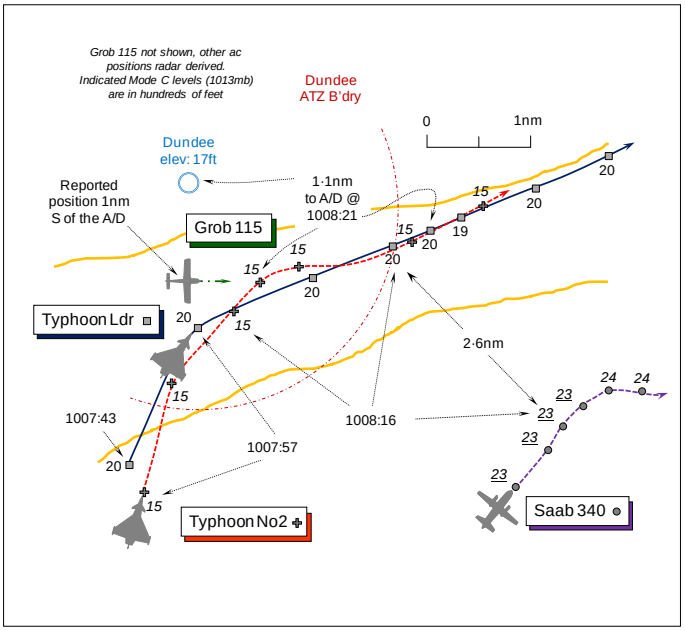
AIRPROX REPORT No 2010175

Date/Time: 14 Dec 2010 1008Z

Position: 5626N 00300W (1nm SE Dundee A/D - elev 17ft)

Airspace: ATZ/Scottish FIR (*Class:* G)

	Reporting Ac	*Reported Ac*
Type:	Grob 115 D2	Typhoon FGR4pr
Operator:	Civ Trg	HQ Air (Ops)
Alt/FL:	1000ft QNH (1036mb)	2000ft SAS/QFE
Weather:	VMC CLBC	VMC CLBC
Visibility:	25km	10km
Reported Separation:	300-500ft V	NR
Recorded Separation:	Not Recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE GROB 115 D2 HERON PILOT (G115), a flying instructor, reports that he was conducting a local VFR training flight in the cct at Dundee; his student was the PF. He was in receipt of an Aerodrome Control Service from Dundee TOWER on 122·9MHz and squawking A7010 with Mode C; Mode S is not fitted.

Whilst Downwind L for RW27, 1nm S of the aerodrome heading 095° at 100kt, flying level at 1000ft Dundee QNH (1036mb), 2 Typhoon jets were observed in his 4 o'clock high position, he estimated 300-500ft above his aeroplane. Both Typhoons were observed in a RHD turn 1nm away tracking NE before heading E down the River Tay. No avoiding action was taken as there was no Risk of a collision. Dundee TOWER reported sighting the 2 fast-jets in close proximity to the Dundee ATZ, but had no previous notification from Leuchars ATC of their overflight. He reported the Airprox to ATC by telephone after landing.

His aeroplane is white with blue stripes; the landing light and HISLs were on.

THE TYPHOON FGR Mk4 LEAD PILOT reports he was leading a pair of Typhoons departing from Leuchars IFR and cleared to take-off and depart on a SID1, which stipulates a climb on RW track to 2000ft QFE, then R onto a track of 070° climbing to FL150. He was in receipt of a TS from Leuchars DEPARTURES (DEPS) who had applied a climb-out restriction of 2000ft QFE against an SF340 at 3000ft QFE. Departing in accordance with the published SID1, on rolling-out to track 070° he saw the SF340 in his 2 o'clock at a distance of 1nm. However, he had incorrectly reset his altimeter to 1013mb during the initial climb out. Whilst he believed he was flying straight and level at 2000ft QFE, he had in fact levelled above his assigned height at 2000ft (1013mb), which equated to 2660ft QFE (1035mb). When he saw the SF340 he assessed that there was no risk and overtook it with divergent headings before being cleared to climb further. He did not report sighting the Grob G115 flown by the reporting pilot.

