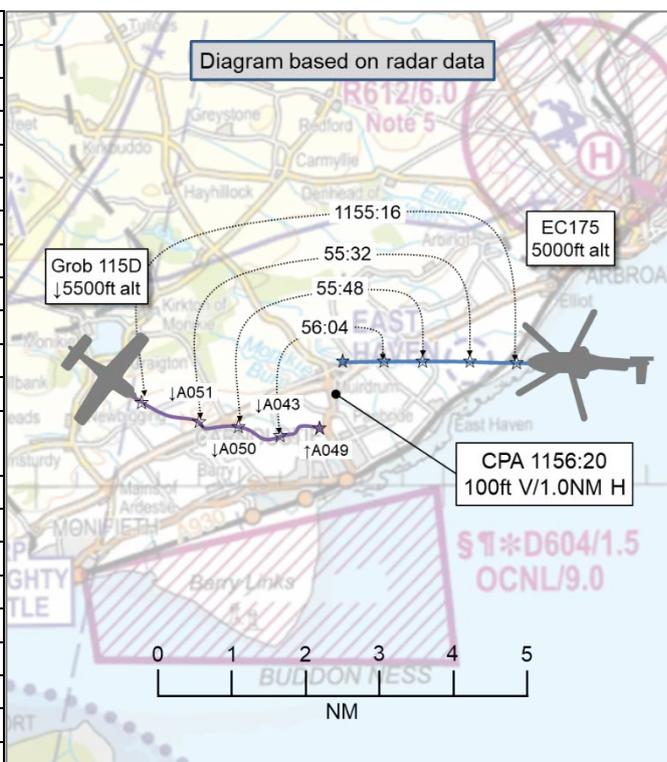


**AIRPROX REPORT No 2021040**

Date: 25 Apr 2021 Time: 1156Z Position: 5631N 00243W Location: Carnoustie

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

Recorded	Aircraft 1	Aircraft 2
Aircraft	EC175	Grob 115D
Operator	Civ Comm	Civ FW
Airspace	Scottish FIR	Scottish FIR
Class	G	G
Rules	IFR	VFR
Service	Procedural	Basic
Provider	Dundee Approach	Dundee Approach
Altitude/FL	F045	F044
Transponder	A, C, S	A, C, S
Reported		
Colours	Blue/white/gold	White/orange
Lighting	Position, strobe, landing lights	Nav, strobes
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	5000ft	>3500ft
Altimeter	QNH (1032hPa)	QNH (1032hPa)
Heading	~270°	090°
Speed	140kt	95kt
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
Separation		
Reported	300ft V/NK H	NK V/1-1.5NM H
Recorded	100ft V/1.0NM H	



**THE EC175 PILOT** reports that, whilst conducting a training sortie, an RNP approach was planned into Dundee and booked accordingly with the aerodrome; the flight plan had previously been submitted. En-route to Dundee, RAF Leuchars was unable to provide a service that day (they would normally provide a radar service in that area). Aberdeen Radar had provided a Traffic Service up to the point of transfer to Dundee. Good VMC existed throughout the sortie and there appeared to be little traffic in the area. After establishing contact with Dundee Approach, and on receiving a Procedural Service, they were given clearance for the RNP approach RW09 which was a change from the predicted RW in use. The pilot was not aware of the service the other aircraft was receiving as they had only been on frequency with Dundee for approximately 5min. Having routed to the south of R612 (Arbroath), they were then cleared direct to IVGEX at 5000ft, the IAP for RNP RW09. Shortly after taking up this track (approximately 270°) a TA was issued. The PF was in the left-hand seat and tried to visually acquire the traffic which was somewhere behind and below their position. Approximately 10sec later, an RA was issued and the aircraft coupled to the climb manoeuvre. The PF monitored the RA and issued the 'TCAS RA' standard R/T call to Dundee. The aircraft deviated approximately 400ft from their cleared altitude and about 5-10sec later 'Clear of Conflict' was announced and the aircraft began a resumption to 5000ft. The standard R/T call was again made for 'Clear of Conflict' to Dundee. Shortly after the RA, the PF became visual with the traffic which appeared to be carrying out general handling in the vicinity. They continued on their present track towards IVGEX routing away from the conflicting traffic and a request was made for further information regarding such traffic. There was no further conflict with the traffic.

