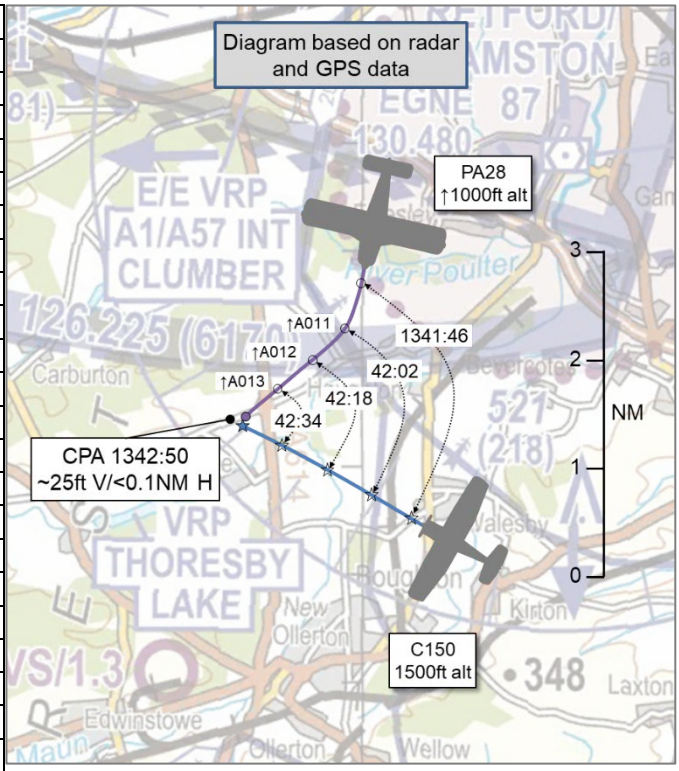
AIRPROX REPORT No 2021059

Date: 27 May 2021 Time: 1343Z Position: 5314N 00102W Location: 4NM SW of Retford/Gamston

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C150	PA28
Operator	Civ FW	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Listening Out	Unknown
Provider	Netherthorpe A/G	(East Midlands)
Altitude/FL	1500ft	1475ft[1]
Transponder	A, C, S	None[2]
Reported		
Colours	Blue, white	Dark blue, white
Lighting	Anti-coll on fin	Beacon on fin
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1500ft	'Climbing'
Altimeter	QNH (1020hPa)	QNH (1019hPa)
Heading	300°	~230°
Speed	95kt	~90kt
ACAS/TAS	Not fitted	SkyEcho
Alert	N/A	None
Separation		
Reported	20-50ft V/0m H	NK V/NK H
Recorded	~25ft V/<0.1NM H	



THE C150 PILOT reports that they had relinquished their Basic Service from East Midlands Radar shortly before the Airprox occurred and had selected Netherthorpe A/G frequency, but not yet called, in preparation for entering the ATZ to join the circuit. This was a flight test and both pilots were maintaining a good lookout at a time of low workload. The conflicting aircraft was seen at a very late stage, having previously been obscured by the Cessna's high right wing. The pilot pushed forward to pass below the other aircraft as there was no time to turn left or right.

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

THE PA28 PILOT reports that they announced that they would be departing from downwind RW03 at Gamston. Their intention was not to climb until clear of the ATZ and the most southerly element of Doncaster's CTA (2000ft-FL60). Whilst climbing towards the VRP (Thorsby Lake), they became aware of a 'flash of white' between their port leading edge and the fuselage – their initial thought was that it was a bird, then they thought that it could have been a glider passing underneath so they looked right to see a Cessna 152, they thought, at a similar level but now behind and to the right of them. They are not sure at which point they changed frequency to East Midlands but they did select the listening squawk. At the time, they dismissed the incident but, on reflection, it should have been reported.

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

THE EAST MIDLANDS LARS CONTROLLER reports that the aircraft had already left their frequency when the Airprox occurred. They do not remember speaking to [the C150 pilot] so are unable to provide any further information.

[1] GPS-derived.
[2] The PA28 pilot reported having selected transponder Modes A, C and S.

