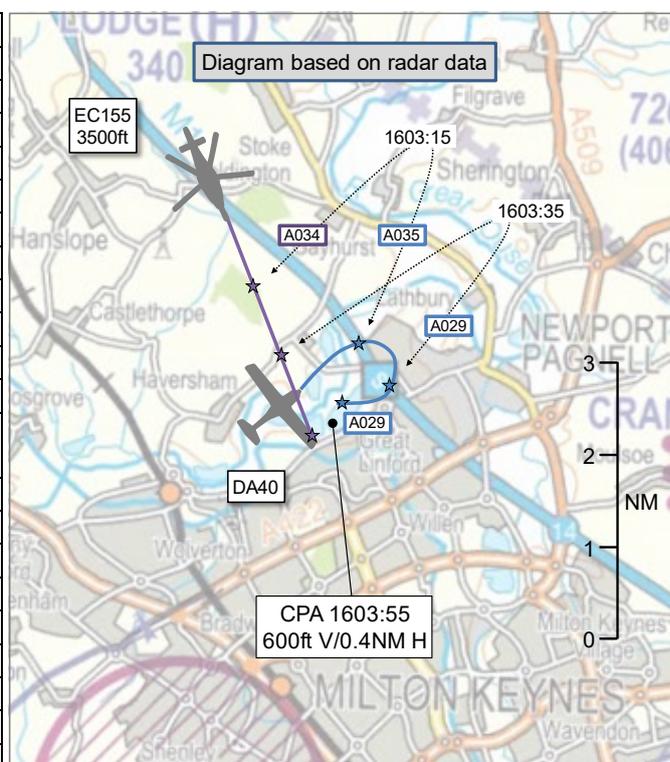


AIRPROX REPORT No 2022249

Date: 04 Oct 2022 Time: 1603Z Position: 5204N 00045W Location: 6NM W Cranfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	DA40	EC155
Operator	Civ FW	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	IFR
Service	Procedural	Basic ¹
Provider	Cranfield	Luton
Altitude/FL	2900ft	3500ft
Transponder	A, C, S+	A, C, S+
Reported		
Colours	White	Grey, Black
Lighting	NR	Nav, HISL, Strobes
Conditions	IMC	IMC
Visibility	NR	NR
Altitude/FL	3500ft	3500ft
Altimeter	QNH	QNH
Heading	NR	160°
Speed	100kt	155kt
ACAS/TAS	TAS	TCAS I
Alert	Information	TA
Separation at CPA		
Reported	Not reported	Not Seen
Recorded	600ft V/0.4NM H	



THE DA40 PILOT reports that on return to base with their student, they were speaking to Brize Radar when they requested a handover to Cranfield requesting an RNP approach via ADSON for RW21. They were in IMC and wanted to stay with Brize with a Traffic Service for as long as possible. Brize handed them over to Cranfield Approach at 4000ft, after which Cranfield Approach gave them clearance to descend to 3500ft, direct to ADSON. They reported en-route ADSON at 3500ft and still in IMC. Approximately on reaching abeam Cranfield on the way to ADSON, the TAS alert came up on their MFD stating that an aircraft was at the same altitude 'right on' them while still being in IMC. The Instructor took control from the student and made an abrupt avoidance manoeuvre as they were not sure what the other traffic was intending to do. They made a descending turn to the right, descending about 500ft, as well as made a call to ATC to tell them of their actions. Looking back on the MFD, the traffic did not seem to make any change to the vector that it was initially flying on. They managed to break out of cloud just below 3000ft and routed back towards ADSON. They asked the Approach controller if the other traffic was speaking to Cranfield at the time to which they replied 'no'. After landing, they managed to see the footage on flight radar and it was very close to being more than just a near miss. With the help of the Ops team they managed to get details of the helicopter in question.

THE EC155 PILOT reports that they were in the cruise at 3500ft on a Traffic Service from Luton to route via their CTR towards BNN. Their clearance was west of Dunstable Downs not above 2500ft to BNN, they intended to descend to 2400ft once clear of R214 (SFC-2400ft). They received an audio once only of "Traffic" with no traffic symbol on their screen. They reduced airspeed whilst changing range on the TCAS screen to look for any threat but none was seen, they also looked at their iPad on SkyDemon to see if there was any traffic as they had a linked EC device, but again, no traffic seen. They continued

¹ The pilot reported a Traffic Service, but was receiving a Basic Service at the time of the Airprox.

looking on both TCAS and [EC] displays but saw no traffic information, Luton had not informed them of any traffic so they continued and descended towards BNN.

