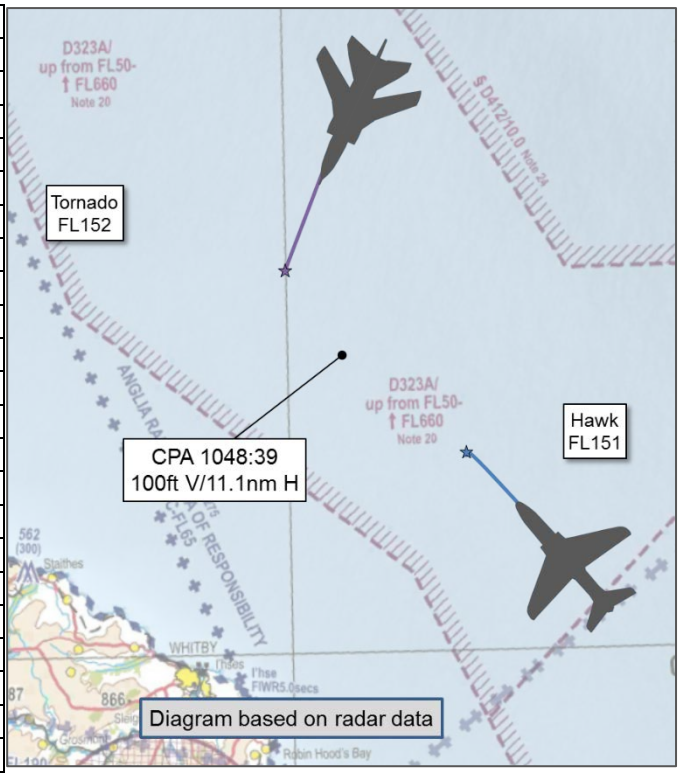
AIRPROX REPORT No 2018258

Date: 17 Sep 2018 Time: 1048Z Position: 5442N 00024W Location: D323

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Hawk	Tornado
Operator	HQ Air (Ops)	Foreign Mil
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Traffic
Provider	Hotspur	Hotspur
Altitude/FL	FL151	FL152
Transponder	A, C, S	A, C, S
Reported		
Colours		
Lighting	NK	
Conditions	VMC	NK
Visibility	10km	
Altitude/FL	15000ft	15000ft
Altimeter	RPS (1004hPa)	
Heading	315°	
Speed	300kt	
ACAS/TAS	Not fitted	Unknown
Separation		
Reported	0ft V/ 7nm H	NK
Recorded	100ft V/11.1nm H	



THE HAWK PILOT reports that he was part of an exercise taking place in EG D323C with some foreign-national Tornados. After being 'killed out' by Blue Air he maintained his sanctuary level of 15,000ft and flowed to the Red hold in D323A. Whilst flowing north he heard one of the Tornados request a climb to 15,000ft to return to base. He broadcast his position and height to increase situational awareness, but received no acknowledgment from either the Tornado pilot or Hotspur. He repeated the position report several times but still with no acknowledgment. The Tornados and Hawks had a co-ordination line separating their operating areas as part of the planned exercise, but he believed the Tornados were routing direct to Coningsby and would infringe his sanctuary in the west lane of the airspace. As the other Tornados also requested a climb to 15,000ft, he requested a range and bearing to the Tornados. The initial call from Hotspur was that the Tornados were 4nm from the No4 Hawk, who was IMC under a Traffic Service, but unaware of the Tornados. The reporting Hawk pilot was also approaching IMC and so made further attempts to confirm safe separation from the fighter controllers. From their response, he estimated that the range between the two aircraft was 10nm, co-altitude, and on an imminent collision course. He performed a hard left turn onto south and requested descent to 14,000ft (which was a Blue sanctuary). The controller confirmed that 14,000ft was clear. Subsequent radio calls made by the Tornado pilot suggested that they had reverted to standard pressure settings within the exercise airspace, and because his RPS was 1004hPa this would reduce their vertical separation by a further 270ft so he requested a further update on the Tornados' position and height. He performed a right turn to expediate his clearance from the D323 complex, informed Hotspur, who acknowledged. He requested further updates and it became increasingly apparent to him that a potential conflict still existed. Due to the range decreasing and additional Tornado formation members climbing into his sanctuary level west of the separation line, he decided to descend further to 13,000ft. He was still not visual with the Tornados who he believed were within 4nm. Throughout the incident the Hawks were operating on the main tactical CRC frequency with no other frequencies available because of traffic saturation levels.

