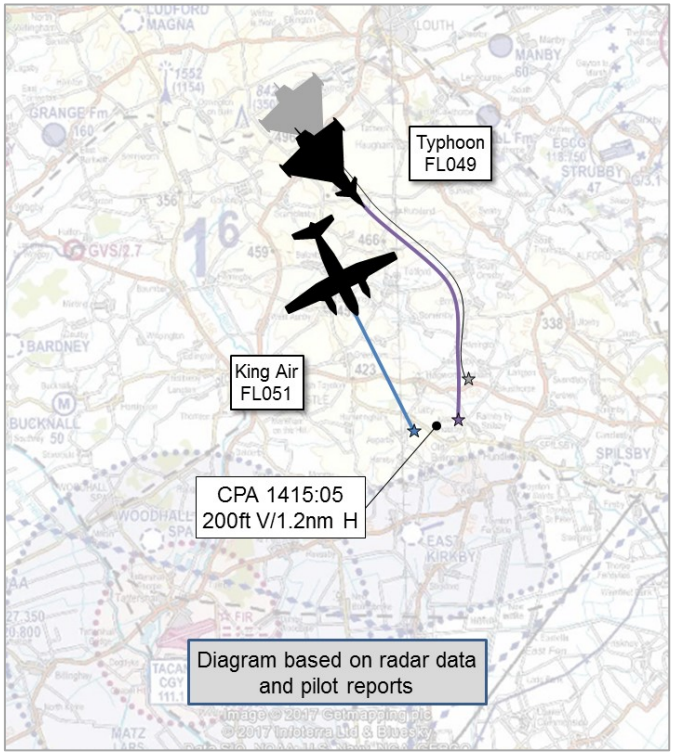
AIRPROX REPORT No 2017051

Date: 05 Apr 2017 Time: 1415Z Position: 5310N 00001E Location: NE Coningsby

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	King Air	Typhoon
Operator	HQ Air (Trg)	HQ Air (Ops)
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	IFR
Service	Deconfliction	Traffic
Provider	Cranwell	Coningsby
Altitude/FL	FL051	FL049
Transponder	On/C, S	On/C
Reported		
Colours	Blue, White	Grey
Lighting	Nav, Beacon, Strobe	Not Reported
Conditions	IMC	IMC
Visibility	0km	>10km
Altitude/FL	4000ft	Climbing
Altimeter	QFE (1022hPa)	NK (1028hPa)
Heading	150°	140°
Speed	200kt	300kt
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
Separation		
Reported	<200ft V/1nm H	NK V/<2nm H
Recorded	200ft V/1.2nm H	



THE KING AIR PILOT reports that he was in a descent from FL70 to 2500ft on a heading of 150° during a radar-to-ILS recovery, in IMC, under a DS from Cranwell Approach. Having been cleared through the RAF Coningsby MATZ, a TCAS RA was received against a pair of Typhoons that were climbing rapidly in the 7-9 o'clock position below the aircraft to approx FL100. Shortly beforehand, avoiding action had been passed by the Cranwell Approach controller and a right turn initiated; the subsequent TCAS RA was followed, reported to ATC, and the aircraft climbed to approx 5000ft. The crew were informed by ATC that the Typhoons were squawking low-level in the climb. He then resumed ATC instructions and the ILS recovery was completed without further incident.

He assessed the risk of collision as 'Medium'.

THE TYPHOON PILOT reports that he was conducting a pair's exercise in the Vale of York. It was a clear day with a layer of cloud 4,000 to 5,600ft. On completion of the task he elected to maintain LL until south of the Humber and transited using LL Common/Humber Radar. At 1412:30, he checked in with Coningsby APP, climbing out of LL to 3,000ft, 3nm East of Market Rasen. He had the King Air targeted [on his radar] at 3.2nm, 7,100ft, co-heading 151°, at 0.3Mach. At 1413:30, Coningsby APP gave a TS and told him to climb to 5,000ft, he commenced the climb. At 1413:40, the Flight leader told number 2 to tie on [UKAB Note: fly in radar trail, normally about 1-1.5nm separated], which occurs shortly after. He continued to climb becoming intermittent IMC at 4,000ft levelling at 5,000ft. At 1414:50, Coningsby APP called 'contact on track', and No2 corrected this to 'one o'clock, 3nm, tracking south, co-level'. The flight lead responded with a request to climb 10,000ft which was approved. The closest point between the flight leader and the King Air was at 1415, and appears to be less than 2nm. VMC was achieved at 5,600ft and no visual contact with the traffic was called.

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

THE CRANWELL CONTROLLER reports that he was controlling the King Air from the northeast of RAF Coningsby by 10nm under a TS. He rang Coningsby app/sup for an eastern stub crossing not below 2500' Cranwell QFE which was approved. The King Air was descending with Mode C indicating approximately 050 when the pilot called for an upgrade in service. After scanning, a low level squawk (LL) was seen to the east of the King Air, he then noticed that this contact's Mode C was not within LL parameters but was climbing higher; the King Air was given avoiding action immediately onto a heading of 270° as the contact's Mode C was passing FL045. The pilot of the King Air subsequently called a TCAS RA. He asked the King Air pilot to report the RA complete, also informing the pilot that the Typhoons were still on a LL squawk at FL100.

