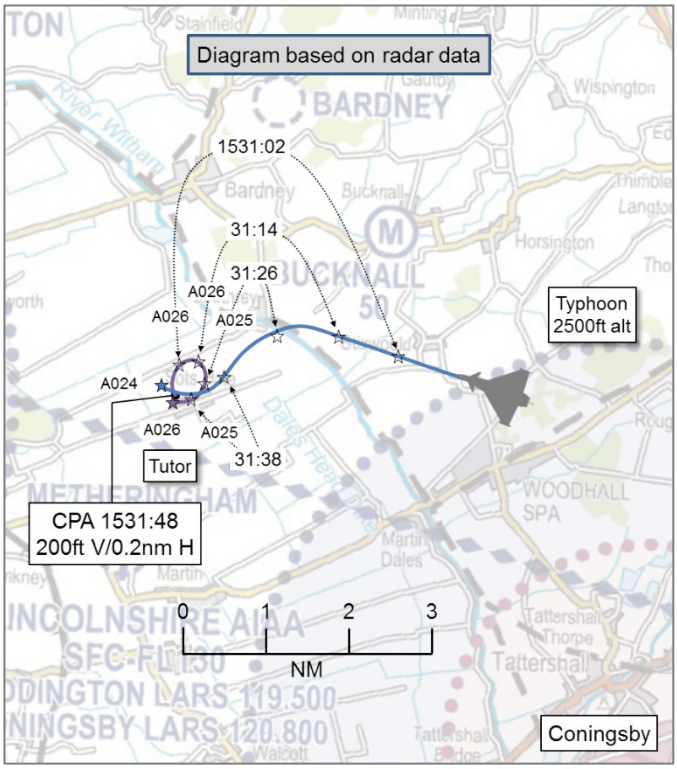
AIRPROX REPORT No 2019053

Date: 03 Apr 2019 Time: 1532Z Position: 5310N 00019W Location: 7nm NW Coningsby

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Typhoon	Tutor
Operator	HQ Air (Ops)	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	VFR
Service	Traffic	Traffic
Provider	Coningsby Radar	Coningsby LARS
Altitude/FL	2100ft	2300ft
Transponder	A, C, S off	A, C, S
Reported		
Colours	Grey	White
Lighting	Nav, HISL	Nav, HISL
Conditions	VMC	VMC
Visibility	10km	7km
Altitude/FL	2000ft	2000ft
Altimeter	QFE (NK hPa)	RPS (NK hPa)
Heading	240°	270°
Speed	230kt	100kt
ACAS/TAS	Not fitted	TAS
Alert	N/A	TA
Separation		
Reported	0ft V/200m H	0ft V/0.25nm H
Recorded	200ft V/0.2nm H	



THE TYPHOON PILOT reports that he was in the instrument pattern for a radar-to-PAR. He requested a Deconfliction Service, but was asked if a Traffic Service was possible because aircraft were holding off from Cranwell due to poor weather. He accepted a Traffic Service as the conditions were mostly VMC. The pilot of the Typhoon behind him in the instrument pattern called traffic on his radar at '9 miles converging, co-altitude'. This traffic (which was not involved in the Airprox but increased the R/T) was assessed as approximately right 9 o'clock from the [Airprox] Typhoon. At about 1531:40, the Typhoon pilot saw a light-aircraft (identified as either a Tutor or a Prefect) in the left 10 o'clock already on a diverging course. The light-aircraft was in a left-turn away, but didn't appear to be 'breaking away'.

He assessed the risk of collision as 'Medium'.

THE TUTOR PILOT reports that he was conducting a Medium-Level Navex sortie, which involved routeing anti-clockwise around the Coningsby MATZ at 2000ft on the RPS, due to cloud, with a Traffic Service from Coningsby LARS on VHF. Whilst he was routing south for the Cranwell/Coningsby MATZ Gap, he was asked by Coningsby ATC if he was able to either climb or descend from 2000ft for Typhoon traffic recovering for Coningsby RW07. He was unable to do so due to the weather conditions at the time (whilst maintaining VMC) so agreed to maintain a position just south of Bardney village (about 8nm NW of Coningsby) at 2000ft as the Typhoons were recovered. Whilst in an orbit at this position he received TI on one Typhoon, which he briefly saw but with no confliction. A short time later, he received further TI on another Typhoon in the radar pattern at a similar level. Whilst trying to gain visual contact on the Typhoon using the aircraft's TAS, he first received a Proximity Advisory (<5nm, <+/- 1200ft) and then a Traffic Advisory (<0.55nm, <+/-800ft). A very short time later, he saw the Typhoon and commenced a steeper turn to move away. He saw the Typhoon bank away at the same time.

He assessed the risk of collision as 'Low'.