The pilot assessed the risk of collision as 'High'.

**THE GROB 115D PILOT** reports operating as PIC with [a local] CFI PPL for their first sortie of the UPRT<sup>1</sup> course. They departed Dundee to the east at 1120, from RW09 with information J and QNH 1032, returning by 1210. The sortie took place in the East Haven/Carnoustie area, with no traffic reported for most of the duration of the sortie. Nearing the end of the flight, helicopter traffic appeared on frequency, reporting to be at 3500ft on the local QNH, routing from the area of Arbroath towards Dundee. ATC called them to let them know about that helicopter, which they acknowledged, they recalled. [UKAB note: the RTF recording showed that the first exchange between the Dundee controller and the Grob pilot regarding the helicopter traffic was the Grob pilot announcing that they were visual with the helicopter.] Both aircraft were at around 3500ft, and they had [the helicopter] in sight at a range of at least 2km. When they first spotted that traffic, they were just north abeam Carnoustie, pretty much overhead the dual carriageway (A92), and they were passing from E to W; [the Grob pilot] was maintaining a westerly heading, flying parallel to [the helicopter], so they decided to turn around in a left turn towards Arbroath to remain away from it, before commencing the next part of their flying exercise. The closest they were to [the helicopter] was when it was passing south of Crombie reservoir and they were over the dual carriageway NW of Carnoustie. At no point did they estimate there to be any conflict between the Grob and the helicopter. Their turning away was a precaution to allow the final part of the flight to be completed. After being made aware of an Airprox, they investigated the traces freely available to them on Flightradar24.com and these showed that the closest the 2 aircraft came to each other (measured on Google Maps) was 1.4km. This information has also been detailed by [the local] CFI PPL to the Dundee ATSU.

The pilot assessed the risk of collision as 'None'.

**THE DUNDEE APPROACH CONTROLLER** reports prior to making radio contact, [the EC175] was coordinated inbound to Dundee by Aberdeen Radar as Leuchars LARS was temporarily closed. At 1152Z [the EC175 pilot] reported 3NM north of Arbroath at 4400ft climbing to 5000ft as coordinated. The crew requested, and was provided with, a Procedural Service. The pilot initially wanted to route to MARIV for RW09 but then requested to route IVGEX. The crew were asked their distance to IVGEX and responded with 28NM. They were then cleared to IVGEX, maintaining 5000ft altitude and asked to report 10NM from IVGEX. At approximately 1156Z the crew of [the EC175] reported a TCAS RA which was acknowledged. Approximately 50sec later they reported clear of conflict and resuming clearance to IVGEX at 5000ft. The crew were advised of a Grob 115 operating to the east-northeast of Dundee and [the EC175 crew] stated they were visual with it. The crew of [the Grob 115] then stated they were visual with the helicopter. [The EC175] continued with the flight without further incident. At the time of the incident a trainee controller was working under the supervision of an OJTI. At no point did the crew state that they would be filing an Airprox.

## Factual Background

The weather at Dundee was recorded as follows:

METAR EGPN 251150Z 10005KT 9999 FEW025 12/05 Q1032=

## Analysis and Investigation

**HIAL** [UKAB Note – to avoid duplication with the CAA ATSI report below, only the Executive Summary of the HIAL investigation is included]

[The EC175 pilot] booked an instrument approach at Dundee for training purposes. At the time the training was booked, RW27 was in use. The Dundee RW in use subsequently changed to 09. Lower Airspace Radar Service (LARS) was unavailable from Leuchars Radar due to staffing. Traffic inbound to Dundee from Aberdeen is normally coordinated between Aberdeen Radar and Leuchars Radar, in the first instance. Leuchars Radar then coordinates with Dundee Approach. [The Grob 115 pilot] booked out on a sortie to operate to the east of Dundee. The crew did not stipulate that the sortie was aerobatic manoeuvre training.

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<sup>1</sup> Upset Prevention and Recovery Training.

Aberdeen Radar coordinated [The EC175] with Dundee Approach, stating the aircraft position as “passing Montrose Basin”. Dundee Approach coordinated [the EC175] to route to the DND NDB at 5000ft. [The EC175 pilot] made initial RT contact with Dundee Approach, giving their position as 3 miles north of Arbroath. The [EC175] crew requested a direct routing to MARIV IAP, for the RNP, but amended to IVGEX IAP.