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

THE CRANWELL SUPERVISOR reports that she was the ATC Sup in the Approach room at the time of the incident. She was listening to the Approach frequency along with VHF Zone and Departures. She heard the King Air call for a Deconfliction Service on the Approach frequency and saw the pair of fast moving LL squawks north of Coningsby. One of the LL squawks then changed to a Coningsby squawk so she immediately rang Coningsby for coordination. The Coningsby Supervisor answered the landline and she requested co-ordination, she was told to "Standby" and she then heard the Coningsby Supervisor try and find out what the pair of Typhoons were doing. It appeared that the Coningsby workload was high at the time as she could hear multiple controllers talking to each other with raised voices. The Approach controller then instigated an avoiding action turn and she informed Coningsby that they would try and avoid the Typhoons. She believes they did the best they could for the King Air with the information they had and the time they had available.

THE CONINGSBY CONTROLLER reports that she was the Approach controller, with both a U/T Director (undergoing a local endorsement check) and a Departures/LARS controller in position. The Coningsby Supervisor was in the VCR at the time for a Spitfire Display as per the Flying Order Book requirement. She had another qualified Supervisor with her who was aiding in any admin calls (for this report he will be referred to as Sup liaison). Before the Spitfire display began, she had one Typhoon to recover; however, due to start times of the display, the Typhoon had to hold off at 4000ft to the east of the airfield. As the pilot had held for 10 mins he was keen to land due to fuel constraints; however because the Spitfire was still conducting his display, there was discussions with the Supervisor and the 'Sup liaison' as to whether the Typhoon could come in. She informed the Typhoon pilot that she would be getting a 30sec call from the Spitfire, of which he would then be allowed to make his recovery to RW25 not below 1500ft in order to deconflict the Spitfire tracking south to facilitate the recovery. Whilst this was happening she had 2 Typhoons [UKAB Note: The Airprox Typhoons] call up from the LL system north of the airfield by approx 13miles. At the time, one ac was squawking a Coningsby (recovery) squawk and the other was still showing LL (7001), this caused some garbled callsigns to appear so she asked the flight to squawk recovery before identifying them. They had reported being at 2000ft, requesting to climb to 5000ft. Having seen their squawk, she passed them the QFE of 1028hPa and climbed them to 5000ft, as well as identifying them and applying a service. As she hadn't fully understood their intentions, she requested this from the pilot, and he informed her that he was looking for an operating block of 5000ft-20,000ft. She informed the pilot she could only offer 19,000ft, and he was happy with that level. The Typhoon Flight were now tracking 140° towards the eastern end of the stub by 6nm having already been given a climb to 5000ft. Another free-calling aircraft called on her frequency from the northeast approximately 35nm at FL170 requesting a PAR recovery; the pilot was still with another frequency and therefore was initially confirming two way with Coningsby. As this was happening, she noticed traffic to the right of the Typhoon flight and called the information to them, she believed it to be 3nm away showing a similar level. She didn't believe the pilot reported visual and instead requested a further climb to 10,000ft; she gave this to the pilot because she felt that the traffic called was not a conflicting issue due to it tracking southwest. The Typhoon for a PAR now reported clear of the other frequency, her initial thought was to get the pilot to re-contact Coningsby Director, as they required the traffic for an endorsement. She was liaising with the Sup Liaison on the best way to do this (i.e. formal handover or freecall), because things were becoming complex or had the potential to become complex; however, she believed that 'Sup Liaison' requested she conduct a landline handover. Whilst this was happening 'Sup Liaison' was speaking with Cranwell, and he requested her to pick up the

landline for co-ordination. As she had picked up the landline, she was then told by the 'Sup Liaison' to forget it as they had hung-up. The Typhoon Flt now tracked to the south for general handling and she proceeded with the handover of the Typhoon for a PAR to Director.

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

THE CONINGSBY SUPERVISOR reports that he was the Supervisor at the time of the incident and, as per the Coningsby Flying Order Book, was positioned in the VCR whilst a BBMF display was being flown. During a quiet period prior to the displays and recovery wave, all ACR control positions were offered breaks. Having been informed by TC(Grd) that the Spitfire was shortly to start he asked a fellow Sup to remain in the ACR during his absence to offer assistance as required to the ACR team and proceeded to the VCR. On his return to the ACR he was made aware of the incident and he informed SATCO.

