

## **AIRPROX REPORT No 2014098**

Date/Time: 25 Jun 2014 1208Z

Position: 5727N 00031W  
(15nm SSE Lossiemouth)

Airspace: Scottish FIR (Class: G)

Aircraft 1 Aircraft 2

Type: JS41 Typhoon FGR4

Operator: CAT HQ Air (Ops)

Alt/FL: FL165 NK

Conditions: VMC NK

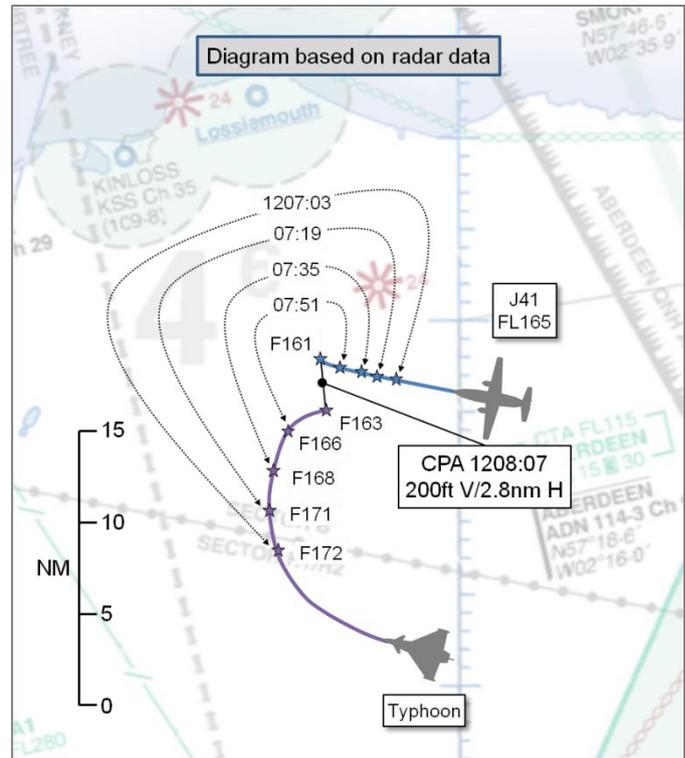
Visibility: >30nm >10km

Reported Separation:

NK NK

Recorded Separation:

200ft V/2.8nm H



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

**THE JETSTREAM 41 (JS41) PILOT** reports under IFR/VMC in receipt, he thought, of a 'Radar Advisory Service' from Scottish Military<sup>1</sup>. Stobes, HISL and navigation lights were illuminated; SSR Modes C and S were selected; the aircraft was equipped with TCAS II. Whilst cruising at FL165, he was instructed to turn right for avoiding action, which was carried out. Commencing the turn he received a TCAS RA, initially to climb, and then to descend at approximately 3000fpm. He did not observe the other traffic and did not report his assessment of the risk of collision.

**THE TYPHOON FGR4 PILOTS** report that they were operating a flight of two Typhoons (JEDI 31/32) conducting air combat training, reportedly under IFR [presumably erroneously entered in the reporting form] but 9000ft above and 10nm horizontally from cloud; navigation lights were illuminated. They were briefed to conduct Beyond-Visual-Range (BVR) to Within-Visual-Range (WVR) engagement profiles culminating in Basic-Fighting-Manoeuvres (BFM). They were operating in Operational Training Area (OTA) C between 1100-1230, in receipt of a Traffic Service from Swanwick Mil North, whilst monitoring the OTA C discrete frequency on the second radio. Prior to commencing high-energy manoeuvres, JEDI Flight had requested and received the block 10000-24000ft RPS with the intention of conducting various types of intercept training. Three runs were conducted without issue within the airspace. On setting up for the final run, Swanwick Mil asked JEDI Flight for a change in 'Block Heights' due to traffic which was soon to depart Aberdeen routeing west (the JS41). However, JEDI 31's pilot requested the block remain 10000-24000ft due to the nature of their training. Nothing more was said by Swanwick Mil regarding this, or indeed the routeing of the civilian traffic. As the pilot of JEDI 32 was routeing east (to achieve split datum) Traffic Information (12 o'clock, 10nm) was given to and acknowledged by the pilot, who turned south away from the contact. For his part, JEDI 31 was not told of the traffic's position by Swanwick Mil but, having gained airborne radar contact, he became aware of the traffic's height (FL165) which was inside the overall block allocated to JEDI formation. Having subsequently manoeuvred, the pilot of JEDI 32 [the subject of the Airprox] then received a further call from Swanwick Mil, resulting in a further turn away from the civilian track. Having now assimilated the geometry, JEDI 31's pilot called a 'TERMINATE', remaining 5000ft below the traffic and maintaining radar contact. The pilot of JEDI 31, having reviewed the recorded evidence, reported that at no point was the traffic called to him, despite the traffic's proximity and the fact that it

<sup>1</sup> Actually in receipt of a Deconfliction Service from the PC Moray Sector.

was in the middle of the established and allocated 'Block' and adjacent to the merge point of the JEDI flight.

The severity of the incident was perceived to be 'Low'.

