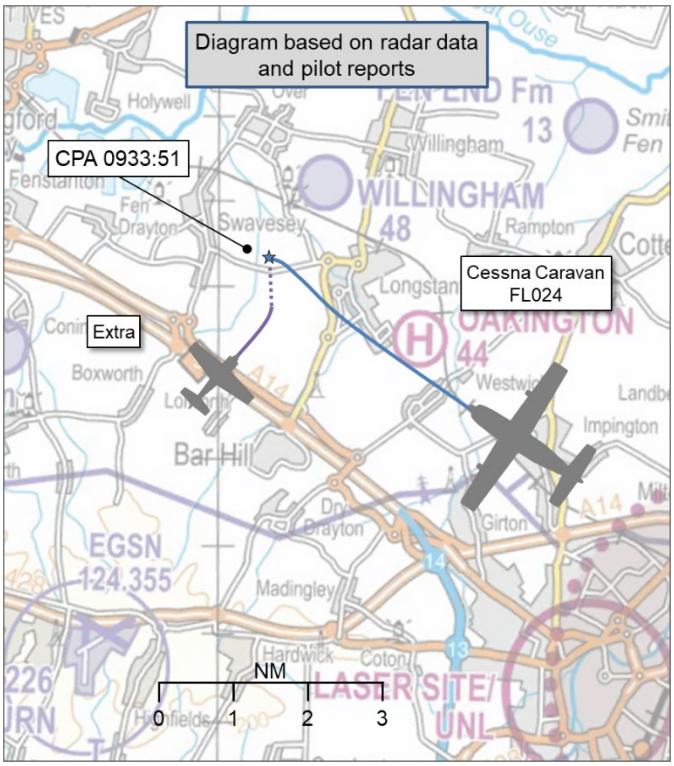
AIRPROX REPORT No 2023004

Date: 11 Jan 2023 Time: 0934Z Position: 5217N 00001E Location: 7NM NNW Cambridge

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Cessna Caravan	Extra 200
Operator	Civ Comm	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	AGCS
Provider	London Info	Fowlmere
Altitude/FL	FL024	NK
Transponder	A, C, S	A, C, S[1]
Reported		
Colours	White, Red, Blue	Red, White
Lighting	Nav Anti-Cols	Strobe, Nav
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	2300ft	3000ft
Altimeter	QNH (1008hPa)	QNH
Heading	300°	NK
Speed	200kt	124kt
ACAS/TAS	SkyEcho	Not fitted
Alert	None	N/A
Separation at CPA		
Reported	0ft V/300m H	Not Seen
Recorded	NK	



THE CESSNA CARAVAN PILOT reports that on returning from a survey overhead Felixstowe, they passed overhead Cambridge. They were receiving a Basic Service from London Information, whilst also 2-way comms with Cambridge Approach for passing overhead their ATZ. Their aircraft was on an approximate track of 300° when they saw a low-wing Extra 300-type aircraft [flying at] 90° to their track, at approximately 1500ft altitude. They were comfortable that this aircraft was going to pass underneath their aircraft, until the aircraft pulled into the vertical, conducting a 'half cuban 8' manoeuvre, through their level and within 300m of their aircraft. They manoeuvred aggressively with 60° AOB to the right, and then immediate left, to remain visual with the other aircraft. They believed that the risk of collision had been high, had they not manoeuvred in the way they did. Cambridge gave them a radio call about a return from primary radar, but this was as they were manoeuvring the aircraft away from danger. The other pilot seemed not to notice their own aircraft, because it continued with its aerobatic manoeuvres as they continued north. They subsequently reported the incident to the relevant ATSUs. They were using [TAS] connected to SkyDemon and there was no return for that aircraft, which backs up with Cambridge only having a primary return on radar. They noted that they weren't receiving any service from Cambridge, it was a courtesy call whilst passing VFR overhead.

