

AIRPROX REPORT No 2013061

Date/Time: 1 Jul 2013 1458Z

Position: 5627N 00302W
(2nm E Dundee Airport-
elevation 17ft)

Airspace: Dundee ATZ (Class: G)

Reporting Ac Reported Ac

Type: Do328 PA34

Operator: CAT Civ Trg

Alt/FL: 2000ft 1000ft
QNH (1010hPa) QNH (1010hPa)

Weather: VMC VMC CLBC

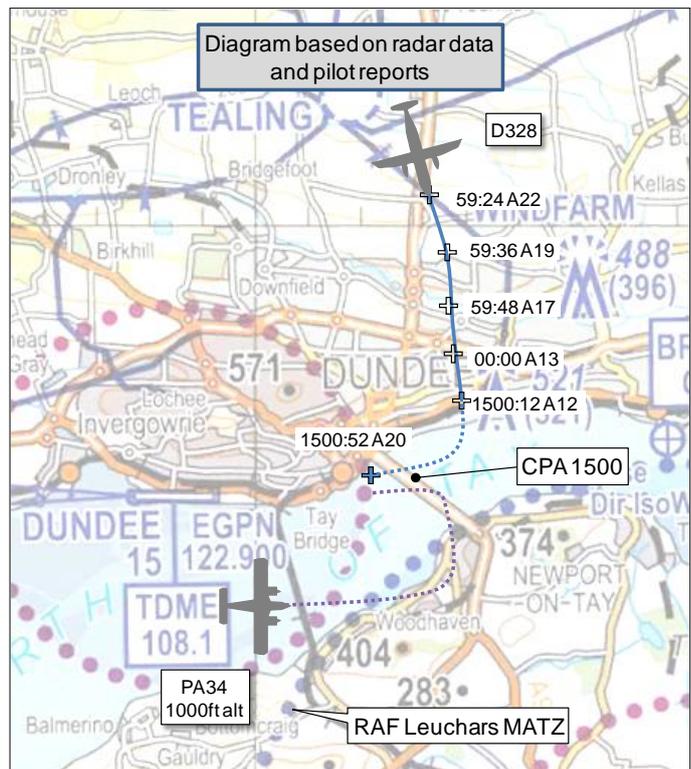
Visibility: >10km 30km

Reported Separation:

50ft V/100m H NK

Recorded Separation:

NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE Do328 (Dornier 328-100) PILOT reports inbound to Dundee on an IFR flight from Aberdeen, in receipt of a Procedural Service from Dundee TWR/APP. The crew had selected the white and strobe lights, together with navigation, beacon and landing lights. The aircraft was squawking 7000, Modes S and C. Approaching Dundee from the N on a visual right-base for RW27 he was informed he was number two and shortly becoming number one¹. While turning onto final for RW27 a TCAS TA was received, followed very shortly by an RA to climb. The traffic, which he first observed at a distance of 0.5nm, was a light twin turning from left-base onto RW27 simultaneously with him at the same level. It then passed below his aircraft. An RA climb was commenced by the First Officer (FO), the handling pilot, towards the Dundee overhead (O/H). The light twin was on the left-hand side and with visual contact of the aircraft the aircraft Captain took control to climb further. (The FO was not visual with the aircraft at the time.) Subsequently, the FO again took control, climbing to 2000ft towards the O/H. A left-hand visual circuit to RW27 was carried out without any further incident.

He assessed the risk of collision as 'High'.

THE PA34 PILOT reports on a VFR training flight inbound to Dundee from Perth, under the control of Dundee TWR. His aircraft is coloured white and blue, SSR Mode C was selected, Mode S is not carried. (No report of the external lights was made.) He was left-hand downwind in the circuit to RW27 at Dundee at 1000ft agl, tracking 090°(M), when he heard a garbled message from what he, subsequently, realised was an incoming aircraft. ATC responded and he heard the words 'South Bank'. He assumed that the aircraft was approaching from his right and probably positioning onto left-base. He continued at the correct parallel displacement from the RW, downwind at 1000ft. He could not see any aircraft either above or below on the right or left, or on base leg, or on final, or positioning from the Visual Reporting Point at Broughty Castle. He extended slightly further downwind to a position halfway between the Rail Bridge and the Road Bridge on the S river bank, whilst continuing to look for traffic. He commented that he did not want to turn onto left-base any earlier because he did not want to obscure his view of an aircraft approaching from the right. He had heard no transmissions

