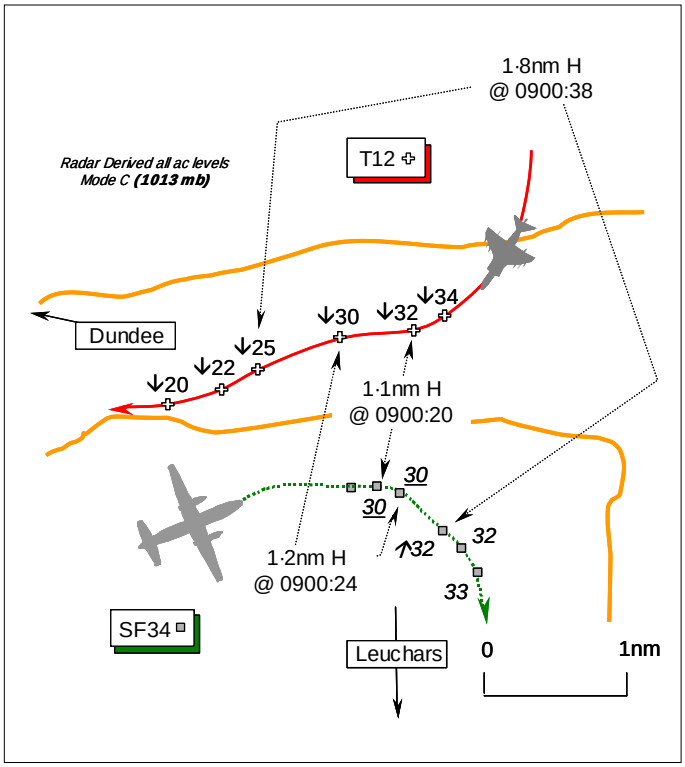
AIRPROX REPORT No 2010092

Date/Time:	20 Jul 2010 0900Z	
Position:	5626N 00252W (3·7nm N of Leuchars - elev 38ft)	
Airspace:	Leuchars MATZ/FIR (*Class:* G)	
	Reporting Ac	*Reported Ac*
Type:	SAAB 340B	Harrier T12
Operator:	CAT	HQ AIR (Ops)
Alt/FL:	3000ft QNH (1009mb)	3000ft QFE (1008mb)
Weather:	VMC CLAC	VMC CLBC
Visibility:	40km	20km
Reported Separation:	100ft V/2nm H	1500ft V/3nm H
Recorded Separation:	200ft V @ 1·1nm Min H Nil V @ 1·2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE SAAB 340B (SF34) PILOT reports he was inbound to Dundee from the S at 7000ft under VFR and in receipt of a TS from Leuchars APP. He was instructed by Leuchars APP to descend to 3000ft Dundee QNH (1009mb) and asked to report visual with Dundee Airport. At a range of 6nm DME, in good VMC, they reported visual with the Airport and requested to transfer to Dundee APPROACH if Leuchars had nothing further [to affect their flight]. They were handed over, he thought, [free-called following a pre-note] to Dundee whilst maintaining level flight at 3000ft and began to position L base for RW27 with the A/P engaged, when a TCAS contact appeared on the screen to the NE rapidly approaching their position, displayed at +900ft and at a range of 8nm. The TCAS contact continued to converge on a constant 'heading' whilst descending and both he and his 1st Officer looked for the other ac but could not see it. TCAS then enunciated a 'TRAFFIC' alert. At this point, heading 070° at 180kt, with the TCAS contact about 2nm away, the Captain (PF) disconnected the A/P and turned R into a climbing turn avoidance manoeuvre. TCAS then enunciated an RA - MONITOR VERTICAL SPEED. The other ac was now showing red on the TCAS display at +I00ft. Within a few seconds TCAS enunciated CLEAR OF CONFLICT. Despite good visual conditions and a good lookout from both pilots the other ac was never visually identified.

They contacted Leuchars APP on VHF box 2 and were told the other ac was a Harrier on a practice diversion (PD) into Leuchars. The pilots then reconfirmed their position with Dundee ATC and continued inbound for a visual approach to RW27. He assessed the Risk as 'high'.

