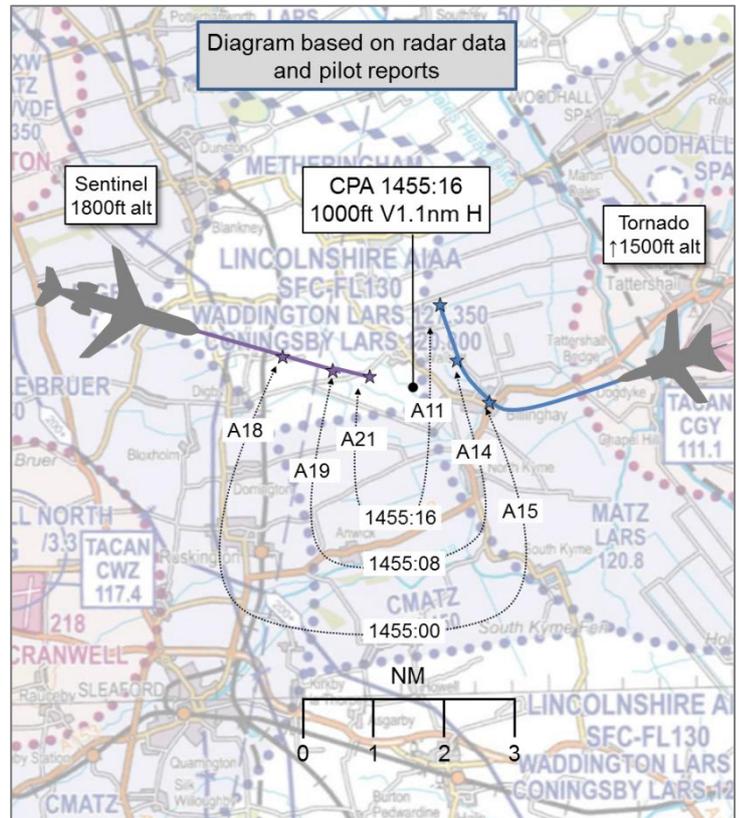


**AIRPROX REPORT No 2015100**

Date: 2 Jul 2015 Time: 1455Z Position: 5305N 00018W Location: 3nm NE Coningsby

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

| Recorded    | Aircraft 1                     | Aircraft 2           |
|-------------|--------------------------------|----------------------|
| Aircraft    | Tornado                        | Sentinel             |
| Operator    | HQ Air (Ops)                   | HQ Air (Ops)         |
| Airspace    | Coningsby MATZ                 | Lincs AIAA           |
| Class       | G                              | G                    |
| Rules       | IFR                            | VFR                  |
| Service     | Traffic                        | Traffic              |
| Provider    | Coningsby Departures           | Cranwell Approach    |
| Altitude/FL | FL014                          | FL019                |
| Transponder | A,C,S                          | A,C,S                |
| Reported    |                                |                      |
| Colours     | Grey                           | Grey                 |
| Lighting    | Strobes, Nav, formation lights | Strobes, Nav lights. |
| Conditions  | VMC                            | VMC                  |
| Visibility  | 10km                           | 10km                 |
| Altitude/FL | 1500ft                         | 1800ft               |
| Altimeter   | QFE (1016hPa)                  | QFE                  |
| Heading     | Turning to 030°                | 090°                 |
| Speed       | 300kt                          | 200kt                |
| ACAS/TAS    | TCAS II                        | TCAS II              |
| Alert       | RA                             | RA                   |
| Separation  |                                |                      |
| Reported    | 500ft V/ 1nmH                  | 300ft V/1nm H        |
| Recorded    | 1000ft V/1.1nm H               |                      |



**THE TORNADO PILOT** reports that prior to departure he was cleared for a Coningsby SID 2, climbing to FL130. Immediately after take-off, the aerodrome controller advised that there was traffic 8nm west of the airfield at 1800ft, tracking east. The crew switched to the Departures frequency, were identified under a Traffic Service, and cleared to climb to FL130, with no mention of the traffic. At 2.5 DME, they turned right in accordance with the SID and, climbing through 1500ft, the controller transmitted that the previously called traffic was now east-north-east 4nm, inbound to Cranwell, and that the Tornado should stop climb at 1200ft. At the same time, a TCAS TA was displayed so, being VMC, the pilot decided to tighten the right turn whilst descending back to 1200ft. During this manoeuvre, a TCAS RA to descend was received, followed swiftly by 'level off' and 'clear of conflict' notifications. He rolled out on a heading of 030°, and the crew became visual with the conflicting traffic, judged to be 1nm away and 500ft above. The TCAS RA was reported to ATC.

He assessed the risk of collision as 'Low'.