¹ The Dundee RT transcript confirmed that the Do328 pilot was informed he was number two in traffic but not that he was shortly becoming number one.

from the incoming aircraft clearly stating its position. He asked Tower if it was clear to turn onto left-base and this was approved. As he made the turn onto left-base, he had the first sighting of the inbound aircraft, which was O/H the airport at about 1000ft above and approximately 2nm distance. With the aircraft O/H the airport he continued a turn onto base-leg and then started to descend from 1000ft, before making a turn onto final. He said that at no time before the first sighting of the aircraft had he intercepted or crossed the inbound centreline of RW27. He finished his report by saying that he was not entirely clear that his aircraft was the one involved in the Airprox.

THE DUNDEE TWR/APP CONTROLLER reports that during a relatively busy traffic pattern the Do328 was on a visual approach to Dundee and the PA34 was in the visual circuit left-hand for RW27. When the Do328 reported on frequency it was instructed to continue for a visual approach to RW27, number two in traffic. The PA34 reported downwind to land and was instructed to continue. He was expecting the Do328 to arrive from the SE for a left-base. At his request the Do328 reported approaching the City and the Road Bridge. However, he was not able to see it. The pilot of the PA34, who had not turned onto left-base as expected, remaining on the downwind leg, was asked if he had the Do328 in sight. Replying negative he was advised to continue the approach but to maintain 1000ft, the circuit height. He then asked the Do328 pilot if he had crossed the river. As the pilot responded, reporting a TCAS RA (against the PA34 on base-leg), he observed the Do328 N of final approach. The PA34 was instructed to continue approach and landed without further incident. The Do328 maintained 2000ft to the O/H, then flew a visual left-hand circuit to land.

Factual background

The Dundee weather was:

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METAR EGNP 011450Z 25013KT 9999 FEW010 SCT045 16/07 Q1011=  
METAR EGNP 011420Z 25011KT 9999 FEW010 SCT045 16/07 Q1010=
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Dundee ATZ is a circle, 2nm radius centred on RW09/27, from surface to 2000ft.

Dundee ATC is not radar equipped.

MATS Part 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: 1) Aircraft flying in, and in the vicinity of, the ATZ'.²

MATS Part 1 states 'Separation standards are not prescribed for application by ATC between VFR and IFR flights in Class D airspace'.³

The CAA published a Safety Notice ⁴ titled 'Integrating Traffic in the Vicinity of an Aerodrome' which states:

'...The incident data highlights the importance for controllers to have **established a plan for the safe integration of aircraft before they converge towards final approach**, as well as the challenge that a controller is presented with when aircraft are established on directionally opposed base legs and/or when integration is required with an aircraft on an instrument approach. In such circumstances, **early integration actions are required as delaying such manoeuvres results in very limited options and significantly increased risk**. Controllers should therefore take these factors into account when establishing a plan and communicating an order in which aircraft are to approach an aerodrome for a landing, also bearing in mind that VFR aircraft may be unable to visually acquire IFR aircraft, e.g. when the IFR aircraft has not yet descended below cloud or is hidden by aircraft structure or glare...'

² MATS Part 1, Section 2, Chapter 1, Paragraph 1.4.

³ MATS Part 1, Section 1, Chapter 5, Paragraph 5.3.

⁴ CAA Safety Notice 2013/001

Analysis and Investigation

CAA ATSI

CAA ATSI had access to written reports from both pilots, the Dundee Tower controller, area radar recordings, radar recordings from Edinburgh Airport, RT recordings and transcripts of the Dundee Tower frequency, together with the unit investigation report. ATSI also interviewed the Dundee Tower controller.

The Dundee Tower controller (ATCO(1)) was providing an Aerodrome Control Service without the aid of surveillance equipment or Direction Finding equipment. At interview, he commented that he was significantly distracted prior to presenting himself for duty and this was compounded by the administrative tasks that he felt compelled to complete. Another controller, who was not operational at the time, was present in the Tower (ATCO(2)).