No Traffic Information was issued to either [The EC175 pilot] or [the Grob 115 pilot].

Dundee Approach believed that [the EC175] had been routing towards the DND NDB as per the coordination with Aberdeen Radar and, therefore, did not believe [the Grob 115] to be a factor. They were unaware that [the EC175] was further east, routing south-west. They were also unaware that [the EC175] appeared to continue south-west before turning to towards IVGEX, rather than routing directly to IVGEX.

[The EC175 pilot] subsequently reported a TCAS RA.

A report was filed by the Dundee ATCO. The ATCO on duty at the time of the incident was an OJTI monitoring a trainee. The OJTI and trainee ATCO provided statements. The crew of [the Grob 115] provided a statement. Having filed an Airprox report, and pending review from the UK Airprox Board, the [EC175] crew declined to provide a statement.

Radar traces were requested from Prestwick Centre, and provided. FlightRadar24 imaging was also retrieved. A transcription of the RT and coordination telephone calls was made. The ATC log and flight progress strips were examined.

Traffic Information was not passed to [the EC175 pilot] or [the Grob 115 pilot], as the ATCOs believed [the EC175] to be following the DND routing coordinated with Aberdeen Radar. They believed [the EC175] to be further west than their actual routing. However, Traffic Information may not have prevented the TCAS. Nevertheless, Traffic Information may have increased pilot situational awareness, in Class G airspace, where pilots remain responsible for their own separation.

#### **HIAL Recommendations:**

- Dundee ATCOs should pass Traffic Information in accordance with CAP774.
- A requirement for aerobatic training sorties to be advised to Dundee ATC has been included in a current revision of the LOA between Dundee ATC and [a local flying school].
- The HRDF screen must be visible to both the OJTI and the trainee.
- In the exceptional circumstance of LARS being unavailable from Leuchars Radar, Dundee ATCOs should request an accurate position report from the coordinating unit, or from the coordinated aircraft.
- Dundee ATCOs must ensure correct readback of all operationally significant information.
- Dundee ATC to investigate the reinstallation of the Transmit bar on the HRDF.

#### **CAA ATSI**

The EC175 pilot had been cleared to IVGEX at 5000ft, for an RNP approach to RW09 at Dundee. At the time of the Airprox the pilot was in receipt of a Procedural Service from Dundee ATC.

The Grob pilot was nearing the end of a local sortie and was in receipt of a Basic Service from Dundee ATC. They reported that they had heard the EC175 pilot come on frequency and that they had subsequently received Traffic Information from Dundee, after the Airprox had occurred. The pilot reported as having acquired the EC175 visually, some time prior to the Airprox occurring.

The Dundee controller reported that, at the time of the Airprox, a trainee controller was operating under the supervision of an OJTI. The controller was providing combined Aerodrome and Approach (non-radar) Services. They reported that the EC175 had been coordinated inbound to Dundee, by Aberdeen Radar, due to Leuchars LARS being closed temporarily, and that the pilot had initially requested to route via MARIV for RW09, but subsequently requested to route via IVGEX.

The investigator had access to the initial report from the Dundee controller, reports from the pilots of both aircraft, the Dundee RTF recordings, and the area radar recording. Screenshots within this report have been taken from the area radar recording.

At **1120:00** the Grob pilot made initial contact with the controller, advising that they had information Juliet, QNH1032, were squawking 7376, and requested taxi instructions, for a 40min flight to the east. Taxi instructions were issued.

At **1125:20** the Grob pilot was cleared for take-off RW09, having been instructed to report passing Broughty Castle.

At **1129:30** the Grob pilot reported passing Broughty Castle and requested a Basic Service. A Basic Service was agreed, and the pilot was advised that there was no reported traffic to affect.

At **1148:00** the Aberdeen controller rang the Dundee controller and advised them that the EC175 was inbound, with an ETA for Dundee of **1200**. The Dundee controller issued a clearance of, direct to the DND, at altitude 5000ft, QNH 1032. The Aberdeen controller explained that the EC175 was currently routing to OSVIB (initial approach fix for RW27 RNP) and asked if this routing was suitable. The Dundee controller explained that RW09 was in use, and that the EC175 pilot would need to route to the west of Dundee, for their RNP approach. Agreement was reached that the clearance would be, direct to the DND, at altitude 5000ft, QNH 1032.