Factual Background

The weather at Doncaster Sheffield Airport was recorded as follows:

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METAR EGCN 271350Z 14005KT 080V180 9999 FEW028 16/10 Q1022=
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Analysis and Investigation

East Midlands ATC

Following a review of the radar and RT recording, along with the electronic flight progress strip recorder, it was clear that [the C150 pilot] left the frequency at 1341:49. This correlates with the report that the pilot gave that they had been talking to East Midlands but had left the frequency a minute or so prior to the Airprox occurring. [The C150] was correlated with an aircraft squawking 4571 (the East Midlands Basic Service conspicuity code) around 5NM SW of Gamston, as the pilot reported. This changed to 7000 shortly after the pilot reported leaving the frequency. There was no conflicting traffic apparent on the radar at the time the pilot reported leaving the frequency. [The C150] was not formally identified by the East Midlands LARS controller (as a non-surveillance based service, a Basic Service is not required to be identified).

An unknown primary radar contact appeared around 45sec after [the C150 pilot] had left the frequency. There was no transponder response, but it is likely that this was [the PA28] given the close proximity to [the C150] and the time of the reported Airprox.

A review of the RTF recordings around the time of the incident was undertaken, and [the PA28 pilot] never checked-in on frequency with East Midlands LARS. The strip recorder also did not show a strip pertaining to [the PA28]. Had [the PA28 pilot] called on frequency and actually been talking to the East Midlands controller, then there would have been a strip corresponding to the aircraft on the board. It is possible that the pilot may have been simply listening-out on the frequency as several aircraft do from time to time – East Midlands does in fact have a published listening out squawk of 4572 – however, since there was no transponder response associated with this primary-only contact, it has not been possible to establish whether the pilot was actually listening-out on the East Midlands frequency or not. What is clear is that the pilot did not call East Midlands nor was any kind of agreement reached between the pilot and the controller as to the level of service being provided.

In conclusion, at the time [the C150 pilot] left the frequency there was no radar response on any conflicting traffic therefore, even if the controller had known where [the C150] was, there was no displayed conflicting traffic for the controller to pass. The conflicting traffic only began to be displayed after [the C150 pilot] left the frequency, and was only ever a primary-only contact with no transponder response observed. [The PA28 pilot] never called East Midlands LARS nor was there any strip generated for the aircraft.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken which showed the C150 displaying the East Midlands Basic Service conspicuity transponder code (4571) in the moments leading up to the Airprox; there were no other radar contacts in the vicinity of the C150 at this time (See Figure 1). Consistent with the East Midlands investigation report, the C150's transponder code was seen to change to 7000 at 1342:10. Shortly before the C150 pilot changed transponder code, an intermittent and unstable primary-only contact appeared on the NATS radar replay – this track correlated with the GPS data (not available to the East Midlands investigation) supplied by the PA28 pilot (see Figure 2). At 1342:38 the primary-only contact disappeared from radar; the last-known lateral separation measured on the radar was 0.5NM (see Figure 3). CPA occurred some 8sec later, at 1342:50, and was measured at ~25ft V and <0.1NM H by comparing the radar position of the C150 with the GPS position of the PA28 (Figure 4).

The C150 pilot confirmed to the UKAB secretariat that the transponder fitted to the C150 does not have 'extended squitter' and thus would not have been detectable by the PA28 pilot's SkyEcho device.

