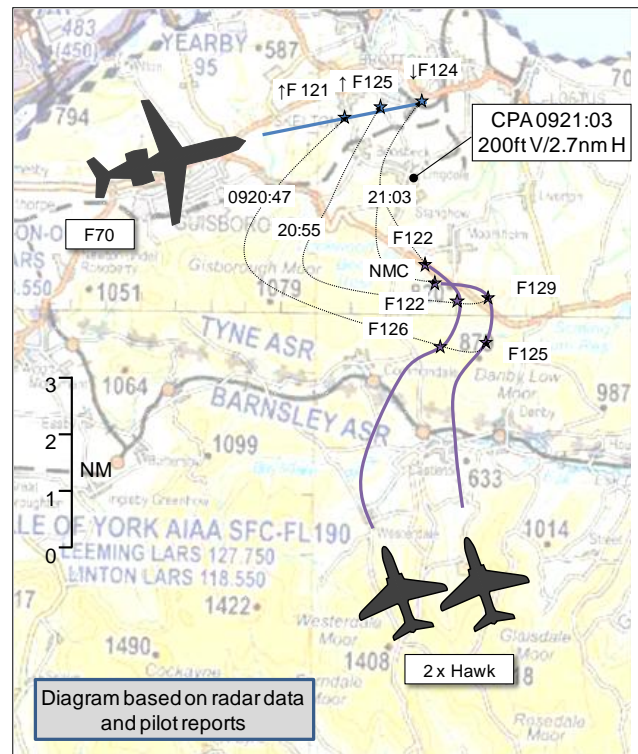


AIRPROX REPORT No 2014058Date/Time: 28 Apr 2014 0920ZPosition: 5431N 00057W
(15nm E Durham Tees)Airspace: Vale of York (Class: G)Aircraft 1 Aircraft 2Type: Fokker 70 HawkOperator: CAT HQ Air (Ops)Alt/FL: FL120 NKConditions: VMC VMCVisibility: NK 10KReported Separation:

0ft V/3nm H

Recorded Separation:

200ft V/2.7nm H

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

THE FOKKER 70 PILOT reports climbing out from Durham Tees Airfield to FL120 and receiving a deconfliction service from ATC. He was given Traffic Information about 2 “fighter jets” approaching from the right. Shortly afterwards, he received a TCAS TA and became visual with the other aircraft, who were doing an evasive right turn, causing the TCAS TA to disappear. A few seconds later the formation made a left turn towards him again, triggering a TCAS RA to adjust vertical speed, he began to follow the RA but before he had fully reached the pitch required, the other aircraft had “switched off their TCAS” resulting in the disappearance of the TCAS RA. Another evasive turn was made by the jets and he continued his climb.

THE HAWK PILOT reports flying a black aircraft with all lights illuminated and SSR transponder Modes 3A,C and S selected. He was undertaking an air combat manoeuvring sortie and receiving a Traffic Service from Swanwick(Mil). He wasn't contacted about the Airprox until a month after it happened and had no recollection of it.

He assessed the risk of collision as ‘Low’.

THE DURHAM TEES VALLEY (DTV) CONTROLLER reports receiving traffic information from Leeming ATC about two Hawks who would be manoeuvring in the area and who Leeming were handing over to Swanwick(Mil). He therefore gave a departure heading of 060° to the F70 to keep him out of the way, and pre-noted the F70 to Swanwick(Mil), informing them that he would route the F70 to the East Coast first before turning towards OTR (the flight planned routing). The F70 departed and was identified under a Deconfliction Service. As it was passing 6000ft, the 2 Hawks were seen about 20nms away heading away, so a heading of 090° was given to the F70. The Hawks then turned back onto a northerly heading; the controller considered turning the F70 onto a different heading, but he judged that a left turn would have little effect, and a right turn would have taken him towards the Hawks, so he thought it best to allow the F70 to continue the climb to get above them. Traffic Information was given when the Hawks were 4 o'clock range 7nm, and the pilot replied that he had them on TCAS. Because Swanwick (Mil) were aware of, and expecting to work the F70, he expected that they would keep the Hawks at a ‘reasonable distance’; however, they closed to a distance of 3nm at the same altitude, at which point the F70 reported a TCAS RA. Once the F70 pilot reported clear of the RA and when clear of confliction, he handed it over to Swanwick(Mil).

