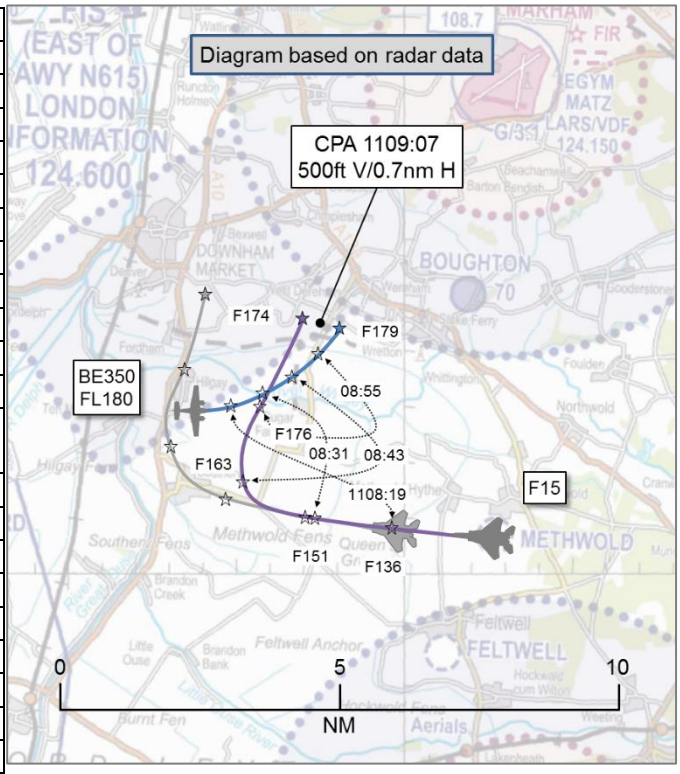
AIRPROX REPORT No 2017263

Date: 06 Nov 2017 Time: 1109Z Position: 5234N 00027E Location: 5nm W Marham

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	B350	F15
Operator	HQ Air (Ops)	Foreign Mil
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Traffic
Provider	Swanwick Mil	Swanwick Mil
Altitude/FL	FL179	FL174
Transponder	A,C,S	A,C,S
Reported		
Colours	Grey	Dark grey
Lighting	Strobe, nav, beacon	Anti-coll, beacons
Conditions	VMC	VMC
Visibility	30km	8km
Altitude/FL	FL180	FL175
Heading	350°	045°
Speed	140kt	350kt
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
Separation		
Reported	<300ft V/<0.5nm H	500ft V/1-2nm H
Recorded	500ft V/0.7nm H from 2nd F15	



THE BEECH 350 PILOT reports that whilst operating in the Marham area for over 2hrs in a 3nm holding pattern at FL180 under the control of Swanwick Mil on VHF, they were requested to re-contact Swanwick on UHF following a controller change. Simultaneously, a pair of F15s that had launched from Lakenheath were observed co-altitude in front of them (as they were turning through a Northerly heading). The F15s then turned and descended approximately 5000ft beneath them before coming back around behind with a high climb-rate causing a TCAS TA quickly followed by a TCAS RA demanding a descent. He recollected that he informed Swanwick Mil on VHF "TCAS RA, standby" whilst the Pilot Handling followed the RA, and reported on a northwest heading. Once clear of conflict, they levelled at FL175 and sighted the F15s to their left, the lead wings-level similar altitude and the wingman left-wing down, still climbing above them, turning to follow the lead. They were advised that the F15s were aware of their position and were holding at FL170 and FL175. He acknowledged and replied they had a contact within 300ft and inside 0.5nm. They then opted to return to the Lincolnshire area to avoid congested airspace. When he reported the RA, the controller sounded pressured and advised him that the F15s were maintaining their cleared levels of FL170 and FL175. With them being at FL180 and not hearing any of the communications from the F15 pilots (all second-hand passed by ATC), they were not aware of the reduced separation of only 500ft.

He assessed the risk of collision as 'Medium'.