THE CONINGSBY SUPERVISOR reports that RAF Coningsby (CGY) were operating on RW07RH and RAF Cranwell (CWL) were operating on RW26. The CGY Radar Approach (RA) controller had been in position for about 15min and was expecting 2 aircraft to join the Radar Training Circuit (RTC) from the visual circuit. The LARS controller had been in position for about 90min and was working the [Airprox] Tutor. The CGY ATC Supervisor was managing a potential runway change following advice from the met office, which precluded his involvement leading up to the [Airprox] Typhoon becoming established in the downwind leg of the RTC. The CGY RA controller received a request for the Typhoon and another Typhoon to leave the visual circuit to carry out radar approaches. The [Airprox] Typhoon was given a climb-out on a left turn heading 290°, climbing to 2000ft; the following Typhoon was given a left turn heading 360°, climbing to 2000ft in order to provide track separation between them. The Tutor was under a Traffic Service (TS) with CGY LARS having requested to transit the CWL stub at 2000ft (Barnsley RPS). The Tutor positioned about 7nm NW of CGY for general handling prior to the 2 Typhoons departing the visual circuit for the RTC. Having identified the potential confliction between the Typhoons and the Tutor, the RA controller liaised with the LARS controller and requested that the Tutor climb to 2500ft to allow the Typhoons a standard RTC. The Tutor pilot stated that he was unable to comply due to weather; the Tutor pilot was requested to operate no further south than his current position (about 7nm NW of CGY). Subsequently, the Tutor pilot was requested to operate a mile or more further north to ensure lateral separation, under a TS, in BLU weather conditions. The [Airprox] Typhoon climbed out from the visual circuit for the RTC and requested a Deconfliction Service (DS), which was initially imposed on climb-out by the CGY RA controller; however, having explained that there were multiple aircraft operating downwind in the RTC, the Typhoon pilot was asked to accept a TS for his inbound recovery. The Typhoon pilot agreed as the conditions were predominantly VMC and was downgraded to a TS. CGY RA contacted RAF Waddington (WAD) to pass Traffic Information (TI) on the [Airprox] Typhoon in the RTC and the WAD RA controller passed that there was a 'tower-to-tower' transiting from WAD to CWL. This aircraft was noted as about 3nm SE of WAD, tracking east. To offer support to CGY RA, the CGY SUP passed TI about the [Airprox] Typhoon (now east of WAD by 6nm) and the following Typhoon (now north of CGY by 7nm) to CWL ATC, requesting 'sterile Area A' - which was approved. Further TI was passed by CWL and, although not pertinent to the Airprox, it increased the duration of the liaison. Whilst heading 360° in the RTC, the following Typhoon pilot requested TI on an aircraft 'BRA 330/9' at a similar level (this was not the aircraft involved in the Airprox, but did increase comms on frequency). The following Typhoon was turned left onto a heading of 270° to maintain clear of that aircraft, whilst continuing to vector for a standard RTC. During this liaison, the 'tower-to-tower' aircraft and the Tutor had moved further south and were now in confliction with the [Airprox] Typhoon. CGY RA passed TI to the [Airprox] Typhoon and turned him left on to a heading of 210° to feed into a tighter pattern and maintain separation. Concurrently, the CGY LARS controller provided TI to the Tutor and the Tutor turned on to a southerly heading in order to deconflict. In response to this concurrent action the CGY RA re-called the position of the Tutor to the Typhoon and turned him right on to a heading of 270 degrees to maintain north of the Tutor. Shortly after, the following Typhoon queried further traffic to his north and was issued a turn by CGY RA to resolve. Subsequently, the [Airprox] Typhoon became visual with a light-aircraft (identified by the pilot as either a Tutor or Prefect) in his 'left 10 o'clock' at a distance of about 600ft, co-height. About 30sec later, as soon as there was an opportunity on the CGY RA frequency, the [Airprox] Typhoon pilot informed ATC that he had 'just come within a couple of hundred metres of a Tutor'.

Factual Background

The weather at Coningsby was recorded as follows:

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METAR EGXC 031550Z 03005KT 9999 FEW032CB BKN070 07/01 Q0996 BLU NOSIG=
METAR EGXC 031450Z 09005KT 9999 VCSH SCT030TCU BKN070 08/00 Q0996 BLU TEMPO 7000 SHRA
BKN022CB WHT=
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Analysis and Investigation

Military ATM

An Airprox occurred on 3 Apr 19 at approximately 1530 UTC, 7nm northwest of RAF Coningsby between Typhoon and a Tutor. The Typhoon was receiving a Traffic Service from Coningsby Approach, the Tutor was receiving a Traffic Service from Coningsby LARS. Figures 1-6 show the positions of the Typhoon and the Tutor at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using the Swanwick Radars, which are not utilised by RAF Coningsby, therefore are not representative of the picture available to the controllers.

The Typhoon had departed the Coningsby visual circuit with the intent of completing radar approaches for training and was given climb out instructions which included an initial heading of 290° and a climb to 2000ft. The Typhoon was one of a pair of aircraft in 5nm trail for individual radar approaches. The Tutor was completing a medium-level navigation exercise routing anti-clockwise round the Coningsby MATZ at 2000ft prior to return to RAF Wittering. In order to maintain VMC, the Tutor was unable to climb or descend due to thunderstorms in the area. Due to this vertical restriction, the Tutor pilot agreed to maintain an orbit about 8nm northwest of Coningsby to allow the Typhoons to complete their instrument approaches. The airspace picture was further complicated by opposing runway directions at Coningsby and Cranwell which required liaison between the units and the activation of a sterile area ('Area A') in accordance with a Letter of Agreement between the two units. On departure, the Typhoon pilot requested a Deconfliction Service. Separation at this point was 7.5nm (Figure 1).