**THE PRESTWICK CENTRE (PC) MORAY SECTOR TACTICAL CONTROLLER** reports that he was 'fairly busy'. His Planner had been on the telephone resolving a conflict between military aircraft northeast of PETOX which were in conflict with traffic inbound and outbound from Aberdeen airport (ABZ) on Advisory Route (ADR) W5D. ABZ Radar requested higher for the JS41, which was outbound from ABZ on track towards the Inverness VOR (INS). He answered the call as the Planner was busy coordinating the W5D conflicts with Swanwick Mil. He could see military traffic manoeuvring between the Aberdeen VOR (ADN) and INS around FL170 so refused to give any higher to ABZ Radar. The W5D conflicts had been satisfactorily resolved when the pilot of the JS41 contacted him at FL85 at the western edge of the ABZ Controlled Airspace (CAS). His Planner was telephoning Swanwick Mil to coordinate this traffic so he initially did not give any climb. He identified the JS41 and gave its pilot a Deconfliction Service. He could tell that the conversation between his Planner and the Military was not going well so he gave the JS41's pilot a right turn to try and take him north of the area that JEDI 31 and JEDI 32 appeared to be manoeuvring in. He instructed him to climb to an intermediate level. He recollected that it was FL120 but it was 5000ft below the level indicated by JEDI Flight. His Planner told him that JEDI Flight was operating in a block from 10000-24000ft and unable to take any coordination against the JS41. At the time, further unknown military aircraft with ALIEN callsigns appeared to be approaching the area on a southerly heading indicating FL80. He decided to continue the JS41's climb to the pilot's requested level of FL165 and continue him on a track to the north of JEDI Flight's area. JEDI 31 and JEDI 32 split and for a while showed no Mode C height and turned in different directions. He gave Traffic Information on the JEDI and ALIEN tracks as best he could, and gave the pilot of the JS41 an avoiding action turn onto 360° to stay clear of one of the JEDI aircraft. This JEDI turned south and out of the way and for a while both of them seemed to be well south of the track to INS, so he let the JS41's pilot resume his own navigation direct to INS. The ALIEN tracks continued on a steady track indicating FL80 which was greater than 5000ft below the JS41. Shortly after the pilot of the JS41 reached FL165 the JEDI Flight turned towards him again. One track, he recollected, was indicating FL120 descending, the other FL170 descending. Additional Traffic Information was given and eventually he had to give the pilot of the JS41 an avoiding action turn onto 330° which put him on a heading 90° to the incoming JEDI [32] aircraft, which was approaching him from his 10 o'clock position. The JEDI aircraft continued its right turn and passed the JS41's port side at approximately 2nm at FL160 descending. During this encounter, the pilot of the JS41 received a TCAS RA and he believed that he descended about 1000ft. The JEDI aircraft moved to an area east of and well behind the JS41. Throughout the incident the JEDI Flight's levels fluctuated greatly and often no Mode C level showed. Turns to the left and right were made. With the benefit of hindsight he was not sure what else he could have done apart from limiting the service he gave. No level that he gave the JS41's pilot seemed safe as the JEDI Flight was climbing and descending and often not indicating any level. If he had left him on a Traffic Service on his own navigation from ABZ to INS he would have gone straight through the area where the JEDI Flight was operating. At the time, attempting to turn the JS41 north of JEDI Flight seemed the best of the bad options available.

**THE PC MORAY SECTOR PLANNER CONTROLLER** reports that he was the Planner on the Moray/Hebrides Sectors combined. There was a significant amount of military activity to the west and east of ABZ. The pilot of the JS41 departed ABZ routeing towards INS climbing initially to FL85. At the time the aircraft became airborne there were at least two military fast-jets manoeuvring in the area between INS and ABZ. They were working Console 2 at Swanwick Mil. He telephoned the controller working the military aircraft to ascertain their intentions and attempt coordination. He was informed that the aircraft were manoeuvring in a block between 10000-24000ft. He asked if it was possible to co-ordinate his civil traffic against the military traffic suggesting a possible cruising level of FL105 for the JS41. He was informed that co-ordination was not possible. The telephone call between himself and the military controller ended. The pilot of the JS41 subsequently had a TCAS RA against one of the military aircraft in question (same level, 1.5nm).

**THE SWANWICK MILITARY NORTH TACTICAL CONTROLLER CONSOLE 2** reports that while controlling with a Planner they received a call from the civil sector. The call was to ask if their two aircraft (JEDI 31/32), which were general handling in the block 9000-24000ft, in receipt of a Traffic Service, could maintain not below FL100. It is worth noting that this block had already been restricted from the requested block due to a Lossiemouth departure. JEDI 31's pilot responded that he needed the full block 9000-2400ft so they informed the civil controller that they could not coordinate. Traffic Information was called to both JEDI pilots on separate occasions, he recalled. The first occasion that he mentioned the JS41 was, he thought, while JEDI 31 was on an easterly heading while the JS41 was heading west. The pilot of JEDI 31 called radar contact. After passing each other and increasing separation, JEDI 31's pilot manoeuvred back onto a westerly heading, on a similar track to the JS41. He then passed Traffic Information to the pilot of JEDI 32 as he came close to 5nm separation from the JS41. The pilot of JEDI 31 then transmitted that he had just been over-flown by the civil flight, and would have preferred an update on Traffic Information. During this situation they had 5 aircraft on 3 separate frequencies, two of which were discrete, resulting in a 'tricky' transmission process.

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

**THE SWANWICK MILITARY NORTH PLANNER CONTROLLER CONSOLE 2** reports that the Tac was working five aircraft over three discrete frequencies. An aircraft at high level in the Glasgow area for a low-level let-down at Ben Nevis; a formation general handling in D809 N of Lossiemouth, and JEDI, a pair, general handling to the S of Lossiemouth. 'Tay' [actually Moray] Sector called him reference the JEDIs and, after being passed Traffic Information, requested that they restricted their lower block level to allow the JS41 to pass below them. They asked the pilots of the aircraft and they were unable to comply. 'Tay' told him they would 'call the traffic and see how it goes'. This intimated to him that the JS41 pilot was likely to be under a Traffic or Basic Service. He last observed the JS41 at FL105 before they entered a particularly busy period, controlling and coordinating aircraft on other frequencies and with other agencies. The Tac also called the JS41 traffic to both JEDI pilots, he recalled. He subsequently noticed that the JS41 pilot had climbed to FL165 and had made no deviation to his course, with the JEDI having turned northbound towards him and descending through FL169. He pointed this out to the Tac just as the Short Term Conflict Alert (STCA) triggered on the radar screen. He was just completing a call on a different frequency and was in the process of deselecting and selecting the other frequency. At this point the JEDI called 'terminate' to the exercise and turned south. He estimated the separation [from JEDI 32] as less than 400ft vertically and approximately 3-4nm laterally based on the range setting on the radar, however, JEDI 31 stated that the civil aircraft had 'flown over him'. He commented that the JEDIs had been in that area for approximately 15 minutes at the time and had stayed in exactly the area the JS41 was routed through so there was no unexpected movement from their aircraft outside of where they had been operating. The incident happened during an extremely busy period for both Tac and Planner, with multiple aircraft on three separate frequencies.

