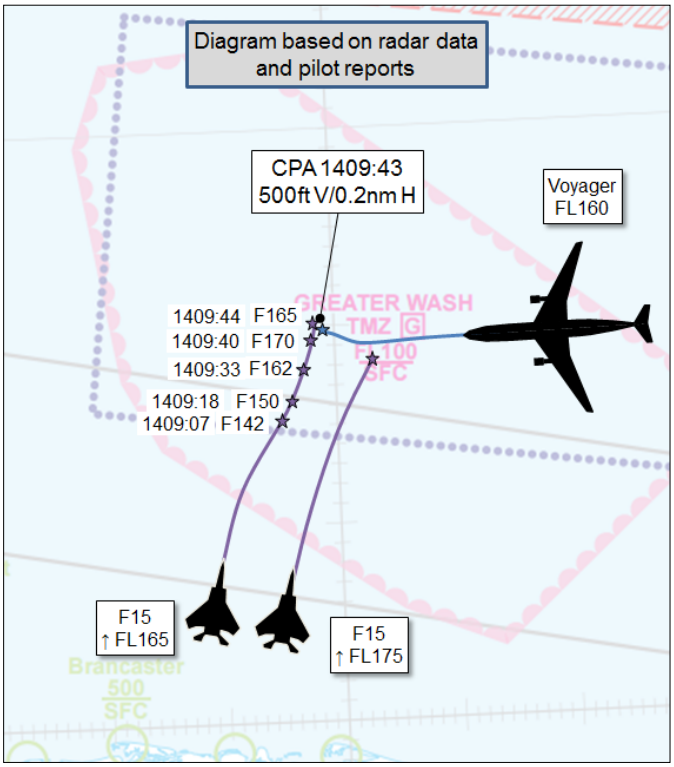
AIRPROX REPORT No 2017002

Date: 05 Jan 2017 Time: 1409Z Position: 5321N 00058E Location: AARA8[1]

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Voyager	2xF15
Operator	HQ Air (Ops)	Foreign Mil
Airspace	AARA8	AARA8
Class	G	G
Rules	IFR	VFR
Service	Traffic	Traffic
Provider	Swanwick Mil	Swanwick Mil
Altitude/FL	FL160	FL165
Transponder	On/C, S	On/C, S
Reported		
Colours	Grey	Grey
Lighting	Nav	Anti-collision
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	FL160	FL165
Altimeter	QNH (1013hPa)	QNH (1013hPa)
Heading	290°	020°
Speed	280kt	350kt
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation		
Reported	0ft V/50m H	500ft V/800m H
Recorded	500ft V/0.2nm H	



THE VOYAGER PILOT reports that the event took place soon after the completion of AAR with a pair of Typhoons who had departed the tanker 1000ft above. He was heading west along the CP-IP line[2] of AARA8[1], at 280kt with wing hoses trailed, when the TCAS alerted with a 'Traffic Alert', two aircraft climbing and converging towards the Voyager. The two aircraft were visually acquired in the 9 to 10 o'clock position roughly 3500ft below at an estimated 3nm distance, still converging and approaching co-level with the Voyager (height and distance estimated from TCAS display). A TCAS RA was not triggered because the TCAS was in 'TA Only' mode IAW SOP for refuelling.[3] Very soon after visual acquisition, a decision was made by the crew to manoeuvre to the north, in a right turn, as avoiding action away from the traffic. As this manoeuvre was commenced, the PM contacted Swanwick Military enquiring about the control / knowledge of this traffic that had entered the block FL140-FL170 in AARA8, which were the operating levels allocated to the Voyager for its AAR serials. During the avoiding right turn, while maintaining FL160, one of the contacts passed above and behind the tanker while the second was witnessed to pass through the 12 o'clock, co-level, estimated to be not more than 50 metres away from the nose of the Voyager. It is thought that these aircraft were F15s. Immediately after passing though this position, this F15 aggressively pulled the nose up with reheat engaged in what appeared to be late avoiding action. The Voyager crew not only saw the engines in reheat but could hear the distinctive roar (even while wearing active noise cancelling headsets), and light turbulence was experienced as the Voyager flew through the F15 jetwash. Once it was perceived that the pair of aircraft were no longer a threat to the Voyager, the Voyager PM called Swanwick Military and declared an 'Airprox'. The Voyager pilot opined that it should not be

[1] Air-to-Air Refuelling Area 8, sometimes notified as ARA8
[2] Each refuelling area has a nominated centre point (CP) and an initial point (IP) that receivers are nominally required to route to at the start of their refuelling bracket. The tanker notionally flies a track along a line that joins the IP to the CP in order to pick up inbound receivers.
[3] Aircraft deselect TCAS RA mode during refuelling in order to prevent any nuisance RAs that will inevitably occur as the receivers approach the tanker.

underestimated how close this incident was to being what could have been a catastrophic mid-air collision. After this incident, the Voyager crew decided to curtail the subsequent serials of AAR and to recover back to base. It was not clear to them what level of ATS control the two F15s were under, and the Voyager crew did not, at any point, hear these aircraft on the frequencies in use / monitored by them, nor was the position of the F15s passed by the controlling agency before the event.

He assessed the risk of collision as 'High'.

THE F15 PILOT reports that they filed a flight plan with their Base Ops prior to departure at 1357. Their plan was to tactically manoeuvre in the North half of the Wash ATA (North of airway Y70) for 30 mins in order to avoid saturated airspace in East Anglia and the Lake ATA as per deconfliction with other booked aircraft. Upon completion of General Handling in the Wash, they would return to base.

At 14:02:25 the F15s requested from Swanwick to "GH SFC-FL240 in the North Half of the Wash"

At 14:02:44 the Swanwick controller cleared them to FL190.

At 14:03:16 the Swanwick controller assigned them a squawk of 3076 and identified them.

At 14:04:14 Swanwick advised them "taking own terrain clearance, cleared to manoeuvre surface to 240".

At 14:07:00 they turned north east below the Y70, then turned from east to west to accomplish flight admin between FL100-FL140.

At 14:08:20 they turned from West to North (heading 020) to set up for the first tactical exercise.

At 14:09:18 they began the first tactical exercise of the mission, north of the Y70 in the Wash ATA at FL155 in a 5 degree climb.

At 14:09:25 Swanwick Mil calls "[F15 C/S], Towline 8 is active, not above FL140" (this call was processed by both aircraft; one F15 was at FL170 and the other at FL 165 at the time of the call). The F15 lead started the formation turning south while advising Swanwick that they will operate south of Y70.

At 14:09:35 the F15 banks left and right to clear the flight path and initiates a 5 degree nose low descent to proceed below FL140 as per Swanwick instructions.

At 14:09:40 the F15 pilot, while descending through FL164, visually picks up the tanker in the 1 o'clock position, estimated to be 500-1000ft below, and immediately selects maximum afterburner and 28 degrees nose high to avoid the conflict, and then continue a turn to the right while passing FL175 toward the south. He estimated the pass to be within a half mile. He continued to climb to FL195 until clear of the conflict, and subsequently descended to below FL140 to fly south of the Y70 for the duration of the sortie.

He assessed the risk of collision as 'Medium'.

