

## AIRPROX REPORT No 2013117

Date/Time: 21 Aug 2013 1040Z

Position: 5624N 00251W  
(5.5 nm NW Leuchars)

Airspace: Scottish FIR      (Class: G)

Reporting Ac      Reported Ac

Type: Typhoon      C525C Citation

Operator: HQ Air (Ops)      Civ Exec

Alt/FL: FL50      FL65

Weather: VMC CAVOK      VMC CAVOK

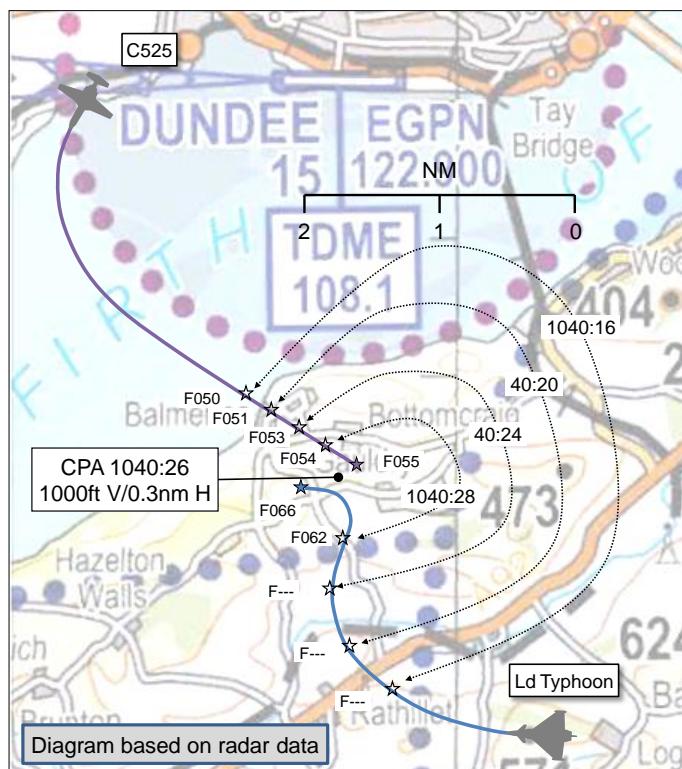
Visibility: 50km      50km

Reported Separation:

500ft V/0.5nm H 1500ft V/5nm H

Recorded Separation:

1000ft V/0.3nm H



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE TYPHOON PILOT** reports departing Leuchars airfield, leading a formation of two Typhoons in trail<sup>1</sup> with navigation and strobe lights on, and SSR Modes A, C and S selected. The formation was cleared to depart on a Standard Instrument Departure (SID) and, on contacting Leuchars Departures, was given a Traffic Service and cleared to climb to FL240. Whilst in the turn (in accordance with the SID), and on passing FL45, traffic was called to the northwest at a range of 5nm; however, this call was 'stepped' on by an internal call between the aircraft in the formation. As the lead aircraft passed FL55, the controller issued an instruction to stop climb at FL50 which, when questioned, was retracted and followed by an avoiding action turn to the left onto a heading of 260°. At this point the trail aircraft became visual with the conflicting traffic and advised that it was no longer a collision. They assessed that the lead aircraft passed within 0.5nm and 500ft of the Citation and the second aircraft passed within 1nm and 500ft.

He assessed the risk of collision as 'High'.

**THE C525C PILOT** reports flying a white and blue aircraft with strobes, "pulse lights" and navigation lights on, and SSR Mode A, C and S selected. The aircraft was fitted with TCAS. He departed from Dundee and after take-off was cleared by Dundee ATC to turn direct to MADAD and climb to FL170. He then called Leuchars Departures for a service but received no reply. At 1040 he received his first TCAS TA which informed him of an aircraft 'aft right wing below'. He established visual contact, called Leuchars Departures and again received no reply. The pilot reported that a second TCAS TA informed him of an aircraft 'below high rate of climb' and again he had visual contact. At 1041 he received a TCAS RA 'don't sink' instruction which he complied with; he then established contact with Leuchars ATC and was cleared to continue climb to FL230.

He assessed the risk of collision as 'Low'.

<sup>1</sup> A trail formation consists of 2 or more aircraft following the same ground track but separated by time (in this case 30 seconds).