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

THE EXTRA 200 PILOT reports that they were flying with an instructor and were performing aerobatics north of Bar Hill at between 2500-4000ft (max altitude 4400ft). They did their usual checks for other aircraft prior to commencement of their practice session. They were performing the sequences and individual figures over a field with no dwellings. Neither they, nor their instructor, were aware of any Airprox, and they noted that their instructor is 'like a hawk', spotting aircraft when they are practising. In fact, they are both pretty good at spotting other aircraft, being aware of their surroundings and taking the utmost care if they do see an aircraft to assess the risk factor involved. They take all necessary

[1] Reported but not seen on the NATS radar replay at the time of the Airprox.

precautions during their sorties, the strobe lights and nav lights were on as was their transponder using 7004 to indicate that they were performing aerobatics. The sky was clear, it was an excellent visibility day and, as far as they were concerned, the sortie passed without incident and it was a very enjoyable morning flight.

THE LONDON INFORMATION FISO reports that the Cessna Caravan pilot was under a Basic Service with London Information. At 0935 the pilot reported an Airprox with an unknown aircraft doing aerobatics. The position of the incident was approximately 9NM northwest of Cambridge at 2300ft. The pilot reported that the other aircraft was white and red and resembled an Extra 300.

THE CAMBRIDGE CONTROLLER reports that the Cessna Caravan pilot called southeast of Cambridge requesting transit via the Cambridge overhead. The pilot was talking to London Information and squawking 1177 and asked if Cambridge could provide a radar service. The controller advised that they were non-radar however they could provide a Basic or Procedural Service. The pilot said that they would rather stay with London Information however, would work Cambridge on box 2 for the overhead transit. The pilot was given the QNH and confirmed the transit level of 2300ft. Once the aircraft had passed through the Cambridge overhead, the controller observed a primary-only contact on the radar display. They were non-radar however, as duty of care, they passed the information to the pilot. The pilot reported they had had an Airprox. They advised the pilot to contact them on the landline for details once on the ground.

Factual Background

The weather at Cambridge was recorded as follows:

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EGSC 110920Z 23014KT CAVOK 07/04 Q1008
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Analysis and Investigation

NATS ATSI

Information available to the investigation included:

- [A report form] from the London Information FISO (LFISO)
- Telephone conversation with Cambridge ATC
- Redacted pilot of [Cessna Caravan C/S] Airprox report
- Redacted pilot of [Extra C/S] Airprox report
- Radar and R/T recordings

The Cessna Caravan was routeing from [departure airfield] for a tasking to the northeast of CLN. The pilot re-called the London Information (LFIS) frequency at 0918:24 (all times UTC) on their return leg back to [destination]. The pilot stated that they were positioned 10NM NNW of CLN, routeing via Wattisham and Cambridge, at altitude 2300ft and requested a Basic Service which was established.

From analysing the RT, Safety Investigations (SI) became aware that the pilot of [Cessna Caravan C/S] had also been in communication with Cambridge Radar whilst also on the LFIS frequency. SI contacted Cambridge ATC to clarify the timeline of this incident.

The Cambridge ATC Investigator detailed that the pilot of [Cessna Caravan C/S] contacted their frequency as they were intending to track through the Cambridge overhead at altitude 2300ft and requested a Traffic Service. Due to controller validation, a Basic Service was provided. The pilot did not inform the LFIS Officer (LFISO) that they had contacted Cambridge ATC (assumed on second RT box). Radar displayed that the [Cessna Caravan C/S] maintained the LFIS SSR of 1177 as they passed overhead Cambridge at 2400ft. The pilot report stated that the pilot was subsequently maintaining a listening watch on their frequency whilst receiving a Basic Service from LFIS.

Cambridge ATC further detailed that the Cambridge controller observed a primary contact ahead of [Cessna Caravan C/S] and provided information to the pilot of this contact displaying tight manoeuvres with no height displayed. Cambridge ATC stated that the pilot immediately responded that this conflict was an Airprox. Cambridge ATC stated that the pilot informed them that they observed the aircraft opposite direction at approximately 1000-1500ft and thought they would pass overhead. The pilot described the avoidance manoeuvre as a sharp right turn to avoid, followed by a sharp left turn to maintain visual with this aircraft.