THE SWANWICK(Mil) CONTROLLER reports that he was not informed of the Airprox until nearly 4 weeks afterwards and therefore had little recollection of the events. He was giving a Traffic Service to 2 Hawks who were combat manoeuvring in the Vale of York, although he can't remember what the height block was that they were using. On receiving the pre-note on the aircraft climbing out of Durham Tees Valley he advised the controller to route towards the coast, he recalled that the Hawks weren't going any further east than the Upper Air routes. On sighting the traffic climbing out, he gave Traffic Information to the Hawks, but they continued to track towards the F70. He could see that the F70 continued to track east with little adjustment for the Hawks who were now tracking north. The Hawks then turned sharply south. On handover, the DTV controller advised that the aircraft had received a TCAS RA.

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

THE SWANWICK(Mil) PLANNER reports working on NE planner with a TAC controller in place. Although filling in the report retrospectively, he had had the opportunity to view the radar replay. The sector had 3 aircraft on frequency (the two Hawks and another unrelated aircraft), and had been pre-noted on the F70 from DTV. On seeing the F70 squawk, the TAC controller gave Traffic Information to the Hawks and asked if they could remain no further north than their current position. The Hawks responded that they needed to go further north; Traffic Information was again given and the Hawks continued to track north. The F70 continued to track east under the control of DTV, eventually the Hawks turned south and the DTV controller called to hand over the F70. At the end of the handover the DTV controller stated that the F70 had called a TCAS RA against the Hawks.

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

THE SWANWICK(MIL) SUPERVISOR reports that he was unaware of the incident until more than 3 weeks after it occurred. He has no recollection of it and was unsure as to whether he witnessed it or not. He could not remember the unit or controller workload at the time.

Factual Background

The weather at Durham Tees Valley was reported as:

EGNV 280920Z 34004KT 300V360 8000 FEW009 BKN014 11/09 Q1012=

Analysis and Investigation

CAA ATSI

ATSI had access to DTV RTF and area radar recording, together with the written report from the DTV Radar controller and the Hawk pilot. The F70 was operating on an IFR flight in Class G airspace and was in receipt of a Deconfliction Service from Durham Radar on frequency 118.850MHz prior to being transferred to Swanwick (Mil) for an en-route service. The Hawk was squawking 6052 and was one of a formation pair operating VFR on a training exercise in the Vale of York and in receipt of a Traffic Service from Swanwick (Mil).

The DTV controller contacted Swanwick Military at 0906:34 to pre-note the outbound F70 which was routeing via OTR (VOR); a squawk and frequency were allocated by Swanwick. The controller asked about the intentions of the Hawks in the Vale of York and Swanwick(Mil) confirmed that the Hawks were likely to be manoeuvring in their present position and approved the controllers plan to route the F70 on an easterly track in order to avoid them. The Hawks were operating in a block of airspace squawking 6052 and 6054 (verified SSR codes). No coordination had been agreed.

When the F70 departed from DTV RW23 at 0916:02 the Hawks were 20.5nm southeast of DTV. After making a left turn onto a radar heading of 060°, the F70 was cleared to FL190; on passing 6000ft, the F70 departed the DTV control zone into Class G airspace and the service was

changed to a Deconfliction Service. At this point the Hawks were established on a southerly track 18.3nm south-southeast of the F70 and the controller instructed the F70 to turn onto an easterly track. The Hawks then turned onto a northerly track and the controller's written report indicated that he had considered a heading change but thought it best to allow the F70 to continue the climb to get above the Hawks. At 0920:02 the Hawks were in the F70's two o'clock at a range of 9.2nm - Figure 1.