**THE SENTINEL PILOT** reports he was the PF in the left-hand seat, and that the Sentinel was downwind in the Cranwell radar pattern receiving vectors for the ILS. It was a northerly feed-in as they were returning from Doncaster. They descended under instruction from Cranwell to 1800ft on the QFE, and were expecting to receive a right turn towards the localiser. ATC made them aware of Coningsby traffic outbound, and assured them that it was co-ordinated. He monitored an approaching contact on TCAS, whilst the pilot non-flying (PNF) attempted to visually acquire the traffic. The PNF, then the PF, saw an on-coming Tornado in their 12 o'clock, climbing towards. Thinking the Tornado had 'TCAS limitations' he was about to take avoiding action when he saw the Tornado break to its right and pass down the left-hand side of the Sentinel. At this point they had a TCAS RA instructing

them to climb. Although visually clear of the conflict, he followed the RA in case there was a second, unseen Tornado. Once clear of conflict they continued the recovery to Cranwell.

He assessed the risk of collision as 'Low'.

**THE CONINGSBY ADC** reports that he had been in position for about an hour with a Ground controller in position. The Tornado taxied out on Ground frequency, and the controller obtained clearance for a SID2 departure. As it approached the holding position the ADC requested an IFR release from the Departure controller, which was granted without any caveat or restriction. The Tornado was cleared for take-off and, very shortly afterwards, the UT Approach controller called to advise that after the Tornado had departed there was to be a climb out restriction of 1200ft which was in place because of a Cranwell inbound for a northerly feed-in. This traffic was identified to the ADC on the Air Traffic Monitor (ATM); at this time the Tornado was turning onto the runway. The ADC was aware that the Tornado would spend some time on the runway prior to rolling, so he continued to monitor the Cranwell traffic on the ATM. When the Tornado became airborne and was at the departure end of the runway, the Cranwell traffic was 8nm away to the NW. The ADC decided to pass Traffic Information as a 'heads-up' to the pilot but, because the aircraft was for a SID2, which was RW track to 1200ft or 2.5DME, he was nonetheless confident that it would turn and climb clear of the Cranwell inbound so he did not impose the climb-out restriction. The pilot acknowledged the Traffic Information and immediately reported changing to the Departures frequency. He continued to monitor the traffic on the ATM and saw that the Tornado was later in the turn than would normally be expected.

He assessed the risk of collision as 'Medium'.

**THE CONINGSBY DEPARTURES CONTROLLER** reports issuing a release on the Tornado departing on a SID 2 climbing to FL130. The Approach controller was notified about an inbound to Cranwell on a northerly feed, which he approved. It was agreed that a climb out restriction of 1200ft QFE would be put in place against this traffic, and that this would be applied to all departing traffic except the Tornado on release because they both thought it would be well ahead of the Cranwell traffic. The ADC frequency was on speaker, and the Departures controller heard Tower pass the Traffic Information to the Tornado, which at that stage was no factor. However, it took longer than anticipated for the aircraft to power-up and get airborne, which resulted in the Tornado climbing out beneath the Cranwell traffic. The controller gave Traffic Information but unfortunately gave an incorrect position report, and then instructed the Tornado to stop climb at 1200ft. The pilot acknowledged this and subsequently called level; he then reported a TCAS RA and, after a brief pause, called to say the confliction was resolved.

He assessed the risk of collision as 'Medium'.

**THE CONINGSBY SUPERVISOR** reports overhearing the UT Approach Controller approve traffic for a northerly approach in the Cranwell radar pattern, and heard them ascertain details. The UT informed the Supervisor of the position of the Cranwell Traffic and, because it was SW of Waddington, he was satisfied that it would not be a factor for the Tornado shortly due to depart. The Instructor and the UT then discussed various courses of action, including issuing a climb-out restriction for all aircraft departing after the subject Tornado. The plan of action was relayed to the Departures controller. On climb-out the Tornado seemed to take longer than normal before the right turn onto north, which put it into confliction with the Cranwell traffic. The Supervisor advised the Departures controller to stop the Tornado climb at 1200ft, which the Departures controller implemented. The Supervisor then heard the Tornado pilot called a TCAS RA, and the controller then correctly allowed the pilot to complete his manoeuvre as required. The Approach controller received a call from Cranwell stating that their traffic had also received a TCAS RA. Shortly afterwards, the Cranwell Supervisor rang to discuss the incident and advise that a DASOR would be filed. Discussion within Coningsby ATC revealed that it was thought that the Sentinel had 'sensitive TCAS' that required 1000ft separation. Cranwell ATC had not informed Coningsby ATC that the aircraft was a Sentinel and that it required 1000ft separation; had that happened, then the Tornado would have been held on the ground, or the departure profile amended.

**THE CRANWELL APPROACH CONTROLLER** reports instructing with a UT controller. The Sentinel was returning from the north and a northerly feed was agreed in advance with Coningsby. His understanding of the Letter of Agreement (LOA) was that once a northerly feed had been agreed, Coningsby outbound traffic and visual circuit would be restricted to 1200ft - once clear of the Cranwell traffic the Coningsby traffic can then climb; the intention being to allow the Cranwell traffic a normal pattern height radar approach without coming into conflict with the departing Coningsby traffic. When traffic departing Coningsby was spotted they were unconcerned at first, believing that it would be stopped off at 1200ft. Coningsby then communicated via landline that they intended to climb up ahead but through the level of the Sentinel. Looking at the tracks at that stage, and believing the departing traffic to be a Typhoon, the controller was still unconcerned, because the climb rate of a Typhoon would have taken it clear. However, it wasn't communicated by Coningsby that this was in fact a Tornado and, as it became apparent that the climb rate of the Tornado was not enough to ensure separation, the closure rate was such that he decided that avoiding action, without the known intentions of the Coningsby traffic, might put the Sentinel in greater jeopardy. The Sentinel pilot then reported the TCAS RA.