The assigned squawk was selected with Modes C and S on. His ac has a grey colour-scheme and the white HISLs were on.

THE NO 2 TYPHOON FGR Mk4 PILOT reports he was flying as the No 2 of the formation, departing on a SID1 under IFR in VMC on a radar assisted trail departure to 2000ft QFE (1035mb) in accordance with their departure clearance. The formation was in receipt of a TS from DEPS. His ac was climbed to and maintained 2000ft QFE (1035mb) due to transit traffic – the SF340. Their ground track resulted in an over flight of Dundee ATZ at 2000ft QFE (1035mb), whilst following his formation leader in a 1nm radar trail; he did not see any other ac during the departure.

The assigned squawk was selected with Modes C and S on. His ac has a grey colour-scheme and the white HISLs were on.

THE SAAB 340 (SF340) PILOT did not file an Airprox report but helpfully provided an occurrence report. The SF340 was inbound to Dundee from Birmingham under IFR and was flying level at 3000ft Leuchars QFE under a TS from Leuchars ATC. About 7nm S of Dundee he observed a contact on TCAS in the vicinity of Leuchars indicating on the ground. They gained visual contact with two ac accelerating along the main runway and taking-off in their direction, which were subsequently identified as a pair of Typhoons climbing fast. As they flew N of the extended RW centreline at Leuchars with the Typhoons passing behind them TCAS RAs of Descend, Monitor Vertical Speed and Climb sounded in quick succession with the red TCAS icons coinciding with the Typhoons' positions. The A/P was disengaged ready to manoeuvre but due to the quick change of the RAs enunciated and visual contact with the traffic the RA was not followed beyond the initial descent of about 200ft. Leuchars ATC was informed of the TCAS RA and he was advised that the Typhoons had been co-ordinated to climb to a height of 2000ft on climb-out. He surmised that the Typhoons' very high initial ROC and speed triggered the 'closure rate envelope in the TCAS logic. He assessed that there was no actual risk due to the traffic co-ordination; the closest proximity was about 1nm horizontally and approximately 1000ft below as the traffic passed from R-L astern at about 90° to their track. Visual contact was maintained until the traffic passed out of sight astern.

THE DUNDEE COMBINED AERODROME AND APPROACH CONTROLLER (TOWER) reports that Leuchars ATC had co-ordinated the arrival of the SF340 for a visual LHD Base–leg join for RW27 at Dundee, whereupon he advised Leuchars of the three G155 ac in the cct. To allow the SF340 to join, the three G115 crews were instructed to orbit in the Downwind leg. Two Typhoon ac then appeared to enter the Dundee ATZ without prior notification from the S and route to the NE passing overhead one of the G115s. The reporting G115 pilot advised the Typhoon was at 1200ft. The incident was discussed with Leuchars ATC.

THE LEUCHARS DEPARTURES CONTROLLER (DEPS) reports that the 2 Typhoons were prenoted for a SID1 departure with a climbout restriction in force of 2000ft Leuchars QFE (1035mb) for the SF340 inbound to Dundee. As the Typhoon formation departed, he identified them, placed them under a TS and re-stated the climbout restriction. The SF340 was inbound for a visual L Base-leg join to RW27 at Dundee, descending to 3000ft Leuchars QFE (1035mb) and crossing the climb-out when the Typhoons departed. As the Typhoons climbed out he called the lead jet to the SF340 crew and stated that the Typhoon pair was climbing to 2000ft on a climbout restriction. Very shortly afterwards the SF340 pilot advised him of a TCAS RA against the Typhoon pair.

As the lead Typhoon started to turn he believes he passed TI on the most easterly non-squawking ac to the N of the lead Typhoon, which was displayed inside the Dundee ATZ [perceived to be one of the Grob 115s]. He cannot recall what the Mode C indications of the individual ac were, only that the climbout restriction was reinforced to the Typhoon pilots on initial RT contact and that they were departing on a SID1.