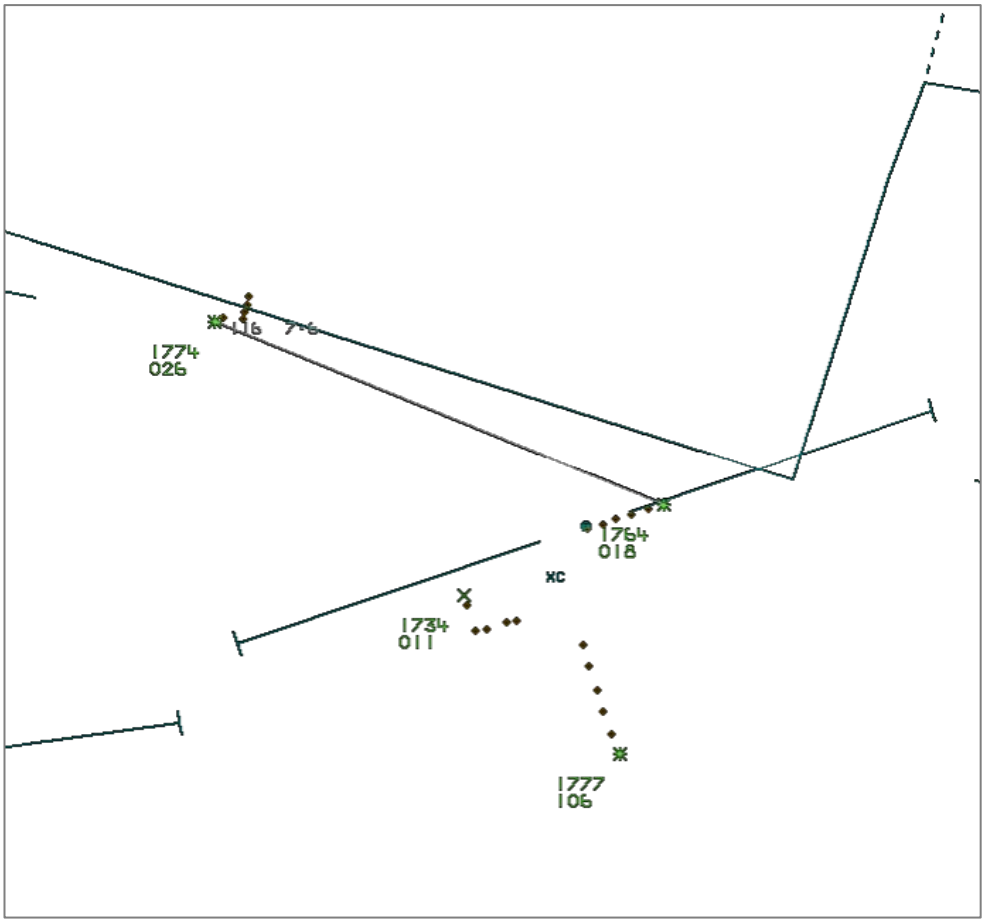

Figure 1 (Typhoon 1764, Tutor 1774)

Due to multiple aircraft operating to the west of Coningsby and the opposing runway direction at Cranwell, the Approach Controller asked if the incident Typhoon was able to accept a Traffic Service. This was agreed by the pilot. Due to the climb out profile of the Typhoon, separation had increased to 9nm at the point this service change was agreed (Figure 2).