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

### Factual Background

The weather at Coningsby was reported as:

METAR EGXC 021450Z 10004KT 9999 FEW030 BKN180 24/16 Q1017 BLU NOSIG

### Analysis and Investigation

#### Military ATM

The Tornado was under a Traffic Service with Coningsby Departures and the Sentinel was under a Traffic Service with Cranwell Approach.

Portions of the tape transcript are below, between the Sentinel, Tornado, Cranwell Approach (CWL RA), Cranwell Departures (CWL Dep), Coningsby Approach (CBY RA), Coningsby Aerodrome Controller (CBY ADC) and Coningsby Departures (CBY Dep):

| From    | To             | Speech   | Time     |
|---------|----------------|--|----------|
| CWL RA  | CBY RA         | Cranwell approach, request northerly feed for traffic Scampton south west one zero miles tracking south east squawking two, six, zero, five.                 | 14:49:28 |
| CWL RA  | Sentinel       | {Sentinel c/s}, Cranwell approach squawk two, six, zero, seven.  | 14:49:40 |
| CBY RA  | CBY RA<br>OJTI | This one...a two, six, zero, five, so {Tornado c/s} will be ahead of him....   | 14:49:48 |
| CBY RA  | CWL RA         | Yeah...yea that is approved.   | 14:49:54 |
| CWL RA  | CBY RA         | Down to one thousand, eight hundred feet our QFE one, zero, one, zero.   | 14:49:57 |
| CBY RA  | CWL RA         | One, zero, one, zero, Roger, thanks Coningsby.   | 14:49:59 |
| CBY RA  | CBY Dep        | Approach, traffic information.   | 14:51:49 |
| CBY Dep | CBY RA         | Go ahead   | 14:51:49 |
| CBY RA  | CBY Dep        | Erm, Cranwell north west ten miles, tracking east squawking two, six, zero, seven  | 14:51:50 |
| CBY Dep | CBY RA         | Contact  | 14:51:54 |
| CBY RA  | CBY Dep        | That is a northerly feed and then if we can get {Tornado c/s} away before him, after that it will be a one thousand, two hundred feet climb out restriction. | 14:51:54 |
| ADC     | CBY Dep        | Tower, request release {Tornado c/s}.  | 14:52:11 |
| CBY Dep | CBY ADC        | {Tornado c/s} released.  | 14:52:12 |
| CBY RA  | CBY ADC        | Approach, err climb out restriction, not for the {Tornado c/s} but after   | 14:52:28 |

|          |          |  |          |
|----------|----------|--|----------|
|          |          | him one thousand, two hundred feet QFE.  |          |
| ADC      | CBY RA   | One thousand, two hundred feet after the {Tornado c/s}.  | 14:52:33 |
| CBY RA   | CBY ADC  | That's against traffic CWL north six miles, tracking east squawking two, six, zero, seven.                                   | 14:52:35 |
| CBY ADC  | CBY RA   | Contact  | 14:52:38 |
| CBY RA   | CBY ADC  | That's a northerly feed.   | 14:52:39 |
| CBY ADC  | CBY Deps | {Tornado c/s} rolling.   | 14:53:49 |
| CWL Dep  | CBY RA   | Go ahead   | 14:54:13 |
| CBY RA   | CWL Dep  | One track, he's just getting airborne now from Coningsby squawking one, seven five, three.                                   | 14:54:14 |
| CWL Dep  | CBY RA   | Contact.   | 14:54:18 |
| CBY RA   | CWL Dep  | He'll be turning to the north...erm. We'll keep him laterally away from the two six zero seven.                              | 14:54:19 |
| CBY ADC  | Tornado  | ... (Inaudible)... Traffic west, eight miles, tracking er east, Cranwell inbound indicating one thousand eight hundred feet. | 14:54:20 |
| CWL Dep  | CBY RA   | Ok that's the Sentinel. The two six, zero, seven.  | 14:54:22 |
| CBY RA   | CWL Dep  | Thanks.  | 14:54:25 |
| CWL RA   | Sentinel | {Sentinel c/s} traffic left eleven o'clock seven miles, crossing left right, one thousand five hundred feet below climbing.  | 14:54:26 |
| CWL RA   | Sentinel | {Sentinel c/s} previously reported traffic is turning to the north, Coningsby will keep it clear.                            | 14:54:32 |
| Tornado  | CBY Deps | {Tornado c/s} airborne passing eight hundred feet traffic service  | 14:54:34 |
| CBY Deps | Tornado  | {Tornado c/s} Coningsby departures, identified, traffic service. SID two approved, climb flight level one three zero         | 14:54:37 |
| Tornado  | CBY Deps | Climb flight level one three zero {Tornado c/s}.   | 14:54:42 |
| CBY Deps | Tornado  | {Tornado c/s} previously called traffic now east north east, four miles tracking east at one thousand eight hundred feet.    | 14:54:44 |
| CBY Dep  | Tornado  | {Tornado c/s} stop climb at height one thousand two hundred feet.  | 14:54:52 |
| Tornado  | CBY Deps | Stop climb height one thousand two hundred {Tornado c/s} .....and you called the traffic to the east.                        | 14:54:56 |
| CWL RA   | Sentinel | {Sentinel c/s} previously reported traffic twelve o'clock two miles heading north bound, five hundred feet below climbing.   | 14:55:02 |
| Sentinel | CWL RA   | {Sentinel c/s} is visual and TCAS RA climbing.   |          |
| Tornado  | CBY Deps | {Tornado c/s} TCAS RA... Standby!  | 14:55:08 |