THE LEUCHARS ATC SUPERVISOR (SUP) reports that whilst the climb-out restriction provided safe vertical separation between the Typhoons departing on the SID1 and the SF340, neither ac can achieve their respective objectives – for the Typhoons a climb and the SF340 crew a descent - until they have passed clear. This particular scenario is resolved by means of a SID2, which ensures that the ac do not meet laterally in the same airspace. This point was recognised by the DEPS controller, but too late to change his plan.

UKAB Note (1): The Leuchars RW27 SID2 stipulates a climb on RW track to 2000ft QFE, then L onto a track of 100° climbing to FL150.

ATSI reports that the Airprox occurred just after 1008UTC, in class G airspace. The Dundee ATZ comprises a circle of radius 2nm centred on the mid-point of RW27 and extending from the surface to 2000ft above the aerodrome elevation of 17ft.

The Dundee 0950UTC METAR: 29003kt 9999 BKN040 03/01 Q1036=

Dundee ATC was providing a combined Aerodrome and Approach control service without the aid of surveillance radar equipment. At the time of the Airprox, Dundee had three G115 ac in the visual LHD cct for RW27 and the reporting G115 crew had completed two ccts prior to the reported Airprox. The Dundee controller's written report indicates that Leuchars ATC had coordinated the arrival of the SF340 and had been advised of three light aircraft flying in the visual cct.

At 1007:05, less than 1min before the Airprox with the Grob, the SAC (Prestwick) radar recording shows the lead Typhoon ac, 5·5nm SSE of Dundee, squawking A0231, passing 0·75nm behind the inbound SF340 that was in receipt of a TS from Leuchars RADAR. The SF340 is shown tracking N at that point indicating FL24 [an altitude of about 3090ft Dundee QNH 1036mb]. The lead Typhoon indicating FL20 [2690ft Dundee QNH] was tracking W at that point some 400ft below the SF340. The SF340 pilot's written report indicates that a TCAS RA was received and an occurrence report was subsequently rendered. Although not a factor in the Airprox, the lead Typhoon pilot's written report indicates that the pilot had incorrectly set 1013mb for the initial climbout instead of the Leuchars QFE of 1035mb (a difference of 660ft at 30ft/mb). The lead Typhoon is observed turning R onto a northerly track towards Dundee Airport and the lead pilot's written report indicates that he was visual with the SF340 and overtook it on a diverging heading before being cleared to climb. At 1007:27, the radar recording shows the second Typhoon squawking A0233 and following the lead aircraft 1·75nm in trail indicating FL15 [about ALT 2190ft]. At 1007:35, the Grob reported downwind for RW27 and the Dundee controller instructed the Grob pilot to report before turning L base. At 1007:51, the radar recording shows the lead Typhoon 2nm S of Dundee airport, turning R to follow a track that passed 1·3nm to the SE of Dundee Airport.

At 1008:00 TOWER observed the two Typhoon ac and transmitted a warning, *"Dundee all stations just be advised two fast jets passing through the overhead."* The Dundee controller's written report indicates that there was no prior notification of the two Typhoon ac that had appeared to enter the Dundee ATZ routeing from the S to the NE. However, the radar recording shows that both Typhoon ac passed above the Dundee ATZ to the SE of the aerodrome, the lead ac maintaining an altitude of 2690ft and the No2 Typhoon maintaining an altitude of 2190ft Dundee QNH (1036mb).

The Dundee TOWER controller decided to hold the three Grob G115 ac on the downwind leg in the cct anticipating the arrival of the SF340 on a wide L base-leg. At 1011:01, the SF340 crew called Dundee TOWER and reported orbiting 4nm SE of Dundee to lose altitude.

