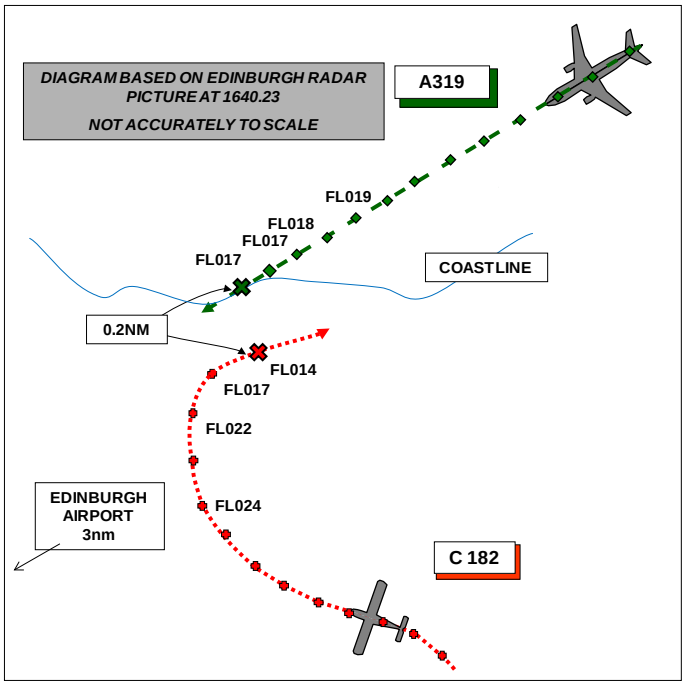
AIRPROX REPORT No 2010149

Date/Time:	4 Oct 2010 1640Z	
Position:	5559N 00315W (4nm Final RW24 Edinburgh - elev 136ft)	
Airspace:	Edinburgh CTZ	(*Class: D*)
	Reporting Ac	*Reported Ac*
Type:	A319	C182
Operator:	CAT	Civ Pte
Alt/FL:	1200ft (QNH 990mb)	1800ft (QNH NR)
Weather:	VMC NR	VMC CLBC
Visibility:	50km	>20km
Reported Separation:	300ft V/900m H	NR V/1km H
Recorded Separation:	~300ft V/0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A319 PILOT reports flying a CAT flight into Edinburgh under IFR and in receipt of an Approach Control Service (ACS) from them. While descending on an ILS approach to RW24, passing about 1200ft, with the ac fully configured and stable on a heading of 235° at 140kt, ATC informed him that they might see traffic ahead on TCAS, to the S of the approach path. The other ac was identified on TCAS as proximate traffic, 100ft above at a range of about 3nm, and the captain identified it visually as a C182 that was apparently orbiting in a holding pattern waiting for them to pass. However, without notice the C182 suddenly performed an extremely rapid descending RH turn and started heading straight towards them. TCAS then enunciated the C182 as *'traffic'*, followed straight away by an RA *'monitor vertical speed'*. The FO [handling pilot] disconnected the autopilot in accordance with company SOPs and followed the TCAS RA command.

The Captain continued to monitor the C182 visually as it flew past and below them on the LH side at close range. After the TCAS 'clear of conflict' they continued their approach and landing. He assessed the risk as being very high.

THE C182 PILOT reports that he was flying a VFR private flight inbound to Edinburgh at 100kt, in receipt of an ACS from them, squawking with Modes C and S and his ac was fitted with an ACAS [TCAS 1 equivalent]. He requested and was given clearance to enter zone VFR to Arthur's Seat [a VRP in the SE of the city] below 2000ft QNH so he continued into the zone in good VFR with a brisk SW'ly wind and as he approached Arthur's Seat at about 1800ft he was experiencing considerable turbulence. He reported at Arthur's Seat and was instructed to continue on course but he became very concerned by flying over the City at relatively low level, which he was told in training was a 'no no'. The RT was busy with other ac and he was then instructed to hold to the S of the approach paths so he then entered a LH orbit over the centre of the city. The orbit reinforced that he was over the city so he decided that his next orbit would be to the right placing him within gliding range of the shoreline on the S of the river Forth to the E of the airport.

As he entered the right turn he briefly saw an airliner about 1km away in his 11 o'clock, slightly higher than him, so he immediately took avoiding action by steepening the right turn and descending out of its flight path; a TA was activated after he turned away. There were various comments on the RT and he was subsequently cleared to land.