THE F15 PILOTS report that they were in a climb whilst General Handling. They picked up initial radar hits at about 10nm, but had no heading information. They then received an initial traffic call stating that the B350 was tracking west so they adjusted heading to roughly 045°. Shortly afterwards, they received another call that the B350 was actually tracking east. They immediately levelled at FL175 and visually acquired the B350. They passed in front of the B350 by about 2nm, with 500ft vertical separation.

He assessed the risk of collision as 'None'.

THE SWANWICK MIL EAST PLANNER CONTROLLER reports operating with a Tactical (Tac) Left and Tac Right in position. The Tac Left was controlling 2 Typhoons, the 2 F15s and the B350, all manoeuvring within East Anglia. The Tac Right was controlling 3 Typhoons transiting from Coningsby to 323D. As the East Planner, he was managing a busy period of flying activity and, minutes before, he had overseen the split of the East and North East Sectors. The B350 pilot was operating at FL180 in the vicinity of Marham and was being controlled on the East VHF ICF by the East Tac Left controller. He requested the East Tac Left controller ask the B350 crew if they could accept UHF so that all the air systems General Handling in East Anglia could operate on the same frequency for situational awareness. This would also allow the East Tac Right controller to take back the VHF ICF, as it is not good practice for controllers to monitor the ICF whilst controlling air systems General Handling on discrete frequencies. Once the B350 pilot had confirmed that they could accept UHF, and shortly after the East Tac Left controller had passed the UHF frequency to them, the 2 F15 pilots started to turn and climb towards the B350. He immediately instructed the East Tac Left controller to pass Traffic Information to the F15 flight. The Traffic Information that was passed was inaccurate; the East Tac Left controller called the B350 as west of the F15's position when in fact it was to the east/north-east of them. Shortly afterwards the B350 pilot came back onto the East VHF ICF declaring a TCAS RA. Once they were clear of confliction, the B350 crew started a climb back up to FL180 and transferred to UHF. Because a change in frequency was in progress, Traffic Information on the F15s was not passed to the B350 pilot. Following the TCAS RA, the F15s continued to fly in close proximity to the B350 declaring that they were visual when Traffic Information was passed. The B350 pilot elected to recover to RAF Waddington shortly after the TCAS RA had occurred.

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

THE SWANWICK MIL TAC LEFT CONTROLLER reports that they were controlling the B350 pilot maintaining FL180 on a Traffic Service operating around East Anglia, and also a pair of Typhoons operating around Lincolnshire area at 19000-20000ft. She then also took control of the pair of F15s. They requested to carry out General Handling so they were given separate squawks, the lowest Regional Pressure Setting (RPS) and the levels they wished to operate. The controller recalled that continuous Traffic Information was issued to both the F15 and B350 pilots. On this occasion the F15 pilots started tracking west, and the B350 was again called to the F15 pilots giving its position, its Flight Level, the way it was tracking and the type of aircraft. The reciprocal was issued to the B350 pilot, calling the F15s to him. When the B350 pilot called a TCAS RA, he stated that he had one F15 fly right ahead of him. It was an awkward situation, despite both pilots receiving a Traffic Service, they were responsible for their own separation.

The controller perceived the severity of the incident as 'High'.

THE SWANWICK MIL SUPERVISOR reports that he did not witness the incident and was made aware by the East Planner shortly after it happened. Once manning and traffic allowed, he relieved the Tac and Planner from console and obtained debriefs from both individuals. There appeared to be a slight conflict in the debriefs so he arranged for a radar replay to be viewed by the Bank LEO/FSO.

Factual Background

The weather at Marham was recorded as follows:

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METAR EGYM 061050Z 17005KT 2500 HZ SKC 05/03 Q1025 YL01 BECMG 4000 HZ GRN=
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Analysis and Investigation

Military ATM

An Airprox occurred on 6 November 2017 at approximately 1109hrs, 5nm west of RAF Marham, between a B350 on task in East Anglia and a pair of F15s conducting General Handling. All pilots involved were receiving a Traffic Service from the same Swanwick Mil East Tac Controller.