THE CONINGSBY SUPERVISOR LIASON reports that he was asked by the duty Supervisor to act as a liaison in the ACR because the Supervisor was needed in the VCR due to a BBMF display practice; it was the start of the BBMF workup for the forthcoming season which generally causes some initial co-ordination issues between Station users. They had received a couple of pre-notes and, on checking the programme, they had further aircraft planning to recover during the display so he made a call to Swanwick to warn Coningsby-based aircraft of a potential delay. The Coningsby Approach (RA) controller was providing a service to a Typhoon aircraft, initially holding in the overhead, but he asked the RA controller to move the aircraft away from the overhead for noise abatement and negotiated a recovery time with the Supervisor. Another Typhoon aircraft free-called Approach for a radar recovery approximately 30nm east of Coningsby; because the trainee Director already had traffic that he was positioning to hold to the south of Coningsby, and because the free-calling aircraft was still some distance from Coningsby, he asked the RA controller to plan to hand the aircraft over rather than telling the pilot to free-call the Director. A flight of 2 Typhoon aircraft then free-called Approach approximately 12nm north of Coningsby. The Cranwell landline rang and they requested co-ordination on the Typhoon Flight. Looking at the radar picture whilst he obtained the RA controller's attention to ask the traffic's intentions, it was obvious that because of the position of the aircraft that he would not be able to carry out co-ordination by proxy for the RA controller and so he immediately asked her to speak to Cranwell. However, before she was able to speak to them, they told him to disregard as they were avoiding the Typhoons.

Factual Background

The weather at Coningsby was recorded as follows:

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METAR EGXC 051350Z 30012KT 9999 BKN040 SCT250 14/03 Q1029 BLU NOSIG
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Analysis and Investigation

Military ATM

Portions of the tape transcripts between Coningsby Approach and the Typhoons are below:

From	To	Speech Transcription	Time
[Typhoon C/S]	Approach	Coningsby approach [Typhoon C/S]	14:12:25
Approach	[Typhoon C/S]	[Typhoon C/S] Coningsby approach	14:12:31
[Typhoon C/S]	Approach	Approach [Typhoon C/S] just pulled out of low level ten, fifteen miles to the north of the field tracking one three zero, level two thousand feet looking for a radar pick up and climb in to the block five thousand to fifteen thousand apologies five thousand to twenty thousand south of the field general handling.	14:12:33
Approach	[Typhoon C/S]	OK standby	14:12:52
Approach	Nightmare 31	Nightmare three one are you visual with the aerodrome?	14:12:56
Nightmare 31	Approach	Affirm	14:12:58
Approach	Nightmare 31	Nightmare three one roger the spitfire is complete, continue with Coningsby	14:12:59

From	To	Speech Transcription	Time
		tower stud two	
Nightmare 31	Approach	Stud two Nightmare three one	14:13:03
Approach	[Typhoon C/S]	[Typhoon C/S] flight squawk recovery	14:13:06
[Typhoon C/S]	Approach	Squawking recovery [Typhoon C/S]	14:13:10
Approach	[Typhoon C/S]	[Typhoon C/S] apologies just confirm is that four one and four two?	14:13:13
[Typhoon C/S]	Approach	Affirm two ship	14:13:16
Approach	[Typhoon C/S]	[Typhoon C/S] roger, correction [Typhoon C/S] flight set Coningsby QFE one zero two eight, climb to height five thousand feet	14:13:18
[Typhoon C/S]	Approach	One zero two eight set climbing five thousand	14:13:26
Approach	[Typhoon C/S]	[Typhoon C/S] flight identified traffic service	14:13:30
[Typhoon C/S]	Approach	Traffic service [Typhoon C/S]	14:13:33
[Typhoon C/S]	Approach	[Typhoon C/S] will be climbing non-standard trails to the south	14:13:40
Approach	[Typhoon C/S]	[Typhoon C/S] flight roger what type of recovery?	14:13:46
[Typhoon C/S]	Approach	Not looking for recovery, looking for a block south of the field please five thousand twenty to thousand	14:13:49
Approach	[Typhoon C/S]	[Typhoon C/S] flight roger I will only be able to give you five to one nine thousand	14:13:55
[Typhoon C/S]	Approach	That will work [Typhoon C/S] flight, looking for own navigation	14:13:59
Approach	[Typhoon C/S]	[Typhoon C/S] flight roger own navigation	14:14:04
[Typhoon C/S]	Approach	Own navigation, levelling five thousand [Typhoon C/S]	14:14:06
Cobra 53	Approach	Coningsby approach cobra five three in the descent to flight level one seven zero, forty miles east of the airfield	14:14:14
Approach	Cobra 53	[Typhoon C/S] five three Coningsby approach are you recovering now?	14:14:20
Cobra 53	Approach	Its Cobra five three Affirm, currently with Magic and want two way with you	14:14:23
Approach	Cobra 53	[Typhoon C/S] five three roger, report switching	14:14:27
Approach	[Typhoon C/S]	[Typhoon C/S] flight you do have traffic right two o'clock correction one o'clock three miles tracking south indicating similar level.	14:14:43
[Typhoon C/S]	Approach	[Typhoon C/S] copied looking for further climb to ten thousand, on one zero two eight	14:14:52
Approach	[Typhoon C/S]	[Typhoon C/S] flight roger climb to height one zero thousand feet.	14:14:55
[Typhoon C/S]	Approach	Climbing ten thousand feet one zero two eight, cobra apologies [Typhoon C/S]	14:15:00

Portions of the tape transcripts between Cranwell Approach and the King Air are below:

From	To	Speech Transcription	Time
[KING AIR C/S]	Approach	[King Air C/S] request deconfliction service	1413:59
Approach	[KING AIR C/S]	[King Air C/S] Roger, deconfliction service	1414:02
[KING AIR C/S]	Approach	Deconfliction service [King Air C/S]	1414:06
Approach	[KING AIR C/S]	[King Air C/S] you are cleared through Coningsby' MATZ	1414:12
[KING AIR C/S]	Approach	[King Air C/S] Roger	1414:15
Approach	[KING AIR C/S]	[King Air C/S] vectoring ILS Runway 26 procedure minima Two Zero Zero feet	1414:24
[KING AIR C/S]	Approach	Two Zero Zero land [King Air C/S]	1414:29
Approach	[KING AIR C/S]	Copied	1414:34
Approach	[KING AIR C/S]	[King Air C/S] Avoiding action turn right immediately heading Two Seven Zero degrees traffic [unintelligible word] east 3 miles tracking south fast moving indicating 200ft below	1414:44
[KING AIR C/S]	Approach	Avoid heading Two One Zero and TCAS RA [King Air C/S]	1414:56
Approach	[KING AIR C/S]	[King Air C/S] Roger, report TCAS RA completed	1415:01
Approach	CWL 98T	98T Turn left heading Three Zero Zero degrees, report localiser established	1415:06
CWL 98T	Approach	Turn left heading Three Zero Zero degrees 98T	1415:10
[KING AIR C/S]	Approach	And [King Air C/S] now clear of that conflict and request descend to 2500ft on current heading	1415:35
Approach	[KING AIR C/S]	[King Air C/S] not on the current heading, those two jets are now indicating well above turn and left heading One Six Zero degrees	1415:41

Figures 1 - 5 show the positions of the Typhoons and the King Air at relevant times in the lead up to and during the Airprox. The screen-shots are taken from a replay using the Claxby radar, which is not used by Cranwell or Coningsby ATC and is therefore not necessarily representative of the picture available to either controller.

At 14:12:33 (Figure 1), the pair of Typhoons free-called Coningsby Approach, having pulled up from low-level. The lead aircraft had already selected the Coningsby 'recovery' squawk and the second aircraft had retained the low level squawk.

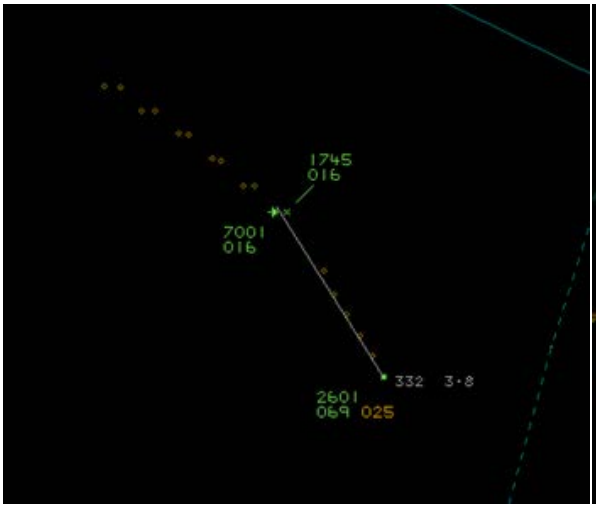


Figure 1: Geometry at 14:12:33

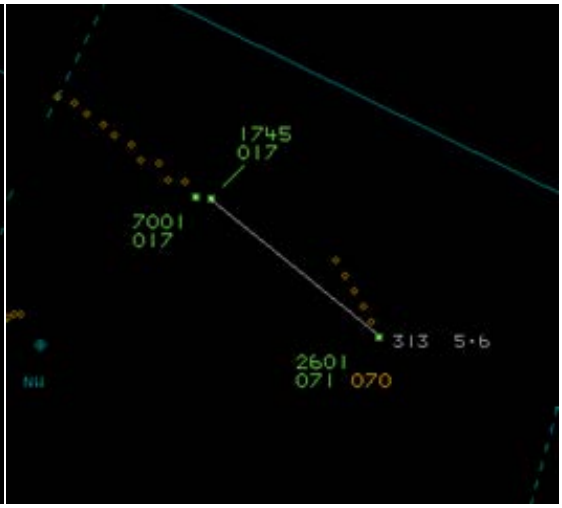


Figure 2: Geometry at 14:13:18

(Typhoons 1745/7001; King Air 2601)

At 14:13:18 (Figure 2), the Typhoons were instructed to climb to height 5000ft on Coningsby QFE 1028hPa, then identified and given TS. The communication that followed was regarding the pair's intentions, with no Traffic Information (TI) passed on the King Air that they were climbing towards.

At 14:13:59 (Figure 3), the King Air, already in the descent to height 2500ft Cranwell QFE, requested change from TS to DS. The Cranwell Approach controller agreed DS, cleared the King Air for transit through the Coningsby MATZ and began admin associated with the ILS approach. At the same time, the Typhoons requested, and were given, own navigation for the climb.