At 1451:54, the CGY Approach controller called the Departures controller and identified the Sentinel (squawk 2607) on a northerly pattern at Cranwell, predicted that the Tornado could get away before him and stated that after that all departures would be restricted to 1200ft QFE. At 1452:12 (Figure 1), the Tornado was released by the CGY Departures controller.

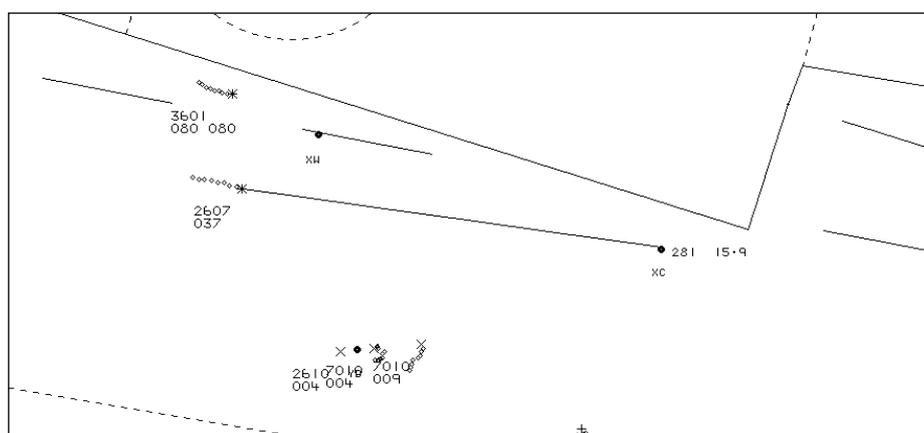


Figure 1: Tornado released by CGY Departures with Sentinel 15.9nm away.

CGY Approach then re-iterated to the Aerodrome Controller at 1452:28 that the climbout restriction of 1200ft did not apply to the Tornado. Traffic Information was then passed to the Aerodrome Controller on the Sentinel (using the radar feed on display in the Visual Control

Room). At 1453:49, the Aerodrome Controller provided a ‘rolling’ call on the Tornado as it was departing. At 1454:19 (Figure 2), CBY Approach had informed Cranwell Departures that the Tornado would be turning north and separation on the Sentinel would be lateral.

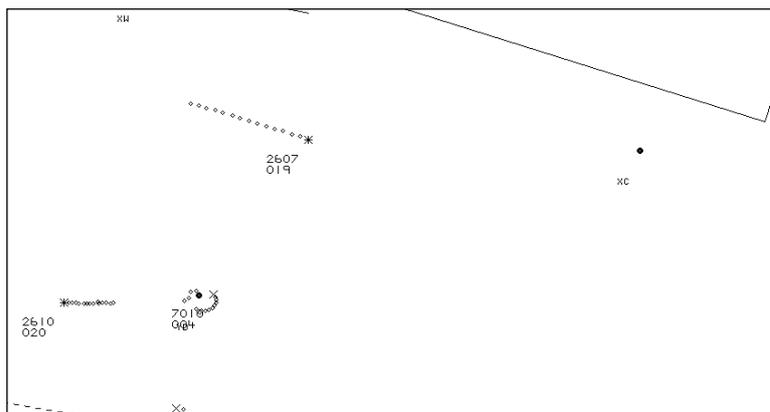


Figure 2: CGY inform CWL of lateral separation on Tornado outbound turning north.

At 1454:20, the Aerodrome Controller called Traffic Information as, “Traffic west, eight miles, tracking er east, Cranwell inbound indicating one thousand eight hundred feet.” At 1454:37 (Figure 3), CGY Departures identified the Tornado, applied a Traffic Service and approved the SID2 to FL130.