**THE LEUCHARS DEPARTURES CONTROLLER** reports being the OJTI<sup>2</sup> with a trainee. He assessed the workload as medium-intensity but reported that the trainee was working ‘close to capacity’. They received two pre-notes, a Citation from Dundee to join controlled airspace at MADAD at FL240, and a pair of Typhoons from Leuchars departing on an SID. The controller noted that he had never seen this combination of tracks before, but realised the potential for conflict and discussed it with the trainee; it was decided that a ‘rolling’ call would be requested from Dundee. Dundee duly rang through with the ‘rolling’ call and, again, the OJTI discussed the potential conflict with the trainee. The Typhoon pilots checked-in on frequency and Departures passed them Traffic Information on the Citation, which at this point was 5nm northwest. As the tracks got closer together, this Traffic Information was updated but the Typhoon formation’s Mode C was not displayed on the radar (because of their climb rate he surmised). Because the Citation had a Mode C indication of FL55, the OJTI instructed the trainee to stop the Typhoon at FL50; however, almost immediately after this clearance was issued, the lead Typhoon’s Mode C indicated FL60 (but had dropped out on the trailing aircraft) so the controller instructed the trainee to issue avoiding action. The pilot of the lead aircraft took the turn and then reported ‘visual’ with the Citation; the trailing aircraft remained on the SID. The Typhoon pilots then resumed their own navigation and, at the same time, the Citation crew checked-in on frequency.

He perceived the severity of the incident as ‘Medium’.

**THE LEUCHARS SUPERVISOR** reports that he was carrying out administrative tasks at the supervisor’s desk at the time of the Airprox and did not witness the incident.

## Factual Background

The weather at Leuchars was recorded as follows:

METAR EGQL 210950Z 26010KT 9999 FEW022 SCT065 19/15 Q1016 BLU NOSIG  
METAR EGQL 211050Z 25011KT 9999 FEW025 SCT028 19/14 Q1016 BLU NOSIG

## Analysis and Investigation

### Military ATM

This incident occurred 5.8nm west-northwest of RAF Leuchars between a formation of 2 Typhoons and a Citation. The Typhoon formation was departing Leuchars in trail, in receipt of a Traffic Service from Leuchars Departures. The Citation pilot was operating under VFR, departing Dundee to the southeast pre-noted to Leuchars Zone but not yet in receipt of an ATS. All quoted heights/altitudes are based upon SSR Mode C from the radar replay unless otherwise stated.

Both crews reported VMC with 50km visibility. The Typhoon crew reported no cloud, whilst the Citation crew reported being 3000ft above cloud at FL65. The Leuchars Departures and Zone control positions were operating ‘band-boxed’, a standard configuration at RAF Leuchars, and was manned by a trainee and an OJTI. Neither the OJTI nor the trainee assessed the complexity of the task; however, at the time of the Airprox, Departures/Zone was providing ATS to one aircraft in addition to the Typhoon Formation; a Tutor operating approx 10nm southeast of Leuchars. The instructor related that they had been on console for approx 45min at the time of the Airprox, and that it had been a ‘medium intensity session’, albeit that the trainee ‘was working close to capacity’. However, the instructor’s assessment that the trainee had been ‘working close to capacity’ was based on their workload throughout the 45 min period, which encompassed a ‘mass departure wave’ from Leuchars, rather than during the Airprox incident sequence itself. The Airprox occurred at the end of the departure wave.

The incident sequence commenced at 1032:22 as Dundee ATC pre-noted the Citation to Leuchars Departures, departing Dundee Rwy 27, climbing to 2000ft, prior to turning left to track

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<sup>2</sup> On-the-Job Training Instructor

approx 120° and climb to FL170 en-track MADAD (southeast of Leuchars). The landline exchange ended at 1033:06. Leuchars Departures did not request Dundee ATC to call them prior to releasing the Citation for departure; a process known as Call For Release (CFR).