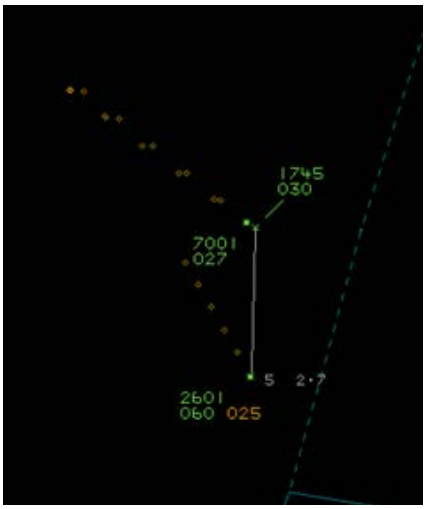


Figure 3: Geometry at 14:13:59

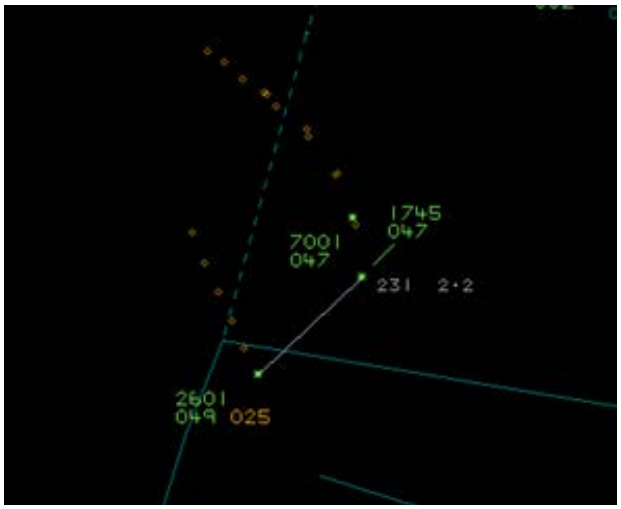


Figure 4: Geometry at 14:14:43

At 14:14:43 (Figure 4), the Coningsby Approach controller passed TI to the Typhoons on the King Air. The Typhoons responded that they were looking and requested further climb. At the same time, the Cranwell Approach controller issued the King Air with avoiding action right onto heading 270 degrees.

At 14:14:55 the Typhoons were instructed to climb to height 10,000ft, while the King Air reported responding to a TCAS RA (and right onto heading 210°). The King Air and Typhoons passed at CPA of 1.3nm at 14:15:05 (Figure 5).

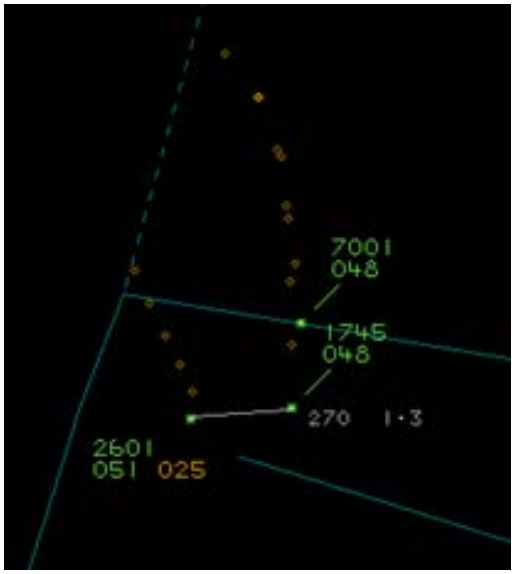


Figure 5: Geometry at 14:15:05

When the pair of Typhoons free-called, the Coningsby Approach controller's focus was on another Typhoon that had been holding ready for recovery during a flying display practice and was approaching minimum fuel. The pair of Typhoons wanted to general handle rather than recover but had called up with the lead squawking for recovery, which led the Approach controller to believe they wanted to recover.

The initial climb to height 5000ft issued to the Typhoons meant that they were at a similar height to the descending King Air, however TI was not passed as it should have been iaw CAP 774. The Coningsby Approach controller's lack of understanding of the Typhoons' intentions meant that their intended track and height block were not correctly scanned for potential confliction, even when the pair were issued with own navigation. Once the Coningsby Approach controller identified that the requested levels by the Typhoons were higher than FL195, which would require handover to Swanwick, their focus switched to ensuring that the Typhoons understood the height limitation, without consideration for lateral movement. Another free-call aircraft 40nm to the east of Coningsby then drew the Approach controller's attention away from the pair of Typhoons. Despite the lack of TI, responsibility for avoidance of other traffic lay with the Typhoons and there was no requirement for them to achieve a specific minimum separation from the King Air.

The Coningsby Supervisor was in the Visual Control Room (VCR) due to the display practice and was therefore unable to assist the Coningsby Approach controller. A second controller, who was also a qualified supervisor, was asked to assist in the Approach Control Room (ACR). At the time the Typhoons were first speaking to the Coningsby Approach controller, the Coningsby 'Supervisor' took a call from the Cranwell Approach controller requesting a crossing of the Coningsby stub, not below 2500ft Cranwell QFE, for the King Air. The crossing was approved and the traffic was pointed out digitally to the Coningsby Approach controller.

When it became evident that the Typhoons were climbing towards the descending King Air, the Coningsby 'Supervisor' took a call from the Cranwell Supervisor, who was trying to effect coordination. When the Coningsby 'Supervisor' realised that he would be unable to get the Coningsby Approach controller's attention to get an agreement from the Typhoons, he attempted to transfer the call to the Approach controller to coordinate for themselves. As the call had become protracted, the Cranwell Supervisor decided that coordination would no longer be effected in time and avoiding action was necessary.