The pilot then reported the Airprox to the LFISO at 0934:57. The pilot stated that "*they basically flew straight towards us, did a half Cuban eight right in front of us, and didn't see us whatsoever. I had to manoeuvre to avoid.*" At the request of the LFISO, the pilot clarified the position as "*about nine to ten miles north-northwest of Cambridge Airport*." The pilot informed the LFISO that they "*did stay on their [Cambridge] frequency as well, but [they] did warn me as the Airprox happened*." Further information was provided by the pilot that they were "*at two thousand three hundred feet on a track of three zero five, and aircraft came at bank ninety degrees angle and tilt straight up into the vertical in what's like a half Cuban eight, rolled out away from us on a westerly, sorry on a heading of about two three zero, I believe didn't see us at all, and not speaking to anyone on this frequency*." The LFISO requested confirmation that the other aircraft was in communication with Cambridge ATC. The pilot of [Cessna Caravan C/S] stated that Cambridge ATC was not in contact with the other aircraft, and "*believe it popped up on their possibly radar and [they] did warn me but no height information available*."

The pilot subsequently described the minimum distance between the two aircraft as "*hard to judge but less than five hundred feet, possibly down to three hundred, two fifty feet.*" The aircraft type was described as an "*Extra three hundred, red and white, [……]*."

The pilot of [Cessna Caravan C/S] Airprox report correlated with the description given on the LFIS frequency.

Figure 1

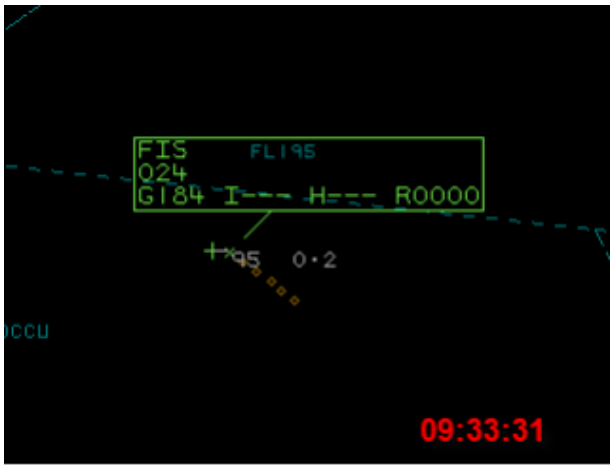


Figure 2

As described within the [Cessna Caravan C/S] pilot report, the aircraft was maintaining altitude 2400ft on a westerly track , turning onto a north-westerly track immediately after passing overhead Cambridge Airfield (see Figure 1 displaying positions of two aircraft prior to confliction). [Extra C/S] displayed as a primary contact only. The primary target of [Extra C/S] subsequently disappeared from radar. The target re-appeared for 1 radar update at 0933:31 on the single source radar S10, (see Figure 2) which was deemed as the closest point of approach between the two aircraft based on NODE radar data alone. At 0933:43, radar indicated [Cessna Caravan C/S] turned right, followed by an immediate left turn. The [Cessna Caravan C/S] pilot's Airprox report described this as a 60° avoidance manoeuvre followed by an 'immediate left to remain visual with other aircraft'.

[Extra C/S] was not displayed as a primary contact on NODE Radar at the time of this manoeuvre, but was subsequently displayed again, after the confliction, at 0934:03 (see Figure 3).

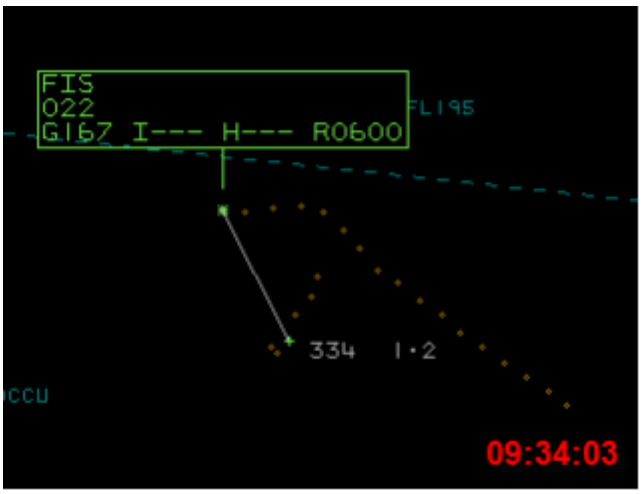


Figure 3 displaying avoidance turn and position of Extra when primary target reappeared.