THE EAST TAC LEFT TRAINEE CONTROLLER reports that she was under training with a screen controller sat behind her. To her right was a Planner also under training with a screen, and a TAC Right controller. Her main task was controlling Air-to-Air Refuelling in AARA8, the tanker being a Voyager at FL160; additionally she was controlling two transits, heading both to, and from the tanker (a Typhoon was transiting to AARA8 and a C130 transiting south after refuelling). Prior to this she had also been working a high-level transit from the southwest through Y70, which required a high workload. The airspace was busy but she did not feel she had reached capacity. The Typhoon was at FL150 and was approximately 5nm southwest of AARA8 when she called the F15 flight to them. At this time, the F15s were approximately 10nm south of AARA8 at FL130 and climbing on a north westerly heading, and therefore converging with the Typhoon. The Voyager at this time was in the south westerly portion of AARA8 heading west at FL160 approaching the point of turn to head north. Within seconds of her completing the traffic call to the Typhoon, the F15s then turned onto a northerly heading and climbed into the Voyagers level block, very quickly passing through FL160 very close to the Voyager. She did not expect the F15s to enter AARA8 (active in the block FL140-170) as it had

been active for some hours already and the F15s had been general handling in the vicinity for some minutes always turning away from AARA8 before entering. Seconds later, the pilot of the Voyager reported having aircraft climbing through his level, then immediately reporting an Airprox, stating the aircraft 'passed through his 12 o'clock at the same level which caused them to fly through the jets wake turbulence'. The whole incident escalated very rapidly leaving her without time to call the F15s to the Voyager or attempt to give any avoiding action. The incident was reported to the supervisor who then released her and her screening controller from console.

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

THE EAST TAC LEFT SCREEN CONTROLLER reports that he was screening a trainee; the sector also had a UT planner and screen, and a TAC right controller. Their task was primarily Tanking however they were controlling a Typhoon transiting to the Voyager tanker, and a C130 transiting from the tanker. Prior to this, a Typhoon had required a high-level transit at FL300 from SE airspace back to base, this required significant planning and scan of Y70 prior to handing over to North East; he would say his workload was quite high, monitoring the radar picture, making notes on the session, discussing points with the UT etc. The position did have some capacity to spare but they were close to saturation. The F15s had been general handling near to the western edge of AARA8 with the TAC Right controller. They had seen these aircraft and interrogated their LJAO scribble [electronic information] which stated they were operating from the surface to FL240. They had been remaining clear of AARA8 prior to this incident. The Typhoon inbound to AARA8 was heading northeast and the Voyager was heading west near the southern border of AARA8. The trainee had called the Voyager to the Typhoon. As the F15s approached the area they were called to the Typhoon; the F15s were heading northwest at 15nm, FL130 manoeuvring rapidly through their levels. They were seemingly converging with the Typhoon, hence the call; however, the projected point of confliction was inside the 'segregated' area of AARA8 and therefore presumed no factor, merely an information call to the Typhoon who may have had radar contact on them. The F15 flight were not called to the Voyager because their NW heading would have kept them clear of the tanker even if they had 'infringed' the refuelling area, (and so far in the sortie they had avoided AARA8). Immediately after calling the F15s to the Typhoon, the F15s were seen to make a high-energy turn to the NNE and 'infringe' AARA8. At this point, the Voyager called saying there was traffic inside 'his' area. The F15s were then seen turning toward the tanker, flying through his level, and almost merging on radar before continuing their climb and departing the area to the south. This series of events was very rapid, the TAC Left position did not have a chance to call the traffic to the Voyager or offer avoiding action against the much faster and manoeuvrable F15's. The Voyager seemed to have immediate SA on the F15's, likely from TCAS. The Voyager reported having aircraft at very close range at the same level, and that he was passing through their wake turbulence. A short time later the Voyager called an Airprox, stated they 'were very close to not being there anymore', and that they would not be accepting any more aircraft on task; this impacted the Typhoon and later two other aircraft. He reported this to the supervisor who had them relieved from console.

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

THE PLANNER TRAINEE CONTROLLER reports that he was the trainee during a high-intensity training period. He noticed that the F15 flight was at FL130 approximately 3-4nm south of the Voyager tracking north. He pointed the tanker out to the TAC East controller and said "keep [F15 C/S] away from the tanker". The TAC East controller then issued an avoiding-action descend instruction to the F15 flight when they were approaching a similar level and just ahead of the Voyager. The F15 flight continued to climb and the Voyager reported an Airprox.

THE PLANNER SCREEN CONTROLLER reports that he was screening a planner in TAC East sector. They had TAC left and TAC right operating, along with Overload TAC left, planner and a TAC right en-route. The team on the bank [of radar consoles] were very close to working at capacity and both the UT planner and himself were working extremely hard to keep on top of the traffic levels. Whilst planning for the two TAC controllers on their bank, they were also busy dealing with prenotes (deciding whether they could take them – if at all) and taking phone calls for Overload (calls come through the east position primarily). In hindsight, as the east planner position they were probably

overloaded by traffic levels (across the 4 TAC positions) and telephone calls (including calls that required them to then transfer to other positions). The F15 flight were working TAC Right and had been given avoiding action to remain outside airway Y70, they then appeared to set up to general handle underneath Y70 for a short period of time. As the F15s transited north, his UT planner pointed out the tanker to the TAC Right telling him to keep them away. They were constantly engaged in other tasks, refusing traffic and monitoring any availability to accept further traffic, and monitoring what traffic levels Overload were working and whether they could take any more. The next he noticed was the TAC Right controller giving avoiding action to the F15s against the tanking traffic. At this point it was already too close and little could be done (he could not recall seeing the F15s respond to the avoiding action). The tanker immediately reported 'Airprox [Voyager C/S] Airprox, they were not Typhoons' shortly followed by 'They were 12 o'clock, very close, our height, we went through their wake turbulence'. Whilst still on console, the replacement TAC Right later asked the F15's if they were visual [with the Voyager], to which they responded 'yes, but later than I would have liked' they also confirmed they were not aware of the AARA8 traffic.