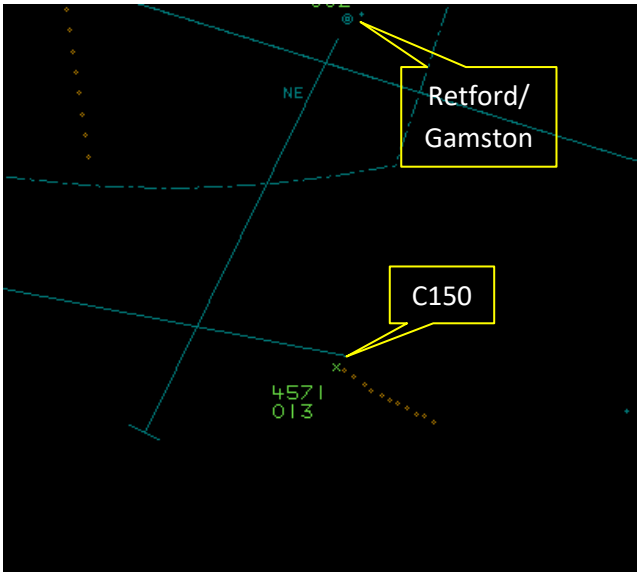


Figure 1 – 1341:00

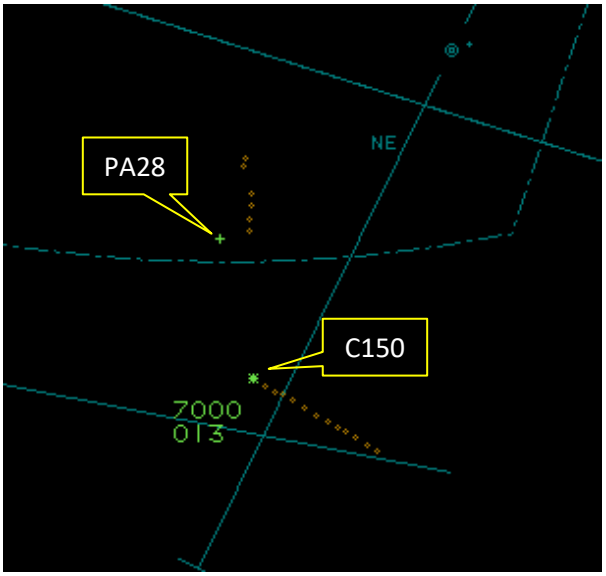


Figure 2 – 1342:10

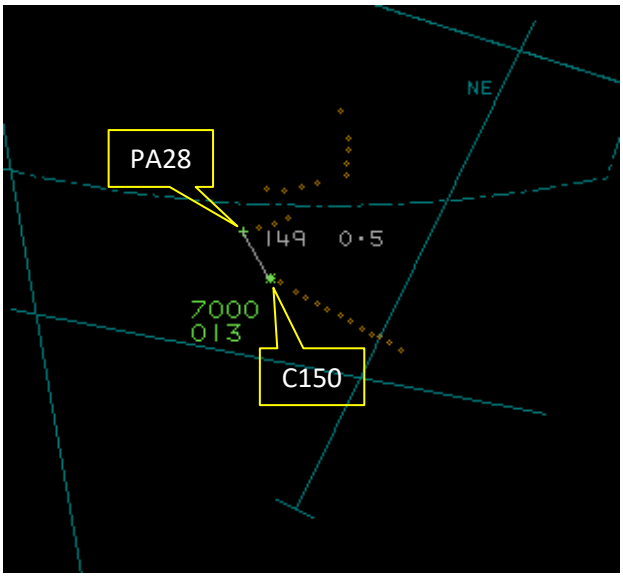


Figure 3 – 1342:38

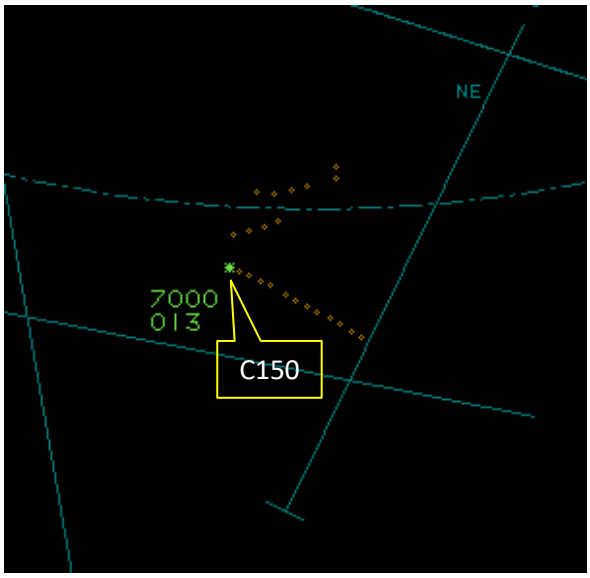


Figure 4 – 1342:50 – CPA

The C150 and PA28 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[3] If the incident geometry is considered as converging then the C150 pilot was required to give way to the PA28.[4]

Summary

An Airprox was reported when a C150 and a PA28 flew into proximity 4NM SW of Retford/Gamston at 1343Z on Thursday 27th May 2021. Both pilots were operating under VFR in VMC. The C150 pilot was listening-out on the Netherthorpe Air/Ground frequency; the PA28 pilot was not in receipt of an ATS.