At **1154:00** the EC175 pilot made initial contact with the Dundee Approach controller. The controller advised that information Lima was current, the QNH was 1032 and that RW09 was in use. The pilot was instructed to squawk 7374. The pilot provided a full and accurate readback. The pilot advised that they were currently 3 miles north of Arbroath, passing 4400ft climbing to altitude 5000ft, on QNH1032, and requested an RNP Approach to RW09. The controller asked what type of service was required. A Procedural Service was agreed. The controller asked the pilot which initial approach fix they wished to route to, and the pilot responded with MARIV. The controller asked, "*roger do you wish to route there direct from your current position*". The pilot responded, "*actually can we make that to IVGEX... and affirm*". The controller responded, "*roger, and report your distance to run to IVGEX*". The pilot told the controller to standby and, after a few seconds, advised that they had 28 miles to run to IVGEX. The controller responded, "*roger climb and maintain altitude 5000ft and report when you've got one zero nautical miles to run to IVGEX*". The pilot read back, "*maintain altitude 5000ft, QNH 1032, routing IVGEX and wilco 10 miles to run*" (Figure 1).

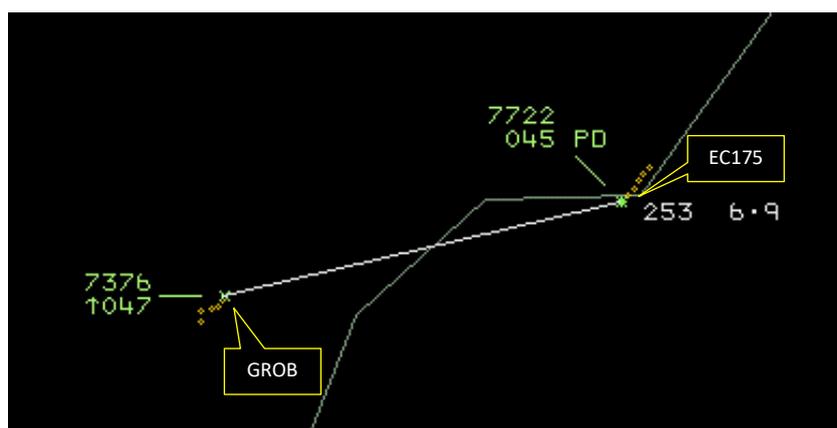


Figure 1 – 1154:00

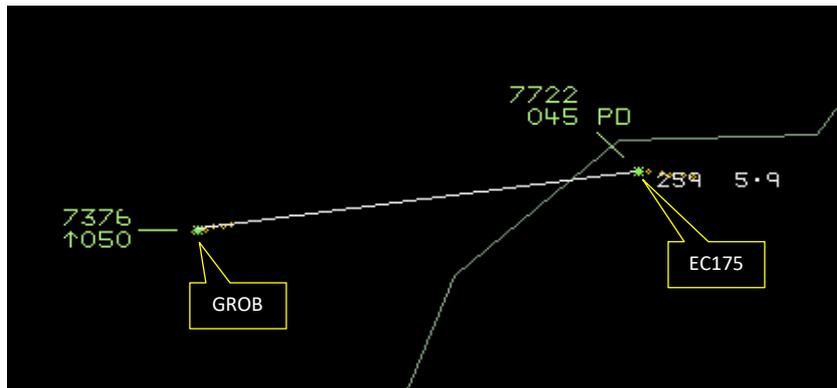


Figure 2 – 1155:00

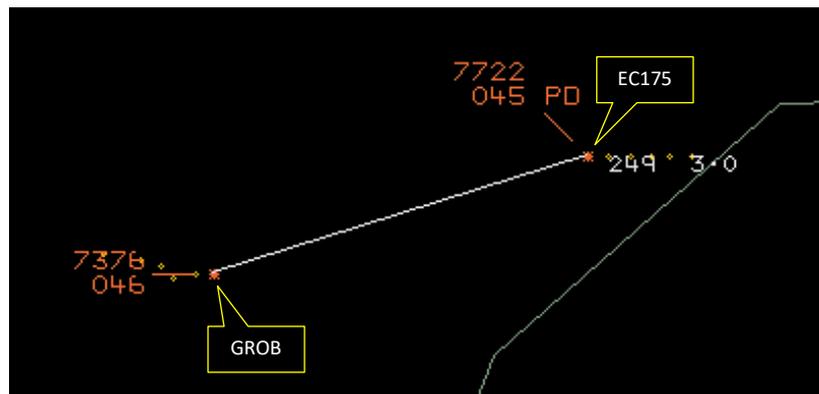


Figure 3 – 1155:45

At **1156:20** CPA occurred, with the aircraft separated by 1.0NM laterally and 100ft vertically, with the Grob displaying a climb arrow (Figure 4).