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

### **Factual Background**

CAP 774, UK Flight Information Services<sup>2</sup>, states:

'A Deconfliction Service is a surveillance based ATS where, in addition to the provisions of a Basic Service, the controller provides specific surveillance-derived traffic information and issues headings and/or levels aimed at achieving planned deconfliction minima, or for positioning and/or sequencing. However, the avoidance of other traffic is ultimately the pilot's responsibility.'

'A Traffic Service is a surveillance based ATS, where in addition to the provisions of a Basic Service, the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however,

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<sup>2</sup> Chapters 3 and 4.

the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility. *Traffic is normally considered to be relevant when, in the judgement of the controller, the conflicting aircraft's observed flight profile indicates that it will pass within 3 NM and, where level information is available, 3,000 ft of the aircraft in receipt of the Traffic Service or its level-band if manoeuvring within a level block*

## Analysis and Investigation

### CAA ATSI

ATSI had access to reports from both pilots, area radar recordings and RTF and transcripts of the Prestwick Centre Moray Sector frequency.

On contact with the Moray sector the JS41 pilot, who was routeing westbound, was instructed to climb to FL120 and placed under a Deconfliction Service with reduced Traffic Information due to operating SSR only. The Moray Planner initiated a telephone call to Swanwick Mil North in an effort to co-ordinate the JS41 against military traffic displaying SSR code 4627 [JEDI 31] 17.2nm northwest of the JS41 (Figure 1). The Moray Planner was advised that co-ordination was not possible and that the 4627 traffic was operating between 10000-24000ft. The Moray Planner stated that they would need to avoid the military traffic.

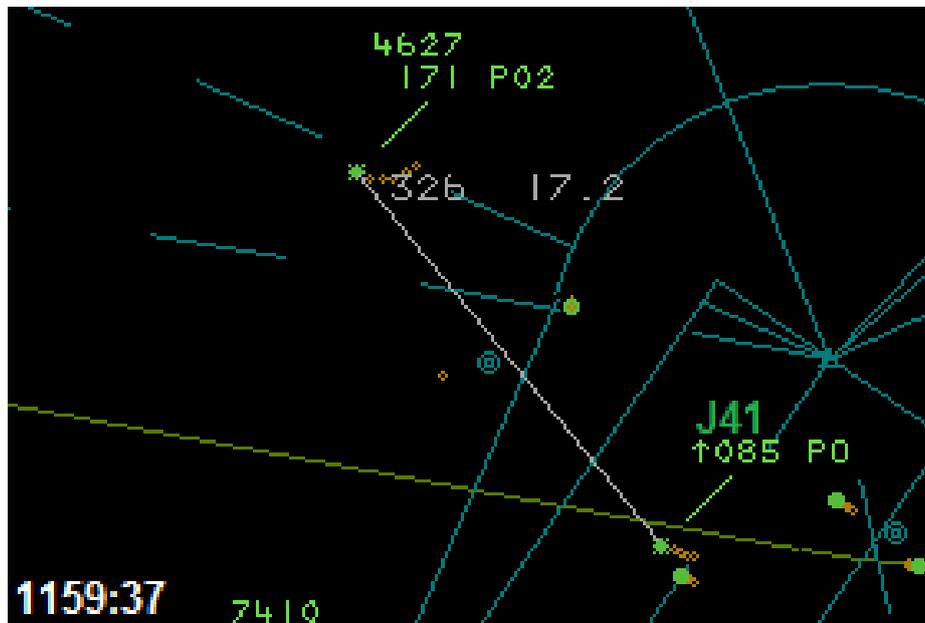


Figure 1

At 1201:19, the JS41 pilot was instructed to turn right 30° and to report the heading which was 320°. The JS41 pilot was subsequently instructed to climb to FL150.

At 1203:11, the JS41 pilot was informed of military traffic *“all around you unkn- there’s unknown traffic in your one o’clock range fifteen miles indicating eight zero climbing I’ve got er further traffic in your huhhh ten o’clock range twelve miles er no height readout at the moment there’s two there they were above you but er there’s I don’t know what level they’re at now.”* (Figure 2).

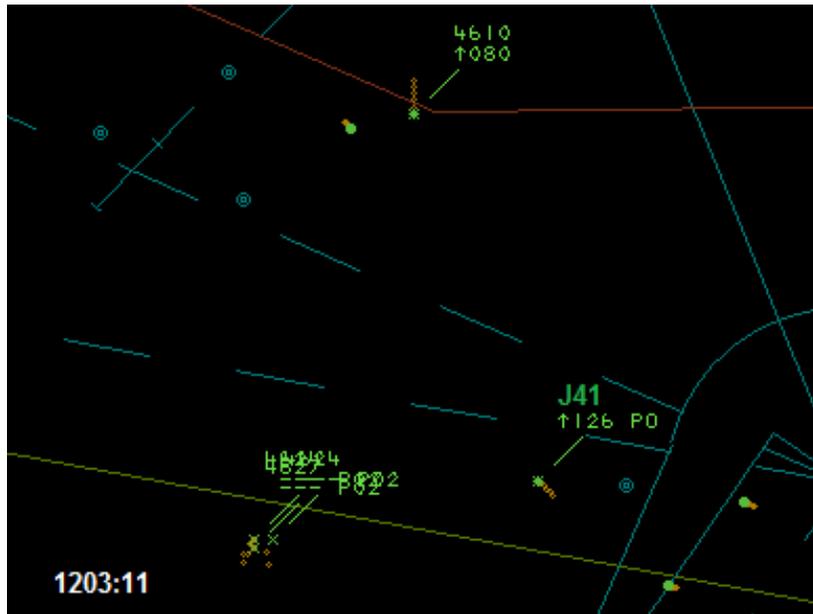


Figure 2

The Traffic Information was acknowledged by the JS41 pilot and the Moray controller instructed him to climb to FL165.

At 1203:54, the Moray controller passed further Traffic Information to the JS41 pilot stating that “the traffic to your left is indicating 130, climbing at the moment, and the traffic in your 11 o’clock is indicating 80 maintaining”.

At 1204:24, the JS41 pilot was instructed “avoiding action turn right immediately heading 350 degrees traffic’s [JEDI 32] in your half past nine of 6 miles indicating FL150 climbing” (Figure 3).