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

THE TORNADO PILOT did not file a report.

THE HOTSPUR CONTROLLER reports that he was the OJTI[1] for the exercise and was tasked with controlling the lower elements; his student was controlling 4x Hawks, 6 x Tornados, 2 x Tornado GR4, a DA20 and a C130. A check-in controller was in place to carry out all transits to and from the airspace. At around 1040 the formation of 6 Tornados were ready to RTB due to fuel. At the same time 2 of the Hawks had been called 'dead' and were routing north at 15,000ft and 16,000ft. The Tornados were routing to Coningsby and needed to vector south of the sanctuary deconfliction line; whilst doing so, one of the Tornados asked to climb to 15,000ft. The climb was approved, even though it was the sanctuary level for the Hawks, because the Tornado was over 45nm away from the Hawks. The No3 Hawk appeared to hear this communication and gave a position update. The Tornados were then sent to the check-out frequency. The student then gave the No4 Hawk pilot (who was at 16,000ft) Traffic Information on the Tornados. On hearing this the No3 Hawk pilot requested a position from him, to which the student replied with a bearing, range and altitude (BRA) call of approx 14nm north at 15,000ft. The No3 Hawk then made a hard turn to the south and requested a descent to 14,000ft, the descent was approved and the Hawk vectored west to exit the airspace. The closest the Hawk and Tornados came whilst co-altitude was 11nm. As the Hawk exited the airspace the student gave further Traffic Information that the Tornados were 4nm away with 1000ft separation. The Hawk pilot then requested a descent to 13,000ft. Throughout the whole incident they were still providing a service to the other aircraft on frequency, and received new aircraft during the Hawk's egress. Furthermore, capacity was taken up by the displays not being linked to the callsign conversion labels, requiring the use of additional methods to maintain ident on the individual elements of the formations.

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

THE HOTSPUR SUPERVISOR reports that he concurs with the controller's report. He was aware of the transit back to base of the Tornados, and the position of the Hawks, and at no point was he concerned by the level of Traffic Information being passed to the pilots or the proximity of the aircraft to one another. He was extremely busy supervising 2 controllers with 26 'red' aircraft and 14 'blue' aircraft being controlled by Blackdog, all within the D323 complex. Therefore, his awareness of the full detail of the incident was low until after the sortie. He heard the Hawk pilot call for turn and descent, which attracted his attention to that area of D323; however, the risk seemed low and Traffic Information was passed so his attention was then focused elsewhere. He agreed with the controller that situation awareness was limited by the lack of tactical labels on the tracks, trying to distinguish between upwards of 20 tracks with very little assistance from the system was far from ideal.

Factual Background

The weather at Coningsby was recorded as follows:

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METAR EGXC 170950Z 20016KT 9999 -DZ SCT014 BKN030 20/17 Q1013 GRN BECMG SCT028 BLU=
METAR EGXC 171050Z 20017KT 9999 SCT020 BKN030 21/16 Q1013 WHT BECMG SCT030 BLU=
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Analysis and Investigation

Military ATM

The Hawk and Tornado were elements of different formations that were taking part in an exercise in D323. At the time of the incident, Hotspur CRC were controlling up to 14 separate aircraft as part of the exercise. Having completed his sortie, the Tornado pilot requested a climb to FL150 and a return to Coningsby. The allocation of this level infringed the sanctuary altitude allocated to the Hawk and, realising that the intended track of the Tornado was likely to conflict with his own flightpath, the Hawk pilot attempted to gain situational awareness on the Tornado position. The Hawk is not fitted with any form of Collision Warning System (CWS).

[1] On the job training instructor

Figures 1-5 show the positions of the Tornado and the Hawk at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using the NATS Radars, which are utilised by CRC Boulmer and are therefore representative of the picture available to the controller.

Having completed his part of the exercise, the Tornado pilot requested a return to Coningsby and a climb to FL150. This was approved by the Weapons Controller who was aware that this would place the Tornado at the sanctuary level of the Hawk but noted that there was 'over 45nm' separation. The actual measured separation at this point was 62nm (Figure 1).