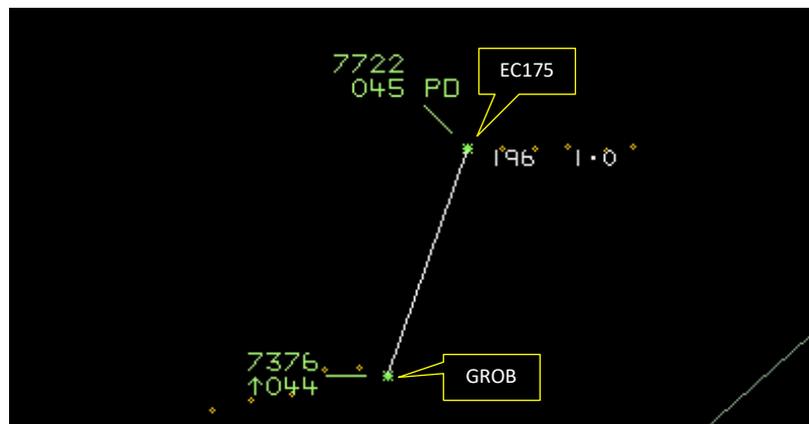


Figure 4 – 1156:20 - CPA

At **1156:30** the EC175 pilot advised the controller “TCAS RA”. The controller responded “roger (unintelligible word)”.

At **1157:00** the EC175 pilot reported, “now clear of conflict, resuming 5000ft, IVGEX”. The controller responded, “roger, you are cleared to IVGEX maintaining altitude 5000ft”. The pilot enquired as to whether the controller had any information on the TCAS traffic. The controller advised that they had one aircraft currently operating east of the airfield, a Grob 115, and that this was the only other traffic they had on their frequency. The EC175 pilot reported that they were now visual with the traffic. The Grob pilot then advised the controller that they were visual with the EC175 and were remaining clear.

The controller was operating without the benefit of a Surveillance picture.

When the Grob pilot departed to the east of the airfield, they did not provide the controller with information on what level/level band they intended to operate at. Under the terms of a Basic Service the Grob pilot was not required to keep the controller informed of what level/level band at/within which they were operating.

The transponder code of 7374 issued by the Dundee controller to the EC175 pilot did not appear to have been selected.

The initial routing of the EC175, toward the initial approach fix for RW27, may have taken the helicopter further south and east of the airfield than might otherwise have been the case.

The controller would have been unaware of exactly how far south and east of the airfield the EC175 was before the aircraft was turned onto a westerly track.

The controller had insufficient information to enable them to understand that there was the potential for the two aircraft to come into proximity.

### **UKAB Secretariat**

The EC175 and Grob 115D pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.<sup>2</sup> If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right.<sup>3</sup>

## **Comments**

### **HIAL General Manager Air Traffic Services**

It is unfortunate in this case that neither Leuchars Radar was available to provide the best possible surveillance service to [the EC175 pilot], nor the ASAD to provide the Dundee ATCO with the opportunity to acquire the relative geometry between the conflicting aircraft and to provide TI as a result.

Whilst the coordination with Aberdeen was sub-optimal (repeats of information and no readback), it is reasonable for the ATCO to have expected [the EC175] (under a Procedural Service) to have been more north of the area where the TCAS RA occurred since a route from '3NM N of Arbroath (reported by the pilot) direct to IVGEX (instructed by ATCO)' would have resulted in a track routing circa 7NM N of Dundee Airport and the last positive position report from [the Grob 115 pilot] was passing Broughty castle (6NM ENE (log book reports [the Grob 115] as E/NE) of Dundee Airport). The relative gap would therefore have been circa 5-6NM. However, 28min had elapsed between the [Grob 115 pilot] report and the TCAS RA reported by [the EC175 pilot] and I would have expected the ATCO to obtain an update from [the Grob 115 pilot] as the routing instruction was provided to [the EC175 pilot], particularly since GH under a BS can vary in terms of area and track without remit to advise ATC. I do not see the distinction between aerobatics and GH do be a contributory factor.