At 1011:45 TOWER asked the Grob G115 pilot, *"Do you know how close those Typhoons got".* The G115 pilot replied, *"Well they went straight across us..probably about 2 hundred feet above."* The Grob G115 pilot's written report indicated that the G115 was at 1000ft Dundee QNH. TOWER asked if the Grob pilot wished to file an Airprox, to which he responded, *"..negative I had them visual the whole time...".* TOWER acknowledged the G115 pilot, *"Copied and can you just confirm they were inside the ATZ at 12 hundred feet",* to which the G115 pilot replied, *"Affirm."*

Leuchars RADAR was aware that the Dundee cct was active and the Typhoon pair was operating IFR with a climb restriction of 2000ft Leuchars QFE (1035mb). Co-ordination or the provision of TI about the two Typhoons from Leuchars would have aided the Dundee controller's SA and would have allowed the passing of timely TI by TOWER to ac operating within the ATZ.

The G115 was operating within the Dundee ATZ in receipt of an Aerodrome Control Service at 1000ft QNH (1036mb). The Dundee TOWER controller sighted the Typhoons as they passed above the Dundee ATZ at altitudes of about 2690ft and 2190ft respectively and passed an appropriate warning. The Manual of Air Traffic Services, Part 1, Section1, Chapter 12, Page 3, Paragraph 2.1, states:

> 'Aerodrome Control is responsible for issuing information and instructions to aircraft under its control to achieve a safe, orderly and expeditious flow of air traffic and to assist pilots in preventing collisions between:
>
> a) aircraft flying in, and in the vicinity of, the ATZ;
> b) aircraft taking-off and landing.'

HQ 1GP BM SM reports that the Typhoon FGR4 pair was in receipt of a TS from Leuchars DEPS whilst departing the aerodrome on a SID1 departure, with a climb-out restriction of 2000ft QFE (1035mb). The radar replay shows the Typhoons tracking approximately 1·3nm SE of Dundee, indicating 2000ft (SSR Mode C with a display QNH of 1037).

The SF340 was also in the vicinity and inbound to Dundee on an IFR flight from Birmingham. The SF340 was in receipt of a TS from Leuchars and the arrival had been co-ordinated with Dundee. Although there is no comment within DEP's report about his workload, it is clear from the transcript that it was medium to high whilst controlling multiple units at varying ranges from the aerodrome, including the SF340.

At 1007:39, DEPS passed TI to the Typhoon pair, *"traffic north half a mile tracking east, no height information appears to be Dundee visual circuit traffic at 1 thousand feet."* Although this was the first TI passed by DEPS to the Typhoons on this traffic, it is clear from the transcript that DEPS was busy in the period immediately before this transmission. The Grob G115 flown by the reporting pilot is not shown on the SAC radar recording [which does not replicate what was displayed to DEPS]. Furthermore, although the G115 pilot reports that his transponder was selected on with Mode C, it is not possible to determine whether traffic in the Dundee visual cct was painting continuously on DEPS' radar display, which might have allowed the controller to pass TI earlier.

There were no military ATM related causal or contributory factors in this Airprox.

UKAB Note (2): At the closest point, the No2 passed 1·1nm SE of Dundee aerodrome and would have been the lowest and closest Typhoon to the reporting Grob pilot's ac at the reported Airprox location 1nm S of the aerodrome. Given the tolerances applicable to Mode C of +/- 200ft, the vertical separation between the No2 and the G115 pilot's reported altitude was not less than 1000ft.