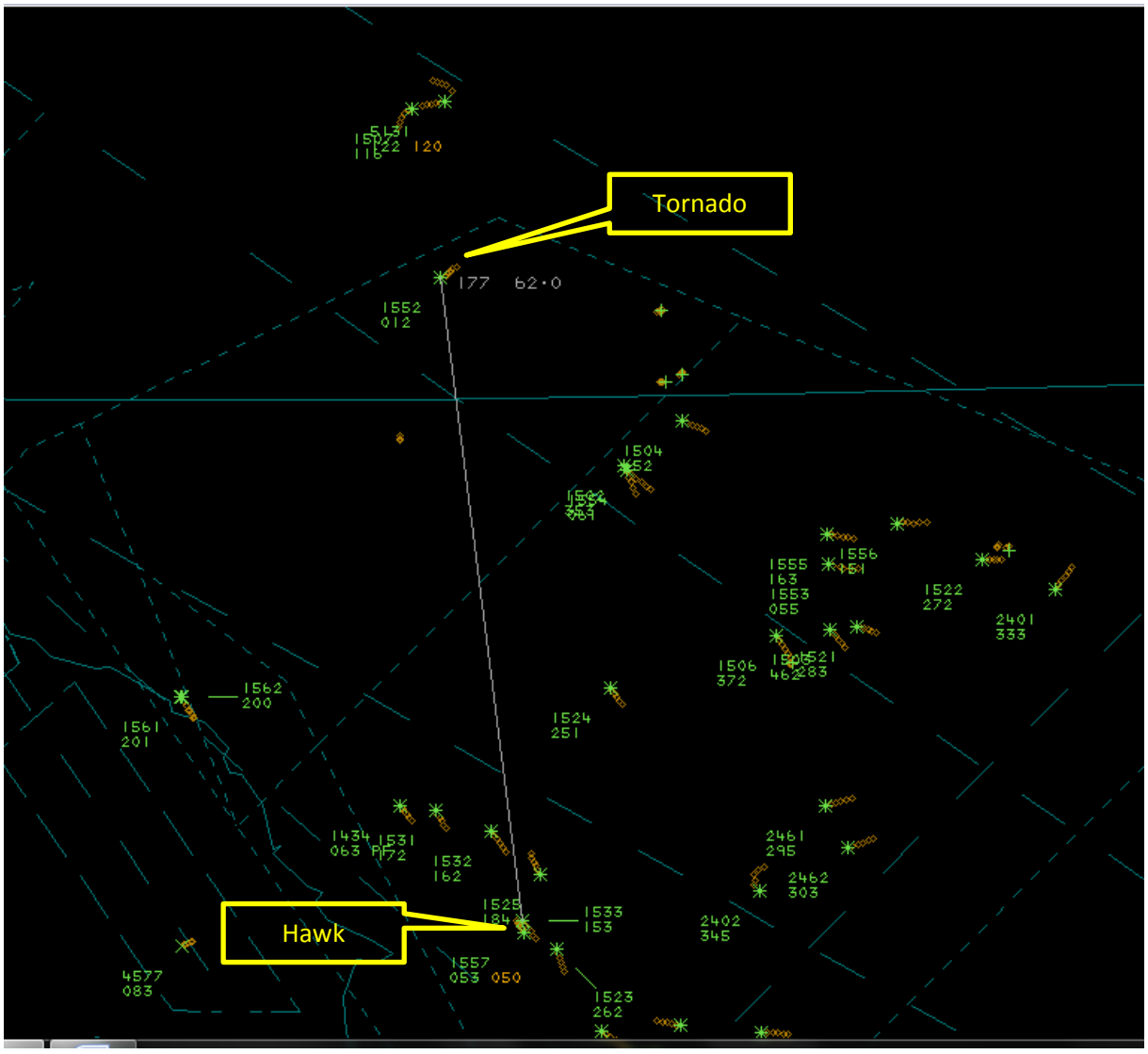


Figure 1

Concerned that the Tornado had been given a climb to his sanctuary level, the Hawk pilot broadcast his position and level from the agreed exercise bullseye point. At this point there was still 59nm separation between the aircraft (Figure 2).