After shutdown a Dundee ATCO visited the flight deck to discuss the situation and asked them to contact Leuchars by telephone. The Captain duly contacted the Leuchars ATC Supervisor and was informed the inbound Harrier with an instructor and student had made a very late call at 6nm from Leuchars requesting the PD. They were also informed that Leuchars had attempted to pass them TI on the Harrier, but they had already switched over to Dundee ATC and been cleared for the visual approach. The Leuchars ATC Supervisor also stated that as the event took place in Class G airspace there was nothing they could do about it. After discussion with the Chief Pilot a report was filed of a suspected Airprox.

THE BAe HARRIER T12 PILOT reports he was flying a dual VFR PD into Leuchars and in receipt of a TS from Leuchars APP on 308·875Mhz; the assigned squawk was selected with Mode C. The ac has a grey low-conspicuity colour-scheme but the HISLs were on.

Turning R through 250° at 300kt, about 6nm N of Leuchars at 3000ft, APP informed them that another ac was recovering into Dundee Airport. Both aircrew were visual with the low-wing twin from 5nm away during their recovery into Leuchars and maintained visual separation criteria throughout. No avoiding action was taken and the twin passed about 3nm away to port with minimum vertical separation of about 1500ft. There was never any Risk of a collision, as their flight paths did not cross. Both ac were in class G airspace throughout the period of the Airprox.

THE LEUCHARS APPROACH (APP) CONTROLLER reports he was mentor for a trainee. APP was bandboxed with DEPS/LARS, operating from the APP control position and monitoring the 2 LARS frequencies along with APP [308·875MHz] and DIR UHF. Digital Readout Direction Finder (DRDF) was u/s.

His trainee had only one ac under an ATS on VHF - 126·5MHz - the SF34 under a TS. The SF34 crew was given a L base visual join to RW27 at Dundee and just prior to being switched to Dundee ATC was descending through about 4000ft Dundee QNH (1009mb). Traffic was observed 6nm NNE of the SF34 tracking SSE squawking A7000 and indicating 4000ft (1013mb) and was called to the SF34 crew. The Saab pilot informed them that they had the other ac on TCAS and he thought the trainee released the SF34 crew to call Dundee for their visual approach at that point.

The moment the Saab was released, the ac squawking A7000 called Leuchars on UHF - 308·875MHz - for an approach with a simulated emergency. This ac – the Harrier T12 - was now only 6nm N of Leuchars tracking S. The T12 crew requested a visual join and was subsequently given the duty RW [RW27RH and the A/D CC – BLUE]. The T12 pilot then read back RW07 and proceeded to turn to the W to set up for an approach to the wrong RW, which was also towards the SF34 inbound to Dundee. [UKAB Note (1): It was at this point – 0859:31, that the SF34 crew was actually instructed to *"…squawk 7 thousand continue with Dundee 1-2-2 decimal 9".*] The T12 pilot was informed of his error and turned his ac back towards the correct RW. During this period the SF34 pilot came back on frequency and asked for a traffic update on the ac that had flown close-by and was informed that it was the previously reported traffic – the Harrier T12.

THE LEUCHARS ATC SUPERVISOR reports that APP was band-boxed with LARS, with a trainee in position. No station-based fast jet traffic was notified to fly until early afternoon. He noticed traffic inbound to Dundee at 3500ft some 4nm N of Leuchars turning SE towards the Leuchars visual cct, which APP informed him had been free-called to Dundee ATC. The Harrier T12 had free-called APP 7nm N requesting a visual join and then the SF34 pilot recalled LARS to say that he was manoeuvring in accordance with a TCAS RA and requesting further information on the traffic. He spoke to the Dundee controller and requested that the SF34 pilot call once on the ground. The SF34 Captain informed him that he was filing an Air Safety Report (ASR) as a result of the TCAS RA.