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

THE CRANFIELD CONTROLLER reports that an inbound DA40 on a Procedural Service was approaching the field from the southwest and cleared to ADSON at 3500ft. They had 3-4 other active flight strips; one on a Basic Service and 2/3 on Procedural Service. The pilot reported that they had descended to 3000ft due to conflicting traffic on TAS. [The controller] acted as if this was a TCAS alert and initially offered no other instructions to the aircraft. They passed essential Traffic Information to another Procedural Service aircraft that had gone around and was flying straight ahead. They noted that the DF traces indicated that the subject aircraft and the GA aircraft were at markedly different bearings (roughly NW and SW) and elected to descend the subject aircraft to 2500ft and climb the GA aircraft to 3500ft in order to achieve Procedural separation. After the event, the pilot called the Tower to discuss the incident. They said they did not consider it an Airprox but were concerned as they were in IMC (presumably as was the other aircraft).

THE LUTON INTERMEDIATE CONTROLLER reports that they had been asked by the unit investigations team to file an MOR for an event when an aircraft was involved in an Airprox whilst operating under a Basic Service on their frequency. The event occurred some time ago and they did not recall a pilot informing them of this event at the time. They had been informed that the aircraft was [EC155 C/S], a helicopter of some description, which was on their frequency operating under Basic Service whilst they were on Luton Radar, prior to a zone crossing.

Factual Background

The weather at Cranfield was recorded as follows:

METAR EGTC 041520Z 22018KT 9999 SCT029 18/12 Q1014=

Analysis and Investigation

NATS

The pilot of [EC155 Registration], operating as [EC155 C/S], contacted the Luton Intermediate Director (GW INT) and requested a crossing of the Luton CTR with a Traffic Service. A squawk of 4671 was allocated and the controller replied "for the moment Basic Service" which was read back correctly by the pilot. The GW INT controller's workload was busy, with other aircraft outside controlled airspace being provided with a Basic Service and providing a zone transit to an aircraft orbiting in the CTR due to several IFR Luton inbound aircraft. The crossing clearance was passed to the pilot of [EC155 C/S] at 1559:31 as the aircraft was approximately 25NM northwest of Luton.

The GW INT controller was then occupied with a stream of Luton arrivals, together with coordinating a runway lighting check and an aircraft crossing the final approach track. [EC155 C/S] continued tracking towards the Luton zone whilst an aircraft displaying Mode A code 7417, the Cranfield Airport IFR Conspicuity code, was tracking in a north-northeasterly direction at the same level. Mode S data identified this aircraft as [DA40 C/S]. This aircraft initially passed approximately 1NM ahead of [EC155 C/S] indicating the same altitude (3500ft), however the aircraft entered a right-hand orbit and descended to an indicated altitude of 2900ft. This turn brought [DA40 C/S] closer to [EC155 C/S], with the Closest Point of Approach (CPA) occurring at 1603:55 (Figure 1).



Figure 1 - CPA measured on the Multi-Track Radar as 0.4NM and 600ft.

The pilot of [EC155 C/S] continued their flight and completed the crossing of the Luton CTR. The pilot left the GW INT controller's frequency at 1612:47 without mention of an Airprox. The Airprox report completed by the pilot of [EC155 C/S] stated "I received an audio once only of 'Traffic' with no traffic symbol on my screen I reduced my airspeed whilst changing range on the TCAS screen to look for any threat but none seen". The report also stated that they did not report the Airprox on the radio as "I was not aware of an Airprox." The Airprox report stated that [EC155 C/S] was in IMC, no mention of meteorological conditions was made by the pilot [EC155 C/S] to the GW INT controller. The Airprox report completed by the pilot of [DA40 C/S] stated "Approx. reaching abeam EGTC on the way to ADSON the TAS alert came up on our MFD stating that an aircraft was at the same altitude right on us while still being in IMC. I took control off the student and made an abrupt avoidance manoeuvre as I was not sure of what the traffic was intending to do." The pilot of [DA40 C/S] was in communication with Cranfield ATC at the time of the Airprox.

Cranfield Investigation

Following receipt of an Airprox report, the FPS and R/T recordings were checked. FPS and R/T recordings indicated that no aircraft with the [EC155] callsign was on frequency at the time, nor any aircraft matching the description of an EC155.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken, both aircraft were identified using Mode S data. As referenced in the NATS investigation report, at 1602:59 the DA40 crossed 1.4NM ahead and at the same level as the EC155, see Figure 2. The DA40 then descended and turned back towards the EC155 until CPA (Figure 1).

