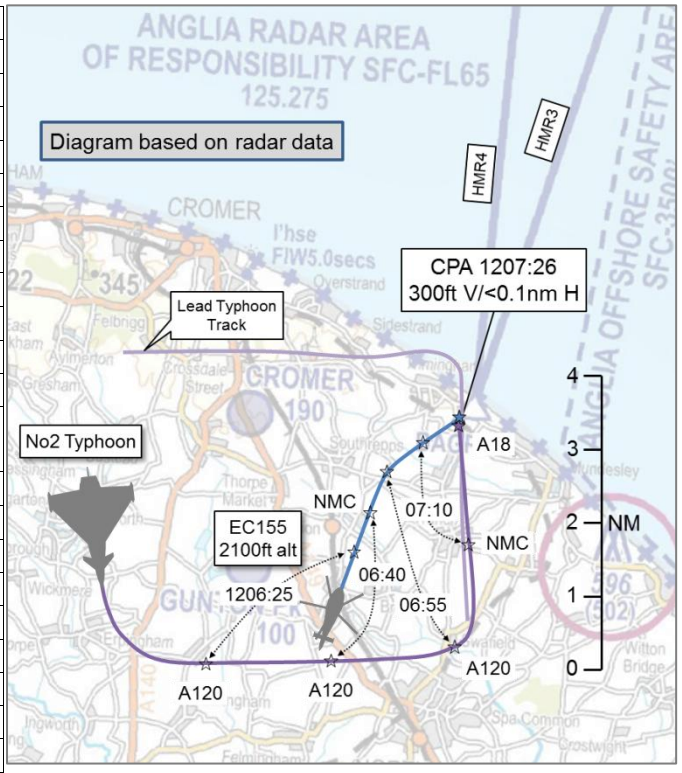
AIRPROX REPORT No 2015064

Date: 13 May 2015 Time: 1206Z Position: 5253N 00012E Location: 10nm N Norwich

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	EC155	Typhoon FGR4
Operator	Civ Comm	HQ Air (Ops)
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	VFR
Service	Traffic	Traffic
Provider	Norwich	Swanwick Mil
Altitude/FL	FL19	
Transponder	A/C	A/C
Reported		
Colours	Blue, red, white	Grey
Lighting	HISL, navigation, landing	Navigation, HISLs (white)
Conditions	VMC	VMC
Visibility	>10km	20km
Altitude/FL	~2000ft	2000ft
Altimeter	QNH (1015hPa)	RPS (1014hPa)
Heading	019°	°
Speed	150kt	400kt
ACAS/TAS	TCAS I	Not fitted
Alert	Unknown	N/A
Separation		
Reported	200ft V/0m H	200ft V/0m H
Recorded	300ft V/<0.1nm H	



THE EUROCOPTER EC155 PILOT reports that he was in the cruise at approximately 2000ft at 145kt IAS when Norwich informed them that a pair of military fast-jets were manoeuvring in their 3 o'clock at FL100 and had been observed operating down to ground level. As this information was being passed the first of the pair of Typhoons came through their 12 o'clock at 2000ft at a range of approximately 5-7nm. They informed ATC that they were visual and requested an update on the second aircraft. As this request was passed to ATC, they also advised them that they would like to manoeuvre to become better visual with the other fast-jet. The aircraft was turned to the right by 20-30° and the right-hand seat pilot observed a fast-jet, 0.5nm away, coming directly at them approximately 200ft lower. The second Typhoon passed directly underneath them and then started a rapid climb; at the same time, Norwich ATC advised them that this aircraft was at their level.. They then observed the Typhoons depart to the west; following this they resumed their outbound track.

He assessed the risk of collision as 'Medium'.

THE TYPHOON FGR4 PILOT reports that Havoc 21 flight were operating as a pair, conducting off-range, high-angle strafe practice on the Norfolk coast by Mundesly. They were under a Traffic Service from Swanwick Military, with both aircraft squawking Mode 3C. At 1204:44 Traffic Information was passed to Havoc 21 flight. Traffic was called as "South 10nm tracking North at 2000ft, probably North Sea rotary traffic". The formation assessed this to be leaving the Norwich 'Aerodrome Traffic Zone'. At 1207:14 Havoc 21 requested an update on the rotary traffic. Based on estimated speed and routing Havoc 21 expected the traffic now to be around 5nm south of the formation but at 1207:22 Swanwick Military replied with the rotary traffic now east, 5nm tracking north-east. At the same time, during the recovery from a simulated strafe attack, Havoc 22's pilot gained visual contact with the previously called rotary traffic and took avoiding action. A bunt of the aircraft was carried out once visual contact was achieved, resulting in a pass below the helicopter.

He assessed that the helicopter passed 200ft above and in front of him. Once clear of the traffic, Swanwick Military was advised of the Airprox at 1207:37. When Havoc 21 requested an update on the traffic, it was already merging with Havoc 22; the call of "5nm east" related to Havoc 21's position.

