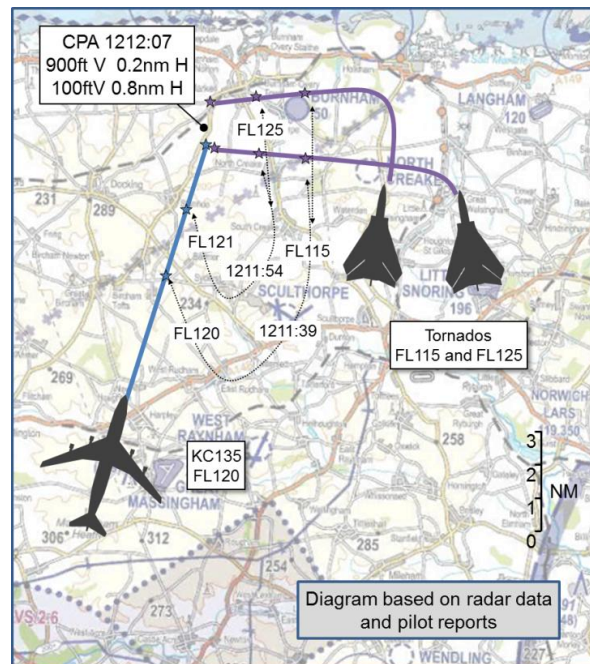


AIRPROX REPORT No 2014216**Date/Time:** 13 Nov 2014 1212Z**Position:** 5255N 00043E
(Sculthorpe)**Airspace:** London FIR (Class: G)**Aircraft 1** **Aircraft 2****Type:** Tornado KC135**Operator:** HQ Air (Ops) Foreign Mil**Alt/FL:** 11000ft FL120
RPS**Conditions:** VMC VMC**Visibility:** 30km NK**Reported Separation:**

0ft V/0.75nm H 900ft V/NK H

Recorded Separation:

900ft V/0.2nm H and 100ftV/0.8nm H

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

THE TORNADO PILOT reports flying in a formation of 2 grey aircraft with all lights illuminated and SSR transponder Modes 3A, C and S selected; the aircraft were not fitted with ACAS. The formation was conducting Close Air Support (CAS) training with a Joint Terminal Approach Controller (JTAC) overhead Sculthorpe and receiving a Traffic Service from Marham Zone. Once established and in communication with the JTAC they were informed that a pair of F15s would be operating in the stack at a higher level. Shortly afterwards the crew became visual with a pair of F15s at the level which they expected and assumed it was the aforementioned aircraft; they informed Marham Zone that they were happy to accept deconfliction in the CAS stack from JTAC. Approximately two minutes later, whilst manoeuvring, the lead pilot became visual with a KC135 which appeared to be within 1nm and at the same level: no traffic information had been passed by Marham Zone. The crew took avoiding action, and the lead pilot called the traffic to the number two. When they subsequently asked Marham Zone about the confliction, the controller stated that he had assumed that it was in the CAS stack and therefore had not passed any information. Subsequently, the crew became visual with a second pair of F15s approximately 5nm away who appeared to be following the KC135 to the north. The KC135 and both formations of F15s were seen clearing the area to the north. The Tornado pilot confirmed with Marham Zone that they were only deconflicted with JTAC traffic in the CAS stack and, once they were sure that they were clear of all confliction, recommenced the CAS exercise.

He assessed the risk of collision as 'Medium'.

THE KC135 PILOT reports flying a grey aircraft with transponder on and Mode 3A, C and S selected; the aircraft was fitted with TCAS. He reports cruising at FL120 en-route to Air-to-Air Refuelling Area (ARA) 8 to refuel some F15s. He was receiving a Traffic Service from "Military Control" and, when about 5 mins away from ARA8, received Traffic Information on a pair of Tornados approaching from the east. He acquired them on TCAS approximately 10nm away and started to look for them visually. The weather was clear, and he quickly visually identified the formation. The Tornados continued to close on a converging heading and a TCAS TA alerted, followed by an RA which initially instructed a climb but then became 'maintain vertical altitude' (which was FL120). He assumed that this was because it picked up both aircraft; one appeared to be slightly in front of his flight path and above his altitude and the other behind and below. He notified the controller that he had the traffic in sight.

He assessed the risk of collision as 'Medium'.