With hindsight he thought that his turn to the right coupled with the strong southerly wind might have caused his ac drift towards the approach path. However, he believes that his action to continue the right turn away from the airliner prevented a conflict and therefore there was no risk of collision.

THE AIR CONTROLLER reported that RAD informed him of a C182 inbound to land from Musselburgh [a VRP 11nm E of Edinburgh Airport] and said to *"watch him"* as the pilot seemed unsure on RT. The pilot checked in and on reaching and reporting at the Braid Hills [Arthur's Seat] he instructed the pilot to route to the Southern airfield boundary and to remain S of RW24. This was not read back correctly so he repeated the instruction to hold S of RW24 and this was acknowledged.

He had traffic to depart and could see on the ATM that two IFR ac were inbound to the airfield. Given the prior warning from RAD and his initial exchanges with the C182 pilot, he decided to sequence the IFR inbounds to land before bringing in the C182. He could see that the C182 was approaching the airfield, so he again instructed the pilot to remain to the S of RW24; this was acknowledged and the ac commenced a LH orbit.

The A319 was by then on final for RW24, the C182 was established in the orbit and at that point he had the C182 visual and on the ATM continuing the LH orbit away from the approach. It was his intention to tell the A319 pilot about the VFR traffic holding to the S when he checked in and he also intended to land another IFR inbound before the C182 and had organised a suitable gap in the IFR traffic with RAD to facilitate this. He did not pass TI to the C182 as it was still in the LH orbit, away from the approach, and was not going to be fitted into the landing pattern until after the subsequent IFR inbound had landed.

The A319 was approaching 4nm final when the C182 inexplicably turned right towards it and the A319 pilot checked in with him. He knew the C182 was above the A319 which left no option to send the A319 around. He asked the C182 pilot if he was visual with the A319 but the A319 pilot responded that he was visual with the RW24 traffic; he instructed the A319 to continue and passed essential TI as he believed that the C182 would pass just in front but above it. When the A319 pilot reported that the C182 was behind them, he cleared him to land. The A319 pilot informed him that it had been really close and that he would be filing an Airprox.

NATS Ltd provided a timely and comprehensive investigation report. The investigation is largely the same as that in the ATSI report below and, for brevity, has not been included. The report also made 4 internal recommendations, which have been implemented, and identified 3 ATC lessons, namely:

1. The benefit of keeping unfamiliar GA pilots in a standard visual circuit pattern.
2. The use of an intermediate VRP to hold off until a suitable gap in the inbound IFR traffic allows the GA traffic to make an approach to land.
3. The suitability of the existing VRPs for the operation at Edinburgh Airport.

ATSI reports that when conducting the investigation they had access to radar recordings provided by NATS Prestwick Centre and Edinburgh Airport, together with RTF recordings and controllers' reports. The Airprox occurred 3.5nm to NE of Edinburgh Airport on final approach to RW24 at an alt of 1100ft, outside the ATZ but within the Edinburgh CTR, which is CAS extending from the surface to 6000ft amsl.

Edinburgh TWR was operating with split positions. The ADC (AIR) was an experienced controller who had been in the operational position for 1hr 10min prior to the incident and he reported that workload as light; RW24 was the runway in use.

The A319 was on an IFR flight inbound to Edinburgh and was being vectored left hand for the ILS RW24 while the C182 was operating on a VFR flight also inbound to Edinburgh and was approaching from the E.

The AIP entry for Edinburgh Airport AD 2-EGPH-1-11 24 Sept 09, VFR flights, paragraph 8, states:

> ' a) VFR flight in the Control Zone will be given routeing instructions and/or altitude restrictions in order to integrate VFR flights with other traffic.
>
> b) Pilots should anticipate routeing via the Visual Reference Points detailed in paragraph 10 or the routes detailed in paragraph 11.
>
> c) Pilots of VFR flights are reminded of the requirement to remain VMC at all times and to comply with the relevant parts of the Low Flying Rules, and must advise ATC if at any time they are unable to comply with the instructions issued.'

Musselburgh and Arthur's Seat are published VRPs and lie 11NM and 7.5NM respectively to the E of Edinburgh Airport.

The METAR was: 041620Z 19015KT 9999 SCT035 16/08 Q0991=.

Edinburgh RAD gave the C182 pilot clearance to enter the CTR, VFR, and join for RW24 routeing via Musselburgh and Arthur's Seat, not above 2000ft QNH; RAD suggested AIR to monitor the pilot, as he seemed unsure on the RT.