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

THE EAST TAC RIGHT CONTROLLER reports that he was in the East TAC Right control position with a Planner and TAC Left controller. Also handling East traffic were 2 Overload controllers with their own dedicated planner. The TAC Left controller was controlling the Voyager in AARA8 amongst numerous other tracks. As East TAC Right controller, he was controlling a 3-ship of F15s operating to the SE of Wittering, a single Typhoon north of Holbeach and the Airprox F15s looking to operate in the Wash. Prenoted was another pair of F15s, and a Tornado from Marham, which was eventually refused due to Swanwick working at capacity. Numerous conflictions (primary contacts and 7000 squawks) were operating in East Anglia which required lots of traffic information to be passed on a regular basis. The Airprox F15s initially climbed to FL190 on departure from Lakenheath and continued on a northbound track under a Traffic Service. A separate squawk was issued to both aircraft in order to operate independently, and they requested to operate in the block SFC to FL240. Once 10nm north of Marham, the F15s were identified and allocated their requested block. At this point his attention was also being divided between the Typhoon and 3-ship of F15s in order to give timely traffic calls. The Airprox F15s continued to maintain FL190 on a northerly heading towards Y70 airway; he called the controlled airspace to them at 5nm and told them to maintain clear, they acknowledged this information. After quickly checking on his other tracks, he returned to the Airprox F15s to see that they were now 2nm from Y70 so avoiding action was given to instruct them to descend and operate below Y70; they acknowledged and began a rapid descent. They were then observed to begin manoeuvring below Y70 to the east of SUPEL by 10nm and 5nm south of the southern edge of AARA8. At this point the 3-ship of F15s near Wittering had multiple conflicting tracks that needed to be called. The lead of the 3 F15s requested an update on one of the tracks so they could operate in clear air. He was then alerted by another controller that the Airprox F15s were now tracking north straight towards the Voyager and about to fly through AARA8. When he realised the impending confliction, he immediately gave avoiding action to the Airprox F15s to descend below FL140; they were observed passing through the Voyager's 12 o'clock as they passed through FL165 just as the TAC Left controller announced an Airprox had been declared by the Voyager. The Airprox F15s then turned right behind the tanker to track southbound. They were then instructed to operate below and to the south of Y70. In his error, he opined, the Airprox F15s were not informed about AARA8 activity and he incorrectly made the assumption that they would not operate any further north of Y70. He described the workload as high due to the very high traffic levels, with multiple distractions from landlines due to multiple prenotes.

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

Factual Background

The weather at Marham was recorded as follows:

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METAR EGYM 051350Z 29003KT 9999 VCSH FEW020TCU 06/03 Q1034 BLU NOSIG
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Analysis and Investigation

Military ATM

Portions of the relevant tape transcripts are reproduced below.

Swanwick East Tac Left controller and the Voyager:

From	To	Speech Transcription	Time	Remarks
Swanwick	Typhoon	[Typhoon 1 C/S] traffic right 1 o'clock 8 miles crossing right left ahead indicating FL135 climbing now FL140 pair of F15s	14:08:59	
Typhoon	Swanwick	[Typhoon 1 C/S] looking	14:09:15	
Typhoon	Swanwick	[Typhoon 1 C/S] is …	14:09:20	Transmission broken by interruption of Voyager C/S
Voyager	Swanwick	Swanwick [Voyager C/S] a pair of aircraft climbing through our area err we are they are two miles away left hand	14:09:23	
Swanwick	Voyager	[Voyager C/S] err we have just called them to [Typhoon 1 C/S] and we have just told them to avoid also	14:09:32	
Swanwick	Voyager	[Voyager C/S] those 2 aircraft have been given an avoiding action	14:09:46	
Voyager	Swanwick	Airprox [Voyager C/S] that is an Airprox, they were not Typhoons	14:09:52	
Typhoon	Swanwick	[Typhoon 1 C/S] tally one only	14:10:04	
Swanwick	Voyager	[Voyager C/S] roger that's copied err they have been told to avoid and are now leaving err the area	14:10:06	
Voyager	Swanwick	Swanwick from [Voyager C/S], its [Voyager C/S] ah we've had one aircraft pass through our 12 o'clock at very close range at our height and went through his wake turbulence	14:10:14	
Swanwick	Voyager	[Voyager C/S] Swanwick Mil that's copied	14:10:29	

Swanwick East Tac Right controller and the F15s:

From	To	Speech Transcription	Time	Remarks
F15 Flt	Swanwick	[F15 No 1 C/S] check, two, Swanwick [F15 No 1 C/S] two-ship levelling one-five-zero for the wash	14:02:03	
Swanwick	F15 Flt	[F15 C/S] Swanwick Mil identified, err, traffic service, say again level stop off	14:02:12	
F15 Flt	Swanwick	[F15 No 1 C/S] currently at five one-five-zero for traffic, err, we will be requesting general handle north half of the wash, surface to two-four-five.	14:02:17	
Swanwick	F15 Flt	[F15 C/S] roger you climb now flight level one-nine-zero, say again levels required	14:02:31	
F15 Flt	Swanwick	[F15 No 1 C/S] further climb one-nine-zero request surface to two-four-oh	14:02:35	
Swanwick	F15 Flt	[F15 C/S] roger do you require a separate squawk	14:02:44	
Swanwick	Typhoon	[Typhoon 1 C/S] traffic north four miles tracking south-east charlie-one-thirty descending through flight level one-six-zero	14:03:01	
Typhoon	Swanwick	Visual [Typhoon 1 C/S]	14:03:05	
Swanwick	F15 Flt	[F15 C/S] do you require separate squawk for number two	14:03:08	

From	To	Speech Transcription	Time	Remarks
F15 Flt	Swanwick	Swanwick affirm for [F15 C/S]	14:03:11	
Swanwick	F15 No2	[F15 No2 C/S] squawk six-zero-seven-six	14:03:14	
F15 No2	Swanwick	Six-zero-seven-six for [F15 No2 C/S]	14:03:18	
Swanwick	F15 No2	[F15 No2 C/S] identified traffic service request level passing	14:03:34	
F15 No2	Swanwick	[F15 No2 C/S] passing????	14:03:36	Possibly "one-eight-thousand"
Swanwick	F15 Flt	[F15 C/S] own navigation for your manoeuvring area, report, err, ready to manoeuvre	14:03:58	
F15 Flt	Swanwick	[F15 C/S] we are ready to manoeuvre at this time Sir, we'll call you two minutes prior to RTB	14:04:05	
Swanwick	F15 Flt	[F15 C/S] roger taking you own terrain clearance operate in the block surface to flight level two-four-zero	14:04:09	
F15 Flt	Swanwick	[F15 No 1 C/S] surface two-four-oh	14:04:14	
Swanwick	F15 Flt	[F15 C/S] controlled airspace twelve o'clock three miles base flight level one-seven-five confirm you're maintaining outside	14:05:17	
Typhoon Flt	Swanwick	Say again for [Typhoon Flt C/S]	14:05:27	
????	????	????	14:05:28	Possible acknowledgement from [F15 C/S]
Swanwick	Typhoon	[Typhoon Flt C/S] disregard call for Duster	14:05:30	
Swanwick	Typhoon	[F15 C/S] you are entering controlled airspace avoiding action descend immediately below flight level one-seven-five	14:05:43	
Swanwick	Typhoon	[Typhoon Flt C/S] traffic west six miles tracking west slow moving no height information believed to be light aircraft at low level	14:07:08	
Typhoon	Swanwick	[Typhoon Flt C/S]	14:07:16	
Swanwick	Marham	Swanwick Mil East tac right	14:07:52	Landline
Marham	Swanwick	Marham supervisor prenote [C/S]	14:07:53	Landline
Swanwick	Marham	Standby	14:07:56	Landline
Swanwick	Typhoon	[Typhoon Flt C/S] traffic north west 6 miles tracking south west indicating F90	14:07:57	
Typhoon	Swanwick	Confirm for [Typhoon Flt C/S]	14:08:04	
Swanwick	Typhoon	Affirm [Typhoon Flt C/S] traffic north west 4 miles tracking SW indicating FL90	14:08:06	
Typhoon	Swanwick	[Typhoon Flt C/S] searching	14:08:12	
Swanwick	Marham	What was the callsign again sorry	14:08:14	Landline
Marham	Swanwick	Err its [C/S]	14:08:16	Landline
Swanwick	Marham	[C/S] I've not got a strip yet standby where will they actually be going	14:08:17	Landline
Marham	Swanwick	Err Spadeadam FL180 for partial air test	14:08:20	Landline
Swanwick	Marham	[C/S] I'll see what sqk I can give you err	14:08:23	Landline
Typhoon	Swanwick	Swanwick negative contact can you let us know whether we are west of that traffic	14:08:31	
Swanwick	Typhoon	[Typhoon Flt C/S] affirm you have further traffic north west err 3 miles tracking north east primary contact err intermittent no height information believed to be light aircraft low level	14:08:36	
Typhoon	Swanwick	[Typhoon Flt C/S]	14:08:44	
Swanwick	Marham	Err ok trying to find a squawk we're very busy sorry	14:08:48	Landline
Marham	Swanwick	Ok	14:08:55	Landline
Swanwick	Marham	Ok squawk please 4657	14:09:02	Landline