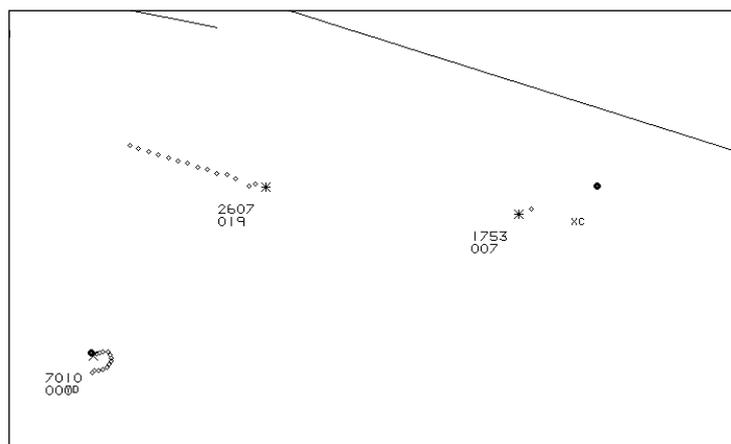


Figure 3: Tornado (squawk 1753) approved on SID2 climbing to FL130.

At 1454:44 (Figure 4), an update was provided by CBY Departures, “previously called traffic now east north east, four miles tracking east at one thousand eight hundred feet.” The Sentinel was in fact west by 5nm.

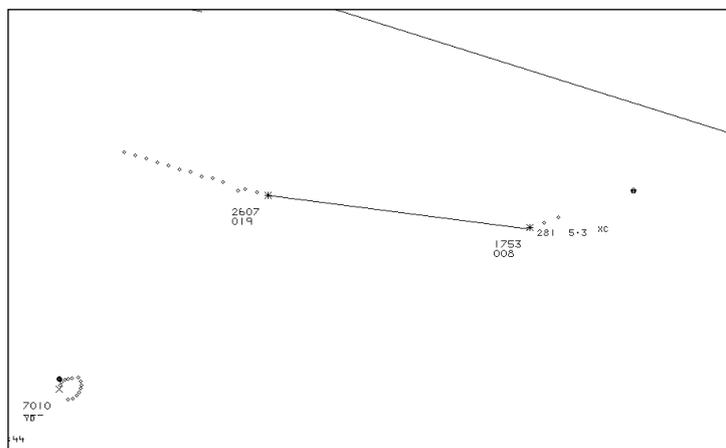


Figure 4: Traffic Information at 1454:44.

At 1454:52 (Figure 5), the CBY Departures controller issued a stop climb at 1200ft. The Tornado pilot readback the stop climb and questioned the 'traffic to the east' call.

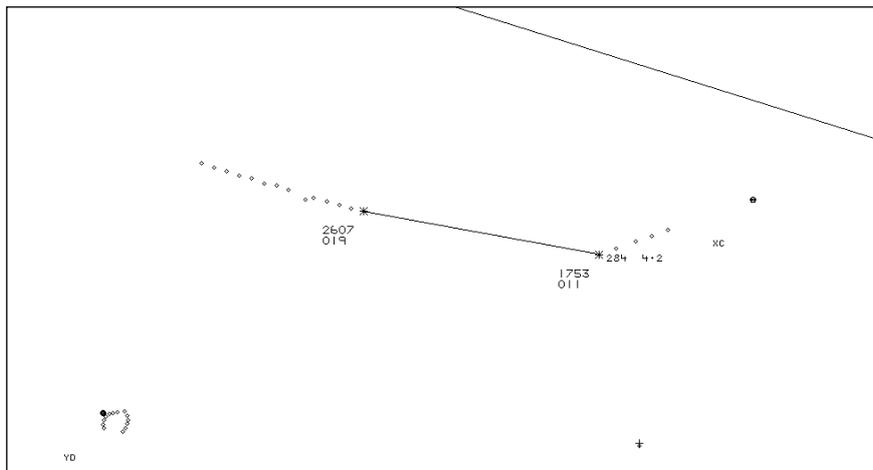


Figure 5: CGY Departures issued a stop climb instruction to the Tornado.

The Tornado was in the right turn at 1455:04 (Figure 6).

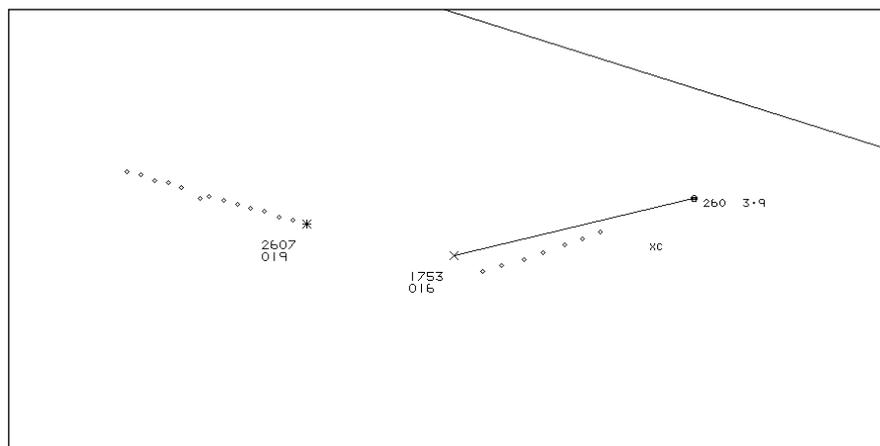


Figure 6: Tornado turning right at 3.9nm from CGY.