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

THE SWANWICK MIL EAST TAC RIGHT CONTROLLER reports that he was called in to replace the East Tac Right position, working TTN31 in AARA8, with Havoc 21 flight working the same frequency, conducting General Handling (GH) north of Norwich prior to their tanking slot on AARA8. Whilst Havoc 21 flight were operating in the block SFC-15000ft (on the Yarmouth RPS 1015hPa) 20nm north of Norwich, he observed an aircraft routing northbound from Norwich at low-level. Because the aircraft was squawking 7427, and was indicating 2000ft, he called the traffic to Havoc 21 flight. He believed the initial traffic call was made when the traffic was south by 10-15nm, and he stated that he believed the traffic to be a rotary outbound from Norwich for the rigs. At the time of the traffic call, Havoc 21 flight were indicating well above and the call was made to provide situational awareness to the pilots in the event of a descent being initiated. Almost immediately after calling the traffic Norwich radar called to request Traffic Information on Havoc 21 flight. He responded that they were a pair of Typhoons operating in the block from SFC-15000ft on the Yarmouth RPS 1015hPa. The Norwich controller then pointed out his traffic squawking 7427, advising that it was a rotary aircraft under a Traffic Service, flying IFR not above 3000ft. Havoc 21 flight then requested a traffic update. At the time, Havoc 21 was west of the traffic by approximately 3-4nm, heading west, with the 7427 having turned north-east bound. The traffic was called as such. At the same time, Havoc 22 was south-east of the 7427 traffic by 2nm indicating approximately 8000-10000ft. At the time, Havoc 22 passed north-west bound overhead the rotary aircraft. Havoc 22's Mode C dropped out. He called the traffic south 2nm indicating 2000ft, to which Havoc 22's pilot replied "visual with the traffic". Mode C then reappeared at 1700ft. Norwich radar then called back to state that his traffic was filing an Airprox against the 2 Typhoons. As Havoc 21 flight were observed to be in the middle of a manoeuvre, he opted to wait to tell the pilots once their manoeuvre was complete. Havoc 21's pilot then stated that Havoc 22's pilot would be filing an Airprox and asked if any further information was required by Swanwick. All details were logged and the Supervisor was informed. Havoc 21 flight completed their sortie and proceeded to AARA8 without further incident.

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

THE SWANWICK MIL SUPERVISOR reports that he was about to handover the Supervisor role to the oncoming Supervisor when East Tac Right called him over. He pointed out his traffic, Havoc 21 flight, and the Norwich helicopter traffic, and advised him of the occurrence. He had not observed the event so he noted down all the details and logged the occurrence in the log-book.

Factual Background

The Norwich weather was:

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EGSH 131150Z 31006KT 270V360 9999 SCT046 14/05 Q1019=
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Analysis and Investigation

CAA ATSI

The EC155 pilot had departed from Norwich on a local IFR detail to the north routing off-shore. He was in receipt of a Traffic Service from Norwich Radar in Class G airspace. The Typhoon was the second of two such aircraft operating VFR on an off-range exercise operating up to 15000ft. The Typhoon crews were both in receipt of a Traffic Service from Swanwick Mil. The Norwich controller observed the two fast-moving aircraft and initiated a request for Traffic Information from Swanwick Mil. Figure 1 shows the 2 Typhoons (codes 6063, 6064), and the EC155 (code 7427).

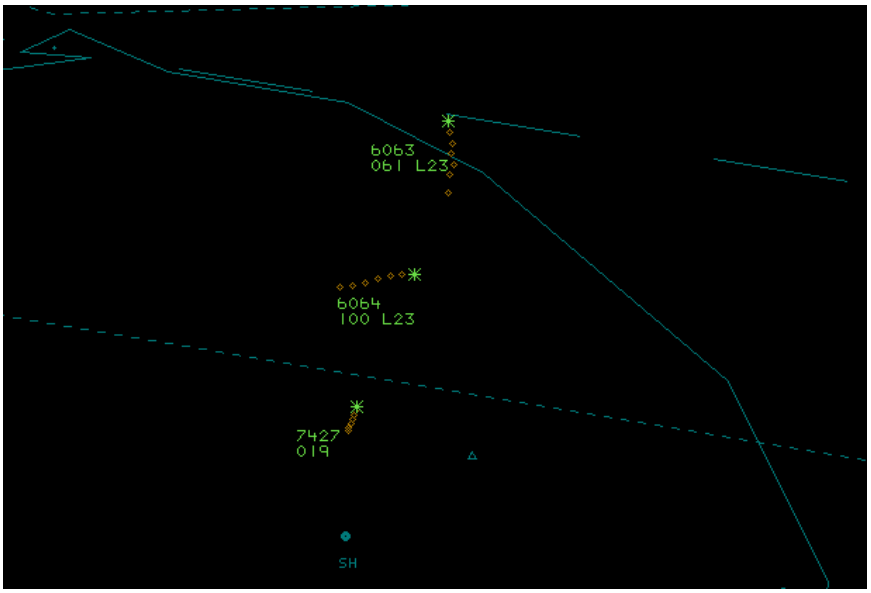

Figure 1 (1203:45)