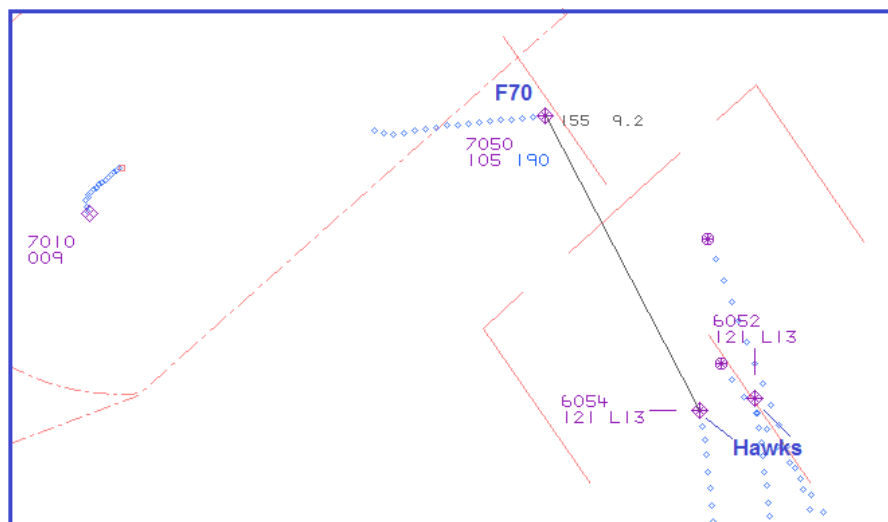


Figure 1 – Swanwick MRT at 0920:02

The controller passed traffic information to the F70 regarding the Hawks, “(F70)c/s two fast jets right eight o'clock correction now four [0920:10] o'clock range of seven miles tracking to pass behind you Flight Level one two zero maintaining”. The F70 pilot acknowledged, “That is copied er on TCAS (F70)c/s” and the controller added, “The present heading is the best one to avoid” and the F70 pilot replied “Thank you”. [Note – the Hawks were actually in the F70's two o'clock]

At 0920:32 the lateral distance had reduced to 5.3nm and the vertical distance to 700ft with the F70 climbing (Figure 2).

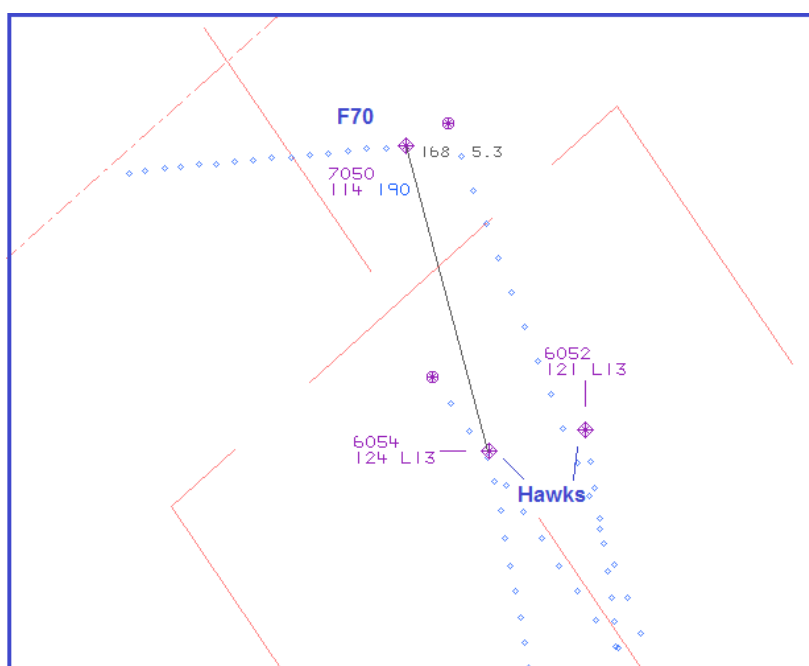


Figure 2 – Swanwick MRT at 0920:32

At 0920:50 the F70 pilot advised, “(F70)c/s TCAS RA” and the controller responded, “(F70)c/s roger report clear”. The Hawk squawking 6052 was in the F70’s 2 o’clock at a range of 3.6nm and 400ft above – Figure 3.