At 1106:48 (Figure 1), having split the pair into separate elements for General Handling, the controller instructed the F15 pilots to operate in the block 6000-24000ft (RPS 29.97 inches = 1015hPa). The F15 pilots were operating on UHF and the B350 pilot was operating on VHF with the same controller.

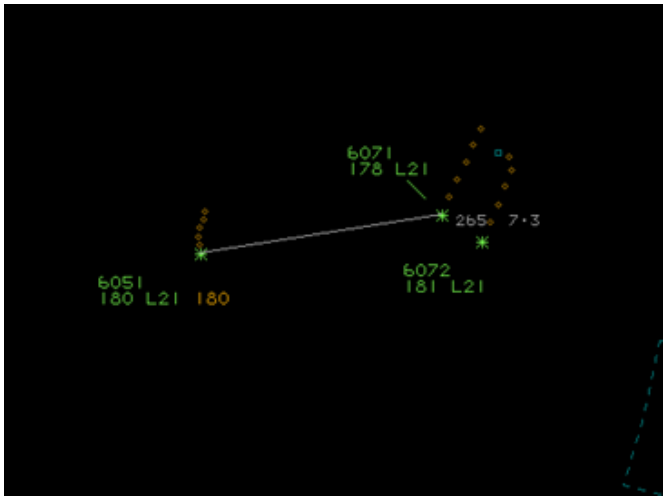


Figure 1: Geometry at 1106:48

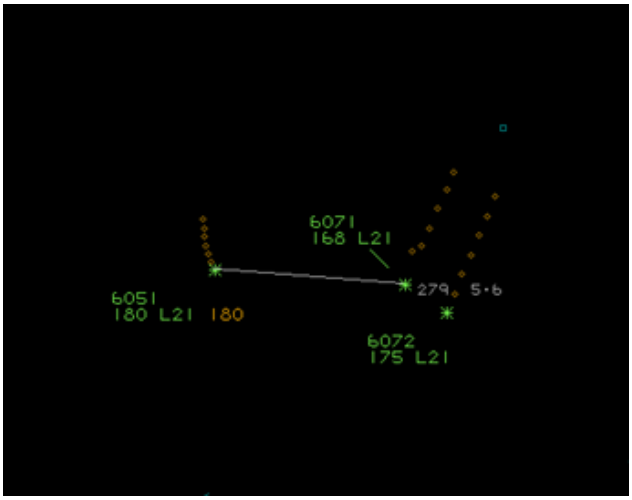


Figure 2: Geometry at 1107:07.
[6051-B350; 6071/6072-F15s.]

At 1107:07 (Figure 2), the controller first passed Traffic Information to the F15 pilots on the B350, describing its position as *"west, 5nm, tracking south east, currently at FL180"*. The lead F15 pilot acknowledged the Traffic Information but did not report visual with the traffic.

At 1107:17 (Figure 3), the controller passed Traffic Information to the B350 pilot on the F15s as *"east, 5nm, tracking south west, currently at FL170, in the block 6000 to 24000ft, pair of F15s".* The B350 pilot acknowledged the Traffic Information but did not report visual with the traffic.

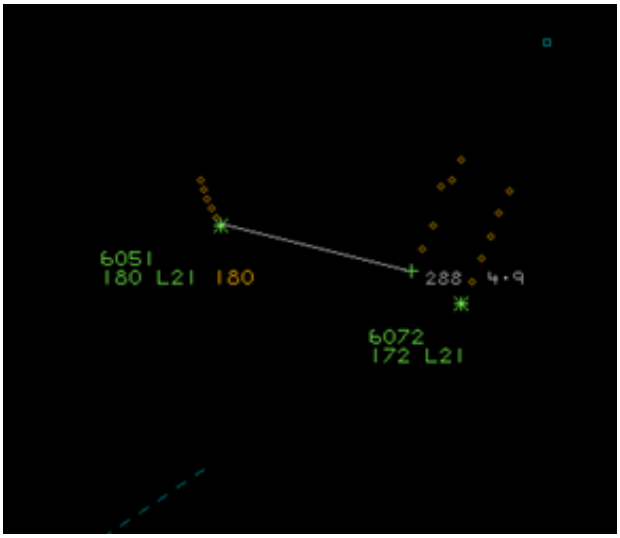


Figure 3: Geometry at 1107:17.