Reciprocal Traffic Information was passed to Swanwick Mil during this call. The Norwich controller then passed this Traffic Information to the EC155 pilot. Approximately one minute later, the controller noticed the Mode C level information drop off the label on the first Typhoon. He was just updating this Traffic Information to the EC155 pilot as the transmission crossed with him reporting the first Typhoon in sight. The controller then passed Traffic Information on the second Typhoon whose level information had also disappeared. Radar then indicates the second Typhoon had descended below the EC155 and passed from south to north, apparently under the EC155. The EC155 pilot then reported the second Typhoon in sight and indicated he would file a report. The EC155 was level at 2000ft, and the pilot reported that the Typhoon passed underneath by approximately 200ft. The controller provided timely and appropriate Traffic Information both to the EC155 pilot and on the telephone to the Swanwick (Mil) controller. A controller providing a Traffic Service is not required to achieve deconfliction minima, and the avoidance of other aircraft is the pilot's responsibility[1]. Although Figure 2 shows the Typhoon approximately 0.2nm from the EC155 and indicated 800ft, it should be noted that, due to the radar update rate, the high speed of the Typhoon, and the high rate of descent of the Typhoon prior to the occurrence, the relative distance and height information may not be accurate.

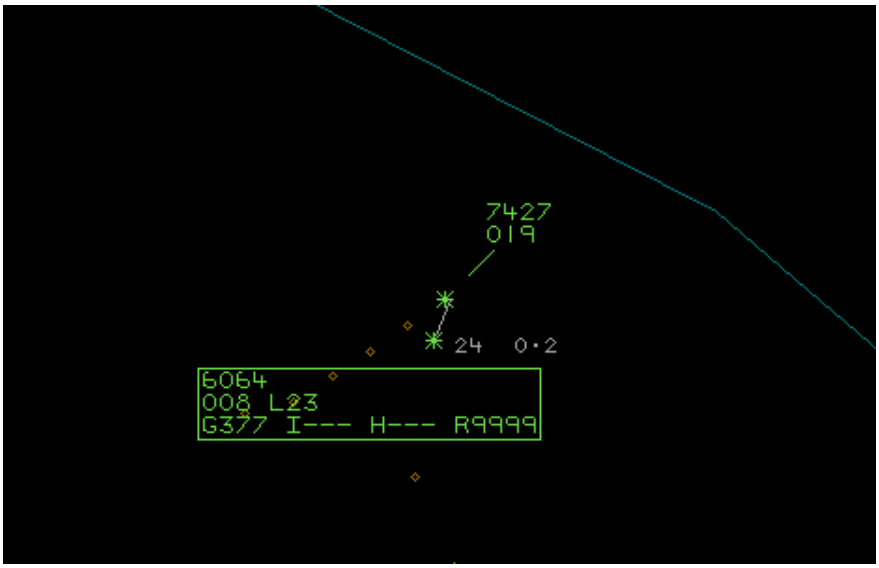

Figure 2 (1207:30)

[1] CAP 493 (Manual of Air Traffic Services Part 1) Section 1, Chapter 12.

Military ATM

The tape transcript between Swanwick Mil (SM), Norwich ATC and Havoc 21 flight is below:

From	To	Speech Transcription	Time
SM	Havoc 21 flt	Havoc 21 flight traffic south, er, one zero miles tracking north indicating 2000' believed to be er, rotary for the rigs.	12:04:41
Havoc 21	SM	Havoc Roger.	12:04:40
Norwich	SM	….er request TI, er 15 north Norwich 6063, 6064	12:05:20
SM	Norwich	Yeah TAC Right's on, er, pair of Typhoons in the block surface to ah, 15000 feet on the Yarmouth 1015.	
Norwich	SM	Roger traffic copied my traffic is Traffic Service just in their vicinity, 7427	
SM	Norwich	contact	
Norwich	SM	helicopter IFR not above 3000 feet.	
SM	Norwich	Copied thanks for the info	
Havoc 21	SM	Swanwick Havoc, request an update on the rotary traffic please.	12:07:03
SM	Havoc 21 flt	Havoc 21 flight er roger, now east of you 5 miles er, tracking north east bound er, 2000 feet er, informed that he's not above er 3000 feet IFR under Traffic Service.	12:07:07
Havoc 21		Havoc [--] descent	12:07:20
SM	Havoc 22	er Havoc 22 that previously called traffic ah, south of you 2 miles tracking north east flight level, correction, 2000 feet er rotary	12:07:35
Havoc 22	SM	Havoc 22 is visual er, with traffic the heading east?	12:07:42
Havoc		Havoc, flow north feet wet	12:07:48
Norwich	SN	Hello, Norwich, just for your information the erm, track I told you about the zero – sorry the 7427.	
SM	Norwich	Yup	
Norwich	SM	He's gonna file an Airprox against the two Typhoons that just passed 200 feet above and below him.	
Havoc 21	SM	Er we're reporting an Airprox er, between Havoc 22 and er, rotary traffic at 12:08	12:08:43
SM	Havoc 21	Havoc 21 roger we've just had a call from Norwich to er state that the rotary will be filing as well.	12:08:51

Swanwick passed Traffic Information to Havoc at 1204:41 (Figure 1) as, "*Havoc 21 flight traffic south, er, one zero miles tracking north indicating 2000' believed to be er, rotary for the rigs*."