[3] (UK) SERA.3205 Proximity.
[4] (UK) SERA.3210 Right-of-way (c)(2) Converging.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, GPS data from the PA28 pilot and, although not involved in the Airprox event itself, a report from East Midlands 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 C150 pilot and heard from a GA pilot member that the C150 pilot switching frequencies to their destination immediately prior to the Airprox had been a case of unfortunate timing. The timing of the frequency change had been entirely appropriate, although some members wondered if the pilot could have contacted Gamston as they transited to the south of the airfield, but the Board acknowledged that this would have increased pilot workload while they were organising their join to their destination airfield. That said, the Board wished to remind pilots to keep an active lookout for traffic arriving at or departing from airfields along their route, especially if they were not in radio contact with those airfields. The Board agreed that the C150 pilot had not had any situational awareness of the presence of the PA28 (**CF1**) as the East Midlands controller's radar screen had not shown any contacts in the vicinity of the C150 when the C150 pilot had left the East Midlands frequency. Therefore, the pilot had been relying on their lookout to detect other aircraft and this had not been fully effective with respect to an early enough sighting of the PA28. Members agreed that, although the C150 pilot had sighted the PA28 immediately prior to CPA, there had not been enough time for the C150 pilot to materially affect the separation and so considered that this had been an effective non-sighting of the PA28 (**CF3**).

Turning to the actions of the PA28 pilot, again the Board heard from a GA pilot member about how the event had occurred at an inopportune moment; the PA28 pilot had just departed from downwind at Gamston and had been conscious of the controlled airspace above them and had also been in the process of considering a frequency and transponder code for the next portion of their flight. Once again, the PA28 pilot had not had any situational awareness of the presence of the C150 (**CF1**) which had been due in part, members agreed, to the SkyEcho device not detecting the signals from the transponder fitted to the C150 (**CF2**). There then ensued a discussion regarding electronic conspicuity devices and their compatibility. Members noted that there had been a number of occasions where they would have expected an interaction between certain items of equipment but that the pilots had reported receiving no alert. In some cases this could have been due to positioning of the equipment within the aircraft leading to 'blanking' in certain directions, but this could not have been the case in all examples. It was the understanding of the Board that some Mode S transponders are not appropriately configured to interact with, for example, SkyEcho, and it had been established that this had indeed been the case in this particular Airprox. However, the Board is convinced that some form of additional electronic conspicuity equipment is preferable to relying purely on lookout and commended to pilots the CAA rebate scheme for electronic conspicuity devices that has recently been extended until 31st March 2022. That said, the Board also wished to highlight that these devices are not a panacea and should be utilised in conjunction with a thorough lookout scan. Returning to the Airprox itself, members agreed that the PA28 pilot had therefore been relying on their lookout to detect other aircraft and that they had not sighted the C150 until after CPA (**CF3**).

The Board then briefly discussed the involvement of East Midlands Air Traffic Control in this event and, noting that the C150 pilot had left their frequency approximately 1min prior to the Airprox occurring, was nonetheless grateful to East Midlands ATC for taking the time to review their recordings of this event and then provide a report to the Board. The context provided greatly enhanced the Board's understanding of the chronology of the Airprox and performance of the various safety barriers.

Finally, the Board considered the risk involved in this event. Members were grateful to the PA28 pilot for having provided their GPS log file of the flight because, although the PA28 pilot had reported that

their transponder had been switched on with Modes A, C and S, this had not been detected by the NATS radars and the resultant primary tack had faded prior to CPA. The Board considered each pilot's assessment of the collision risk and the CPA measured through comparison of the radar track of the C150 and the GPS data of the PA28. The Board considered that separation had been reduced to the bare minimum (**CF4**) and that the actions of the C150 pilot in pushing forward on the controls would have been too late to materially affect the separation. Members concluded, therefore, that providence had played a major part in events and that a serious risk of collision had existed. Consequently, the Board assigned a Risk Category A to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021059			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Flight Elements			
	• Situational Awareness of the Conflicting Aircraft and Action			
1	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
	• Electronic Warning System Operation and Compliance			
2	Technical	• ACAS/TCAS System Failure	An event involving the system which provides information to determine aircraft position and is primarily independent of ground installations	Incompatible CWS equipment
	• See and Avoid			
3	Human Factors	• Monitoring of Other Aircraft	Events involving flight crew not fully monitoring another aircraft	Non-sighting or effectively a non-sighting by one or both pilots
	• Outcome Events			
4	Contextual	• Near Airborne Collision with Aircraft	An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles	