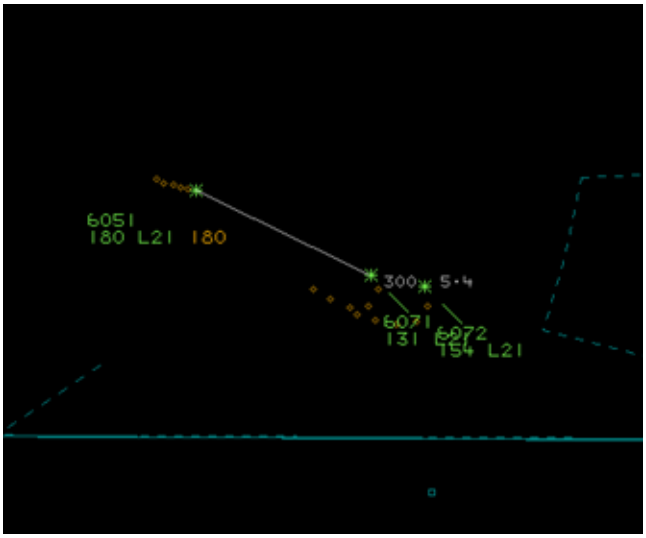


Figure 4: Geometry at 1108:01.

At 1108:01 (Figure 4), the controller asked the B350 pilot, who was still operating on VHF, if he could accept a UHF frequency. The pilot asked the controller to standby and then responded that he could accept UHF.

At 1108:40 (Figure 5), the controller instructed the B350 pilot to change frequency from VHF to UHF.

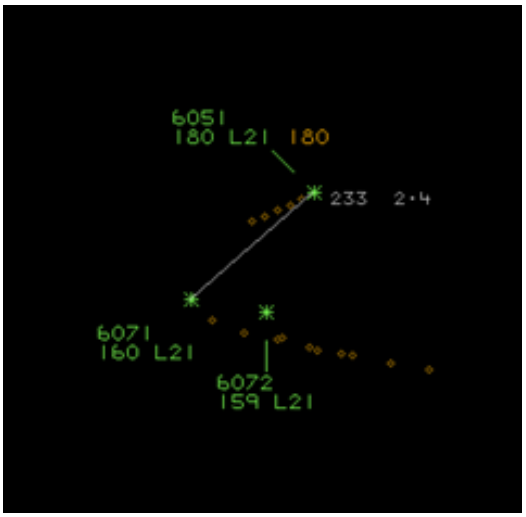


Figure 5: Geometry at 1108:40.

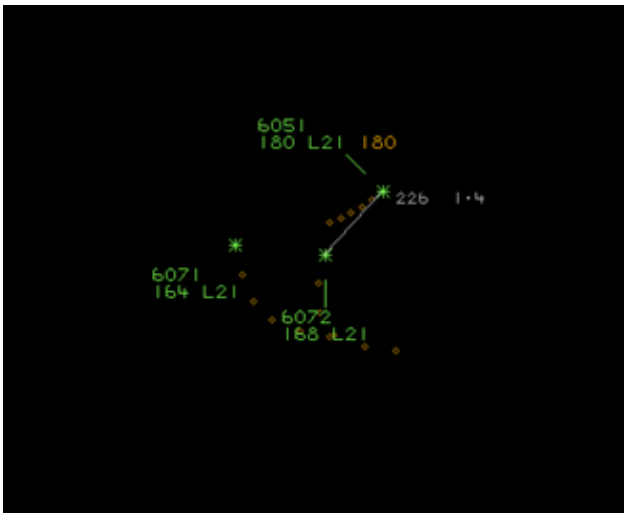


Figure 6: Geometry at 1108:50.