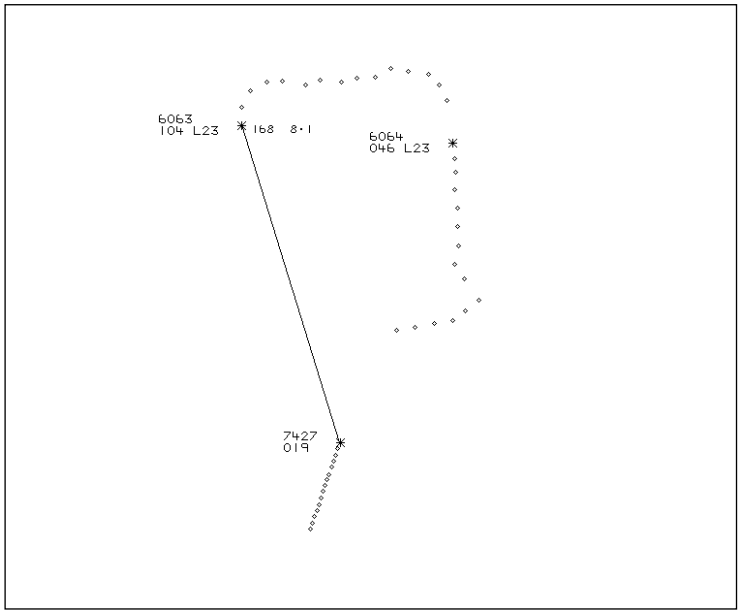

Figure 1: Traffic Information at 1204:41 (EC155 squawk 7427; Havoc 21 6063; Havoc 22 6064).

At 1306:33 (Figure 2), Havoc 21 had descended rapidly but the speed and horizontal separation had kept the aircraft clear of the EC155.

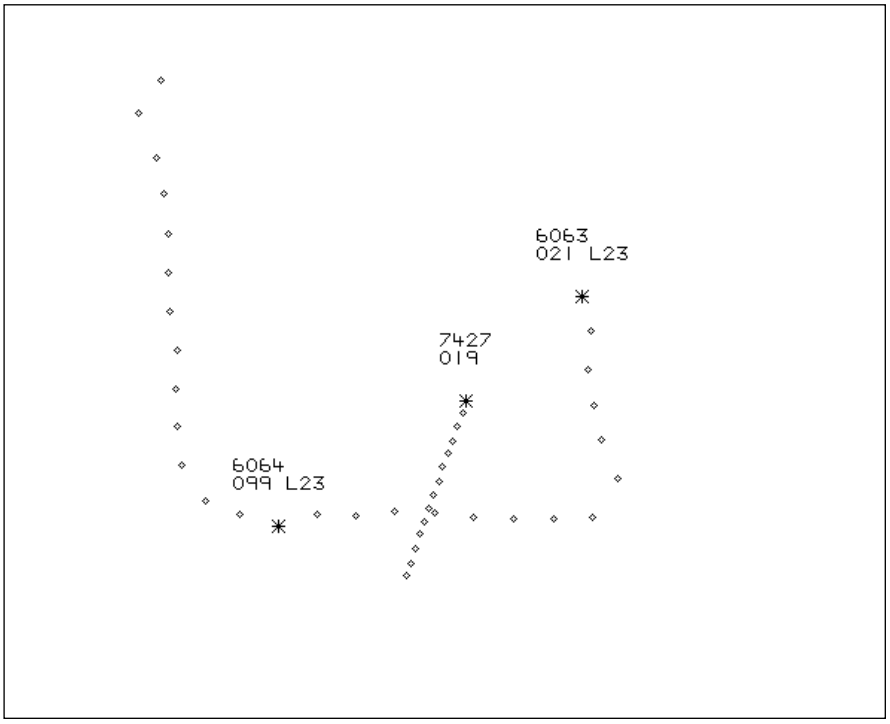

Figure 2: Geometry at 1206:33.

At 1207:03, Havoc Flt requested an update on the rotary traffic and Swanwick replied at 1207:07 (Figure 3) with, "*Havoc 21 flight er roger, now east of you 5 miles er, tracking north east bound er, 2000 feet er, informed that he's not above er 3000 feet IFR under Traffic Service*." The radar replay shows the rotary at 2nm to the south-east of Havoc 21 and approximately 3nm to the north-north-west of Havoc 22.