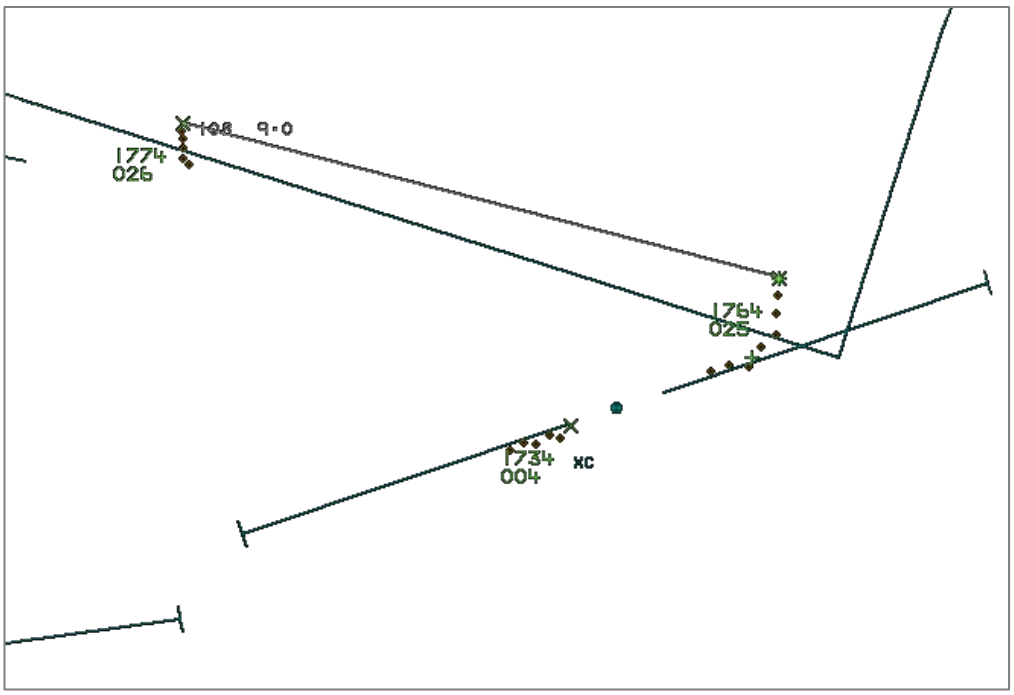

Figure 2

The next two minutes of R/T exchanges were taken up with the Approach Controller passing the procedure minima and the non-incident Typhoon requesting Traffic Information (TI) on an aircraft he had detected on his air-to-air radar. Shortly after this exchange, separation between the aircraft decreased to 5nm. The Coningsby LARS Controller passed TI to the Tutor pilot at 5nm and amplified the information with type (Typhoon) and the fact that it was in the Coningsby Instrument Pattern. Although not visual with the Typhoon, the Tutor pilot received a TAS warning consistent with the TI passed (Figure 3).

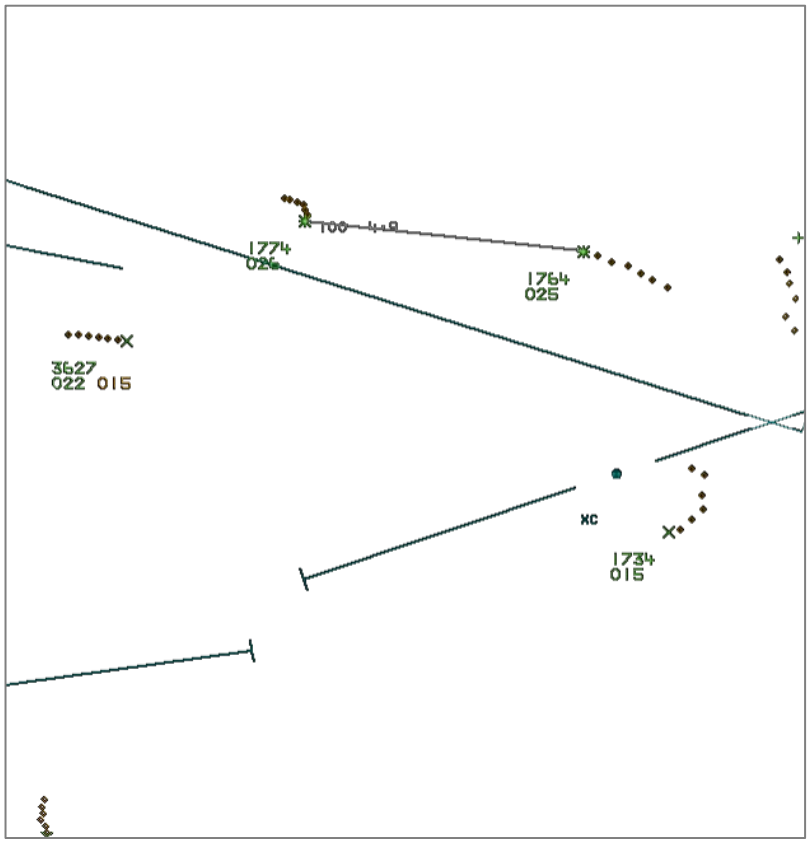

Figure 3

Separation between the aircraft continued to decrease and the incident Typhoon was given a positioning turn, left on to heading 210°. The Typhoon had not been provided with any TI by this point; the Tutor had received updated TI at 3nm but was still not visual with the Typhoon. Separation between the aircraft had decreased to 2.7nm laterally and 100ft vertical by the end of this R/T exchange (Figure 4).