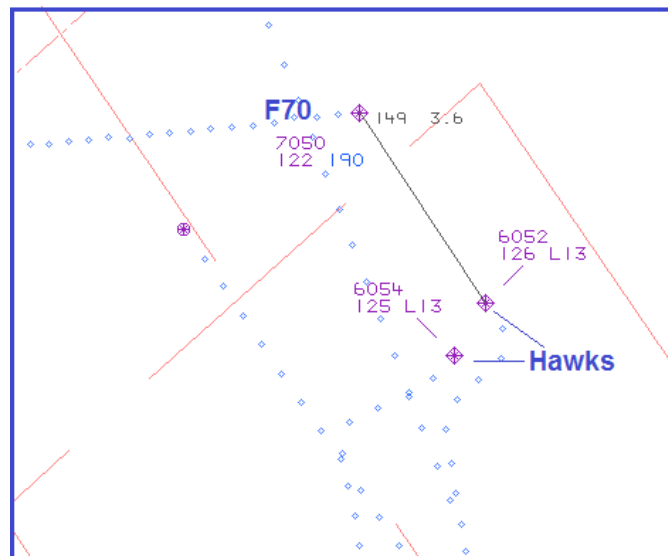


Figure 3 – Swanwick MRT at 0920:50

At 0920:58 the Hawks were in the F70’s 3 o’clock position at a range of 3.1 nm (CPA) in a left turn. The lead Hawk was 400ft above and the following Hawk 400ft below the F70 – Figure 4.

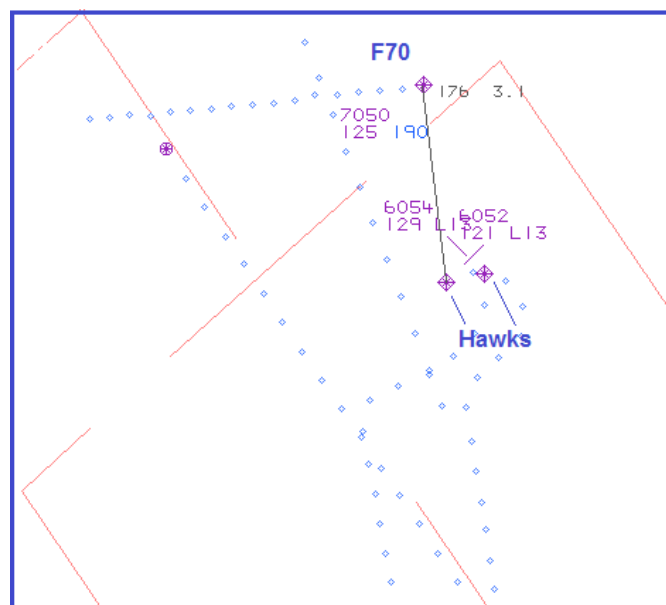


Figure 4 – Swanwick MRT at 0920:58

At 0921:01 the F70 pilot reported, “er they switched off the TCAS er now clear of conflict”. The controller replied, “(F70)c/s roger they have started manoeuvring three miles er south of you present continue present heading”. The F70 pilot acknowledged, “Wilco”.

The aircraft continued to diverge and at 0921:40 the F70 was given a right turn onto a radar heading of 120° before being transferred to Swanwick(Mil).

The controller had informed Swanwick(Mil) of his plan to avoid the Hawks in receipt of a Traffic Service and the controller had an expectation that the Hawks would remain clear. However there had been no coordination and the intentions of the Hawks operating in a block of airspace were unknown. The F70 was in receipt of a Deconfliction Service where the deconfliction minima against uncoordinated traffic was 5nm laterally and 3000ft vertically. When the controller

observed the Hawks northbound he judged that a heading change for the F70 would have had little effect and judged it better to allow the F70 to climb above the Hawks. The separation eroded to less than that required, and a TCAS RA resulted. The recorded minima was 3.1nm and 400ft.

Military ATM

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. The Swanwick(Mil) tactical controller was informed of the Airprox four weeks after the incident and recollection of events was minimal. As the Swanwick(Mil) planner was not aware of an Airprox at the time of the incident, the occurrence report was completed retrospectively, with the use of the radar replay.

The controller recalled providing a service to a pair of Hawks in the Vale of York and receiving a prenote of the F70 from DTV. At the time, a service was being provided to two Hawks, a Typhoon routing northbound and the pre-noted F70. The Durham Tees controller was advised to route the F70 towards the coast in order to deconflict with the Hawk profile, but, although the Swanwick(Mil) controller advised the Hawks of the outbound F70, they continued their transit towards it. As the F70 was being handed to Swanwick(Mil) the controller was informed of a TCAS RA. The perceived severity of the incident was graded as 'negligible' and the unit and controller workload was assessed as 'low'.