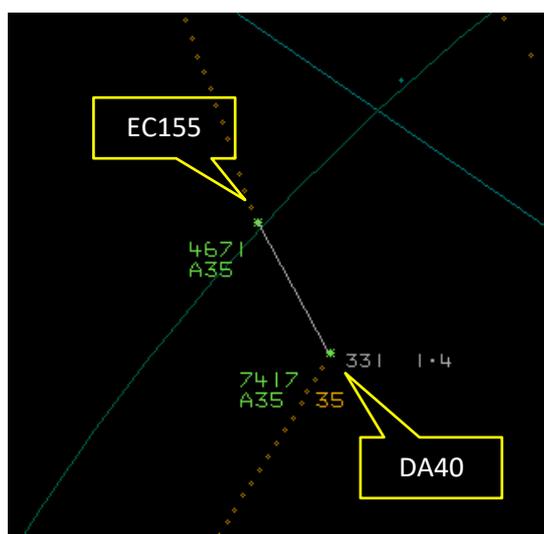


Figure 2 – 1602:59

The DA40 and EC155 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.²

Summary

An Airprox was reported when a DA40 and an EC155 flew into proximity 6NM west of Cranfield at 1603Z on Tuesday 4th October 2022. Both pilots were operating under IFR in IMC, the DA40 pilot in receipt of a Procedural Service from Cranfield and the EC155 pilot in receipt of a Basic Service from Luton Int (Swanwick).

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 controllers involved and reports from the appropriate operating authorities. 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.

The Board first considered the actions of the DA40 pilot. They had been operating in IMC and reported that they had remained with Brize Radar for as long as possible, because they had been aware that they could only receive a Procedural Service from Cranfield. Under a Procedural Service, the pilot could have only received Traffic Information on aircraft known to the Cranfield controller, ie anyone who had called on the Cranfield frequency. Unfortunately, in this case the EC155 had not been known to the Cranfield controller and so no Traffic Information had been passed. The TAS on the DA40 had alerted to warn the pilot of something in the vicinity (**CF9**), providing the pilot with generic situational awareness about another aircraft, but unfortunately the information had been vague enough that it had given the pilot an inaccurate picture that the unknown aircraft had been immediately above them, when in fact it had been 1NM away (**CF7**, **CF10**). In response to the TAS warning, the DA40 pilot had elected to descend and turn to the right, and members cautioned that a descent and turn in IMC had the potential to disorientate a pilot and therefore advocated reacting to a TA in the vertical plane only (**CF10**). Fortunately, on this occasion, the pilot had quickly become VMC below the cloud and had levelled off at 3000ft but, because of the cloud, they had not become visual with the EC155 at all (**CF11**). Once VMC below the cloud and satisfied that they had become clear of traffic, the pilot had repositioned by continuing the right turn back onto their previous track.

Turning to the actions of the EC155 pilot, they had also been operating in IMC. They had requested a Traffic Service from Luton, but had been provided with a Basic Service due to controller workload. Members thought that the pilot may have been better served descending to become VMC and advised against flying in IMC without a surveillance-based ATS (**CF6**). Some members opined that, at the very

² (UK) SERA.3205 Proximity.

least, telling the controller that they had been IMC might have prompted the controller to monitor the aircraft more closely. Under a Basic Service, the pilot would not have received any Traffic Information from the Luton controller and some members thought that the pilot should have been more aware of their positioning and called Cranfield on their second radio as they had passed to the west of the airfield (CF5), which would have had the dual purpose of providing Cranfield ATC with information on the EC155's track, but also had the potential to have provided the EC155 pilot with details of any traffic to affect them. The TCAS on the EC155 had provided the pilot with a single alert (CF8), probably as the DA40 crossed ahead, but because the display had been set to a large scale, this alert had only provided the pilot with generic situational awareness (CF7). The TCAS did not alert again and the EC155 pilot did not become visual with the DA40 at all (CF11).

Turning to the role of ATC, and first looking at the Cranfield controller, members agreed that there had been little more the controller could have done in the circumstances. They had been providing a Procedural Service to the DA40 pilot but, without a radar, had not known about the EC155 (CF3) and so could not have provided any Traffic Information. The EC155 pilot had requested a Traffic Service from the Luton controller, but the controller had other higher priority traffic on approach and so had told the pilot they could only provide a Basic Service (CF2). Under a Basic Service the controller had not been required to monitor the EC155 (CF1) and STCA had not alerted because the squawk for the Basic Service had been outside the select frame (CF4), therefore the Luton controller had not been aware that the EC155 had come into close proximity to the DA40. Members discussed whether the Luton controller could have done more to assist the EC155 pilot, but agreed that as Luton was not a LARS provider, the controller's priorities lie in recovering aircraft to the airfield. There followed a discussion about the lack of a LARS provider in this area, with some members wondering whether there had been a better ATS provider for the EC155 pilot to call. In the end it was acknowledged that there was a 'hole' in the LARS provision in this area, being just outside the Brize AOR and too far north for Farnborough and so there had been no obvious solution available to the EC155 pilot for a better level of service.