At 1633:39 the C182 pilot called TWR, *"This is (C182)c/s at Musselburgh I'm heading towards Arthur's Seat"* and the AIR replied, *"(C182)c/s Edinburgh Tower Good Afternoon report at Arthur's Seat please".*

AIR reported that he was monitoring the A319 on the ATM, and planned either to make the C182 No1, or alternatively to hold it to the S, depending on the range that the A319 turned onto the ILS.

At 1635:20 the C182 reported at Arthur's Seat and AIR instructed the pilot, *"(C182)c/s thank you report approaching the southern airfield boundary remain south of Runway 24 please"* and the pilot replied, *"Report southern area of L- boundary erm (C182)c/s say again er erm positioning for runway two four (C182)c/s".* AIR reported that the pilot seemed unsure and gave an incomplete readback so he decided to emphasise the clearance and instructed the C182 pilot, *"Yes remain south of Runway two four please";* the pilot responded*, "Remain south of Runway two four (C182)c/s".*

The controller was asked if he considered that TI to the C182 would have been appropriate; he stated that there was no cct traffic at that time to affect the C182 and the A319 was still some distance away.

As the A319 closed on final approach, AIR informed RAD that the C182 would hold to the S; at 1637:33 AIR instructed the C182 pilot, *"(C182)c/s if you hold to the south of Runway two four please"* and the pilot replied, *"Holding to the south of Runway two four (C182)c/s".* The radar recordings show the C182 position to be 3nm E, tracking towards the airfield at an alt of 1600ft, with the A319 on left base 10nm ENE of the airfield.

AIR noted both visually and on the ATM, that the C182 entered a left hand orbit. At 1638:43, the radar recording showed the C182 in a left hand orbit 2.75nm E of the airfield, indicating an alt of 1800ft and the A319 established on final approach at 7nm; RAD had informed the A319 crew about the C182 holding to the S. At 1639:28 the radar recording showed the C182 taking up a N'ly track indicating an alt of 1900ft. AIR reported that he saw this, but shortly afterwards he was reassured when he saw the C182 commence a left turn, still at 1800ft, as though it was continuing in the left-hand orbit. At the same time, 1639:37, the A319 pilot contacted AIR, *"Tower (A319)c/s with you descending on the ILS"*; immediately after this call AIR reported that he saw the C182 make a sharp right turn towards the final approach. The radar recording shows the C182 turn right at 1639:57 indicating an alt of 1700ft.

The controller reported that he immediately recognised that the ac were in conflict and at 1639:58 transmitted to the C182 pilot, *"(C182)c/s just confirm you're visual with the er traffic on two four",* but at 1640:05, the A319 pilot reported, *"(A319)c/s is visual with the er traffic on two four".* The radar recording shows the A319 at 3.5nm on the final approach, indicating an alt of 1200ft, with the C182 in its 11 o'clock position at 1.2nm crossing from left to right, indicating 1700ft. AIR responded to the A319's call, *"(A319)c/s roger there is VFR traffic I believe just about to cross you left to right are you visual with that".* At 1640:14 the radar recording showed the C182 descending and passing 1600ft, in a right turn towards the A319, indicating 1100ft. At 1640:19, the A319 pilot replied, *"Er Yeah it's erm a bit close*".

At that point radar the recording shows both ac indicating an alt of 1100ft, 0.5nm apart with the C182 then continuing its right turn and descending to 700ft. AIR reported seeing the C182 make a rapid descent and right turn and pass down the left hand side of the A319 and was concerned regarding the safety of the C182.

The A319 was instructed to continue its approach and the pilot commented that the C182 had approached them very quickly. The C182 made an apology and repositioned onto final approach. Both ac landed without further incident.

The controller was asked to consider anything that might prevent a future occurrence; he indicated that once he had decided to hold the C182, TI to the pilot would have been appropriate regarding the IFR ac inbound with the reason for the delay. He also added that, if the C182 pilot was unable to comply with an instruction to remain S of RW24, he should have advised ATC.

The controller also reported that the airport was well served with VRP's except to the S, where a suitable VRP would enhance the arrival and holding of VFR traffic.

Following the Airprox the ATSU has recommended a review of current procedures for inbound VFR flights and a review of VRPs. The ATSU reported that a suitable VRP had been identified and an appropriate application, for the approval of the VRP was being processed with DAP.