At 1454 RAF Leuchars telephoned Dundee to notify ATC of the inbound Do328. ATCO(1) was busy dealing with an aircraft that had stopped in the wrong place on the apron and in a bid to help his colleague, ATCO(2) took the call.

Leuchars advised ATCO(2) that the Do328 was approaching from the N. The callsign of the Do328 indicated to ATCO(1) that it was operating a charter service. Most charter operations into Dundee operate from the S. ATCO(2) asked ATCO(1) if he wanted the Do328 to route to the O/H at 3000ft but, due to pending departure traffic that would be delayed if the Do328 routed to the O/H, ATCO(1) informed ATCO(2) that he wanted the Do328 to route towards a visual left-base for RW27. As there is no RT loudspeaker in the tower at Dundee, ATCO(2) was unaware of the operational situation at the time. The routeing towards left-base could have been made for valid operational reasons and ATCO(2) did not question it. The instruction was passed on to Leuchars.

When the Leuchars controller issued the left-base routeing to the Do328 the Leuchars controller realised that, as the aircraft was operating from the N, it would be more expeditious to join on right-base and changed the instruction to the Do328 accordingly. Leuchars did not inform Dundee of the amended routeing. The Letter of Agreement (LOA) between Leuchars and Dundee states: 'Nothing in this Letter of Agreement shall prevent any controller at RAF Leuchars or Dundee from using discretion to modify these procedures to achieve greater flexibility and efficiency for a specific aircraft movement, provided the other agency in this agreement is notified, agreement obtained, and flight safety not jeopardized.'

At 1458:15 the Do328 contacted Dundee Tower and reported being "*on a right-hand visual er base for two seven*". The Do328 was instructed to continue approach and informed that it was number two in traffic.

At 1458:40 the PA34, which was in the left-hand circuit, informed ATCO(1) that it was downwind for a touch-and-go RW27. ATCO(1) replied "*roger continue*".

ATCO(1) reported at interview that he was looking for the Do328 on left-base and could not see the traffic.

At 1458:50 ATCO(1) asked the Do328 to report its position. The Do328 pilot reported that he was "*coming up to the er the town on the road bridge*". At that point the Do328 was 5nm NE of Dundee tracking S.

At 1459:30 the PA34 pilot reported ready to turn base and ATCO(1) asked if he was visual with the Do328 that was "*east of the field now*". The PA34 pilot replied negative and ATCO(1) instructed him to turn base but maintain 1000ft.

At 1500:00 ATCO(1) transmitted to the Do328 "*I don't see you from the control tower just confirm have you crossed the south bank of the river.*" The Do328 replied "*we're just crossing the river now*".

turning onto base climb climb" before informing ATCO(1) that they had a TCAS climb. When the transmission saying "*climb climb*" was made the Do328 was 3.2nm ENE of the airfield on a base leg at FL011 (altitude 1046ft). At 1500:19 the Do328 was no longer visible on the radar recordings. The PA34 was not visible on the radar recordings at any time during the course of the incident.

ATCO(1) reported that he obtained visual contact with the Do328 as it reported the TCAS RA.

The unit investigation into the incident recommended that consideration is given to allocating a level to inbound aircraft that would vertically separate it from traffic in the circuit until the Dundee Tower controller obtains visual contact This would create a more effective means of complying with the recommendations produced in Safety Notice 2013/001.

Military ATM

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

Although RAF Leuchars ATC were aware of the Airprox within the Dundee visual circuit, they did not perceive a requirement to submit occurrence reports for the incident. Consequently, when their contributory participation in the incident sequence became clear 3½ months later, the persons involved did not have a detailed recollection of events. However, RT and landline data from RAF Leuchars ATC, including 'live-mic' recording, were available to assist the investigation.

From RAF Leuchars ATC's perspective, the incident sequence commenced at 1454:14 as Leuchars Approach contacted Dundee ATC to pre-note the inbound Do328. During this landline exchange, at 1454:33, Dundee ATC advised Leuchars Approach "*okay, [Do328 c/s] visual left base 2-7, Q-N-H is 10...[pause] I am not the controller on duty, 1-0-1-1.*" Leuchars Approach read back this clearance and Dundee ATC then corrected themselves saying "*disregard, it's 1-0-1-0, I'm sorry*" which was acknowledged.