THE MARHAM LARS CONTROLLER reports that he had recently taken over the control position, approximately 15 mins earlier, and was controlling for the first time that day. He was providing a Traffic Service to two Tornados in a formation, and another Marham based aircraft in the north Norfolk area. The formation of Tornados climbed out from Marham and entered the CAS exercise area and, after he had called traffic to them, the crew informed him that they were deconflicted from the F15 traffic within the CAS area by the operators. This led the controller to believe that Traffic Information would not need to be passed on traffic operating in the CAS area as this would distract the crew from their operations. He saw an aircraft transiting through their location and shortly afterwards the formation lead pilot asked if he knew about the KC135 in the area. He replied that he had thought that they were deconflicted from traffic operating in the area, He then saw two further aircraft following the aircraft that he now knew to be the KC135. The lead pilot then informed him that to avoid any further confusion, they were only deconflicted from aircraft operating above them.

He perceived the severity of the incident as 'Low'.

THE MARHAM SUPERVISOR reports that the unit's workload was medium-to-low, as was the controller's workload. He was in the visual control room at the time of the incident briefing the ADC on a VIP aircraft on approach to Marham. The LARS controller was a fully endorsed, supervisor qualified, experienced controller and, in addition, the lead Local Examining Officer was conducting an examination of a experienced controller in Approach, so he was confident about leaving the ACR¹ momentarily to brief the ADC. Upon his return to the ACR and to the Supervisor's console, he heard the RT exchange between the Tornados and the LARS controller regarding the presence of a KC135. The controller explained that he had been told that the Tornados were procedurally deconflicted against the F15s in the stack and that he had believed that this included the aircraft subsequently reported as the KC135. Once the Tornados had landed, the pilot telephoned the Supervisor and advised that he would be submitting an Airprox report.

THE SWANWICK(MIL) CONTROLLER reports that he had been on console for a little over two hours for a consistently busy period. The KC135 was handed over from Lakenheath for ARA8; however, a higher priority tasking was already using the area in a block of FL140-170, so it was agreed that the KC135 would take a block FL100-140 until the higher block became available. Consequently, the KC135 was instructed to climb to FL120 for the transit to ARA8. Two aircraft wearing Marham squawks, and believed to be Tornados, were operating in the Sculthorpe area, so traffic information was given to the KC135 pilot, who was receiving a Traffic Service. The pilot was not visual at this point, so the controller called the traffic to him again a short time later and this time the pilot reported visual, stating that one had flown over the top of him and the other underneath, the Mode C on the Tornados was showing FL115 and FL125.

He perceived the severity of the incident as 'Low'.

Factual Background

The weather at Marham was reported as:

METAR EGYM 131150Z 14014KT 9999 SCT015 BKN220 12/10 Q1004 WHT NOSIG

Analysis and Investigation

Military ATM

The Airprox occurred between a KC135 under a Traffic Service with Swanwick(Mil) and a pair of Tornado GR4s under a Traffic Service with Marham LARS and in communication with a JTAC, on the ground at Sculthorpe.

¹ Approach Control Room

At 1200:42 Fang was provided a Traffic Service by Marham Zone and Traffic Information was called at 1201:09, 1202:30 and 1204:03. At 1207:53 (Figure 1) Fang transmitted, “Marham Zone from Fang we’re aware of the two F15s which are working that area and we are deconflicted in our CAS airspace.”