The Tornado reported a TCAS RA at 1455:08. The CPA was estimated between 1455:08 and 1455:16 (Figure 7) with a height separation of 1000ft and 1.1nm horizontally.

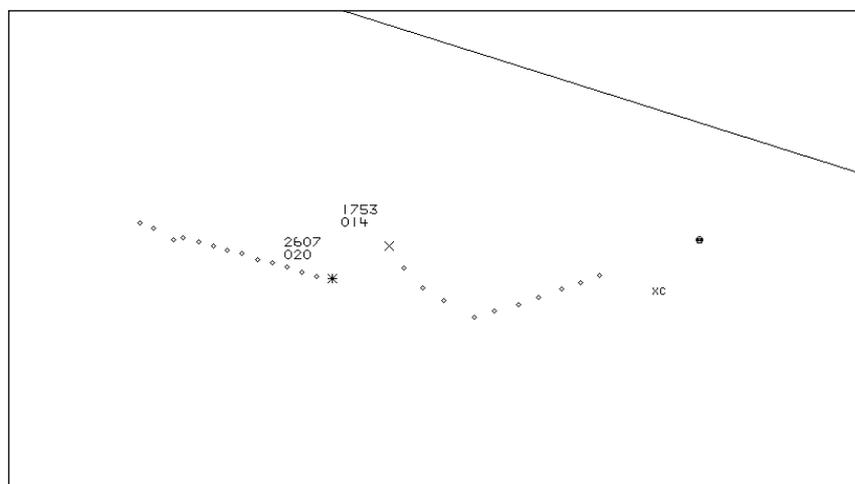


Figure 7: Geometry at 1455:16.

The CGY SIDs are outlined in Figure 8. The SID2 approved on the tape transcript refers to the SID25 North.

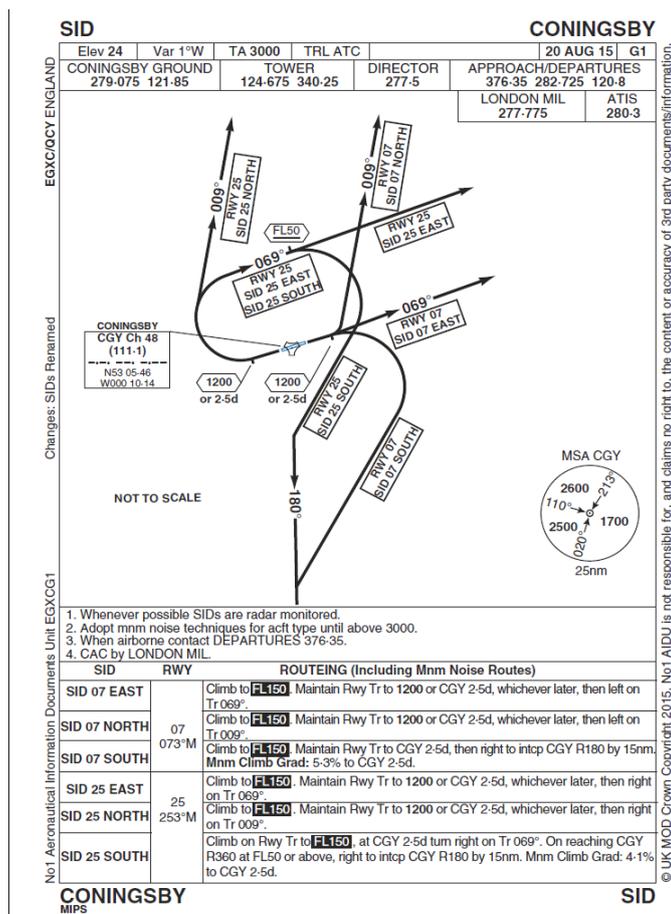


Figure 8: Coningsby SIDs.

The Tornado pilot was on a SID in VMC and had initial Traffic Information from Tower, a TCAS TA once airborne, updated and incorrect Traffic Information from Departures and a descent instruction against the profile, coupled with a TCAS RA. The Tornado was on a SID2: Climb to FL150, maintain Rwy Tr to 1200 of 2.5 DME, whichever later, then right on Tr 009 degrees. At the time, the GR4 crew would have been following the SID, responding to TCAS and attempting to get visual sighting of the Sentinel. The pilot reported turning at 2.5 nm DME, as per the SID and the ATC Supervisor commented upon a delay in turning (Figure 6 demonstrated the Tornado in the turn). It is feasible that the Tornado may have required more than 2.5 nm DME to reach 1200 feet and Coningsby ATC were used to station-based Typhoons with a quicker rate of climb and tighter turns.

The Cranwell Approach controller had called two sets of accurate Traffic Information to the Sentinel, as per the provision of a Traffic Service. The LOA between Cranwell and Coningsby (IFR recoveries to Cranwell on a northerly feed) requires Cranwell to identify their aircraft to Coningsby and request the northerly feed. As per the LOA, Coningsby approved the northerly approach at 1800ft Cranwell QFE 1010hPa. The LOA also states that, "CGY will then coordinate IFR traffic as appropriate and warn VFR traffic as necessary." Having approved a northerly feed, the onus was upon Coningsby to coordinate the IFR Tornado outbound. At 1454:18, Cranwell were informed of the Tornado getting airborne and Coningsby confirmed that they would take lateral separation on the Sentinel.

