time of the incident.
- b. In the lead up to the incident the Tornado autopilot and TFR engaged at 3000 ft (alt) and initially the ac was descending correctly to low level in 'auto-TF'
- c. While in the descent, 13 sec after engagement, the TFR detected something (i.e. terrain, an ac or weather) that generated a normal auto-TF climb command producing at 20° nose-up attitude.
- d. The ac climbed with auto TF engaged then levelled at an alt of about 5600ft when auto-TF was discontinued and the ac flown manually initially remaining the same alt
- e. The Lossie METAR showed no probability of weather 'thick enough' to produce such a climb.
- f. The C130 was not seen on the Tornado HUD recording at any time. This was consistent with the pilots' reports of a thin cloud layer between the ac and the Lossiemouth METAR showing the cloud as being broken at 3400ft.

Bearing the facts above in mind it was the opinion of the Secretariat, substantiated by the independent expert, that shortly after engagement, the Tornado TFR had 'seen' the lead C130, demanded a climb and attempted to climb the Tornado over the ac by the 'Set Clearance Level' height set at the time (presumed to be 500ft). This opinion was given further credence by respective alts of the ac at the presumed time of crossing [Tornado from the HUD and the C130 Lead from Mode C].

Since the pilot encountered the unexpectedly high angle climb and after passed through the Minimum En Route Alt for the leg, he disconnected the autopilot and recovered the ac to level flight at 5600ft alt (4790ft agl) manually; again no other ac was visible on the HUD video. It was assumed that this would have been just as he passed very close to the trailing C130 crossing from its 1030 to its 0430, as seen by the pilot.

Analysis was not able to determine either the lateral or vertical separation as there was no information regarding the precise time or position of the CPA or any Mode C information from the No2 C130 [the leader was at about 5100ft alt].

The Board noted that both ac had been operating legitimately under VFR in Class G airspace where the principal method of collision avoidance is 'see and avoid'. The cloud layer between the ac prevented either pilot from being visual with the opposing ac until the last moment and the Board considered it unlikely that C130 No2's avoidance would have had time to take effect before the CPA; therefore there had been a risk that the ac would have collided. Members also observed that the sequence of events had taken place very quickly when the Tornado crew was in a very high workload situation. This had prevented them from conducting a full analysis of the situation they faced which might have led to their having better SA.

Members agreed with the points identified by the Tornado crew in their post flight analysis, particularly that it is unwise to commence automatic TFR flying on, or close to, the approach lane to an active airfield.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado crew climbed into conflict with the MC130P which they did not see.

Degree of Risk: A.