At 1108:50 (Figure 6), the controller passed Traffic Information to the F15 pilots as *"west, 3nm, tracking north east at FL180, Beech 350".* The lead F15 pilot responded that he was searching. At the time, the B350 was actually to the north-east of the F15s, not west as described.

At 1109:06 (Figure 7), the B350 pilot transmitted on UHF that he had just had a TCAS RA. At that time there was approximately 0.7nm horizontal and 500ft vertical separation between the B350 and the second F15.

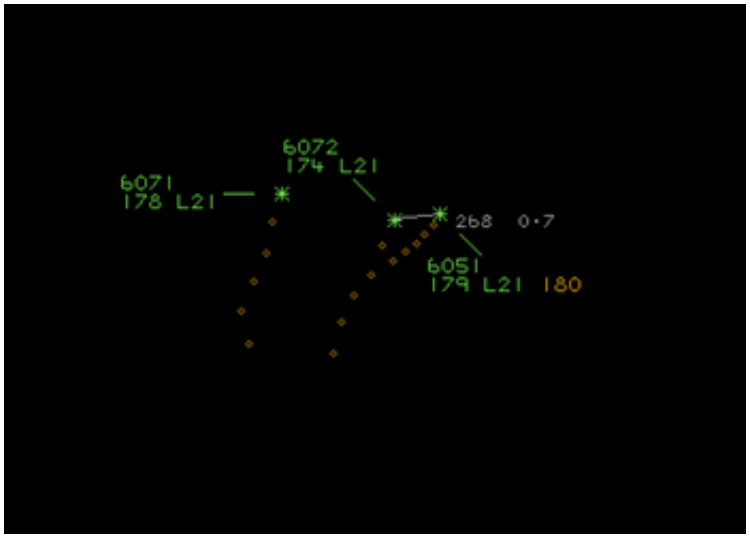


Figure 7: Geometry at 1109:06.

The Tac Left controller was working the B350 pilot and a pair of Typhoon pilots on VHF ICF and the pair of F15 pilots on UHF. Due to it being a busy period of flying activity, there was also a Planner in situ, assisting the two East Tac controllers. The Planner had requested that the Tac Left controller ask the B350 pilot if he could accept UHF, which would put all pilots operating in East Anglia on the same frequency, improving their situational awareness. He also intended to reallocate the VHF ICF to the Tac Right controller, allowing the Tac Left controller to concentrate on the UHF speaking units.

When the F15 pair split for General Handing at a range of 7.3nm from the B350, the East Tac Left controller instructed the pair to operate in the block 6000-24000ft (RPS). The split had been protracted due to the process of identifying and verifying Mode C of the second F15, as well as

passing Traffic Information on the General Handling Typhoons. The controller then passed Traffic Information to both the F15 and B350 pilots on each other, meeting the requirements of a Traffic Service.

The East Tac Left controller then passed Traffic Information to the Typhoon pilots, before asking the B350 pilot if he could accept a UHF frequency. The pilot asked the controller to standby and then responded that he could accept UHF. At this time, the F15 pilots had conducted a tight turn and descent, but were tracking back towards the B350. With 5.4nm lateral separation and no altitude restriction on the F15s, it would have been reasonable to expect the controller to update the Traffic Information passed previously to the F15 and B350 pilots. Instead, the controller instructed the B350 pilot to change to UHF.

Moments later, when the F15 pilots turned and climbed towards the B350, the controller did update the Traffic Information to the F15 pilots, but it was inaccurate, describing the position of the B350 as west rather than north-east of the F15s. The lead F15 pilot responded that he was searching for traffic, and the radar replays see the F15s adjust course to a more north-easterly track, which took the second F15 to within approximately 0.7nm, and 500ft of the B350 when the B350 pilot declared that he had received a TCAS RA.