HQ 1GP BM SM reports that Leuchars ATC provide a surveillance-based ATS to ac inbound to Dundee Airport and the SF34 crew had been in receipt of a TS from APP on VHF before the Airprox occurred. APP was manned by a controller under training and Mentor who, at 0858:42, provided timely TI to the SF34 crew on an unknown ac squawking A7000, *"..traffic north 6 miles tracking south east indicating 8 hundred feet below",* which subsequently proved to be the reported Harrier T12 inbound to LEU with a simulated emergency. Although APP reported the range between the ac as *"6 miles"* the radar recording shows that it was about 9nm away. The SF34 crew acknowledged the TI, stating that they could see the contact on TCAS.

Coinciding with this TI transmitted on VHF, the Harrier T12 crew free-called APP on UHF at 0858:40. Whilst this does not accord with the APP controller's report, which states that the Harrier T12 crew called after the SF34 crew had been released to Dundee, the tape transcript provides a clearer view of events.

At 0858:56, the Harrier T12 crew transmitted to APP, *"…with a simulated engine emergency requesting a straight in approach runway 2-5"*. At this point, the Harrier T12 was approximately 9nm NW of LEU. The LEU entry in the RAF FLIP En-Route Supplement ERS (BINA) states that all ac inbound to LEU are to call APP by 40nm. Notwithstanding the importance of the training value afforded to fast-jet pilots of practising no-notice emergency PDs into aerodromes, the instruction to visiting aircrew to call APP by 40nm is to facilitate the integration and sequencing of LEU and Dundee traffic. In this case, the late call from the Harrier T12 crew served to increase the workload of LEU APP and degraded that integration process.

APP passed the 'short' weather to the Harrier crew at 0859:08, "[C/S] *squawk 0-2-4-6 with ident Leuchars runway 2-7 right hand colour code blue fully serviceable set Q-F-E 1-0-0-8".* Unfortunately, APP did not detect the incorrect readback from the crew of *"..runway 0-7..",* instead of *"..2-7.."* when they responded at 0859:21, *"squawking 0-2-4-6 1-0-0-8 and apologies that will be a straight in for runway 0-7".* DRDF was u/s, so the first confirmation to APP about the proximity of the Harrier to the SF34 was when the Harrier's SSR of A0246 appeared at 0859:25; however, this was when the squawk was apparent on the radar recording and not necessarily the time that it appeared on the controller's Watchman ASR display. Overlapping the end of the weather transmission by about 2sec is a transmission on VHF from the SF34 crew at 0859:27 that they were, *"..happy to change.."* frequency to Dundee; it is possible that the overlapping transmissions caused APP to miss the incorrect read-back from the Harrier crew. The transmission from the SF34 crew will have forced APP to change their visual focus from the radar display to their RT frequency selector panel to de-select UHF and then re-select VHF in order to transmit to the SF34 crew. APP's quick response to the SF34 crew's call at 0859:31, transferring the flight to Dundee ATC without any TI update, suggests that they did not perceive a confliction between the two ac at this point. It is possible that this was based upon an assessment of the acs' relative flight paths, such that there was no requirement to update the TI. Alternatively, the increased cognitive arousal caused by the Harrier crew free-calling with a simulated emergency could have induced attentional tunnelling in the trainee such that he provided an automatic response to the SF34 crew, without consideration of the circumstances, to allow the trainee to focus their cognitive resource on the Harrier. Additionally, the fast RT response from the trainee in approving the transfer of the SF34 to Dundee would have prevented the mentor from intervening. However, it is impossible to determine conclusively the reason for the lack of updated TI to the SF34 crew.

At 0859:47, APP commenced a transmission to the Harrier crew on UHF placing the flight under the requested TS. The confliction between the two ac was evident from about 0859:49, following the Harrier crew's turn onto S, towards the SF34. It is likely that this turn onto S was a positioning turn for an approach to RW07, which the Harrier crew erroneously believed was the duty runway. At 0900:14, APP passed TI to the Harrier crew about the SF34, "[C/S] *traffic 12 o'clock half a mile tracking east believed to be civil traffic inbound to Dundee".* [The diagram commences at 0900:16 during this transmission.] The crew replied immediately that they were visual, [with separation of about 1.4nm evident – not the ½ mile reported by APP.] APP believed that the Harrier crew would have been positioning for RW27 and would not therefore have expected the turn onto S commenced at 0859:49, it is reasonable to argue that there was no reason for APP to provide the Harrier crew with TI about the SF34 before 0859:49. Furthermore, given that APP was already transmitting as the confliction became evident, they would not have been able to provide TI until at best 0859:54. However, an opportunity did exist to provide TI from this point, which best practice dictates should have been issued, given the developing situation.