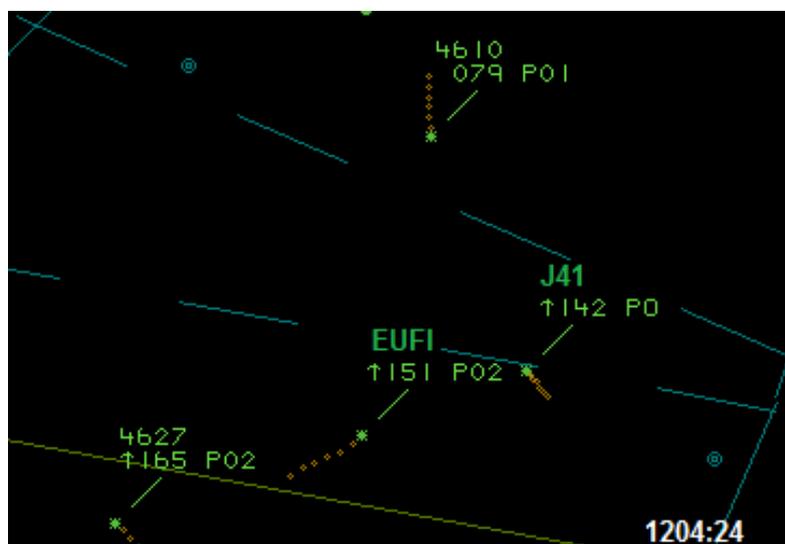


Figure 3: EUFI = JEDI 32

The JS41 pilot acknowledged the Traffic Information and replied that he ‘had it on TCAS’. The Moray controller informed the JS41 pilot that the traffic had turned away so he could resume his own navigation to Inverness (INS). He replied that he was routeing direct to INS.

At 1206:25, the JS41 pilot was informed of “further traffic [the military 4627 squawk, JEDI 31] now in your half past 11 crossing left to right at a range of 15...make that 12 miles now is traffic was indicating one seven five it’s now not got any height readout at all”. The JS41 pilot replied that he was looking. The Moray controller then informed the pilot of “further traffic [JEDI 32] er there’s

traffic in your ha- ten o'clock range ten miles make that twelve miles actually indicating one seven five and he's turning onto a northwesterly track at the moment" (Figure 4). The Traffic Information was acknowledged by the pilot.

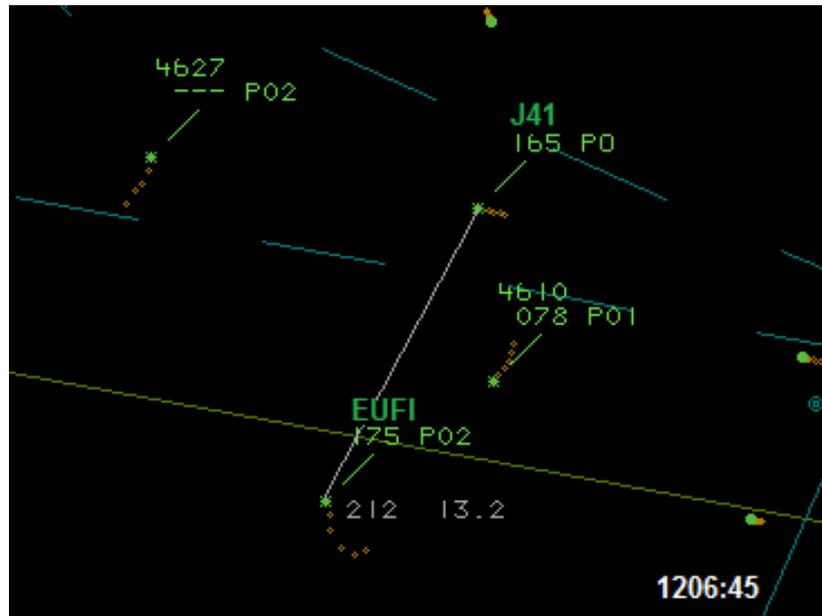


Figure 4

At 1207:04, the JS41 pilot was advised "the traffic with no height readout is now in your twelve o'clock range nine miles er looks like he's turning hard onto a southerly track looks like he's going to er n- in fact now he's heading straight towards you at the moment range eight miles". The pilot replied that he was looking and the Moray controller stated that the traffic was indicating FL115 descending.

At 1207:27, the Moray controller informed the JS41 pilot that "the traffic at one seven zero is in your ten o'clock range seven miles now indicating one seven zero descending" (Figure 5).

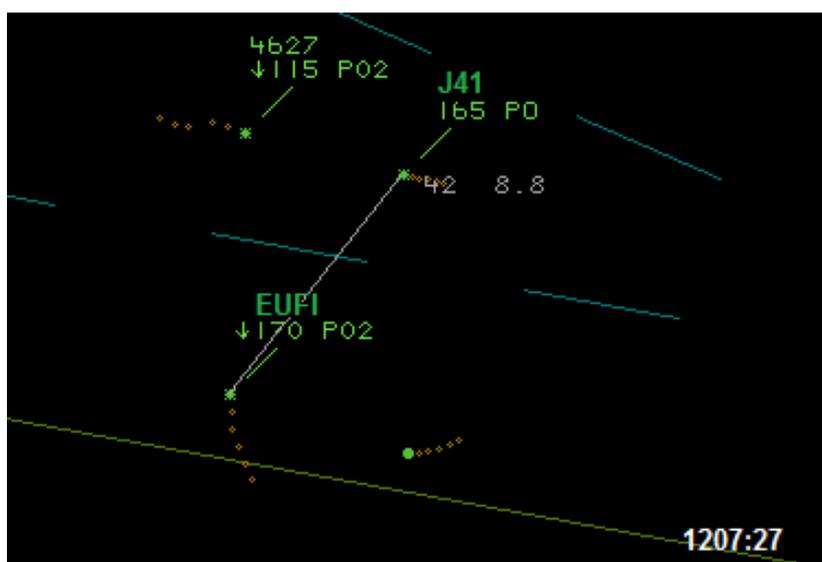


Figure 5

At 1207:32, low level STCA activated followed by high level STCA 8sec later (Figure 6).