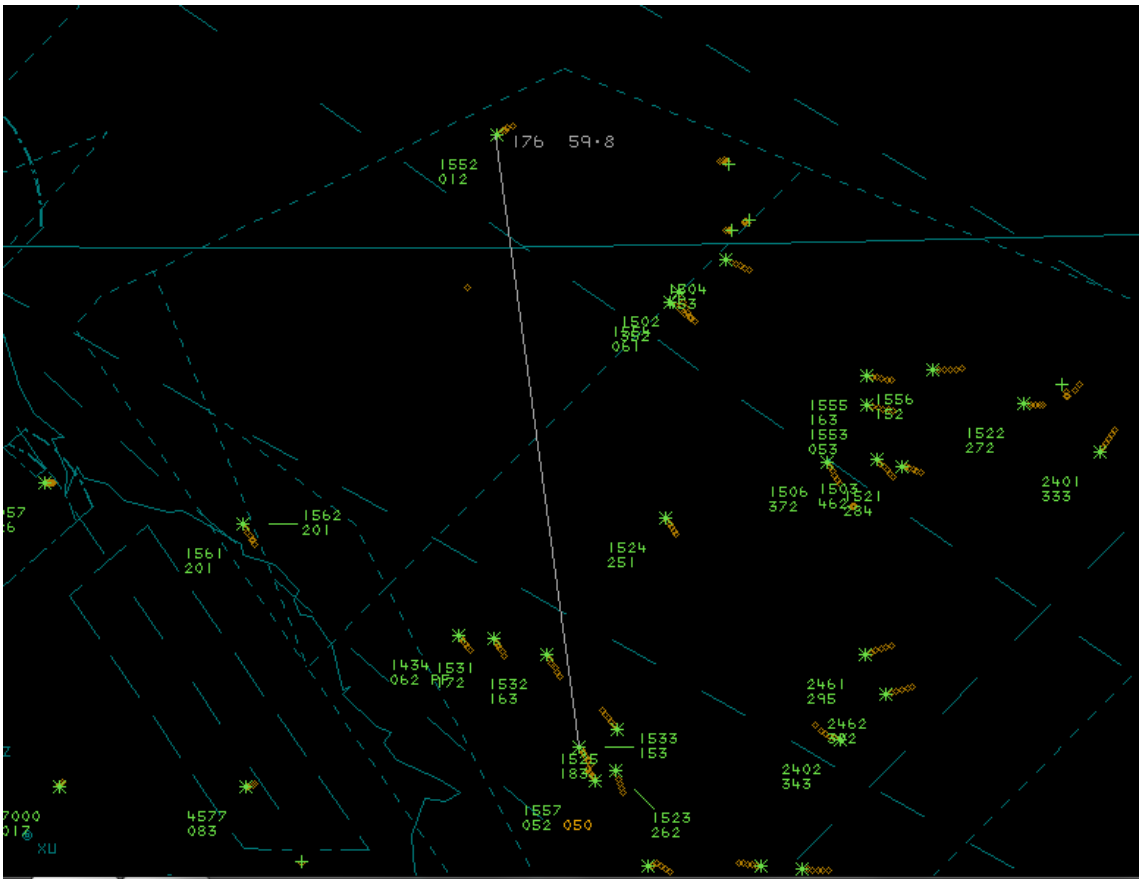


Figure 2

Aware that the Tornado had been sent to the check-in frequency, and concerned about a potential growing confliction, the Hawk pilot requested a change to the same frequency as the Tornado and reiterated his position and altitude. Although the Hawk pilot did not know it, separation with the Tornado was still 45nm (Figure 3).