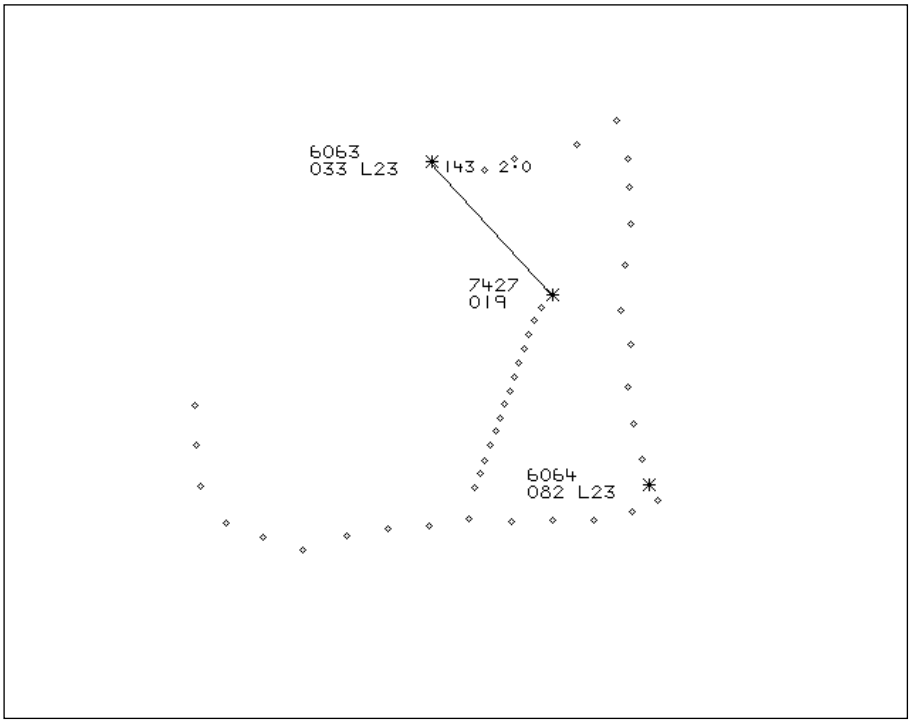

Figure 3: Traffic Information at 1207:07.

At 1207:25 (Figure 4) the replay shows 1nm separation and the Typhoon indicating 1600ft above.

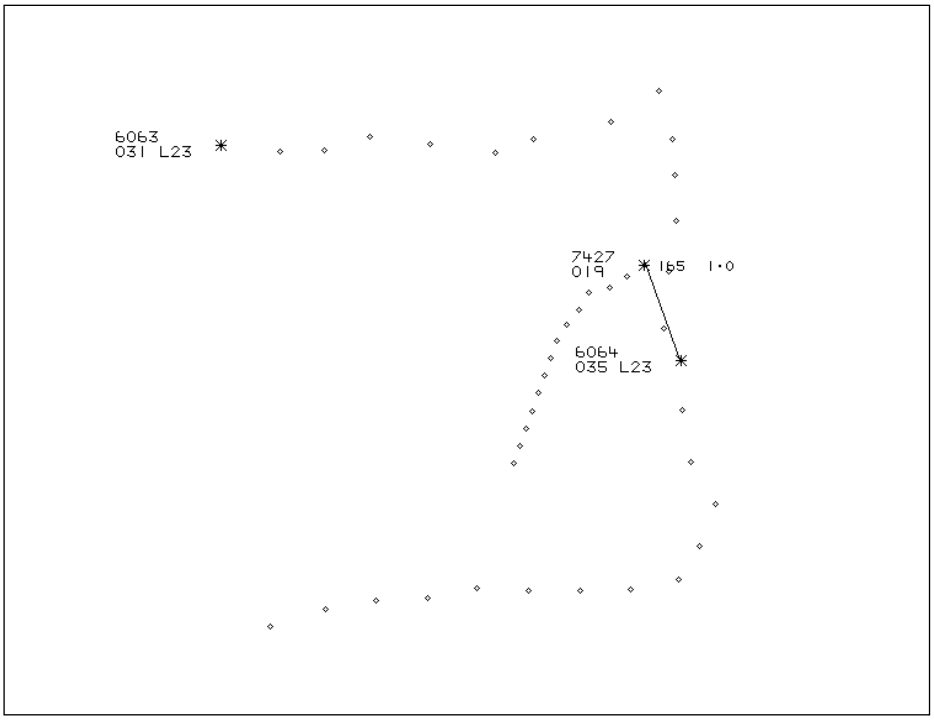

Figure 4: Closing geometry at 1207:25.

The CPA was estimated at 1207:29 (Figure 5) with 0.1nm and 300ft separation.