The Coningsby Approach controller (as discussed by the OJTI and trainee) had initially devised the plan to allow the Tornado to depart unrestricted prior to imposing a climbout restriction on all subsequent departures. At the time of the decision, the Sentinel was at range and the Supervisor

had also thought it a sound plan. Coningsby may be used to Typhoons with potentially a shorter period spent on the runway and higher rate of climb; the Tornado rolled at 1453:49, which was 1 min 37 secs after the release from Departures. Following the rolling call from Tower, the Coningsby Approach controller called Cranwell to identify the Tornado squawk and advise of the intention to achieve lateral separation; at this point, Coningsby Approach still felt that the Tornado could turn north, as per the SID profile, to provide lateral separation.

The Coningsby Departures controller had been provided a plan by the Approach controller and was well aware of the Sentinel positioning. Departures released the Tornado with 15.9nm separation (Figure 1). Once the Tornado was airborne, Departures issued almost continuous transmissions to provide a climb to FL130, Traffic Information and then a stop climb at 1200ft. The Traffic Information was inaccurate (north-east versus west) and this was likely to have been a slip by the controller. Once it was apparent that the original plan of lateral separation would not work, Departures issued the 'stop climb' instruction to the Tornado to provide vertical separation. The Departures controller had not witnessed this scenario before and the Sentinel would have been quicker than most tracks experienced in the Cranwell pattern.

Coningsby were attempting to be pro-active and flexible by allowing a non-standard northerly pattern for Cranwell and allowing the Tornado to continue climb on departure; parts of the Radar Vector Chart are above 1200ft and the controllers were generally not keen on maintaining the fast-jet at that height for any length of time. At any point, Coningsby could have insisted on a southerly pattern for the Sentinel, capped the Tornado climb, or held the departure. As events changed, the plan needed to be re-assessed and by the time it was evident that lateral separation was not going to be achieved, the stop climb instruction was passed to rectify the situation, with Traffic Information to amplify.

TCAS had alerted both crews to each other and this barrier was always present. The procedure itself required coordination of a SID against a northerly pattern but the original assessment was that the Tornado would have departed before becoming a conflict for the Sentinel. The ATC team were aware of the aircraft and Traffic Information was passed; however, as the dynamic situation changed, it was apparent that the original plan of timed deconfliction would not work and the substitute plan of lateral deconfliction was not going to be achieved. The controller had then resorted to height deconfliction but the aircraft were on such trajectories that crews received TCAS RAs. At the closest point the crews were 1.1nm apart with 1000ft height separation. The slow reaction from the whole team may have been a planning/decision making error, as the plan was insufficient to cater for a delayed departure and there was a failure to integrate the information available.

### **UKAB Secretariat**

Both pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard<sup>1</sup>. If the incident geometry is considered to be converging then Tornado pilot was required to give-way<sup>2</sup>, if it If the incident geometry is considered as head-on, or nearly so, then both pilots were required to turn to the right<sup>3</sup>.

### **Comments**

#### **HQ Air Command**

There are lessons for all parties involved in this incident as an Airprox resulted from fairly benign origins. Whilst the controllers at Coningsby and Cranwell wanted to provide each aircraft with the best possible service, safety margins were eroded as the deconfliction plan was always going to be 'tight'. It relied on the Tornado turning at 2.5nm on the SID whereas a turn initiated at an

<sup>1</sup> SERA.3205 Proximity.

<sup>2</sup> SERA.3210 Right-of-Way (c) (2) Converging.

<sup>3</sup> SERA.3210 Right-of-way (c) (1) Approaching head-on.

altitude of 1200ft and at a distance marginally greater than 2.5nm was more likely given the performance of a heavy Tornado (though on-board recording equipment shows the aircraft commencing a turn at 2.5nm); it may be that the controllers at Coningsby are more used to the performance of Typhoons. TI issued to the Tornado that traffic was to the east may also have led to the pilot believing that there was no 'urgency' to turn to the north. Pilots should be mindful that their clearances are issued on an assumption that certain parameters will be met and that the controllers may well be formulating a deconfliction plan based on those assumptions. Contingency plans should also consider alternative actions to maintain separation where the initial plan does not execute as expected (such as an unanticipated delay to aircraft departure resulting in erosion of lateral separation); perhaps a more prudent course of action might have been to apply the climb out restriction to all aircraft in the first instance, and clear the Tornado for further climb if it became apparent that lateral separation would be achieved. Ultimately, the TCAS II systems fitted to both aircraft interacted as expected and issued a coordinated RA once separation had sufficiently reduced. However, the Sentinel pilots were visual with the Tornado in time to take action should the RA not have been issued, and the Tornado pilot had started to tighten his turn based on SA gained from the TCAS, so it is unlikely that the aircraft would have come into close proximity.