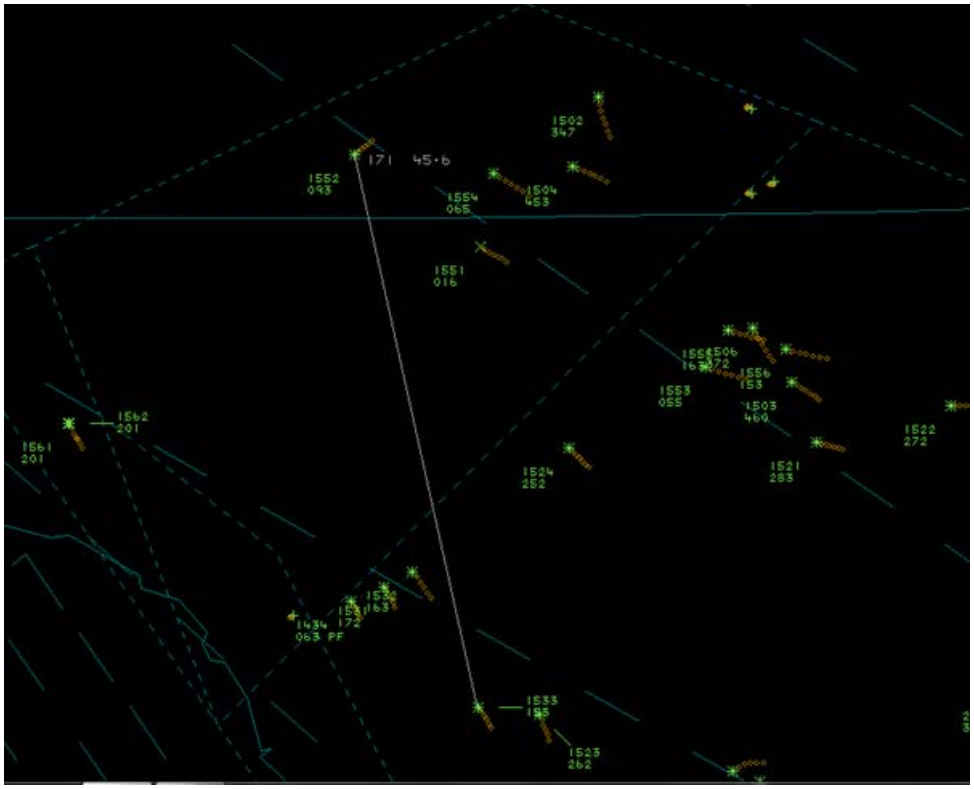


Figure 3

The Hawk pilot again requested to change to the check-in frequency (denied by the Weapons Controller due to the workload of the next agency), and requested a position check on the Tornado. This request asked for a Bearing, Range and Altitude (BRA) to the Tornado but the Traffic Information passed was from the exercise datum (200/4nm) which led the Hawk pilot, who was IMC, to believe that he had conflicting traffic within 4nm at the same level. In fact, the aircraft were 18nm apart (Figure 4).

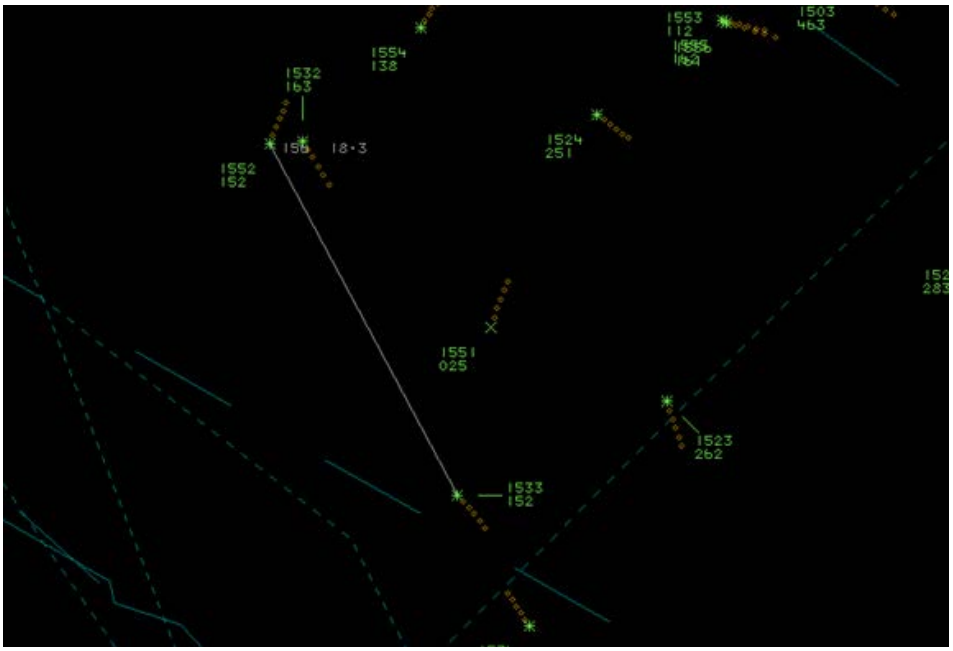


Figure 4

The Hawk pilot then requested a clarification of this Traffic Information and was given the correct position of the Tornado (324/14nm) from his aircraft. Having assimilated this, the Hawk pilot made the decision to make a hard-left turn to increase separation. CPA occurred some 20secs later (Figure 5) and was measured at 11.1nm.