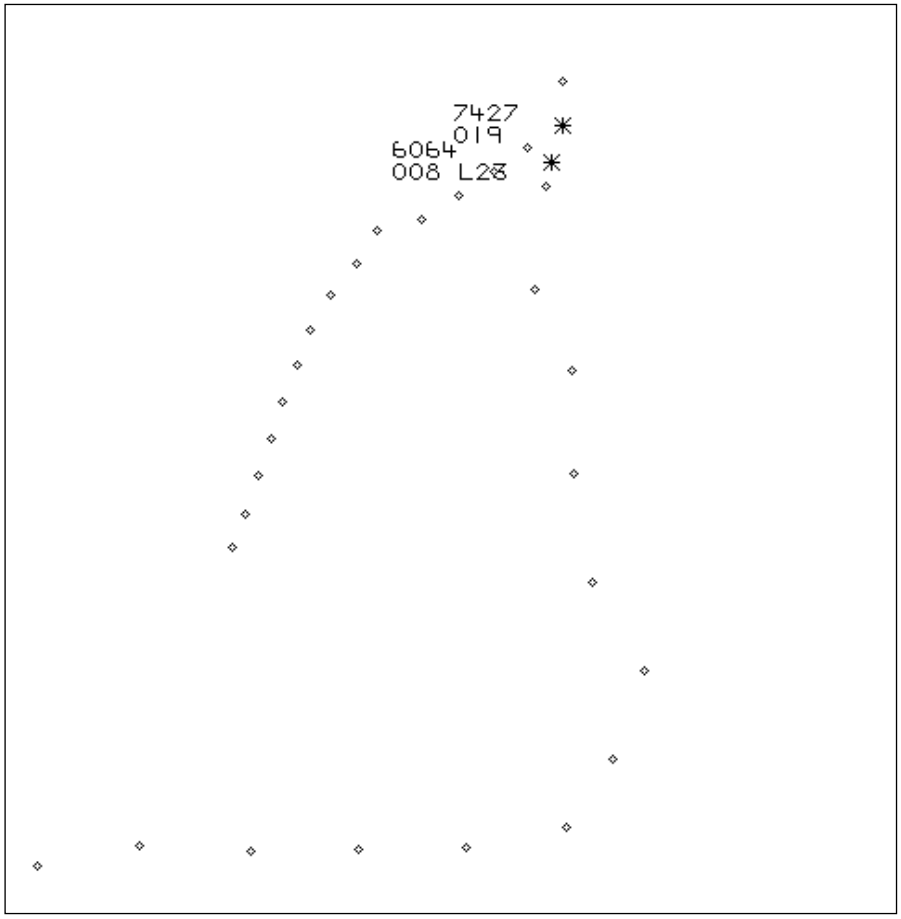

Figure 5: CPA estimated at 1207:29.

At 1207:35 (Figure 6), Swanwick provided an update, "*er Havoc 22 that previously called traffic ah, south of you 2 miles tracking north east flight level, correction, 2000 feet er rotary*."

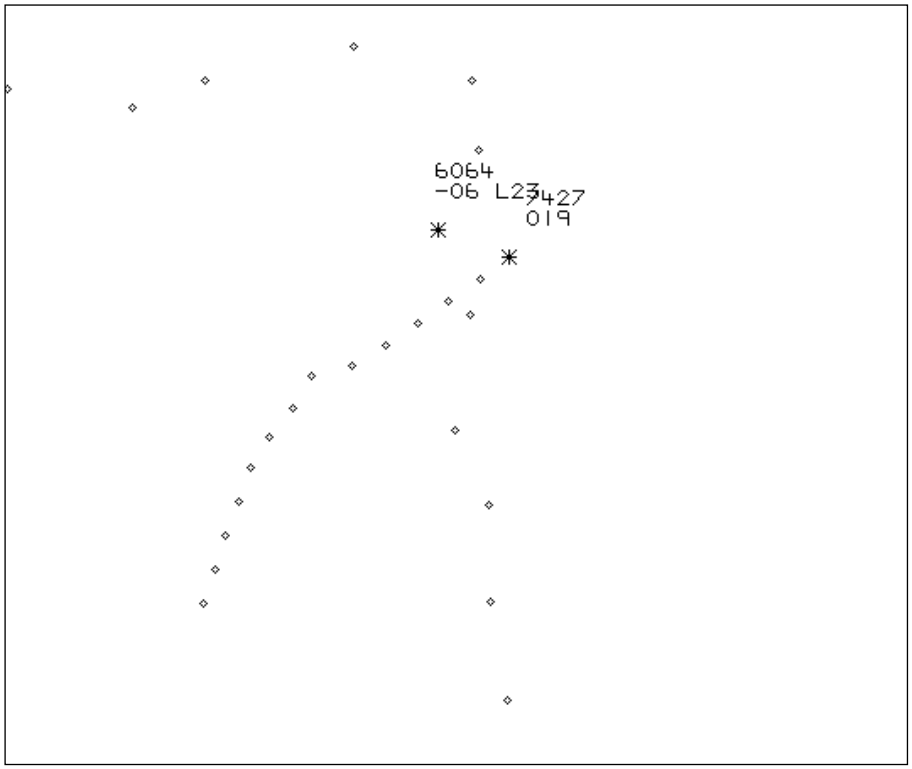

Figure 6: Updated Traffic Information at 1207:35.

The Typhoon crew had chosen to operate in the area because a number of factors: favourable met conditions, it provided a distinct target, and it was part of a composite sortie in D323C. The crew were aware of the Helicopter Main Routes and had relied upon Swanwick for the passage of Traffic Information. Additionally, the sortie was booked into the Low Flying System, and was on CADS[2]. Due to the height difference and geometry of the conflicting tracks, the rotary was not in scan coverage, and the pilot was not visual until approximately 200ft away. The pilot described a 'high' cockpit workload, and recalled the Traffic Information at 10nm and 5nm separation; the lead pilot commented that the information was not accurate as Havoc 22 conflicted with the rotary. To elucidate, the pilot commented that the Traffic Information was insufficient because the formation had taken a predictable pattern and the information was passed in relation to the lead aircraft.