## Summary

An Airprox was reported when a Tornado and a Sentinel flew into proximity at 1455z on 2 July 2015. The Sentinel was in receipt of a Traffic Service from Cranwell Approach and the Tornado in receipt of a Traffic Service from Coningsby Departures. The Sentinel was operating VFR in VMC; inbound to Cranwell and positioning for a northerly radar pattern. The Tornado was departing Coningsby IFR on a northerly SID. Both pilots received TCAS RAs.

## **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 first looked at the actions of the Tornado pilot. Some of the civilian members wondered whether it was usual for an aircraft to remain on the runway for such a long period of time before take-off, but were assured by the military members that it was normal for some types if, for example, engine checks were required; it is standard procedure for Tornados to conduct a 30 second engine run-up check once lined up on the runway. That said the Tornado spent approximately 1min 30 on the runway and the Board weren't able to ascertain what caused the delay. Nevertheless, although it didn't preclude air traffic asking the pilot to expedite if necessary, once the controller had given the pilot the runway by clearing him for departure, the pilot could take as long as he needed to get airborne. Turning to the comments that the Tornado turned late, the Board noted that the Coningsby SID2 was clear in that it required the pilot to remain on runway track until reaching 1200ft or 2.5DME, whichever is later. Military members commented that a heavy-weight Tornado might easily extend beyond 2.5nm before reaching 1200ft. The Tornado pilot had confirmed that he initiated the turn at 2.5DME based on a reading on his HUD, however the radar display indicated that the track went beyond 2.5nm, leading to controller perception that he had turned late. Ultimately the Board noted that the Tornado pilot had descended promptly when instructed to by the controller, and that this, coupled with the TCAS information, had enabled him to see the other aircraft and avoid it in a timely manner.

From the Sentinel pilot's perspective, the Board thought that there was very little that he could have done differently under the circumstances. Having been told by air traffic that the traffic departing from Coningsby was co-ordinated, the Board felt that he had no way of knowing that the Tornado was not going to keep clear of him. The Board commended him for correctly following the TCAS RA, even though he was visual with the Tornado because, as he rightly pointed out, there could easily have been another aircraft that he was not visual with in the vicinity.

Turning to Coningsby Air Traffic, the Board acknowledged that they were trying to remain flexible and provide everyone with the service they wanted. However, although the original plan may have been appropriate when it was first made, it clearly required updating once the controllers became aware that the Tornado's take-off had become protracted. The controllers also had a flawed expectation of what they thought would happen given their experience of station-based Typhoons, but when circumstances didn't play out as intended, the plan should have been reassessed. Some controlling members felt that the fail-safe option would have been to put a climb-out restriction of 1200ft on the Tornado anyway, and then, if circumstances proved favourable once the exact geometry was known, it would be easier to remove the restriction rather than impose one at the last moment. Returning to the incident itself, controller members acknowledged that the ADC did what he could to help the situation by passing a rolling call to the Departures controller and giving the Tornado pilot Traffic Information as he got airborne; however, they opined that, ultimately, it had been for the radar controllers to decide on suitable action. Finally, they noted that the erroneous Traffic Information from the Departures controller had been unfortunate in compounding the situation; had he passed the correct bearing this may have alerted the Tornado pilot earlier to the proximity of the Sentinel.

In looking at the actions of the Cranwell controllers, the Board felt that the circumstances were largely beyond their control. That being said, it was noted that the Sentinel was quicker than the usual Cranwell traffic of Tutors and King Airs, and some members wondered whether had that been mentioned by the Cranwell controllers during the initial request for the northerly radar pattern the Coningsby controllers might have made a different plan. Members also noted that although the Cranwell controller had told the pilot that the Coningsby traffic was co-ordinated, in fact the telephone conversation between the two units did not include the term 'co-ordination'; they wondered whether the LOA had lulled the controllers into believing they had protection, when in fact Coningsby VFR traffic would simply only be warned of the Cranwell radar traffic rather than being specifically coordinated against it.

The Board debated at length whether the procedures, and in particular the SID2, were partially to blame for this incident. Some members felt that the option of turning at 2.5DME or maintaining runway track until 1200ft whichever is the later could cause confusion; however, ultimately it was agreed that the Coningsby controllers should have known what the SID was, that there was nothing inherently unsafe about it, and, furthermore, controllers are always able to amend the profile tactically to fit with specific circumstances.

Finally, the Board discussed the merits of TCAS, which, in this instance, had provided both pilots with an instruction to take action, albeit at the same time that the Departure controller had instructed the Tornado to descend. The Board noted the controllers' comments about the Sentinel's 'sensitive TCAS', but were advised by military members that at the time of the Airprox TCAS was relatively new to the military and that there had been misconceptions about how it worked. Since then, controllers have been educated that the vertical and horizontal boundaries of TCAS alerting are not type-specific, but based on set algorithms.

In looking at the cause of the Airprox, the Board quickly agreed that it was that Coningsby ATC had allowed the Tornado to depart into conflict with the Sentinel. Nevertheless, the actions taken by the pilots had been timely and effective, and so the risk was assessed as Category C.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: Coningsby ATC allowed the Tornado to depart into conflict with the Sentinel.

Degree of Risk: C.