[UKAB Note (1): Minimum horizontal separation occurred at 0900:20, as the Harrier turned R through W descending through 3200ft Mode C (1013mb), with the SF34 1·1nm to the S and 200ft below it. Horizontal separation starts to increase through 1·2nm as the Harrier descends through the SF34's level on the next sweep, both ac indicating similar levels on Mode C. The climb reported by the SF34 pilot is evident on the recording at 0900:38, as the range increases to 1·8nm with vertical separation of 700ft apparent.]

In part, the decision by the Harrier crew to call APP late, contrary to the LEU entry in the ERS BINA, began a chain of events that led to this Airprox because of its effect on the APP controller's workload.

Notwithstanding that the Airprox occurred after the SF34 crew left APP's freq and that they had reported that they had contact with the Harrier on TCAS, best practice suggests that the SF34 crew should have been given updated TI on the Harrier before being transferring to Dundee. However, it is unlikely that the provision of this updated TI would have affected the outcome of the occurrence.

As the Harrier crew report maintaining visual separation throughout, it is impossible to state whether the provision of additional TI by APP to the Harrier crew would have resulted in a different outcome. Certainly, the SF34 crew had received timely TI on the Harrier, were monitoring its progress on TCAS and responsible for maintaining their own separation. Whilst not a contributory factor to the Airprox, it is clear that APP should have provided more timely TI to the Harrier T12 crew.

ATSI reports that the Airprox occurred in Class G airspace, 8nm E of Dundee Airport. Dundee Aerodrome and Approach control were operating combined without the aid of surveillance equipment, which is not provisioned at Dundee. The SF34 was IFR in receipt of a Procedural Service and had reported E of Tayport [350° Leuchars 4¼nm] with the aerodrome in sight. The SF34 was cleared for a visual approach to RW27. Shortly afterwards Leuchars RADAR rang Dundee, concerned that the SF34 was turning E towards the Leuchars cct. Leuchars RADAR requested that the SF34 pilot contact Leuchars after landing. The Dundee controller was not aware of other traffic in the vicinity and not immediately aware that an Airprox had occurred.

The pilot of the SF34 was in receipt of a Procedural Service. CAP493 MATS Pt1 (01/07/10), Section 1, Chapter 11, page 10, paragraph 6.1.1, states:

> 'A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions and approach clearances, which if complied with, shall achieve deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.'

The Dundee 0850UTC weather was reported as: Surface Wind 220°/3kt; Visibility >10km; Cloud FEW @ 1500ft; Temp 17/15; QNH 1009mb.

HQ AIR (OPS) comments that the Harrier was visual with the Saab from 5nm and whilst manoeuvring towards the intended final approach path maintained adequate separation.

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 video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Although the SF34 pilot reported that he was flying under VFR at the time of the Airprox it was evident that he had not cancelled their flight plan and was still operating under IFR, even though the crew was flying a visual approach into RW27 at Dundee. As this ATSU is not radar equipped, the Board recognised the Dundee controller would have been unaware of the Harrier's presence and would not have been able to provide any TI under the Procedural Service unless Leuchars had told him about it. Moreover, Dundee ATC could only separate the IFR SF34 from other IFR flights under their control. With the SF34 just inside the northern boundary of the Leuchars MATZ, after the radar based TS with Leuchars ATC had been terminated and the Harrier still just outside the MATZ under a TS when this Airprox occurred in Class G airspace, the responsibility to effect separation between these two flights under 'see and avoid' remained with the crews themselves.