When assessing the risk of the Airprox, members considered the reports from both pilots and controllers together with the radar screenshots. They quickly agreed that, on this occasion, the CWS on the DA40 worked, in that it alerted the pilot who then descended, but that, unbeknownst to the DA40 pilot, there had been enough lateral separation to ensure that although safety had been degraded, there had been no risk of collision; Risk Category C.

When discussing this Airprox, members noted that there had been a number of Airprox involving aircraft at Cranfield recently and 2 other similar Airprox this month (2022233 and 2022248). They discussed that the airfield had recently become much busier with training flights and the difficulties that the controllers faced when providing an ATS with limited situational awareness of the prevailing traffic situation. The Board therefore resolved to make two recommendations: that *Cranfield aerodrome operator considers a means by which controller situational awareness of traffic utilising airspace surrounding the Cranfield ATZ can be improved*, and that *Cranfield-based training organisations review their risk assessments with respect to their local operations without a surveillance-based ATS*.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2022249			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
	Ground Elements			
	• Situational Awareness and Action			
1	Contextual	• ANS Flight Information Provision	Provision of ANS flight information	The ATCO/FISO was not required to monitor the flight under a Basic Service
2	Contextual	• ATM Service Effects	An event affecting Air Traffic Management operations.	Controller not able to provide requested ATS
3	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness

• Electronic Warning System Operation and Compliance				
4	Technical	• Conflict Alert System Failure	Conflict Alert System did not function as expected	The Conflict Alert system did not function or was not utilised in this situation
Flight Elements				
• Tactical Planning and Execution				
5	Human Factors	• Accuracy of Communication	Events involving flight crew using inaccurate communication - wrong or incomplete information provided	Ineffective communication of intentions
6	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
• Situational Awareness of the Conflicting Aircraft and Action				
7	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late, inaccurate or only generic, Situational Awareness
• Electronic Warning System Operation and Compliance				
8	Contextual	• ACAS/TCAS TA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system traffic advisory warning triggered	
9	Contextual	• Other warning system operation	An event involving a genuine warning from an airborne system other than TCAS.	
10	Human Factors	• Response to Warning System	An event involving the incorrect response of flight crew following the operation of an aircraft warning system	CWS misinterpreted, not optimally actioned or CWS alert expected but none reported
• See and Avoid				
11	Contextual	• Visual Impairment	Events involving impairment due to an inability to see properly	One or both aircraft were obscured from the other

Degree of Risk:

C.

Recommendation:

1. The Cranfield aerodrome operator considers a means by which controller SA of traffic utilising airspace surrounding the Cranfield ATZ can be improved.
2. Cranfield-based training organisations review their risk assessments with respect to their local operations without a surveillance-based ATS.

Safety Barrier Assessment³

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

Ground Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Cranfield controller, who was operating without surveillance information, did not have any information about the EC155, and the Luton controller was not required to monitor the EC155 under the terms of a Basic Service.

Electronic Warning System Operation and Compliance were assessed as **not used** because the squawks on both aircraft were outside the Luton STCA select frame and so it would not have alerted.

³ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

Flight Elements:

Tactical Planning and Execution was assessed as **ineffective** because the EC155 pilot was in IMC, but did not tell the Luton controller and might have been better served giving Cranfield a call as they transited past.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the EC155 pilot had generic SA from their TCAS, and the DA40 pilot had inaccurate information from their TAS.

See and Avoid were assessed as **not used** because the DA40 pilot took action using information from their TAS and both aircraft were obscured from one another due to the meteorological conditions.

Airprox Barrier Assessment: 2022249		Outside Controlled Airspace						
Barrier	Provision	Application	Effectiveness					
			Barrier Weighting					
			0%	5%	10%	15%	20%	
Ground Element	Regulations, Processes, Procedures and Compliance	✓	✓	<div style="width: 50%; background-color: green;"></div>				
	Manning & Equipment	✓	✓	<div style="width: 25%; background-color: green;"></div>				
	Situational Awareness of the Conflicting & Action	✗	✗	<div style="width: 15%; background-color: red;"></div>				
	Electronic Warning System Operation and Compliance	✓	○	<div style="width: 0%; background-color: red; border: 1px solid red;"></div>				
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✓	<div style="width: 10%; background-color: green;"></div>				
	Tactical Planning and Execution	✗	✗	<div style="width: 10%; background-color: red;"></div>				
	Situational Awareness of the Conflicting Aircraft & Action	!	✓	<div style="width: 20%; background-color: yellow;"></div>				
	Electronic Warning System Operation and Compliance	✓	✓	<div style="width: 15%; background-color: green;"></div>				
	See & Avoid	✗	○	<div style="width: 0%; background-color: red; border: 1px solid red;"></div>				
Key:								
	Full	Partial	None	Not Present/Not Assessable	Not Used			
Provision	✓	!	✗	●				
Application	✓	!	✗	●	○			
Effectiveness	■	■	■	■	□			