The Durham Tees Approach controller recalled being given a departure heading of 060° for the F70, in order to avoid the Hawks. As the F70 was passing 6000ft in the climb, the Hawks were approximately 20nm to the southeast of EGVN and heading away from the F70; a heading of 090° was passed to the F70. The Hawks then turned onto a northerly track and started to converge with the F70. The DTV controller considered lateral separation but, because the F70 was climbing through a similar level to the Hawks, it was decided to continue the climb. Traffic Information was passed at 7nm and the F70 pilot replied with a TCAS contact. When the Hawks were at approximately 3nm and the same level, the F70 pilot reported a TCAS RA. Once clear of the RA and confliction, the Approach controller handed the F70 to LATCC(Mil). Because the F70 had been pre-noted to LATCC(Mil), the Durham Tees controller had expected the Hawks to keep a reasonable distance.

As per Figure 5, at 0919:45, the Swanwick(Mil) controller transmitted, , “[Hawk C/S] *can you manoeuvre no further north than your current position for civil traffic outbound from Durham Tees Valley?*” The Hawk pilot responded with, “*I’d like to manoeuvre north for the next two mike, then we will track south.*”

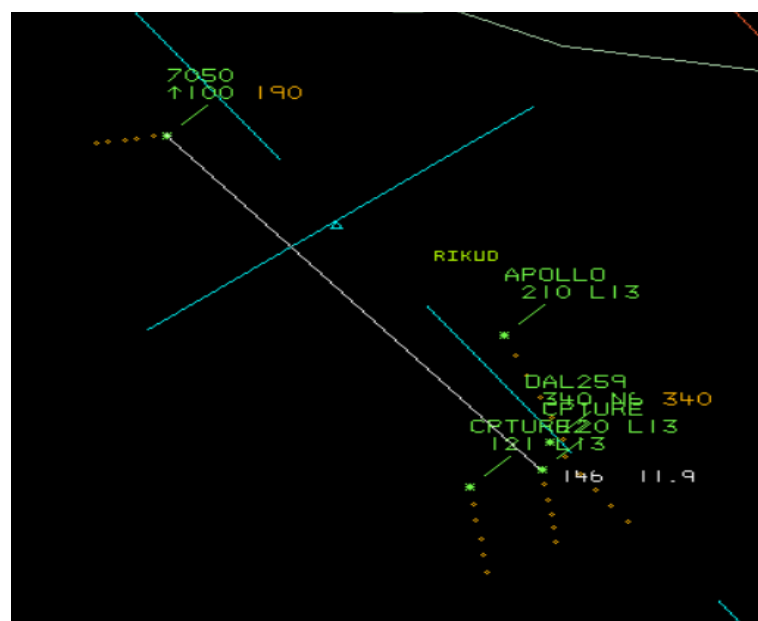


Figure 5: Aircraft geometry at 0919:45 (F70 squawking 7050; Hawks squawking CPTURE).

The controller added at 0919:56, as per Figure 6, “the traffic’s north eight miles, tracking east, indicating FL 105.” At 0920:36, the pilot responded with, “Copied. We’re shortly manoeuvring south.”

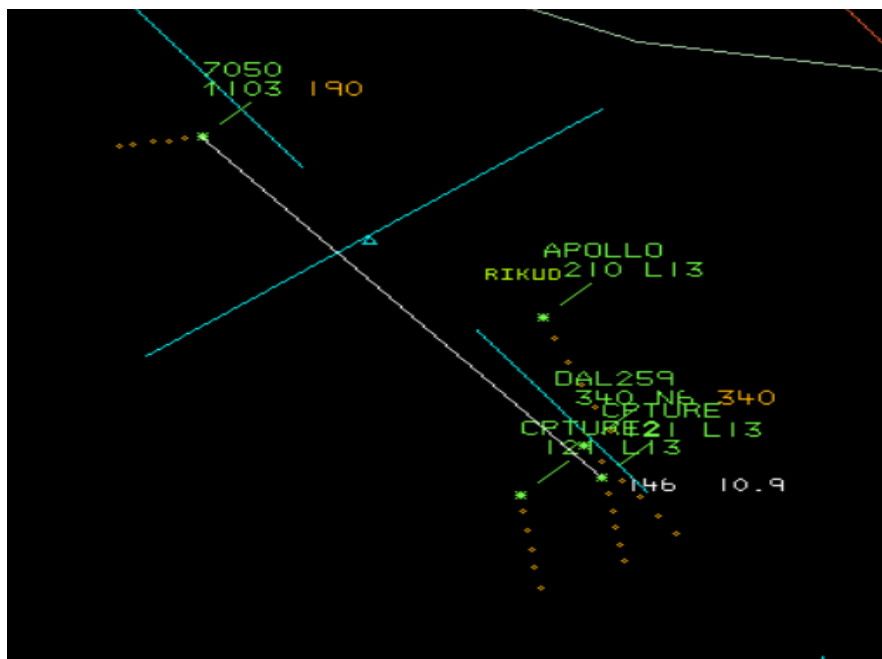


Figure 6: Traffic Information at 0919:56.