Although the Planner had requested that the East Tac Left controller move the B350 pilot from VHF to UHF, it was the controller's decision to do so at a time when Traffic Information should have been updated. The inaccuracy of the late Traffic Information is also likely to have compounded the problem as the F15 pilots manoeuvred north-east, inadvertently towards the B350, while thinking the conflicting traffic was to their west. When operating in Class G airspace under a Traffic Service there is no requirement for the controller to separate aircraft, because responsibility for separation remains with the pilots, but it would have been sensible to ask the F15 pilots if they could accept a restricted operating block or move away from the B350's operating area.

After an investigation at RAF(U) Swanwick, the incident has been used as an example of both the importance of prioritising timely Traffic Information and effecting tactical airspace management.

UKAB Secretariat

The B350 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[1]. If the incident geometry is considered as converging then the F15 pilot was required to give way to the B350[2]. If the incident geometry is considered as overtaking then the B350 pilot had right of way and the F15 pilot was required to keep out of the way of the other aircraft by altering course to the right[3].

Comments

HQ Air Command

At the time of this incident it is clear that the Air Traffic Controllers involved were extremely busy. The Airprox appears to hinge around the timing of the requested frequency change for the B350 and the inaccurate Traffic Information passed to the F15 pilots at a crucial time. Initial Traffic Information on the B350 passed to the F15 pilots was accurate; however, the Traffic Information passed 1¾ mins later on the same aircraft (during which time the F15 pilots had conducted several evolutions) was inaccurate in azimuth and led to the F15 pilots actually turning towards the B350 in order to effect separation on an aircraft that they could not see. When workload is high, the ideal moment at which to execute tasks may not be available and so it is often a question of judgement as to when to complete those tasks. From the radar screenshots, it appears that at the time the controller took the decision to request the B350 to change frequency, the contacts were actually

[1] SERA.3205 Proximity.
[2] SERA.3210 Right-of-way (c)(2) Converging.
[3] SERA.3210 Right-of-way (c)(3) Overtaking.

diverging; it was the subsequent passage of incorrect Traffic Information that then led to the F15 pilots turning towards the B350 and separation being eroded. There was little the B350 pilot could do at this point as he was in the process of changing to the same frequency that the F15s were using and so could not have known that the Traffic Information was incorrect (he had positional SA on the F15s from his TCAS) and by the time the closure of the F15s was recognised, he received a TA followed by an RA (which he was obliged to follow). It is worthy of note that the B350 pilot reports a '…reduced separation of 500ft.' against the F15s; under a Traffic Service controllers do not provide separation between aircraft, this remains the pilot's responsibility. The ATC unit involved in this Airprox conducted an investigation into the incident and the findings and recommendations have been widely publicised within that community. The main lesson for crews is that controllers are also human and therefore fallible. On-board sensors, when available, should be used to supplement/confirm the traffic calls from ATC and, if something does not add up, question it.

USAFE-UK

USAFE-UK commented that a busy controller passed inaccurate Traffic Information, to the tune of 180^0, to the F15 pair which not only caused them to scan in the wrong direction but to continue their right turn away from the supposed confliction and into actual conflict with the B350. In at least 2 places in this report we are reminded that pilots receiving a Traffic Service are responsible for their own separation; in this case, however, no Traffic Information would have been preferable to that which was inaccurate.'

Summary

An Airprox was reported when a B350 and 2 F15s flew into proximity at 1109hrs on Monday 6th November 2017. Both pilots were operating under VFR in VMC, in receipt of a Traffic Service from Swanwick Mil.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board was first briefed by the USAFE-UK advisor about the operation of the two F15s. The pilots were conducting general handling in East Anglia under VFR, in receipt of a Traffic Service from Swanwick Mil. They had been cleared to operate in a block from 6000-24000ft. The Board then noted that the B350 pilot, under VFR, had reported being in the Marham area for a period of over two hours in a 3nm holding pattern at FL180, and had also been in receipt of a Traffic Service from Swanwick Mil. When the controller cleared the F15 pilots to operate from 6000-24000ft they were manoeuvring about 7nm east of the B350 at FL180. At the time, the B350 was in a left turn maintaining FL180. Some Board members wondered why the fast-jet aircraft had been cleared to operate in the area in a block which included the level of the less manoeuvrable B350. However, military controller members commented that pilots in receipt of a Traffic Service under VFR are not required to be separated, the pilots carrying out their own avoidance based on the Traffic Information received; if they required separation they would have had to request a Deconfliction Service.