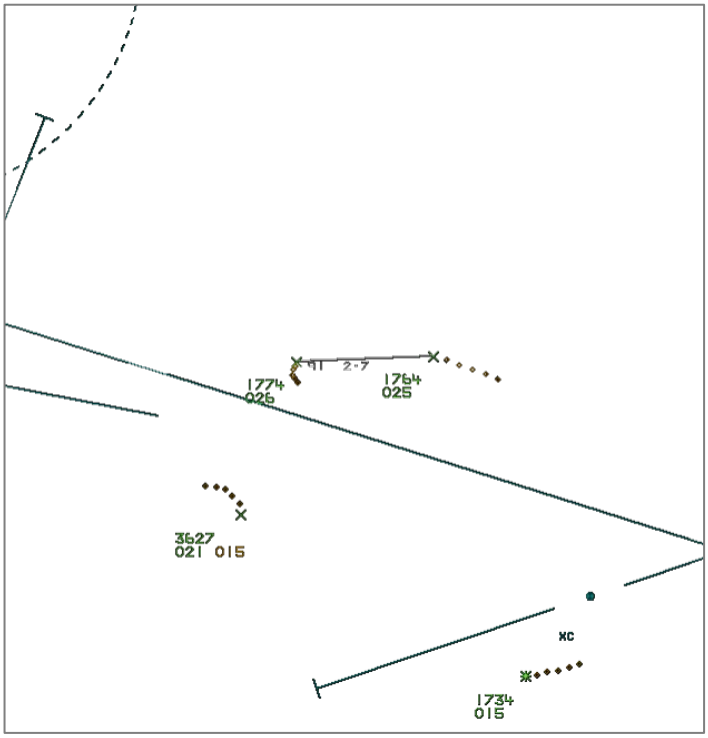

Figure 4

Six seconds after the positioning turn was issued to the Typhoon pilot, the Coningsby Approach controller passed him TI. This TI was accurate and noted that the inbound turn should keep the Typhoon clear. However, because the Tutor was conducting a right-hand orbit rather than being steady on a heading, this was not the case. The Coningsby LARS controller passed TI to the Tutor for a third time by which point, separation had decreased to 1.1nm (Figure 5).

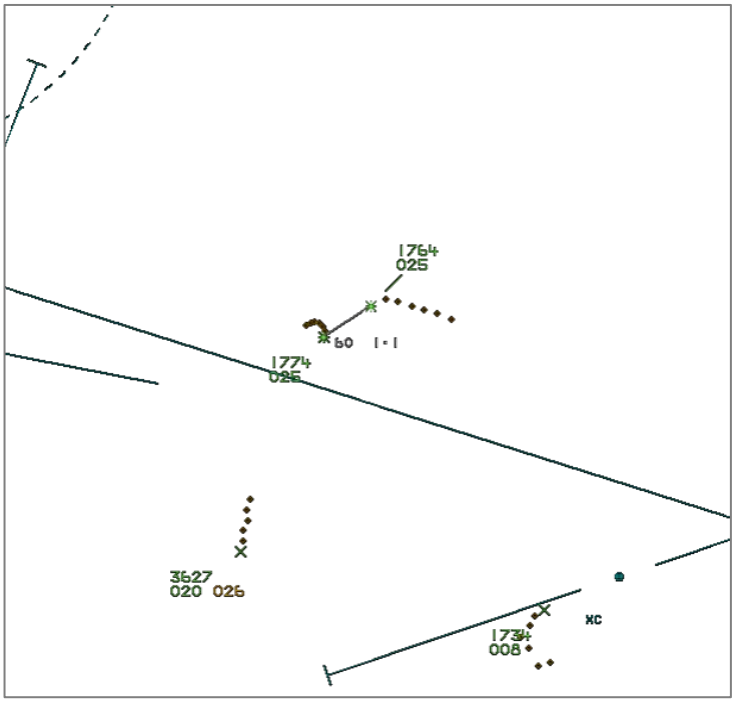

Figure 5

Shortly after the TI was passed, the Approach Controller noted that the confliction was growing and turned the incident Typhoon onto a heading of 270°. The Closest Point of Approach (CPA) occurred 16sec after this turn onto west and was measured at 0.2nm and 200ft (Figure 6). Concurrent with this turn, the Coningsby Zone controller passed TI to the Tutor pilot for a 4th and final time at a range of ½mile. The Tutor pilot reported visual with the Typhoon at the same time as the recorded CPA.