The Do328 was being provided with a Deconfliction Service (DS) by Leuchars Zone, which was operating in a 'band-boxed' Departures/Zone control position, a standard configuration for Leuchars ATC. Based solely on analysis of the RT transcript for the period of the incident, Leuchars Zone was subject to a relatively high task-load, providing ATS to a number of formations of departing Typhoons, in addition to Zone traffic. Although there is no evidence on the landline transcript of liaison between Leuchars Approach and Leuchars Zone, at 1456:20, Leuchars Zone advised the Do328, "*own navigation for left base, runway 27*" which was acknowledged. A second voice is then heard on the 'live-mic', during the Do328's read back, saying "*right base...that'll be right base.*" Leuchars Zone immediately advised the Do328 "[Do328 c/s] *my apologies, own navigation for right base runway 2-7 at Dundee*" which was acknowledged. The Do328 subsequently left Leuchars Zone's frequency at 1457:54, 8.3 nm N of Dundee airport.

RAF Leuchars ATC have assessed that this second voice was Leuchars Approach, talking to the Leuchars Zone controller. Although Leuchars Approach could not recall the incident when subsequently asked, it was considered likely that as the Do328 was approaching Dundee from the N, they had believed at the time that an error was made in instructing a left-base join and thus they prompted Leuchars Zone to instruct the aircraft to join via right-base. However, this amended routeing was not advised by Leuchars ATC to Dundee ATC, which is a requirement of the LOA between the 2 units.

Given the lack of detail in the recollection of the incident by Leuchars ATC, it is not possible to determine why Dundee ATC was not notified of the amended routeing of the Do328. Leuchars Zone may have intended to notify Dundee ATC but forgot to carry out the action due to the distraction caused by other tasks, given their high task-load at the time. Allied with this, Leuchars Approach may have assumed that Leuchars Zone would have conducted this liaison. However, following this incident, SATCO RAF Leuchars reminded ATC personnel of the requirement

contained within the LOA to notify and agree with Dundee ATC any changes to the flight profiles of inbound aircraft.

Summary

The Airprox occurred within Class G airspace near the boundary of the Dundee ATZ. Both aircraft were under the control of the Dundee controller, who was providing a combined Aerodrome/Approach service. The PA34 was inbound VFR, positioning downwind left-hand to RW27. The Do328 was inbound IFR from the N. However, ATCO(1) believed that the aircraft was inbound from the S. Consequently, when his colleague, ATCO(2), was discussing the aircraft's arrival routeing with RAF Leuchars, he requested it to join on left-base. Although this was agreed, Leuchars changed the route to join on right-base, without informing Dundee, thereby not complying with the LOA. When the Do328 contacted Dundee, ATCO(1) did not register that the aircraft reported on right-base. The Do328 pilot was informed he was number two in traffic but no information was passed about the position of number one. The PA34 was not informed about the believed position of the Do328. ATCO(1) tried to obtain visual contact with the Do328 but this was not achieved because he was looking towards the SE, whilst the aircraft was approaching from the NE. The Do328, subsequently, reacted to a TCAS RA climb. The PA34 pilot did not observe the Do328 until after the Airprox.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board first considered the actions of the Dundee Tower controller. The Board opined that the Airprox sequence started when the Dundee Tower controller made an incorrect assumption, based on its callsign, that the Do328 was approaching from the South as opposed to it in fact being inbound from the North. A civil ATC member commented that if the controller had looked at its flight progress strip it would have shown the departure airport (Aberdeen) and this would have quickly resolved the impending confusion. Acting on his incorrect assumption, the controller asked a colleague to coordinate the aircraft's arrival with RAF Leuchars to join on left-base. This was agreed but, subsequently, seeing the direction of arrival, Leuchars amended the join, under their own initiative, to proceed onto right-base, without informing Dundee of the change. The Military ATM advisor confirmed that this change should have been notified to Dundee. Board members considered this to be a contributory factor to the Airprox. Nevertheless, on initial contact the Do328 reported right-base and the Board opined that the controller should then have assimilated this information and re-appraised his understanding of the dynamics of the situation. Several members queried the performance of the Dundee controller. The ATSI advisor reported that during their investigation the controller had reported being distracted prior to presenting himself for duty and had also reported that he had been expected to carry out administrative tasks whilst at work, and that this had distracted him further. The Board considered this to be a contributory factor to the Airprox.