The Swanwick Tac controller passed Traffic Information as 'south at 10nm' (Figure 1) to the flight callsign and the rotary was on a bearing of 168° at 8.1nm. An update was requested approximately 30 seconds prior to CPA, and the information was again given to the flight callsign as 'east at 5nm, not above 3000 feet, IFR'. The radar replay shows that the rotary was 2nm to the south-east of Havoc 21 and approximately 3nm to the north-north-east of Havoc 22 (Figure 3). An update was passed specifically to Havoc 22 approximately 5 seconds after CPA. The Traffic Information had been passed to the formation, despite their split, and not to individual elements until post-CPA. The Swanwick Tac controller had three aircraft on frequency in a 'medium-to-low' environment. Both Airprox aircraft were in Class G airspace and information had been passed between Swanwick and Norwich, but no formal coordination had been agreed due to the tracks being under a Traffic Service. As per CAP774, the definition of a Traffic Service states that, "the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic." Furthermore, under the terms of a Traffic Service, the controller is not required to achieve deconfliction minima and the pilot is responsible for collision avoidance.

[2] Centralised Aviation Data Service, a web based advisory system designed to highlight potential conflictions in planned routes.

'Safe' separation was lost between Havoc 22 and the rotary. In the absence of TCAS/CWS and radar contact, the pilot relied upon Traffic Information from Swanwick. This information placed the rotary 5nm to the east, not above 3000ft, and as the pilot of Havoc 22 considered that the rotary was separated laterally, he continued a descent through the last reported altitude. The controller had readily highlighted the lessons from the incident and the actions can be viewed in the context of the wide radar range-scale being used to view all elements under a service (estimated radar range as 75nm), an expectation that the Typhoons could generally acquire conflictors on radar, and that the rapid descent had allowed less time to assimilate the closing geometries. Although the crews had attempted to maintain a predictable pattern of strafing runs, the controller may have misjudged spatial information and aircraft projection.

The normal barriers to an incident would be ACAS/TAS, radar-derived Traffic Information and the principle of see-and-avoid. The Typhoon did not have ACAS or TAS fitted and Traffic Information was a partially-absent barrier. See-and-avoid was the principal barrier remaining to prevent loss of safe separation; the Typhoon pilot had a late sighting with 200ft separation and the rotary pilot first became visual with the fast jet with 0.5nm separation.

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The pilots involved shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[3]. Because the geometry was considered to be overtaking then the pilot being overtaken had right of way and the other pilot was required to keep out of the way of the other aircraft by altering course to the right[4].

HQ Air Command

All aircraft involved in this incident were operating in Class G airspace under a Traffic Service from two different agencies. The Typhoon pilots were well aware of the proximity of the HMRs, the possibility of encountering rotary traffic, and had made the conscious decision to seek an ATS from Swanwick (Mil) rather than Norwich. The Typhoons were driven into operating in this area by a combination of favourable weather and avoidance areas along the north Norfolk coast. The Traffic Information provided to the Typhoon pilots was reasonably accurate but was not sufficiently detailed for the formation number 2 to realise that the helicopter's track directly affected his aircraft. It is unclear whether or not the EC155 pilot was aware of the extent of the vertical and lateral manoeuvring of the Typhoons and so he may not have been able to formulate an informed plan to avoid any possible conflict.

Summary

The Airprox occurred in Class G airspace; the EC155 pilot, outbound from Norwich was in receipt of a Traffic Service from Norwich and the Typhoon pilots were in receipt of a Traffic Service from Swanwick Mil. The Typhoon flight was General Handling in the vicinity of the EC155 pilot's track between surface and 15000ft. The Typhoon pilots were issued with Traffic Information when the EC155 was approximately 8nm south of them. Discussion took place between Norwich and Swanwick Mil but no coordination was agreed. The pilot of Havoc 21 requested and was issued with an update to the Traffic Information. However, the pilot of Havoc 22, who was on a conflicting track with the EC155, was not given updated information on its position relative to him until after the CPA. The pilot of the EC155 was issued with Traffic Information about the Typhoons. He first observed the second Typhoon 0.5nm away, coming directly at his helicopter approximately 200ft lower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

[3] SERA.3205 Proximity. Rules of the Air 2015.
[4] SERA.3210 Right-of-Way (c) 3 Overtaking. Rules of the Air 2015.

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 first discussed whether it had been a reasonable plan for the Typhoon pilots to have carried out their operational manoeuvres in an area adjacent to the entrance/exit points (at the Norfolk northern coast) of two Helicopter Main Routes (HMR). A Military Pilot member explained that, although the Typhoon crews had been aware of the HMRs and the possibility of the presence of an off-shore helicopter flight, they had been restricted for a number of reasons from operating elsewhere. He offered that there had been a number of avoidance areas further along the coast; the weather in other areas had not been suitable to their task; they had required to operate as close as possible to D323C; and that there had been a suitable 'target' on the coast. This led to a protracted discussion amongst the Board members as to the suitability of this decision. Although recognising the constraints mentioned, many members thought that it had not been a sensible decision to plan to conduct the exercise against a target that was, for all intents and purposes, at the start/end of the HMR. They opined that the incident could have been prevented simply by choosing a target even only a few miles away rather than rely so heavily on Traffic Information from ATC to warn them about any helicopters in the area. Given their highly-dynamic manoeuvring, and the likely inaccuracy of any Traffic Information as a result, that the Typhoon pilots had then continued to conduct their exercise after receiving Traffic Information about the EC155 raised questions in many members minds as to the fine line in decision-making between abandoning the run or continuing. A military pilot member said that the Typhoon crews had no doubt used the Traffic Information issued by the controller to try and calculate whether they could complete another two runs before the EC155 was in their precise operating area. Based on the information they had (which was referenced to the lead Typhoon), the Typhoon pilots had calculated that the EC155 had been about 5nm south of them and had judged, incorrectly, that they would be able to carry out their two runs before it had reached their vicinity. Irrespective of the fine judgement of this situation, a Civil Controller member with experience of the Norwich operation added that at certain times of the day the HMRs can become very busy indeed with off-shore traffic, and he considered that it was not an ideal place for military fast-jet manoeuvres at any time, even though he agreed that they had been entitled to be there.