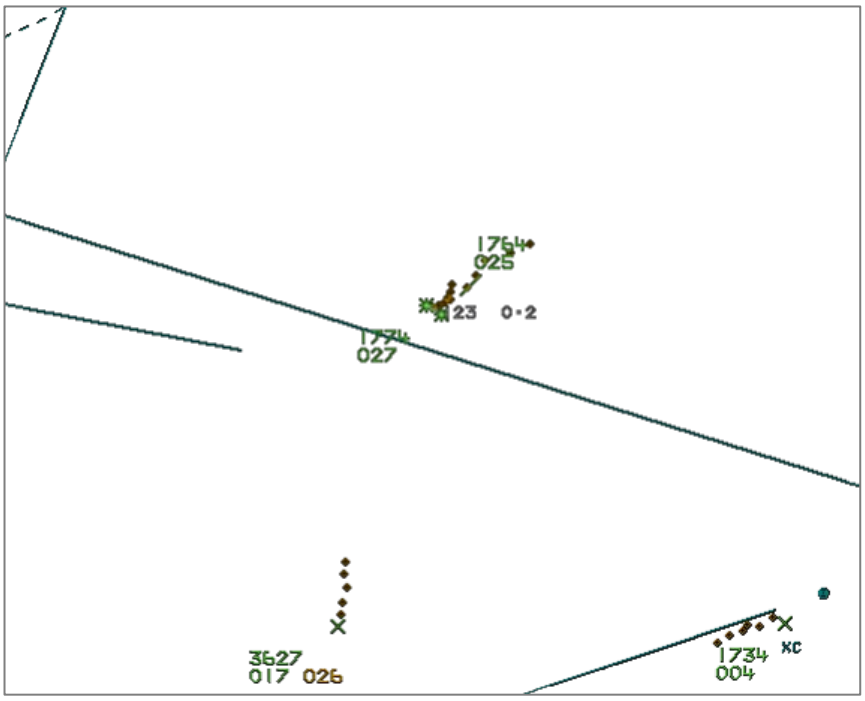

Figure 6 – CPA

The Unit conducted a thorough Occurrence Safety Investigation which noted the high workload for all involved, with complexity added by the opposing runway configurations of Cranwell and Coningsby. Once it was established that the Tutor could not climb due to the prevailing weather conditions, the plan to hold the Tutor in an orbit to the northwest of Coningsby was sound. However, this plan required the Approach Controller to vector the Typhoon away from the Tutor and the Approach Controller did not appear to have assimilated the turn radius of the Tutor when positioning the Typhoon. Although TI was passed to the Tutor on 4 occasions, the pilot only became visual with the Typhoon at CPA. TI was passed to the Typhoon (albeit at a less than ideal range) 35secs prior to CPA but the Typhoon pilot did not report visual with the Tutor until after CPA.

UKAB Secretariat

The Typhoon and Tutor 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 overtaking then the Tutor pilot had right of way and the Typhoon pilot was required to keep out of the way of the other aircraft by altering course to the right[2].

Coningsby Occurrence Investigation

The Coningsby Occurrence Investigation made the following findings:

> Due to the rate of closure and lack of angular movement of the Tutor ac track, the pilot of the Typhoon did not see the Tutor ac until the last stages of the incident.

[1] MAA RA 2307 paragraphs 1 and 2.
[2] MAA RA 2307 paragraph 14.

Although alerted to the conflict on the ac's Traffic Alert System (TAS) the handling pilot of the Tutor was not visual with the Typhoon as the Tutor was in a tight right-hand orbit and was unsighted possibly due to obscuration from his own airframe or probably due to the lack of angular movement of the Typhoon in his line of sight.

[The Radar controller] had not passed TI to [the Typhoon] concerning the Tutor ac at 5 miles away as [the Radar controller] was now busy passing procedure minima to both Typhoon ac and dealing with a specific request for information from [the following Typhoon].

Because the TWR Supervisor was busy with contacting the Duty Controller Flying (DCF) and the MET Office to confirm a possible runway change due to the prevailing winds, [the Supervisor] was now unable to provide oversight to help [the Radar controller] with the area radar picture. The DCF was not required to be physically present in the VCR during CGY flying operations and usually had to be contacted by phone.

[The Typhoon pilot] did not become visual with the contact called at 2 nm and the contact did not appear on the ac radar, which was not unusual when in the circuit potentially due to the contact size, aspect and weather conditions. Nor was it visible through the HUD. The Typhoon does not have a Collision Warning System fitted (CWS).

Despite [the Tutor pilot] saying that they could accept a descent to transit the CWL stub, this was declined by [the LARS controller] due to the slower airspeed of the Tutor and [the LARS controller]'s reluctance to descend any ac through the terrain safe level (2000') and position it through the CGY approach path.

The direction from HQ 3 FTS was that "EFT medium level NAVEX's should be planned for 3000' above mean sea level (amsl), no lower than 2500' amsl except under exceptional circumstances (Pilot Nav Test/End of Course Test) and then not below 2000' amsl" preconditioned the pilot of [the Tutor] not to accept the offered descent. Had he held at the lower height, or even transited the gap below 2000', then vertical separation would have been achieved.

[The Tutor pilot] could not accept a climb either due to adverse weather to the north and west of their current position at height of about 3000' with a base down to 1000' ([the LARS controller] added that earlier in the shift 2 [Wittering] Tutors had had to turn back east then south due to the prevailing thunderstorms north of CGY, that morning).

[The Tutor pilot] confirmed to [the LARS controller] that they would hold their current position and were then advised to remain "no further south than their current location and possibly move a mile or 2 further north..." Again, [the Tutor pilot] was unable to move further north due to thunderstorms but had enough fuel to hold.

The set nav route which plans to route between CRN and CGY at 2000 – 3000', while iaw rules and regulations, is a poor plan as it routes ac through potentially busy airspace, irrespective of the runways in use at CRN and CGY, relies on good weather, good comms and good AT coordination.

Despite [the LARS controller] having passed TI to [the Tutor pilot] "traffic south east, 5 miles..." [the Tutor pilot] was not visual with this traffic but had received a proximity advisory warning and visual indication of a contact on the ac TAS, consistent with the reported traffic. However, [the LARS controller] was now unable to request that [the Tutor pilot] move further north because of the track of [the following Typhoon].

[The LARS controller] was unable to provide [Tutor] a turn away as the ac track on the radar screen was not consistent during small manoeuvres. Primary and Secondary Surveillance Radar update or refresh information takes approx 4-7 secs to update ac track and small manoeuvres are not always apparent at the range scale normally used for area or zone controlling (40-60nm scale selected centred on Rwy).

The Coningsby Occurrence Investigation made the following recommendations:

Consideration should be given to maintaining a DCF presence in the ATC Tower during flying operations at CGY. This would negate the wasted time and reduced supervisory capacity in trying to facilitate communications with the DCF on landline or mobile.

Consideration should be given to a review of DCF orders at RAF Coningsby to ensure best practice in continued support of flying operations.

The LOAs for Twr to Twr procedures in use are to be discussed and reinforced to all Lincs Airspace Users Working Group (LAUWG) members.