The RAF Leuchars controller training handbook states that a CFR may be imposed by any controller to prevent aircraft departing into conflict where it is not possible or practical to amend an aircraft's departure clearance. It also highlights that an amendment to an aircraft's departure clearance is the 'normal method of resolving conflicts with MATZ transit traffic'. With regards to departures from Dundee, the Leuchars controller training handbook states that Leuchars ATC provides Dundee ATC with Traffic Information on any traffic that conflicts with Dundee IFR departures. A CFR may be issued by Leuchars ATC for Dundee IFR departures that conflict with Leuchars IFR traffic. Where the conflicting traffic is unknown, Dundee outbounds are not held by Leuchars, the release decision is made by Dundee ATC.

Originally, the Typhoon formation had been pre-noted to Leuchars Departures as departing singly on a SID1; however, between 1034:51 and 1035:03, Leuchars Tower advised Leuchars Departures that this had been amended such that the 2 Typhoons would depart as a formation, albeit in trail. SID 1 for RW26 at RAF Leuchars is to 'climb on runway track 2000, then right onto track 070° climbing to FL240'. Leuchars Departures did not place a CFR against the Typhoon formation's departure.

The Leuchars Departures instructor reported that in the 6 years that he had controlled at RAF Leuchars they had 'never witnessed this combination' of departure profiles from Dundee and Leuchars; however, he did appreciate that they had 'the potential to conflict with each other'. Because it was an unusual scenario, [he] highlighted the possible conflict to the [trainee]'. In so doing the Leuchars Departures instructor asked the trainee to confirm the location of MADAD and confirm the type of profile that the Citation would follow; both of which the trainee was able to do. The Leuchars Departures instructor then asked Approach to request from Dundee ATC 'a rolling call for [Citation c/s] and again prompted the [trainee] to be aware of the potential conflict'. The instructor subsequently related that they did not consider that there was a requirement to place a CFR on either the Citation or the Typhoon Formation because the rolling call from Dundee, alongside the distance between Dundee and Leuchars, would give them time to assess the situation and put a course of action in place. He further related that he had determined 3 options that could have been effected to resolve the potential conflict, but that his error was in assuming, rather than checking, that the trainee had made similar plans.

Between 1036:00 and 1036:14, Leuchars Approach contacted Dundee ATC to request a 'rolling call' on the Citation. During the landline exchange with Dundee ATC, Leuchars Approach was asked "so is he [the Citation], is he released?" Whilst the landline to Dundee ATC was open, Leuchars Approach can be heard to ask Leuchars Departures "is he released?" Although Leuchars Departures' response was not recorded, Leuchars Approach then replied to Dundee ATC saying, "yeah, he is released, we just need a rolling call", which was acknowledged.

At 1037:53, Dundee ATC rang Leuchars, with the call answered by Leuchars Approach, advising them that the Citation was "*rolling now*"; the landline exchange ended at 1037:57. Although the Leuchars Departures instructor's recollection was that this notification was made co-incident with the Typhoon formation being cleared to take-off, the Typhoon Formation were cleared for take-off slightly later at 1038:07. Following the rolling call from Dundee ATC, the Leuchars Departures instructor recalled prompting the trainee again 'to be aware of the potential conflict' between the Citation and the Typhoon formation.

The Citation was first visible on NATS radars at 1038:36, 1nm West of Dundee, indicating a climb through 1600ft; it is reasonable to argue that the Citation would have been detected by Leuchars' surveillance radar before this time. At 1039:12, 1.6nm West of Dundee, the Citation commenced a slow left turn onto southeast tracking towards MADAD.

The Typhoon pilots left Leuchars Tower's frequency at 1039:29, subsequently contacting Leuchars Departures/Zone at 1039:31, advising that they were "airborne, SID 1, request Traffic Service." The formation was identified, a Traffic Service was applied and they were instructed to "climb flight level 2-4-0." Although the Typhoon formation was not yet visible to NATS radars, the Citation was 8.6nm west-northwest of RAF Leuchars, indicating a climb through 3100ft and continuing the left turn, passing through south-southwest. The Citation crew was not yet in communication with Leuchars Departures. Figure 1 depicts the position of the Citation in relation to Leuchars at 1039:31; SSR 3A 2021 was the Citation.