Turning to the ATC aspects, a military controller member agreed that the initial Traffic Information that had been issued to the Typhoon flight could have been more usefully articulated and had not been wholly accurate. The EC155 had been reported as 10nm south of them when it was actually about 8nm away, although it was recognised that the controller was operating with a radar display showing a range of at least 75nm and this large scale could have explained the discrepancy. Notwithstanding, members noted that the Typhoon flight had been informed that the EC155 was tracking north at 2000ft (towards their operating area). The Board then noted that, just over 2 minutes after receiving the initial Traffic Information, Havoc flight had requested an update on the rotary traffic. Traffic Information had been issued to the flight as 5nm east, tracking north-east not above 3000ft. The military controller member agreed that this had not been an appropriate message because, at the time, the two Typhoons had been operating independently some distance apart; Havoc 21 had already passed ahead of the EC155. He commented that Traffic Information should have been issued directly to Havoc 22's pilot, rather than the flight, because he had been on a conflicting track with the EC155; as it happened, Traffic Information referenced to him was only passed after CPA.

Some Board members wondered whether Norwich ATC should have invited the EC155 pilot to turn right to take him away from the operating area of the Typhoons. A civil controller member and a civil helicopter pilot member commented that this was not a practical solution given the dynamics at play. The EC155 had been comparably much slower and less manoeuvrable than the Typhoons, and there had been no guarantee that the Typhoon crews would have stayed operating in the same part of airspace.

The Board then discussed how the Airprox could have been prevented. A number of Board members thought that coordination should have taken place between the Norwich and Swanwick (Mil) controllers to separate the flights vertically. The EC155 was on a constant flight-path not above 3000ft, and some members reasoned that the solution would have been for the Typhoons to level off

1000ft above the helicopter's operating altitude. However, a military pilot member commented that this would probably not have allowed the Typhoon pilots to carry out their task, and there had probably been a requirement for them to descend to a level well below the EC155's altitude during their recovery manoeuvre. As such, height coordination was probably not compatible with the Typhoon pilots' task. The discussion on preventive strategies continued to ebb and flow with two main themes: the Typhoon pilots' choice of operating location, and their decision to carry on with their exercise after they were informed that the EC155 was in their general operating area. In this latter respect, a military pilot member confirmed that the Typhoon flight operation had been booked into CADS, and members thought that it would have been be advantageous to both them and the helicopter pilot if the helicopter operating companies could also book their flights on CADS. The Board were informed that it was possible for these companies to have access to a CADS terminal to book their flights, and the HQ Air Command representative undertook to explore this option.

The Board then discussed the cause of the Airprox. It was apparent to the Board, using the radar recordings available, that Havoc 22's pilot was overtaking the EC155 at the time of the Airprox; consequently, he was required to keep out of its way. It was therefore decided that the cause of the Airprox had been that he had flown into conflict with the EC155. The Board noted that Havoc flight had been issued with Traffic Information about the EC155, but that this had not been updated specifically to Havoc 22's pilot before CPA; the Board considered that this was a contributory factor. Finally, after considerable further discussion, it was decided that the Typhoon crew's choice of operating area adjacent to the HMR entrance/exit point was also a contributory factor.

The Board then turned its attention to the risk. It was noted that the CPA did not show on the radar recording but that it had been estimated as 0.1nm horizontally and 300ft vertically. Although the EC155 pilot had been issued with Traffic Information about the Typhoon at a late stage, due to the differing performance of the two aircraft, the Board agreed that he had been unable to take any action to avoid it. For his part, the Typhoon pilot had made a late sighting of the EC155, and had reported that he had bunted to pass 200ft below the helicopter. A military pilot member commented that the Airprox had occurred during the recovery phase of the Typhoon's strafe profile. Although the pilot would have been descending at 30-45° during his strafe attack, he would have been pulling out at the time of the Airprox which, although still a highly-dynamic situation, had allowed him to abandon his recovery manoeuvre and take avoiding action to reduce the risk of a collision. Notwithstanding his action, the Board considered that safety margins had been much reduced below the normal, and so it was agreed that the Airprox should be categorised as risk Category B.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Typhoon pilot flew into conflict with the EC155.

Contributory Factors: 1. The Swanwick Mil controller passed Traffic Information relative to the Typhoon formation leader, not to the No2.

2. The Typhoon pilots chose to operate adjacent to the HMR entrance/exit point.

Degree of Risk: B.