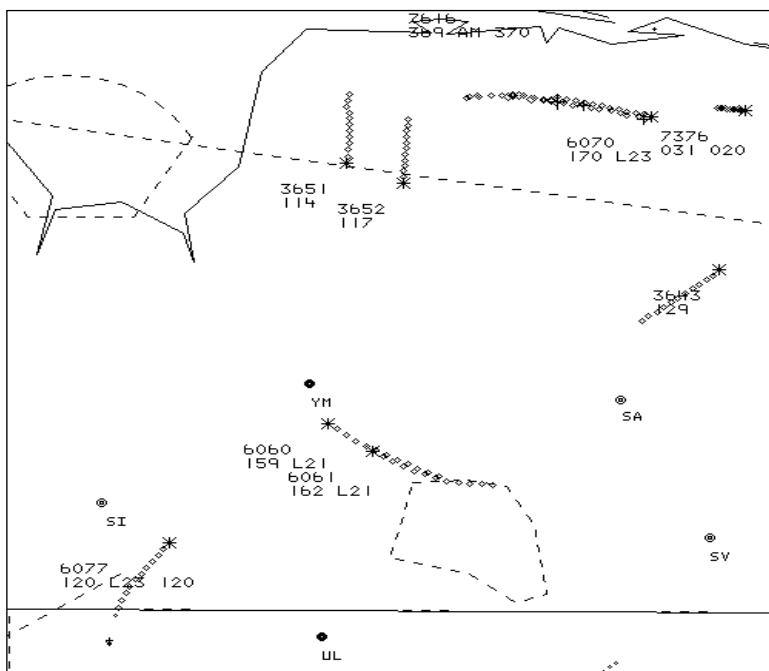


Figure 1: Fang confirmed deconfliction with F15s at 1207:53 (Fang 1 3651, Fang 2 3652, KC135 6077).

At 1209:20, the Swanwick controller advised, “[KC135 callsign] traffic 12 o'clock, 10 miles manoeuvring, two tracks indicating FL125, FL115 believed to be pair Tornados.”

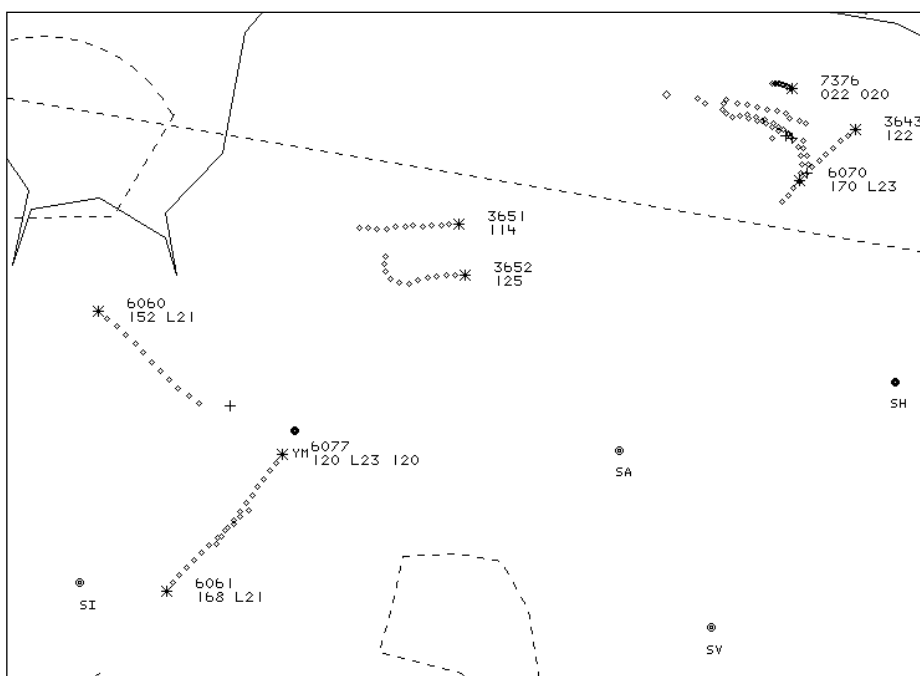


Figure 2: Swanwick Traffic Information at 1209:20.

At 1211:46 (Figure 3), the KC135 commented, “Swanwick we have any traffic er currently {unreadable}”