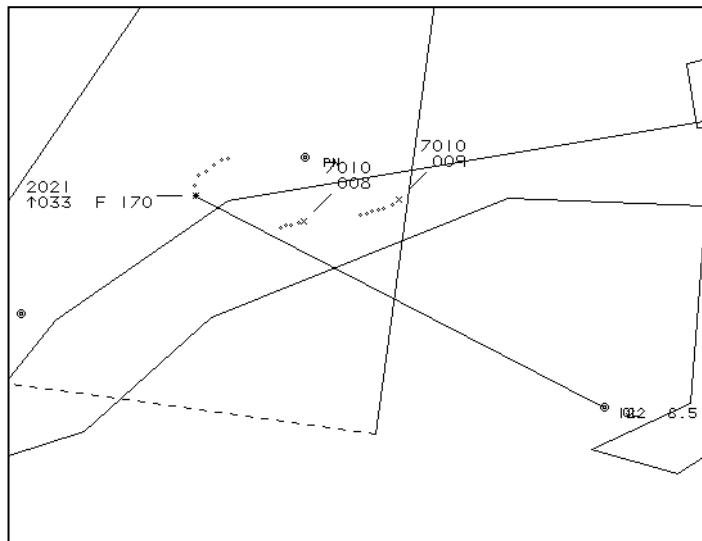


Figure 1: Incident Geometry at 1039:31

At 1039:46, as Leuchars Departures' transmission to the Typhoon formation ended, the Citation pilot made his initial call on VHF to Leuchars; however, the final 2-3 secs of this transmission was 'stepped on' by the Typhoon formation's acknowledgement of the instruction to climb to FL240. The Leuchars Departures instructor reported that 'due to [Typhoon Formation lead aircraft's c/s] rate of climb, there was no height read out on radar. [Citation c/s] had a height read out of 055 and climbing so he instructed the [trainee] to stop [Typhoon Formation c/s] off at FL50'. Around 5 secs after the Typhoon Formation's transmission, at 1039:58, Leuchars Departures passed them Traffic Information on the Citation, advising them "*traffic north-west, 5 miles, tracking south-east, er, stop climb [1½ sec pause] Stop climb flight level 5-0.*"

During this transmission, at 1040:08, the Typhoon Formation became visible to NATS surveillance radars. Figure 2 depicts the incident geometry at this point; SSR 3A 7411 was the lead aircraft in the Typhoon Formation, the trail Typhoon had not yet been detected by NATS radars.

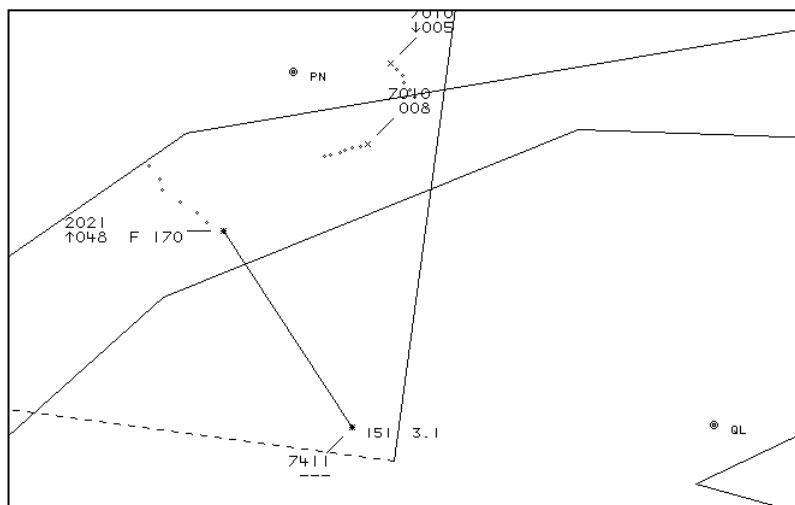


Figure 2: Incident Geometry at 1040:08

The Typhoon pilots reported their perception that 10-seconds elapsed between Leuchars Departures providing Traffic Information on the Citation and instructing the Typhoon formation to “stop climb.” Whilst this perception was not borne out by the R/T transcript, the Typhoon formation leader also reported that the Traffic Information element of the transmission from Leuchars Departures was ‘stepped on by an internal call’ within the formation, and that they were ‘passing FL55 [when they] were advised to stop climb FL50’.