As per Figure 7, at 0920:36, the controller updated the Traffic Information with, “[Hawk C/S], traffic north, five miles, tracking east, indicating FL120.”

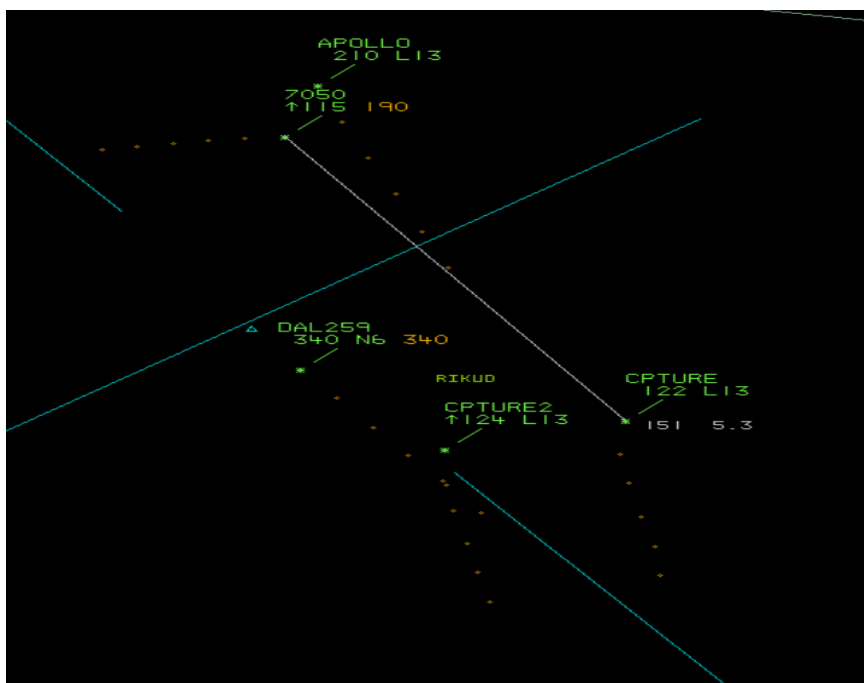


Figure 7: Traffic Information at 0920:36.

At 0921:01, as per Figure 8, the F70 indicates at FL125 climbing with 2.7nm separation on the Hawk at FL121 and at 0921:05, the radar replay shows the F70 descending to FL124 with 2.6nm lateral separation.

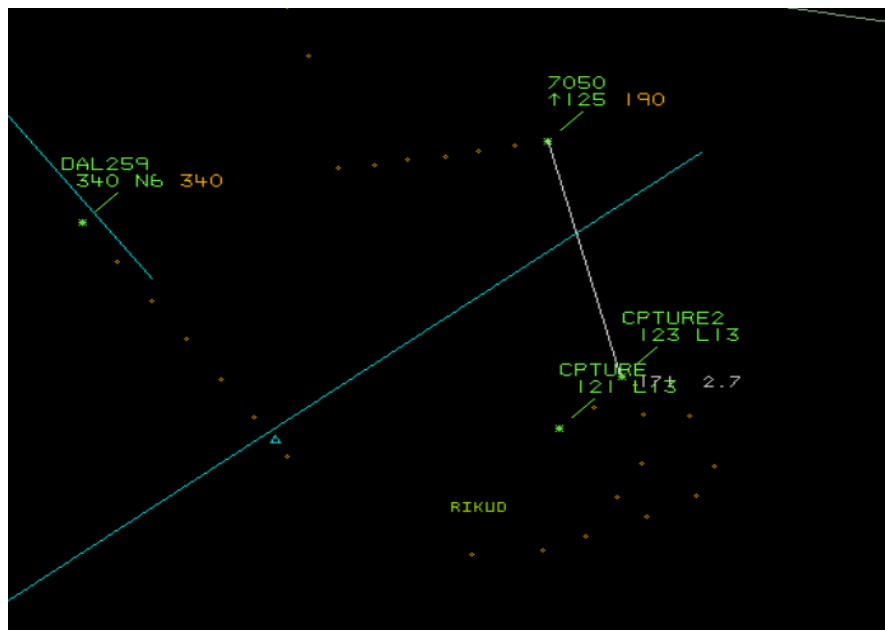


Figure 8: Closest Point of Approach at 0921:01.