The Cranwell Approach controller observed the pair of Typhoons and the low-level and Coningsby squawks, but noticed that the Mode C was indicating above the parameters of the low-level system. When the King Air upgraded to DS, despite the speed and continued climb of the Typhoons, the Cranwell Approach controller moved on to eliciting information associated with the King Air's ILS approach rather than seeking TI from Coningsby or issuing an early avoiding action turn, which would have been a more appropriate course of action at the limits of deconfliction minima. When the Typhoons turned right, own navigation, the Cranwell Approach controller did instruct the King Air to take avoiding action but its relatively slow speed meant that separation was further reduced to 1.3nm and approximately 300ft. This illustrates the need to react to a dynamic situation when applying DS, including timely issuance of avoiding action when necessary (control before admin), until coordination can be put in place.

An OSI led by RAF Coningsby ATC identified several contributory factors and made recommendations, including standards bulletins, to remind all controllers of their responsibilities to not introduce a risk of collision for TS aircraft, as well as highlight the importance of understanding the intentions of aircraft prior to implementing a plan. There is also an ongoing change to the LoA between Cranwell and Coningsby ATC to reflect the requirement for Cranwell to inform Coningsby of all DS traffic inbound to Cranwell. Due to the timing of the King Air's upgrade to DS, this is unlikely to have helped on this occasion but it may assist in preventing future losses of separation.

UKAB Secretariat

The King Air and Typhoon 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 King Air 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].

Comments

HQ Air Command

With lookout essentially denied due to the weather conditions during this Airprox, the remaining barriers to MAC in a Class G environment are electronic conspicuity and a surveillance-based Air Traffic Service. Both of these remaining barriers functioned to a degree, although it appears that perhaps neither worked as efficiently as it could have. The Typhoons elected to remain on a TS as they expected to 'punch through' the cloud layer and, by the time a DS could have been agreed, would have been VMC once more and so would have immediately downgraded from a DS to a TS. Furthermore, with a radar lock on the factor-traffic the Typhoon pilot knew that there was no danger of collision with the King Air.

From the timings available in the reports (transcripts and Typhoon on-board recordings) and, assuming a descent rate of approx. 1500fpm for the King Air (info from King Air Standards Flight) it seems that the King Air pilot, knowing he would be penetrating the cloud, could have requested a DS slightly earlier than he did. This is not a criticism of the King Air pilot, rather this highlights that the more notice that is provided to ATC that a change of Service is required then the better the opportunity for the controller to scan around the screen to give appropriate and timely information.

Additionally, it appears that in an effort to be helpful to the Coningsby Approach (RA) controller, the Typhoon pilot pre-set the recovery squawk for Coningsby before being instructed to do so. This led the RA controller to assume that the aircraft were for recovery rather than general handling which would have meant that they would need to hold off during the display practice;

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

without information on their intended flight path it is difficult to predict where conflictions may exist. Pilots should be mindful that the best of intentions may not always be interpreted as intended, thus it is usually better to wait until being told to do something by the controller.

This event was subject to a detailed investigation on the unit which drew out a number of lessons – mainly within the ATC domain. However, crews can help controllers to help them by simply considering some of the points made above.

Summary

An Airprox was reported when a King Air and a Typhoon flew into proximity at 1415 on Wednesday 5th April 2017. Both pilots were operating under IFR in IMC, the King Air pilot in receipt of a Deconfliction Service from Cranwell and the Typhoon pilot in receipt of a Traffic Service from Coningsby.

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 by discussing the actions of the King Air pilot. Although they agreed that it would have been prudent to request an upgrade to a Deconfliction Service as early as possible, especially due to the busy airspace they were operating in, some members commented that this was a moot point in that, under a TS, the controller should in any case have given comprehensive TI on the Typhoons. Nevertheless, asking for a DS at an earlier point may have given the Cranwell controller more time both to assess whether the aircraft that would conflict with the King Air and also liaise with any other agencies to effect coordination against the conflicting traffic; the Board noted that achieving such coordination was not always possible due to the busy local conditions and associated R/T levels, and so the earlier a request was made the better. The Board noted that the difference in speed between the King Air and the Typhoons approaching from the rear quarter would have meant that any avoiding action carried out by the King Air in relation to the RA would likely only have served to avoid a collision rather than achieve significant separation.