The Board then discussed the actions of the controllers involved. It was noted that the same controller (Tac Left), was providing a Traffic Service to both the B350 and F15 pilots. The B350 pilot was operating on a VHF frequency and the F15 pilots on UHF. The controller was also providing a Traffic Service to a flight of two Typhoons in the Lincolnshire area between 19000-20000ft, also on UHF. Military Controller members commented that it was not unusual for traffic to be on different frequencies talking to the same controller; however, the Board considered that it was a contributory factor to the Airprox that the F15s and the B350 were on different frequencies because it had prevented the pilots from gaining Situational Awareness from hearing the respective transmissions from each other. The F15 pilots were issued with Traffic Information on the B350 when it was 5nm away, tracking south east at FL180, which was acknowledged by the lead pilot. The Board considered that because the controller was fully aware that the B350 pilot was operating in a 3nm holding pattern, thereby continually changing

headings, it would have been appropriate to have included this information to the F15 pilots. The fact that the Traffic Information to the F15 pilots was not explicit regarding the B350 orbit was also considered to be a contributory factor to the Airprox. For his part, the B350 pilot was then issued with Traffic Information about the F15s to the east, currently at FL170 tracking south west, operating in the block from 6000-24000ft, which was also acknowledged by the pilot.

At about this time, the East Planner requested the Tac Left controller to ask the B350 pilot whether he could accept a UHF frequency. He considered that being on the same frequency would assist the situational awareness of the pilots because they would be able to hear the transmissions made to the other pilots; it would also help to reduce the controller's workload if they were operating on the same frequency. The Tac Left controller's workload was considered to be high at the time and, in the Board's opinion, this was a further contributory factor to the Airprox. The Board wondered why the B350 pilot had been instructed in the first place to operate on VHF and not UHF whilst carrying out his flight. A military controller member with current experience at Swanwick commented that the B350's operating airfield had reported that there had been problems with UHF communications with B350 aircraft, and that the standard procedure was for them to request VHF frequencies with Swanwick. However, a military HQ Air member responded that he had asked other B350 pilots about this, and they opined that there were no problems with B350 UHF communications; they thought that it was Swanwick which was asking them to use VHF. It appeared to the Board that there was a disconnect between the B350 operators and Swanwick about who was requesting what, and that this had led to the B350s being allocated VHF frequencies when it might not have been necessary. Notwithstanding, when asked to change to UHF, the B350 pilot only confirmed that this would be possible some 26secs later, which seemed to indicate that the pilots may have been discussing UHF issues before responding. Members noted that the controller had instructed the B350 pilot to change frequency from VHF to UHF at the time the F15s were turning towards the B350 at a range of about 2.4nm. Because the aircraft were in close proximity the Board considered that it had been inappropriate for the controller to request a frequency change before updating the Traffic Information. The fact that the B350 pilot was asked to change frequency just before CPA and before Traffic Information was updated was considered to be a contributory factor to the Airprox.

Turning to the F15 pilots, members noted that Traffic Information about the B350 had been updated to them but the controller had reported that it was west, 3nm, tracking northeast at FL180. At the time, the B350 was northeast of the F15s, not west as described. It was not known why the controller had made the error but it was likely a result of their high workload. The Board then discussed what effect this inaccurate Traffic Information had had on the incident. At first it was thought that the pilot of the closest F15 to the B350 might have altered course to the northeast in the belief that he was routing away from the B350 to his west as just called. However, the recordings showed that he had already made a turn onto a north-easterly track before the erroneous Traffic Information had been given, and that he had been given and acknowledged Traffic Information about 2mins prior to this that the B350 was to their west by 5nm tracking southeast. Members thought it was not unreasonable therefore to expect the F15 pilots to have assimilated that the B350 would be in proximity before they turned to the northeast, and that their turn would likely exacerbate any conflict. The unfortunately erroneous Traffic Information had therefore probably only reinforced their incorrect mental model as to the B350s location and, whilst turning, had concentrated the F15 pilots' look-out to their left meaning that they only saw the B350 at a relatively late stage.