In response to Leuchars Departures’ instruction to “stop climb flight level 5-0”; the Typhoon formation leader transmitted “again for [Typhoon formation c/s].” Based on the R/T and the pilot’s DASOR, BM SPA contends that the pilot had probably asked Leuchars Departures to ‘say again’ but the initial part of the transmission was clipped. The Leuchars Departures instructor reported that almost immediately after passing the stop-climb instruction, the Typhoon formation leader’s SSR Mode C indicated passing FL60. The OJTI then instructed the trainee ‘to give avoiding action to [the Typhoon formation] because the Mode C had dropped out on the trail aircraft, so there was no indication of what height separation there was from [Citation c/s] and both aircraft were converging’. Thus, in reply to the Typhoon formation’s request to ‘say again’, Leuchars Departures stated “[Typhoon formation c/s] disregard, traff...[Typhoon formation c/s] avoiding action, turn left immediately heading 2-6-0 degrees, traffic north, 1 mile, tracking southeast, indicating 1000 feet below.” Figure 3 depicts the incident geometry at the point when Leuchars Departures starts to pass deconfliction advice and highlights, for reference, a point that is 4nm from the Leuchars Aerodrome Reference Point, on the RW26 extended centreline.

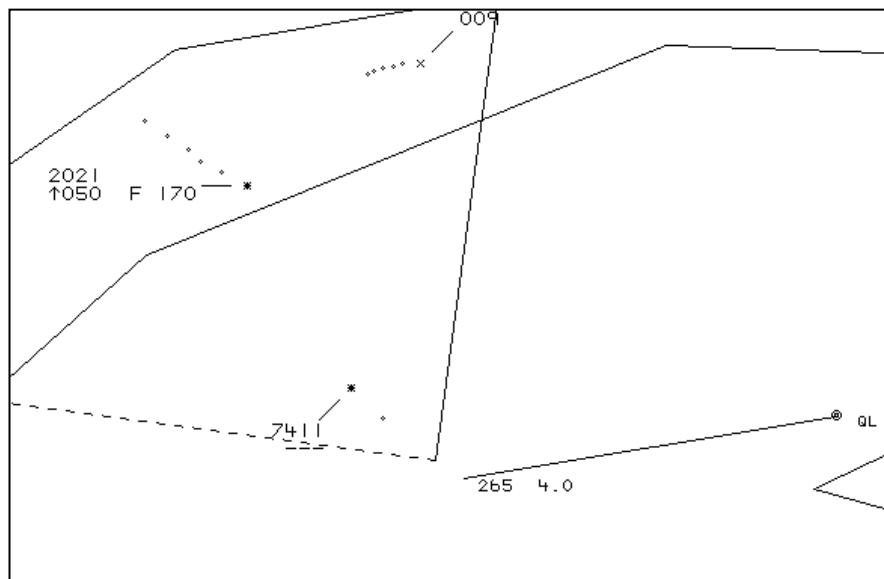


Figure 3: Incident Geometry at 1040:13

In reply, at 1040:25, one of the Typhoon pilots advised Leuchars Departures “visual, no factor”. Based on the report of the Typhoon formation leader, it was the trail Typhoon pilot that made this transmission. The CPA between the lead Typhoon and the Citation occurred between sweeps of the radar at 1040:26 with 0.4nm lateral separation and around 1000ft vertical separation existing. Figures 4 and 5 depict the incident geometry at 1040:24 and 1040:28, with the radar sweeps either side of the CPA; SSR 3A 7421 was the trail Typhoon of the formation. In Figure 5 it appears that the lead Typhoon has followed the deconfliction advice passed by Leuchars Departures. The CPA between the trailing Typhoon and the Citation occurred at 1040:37, as the Typhoon passed 0.9nm south of the Citation, co-altitude with it.