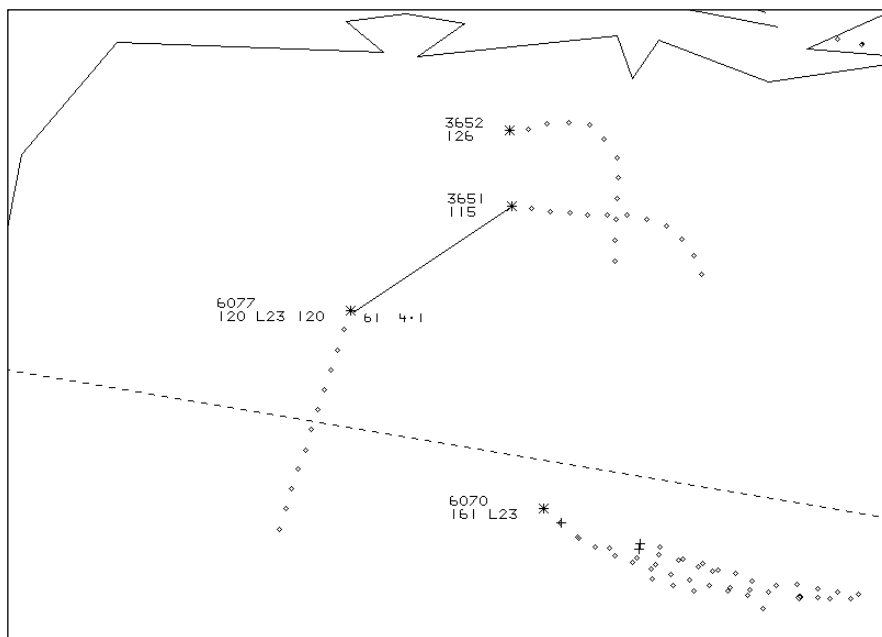


Figure 3: Geometry at 1211:46.

At 1211:54 (Figure 4), Swanwick transmitted, “[KC135 callsign] *roger traffic now er north east er two miles tracking west at FL115 FL125.*”

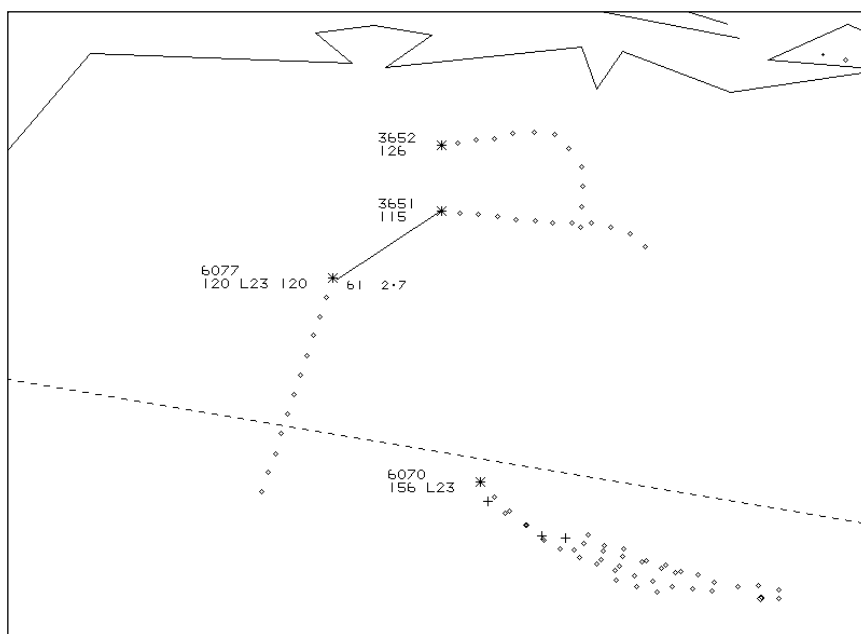


Figure 4: Traffic Information at 1211:54.

At 1212:05 (Figure 5) Fang called, “*Marham Zone are you aware of a err KC135 that’s just transit our airspace?*” The CPA was estimated at 1212:06 with 0.2nms horizontal separation and 1100ft height difference.

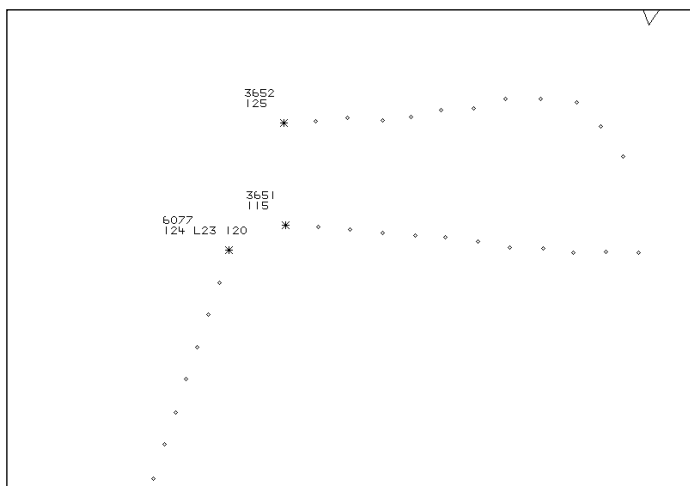


Figure 5: CPA at 1212:06.