Typhoon DT should consider provision of a CWS or Traffic Alert System (TAS/TCAS) for the Typhoon ac fleet.

3 FTS Tutor pilots are to be reminded by promulgation of the details of this event and by reinforcement of the direction from HQ 3 FTS. "EFT medium level NAVEX's should be planned for 3000' above mean sea level (amsl), no lower than 2500' amsl except under exceptional circumstances (Pilot Nav Test/End of Course Test) and then not below 2000' amsl." The student pilot was on NAV Serial 1 and was approx 3/4 through this phase of pilot training. The direction for EFT HQ 3 FTS adds " if you get airborne and find the weather incompatible with those limits, RTB and DNCO".

EFT HQ 3 FTS direction for all ML NAVEXes be amended to define the minimum time required at 2000' 3000' en route or objectives achieved to DCO the sortie. Guidance should state that the ac can descend below these heights if necessary, iaw the handling pilot's authorisation, for co-ordination with other traffic in areas of high air activity, weather or to avoid controlled or restricted airspace should also be considered.

Because of the increased potential for confliction in the choke point between CRN and CGY, due to the introduction of MFTS at CRN and Typhoon Force growth, the northern nav route should be removed from the ML NAVEX route options.

Comments

HQ Air Command

This Airprox led to an in-depth Occurrence Safety Investigation (OSI) convened by the Typhoon's operating authority. The investigation found 10 causal factors and made 7 recommendations to address those causal factors.

The plan-to-avoid barrier was not relevant to this encounter as the Typhoon had completed the tactical element of the mission and was now in the radar pattern on return to home base. Having requested a Deconfliction Service, the controller requested that the pilot accept a Traffic Service (TS) due to the traffic levels to the west. The pilot agreed to a TS as the pattern was 'mostly VMC' – it must be highlighted that, under the terms of a TS, the pilot should be able to effect visual deconfliction on traffic around him, aided by the TI from the controller; if there is any doubt that this can be achieved then a higher level of ATS should be maintained. For his part, the Tutor pilot was also under a TS in the same area and subject to the same weather conditions as the Typhoon pilot. However, the Tutor pilot was equipped with a TAS which added to his situational awareness, noting that the azimuth indication on the TAS in a Tutor is not to be relied upon and is only to be used as an aid to visual acquisition. The Typhoon does not carry any form of ACAS at present.

The controller spotted the decreasing separation of the Typhoon from the Tutor somewhat later than would be ideal, but did issue a heading to increase separation, albeit too late to prevent a reasonable close proximity. Lookout was hindered by the weather conditions, and neither pilot became visual with the other aircraft until at or around CPA.

There are many lessons to be drawn from this Airprox and the OSI has already recommended actions to minimise the likelihood of recurrence. However, it is worth reinforcing that an Air Traffic Service is a 2-way contract between the pilot and controller and relies on both parties being able to execute their part of the agreement. Pilots and controllers should be wary of agreeing a level of Service that is not best suited to the prevailing conditions.

Summary

An Airprox was reported when a Typhoon and a Tutor flew into proximity near Coningsby at 1532Z on Wednesday 3rd April 2019. The Typhoon pilot was operating under IFR in intermittent IMC, the Tutor pilot under VFR, and both in receipt of a Traffic Service from Coningsby, the Typhoon on a UHF frequency with Coningsby Radar and the Tutor on a VHF frequency with Coningsby LARS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate operating authorities. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

Members first discussed the Coningsby ATSU actions. The LARS controller had requested that the Tutor pilot hold to the northwest of Coningsby, to which he had agreed, in order that the Approach controller could then sequence two Typhoons for separate radar approaches around the radar pattern. Coningsby and Cranwell were operating on 'opposite' runways, which required additional communication between the units, and a 'sterile area' had also been activated iaw a Letter of Agreement between the two units. Concurrently, the Coningsby Supervisor was involved in a potential runway change which precluded his involvement in events leading up to the Airprox. Members agreed that ATC workload had been high, and that it was in this context that events unfolded. The LARS and Approach controllers coordinated to have the Tutor held to the northwest in order to provide 'lateral separation' from the Typhoons as they flew around the radar pattern. Weather was a significant factor in events because the Tutor pilot could not climb or descend whilst remaining VMC, which placed him at the same altitude as that to which the Typhoons were cleared. Controller members acknowledged that they were not looking at the same radar replay as that available to the Coningsby controllers, but nevertheless felt that it was clear that the potential for confliction was apparent as soon as the first Typhoon had rolled out on his 'downwind' heading. Indeed, members noted that the very reason for the Approach controller asking the Typhoon pilot whether he could accept a Traffic Service rather than a Deconfliction Service (**CF6**) was that the aircraft would get closer than the separation to which controllers should strive under a Deconfliction Service (5nm and 3000ft).