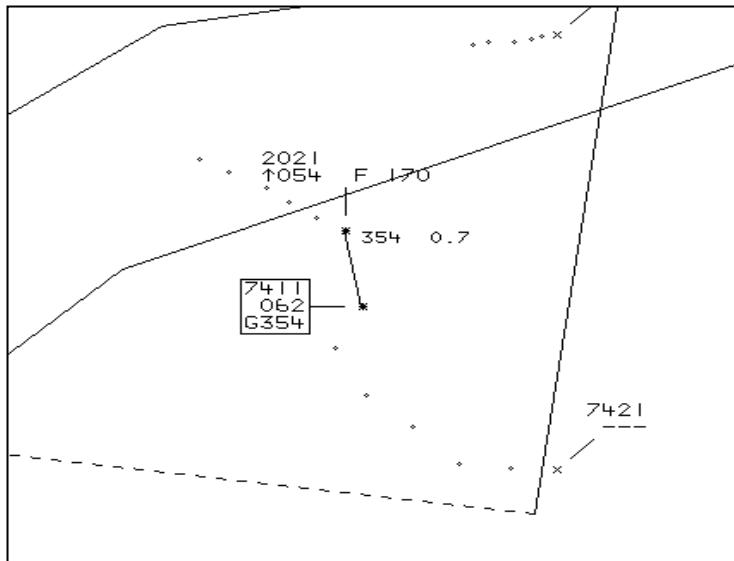


Figure 4: Incident Geometry at 1040:24

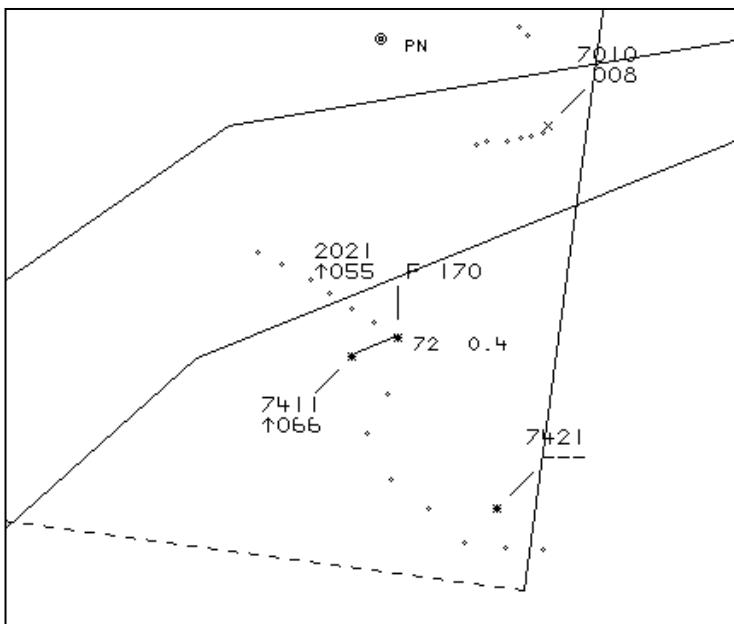


Figure 5: Incident Geometry at 1040:28

It is clear from the narrative supplied by the Leuchars Departures OJTI that the controlling team was aware of the potential conflict between the Typhoon formation and the Citation very early in the incident sequence. It is also clear, based on analysis of the RT transcript, that until 1039:39 when Leuchars Departures instructed the Typhoon formation to “*climb flight level 2-4-0*”, the opportunity existed for a number of control measures to have been put in place which may have prevented the conflict. The initial error was, as related by the Leuchars Departures instructor, that he assumed that the trainee had planned how to deal with the confliction. The point at which Leuchars Departures lost the ability to prevent the Airprox was when the trainee instructed the Typhoon Formation to “*climb flight level 2-4-0*” and the instructor did not intervene to amend that instruction. Assessing the point of intervention is a critical task for instructors and is based on a number of factors, including their experience and training. In this instance, the point of intervention was missed and, due to the Typhoon formation’s rate of climb, the subsequent action to stop their climb was ineffective. The lateral avoiding action instruction passed by Leuchars Departures at 1040:13, prompted by the instructor and adopted by the formation leader succeeded in breaking the conflict, albeit with reduced safety margins.

BM SPA continues to highlight methods of ‘good practise’ in the supervision of trainees through the RAF ATM<sup>3</sup> and ASACS<sup>4</sup> STANEVAL<sup>5</sup> teams. Further work is being undertaken by the RAF ATM Force, taking into account the training conducted by, and experienced within, other ANSP<sup>6</sup>s, to understand whether training provision needs to improve and, if so, how. To support this, BM SPA commissioned an academic study to examine the HF related to the monitoring of trainee controllers and to develop a ‘tool box’ for use by supervisory personnel; this work is expected to be completed by Dec 13.