At 1212:11 (Figure 6) Marham responded with, “*Fang there is an aircraft there. I figured that was the ones that you were coordinated with.*” Fang 1 confirmed at 1213:41. “*Apologies for the confusion we’ll be working at 11 and 12,000 feet. If there is any traffic which is co-height or roughly co-height inbound to our area, if you could let us know about that please. We are coordinated traffic {unintelligible} should be above us.*”

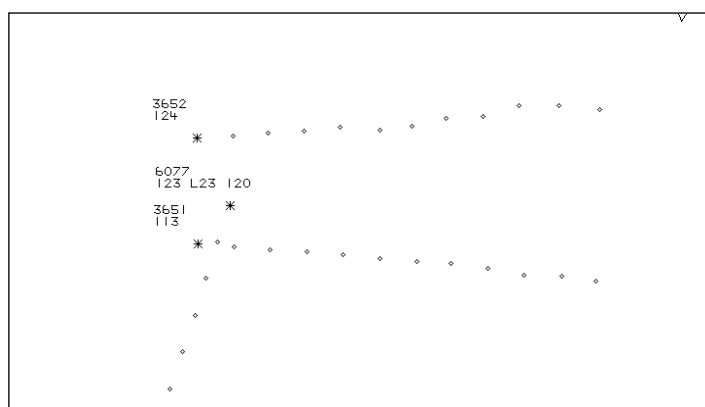


Figure 6: Geometry at 1212:12.

The CAS Exercise NOTAM details are at Figure 7.

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Group: M_CAA_HOUSE / User: M_LONDON_1A1S          UTC Time: 2014.10.30-16:36:09
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AFP6086 301548
GG EGQLZXCO EGQMZXAF EGQSYWYF EGQSYWYO EGQSZXAO EGQSZXDO EGTTZDZM
EGTTZRZN EGUBYWYO EGUBZGZX EGULYMYX EGULYWYO EGULZXBO EGUNZXAO
EGUNZXAS EGUYVYX EGUYWYWO EGUWZXGO EGUYZGZX EGUYZXAO EGVAYWYO
301547 EUECYIYN
(H5638/14 NOTAMN
Q) EGTT/QWELW/IV/BO /W /000/150/5251N00046E010
A) EGTT B) 1411100800 C) 1411142300
D) 0800-2300
E) CLOSE AIR SUPPORT EXERCISE. MULTIPLE FAST JET ACFT AND HEL WILL
CONDUCT HIGH ENERGY MANOEUVRES WI 10NM RADIUS 525055N 0004543E
(SCULTHORPE, NORFOLK). ACFT MAY OPR OUTSIDE AREA AND MAY BE UNABLE TO
COMPLY WITH RAC. CREWS INTENDING TO TRANSIT THE AREA SHOULD CONTACT
HIGHLANDER CONTROL ON 234.125MHZ OR 234.750MHZ. MILITARY ACFT SHALL
AVOID THIS AREA AT NIGHT, EXCLUDING MARHAM MATZ. OPS CTC 07828
326220.
14-11-0394/AS3
F) SFC G) 15000FT AMSL)

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Figure 7: NOTAM (RAC means Rules of the Air and ATC Rules).

The Marham LARS controller did not provide Traffic Information to Fang on the KC135. Fang were put under a Traffic Service and traffic had been called on three occasions prior to the CAS exercise; information was not passed on the KC135 because the controller was under the impression that the aircraft was separated as part of the CAS exercise. The controller had displayed scan, and the provision of Traffic Information, up until the point when Fang declared that they were deconflicted with the two F15s. The controller was not aware of which callsigns were working with the JTAC or what levels had been assigned for height deconfliction or what squawks the deconflicted F15s were wearing; another formation of F15s were also transiting the area with the KC135. The NOTAM was available in Marham ATC but this only provided generic information on activities. The information passed by Fang was open to misinterpretation and the controller was under the impression that the KC135 was exercise traffic; concurrently, Traffic Information was passed to another Tornado callsign being worked by LARS. This was an error in perception by the Marham controller, a misidentification of information, caused by a lack of information and the belief that the KC135 was part of the deconflicted exercise traffic.