I note the ATCO did not pass TI. Had the DF been fully utilised throughout and the position of [the Grob 115] been confirmed when [the EC175 pilot] came on frequency, then the ATCO's perception of geometry would have been enhanced and TI would likely have been passed. Regardless, even assuming the geometry as indicated in the report, the ATCO should have passed TI as per the conditions of CAP774 as both aircraft were in relative close proximity and pilot position reporting is often inaccurate. Furthermore, the importance of using DF cannot be overstated in determining relative aircraft position, a skill well versed in the procedural environment and the Unit should examine the HF aspects of OJTIs conducting OJT from an abnormal position.

<sup>2</sup> (UK) SERA.3205 Proximity.

<sup>3</sup> (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on.

This is not the first incident at Dundee where a lack of TI has been identified as a contributory factor and the Unit should take action to enhance competence and/or culture in this area.

## Summary

An Airprox was reported when an EC175 and a Grob 115D flew into proximity near Carnoustie at 1156Z on Sunday 25<sup>th</sup> April 2021. The EC175 pilot was operating under IFR in VMC and in receipt of a Procedural Service from Dundee Approach. The Grob 115D pilot was operating under VFR in VMC and in receipt of a Basic Service from Dundee Approach.

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

Information available consisted of reports from both pilots, radar photographs/video recordings, reports from the air traffic controller involved and a report from the appropriate ATC/operating authority. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided a combination of written contributions and dial-in/VTC comments.

The Board first considered the actions of the EC175 pilot and noted that they had planned on securing a surveillance-based Air Traffic Service from Leuchars en-route to the Dundee procedure but that this had been unavailable at the time. This had limited the means by which the EC175 pilot could have gained situational awareness of the presence of the Grob 115. The Board agreed that, without any Traffic Information forthcoming from the Dundee Approach controller, the pilot had had to utilise their on-board TCAS II equipment for situational awareness. Angle-of-arrival information from TCAS II fitted to helicopters has been shown to be less accurate than for fixed-wing aircraft (though still sufficiently accurate to aid visual acquisition) and, as such, the Board concluded that the EC175 pilot had only gained generic situational awareness of the presence of the Grob from this equipment (**CF7**). This had cued their lookout in the general direction of the Grob but they had not sighted it before the TCAS II issued an RA (**CF9**), which the aircraft followed. The Board considered that the issuance of an RA had concerned the pilot as to the relative proximity of the Grob (**CF8**) as they had had insufficient information to assess the true threat to their aircraft that the Grob had posed.

The Board then considered the actions of the Grob 115 pilot and noted that their flight profile included elements of vertical manoeuvring. The Board heard from an ATC member that it may have been useful to the controller had the pilot booked-out as an aerobatics sortie and informed the controller of their intended height block – this would have given ATC the awareness that the Grob would have been manoeuvring in the vertical plane. Furthermore, some controller members considered that it would also have been helpful to ATC if the Grob pilot had set their transponder Mode A to the code for aerobatics (7004) because controllers at area radar units would then have been able to plan the routing of other aircraft accordingly. That said, the Board agreed that there had been no requirement for the Grob pilot to either book-out as an aerobatics flight or to set their transponder Mode A code to 7004. The Board considered that, in the event, the Grob pilot had gained generic situational awareness of the presence of the EC175 through hearing the helicopter pilot's radio transmissions (**CF7**) and that this had cued their lookout such that they had become visual with the helicopter and had been able to maintain a suitable VFR separation from it.

Turning to the actions of the Dundee controller, some members wondered if they had forgotten about the Grob 115 operating in a similar area to the EC175. The Board noted that the controller had requested the EC175 pilot's range to IVGEX but, without an inbound track, this had not been sufficient for the controller to understand the position of the EC175 with any degree of accuracy. Additionally, it had been approximately half an hour since the last position report from the Grob pilot, and so the Board concluded that the controller's situational awareness regarding the relative positions of the 2 aircraft had been generic at best (**CF6**). The Board was grateful for the HIAL investigation into this incident, as it offered insights as to why the controller had been unaware of the relative proximity of the EC175 and

Grob. The Board agreed that the Dundee controller had assumed that the Grob had not been in the vicinity of the EC175 when it had been to the north of Carnoustie (**CF4**) and noted that, due to COVID-19 social distancing requirements, the OJTI's view of the DRDF display had been restricted and so this had been a contributory factor in the Airprox (**CF2, CF5**). Nevertheless, the Board felt that there had been opportunities for the Dundee controller to establish the relative positions of the aircraft and therefore pass Traffic Information to both pilots, but this had not occurred (**CF1, CF3**) and so the EC175 pilot had been surprised by the issuance of a TCAS RA.