Degree of Risk: A

Safety Barrier Assessment[5]

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

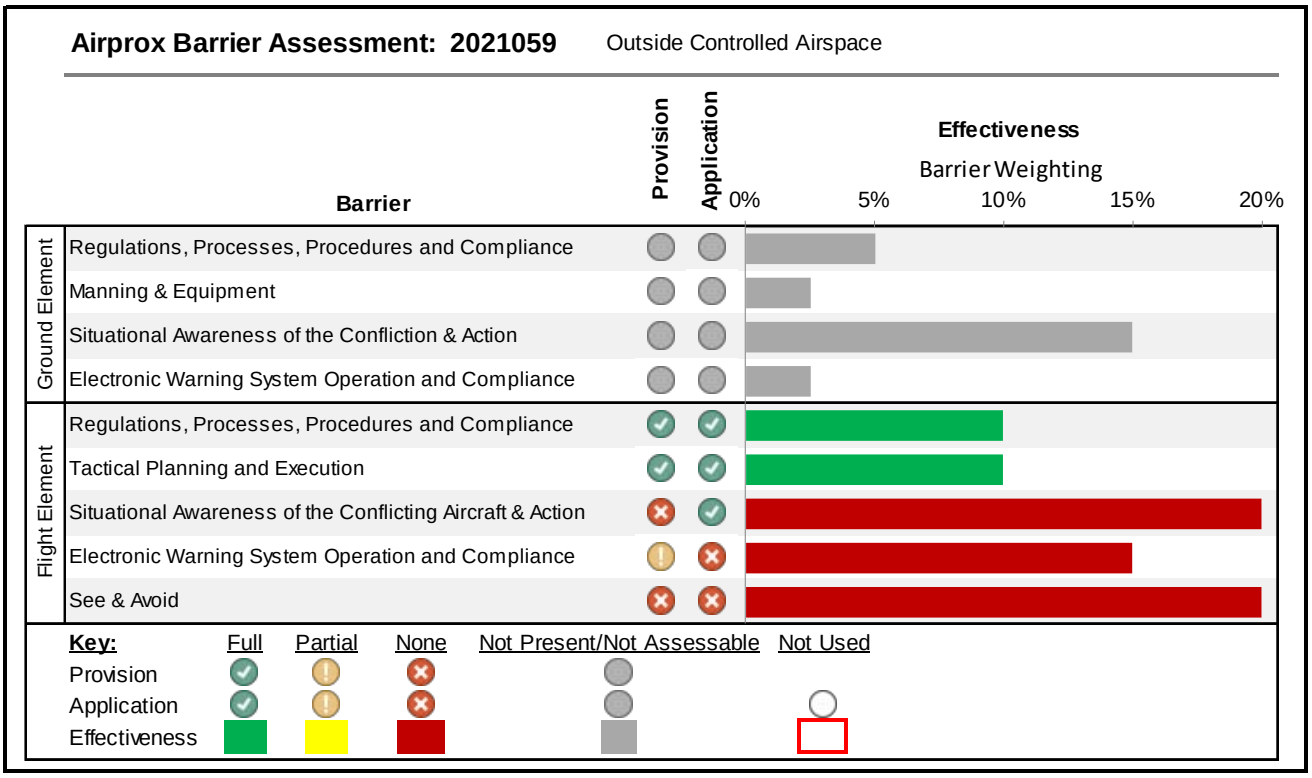
Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither had had any prior warning of the presence of the other aircraft.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the SkyEcho device carried by the PA28 pilot did not detect the presence of the transponding C150.

See and Avoid were assessed as **ineffective** because the PA28 only saw the C150 after the aircraft had crossed tracks, and the C150 pilot saw the PA28 too late to take any action to materially increase the separation.

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


Airprox Barrier Assessment: 2021059
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
Key:
Full
Partial
None
Not Present/Not Assessable
Not Used
Provision
Application
Effectiveness