After much discussion, the Board ultimately agreed that the cause of the Airprox was that the F15 pilots had inadvertently flown into conflict with the B350 having not fully assimilated earlier Traffic Information; their being given erroneous Traffic Information in azimuth just prior to CPA, was considered to be only a contributory factor because they had already started their turn towards the B350 before this call had been made. The Board then turned its attention to the risk and noted that, although the B350 and the second F15 had passed close to each other horizontally, they had been separated by 500ft vertically at the time; although the final Traffic Information had been erroneous in azimuth, the Board noted that it had been correct in altitude and that this had caused the F15 pilots to level at FL175, below the B350. For his part, the B350 pilot had received a TCAS TA followed, shortly afterwards, by an RA demanding descent; however, he had only just commenced descent at CPA, and the Board was not convinced that this had materially increased separation due to the dynamics of the encounter. Nevertheless, the

Board considered that although safety had been degraded, the deliberate level-off and height separation achieved by the F15 pilots had prevented a risk of a collision and had assisted in subsequent visual contact before CPA; they therefore assessed the Airprox as risk Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The F15 pilots inadvertently flew into conflict with the B350 having not fully assimilated earlier Traffic Information.

Contributory Factors:

1. The F15s and the B350 were on different frequencies.
2. The B350 pilot was asked to change frequency just before CPA and before Traffic Information was updated.
3. Tac controller workload was high.
4. Traffic Information to the F15s was not explicit regarding the B350 orbit.
5. F15s were given erroneous Traffic Information in azimuth just prior to CPA.

Degree of Risk: C.

Safety Barrier Assessment[4]

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

ANSP:

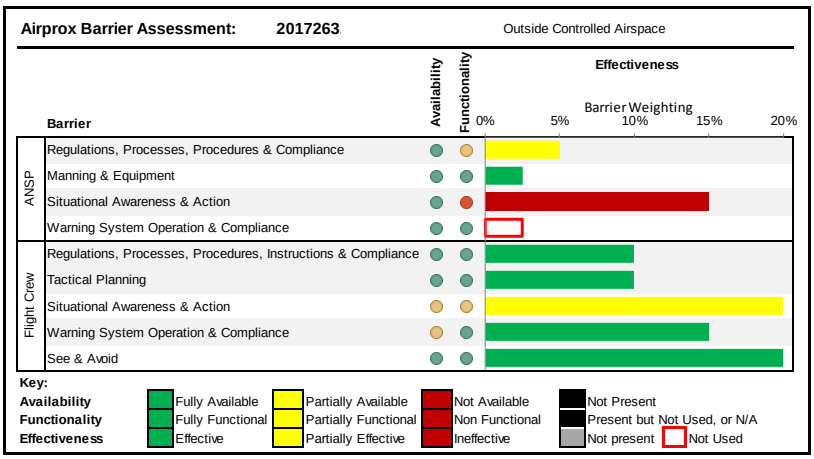
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Swanwick Tac Left controller inadvisably instructed the B350 pilot to change frequency when in close proximity to the F15s and before Traffic Information was updated.

Situational Awareness and Action were assessed as **ineffective** because the Tac Left controller passed erroneous Traffic Information to the F15 pilots.

Flight Crew:

Situational Awareness and Action were assessed as **partially effective** because of the incorrect azimuth Traffic Information issued to the F15 pilots.

Warning System Operation and Compliance were assessed as **partially available** because only the B350 was equipped with an electronic warning system.



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