From	To	Speech Transcription	Time	Remarks
Marham	Swanwick	4657	14:09:05	Landline
Swanwick	Marham	An err 2 3 3 decimal 7 2 5 initially it might change	14:09:06	Landline
Marham	Swanwick	2 3 3 decimal 7 2 roger	14:09:12	Landline
Swanwick	Marham	Thank you	14:09:13	Landline
Marham	Swanwick	Thanks Marham	14:09:14	Landline
Swanwick	F15 Flt	[F15 C/S] Swanwick Mil	14:09:17	
F15 Flt	Swanwick	Swanwick go for [F15 No 1 C/S]	14:09:20	
Swanwick	F15 Flt	[F15 C/S] be advised tow-line 8 is active, not operate above FL140 avoiding action descend immediately below FL140	14:09:22	
F15 Flt	Swanwick	[F15 No 1 C/S] below 140 and sir can we operate south of the wash	14:09:34	
Swanwick	F15 Flt	[F15 C/S] affirm tow-line 8 is active	14:09:41	
F15 Flt	Swanwick	[F15 No 1 C/S] we'll manoeuvre south of the wash at this time err same altitude	14:09:45	
Swanwick	F15 Flt	[F15 C/S] you can operate below Yankee 70 or to the south	14:10:57	
F15 Flt	Swanwick	[F15 No 1 C/S] we will operate both below Yankee 70 and south	14:11:03	

Figures 1 - 8 depict the positions of the Voyager and F15s at relevant times in the lead up to the Airprox and are based on the radar picture provided by the Cromer radar head.

At 14:04:09 (Figure 1), the pair of F15s was instructed to operate between the surface and FL240. There was no lateral restriction passed, though the pair had earlier requested to 'general handle north half of the wash'.

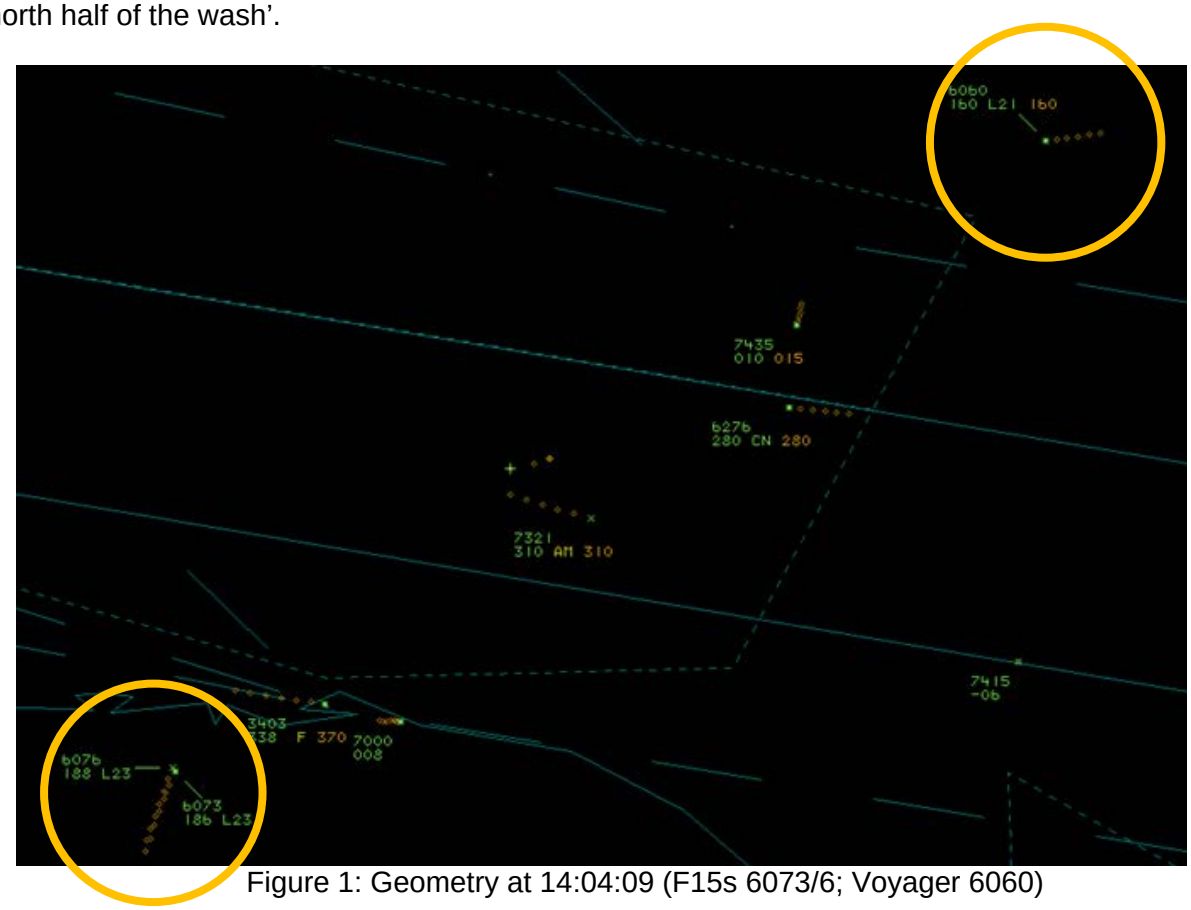

Figure 1: Geometry at 14:04:09 (F15s 6073/6; Voyager 6060)