The C182 pilot did not comply with the AIR controller's instruction to report approaching the Southern airfield boundary and to remain S of RW24. The AIR controller, aware of the requirement to monitor the C182 pilot, decided after the incomplete read back, to emphasise the requirement to remain S of RW24 on two further occasions. The C182 pilot subsequently turned towards final approach without advising the controller.

When the AIR controller decided to hold the C182 because of the A319 on final approach, the controller did not provide the C182 pilot with appropriate TI, which would have aided the pilot's situational awareness regarding the A319. Therefore, the absence of appropriate TI is considered to be a contributory factor. The Manual of Air Traffic Services (MATS) Part1, Section 2, Chapter 1, Page 1, 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.'

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

The Board was briefed regarding the wind conditions and a pilot Member familiar with operating from Edinburgh informed the Board that significant turbulence downwind of the Pentland Hills and over the city was not an uncommon feature and would have been uncomfortable for the C182 pilot.

Although Members generally considered the Controller's sequencing plan sound in the circumstances, some familiar with Edinburgh procedures opined that instructing the C182 to join downwind or base for RW24 would have been more expeditious and might have allowed the ac to join and land, without the need to hold, before the instrument traffic (which had priority); that, however, was a matter of judgement and they agreed that the controller was better placed than them to make the decision.

Both pilot and controller Members observed that, although the controller believed his instructions to be clear and unambiguous, the C182 pilot had not understood or implemented them as intended. The controller noted the pilot's unclear and incorrect readback and reiterated the instruction, but he did not repeat the instruction to track to the Southern Aerodrome boundary. The Board noted the potential for misunderstandings in an instruction to remain south of a runway that was not oriented east-west; several controller and pilot Members said they would interpret the instruction to remain *"south of runway 24 please"* as an instruction to remain S of the RW24 approach path, particularly when approaching the airfield from the E. Therefore the Board considered it to be an imprecise instruction that could be understood either way and Members agreed that an instruction to proceed to/hold at a precise location, direction and alt would have been clearer and less open to interpretation. It was also observed that in such circumstances in Class D airspace ATC is required by MATS Pt 1 (Sect 3.2) to provide TI to the VFR ac on the IFR ac; it is considered good practice to inform the pilot of his number in the landing sequence. The first indication to the C182 pilot that there was another aircraft approaching would have been when the A319 pilot called on TWR frequency at 1639:37, just as the C182 pilot was changing the direction of his orbit; even then, the A319 pilot called, *"Tower (A319) c/s with you descending on the ILS",* which would not have indicated the precise position of the A319 to the C182 pilot. Shortly after this TWR observed the C182 tightening its turn as the pilot most likely first saw the airliner. Members could not determine, however, why the C182 descended through the airliner's alt rather than remaining level above it.

In the event the C182 pilot did not comply strictly with the controller's instructions and Members agreed that he had not understood them fully. Further, the pilot was uncomfortable with holding over the city at an alt where he considered that he would not have been able to glide clear of the built-up area in the event of an engine failure. Up to the time the pilot decided to reverse the direction of his holding turn Members agreed that, although not strictly in accordance with his instructions, and despite the lack of an explicit instruction to maintain the left hand orbit, it was reasonable for the Controller to assume the C182 would continue its left hand orbit and that this would result in safe separation clear to the S of the approach path. Only when the C182 pilot, for understandable reasons changed to a right-hand orbit, without calling it and in the absence of any prior warning about the A319, did the separation erode. The controller noted this quickly, and attempted to ensure that the C182 was taking visual separation; however at that stage the A319 reported visual with the C182. The C182 pilot saw the A319 in his 11 o'clock and increased his rate of turn and descent ensuring that there was no risk of collision.

Although Members noted and welcomed the NATS review of VRPs, it was pointed out that the prime purpose of VRPs is for routeing instructions to VFR Zone traffic and their suitability for holding VFR inbounds could not be ensured as they are frequently too far away from the airfield.

Pilot Members discussed the soundness of disconnecting the Autopilot in the event of a 'passive' TCAS RA; it emerged that different airlines have different SOPs. The CAA FOI Advisor advised that the CAA directs that operators should have a SOP, not what the SOP should be; the CAA requires operators to give the issue due consideration and write their SOPs accordingly.

Post Meeting Note: The airline concerned informed the UKAB that their TCAS procedures are in line with those recommended by the ac manufacturer. As the Board agreed at the Meeting, the pilot's actions were, as far as could be determined, totally in accord with the airline's SOPs.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In the absence of TI, the C182 pilot flew close enough to cause the A319 crew concern.

Degree of Risk: C.