The separation between Tutor and Typhoon then reduced as the Tutor orbited in position and the Typhoon flew westwards. Neither pilot could see the other aircraft, however, it was for the pilots to ensure that they did not fly into a position of collision hazard by using, at least in part, the Traffic Information afforded to them under a Traffic Service, and if felt necessary requesting updated Traffic Information. In this respect, as the Tutor pilot continued his orbit, his track took him to the south of the Typhoon's track. However, the Approach controller then issued a heading change to the Typhoon pilot, left onto a heading of 210°. Members discussed the vector the Approach controller had issued to the Typhoon pilot and agreed that it had resulted in the aircraft closing into conflict (**CF1**). Members also felt that the potential for conflict had been evident at that point and, given that the Tutor pilot had been requested to hold in that position by Coningsby ATC, a degree of vertical separation should have been used by the controller. As such, the Board agreed that the Approach controller's instructions had not been appropriate (**CF4**). The Board surmised that the Approach controller had not detected the developing conflict at an early stage (**CF2**), and that this had resulted in late Traffic Information (**CF5, CF7**) and a late avoiding-action heading change onto west (**CF3)** which probably exacerbated the situation by taking the rapidly closing Typhoon behind and across the Tutor's flight path (**CF4**). The Board were clear that under a Traffic Service, responsibility for collision avoidance rested entirely with the pilot. However, in this case the Coningsby controllers had 'coordinated' the traffic to a degree and therefore in the Board's opinion had an added responsibility not to vector them into proximity.

For his part, the Tutor pilot had agreed to coordinate with the Coningsby traffic (the two Typhoons) and was holding as requested by ATC. His TAS provided a degree of SA on the closing Typhoon but members were uncertain whether he could, or should, have acted more positively to the information. Although ultimately responsible for his own collision avoidance, having been asked to orbit at that location by ATC, it was not unreasonable for him to suppose that ATC would then route their traffic

around him. Although the Tutor pilot did receive a TAS alert (**CF8**), it was felt that the dynamics of the situation meant that he had little ability to enact any meaningful manoeuvre to materially resolve the conflict at that stage. It was unfortunate that the Tutor was not picked up by the Typhoon radar at an earlier stage and, with the Typhoon not being fitted with a CWS, its pilot was therefore wholly reliant on ATC or visual sighting for collision avoidance. Unfortunately, neither pilot saw the other's aircraft apparently until at such a late stage that separation at CPA could not have been materially changed; effectively a non-sighting by both pilots (**CF9**).

The Board then considered the risk and, whilst it was noted that the lateral separation was not acutely close, members noted that both pilots had reported the other aircraft being at the same level (despite the Mode C separation showing 200ft vertically), and so the recorded vertical separation was probably in error. In essence, the Typhoon, with 130kt overtake, had turned towards the Tutor whilst in proximity, flown through its flightpath and neither pilot had seen the other in time to materially affect separation. The Board therefore felt that this incident represented a situation where providence had played a major part, and that it merited a risk assessment of Category A.

Lastly, members expressed their reservations with the findings of the Coningsby Service Investigation. The ability of the overarching DDH to be able to make safety decisions rests on the provision of accurate and robustly derived information with which to make such decisions. In this case, the service investigation did not identify one of the most significant causal factors, that the Coningsby Approach controller had vectored the Typhoon into proximity with the Tutor, (who's hold position had been planned and agreed between the Approach and LARS controllers). Members expressed their concern that the Investigation process did not appear to be sufficiently robust, which the military member agreed to relay to the appropriate authority.

PART C: ASSESSMENT OF CAUSE AND RISK

Contributory Factors:

CF	Factor	Description	Amplification
	Ground Elements		
	• Regulations, Processes, Procedures and Compliance		
1	Human Factors	• ATM Regulatory Deviation	Regulations and/or procedures not complied with
	• Situational Awareness and Action		
2	Human Factors	• Conflict Detection - Detected Late	
3	Human Factors	• Conflict Resolution - Provided Late	
4	Human Factors	• Inappropriate Clearance	Controller instructions contributed to the conflict
5	Human Factors	• Traffic Management Information Provision	Not provided, inaccurate, inadequate, or late
	Flight Elements		
	• Tactical Planning and Execution		
6	Human Factors	• Communications by Flight Crew with ANS	Controller not able to provide requested ATS
	• Situational Awareness of the Conflicting Aircraft and Action		
7	Contextual	• Situational Awareness and Sensory Events	Pilot had no, or only generic, or late Situational Awareness
	• Electronic Warning System Operation and Compliance		
8	Contextual	• ACAS/TCAS TA	TCAS TA indication
	• See and Avoid		
9	Human Factors	• Monitoring of Other Aircraft	Non-sighting by one or both pilots

Degree of Risk: A.

Recommendation: Nil.

Safety Barrier Assessment[3]

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

Ground Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because the Coningsby Radar controller vectored the Typhoon into conflict with the Tutor.

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the Coningsby Radar controller did not detect that the left turn on to 210° would bring the Typhoon and Tutor into conflict and could not detect that the subsequent right turn on to 270° would result in the Typhoon crossing the Tutor flight path at close range and did not resolve the confliction.

Flight Elements:

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

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Typhoon pilot did not receive Traffic Information until at a range of 2.7nm from the Tutor.

See and Avoid were assessed as **ineffective** because neither pilot saw the other aircraft before CPA, effectively a non-sighting, and consequently neither were able to manoeuvre to increase separation at CPA.