Finally, the Board considered the risk involved in this event. Members noted that the EC175 pilot had assessed the risk of collision as 'high' and wondered if there had been an element of surprise in receiving a TCAS RA without any information from the controller on the traffic that triggered the alert. The Board also noted that the Grob pilot had been visual with the EC175 at an early stage, had been comfortable with the separation and had assessed the risk of collision as 'none'. This, coupled with the lateral separation of 1.0NM measured on the NATS radar replay led members to conclude that normal safety standards for VFR flight in Class G airspace had pertained and that there had been no risk of collision. Consequently, the Board assigned a Risk Category E to this event.

### **PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK**

#### **Contributory Factors:**

	2021040			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Ground Elements</b>				
<b>• Regulations, Processes, Procedures and Compliance</b>				
1	Human Factors	• ATM Regulatory Deviation	An event involving a deviation from an Air Traffic Management Regulation.	Regulations and/or procedures not fully complied with
<b>• Manning and Equipment</b>				
2	Human Factors	• Recurrent/OJT Instruction or Training	Events involving on the job training of individuals/ personnel	
<b>• Situational Awareness and Action</b>				
3	Human Factors	• ANS Traffic Information Provision	Provision of ANS traffic information	TI not provided, inaccurate, inadequate, or late
4	Human Factors	• Expectation/Assumption	Events involving an individual or a crew/team acting on the basis of expectation or assumptions of a situation that is different from the reality	
5	Human Factors	• Monitoring of Equipment/Instruments	Events involving an individual or a crew/team not to appropriately monitoring equipment or instruments	
6	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late or no Situational Awareness
<b>Flight Elements</b>				
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>				
7	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late or only generic, Situational Awareness
8	Human Factors	• Unnecessary Action	Events involving flight crew performing an action that was not required	Pilot was concerned by the proximity of the other aircraft
<b>• Electronic Warning System Operation and Compliance</b>				
9	Contextual	• ACAS/TCAS RA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system resolution advisory warning triggered	

**Degree of Risk:**

**E**

## Safety Barrier Assessment<sup>4</sup>

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

### Ground Elements:

**Regulations, Processes, Procedures and Compliance** were assessed as **ineffective** because the Dundee Approach controller did not pass Traffic information to either pilot.

**Manning and Equipment** were assessed as **partially effective** because, due to COVID-19 social distancing requirement, the instructor was not able to fully utilise the DRDF display.

**Situational Awareness of the Confliction and Action** were assessed as **ineffective** because the Dundee Approach controller only had generic situational awareness regarding the relative positions of the 2 aircraft and did not ask either pilot for a position update.

### Flight Elements:

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **partially effective** because the EC175 pilot had gained generic situational awareness of the presence of the Grob 115 from their TCAS equipment, and the Grob 115 pilot had gained generic situational awareness of the presence of the EC175 from the pilot's radio calls.

Airprox Barrier Assessment: 2021040		Outside Controlled Airspace						
Barrier	Provision	Application	Effectiveness Barrier Weighting					
			0%	5%	10%	15%	20%	
Ground Element	Regulations, Processes, Procedures and Compliance	✓	✗					
	Manning & Equipment	✓	!					
	Situational Awareness of the Confliction & Action	!	✗					
	Electronic Warning System Operation and Compliance	○	○					
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✓					
	Tactical Planning and Execution	✓	✓					
	Situational Awareness of the Conflicting Aircraft & Action	!	✓					
	Electronic Warning System Operation and Compliance	!	✓					
	See & Avoid	✓	✓					
<b>Key:</b>								
	Full	Partial	None	Not Present/Not Assessable	Not Used			
Provision	✓	!	✗	○				
Application	✓	!	✗	○	○			
Effectiveness	■	■	■	■	■			

<sup>4</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).