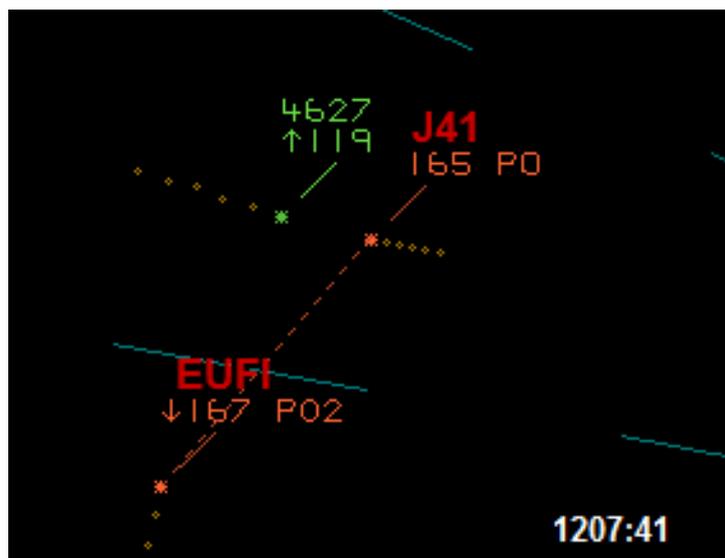


Figure 6 (the JS41 and JEDI 32 6.2nm apart)

The Moray controller instructed the JS41 pilot “avoiding action turn right immediately heading er three three zero degrees that traffic is in your er nine o’clock e- at five miles indicating one six six”. The pilot reported “TCAS RA” (Figure 7) which was acknowledged by the Moray controller.

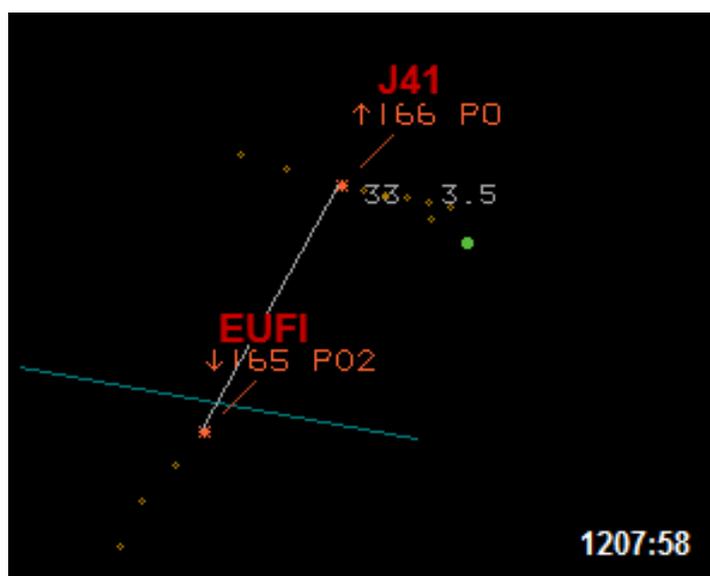


Figure 7

CPA was 2.8nm and 200ft at 1208:05 as JEDI 32 pilot, at FL165, turned behind the JS41. The aircraft subsequently diverged.

During the telephone call with the Moray Planner to Swanwick Mil co-ordination was attempted against the 4627 squawk [JEDI 31] but co-ordination against JEDI 32 was not discussed.

The Moray Tactical controller imposed a limited Deconfliction Service on the JS41; no specific service was requested by the JS41 pilot. It is not known what service the pilot of the JS41 would have requested however, the limited Deconfliction Service was read back unchallenged.

The deconfliction minima against uncoordinated traffic is 5nm laterally or 3000ft vertically (provided the surveillance returns do not merge if the Mode C remains unverified). The Moray

controller gave headings to the JS41's pilot to avoid the general area the two military aircraft were operating in and ultimately gave avoiding action against JEDI 32. CAP774<sup>3</sup> states:-

*'High controller workload or RTF loading may reduce the ability of the controller to pass deconfliction advice and the timeliness of such information. Furthermore, unknown aircraft may make unpredictable or high-energy manoeuvres. Consequently, it is recognised that controllers cannot guarantee to achieve these deconfliction minima; however, they shall apply all reasonable endeavours'*

Deconfliction minima was not achieved, however, Traffic Information was passed and updated regularly during the event.

### Military ATM

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

The pair of Typhoon pilots were under a Traffic Service with Swanwick(Mil) and the JS41 pilot was in receipt of a Deconfliction Service with the Moray Sector.

In a response to the Moray Planner, the Swanwick(Mil) Planner gave information at 1159:49 on JEDI 31, *"yeah he's manoeuvring in the block err 10000' to 24000' on 1016."* The Moray Planner responded at 1159:53 (Figure 8) with, *"Roger we've got err [JS41 C/S] just departed Aberdeen he's looking err for a better climb. He's stopped off at 85 just now, are you able to offer anything?"*

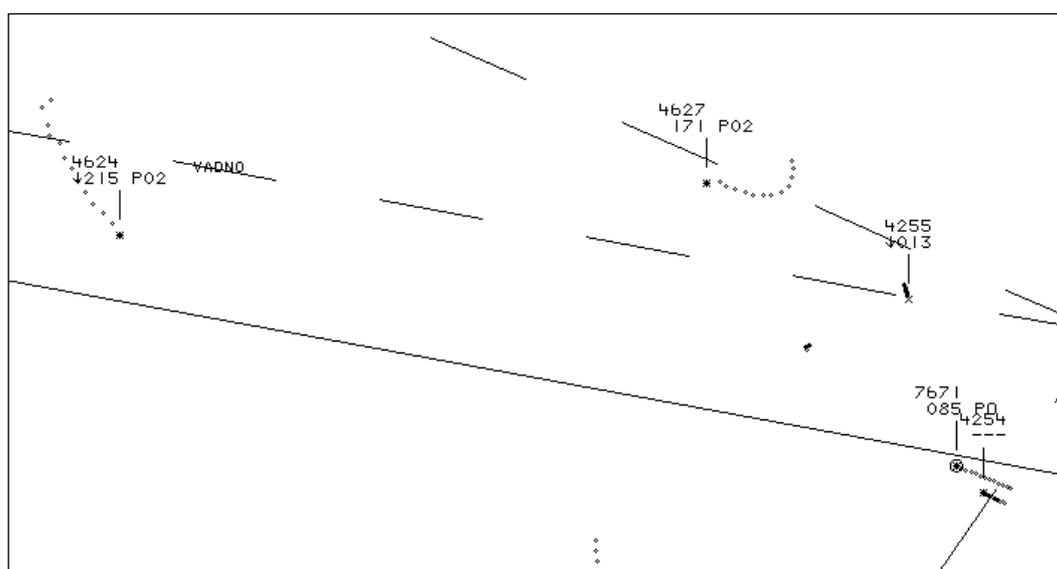


Figure 8: Geometry at 1159:53 (JEDI 31 4627, JEDI 32 4624, JS41 7671)