The Swanwick controller had called Traffic Information at 10nms and this enabled the KC135 to acquire the Tornados on TCAS and visually. The controller had become involved in a conversation about the refuelling brief; however, the updated information at 2nm was provided 12 seconds prior to CPA. All aircraft were under a Traffic Service in Class G airspace. The JTAC operating at Sculthorpe was not providing an air traffic service to any of the aircraft formations and the aircrew would be aware of this and their own responsibility for collision avoidance when conducting CAS. No radar unit was nominated to provide control or coordination of the exercise and the JTAC had not passed information to Marham ATC. The F15s were not thought to be under any type of service.

The KC135 was en-route to AARA8 under his own navigation and the routing took the crew through the NOTAMed exercise area. This NOTAM was for information purposes only and was not a mandatory avoid; the airspace around Sculthorpe can get busy with fast jet activity because of the training value that the area affords and potential funnelling due to airspace constraints. The KC135 had maintained a good lookout and used the various sources of information to maintain situational awareness on the Tornados.

The Tornados were receiving a Traffic Service from Marham as well as being informed of height separation on the F15s operating above by the JTAC. Fang lead became visual with the KC135 at approximately 1nm and took avoiding action, as well as informing the wingman. The Tornado crew understood their responsibilities for collision avoidance in Class G and were under a suitable type of service for the airspace and conditions. The Tornados were not fitted with any form of ACAS. CAS training would require high concentration levels and would certainly compete for attention and capacity from the crews.

The normal barriers to an Airprox would be 'see-and-avoid', ACAS, Traffic Information and sound deconfliction procedures. The KC135 had the Tornados on TCAS and this helped with situational awareness; neither Tornado was fitted with an ACAS. The KC135 pilot was able to visually identify the Tornados at range due to the good weather; the crew of Fang were not aware of the KC135, closing on a constant bearing from the 10 o'clock position and got visual at approximately 1nm. The met conditions and size of the KC135 would indicate that the aircraft had the potential to be acquired at range; the previous Traffic Information and separation from the JTAC may have reassured Fang that LARS was providing accurate information and the F15s would maintain height separation above. The decision not to call traffic and the misunderstanding between pilot and controller contributed to the lack of radar-derived Traffic Information. In the congested airspace, the lack of clarity and agreement on who was involved in the exercise, and what traffic was separated, also contributed to weakening the procedural barrier. The NOTAM did not provide segregated airspace and common and well-practiced procedures should provide a stronger barrier to deconflicting aircraft. With a lack of information and clear procedures, the controller interpreted that the KC135 was part of the de-conflicted exercise traffic. The procedures for

Sculthorpe's use on the day were not robust enough to satisfactorily deconflict the airspace users and are subject to an ongoing review.

UKAB Secretariat

Both pilots shared an equal responsibility for collision avoidance and for not flying into such proximity as to create a danger of collision². If the geometry is considered to be converging then the KC135 pilot was required to give way³.

Comments

HQ Air Command

This incident prompted a Non-Statutory Investigation at RAF Marham which made a number of recommendations, ranging from a review of how airspace over Sculthorpe might be better allocated, to developing robust SOPs for CAS exercises at Sculthorpe that will provide direction for the provision of ATS and inter-agency coordination. However, there are learning points here that are worthy of further mention:

1. Never assume, check. The Marham LARS controller assumed that aircraft tracking towards Sculthorpe must be involved in the CAS exercise; this was not the case for the KC135.
2. Keep comms clear and concise. The message from the Tornados to the Marham controller led him to believe that deconfliction between aircraft was being provided when it was purely coordination between known exercise aircraft.

USAFE

It is of note that the KC135 had intended to climb above the NOTAM'd area and would have done so had not other traffic, already on ARA8, resulted in Swanwick Mil restricting its climb. Further, it seems evident from the Tornados' RT calls that they thought the NOTAM gave them exclusive use of the airspace, which may also help explain why Marham Zone thought that all the traffic in the vicinity was in the exercise, despite the KC135 displaying a Swanwick Mil SSR code.

Summary

An Airprox was reported on 13th November 2014 at 1212 between two Tornados and a KC135 in Class G airspace. The Tornados were receiving a Traffic Service from Marham LARS but, due to some confusion over what constituted exercise traffic, were not given Traffic Information. The KC135 pilot was receiving a Traffic Service from Swanwick(Mil) and obtained Traffic Information from the controller and from his TCAS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board first looked at the actions of the Tornado crews and noted that the pilots had constrained the Traffic Information that they might have received from the Marham LARS controller by taking responsibility for their own deconfliction in the CAS area. Members commented that, when conducting high cockpit-workload exercises in Class G airspace, an ATC radar service provides useful mitigation as an additional barrier against mid-air collision in support of see-and-avoid; in

² Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).