HQ AIR (OPS) comments that this complex occurrence has been extensively investigated as a result of a well meaning but erroneous estimation of the Typhoon's height by the G115 pilot. There was no infringement of the ATZ nor any risk of collision. The execution of a SID1 in this case was acknowledged as being less than ideal in that it delayed the execution of the climb/descent profiles for the Typhoons and the SF340. However, it was not unsafe and would have provided 1000ft clearance from the coordinated traffic and from normal circuit traffic at Dundee. The incorrect altimeter setting of the lead Typhoon was not in accordance with standard practice and this has also been acknowledged and debriefed. It resulted in a TCAS RA for the SF340 but both ac had each other in sight and felt there was no risk of collision.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of the ac involved, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The SF340 pilot had not reported an Airprox but it was evident that his ac's IFR transit had been instrumental in restricting the Typhoon pair's climb-out and thus a factor as to why the jets were lower than might normally be expected in the vicinity of Dundee. Whilst the SF340 pilot was aware that the Typhoon formation had been co-ordinated to climb to 2000ft QFE beneath his ac, he perceived at the time that it was the Typhoons' initial ROC and speed that had triggered the RAs. However, from the Typhoon leader's frank account, coupled with the recorded radar data, it was clear that the lead pilot had exceeded his assigned height, thereby reducing the vertical separation from the planned 1000ft to 400ft as the pair flew 0·75nm astern of the SF340. The HQ Air Ops Member observed that although the SF340 pilot was unaware of this at the time, in the prevailing good weather the Typhoon pilots were clearing their flight path visually and the higher lead pilot had subsequently acquired the airliner. The lead Typhoon pilot had set the QFE on his altimeter before take-off but had subsequently set 1013mb climbing through 1000ft. However, with the intervening stop at 2000ft issued by DEPS to remain beneath the SAAB, the leader had omitted to reset the QFE on his altimeter, hence, the 'height' bust. Unfortunately, neither the No2 Typhoon pilot nor the DEPS controller had commented on the RT to the lead pilot when this occurred. However, this was an acknowledged lapse by the lead pilot, which the Board noted had been addressed.

Ironically, by levelling his ac 660ft higher than his assigned height of 2000ft QFE (1035mb) – equating to about 2690ft Dundee QNH (1036mb) –the lead Typhoon pilot had inadvertently increased the separation from the Grob 115 flown by the reporting pilot who was downwind at 1000ft Dundee QNH. Some Members commented that it would have been helpful if DEPS had called Dundee when it became evident that the Typhoons would be kept low and were flying wide of the SID1 track close to the Dundee ATZ. However, DEPS might reasonably have expected the pair to be remaining over the S bank of the River Dee estuary whilst following the SID1 track and therefore normally clear to the S of the Dundee ATZ, as shown in the UK Mil AIP. Furthermore he was operating under a medium to high workload and he probably had little opportunity to liaise on the landline in the time available. It was contended that the lead Typhoon's wider ground track on departure might have been flown with the intentions of assisting DEPS by increasing the horizontal separation against the SF340 as soon as possible, thereby allowing the latter to descend whilst facilitating an earlier climb for the jets. Nevertheless, it was plain that a SID2 with a LHD turnout could also have accomplished this aim, as suggested within the SUP's comments.

The Grob 115 pilot's written account reports that the Typhoon pair had flown about 300-500ft above his aeroplane. However, when questioned over the RT by ATC some 3½min after the event it was evident that the Grob pilot had estimated that the Typhoons were only 200ft above his aeroplane and had entered the ATZ. Unless he had climbed significantly above the 1000ft QNH cct altitude reported, it was plain from comparison of his reported altitude and the recorded radar data that he had significantly underestimated the vertical separation that existed. Whilst it might not have been wise to fly this close to the 2017ft amsl upper limit of the Dundee ATZ without RT contact, it was evident to the Board that the Typhoon pair had not entered the ATZ without permission. The radar recording placed both the lead Typhoon and the No2 above the upper limit of the ATZ at altitudes of about 2690ft and 2190ft respectively with the lower of the pair in unregulated airspace in excess of 1000ft above the pattern altitude. Whilst the Board accepted that the Grob 115 pilot and the Dundee controller had filed their reports in good faith, they were plainly mistaken in their estimates of the altitude of the two Typhoons and the minimum separation that actually existed. In the Board's opinion, this was not an Airprox but a sighting of traffic flying above the ATZ boundary and the Members agreed unanimously with the reporting Grob 115 pilot's view that no Risk of a collision had existed whatsoever.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Sighting Report.

Degree of Risk: C.