It was apparent that the SF34 crew had been given TI about the Harrier before both crews called their respective destinations, actually when it was 9nm away the HQ Air ATC report revealed, and a controller Member emphasised that it was unknown traffic at that stage. This had alerted the SF34 crew who reported that it was displayed to them on their TCAS and that would have reassured APP when later advised that the flight wanted to switch to Dundee ATC. However, having been told

originally that the unknown traffic was *"..indicating 8 hundred feet below",* a CAT pilot Member suggested that the SF34 crew would have been concerned when, not being able to detect it visually, their TCAS enunciated the TA followed by the fleeting RA triggered by traffic descending from above, in all probability not realising at the time it was the same ac they had been told about earlier when it was below them. Following the TA, the SF34 Captain reports he disengaged the A/P, turned R and climbed to avoid the Harrier shown on their TCAS, before the RA commanding the crew to MONITOR VERTICAL SPEED was triggered. The radar recording showed the climb in response to the RA had been initiated after the CPA when the Harrier was already 500ft below the SF34's altitude and some 1·8nm astern, so it seemed that the crew's reaction to their TCAS RA had little impact on the overall outcome here. Whilst manoeuvring on the basis of a TA alone is contrary to established practice, CAT pilot Members recognised that the SF34 crew would have been greatly concerned at the possibility of a confliction with the fast moving ac and would want to preserve whatever separation they could. In the vertical plane TCAS information is entirely accurate, whereas azimuth indications can give a misleading impression of the actual geometry.

Whilst HQ 1 Gp had suggested the Harrier should have called APP for the PD at an earlier opportunity, the HQ Air Ops Member expected military ATSUs to be able to accommodate short or no notice practice emergencies such as these whenever at all possible. During training great emphasis is placed on the potential for such emergencies, which are practised at every opportunity. Military aircrew and controller training must contain this essential element and it was important that ATC should react promptly to such requests. Furthermore, the Air Ops Member contended that the Harrier instructor might well have realised that his student was turning to approach the A/D from the wrong direction and wanted to see how his student would subsequently react. A CAT pilot Member identified that this turn for the wrong RW was significant and in his view the catalyst to the conflict. The Harrier was originally heading SE and would not have flown into conflict as the Harrier's course for a visual straight in approach to RW27 would not have conflicted with the SF34. APP was not busy and it was unfortunate that the trainee, and more especially the mentor, had not subsequently detected the incorrect read-back from the Harrier crew which resulted in the Harrier turning westerly toward the SF34. Whilst APP would not have been expecting this, a military controller Member suggested that the APP mentor was not paying sufficient attention to his trainee and should have spotted the Harrier crew's mistake earlier. Another controller Member perceived that the TI passed to the Harrier crew about the SF34 could have been passed earlier; indeed the HQ 1 Gp report concluded that an opportunity did exist to provide more timely TI to the Harrier crew. Controller Members agreed that in this situation, given the Harrier crew's unexpected turn for the wrong RW and thus toward the SF34, the mentor should have recognised the potential for a conflict and ensured that TI was promptly issued to the Harrier crew.

It was plain that TI about the SF34 was actually passed at a range of 1·4nm not the ½nm transmitted, but it was unfortunate that APP had not appreciated what was happening earlier. Nevertheless, the Harrier pilot reported they had sighted the SF34 from about 5nm away, well before this TI was given, and responded immediately that they had it in sight. However, despite maintaining visual contact on the SF34 throughout the encounter it was evident the Harrier crew had flown closer to it than they had realised during their initial manoeuvring for their approach. The radar recording revealed that the horizontal separation was 1·2nm, when the Harrier descended through the twin's level and somewhat less than the 3nm/1500ft the Harrier pilot subsequently reported. Nevertheless, the HQ Air Member opined that the Harrier crew had spotted the SF34 in good time and had avoided it by a suitable margin. The Board concluded therefore that this Airprox had resulted because the Harrier crew flew close enough to the SAAB 340B to trigger a TCAS RA. However, with the Harrier crew entirely cognisant of their position relative to the SF34 and able to manoeuvre their nimble ac whatever the SF34 crew might do, no Risk of a collision had existed.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Harrier crew flew close enough to the SAAB 340B to trigger a TCAS RA.

Degree of Risk: C.