The Swanwick(Mil) Tac 2 controller requested, at 1200:43, *"JEDI 31 are you able to have your lower err ceiling as one err sorry 12000' to accommodate civil traffic?"* The Typhoon lead pilot responded at 1200:52 (Figure 9) with, *"Negative, JEDI 31 Flt request 10000 feet."* At 1201:00, the Swanwick(Mil) Planner confirmed that the Typhoon formation were under a Traffic Service. The Moray Planner responded at 1201:01 with, *"Right ok we'll just need to call the traffic, see how it is then, ok ta."*

<sup>3</sup> Chapter 4, Paragraph 4.10.

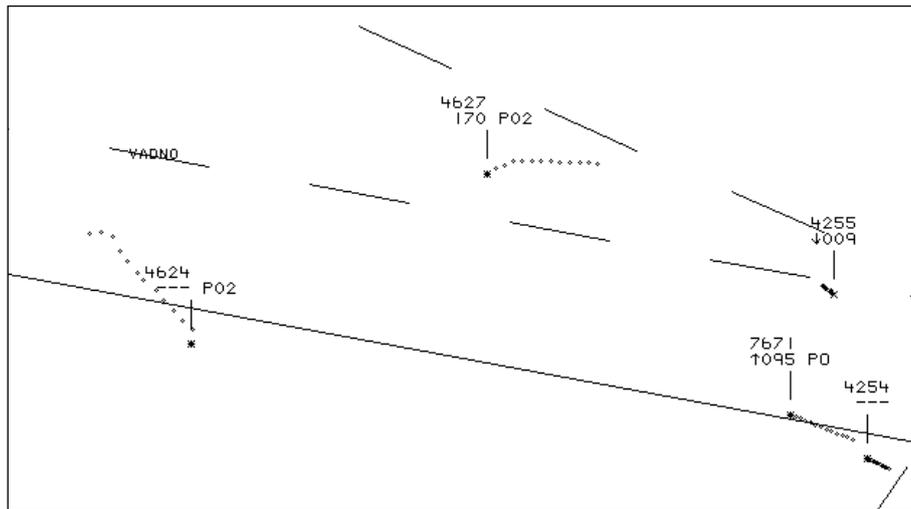


Figure 9: Aircraft geometry at 1200:52

At 1204:15, (Figure 10), Swanwick(Mil) Tac 2 called Traffic Information as, “JEDI 32 traffic 12 o'clock 10 miles crossing right left ahead currently FL140 in the climb.” JEDI 32 pilot replied “radar contact” at 1204:22.

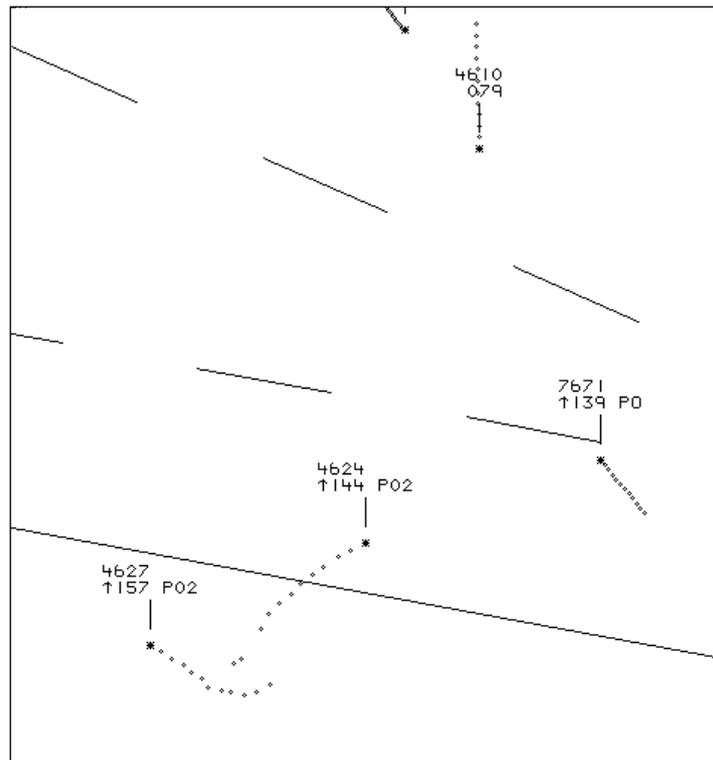


Figure 10: Traffic Information at 1204:15

Figure 11 outlines the geometry as JEDI 31 and the JS41 were on a reciprocal heading with 5000ft vertical separation. Further Traffic Information was passed by Swanwick(Mil) Tac 2 at 1207:50, “JEDI 32 traffic north east 5 miles crossing right left ahead, civil traffic FL165.”

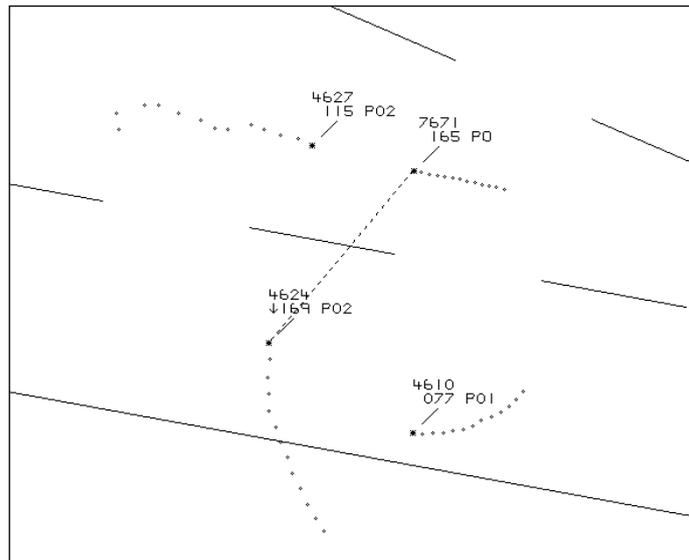


Figure 11: Geometry at 1207:33

The CPA was at 1208:04 (Figure 12) at 200ft vertical separation and 2.8nm lateral separation. At 1208:17, the pilot of JEDI 31 enquired, “Swanwick that civil traffic FL 165 directly overhead JEDI 31 in our block, confirm?” Swanwick(Mil) Tac 2 replied with, “affirm that civil traffic’s aware you’re under a Traffic Service that is previously called traffic just to JEDI 32.”