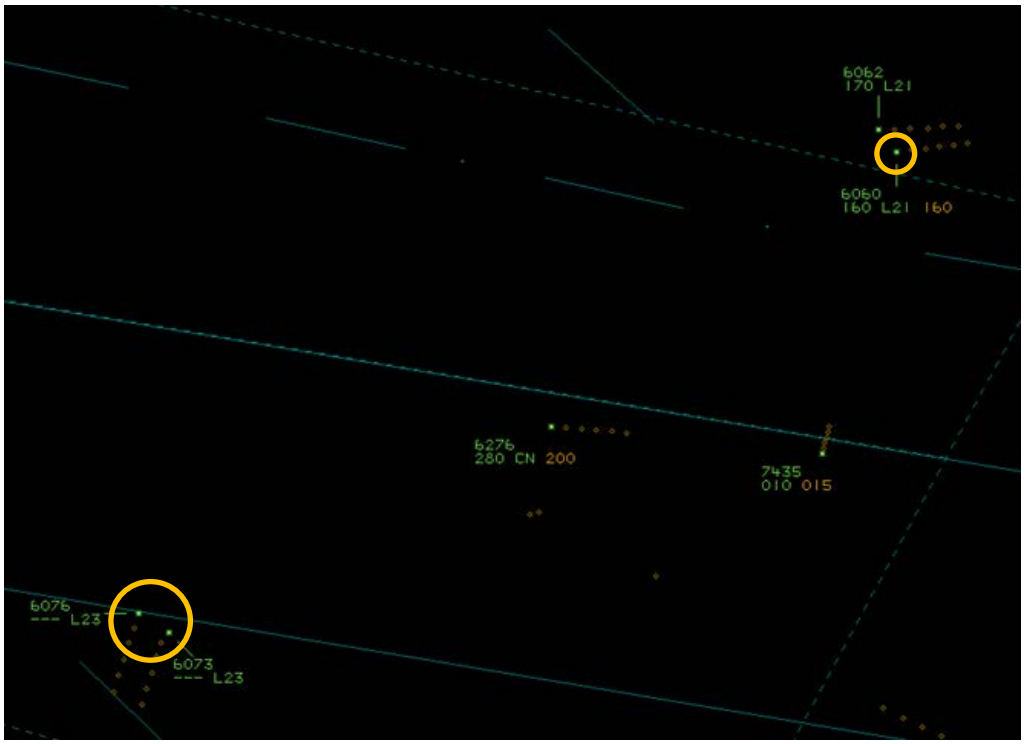

Figure 2: Geometry at 14:05:43 (F15s 6073/6; Voyager 6060)

At 14:05:43 (Figure 2), the Swanwick E Tac R controller gave the F15s avoiding action as they penetrated controlled airspace (CAS). They had already been advised, with 3nm to run, that they were to remain outside of CAS.

At 14:07:08 (Figure 3), the Swanwick E Tac R controller passed Traffic Information TI, to another formation of F15s under his control, operating in the western portion of East Anglia (squawking 6070-2 in Figure 3). Shortly afterwards, they answered a landline and began taking a prenote from Marham.

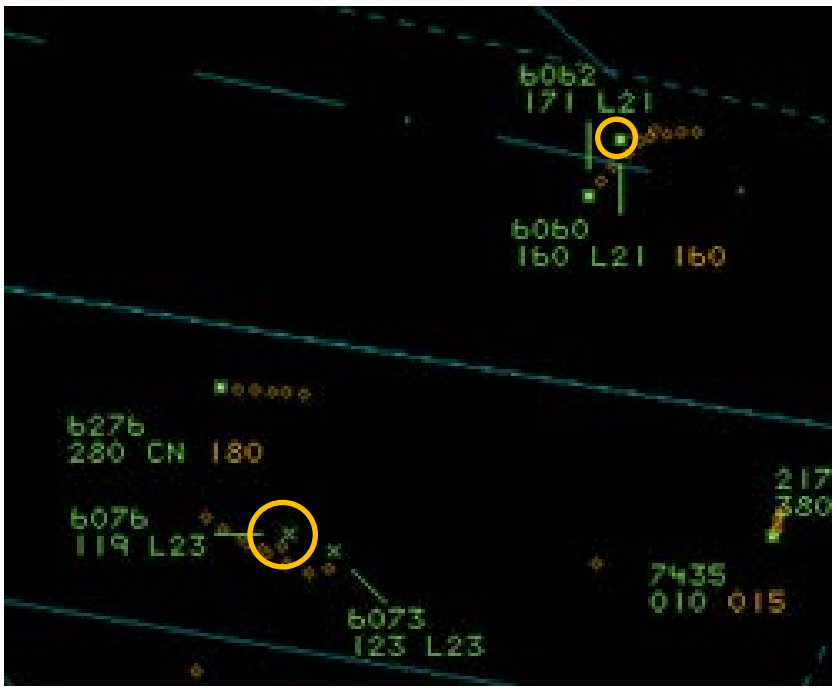

Figure 3: Geometry at 14:07:08 (F15s 6073/6; Voyager 6060)

Figure 4: Geometry at 14:07:57 (F15s 6073/6; Voyager 6060)

At 14:07:57 (Figure 4), the Swanwick E Tac R controller passed further TI to the formation of F15s operating in the western portion of East Anglia. The TI was repeated and then the prenote from Marham continued.

At 14:08:36 (Figure 5), the Swanwick E Tac R controller passed further TI to the formation of F15s operating in the western portion of East Anglia, then continued the prenote from Marham.

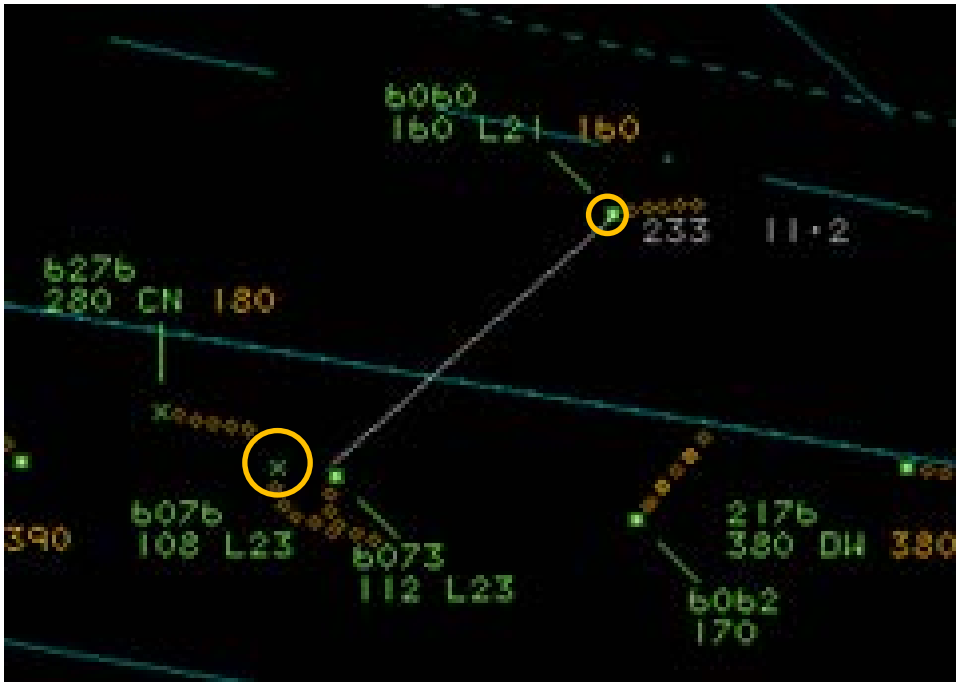

Figure 5: Geometry at 14:08:36 (F15s 6073/6; Voyager 6060)