The Board then looked at the actions of the Typhoon pilot. The military member began by informing the Board that the Typhoon pilot had initially climbed out of low-level when VMC, had expected to climb quickly through the cloud layer, and had therefore decided not to upgrade to a DS when climbing through IMC. In the event, the Typhoon pilot had been levelled off in IMC by ATC and so his initial plan had become compromised. Some members with military experience questioned whether the plan to climb through even a layer of cloud in what was a busy ATC area was a valid plan given that such an act would almost inevitably result in flying through either Coningsby's or Cranwell's radar patterns; although he may well be able to ensure his own aircraft's safe separation by using his radar, ATC units could not know that and would be required to pass avoiding action to their aircraft in the area. The Board noted that the Typhoon pilot's selection of a recovery squawk had been well-intentioned but had resulted in the Coningsby controller's SA becoming flawed and the controller therefore not initially planning adequately for the Typhoons to climb through the level of the King Air. Notwithstanding, members agreed that the Typhoon pilot had sufficient SA on the King Air from his onboard radar in order to avoid it (although they opined that he probably lost radar contact on it prior to CPA when the King Air would have likely been outside the Typhoon's radar coverage). However, they agreed that in turning towards the King Air (whilst in cloud), the Typhoon pilot had caused the King Air to receive a TCAS RA. Some members wondered whether the Typhoon pilot appreciated the separation that was required in order to avoid triggering a TA or RA in other aircraft; although this varied with speeds and altitude, Figure 6 shows the conditions that were extant at the time whereby it can be seen that at least 2nm separation on the beam was required if an RA was to be avoided, and preferably about 3nm in order to avoid a TA warning.

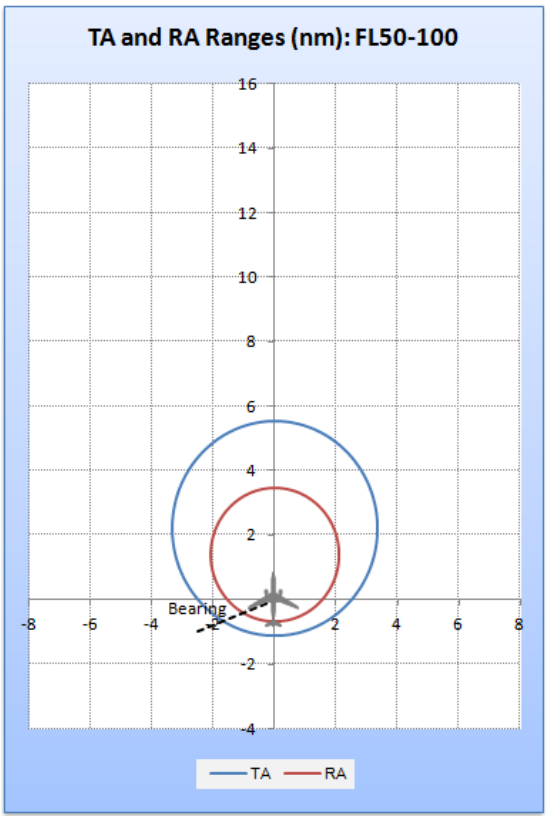


Figure 6: TCAS TA/RA Alerting Guide
Target 200kts, Intruder 300kts
FL50-FL100

The Board then turned to the actions of the Coningsby controller. ATC members opined that because the Typhoon pilot was squawking 'recovery' she may not have assimilated the King Air as a factor when she initially cleared the Typhoons to climb before identifying them and agreeing the TS. However, it should have become clear that the King Air was a factor soon after, and before she cleared them 'own navigation' (which removed an effective barrier by not controlling the Typhoon's heading). Although eventually giving the Typhoons TI on the King Air, by then subsequently clearing them to climb, members thought that the Typhoon crews may have formed a false perception that ATC were not concerned about the separation between the aircraft. The Board felt that the Coningsby controller's approval of the Typhoon's climb through the King Air's level was a contributory factor in the Airprox in that it gave tacit approval for the Typhoon pilot to climb into conflict. As for the lack of timely TI during the Typhoon pilot's initial climb out of low-level, although this was considered to have been a lapse, because the Typhoon pilot had radar information on the King Air, the Board decided that this had not materially influenced the actions of the Typhoon pilots.

Looking next at the actions of the Cranwell controller, the Board agreed that he had allowed himself to become distracted by carrying out an admin task after upgrading the King Air to a DS. This had resulted in the King Air not receiving timely avoiding action prior to the RA, which could otherwise have been avoided by an earlier turn away from the Typhoons.

The Board then considered the cause and risk of the incident. There was an intense debate on the cause of the incident which hinged on whether it was the action of the Typhoon pilot turning towards the King Air that had resulted in the incident, or whether the Coningsby and Cranwell controllers should have done more to ensure separation. Although the debate ebbed and flowed, members eventually agreed that there were a number of contributory factors: the first being that the Typhoon pilot's autonomous selection of the recovery squawk caused uncertainty in the mind of the Coningsby controller; the second being that the Coningsby controller's agreement for the Typhoon pilot's own navigation and subsequent climb in the vicinity of the King Air gave tacit endorsement to his plan; and the third being the late traffic information and avoiding action by the Cranwell controller to the King Air

pilot. However, in the end, the Board agreed that the incident was within Class G airspace and that the pilots were ultimately responsible for their own separation. Although ultimately the Typhoon pilot had maintained separation on the King Air, it had been his turn towards, and subsequent climb, that had caused a TCAS RA and, therefore, the incident. As a result, the Board agreed that the cause of the incident was that the Typhoon pilot had turned towards the King Air and flown close enough to cause a TCAS RA. Turning to the risk, members agreed that although the Typhoons had turned towards the King Air whilst IMC and that safety had been degraded, the fact that the Typhoon pilot had assessed the resulting separation using his radar had meant that there had been no risk of collision; accordingly, the Board assessed the risk as Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Typhoon pilot turned towards the King Air and flew close enough to cause a TCAS RA.