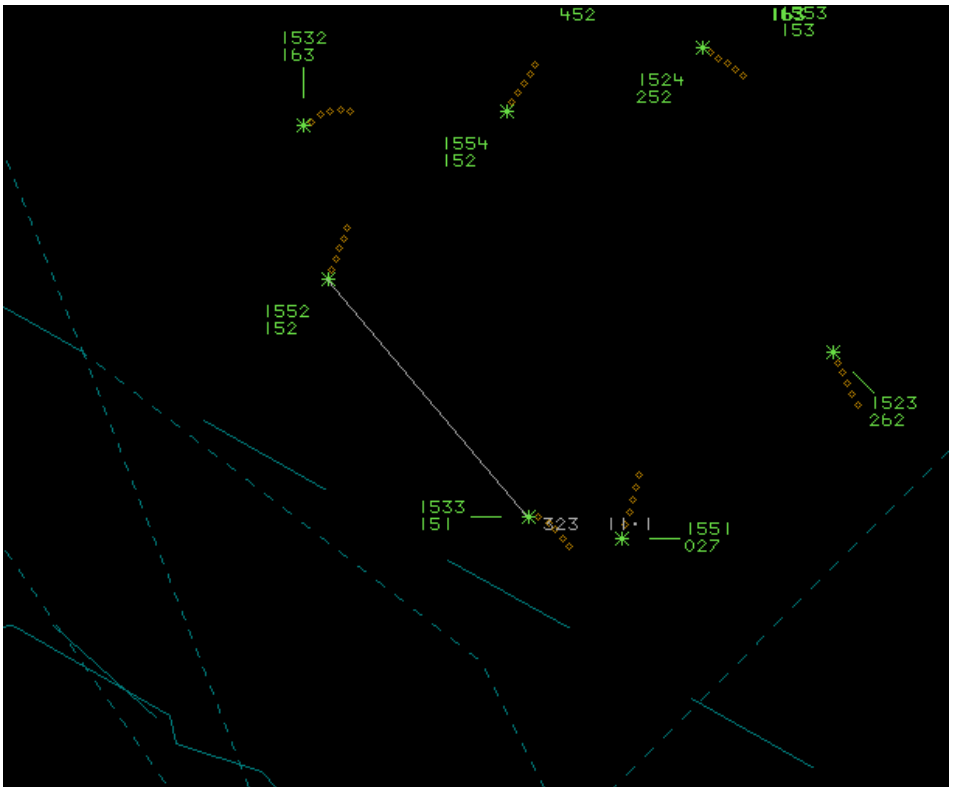


Figure 5: CPA

This was an extremely busy time for all parties involved. Having received a request to climb and RTB, the Hotspur Weapons Controller correctly assimilated the air picture and issued a climb to the Tornado knowing that there was sufficient separation between the aircraft concerned. Without the full air picture, approaching IMC conditions, and without a CWS, the Hawk pilot became increasingly concerned with the potential evolving confliction. Although the Hawk pilot eventually initiated a turn away from the perceived confliction resulting in 11.1nm of separation, analysis of the radar replay shows that, at the point the turn was initiated, the Tornado was already through the 12 o'clock position of the Hawk and some 20kts faster. Therefore, even without the turn, it is likely that Hawk would have passed safely behind the Tornado by about the same distance albeit at the same level.

UKAB Secretariat

The Hawk and Tornado pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[2].

Comments

HQ Air Command

This Airprox is the subject of a detailed Occurrence Safety Investigation which, due to the complexity of the incident, has not yet concluded. However, HQ Air Command has been provided with the findings thus far from which the following comments are constructed.

The Hawk T1 is not equipped with any on-board air-to-air sensor equipment, neither does it have any form of ACAS (though the latter is funded and currently sits within the Defence procurement process). Therefore, the Hawk pilot was highly reliant on the controller to provide accurate information regarding the position of potentially conflicting traffic. When the Tornados were cleared to climb to the sanctuary level of the Hawks there was some 60nm of separation between the 2 elements, thus there was no need to inform the Hawk pilot of this. The Tornados' intended track would take them relatively close to the Hawks and the controllers had anticipated this. However, on hearing that another formation had been cleared to his level, the Hawk pilot announced his position to highlight to the controller that he was currently at the same level.

As time progressed, the Hawk pilot became more uncomfortable with what he perceived to be the relative proximity of the Tornado formation and requested updates. Unfortunately, it *appears* that the controller issued a position call relative to the exercise bullseye, but used phraseology that is more normally associated with position calls relative to individual aircraft ('BRA' vice 'bullseye'); furthermore, from the tape transcript, the use of 'BRA' instead of 'bullseye' had been widely used throughout the mission. The controller was extremely busy and so this interchange of phraseology was not corrected by the participants (presumably since the majority of players would have been able to assimilate what the controller meant through the use of on-board sensors). At a given range of 4nm (from bullseye rather than from the Hawk) the Hawk pilot rightly initiated a turn away and change of altitude from what he perceived to be an unsafe separation. Subsequent TI, this time correctly given as a range and bearing from the Hawk with a distance of 14nm, did nothing to alleviate the Hawk pilot's uncomfortable feeling.