## Comments

### HQ Air Command

The potential for conflict was identified by Leuchars ATC well before the event, yet the coordination actions were limited to an information call between Leuchars and Dundee. The subsequent sequence of events then put the Leuchars trainee controller in a predicament for which he/she was not prepared. The absence of timely intervention by either the Leuchars ATC instructor or the Supervisor left the trainee struggling to direct the Typhoons out of conflict. In addition, internal communication between the Typhoons during this critical phase of flight may well have prevented the Typhoon pilots from having earlier warning of the situation.

## Summary

A Typhoon formation and a Citation flew into conflict at 1040 on 21<sup>st</sup> August 2013, 5nm northwest of RAF Leuchars. Both elements were operating VFR in Class G airspace and were pre-noted to the Leuchars Departures Controller. At the time of the Airprox, the Typhoon formation was in trail and receiving a Traffic Service in a climbing turn to FL240 on a SID; the Citation was climbing to FL170, but not yet identified, on track from Dundee to controlled airspace to the southeast of Leuchars. The Citation received two TCAS TAs, and then an RA, and became visual with the Typhoons following these prompts. The Leuchars Departures controller gave Traffic Information and then avoiding action to the Typhoon pilots; whilst the lead aircraft took the avoiding action, the trail Typhoon became visual with the Citation. The recorded CPAs were 0.4nm horizontally and 1000ft vertically between the lead Typhoon and the Citation, and 0.9nm horizontally and 0ft vertically for the second Typhoon.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available included reports from the pilots of both ac, 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 considered the actions of the pilots concerned, and concluded that they had done all that could be reasonably expected of them in adhering to their cleared flight profiles, and reacting in a timely manner when given Traffic Information and avoiding action. On a minor note, the CAA Flt Ops Rep noted that although the Citation pilot had reported that he had received a “don’t sink” RA, in fact this was incorrect terminology and in all likelihood he would have received a ‘maintain’ or ‘monitor’ height instruction.

The Board then went on to consider the actions of the Leuchars Departures controllers and considered that the root cause of the Airprox lay in their lack of effective coordination between the Citation’s Dundee departure and the Typhoons’ SID; ATC members opined that there had been ample opportunity for them to have prevented this Airprox if they had formulated and enacted a plan in a timely manner. At the most basic level, had the controllers requested a “Call for Release” from Dundee (an accepted procedure between Dundee and Leuchars ATC) instead of a rolling call, they would have given themselves sufficient time to implement avoiding instructions. Furthermore, a

<sup>3</sup> Air Traffic Management

<sup>4</sup> Air Surveillance and Control System

<sup>5</sup> Standards and Evaluation

<sup>6</sup> Air Navigation Service Providers

member noted that, even when the controllers had tried to stop the Typhoons' climb at FL50, the Citation had not yet cleared that level and a potential conflict would still have been present as the Citation climbed through FL50. Beyond this, there were other solutions to the unfolding situation that might have ensured separation standards if they had been enacted in a timely fashion. The Board felt that, overall, the OJTI had allowed the situation to develop too far without timely intervention; a discussion with the trainee before the aircraft had got airborne would have ensured that the trainee either had a plan, or the OJTI could have prompted him with a plan of his own. Finally, although not directly related with the incident, the Board also questioned the role of the Supervisor, whose testimony stated that he was involved with "admin tasks" at the time and did not witness the incident. The Board wondered whether he was actually supervising in the accepted sense or was more absorbed and distracted by day-to-day management activities.

In discussing the risk, the Board decided that, through a combination of the controller's eventual avoiding action and the Citation pilot being visual with the Typhoons, there had been no risk of actual collision; they therefore decided that the risk assessment was Cat C.

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

Cause: Leuchars departures allowed the Typhoon to climb into conflict with the Citation.

Contributory Factor(s): Ineffective communication and mentoring by the OJTI.

Degree of Risk: C

ERC Score<sup>7</sup>: 10

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<sup>7</sup> Although the Event Risk Classification (ERC) trial had been formally terminated for future development at the time of the Board, for data continuity and consistency purposes, Director UKAB and the UKAB Secretariat provided a shadow assessment of ERC.