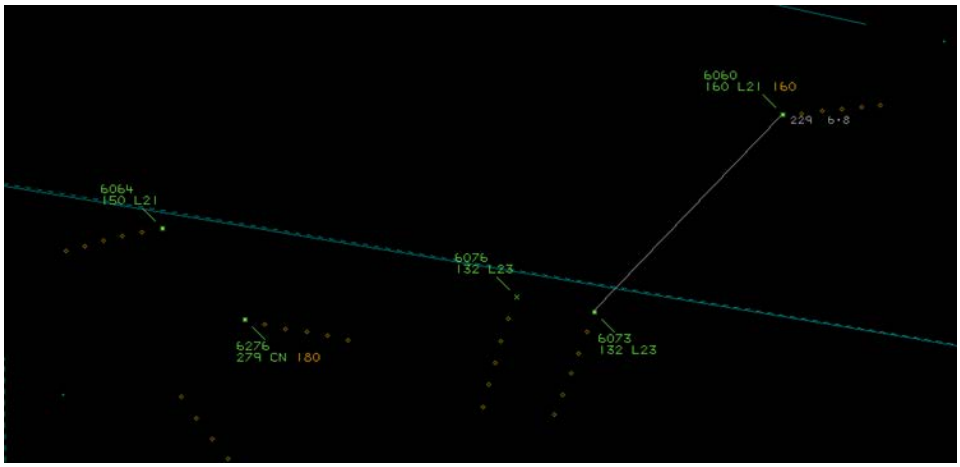

Figure 6: Geometry at 14:08:59(F15s 6073/6; Voyager 6060)

At 14:08:59 (Figure 6), the Swanwick E Tac L controller, who was controlling the Voyager, passed TI to a formation of Typhoons (squawking 6064 in Figure 6) on the general handing pair of F15s. No TI was passed to the Voyager on the same traffic.

At 14:09:22 (Figure 7), the F15s were advised, for the first time, by the Swanwick E Tac R controller, that AARA 8 was active. No specific TI was passed, but avoiding action to operate below FL140 was given. The F15s asked if they could work to the south of the Wash, and the controller iterated that AARA 8 was active. At the same time, the Voyager queried the F15 traffic with the Swanwick E Tac L controller, who responded that the traffic had been called to the Typhoons, and that the F15s had been told to avoid.

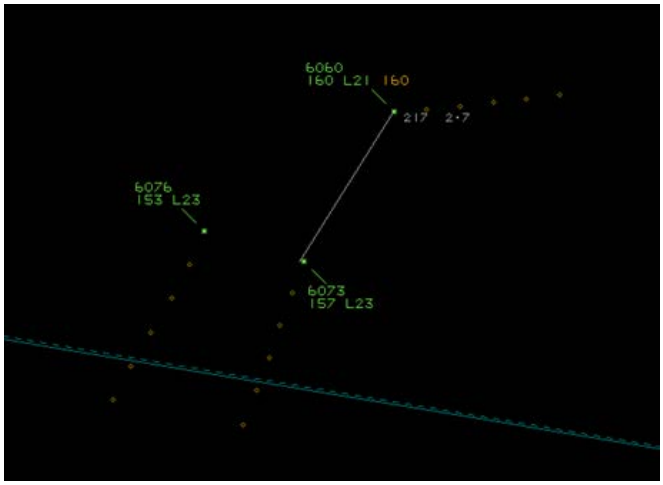

Figure 7: Geometry at 14:09:22

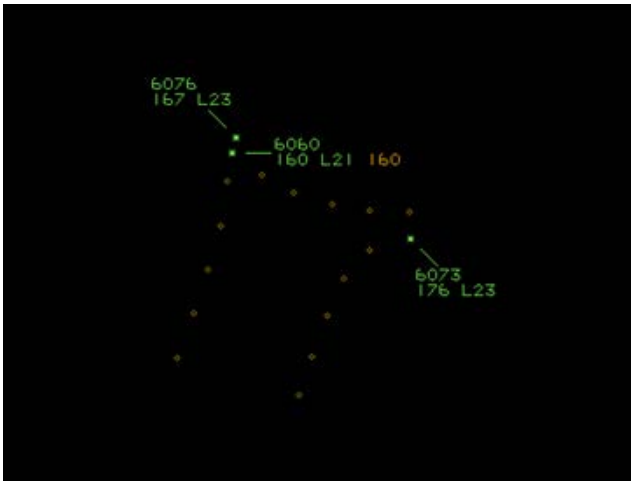

Figure 8: Geometry at 14:09:48
(F15s 6073/6; Voyager 6060)

At 14:09:48 (Figure 8), the second F15 and Voyager were at CPA, officially recorded as 0.2nm.

The Swanwick East Tac R controller was working a formation of F15s in the southwest of their Area of Responsibility (AoR), a Typhoon north of Holbeach and the general handling F15s in the Wash. There were also prenotes for another pair of F15s, and a Tornado transit out of Marham, the latter taken in the minutes preceding the incident, further adding to the controller's workload. Due to the high traffic density in their vicinity, the F15s operating to the southwest required regular updates of TI, which drew the controller's focus to this area of the screen.

When the pair of F15s involved in the Airprox gave their intentions, they stated that they desired to operate in 'the Wash' and 'the north half of the Wash' rather than the Wash Aerial Training Area

(ATA), which has defined parameters and can be displayed on the radar map. The Swanwick E Tac R controller did not clarify the location and was subsequently found not to be aware of the geographical location of the Wash ATA, therefore assumed that the F15s would remain to the south of AARA 8 and did not pass information on its activity.

The Swanwick E Tac L controller was under training and was controlling tanking in AARA 8, transits to and from the tanker, and also a demanding high-level transit, which meant that both the trainee and instructor were close to mental capacity. TI was passed to the Typhoon on the F15s; however, based on the heading and general handling profile of the F15s, it was anticipated that they would remain outside of the lateral parameters of AARA 8 and hence TI was not passed to the Voyager. The F15s' rapid, high-energy turn towards the Voyager gave insufficient time for the controller to pass TI or give avoiding action.

Both the Voyager and the general-handling F15s were under TS, but neither received TI on the other, which meant that the aircraft did not have appropriate Situational Awareness (SA) to plan their manoeuvres (i.e. the F15s to avoid AARA 8), nor to implement see and avoid in good time. Although the avoidance of other aircraft lay with the pilots, both controllers had the opportunity to pass information on general airspace activity as well as specific TI that would have enabled the pilots to do so more effectively.

UKAB Secretariat

The Voyager and F15 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[4]. If the incident geometry is considered as converging then the F15 pilot was required to give way to the Voyager[5].

Comments

HQ Air Command

This incident was subject to a very thorough investigation by RAF investigators, which uncovered 2 causes and several contributory factors, some of which go beyond the straightforward aircrew / controller interactions. Overall 15 recommendations were adopted and a few of the more pertinent ones are discussed below. The causal factors identified by the RAF investigation were that the controller did not effectively prevent the F15 from entering the airspace around the Voyager, and the fact that the F15s entered the active AARA unaware that it was active.

There are 14 Air to Air Refuelling Areas (AARA) in the UK and most are in Class G airspace; although not required, it is expected that military aircraft will either avoid these areas or at least coordinate activity within them with ATC. The in-use areas are promulgated by the Military Airspace Booking Co-ordination Cell (MABC) by email 24 hours in advance with a final update at 1700 on the day prior to the activity. The base of the F15s receives the email; however, it became apparent during the investigation that when checking AARA activity as part of their planning, the F15 pilots only had information available on their squadron about AARA activity which concerned USAF assets. This 'filtering' of information available to F15 pilots was identified and a recommendation made (which has been adopted) to prevent its repetition in the future.