³ Ibid. Rule 9 (Converging)

asking for only limited Traffic Information, the crews weakened that barrier. The Board noted that the KC135 was a large aircraft and was there to be seen for some time, especially since the Tornado crews should have cleared their airspace before commencing their formation turn towards; despite this, of the 4 crew members in the two aircraft, no-one saw it in time to take early action. In debating this, the Board discussed the procedures for the exercise. Some members opined that it seemed as if the Tornado crews might have believed that the NOTAM airspace was sterile to other users; this notion was quickly rebutted by military members, who stated that it was definitely understood that the NOTAM only applied to military crews, and even then was not a mandatory avoid. The Board were informed that Marham had conducted its own investigation into this incident and had made a number of recommendations, including mandating that in future Marham ATC will provide an ATC service to all aircraft participating in the exercise.

As for the KC135 crew, the Board noted that they were aware of, and had originally planned to route above, the NOTAM'd exercise area. When ATC had stopped their climb at FL120, the Board wondered why they had not therefore queried this instruction, or asked to be routed around the exercise. The Board also noted that the NOTAM provided a frequency for aircraft transiting the area to call on and, again, the Board wondered why, despite having more than one radio, the crew hadn't done so. Some members wondered whether, being under a service from Swanwick (Mil), the crew might have assumed that Swanwick (Mil) would ensure deconfliction and automatically coordinate their routing through the NOTAM. Finally, the Board also noted that the crew had received Traffic Information from Swanwick (Mil) and from the TCAS on a number of occasions, yet still maintained course despite the fact that the Rules of the Air required that they give way. Members opined that all of this suggested that the KC135 crew might not have been fully aware of their responsibilities when operating under a FIS when in Class G airspace within the UK.

Turning to the Air Traffic Controllers involved, the JTACs were effectively providing a Procedural Service and therefore only providing separation from known traffic; because the KC135 was under a service from Swanwick(Mil) it was unknown to the JTACs and therefore beyond their ability to factor into their plan. The Board opined that although the Swanwick (Mil) controller may have been task-focused in completing coordination for the air-to-air refuelling task, he should still have been aware of the NOTAM, and could easily have allowed the KC135 to climb above the exercise area for transit (descending for ARA8 afterwards), or could have instructed the KC135 pilot to call on the exercise frequency on his other radio. Looking at the actions of the Marham LARS controller, the Board accepted that, having been asked to stop passing Traffic Information, he would be reticent about interrupting the Tornado crews. Nevertheless the Board felt that, given the proximity of the aircraft, even if he had thought the other aircraft was part of the exercise a call for clarification would have been wise. The Board's debate then turned to how well ATC had coordinated with each other and they noted that had either the Swanwick(Mil) controller given, or the Marham LARS controller requested, Traffic Information from each other, or had the JTAC been contacted (by telephone or radio) for coordination by ATC, the situation may not have arisen.

Because the KC135 crew did not act on the Traffic information or TCAS warnings they received, the Board determined the cause of the Airprox to be that the KC135 pilot had flown into conflict with the Tornados. However, the Board agreed that there were a number of contributory factors: firstly, that the Tornado crews had terminated the Traffic Information calls; secondly, that the KC135 crew did not contact the NOTAM controlling authority whilst transiting the NOTAM'd area; and thirdly, that Swanwick(Mil) had routed the KC135 through the NOTAM'd area without informing the NOTAM Controlling Authority. The risk was assessed to be Category C; effective avoiding action had been taken by the Tornado crews.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The KC135 pilot flew into conflict with the Tornados.

Contributory Factor(s):

1. The Tornado crews terminated the Traffic Information calls.
2. The KC135 crew did not contact the NOTAM Controlling Authority whilst transiting the NOTAM'd area.
3. Swanwick (Mil) routed the KC135 through the NOTAM'd area without informing the NOTAM Controlling Authority.

Degree of Risk: C.

ERC Score⁴: 10.

⁴ Although the Event Risk Classification (ERC) trial had been formally terminated for future development at the time of the Board, for data continuity and consistency purposes, Director UKAB and the UKAB Secretariat provided a shadow assessment of ERC.