The Do328 pilot was advised that he was number two in traffic but not, as he thought, shortly becoming number one. ATC and pilot members all agreed that the controller should have stated the position of the number one to the Do328 pilot in order to assist him in sequencing his join. Equally, because he had omitted this information, the Do328 pilot should have queried it. This was important because the Do328 would require visual contact with number one in order to join the circuit safely. Both of these omissions in action were considered to be contributory to the Airprox.

When the PA34 pilot reported downwind, he was instructed to continue but not advised of his sequence number in the traffic pattern. At this point the controller was still looking for the Do328 approaching from the South. The Do328 pilot reported his position as "coming up to the town on the road bridge" but Board members considered this an ambiguous call because built-up areas are situated at both the north and south ends of the road bridge. They considered there should have been more positive position reports used by both ATC and the pilots; this was considered to be another contributory factor. When the PA34 pilot reported ready for base-leg neither he nor the

controller had visual contact with the Do328. He was instructed to turn base but to maintain 1000ft. This was a precaution so that the PA34 could be broken off the approach at a safe altitude if the Do328 was seen to be too close, but the Board considered that this may have introduced a further element of doubt as to which aircraft actually was number one in the traffic pattern. Ultimately, the Do328 continued towards final approach with no visual contact with the PA34 and then turned into conflict with the aircraft. This was considered by the Board to have been the cause of the Airprox. Subsequently, the Do328 pilot reported reacting to a TCAS RA climb and then the Captain took control of the aircraft because he had the PA34 in sight. Civil airline pilot members queried whether the Do328 crew had fully followed the TCAS RA, as the system would normally provide more than the reported 50ft vertical separation. They also queried the Captain's rationale for taking control. Assuming that the handling pilot had applied the required control inputs on receipt of the TCAS RA, his actions should have generated sufficient separation.

Although the separation as reported by the Do328 pilot had been 50ft vertical and 100m horizontal, the Board considered that, in these circumstances, there was in fact no risk of a collision because the Do328 pilot had received and actioned a TCAS RA and was then in visual contact with the PA34 as they climbed. Consequently, the risk was classified as Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Having been told that he was No.2 in the pattern, but in the absence of effective Traffic Information, the Do328 pilot turned into conflict with the PA34.

Risk: C.

Contributory Factors:

1. Leuchars did not coordinate the right-hand base join with Dundee.
2. There was insufficient Traffic Information from ATC regarding the PA34.
3. The Dundee Controller was distracted by non-operational tasks.
4. The use of ambiguous reporting points.
5. A lack of questioning of the Traffic Information by the Do328 pilot.

ERC Score⁵: 10.

⁵ 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.

ANNEX A

ATSI Report

1 Background

- 1.1 An AIRPROX was reported by a Dornier 328-100 (D328) when it received a TCAS RA to climb against a Piper PA34 (PA34) whilst turning onto final approach to runway 27 at Dundee airport.
- 1.2 The D328 was operating IFR from Aberdeen to Dundee and was in receipt of an Aerodrome Control Service from Dundee Tower on frequency 122.9MHz.
- 1.3 The PA34 was operating VFR on a flight from Perth to Dundee and had joined the visual left hand circuit for runway 27. The PA34 was in receipt of an Aerodrome Control Service from Dundee Tower on frequency 122.9MHz.
- 1.4 CAA ATSI had access to written reports from both pilots, the Dundee Tower controller, area radar recordings, radar recordings from Edinburgh Airport, RTF recordings and transcripts of the Dundee Tower frequency, together with the unit investigation report. ATSI also interviewed the Dundee Tower controller.
- 1.5 The Dundee Tower controller (ATCO(1)) was providing an Aerodrome Control Service without the aid of surveillance equipment or Direction Finding equipment. Another ATCO, who was not operational at the time, was present in the Tower (ATCO(2)).
- 1.6 The Dundee weather is reproduced below:

METAR EGPN 011450Z 25013KT 9999 FEW010 SCT045 16/07 Q1011=
METAR EGPN 011420Z 25011KT 9999 FEW010 SCT045 16/07 Q1010=

2 Factual History

- 2.1 Prior to starting work at 1315 UTC ATCO(1) had received some difficult personal news. At the time ATCO(1) believed that he was still capable of performing the operational task but in hindsight recognised that he was distracted and upset when he arrived at work. ATCO(1) was also aware that, due to staffing constraints, removing himself from operational duty had the potential to force the airfield to close early. When ATCO(1) arrived at work he was confronted with some unexpected and pressing administrative tasks that needed completing prior to him going on leave, which further compounded his distraction. ATCO(1), constrained by the time available to complete the administrative tasks, felt compelled to try and complete some of the tasks while operational. Just prior to the AIRPROX, a pilot had received an uncharacteristic outburst from ATCO(1) following an error that would normally have been dealt with on the telephone post-incident.
- 2.2 At 1454 RAF Leuchars telephoned Dundee to notify them of the inbound D328. ATCO(1) was busy dealing with an aircraft that had stopped in the wrong place on the apron and, in a bid to help their colleague, ATCO(2) took the call.

- 2.2 Leuchars advised ATCO(2) that the D328 was approaching from the north. The callsign of the D328 was a callsign that ATCO(1) was familiar with as being a charter operation. Most charter operations into Dundee operate from the south. ATCO(2) asked ATCO(1) if he wanted the D328 to route to the overhead at 3000ft but, due to pending departure traffic that would be delayed if the D328 routed to the overhead, ATCO(1) informed ATCO(2) that he wanted the D328 to route towards a visual left base for runway 27. There is no loudspeaker in the tower at Dundee so ATCO(2) was unaware of the operational situation at the time. The routing towards left base could have been made for valid operational reasons and ATCO(2) did not question it. The instruction was passed on to Leuchars.
- 2.3 When the Leuchars controller issued the left base routing to the D328 the Leuchars controller realised that, as the aircraft was operating from the north, it would be more expeditious to join on right base and changed the instruction to the D328 accordingly. Leuchars did not inform Dundee of the amended routing.
- 2.4 At 1458:15 the D328 contacted Dundee Tower and reported being *"on a righthand visual left base for two seven"*. The D328 was instructed to continue approach and informed that they were number two in traffic.
- 2.5 At 1458:40 the PA34, which was in the left hand circuit, informed ATCO(1) that they were downwind for a touch and go runway 27. ATCO(1) replied *"roger continue"*.
- 2.6 ATCO(1) reported at interview that he was looking for the D328 on left base and could not see the traffic.
- 2.7 At 1458:50 ATCO(1) asked the D328 to report their position. The D328 reported that they were *"coming up to the left of the town on the road bridge"*. At that point the D328 was 5 nautical miles (NM) northeast of Dundee tracking south.
- 2.8 At 1459:30 the PA34 reported ready to turn base and ATCO(1) asked if they were visual with the D328 that was *"east of the field now"*. The PA34 replied negative and ATCO(1) instructed him to turn base but maintain a thousand feet.
- 2.9 At 1500:00 ATCO(1) said to the D328 *"I don't see you from the control tower just confirm have you crossed the south bank of the river."* The D328 replied *"we're just crossing the river now turning onto left base climb climb"* before informing ATCO(1) that they had a TCAS climb. When the transmission saying *"climb climb"* was made the D328 was 3.2NM east-northeast of the airfield on a base leg at FL011 (altitude 1046 feet). At 1500:19 the D328 was no longer visible on the radar recordings. The PA34 was not visible on the radar recordings at any time during the course of the incident.
- 2.10 ATCO(1) reported that he got visual contact with the D328 as it reported the TCAS RA.
- 2.11 The report from the pilot of the D328 stated that the crew saw a light twin turning onto final from left base as they were turning onto final from right base at the same level. The twin passed below on the left hand side. The D328 climbed to 2000ft, positioned overhead the airfield and completed a visual circuit to land.
- 2.12 The written report from the pilot of the PA34 stated that they were aware of the D328 prior to turning base and assumed that the D328 was joining on left base. The pilot was looking for the traffic but was

reluctant to turn base as it would reduce their visibility for traffic joining, as they thought, on their right hand side. The PA34 reported that they first saw the D328 when it was overhead the airfield, approximately 1000ft above and 2NM away, after the AIRPROX had occurred.