The investigation also identified that there was confusion among several parties over the naming of certain airspace areas. When the F15s requested to operate in the 'Wash' and 'Northern half of the Wash' the controllers assumed that they were referring to the geographic Wash (which is south of Y70 airway and AARA8) rather than the Wash Aerial Tactics Area (ATA) which extends North of Y70 and overlaps AARA8. It was this misunderstanding that led to the Swanwick controller electing to answer a telephone call whilst controlling aircraft he believed would not require any deconfliction. Another recommendation from the investigation has been made (and

[4] SERA.3205 Proximity.
[5] SERA.3210 Right-of-way (c)(2) Converging.

adopted) to review airspace names to prevent confusion in the future. Recommendations were also made for Swanwick to review their console management with respect to telephone call management.

Although equipped with TCAS, the Voyager only operates in 'Traffic' mode during AAR activities to avoid spurious resolution activity from its receivers; however, the TCAS did successfully cue the Voyager to gain visual contact with the F15s and commence a turn. F15s are not fitted with TCAS, but the pilot did see the Voyager as he attempted to comply with the ATC instructions to descend below FL140.

Once the controller had been alerted to the potential conflict (by the planner) it took a few seconds to interpret what the F15s were actually doing and, exacerbated by the slow update of the radar, the F15s had already climbed above the Voyager when the instruction to descend below FL140 was received. It is ironic that it was during this descent that the actual Airprox occurred. This was corroborated by the fact that it was the only time during the sortie that the F15 pilot used his afterburner. Whilst the Voyager crew initially estimated CPA as 50m, they later accepted that because it was an F15 (which is larger than the Typhoons that they regularly see) it could have been slightly further away, but no more than 200m. It was certainly close enough to leave the crew considerably shaken; they cancelled their next refuelling serial and returned to base.

Whilst it is easy to focus on the actions of controllers and aircrew, the RAF investigation uncovered several other factors which, once addressed, will hopefully help prevent a similar occurrence in the future.

USAFE

The F15 Fighter Wing cooperated fully with the RAF Occurrence Safety Investigation(OSI) that was initiated very soon after the Airprox occurred. Of the 13 recommendations made by the OSI, 3 referred directly to F15 operations, viz, to review the dissemination pathway for current airspace activity, the review of standard flight plans to ensure their conformity with current airspace boundaries and reporting points and, lastly, that newly arrived USAF crews be given the opportunity to visit Swanwick in order to understand more clearly airspace issues and limitations encountered regularly by controllers. The first 2 recommendations have been acted upon and the resolution of the third is ongoing.

As covered in the body of this report, many factors contributed to this Airprox. While it is accepted that both the Voyager and the F15s were responsible for avoiding each other, neither received Traffic Information on the other and the controller's late attempt to resolve the confliction by vertical separation served only to exacerbate a situation which, ultimately, was resolved by the F15s.

Summary

An Airprox was reported when a Voyager and an F15 flew into proximity in AARA8/Wash ATA at 1409 on Thursday 5th January 2017. The Voyager pilot was operating under IFR in VMC and the F15 pilot was operating under VFR in VMC, the Voyager pilot in receipt of a Traffic Service from Swanwick Mil East TAC Left and the F15 pilot in receipt of a Traffic Service from Swanwick Mil East TAC Right. AARA8 is a designated area for refuelling operations, is coincident with much of the Wash ATA, but remains as Class G airspace.

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 their discussions by looking at the actions of the F15 pilots. The USAFE liaison advisor confirmed to the Board that, at the time, USAFE crews did not have information available to them pre-flight about refuelling activities that did not involve USAF aircraft. Instead, they relied on Swanwick to inform the crews, once airborne, of any activity that would affect their sortie. Members considered that the fact that the F15 crews had not been aware that AARA8 was active was seminal to the incident. As illustrated in Figure 9, given that most of Wash ATA(N) was coincident with AARA8, members were nonplussed that those planning to use either area would not actively check the status of the other before flight rather than relying on ATC to give them such information once airborne. The USAFE advisor confirmed that this, and other practices related to the Airprox, had now been changed as a result of the joint RAF/USAFE incident review, and the Board were heartened to hear this. The USAFE advisor went on to confirm that the F15s were operating in a block, as agreed with Swanwick, but that there appeared to have been a miscommunication as to where they wanted to operate. The F15 crews had informed Swanwick that they wished to operate 'in the northern half of the Wash', meaning 'Wash ATA(N)'. Members noted that the controller had interpreted this to mean that they were going to operate in the north of the geographical Wash area. Notwithstanding the fact that the F15 crews routinely use the Wash ATA and that 'shorthand' expressions for this area might have gained prevalence, members felt that their request should have been specific in using the correct terminology for their operating area. Some Board members opined that the F15 crew may have been new in theatre and not fully aware of the local airspace, the USAF liaison advisor said this was not the case. Other members with military experience went on to acknowledge that although the F15 is not fitted with TCAS, they are fitted with a state-of-the-art radar that should easily have detected the Voyager. Finally, the Board noted that the military investigation had identified that the F15 crew had said that the Voyager had appeared on their displays but that they had not seen it because they were flying visually at the time; they had also commented that they had not seen the Voyager during their initial climb through its level. With 4 crew members able to conduct lookout from the 2 F15 aircraft, military members opined that they should have been able to visually sight the Voyager, despite its grey camouflage scheme, as they climbed towards it. In both these respects, Board members wondered if the F15 crews had become task focused and whether this may have been the reason that they missed or discounted the Voyager both visually and on their radars.

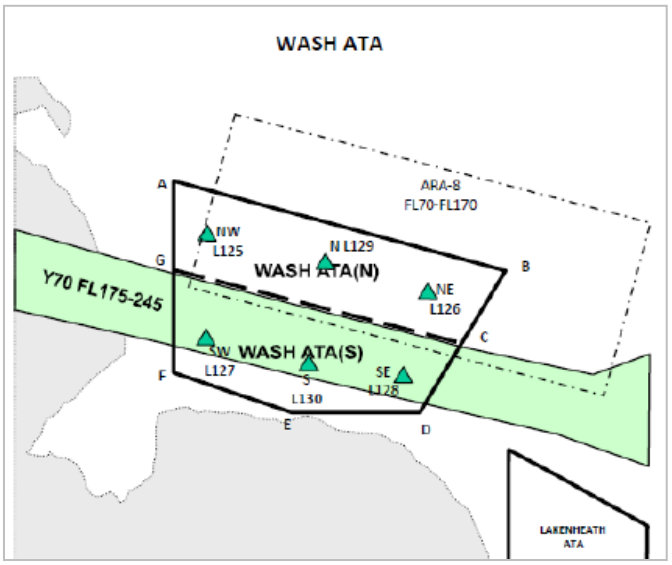

Figure 9: AARA8 and Wash ATA

For their part, the Board commented that the Voyager crew's report inferred that they were not expecting non-refuelling traffic to be in their 'allocated' operational area and flight levels. Whilst acknowledging the geographical delineation of AARAs for integration purposes, members stressed that the activity was being carried out in Class G airspace, and that aircraft were therefore entitled to fly through the towline on a see-and-avoid basis. Some members wondered whether, given the potential lack of manoeuvrability of tanker towline operations, there was a case for them being afforded more protection through segregation or formal NOTAM action. A military member from the HQ Air Command Safety Centre commented that after the incident there had been a discussion about refuelling areas being classified as segregated airspace. However, the risks associated with conducting operations of this nature in Class G airspace had been assessed as being acceptable based on the requirements of other, non-military, airspace users. He acknowledged that the Wash ATA and AARA8 are within overlapping areas but, given that both were under the control of Swanwick, this was not identified as a causal factor within the military incident investigation.