At 0922:11, the controller transmitted, “[Hawk C/S] *can you manoeuvre no further east than your current position for civil traffic shortly working us?*” The pilot replied that he was proceeding south.

Radar-derived Traffic Information worked as a barrier because both controllers provided information to alert the crews. Lookout was not as effective as a barrier due to the aircraft profiles, the range of the Airprox at approximately 2.6nm, the fact that the F70 had the pair in its 4 o’clock position, and the Hawks being engaged in high-energy formation manoeuvres. ACAS was not fitted to the Hawks, but the F70 had a TCAS TA followed by an RA. All aircraft were in Class G airspace and were under appropriate types of service.

UKAB Secretariat

All pilots involved were responsible for collision avoidance¹; even though the F70 was receiving a Deconfliction Service, ultimately the avoidance of other traffic still rests with the pilot². Furthermore, the F70 pilot was required to give way to traffic on his right³, which, after receiving his TCAS RA, he did.

Comments

HQ Air Command

Both aircraft involved in this Airprox were operating in Class G airspace but under differing ATS. However, the dynamic nature of the Hawk air exercise (air-ex) does not appear to have been fully understood by the DTV controller who, having initially given the F70 a heading to keep it clear of the Hawks, chose to rely on the F70 out-climbing the Hawks. Furthermore, the TI passed to the F70 by the DTV controller (stating that the Hawks were tracking to pass behind the Fokker at a steady altitude) may have led the F70 pilot to believe that the situation was more benign than was the case. Air Combat Manoeuvring involves rapid changes of heading and height, and also necessitates an area clear of cloud. It is unclear whether or not the Hawks were repositioning to the north for weather but, in any case, the nature of the air-ex would normally mean that deconfliction by height alone is likely to be short-lived so lateral separation should continue to be applied where possible.

¹ Rules of the Air 2007 (as amended), Rule 8, Avoiding Collisions

² CAP 774, Chapter 4, Deconfliction Service

³ Rules of the Air 2007 (as amended), Rule 9, Converging

Summary

The Airprox occurred at 0920, 15.8nm to the east of Durham Tees Valley Airport, between a F70 and a formation of Hawks, in Class G airspace. The F70 was receiving a Deconfliction Service from Durham Tees Valley and did not receive any avoiding action, but did receive Traffic Information and a TCAS RA. The Hawks were receiving a Traffic Service from Swanwick(Mil) and also received Traffic Information.

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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board first considered the actions of the DTV controller. Although he was in a difficult position in trying to avoid fast-jets who were manoeuvring, the Board agreed that once the Hawks had turned back onto north after he had turned the F70 onto an easterly heading he should have re-assessed the plan and given an avoiding action turn; at the very least, a turn to the left would likely have prevented the TCAS RA. Some members of the Board opined that, in addition, had he called the Swanwick(Mil) controller for an early handover of the F70 they may have been more pro-active in helping him to achieve coordination.

Whilst acknowledging that the F70 was entitled to be in Class G airspace, some Board members wondered whether, as a CAT aircraft, he would have been better served by using controlled airspace and accepting a longer routing. That said, others confirmed that this was a standard routing out of DTV, and that the pilot and his operating authority should be well aware of his responsibilities for collision avoidance under a Deconfliction Service.

The Board was disappointed that the Swanwick(Mil) controllers had not made written reports at the time of the incident; Board members opined that, having been told on the handover that the F70 had received a TCAS RA, they should reasonably have expected that such reports were necessary. The Board felt that whilst they discharged their duty for their own aircraft, the Swanwick controllers could have done more to help the DTV controller, particularly given that the F70 was to be handed over to them eventually.