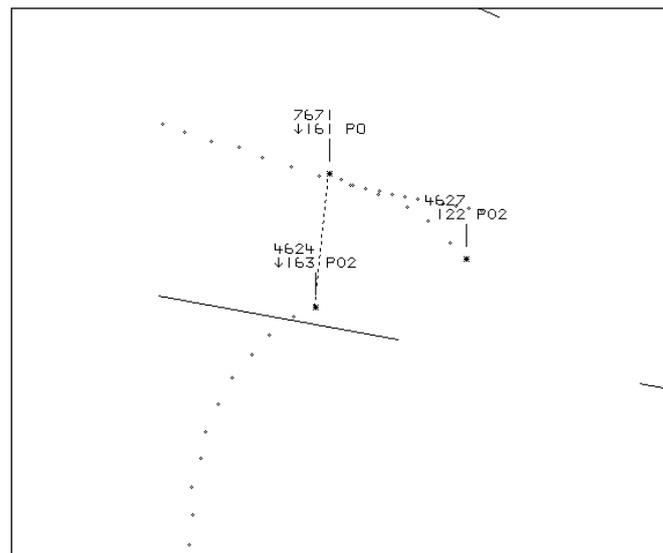


Figure 12: CPA at 1208:04

At 1208:28, JEDI 31’s pilot transmitted, “That’s copied. I’ve just been over flown by a civilian ac above me in our block that we have no traffic information passed, confirm?” Swanwick(Mil) replied with, “JEDI 31 err that is the traffic I passed to you when you went out on your easterly run a few moments ago.”

The Swanwick(Mil) Tac controller had passed the altitude coordination request from Moray to the Typhoon pilots and had called accurate Traffic Information twice to the pilot of JEDI 32. The JS41 was passing within the general handling block of the Typhoons and it was required to pass information to all elements of the flight, even though JEDI 31 was 5000ft below the JS41. However, both pilots would have been aware of the civil transit given that Traffic Information was passed to JEDI 32 on the discrete frequency, and the request to raise their lower operating altitude for a transit. The unit recognised in their investigation that the controller had a high workload, that precluded passing more information specifically to JEDI 31 and CAP774 advises that Traffic Information is subject to controller workload and judgement.

The Moray controller had the option of capping the JS41 climb below the Typhoon block, attempting lateral coordination or re-routing the JS41 pilot around the intercept area. The Moray controller was also under a high workload and further military traffic to the north, routing at FL80, would have placed further demands on the controller and limited control options. Standard separation would be difficult to maintain in the busy airspace but deconfliction advice and Traffic Information were passed.

The Typhoons required the block in Class G airspace for intercept training and they had already ceded a portion of their lower limit for a previous transit aircraft. The formation wanted to conduct their final intercept and that was terminated to steer clear of the JS41.

Traffic Information was passed by both sets of controllers and this barrier was reinforced by TCAS on the JS41 and radar contact in the Typhoon. The Traffic Information at 1207:50 informed JEDI 32 of the civil traffic and the training was terminated to allow the pilot of JEDI 32 to build in lateral separation and the pilot of JEDI 31 to build in vertical separation. The general situational awareness from JEDI helped maintain separation. For the JS41, TCAS TA/RAs and Traffic Information combined to inform its pilot of the Typhoons and as such all crews were aware of the other airspace users. Whilst deconfliction minima was not maintained by the Moray controller, procedures for a Deconfliction Service, in terms of information and avoiding action, built in further barriers to provide separation of 2.8nm laterally and 200ft vertically in Class G airspace.

## UKAB Secretariat

Both pilots had equal responsibility for collision avoidance and not to fly into such proximity as to create a danger of collision<sup>4</sup>. The pilot of JEDI 32 was required to give way<sup>5</sup>, which he did.

## Comments

### HQ Air Command

This incident highlights the need for controllers to understand the intentions of the pilots concerned. Whilst all aircraft were entitled to operate in the airspace, the dynamic manoeuvring of the Typhoons meant that their positioning (in all dimensions) was always going to be difficult for the Montrose controller to predict. The decision to route through the airspace based on the 'current' position of the Typhoon pair was probably flawed and this is not the first Airprox that has occurred where a pair of military fast-jets has split to conduct high energy manoeuvres throughout a block of altitude notified to ATC. Fortunately the Typhoon pilots gained radar SA on the JS41 and that, coupled with pertinent Traffic Information from the Swanwick (Mil) controller, allowed appropriate separation to be maintained. The Regional Airspace Users' Working Group meeting held at RAF Lossiemouth on 4 Nov 14 included a capabilities brief from a Typhoon pilot to civil controllers, explaining the performance of the aircraft and typical training profiles to enable wider understanding of Typhoon operations. This will hopefully go some way to improving the understanding of military operations in northern Scotland and aid the decision making of civil controllers faced with dynamic fast-jet manoeuvring.

## Summary

An Airprox in Class G airspace, was reported by the pilot of the JS41, who was in receipt of a Deconfliction Service from the Moray Sector against a Typhoon (JEDI 32), whose pilot was in receipt of a Traffic Service from Swanwick Mil. The Moray Planner was not able to achieve coordination for the JS41 against JEDI 32. The Mil controller had asked the lead pilot of JEDI Flight if he could accept a base of 12000ft but he requested a base of 10000ft. The Tactical controller attempted, therefore, to route the JS41 away from the area that the military traffic were operating in. JEDI 32

<sup>4</sup> Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions), and as reflected in Military Flying regulations.