Turning to the ATC aspects, a Military Air Traffic Board member informed the Board that a number of points had been identified from the Military Occurrence Investigation. The F15s had begun by

carrying out a racetrack in the southern half of the Wash ATA, which lulled both the controllers into believing that they would remain south of AARA8. As a result, they were not expecting them to transit to the north of their position. Given the high workload that the ATCO controlling the F15s experienced, he was starting to work at maximum capacity and this manifested itself in reduced monitoring of the F15s operating in the Wash ATA as he concentrated on another pair of F15s operating in another area and a Typhoon. It also meant that he did not clarify the F15's operating area as being the Wash or the Wash ATA. The Board noted that the controller had commented that he was not aware of the location of the Wash ATA and so the F15 crew's description of wishing to operate in the northern Wash area was taken at face value. The military controller member confirmed that a Wash ATA map overlay is available to be displayed on the radar screen, but was reported in the military investigation as not being displayed on either the Tac Right or Left controllers radar screens; a number of recommendations including this had been introduced to prevent a reoccurrence. Controller members also noted that the Tac Right controller had answered a landline that was not his responsibility, and had became embroiled in a distracting and complicated prenote that served to further increase his workload and resulted in him focusing on an that task rather than on the F15s in the vicinity of AARA8.

The Board then summarised the overall actions of all the parties involved. They opined that the Voyager crew had appeared to have been operating under a false impression that they were protected whilst operating within the confines of AARA8, even though it is within the open FIR. Notwithstanding, the Board agreed that the Voyager's crew had had very few options for avoiding action due to manoeuvrability of his aircraft and the tracks of the F15, one passing in front and one behind; the Board concluded that his right-turn manoeuvre was probably the best he could achieve. Members were disappointed that the F15 crews' pre-flight planning did not include information regarding AARA8 activity, and that their ambiguous call did not provide Swanwick ATC with sufficient information to identify their planned operating area once airborne. However members agreed that this latter point was compounded by the controller accepting their intentions without properly clarifying the operating area; the operating area phraseology used by the F15 crew could have been questioned by the controller to clarify their intentions and therefore enable him to ensure they remained outside of AARA8. The Board agreed that, although well intentioned, it was unfortunate that when the Tac R controller passed the avoiding action descent to the F15 pilot this had actually resulted in reducing the separation between the aircraft. Probably as a result of the height information lag in the radar update rate (that was likely still displaying the F15s as below the level of the Voyager), and an instinctive reaction because he had not been sufficiently monitoring the F15s. In these circumstances, there can be a very fine line between leaving the aircraft to climb or descending it to increase separation. Finally, the lack of TI by Swanwick to either the F15 or the Voyager pilots meant that neither were alerted to the other's presence earlier, which hampered their gaining situational awareness on each other.

The Board then considered the cause and risk of the incident. Notwithstanding some controlling aspects, members quickly agreed that because the aircraft were operating in Class G airspace in a promulgated and active refuelling area, the fundamental cause of the incident had been that the F15 pilot had flown into conflict with the Voyager to which he was required to give way. There were also a number of contributory factors: the lack of timely TI from both controllers to the F15s and the Voyager; the Tac Right controller's distraction due to a high workload which resulted in him not sufficiently monitoring the F15s operating close to the Voyager; the F15 crews were not aware that AARA8 was active due to the system of pre-flight planning in place at the time; and that the ambiguous and unquestioned R/T call from the F15s regarding their planned operating area resulted in a misunderstanding between the F15 crews and ATC. Turning to the risk, members agreed that although the Voyager crew had been visual with the F15s and had turned away to avoid, the dynamic nature of the F15's flight path versus the relatively non-manoeuvrable Voyager had meant that it was unlikely that the Voyager pilot's actions had materially affected the outcome. Given also that the F15 pilot was unaware of the Voyager until virtually at CPA, members agreed that there had been a serious risk of collision where luck had played a major part; accordingly, the Board assessed the risk as Category A.

The Board were heartened that the military had conducted a thorough incident investigation in conjunction with USAFE, and that they had recommended changes and enhancements to the current systems to prevent a reoccurrence of this Airprox, including a review of the naming of the Wash ATA areas to avoid future confusion.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F15 pilot flew into conflict with the Voyager.

Contributory Factor(s): 1. The radar controllers did not issue timely Traffic Information.

2. The Tac Right controller's workload was such that he was distracted and did not sufficiently monitor the F15s.

3. The F15 crews were not aware that AARA8 was active.

4. Misunderstanding between the F15 crews and both controllers regarding the F15 planned operating area.

Degree of Risk: A.

Safety Barrier Assessment[6]:

The Board decided that the following key safety barriers were contributory in this Airprox:

ATC Strategic Management and Planning was considered to be **ineffective** because the controllers were working to capacity and there was no additional available manpower.

ATC Conflict Detection and Resolution was also considered to be **ineffective** because: the East TAC Left controller did not pass TI to the Voyager pilot on the F15's; the East TAC Right controller did not pass TI to the F15 pilot on the Voyager or that AARA8 was active; the East TAC Right controller did not question or confirm the F15's operating area; and the East TAC Right controller did not restricted the F15s operating block to below the Voyager's operating level.

Ground Based Safety Nets were not applicable because although the system is available at Swanwick, the military controllers do not have the capability to use this equipment due to the nature of military operations; unfortunately, in this incident this would have been an effective barrier as it would have alerted both controllers to the developing confliction.

Flight crew Pre-Flight planning was considered to be **partially effective** because although the F15 crews would have been aware of AARA8 they were only notified of refuelling activities that related to USAFE activities.

Flight Crew Compliance with ATC Instructions was considered to be **ineffective** because the F15 pilot did not use standard R/T for the Wash ATA and flew into a promulgated and active military refuelling area. Whilst not required to remain outside of these areas, it is accepted that military aircraft will either avoid them or positively coordinate with the controlling ATC authority before entering.

Flight Crew Situational Awareness was considered to be **partially effective** because neither pilot was given TI on the other aircraft and therefore their situational awareness was reduced.

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

Onboard Warning/Collision Avoidance Equipment was also considered to be **partially effective** because the Voyager was operating in TA mode only (for understood operational reasons) and the F15s had not assimilated the Voyager on their radar system.

See and Avoid was considered to be **ineffective** because although the Voyager pilot saw the F15 before CPA, his endeavours to increase the separation were likely to have had minimal effect; and the F15 crew did not see the Voyager until after CPA.