Contributory Factor(s): 1. The Typhoon pilot's autonomous selection of a recovery squawk caused uncertainty in the mind of the Coningsby controller.
2. The Coningsby controller's approval of the Typhoon pilot's actions gave tacit endorsement to his plan.
3. Late Traffic Information and avoiding action by the Cranwell controller.

Degree of Risk: C.

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:

ANSP Regulations, Processes, Procedures & Compliance was considered to be **ineffective** because the Coningsby controller had allowed a confliction to be introduced by allowing the Typhoons to turn towards and then clearing them to climb through the level of the King Air.

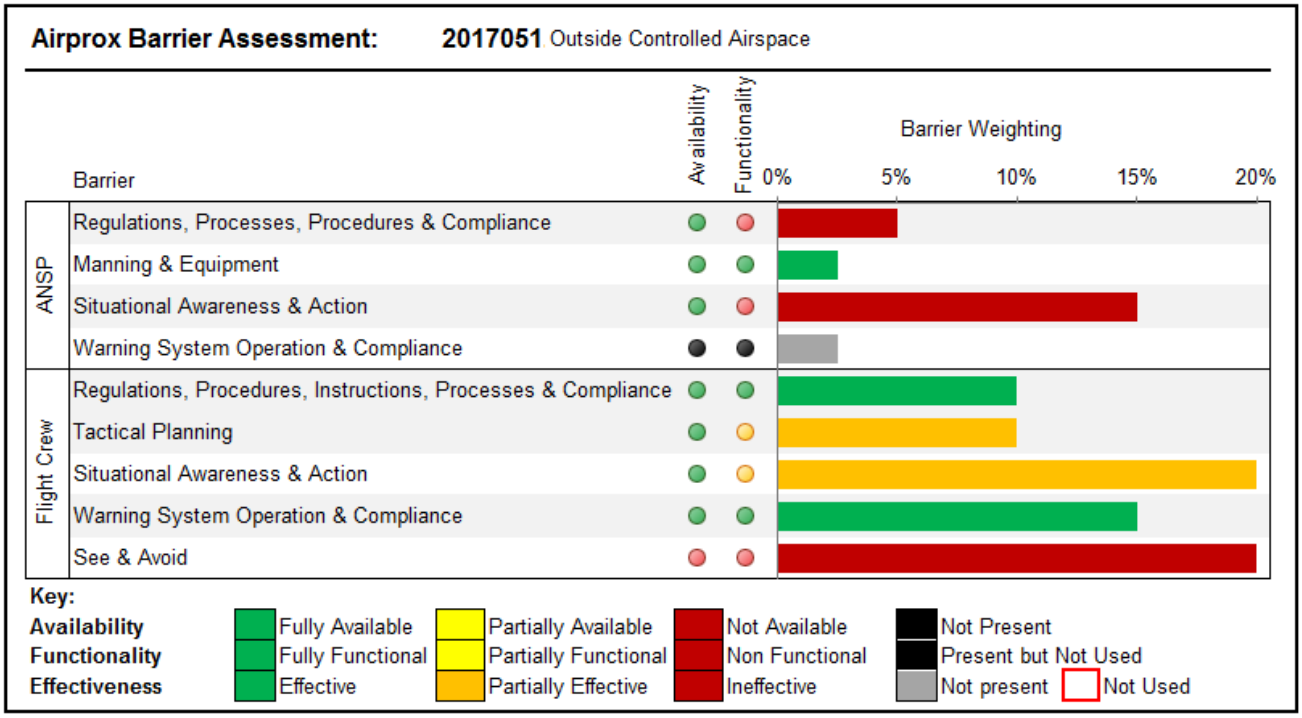
ANSP Situational Awareness and Action was considered to be **ineffective** because the Cranwell controller did not provide avoiding action to the King Air pilot early enough to ensure sufficient separation from the Typhoons, and the Coningsby controller had allowed the Typhoons to climb into conflict with the King Air.

Flight Crew Tactical Planning was considered to be **partially effective** because although the Typhoon pilots were aware of the King Air on their radar, they climbed and flew towards the King Air whilst in IMC.

Flight Crew Situational Awareness and Action was also considered to be **partially effective** because although the Typhoons were aware of the King Air they did not alter their trajectory to avoid the King Air by a sufficient margin.

See and Avoid was considered to be **ineffective** because both pilots were IMC and therefore unable to see the other aircraft.

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


Airprox Barrier Assessment: 2017051 Outside Controlled Airspace
Barrier
Availability
Functionality
Barrier Weighting
0%
5%
10%
15%
20%
ANSP
Regulations, Processes, Procedures & Compliance
Manning & Equipment
Situational Awareness & Action
Warning System Operation & Compliance
Flight Crew
Regulations, Procedures, Instructions, Processes & Compliance
Tactical Planning
Situational Awareness & Action
Warning System Operation & Compliance
See & Avoid
Key:
Availability
Functionality
Effectiveness
Fully Available
Fully Functional
Effective
Partially Available
Partially Functional
Partially Effective
Not Available
Non Functional
Ineffective
Not Present
Present but Not Used
Not present
Not Used