Whilst there never was any loss of safe separation in this incident, it does go to show that we are very often reliant on *accurate* information and *correct* terminology. The Hawk pilot did exactly the right thing given his perception of the situation; the controller did not see anything that would concern him regarding the proximity of the two tracks.

[2] MAA RA 2307 paragraphs 1 and 2.

Summary

An Airprox was reported when a Hawk and a Tornado flew into proximity in the EG D323 complex at 1048hrs on Monday 17th September 2018. Both pilots were operating under VFR in VMC, and were receiving a Traffic Service from Hotspur.

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 began by discussing the actions of the Hawk pilot. At the end of the exercise he heard the request made by the Tornado pilot to transit at his sanctuary level. Unbeknown to him, the Tornados were over 60nm away but, because the frequency was busy, when the Hawk pilot tried to draw the controller's attention to the perceived confliction by giving his position, the controller did not respond. Becoming more and more concerned, the Hawk pilot asked for a position report on the Tornados relative to him, but the controller incorrectly gave the position relative to the exercise datum, the 'bullseye'. This led the Hawk pilot to believe the Tornados were just 4nm away. Although the controller subsequently updated the Traffic Information with a range and bearing from the Hawk of 14nm away, the doubt in the Hawk's pilot's mind was not alleviated and he asked for a descent and turned away. Noting that this interchange of transmissions between the controller and the Hawk pilot had been the source of the Hawk pilot's uncertainty, some members thought that rather than maintain military protocol there was a clear case for the Hawk pilot just using plain English to alert the controller earlier to his concerns. If he had specifically said that he was concerned that the Tornados were crossing through his level in close proximity, the controller may have been able to put his mind at rest at that point because it appeared that the controller did not fully appreciate that the Hawk pilot was concerned by the Tornados proximity. Nevertheless, given the doubts that he had, the Board completely understood why the Hawk pilot had acted in the way that he did. Noting that the Hawk was the only aircraft type participating in the exercise without a radar or a CWS, the Board were told by the military member that the programme to introduce a CWS to the Hawk was in hand, although when pressed on when this would be completed, he could give no confirmation of dates.

In looking at the actions of the Tornado pilots, some members questioned whether they should have been in the Hawk's sanctuary level for their egress from the range. The military member responded that the sanctuary levels were only effective for a 10nm 'bubble' around an aircraft, and that being 60nm away when they requested that level, it was perfectly acceptable for them to use the 'Red' sanctuary level. When asked how a pilot would know if he was within the 10nm bubble of another aircraft, the military member responded that pilots (or controllers) would normally be expected to have situational awareness of the other aircraft surrounding them. In this case, the Tornado pilots and controllers knew that there was more than 10nm separation and so the sanctuary level was available, it was just unfortunate that the Hawk pilot did not, and the controller did not pass this key piece of information to him. Having been cleared to the Hawk pilot's level, the Tornados were then sent to the 'check-out' frequency and so were probably unaware of the Hawk pilot's concerns.

The Board then turned to the controllers' part in the Airprox. The BM advisor informed the Board that the controller was extremely busy and that the RT transcript reflected this with near continuous transmissions on the frequency. As the individual elements of the exercise finished their tasks, the controller could have expected that they would be transferred to the check-out frequency but, although the Tornados did switch across, the check-out controller was too busy to accept the Hawks. This meant that the two formations were on different frequencies and the controller had to continue with the exercise traffic as well as the Hawks. Although the controller could see that there was no confliction between the Hawk and the Tornado, it was clear that the Hawk pilot had an incorrect mental model of the situation which the controller reinforced by passing the Traffic Information as a range and bearing from the exercise datum when the Hawk pilot had asked for it relative to him. The Board thought that whilst the controller was probably too busy to pick up on the hints that the Hawk pilot was giving about his position, had they passed the correct Traffic Information first time, this would have reassured the

Hawk pilot that all was not as he feared. Some members wondered whether the controller was overloaded by the traffic levels and therefore unable to provide an adequate level of service, but they were told that the Unit was manned to appropriate levels for the exercise and that such traffic levels were fairly standard.