3 Analysis

3.1 ATCO(1) was significantly distracted prior to presenting himself for duty, this was compounded by the administrative tasks that he felt compelled to complete and the altercation on the R/T prior to the incident.

3.2 The phonecall received from RAF Leuchars was not answered by the operational ATCO, ATCO(1), but instead by ATCO(2). ATCO(1) assumed the D328 was operating from the south, the more usual direction for traffic of that kind and did not personally hear Leuchars state that the traffic was positioning from the north. ATCO(2) did not question the routeing and passed it to Leuchars. The Leuchars controller, recognising that a routeing towards right base would be more expeditious, instructed the D328 to route towards right base without co-ordination with Dundee. The Letter of Agreement between Leuchars and Dundee states:

'Nothing in this Letter of Agreement shall prevent any controller at RAF Leuchars or Dundee from using discretion to modify these procedures to achieve greater flexibility and efficiency for a specific aircraft movement, provided the other agency in this agreement is notified, agreement obtained, and flight safety not jeopardized.'

The Leuchars controller did not notify and obtain agreement from Dundee to the change of routeing.

3.3 When the D328 contacted ATCO(1) the pilot stated that they were routeing to right base. This was not detected by ATCO(1). It is likely that the distractions referred to in paragraph 2.1, in combination with the expectation that the D328 was routeing towards left base, contributed towards ATCO(1) not fully assimilating the position report.

3.4 ATCO(1) informed the D328 that they were number two in traffic but did not pass traffic information on the aircraft they were following. ATCO(1) did not see the D328 until it reported responding to the TCAS RA. Any traffic information that ATCO(1) may have elected to pass to the PA34 on the D328 would have been incorrect, based on ATCO(1)'s belief that the D328 was joining on left base, however, it may have alerted the crew of the D328 to ATCO(1)'s misperception and prompted a correction from the crew of the D328.

3.5 At interview ATCO(1) stated that he instructed the pilot of the PA34 to maintain 1000ft as he was anticipating having to instruct a go-around to the PA34. However, the D328 was descending through FL011 when it responded to the TCAS RA, and the crew of the D328 reported that the PA34 was at the same level (it is likely that the PA34 did not see the D328 until the D328 had initiated a go-around). Safety Notice 2013/001, Integrating Traffic in the Vicinity of an Aerodrome states:

'...The incident data highlights the importance for controllers to have **established a plan for the safe integration of aircraft before they converge towards final approach**, as well as the challenge that a controller is presented with when aircraft are established on directionally opposed base legs and/or when integration is required with an aircraft on an instrument approach. In such circumstances, **early integration actions are required as delaying such manoeuvres results in very limited options and significantly increased risk**. Controllers should therefore take these factors into

account when establishing a plan and communicating an order in which aircraft are to approach an aerodrome for a landing, also bearing in mind that VFR aircraft may be unable to visually acquire IFR aircraft, e.g. when the IFR aircraft has not yet descended below cloud or is hidden by aircraft structure or glare...'

The unit investigation into the incident recommends that consideration is given to allocating a level to inbound aircraft that would vertically separate it from traffic in the circuit until the Dundee Tower controller obtains visual contact thus creating a more effective means of complying with the recommendations produced in Safety Notice 2013/001.

4 Conclusion

4.1 The AIRPROX occurred when the D328 and the PA34 turned onto opposite base legs at approximately the same time – radar recordings were unable to determine the exact geometry of the encounter.

The following factors are considered to be contributory:

- a) ATCO(1) was significantly distracted while performing his operational task (due to external factors and administrative work being undertaken).
- b) ATCO(1)'s assumption that the D328 was positioning from the south which prompted him to issue a routeing towards left base.
- c) The change of routeing towards right base issued to the D328 by RAF Leuchars which was not co-ordinated with Dundee.
- d) ATCO(1)'s belief that the D328 was joining left base hampered his ability to visually acquire the D328 out of the window.
- e) The lack of traffic information issued to the D328 prevented the pilot from being aware of the PA34's intentions.