<sup>5</sup> Ibid., Rule 9 (Converging).

and the JS41 subsequently came into conflict and an avoiding action turn was issued: due to the unpredictable manoeuvring of the Typhoon, deconfliction minima was not achieved. The pilot of the JS41 was passed regular Traffic Information and subsequently responded to a TCAS RA against JEDI 32. The Mil controller issued appropriate Traffic Information to the pilot of JEDI 32, who turned away from the JS41. The pilot of JEDI 31, using airborne radar remained 5000ft below it. The minimum distance between the JS41 and JEDI 32 was 200ft vertically and 2.8nm horizontally.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available included reports from the pilots and the controllers concerned, area radar and RTF recordings and reports from the appropriate ATC and operating authorities.

The Board first noted that the Airprox occurred in Class G airspace and that all the pilots were entitled to be operating in the airspace concerned. They then discussed the actions of the Typhoon pilots. A Military Air-Ops member explained that, due to the dynamic vertical and horizontal displacement of the aircraft when involved in their planned tasks, it was not unreasonable for the Typhoon pilots to request to operate in a block from 10000-24000ft within an Operational Training Area. However, as it was within Class G airspace, this did not give them the right to expect other aircraft to be excluded from the airspace. The member explained that, with respect to this sort of training mission, until recently Lossiemouth and its surrounding airspace had been relatively quiet but, just prior to the Airprox, the Typhoons had relocated from Leuchars to Lossiemouth and activity in the airspace had increased. Having previously conducted much of their training over the sea, he commented that it was possible that the Typhoon pilots would not have been used to operating in airspace regularly used by CAT. A Civil ATC member wondered whether the Typhoons could have remained in their requested level block but have moved to a different area. The Military Air-Ops member reasoned that, given they were on their last profile, fuel considerations would probably have precluded this.

The Board then considered the actions of the JS41 pilot. It was noted that the aircraft was operating a scheduled flight in Class G airspace; there was no Airway or Advisory Route for its flight from Aberdeen to its destination until it reached Inverness. The Board hoped that the aircraft operator had factored this into their risk assessment, and particularly now that Typhoons had moved to Lossiemouth. The Board noted that the JS41 pilot had received and had reacted to a TCAS RA, initially to climb and then to descend. Members wondered why this TCAS reversal had occurred and a Civil Airline Pilot member commented that, although this was not a normal occurrence the mechanisation of TCAS was such that reversals could occur in highly dynamic situations. Because the Typhoons were not equipped with TCAS, the JS41's system was operating independently from the other traffic and so mutual RA awareness was not possible (TCAS units that are reacting to each other are aware of the other's demanded manoeuvre and take this into account). Members noted that TCAS algorithms were not designed to operate in Class G airspace in the vicinity of manoeuvring VFR traffic and this reduced the ability of TCAS to resolve the situation. Several Board members believed that, although the pilot of JEDI 32 ensured that there was no risk of a collision, he should have positioned himself above, below or further from the JS41 to avoid its pilot receiving a TCAS RA due to his flight vector impinging on the JS41's TCAS-protected volume.

The Board then turned its attention to the Moray Sector's actions. The Tactical controller had agreed a Deconfliction Service with the pilot despite him not requesting it. A Civil ATC Area Controller, with experience of the Moray sector, commented that it was standard practice to offer pilots the 'best' service available outside CAS, i.e. a Deconfliction Service, whether or not it had been requested. It was apparent that the controllers had realised the potential for conflict between the JS41 and the Typhoons at an early stage because they had tried to coordinate the JS41's flight with Swanwick Mil. Some Members questioned the wisdom of routing and climbing the JS41 through the Typhoons' operating block. However, it was pointed out that there was further traffic routing southbound towards the JS41 at FL80, which would have resulted in a conflict if the JS41 had remained at its handover level of FL85. The Board noted that the controller did not achieve the deconfliction minima due to the unpredictable and high-energy manoeuvres of the Typhoons. However, the Board realised that he had applied all reasonable endeavours to try and achieve the minima.

The Board noted that the Typhoon pilots were in receipt of a Traffic Service from Swanwick Mil. A Military ATC advisor opined that the Swanwick Mil controller should have issued Traffic Information to the pilot of JEDI 31 as the JS41 was operating in the Typhoons' level block although they also agreed that the busy controller might have inferred that JEDI 31 was aware of it from previous information to JEDI 32 and the fact that he was in radar contact with the JS41. A Military ATC member commented that the controller had believed (and recollected) incorrectly that he had passed this information to JEDI 31's pilot. Some Board members wondered whether it was appropriate for the Swanwick controller to be operating three discrete frequencies, and whether this had increased his workload sufficiently to distract him and make him believe he had issued Traffic Information to the pilot of JEDI 31. A Military ATC Area member explained that operating several frequencies was normal practice in quiet situations. On this occasion two of the frequencies were being used by pilots just 'listening out' and no ATC service was being provided to them. The Mil controller did pass appropriate Traffic Information to the pilot of JEDI 32, allowing him to turn away from the JS41.

The Board then considered the cause of the Airprox. Discussion took place as to whether the JS41 pilot simply filed because he had received a TCAS RA. However, the Board considered that there was more to the incident than just a TCAS alert because positive avoiding action had had to be taken by the Typhoons. Consequently, it was agreed that the cause was a conflict in Class G airspace. The Board then discussed the degree of risk. Although deconfliction minima had not been achieved it was considered that there had been no risk of a collision. The pilot of JEDI 31 had provided vertical separation from the JS41, and the pilot of JEDI 32 had turned away from the JS41 and remained at least 2.8nm from the aircraft. Consequently, because effective and timely actions had been taken, the Airprox was categorised as Category C.

The Board were heartened to hear about the action that has been taken to assist in preventing similar incidents occurring in future. The capabilities brief given by a Typhoon pilot to civil controllers should aid their understanding of military operations relative to fast-jet traffic operating from Lossiemouth, and a member of the UKAB Secretariat had recently visited Lossiemouth to brief them on TCAS mechanisation and the implications of flight in the vicinity of TCAS-equipped aircraft.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

<u>Cause:</u>	A conflict in Class G airspace.
<u>Degree of Risk:</u>	C.
<u>ERC Score<sup>6</sup>:</u>	2.

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<sup>6</sup> 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.