The level of supervision was then discussed, with some members with previous RN experience commenting that exercises of such complexity in the maritime environment were allocated an 'Eagle Safety' frequency for pilots to use if they had fundamental concerns about safety of flight. The BM advisor responded that for RAF operations the overall safety function was carried out by a Supervisor who could intervene on any frequency. Whilst this was acknowledged, with such a busy environment members asked how a pilot could make his concerns clearly known on a frequency that was not being blocked out by exercise transmissions. The military member responded that the preference was for pilots to use 'Guard, 243MHz' for such safety calls: some members wondered whether Guard was therefore continuously monitored by the controllers or the supervisor but unfortunately there was no ASACS advisor present at the meeting to answer this. Turning back to this specific incident, the BM advisor commented that there had been an appropriate level of supervision at the time and, because the Supervisor could see that the aircraft had more than the necessary separation, there was no need for him to intervene. He went on to explain that all the controllers were content with the situation, and it was only because of the Hawk pilot's inaccurate situational awareness that he perceived there was an issue; the Supervisor could not have been aware of that.

In discussing the cause of the Airprox, the Board quickly agreed that the incident had resulted from the Hawk pilot becoming concerned by the perceived proximity of the Tornados because he had a flawed mental model of their position, which the controller had further contributed to by passing incorrect Traffic Information. In assessing the risk, the Board quickly agreed that there had been no risk of collision, but debated at some length whether safety had been degraded or not (i.e. either risk Category C or Category E). In the end they decided that the separation between the aircraft had been such that normal safety standards had pertained; risk Category E.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk pilot was concerned by his perceived proximity of the Tornados.

Contributory Factors: 1. The Hawk pilot had a flawed mental model of the Tornados' proximity.

2. The controller passed Traffic Information incorrectly.

Degree of Risk: E.

Safety Barrier Assessment[3]

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

ANSP:

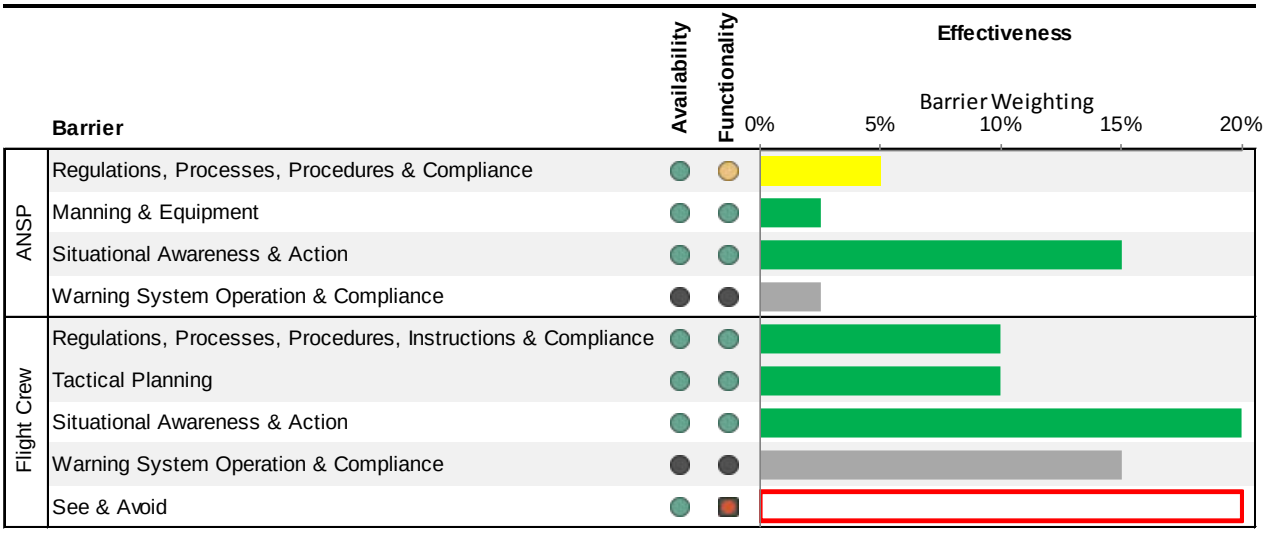
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Hotspur controller initially gave misleading Traffic Information which led to the Hawk pilot's incorrect mental model.

Flight Crew:

See and Avoid were assessed as **not used** because the two aircraft were never close enough to need to use this barrier.

[3] The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the UKAB Website.

Airprox Barrier Assessment: **2018258** Outside Controlled Airspace



Key:

Availability	Fully Available	Partially Available	Not Available	Not Present
Functionality	Fully Functional	Partially Functional	Non Functional	Present but Not Used, or N/A
Effectiveness	Effective	Partially Effective	Ineffective	Not present / Not Used