With assistance from Cambridge ATC, SI were able to establish the identity of the second aircraft as [C/S redacted], an Extra 200 aerobatic aircraft. NODE radar displayed [Extra C/S] was airborne from [departure airfield] at approximately 0909:11 and subsequently tracked northbound to establish abeam the position of the Airprox. This was confirmed by the pilot of [Extra C/S]'s Airprox report. The aircraft was identified by the Mode-S aircraft address. Mode A and C were displayed until 0918:55 when radar displayed the aircraft as a primary track only. The primary track proceeded to display as if performing high energy aerobatic manoeuvres abeam the area pictured in Figure 1.

As stated previously, [Extra C/S] had positioned to their aerobatic location abeam Bar Hill using both Mode-A and C enabled. UK AIP ENR 1.6 ATS Surveillance 2.1.1 stated that:

> In accordance with the Air Navigation Order, a SSR Mode S transponder shall be operated within the airspace notified at GEN 1.5, paragraph 5.3.1. In all other airspace, when a serviceable SSR transponder is carried, a pilot shall operate the transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where SSR is used for ATS purposes in accordance with SERA.13001(a) and should enable pressure altitude reporting if available, in order to facilitate detection of their aircraft by collision avoidance systems and ATS surveillance equipment.

Radar displayed [Extra C/S] Mode A and C cease to transmit prior to performing their aerobatic manoeuvres and continued as a primary target when transiting back to [airfield]. The Airprox report from the pilot of [Extra C/S] stated that their transponder displayed '7004 to indicate we were performing aerobatics.' Radar data did not correlate with the pilot report.

UK AIP ENR 1.6 ATS Surveillance 2.2.2.2.1 stated that SSR 7004 'Aerobatics and Display' was:

> for use by civil or military aircraft conducting solo or formation aerobatic manoeuvres, whilst displaying, practising or training for a display or for aerobatics training or general aerobatic practice. Unless a discrete Mode A code has already been assigned, pilots of transponder equipped aircraft should select 7004, together with mode C pressure-altitude reporting mode of the transponder, five minutes before commencement of their aerobatic manoeuvres until they cease and resume normal operations. Pilots are encouraged to contact ATS Units and advise them of the lateral, vertical and temporal limits within which they will be operating and using 7004.

From the description within the Airprox report by the pilot of [Extra C/S], the pilot or instructor were not cognisant of [Cessna Caravan C/S] transiting above their position prior to initiating a rapid climb manoeuvre.

The Airprox occurred when the pilot of [Extra C/S] performed a rapid climb aerobatic manoeuvre climbing into the path of [Cessna Caravan C/S] that was maintaining altitude 2400ft in level flight. The Closest Point of Approach displayed on radar occurred at 0933:31 and was recorded on multi Track Radar as 0.2NM lateral distance based on a single radar update, however it is probable the aircraft tracks came into closer proximity. [Extra C/S] was a primary target and a more accurate

radar-based closest point of approach was not possible. The pilot of [Cessna Caravan C/S] reported the lateral distance as being approximately 250ft at the same altitude. The incident was resolved by the pilot of [Cessna Caravan C/S] initiating a reported 60° avoidance manoeuvre to the right in order to avoid. The pilot of [Cessna Caravan C/S] reported that without this manoeuvre there was a high risk of collision. The pilot of [Extra C/S] was not cognisant of a confliction until they were informed by the UKAB.

UKAB Secretariat

The Cessna Caravan and Extra 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 Cessna Caravan and an Extra flew into proximity 7NM northwest of Cambridge at 0934Z on Wednesday 11th January 2023. Both pilots were operating under VFR in VMC, the Cessna Caravan pilot in receipt of a Basic Service from London Information and the Extra pilot not in receipt of an ATS.