Similarly, the Board was disappointed that the Hawks pilots had not been notified of the Airprox earlier and could therefore not remember the incident. Although as a result it could now not be known what had caused them to maintain a northerly track towards another aircraft (of which they had been given Traffic Information), it was felt that they had probably exacerbated the situation by firstly not giving due consideration to the needs of other airspace users, and secondly giving scant assistance to the controllers who were trying to sequence their activities. In particular, by flying directly towards the F70's beam at the same level they appeared to demonstrate poor awareness of the effect that their flight vector would have on TCAS-equipped aircraft; even though they subsequently turned away, the vector had been enough to set off the F70's TCAS RA. As with previous Airprox involving fast-jets and TCAS-equipped aircraft, the Board wondered whether the military fast-jet fraternity had sufficient awareness of the impact of such vectoring. Although precise speeds are not known for this event, as Figure 9 below illustrates⁴ (with the F70 positioned at the origin), in the height block FL100-200, TAs will be generated by an interloper at ranges approaching 7nm on the beam, whilst RAs will be generated within 4nm.⁵

⁴ Diagram is an unofficial representation of TCAS response which is derived from UKAB analysis.

⁵ At representative speeds of 360kts TAS for the F70 (who was flying at 270kts IAS) and 420kts TAS for the Hawks.

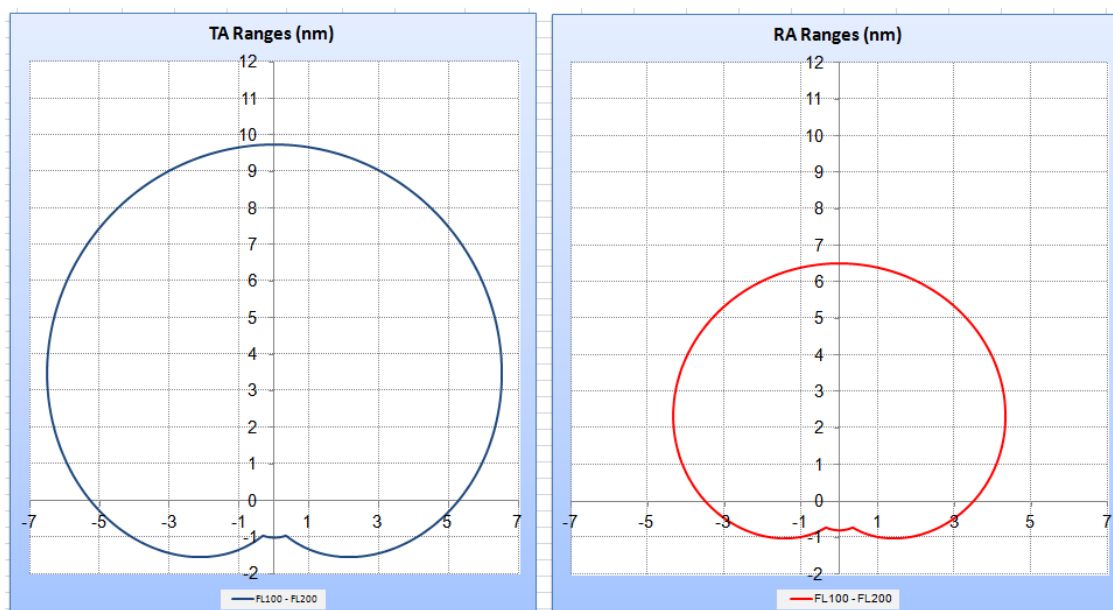


Figure 9: Representative TCAS TA and RA trigger ranges.

In assessing the cause and risk, the Board agreed that the primary cause was that the DTV controller did not achieve the desired Deconfliction Service deconfliction minima. But the Board also considered that there were two contributory factors, firstly, the Hawk pilots' awareness of flight vector with regard to TCAS-equipped aircraft, and secondly that there was insufficient co-ordination between the DTV and Swanwick controllers. The Board was initially split on whether this incident was risk C (timely actions had been taken to prevent collision) or E (a benign event wherein normal procedures, safety standards and parameters pertained); in the end, a vote settled the risk as C because the majority did not consider it entirely benign or normal due to the generation of a TCAS RA in a CAT aircraft within a highly dynamic scenario.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The DTV controller did not achieve the desired Deconfliction Service deconfliction minima.

Contributory Factor(s): 1. Hawk pilot awareness of flight vector with regard to TCAS equipped aircraft.
2. Insufficient coordination between the DTV controller and Swanwick(Mil).

Degree of Risk: C.

ERC Score⁶: 102.

⁶ 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.