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 and FISO 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 looked at the actions of the Cessna Caravan pilot. They commended the pilot for calling Cambridge ATC on their second radio as they transited close to Cambridge airfield. Although the pilot had been aware that they had not been receiving a radar service from Cambridge, they had elected to stay on the frequency until clear of the area. The Cambridge controller had provided some generic Traffic Information about the primary-only contact that they could see on the radar, but unfortunately this information had been passed at the same time as the pilot had seen the Extra. The CWS on the aircraft could not detect the non-squawking Extra (**CF6**) and so the Board agreed that the Caravan pilot had not received any prior situational awareness that the Extra had been operating in the area (**CF5**). Members also agreed that, although the Caravan pilot had seen the Extra at a late stage (**CF7**), they had succeeded in taking avoiding action to increase the separation.

Turning to the Extra pilot, Board members were not sure why the aircraft's transponder had not been displaying and members wondered whether, when changing to a 7004 squawk, the student had not re-selected the transponder on and, given that it had been displaying earlier in the sortie, they thought it unlikely that it had suddenly become unserviceable mid-flight. Whatever the reason, they wished to highlight to pilots that it is a requirement of (UK) SERA.13001(a) to operate with the transponder on at all times during the flight (**CF2**, **CF4**). Unfortunately, the lack of transponder signals had rendered the EWS barrier ineffective because the CWS in the Cessna Caravan had been unable to detect the Extra, and the Extra had not been fitted with a CWS. Furthermore, a 7004 squawk would have alerted Cambridge ATC to the fact that the Extra had been conducting aerobatics. Members thought that, given that the Extra had been operating within 10NM of Cambridge, it would have been courteous for the pilot to have given Cambridge ATC a call as they transited to the area prior to their planned aerobatics. Whilst members accepted that an ATS would have been difficult to obtain whilst conducting the aerobatics, such a courtesy call, with a height band of operation, would have furnished Cambridge ATC with the knowledge that the Extra had been operating in the area and they may have been able to have given the Caravan pilot an earlier warning (**CF3**). Without an ATS or any CWS, the Extra pilot also had not had any situational awareness that the other aircraft had been in the vicinity (**CF5**). Members stressed that when conducting aerobatics it was incumbent on pilots to conduct a thorough lookout prior to manoeuvring in order to prevent such an event as this Airprox, where one aircraft unexpectedly pulls up into the path of another. Despite assurances from the Extra student that both pilots had been

[2] (UK) SERA.3205 Proximity.

conducting a lookout, they reported not seeing the Caravan at all (**CF8**). Some members wondered whether there had been a lack of mentoring from the Extra instructor, both in not noticing that the transponder had not been selected 'on' and for the ineffective lookout, but they stopped short of allocating this as a contributory factor. However, they noted that the Extra pilot's report had been submitted by the student and were disappointed not to also receive the instructor's perception of events. Finally, members noted that there had been a number of Airprox involving Extras in this area in recent months and wondered whether the Extra operator had in place sufficiently robust mitigations against MAC.

The Board then turned their attention to the role of ATC. The London FISO had been operating without a radar and therefore had not been able to monitor the flight, nor were they required to do so when providing a Basic Service (**CF1**). Noting that Cambridge ATC had not been providing a service, and that the controller had not been radar qualified, the Board wished to commend the controller for their actions in calling the primary-only contact to the Caravan pilot.

When discussing the risk of the Airprox, the Board considered the reports from both pilots and the ATSUs, together with the radar data available. They agreed that the action taken by the Cessna Caravan pilot had increased the separation, but thought that the late nature of the action, due to the unexpected manoeuvre by the Extra, had meant that there had still been a risk of collision and safety had been degraded (**CF9**); Risk Category B.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2023004			
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
	Flight Elements			
	• Regulations, Processes, Procedures and Compliance			
2	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with
	• Tactical Planning and Execution			
3	Human Factors	• Communications by Flight Crew with ANS	An event related to the communications between the flight crew and the air navigation service.	Pilot did not request appropriate ATS service or communicate with appropriate provider
4	Human Factors	• Transponder Selection and Usage	An event involving the selection and usage of transponders	
	• Situational Awareness of the Conflicting Aircraft and Action			
5	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			
6	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			
7	Human Factors	• Identification/ Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
8	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			
9	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: B.

Safety Barrier Assessment[3]

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 Confliction and Action were assessed as **not used** because the FISO was not required to monitor the Cessna Caravan and was operating without a radar.

Flight Elements:

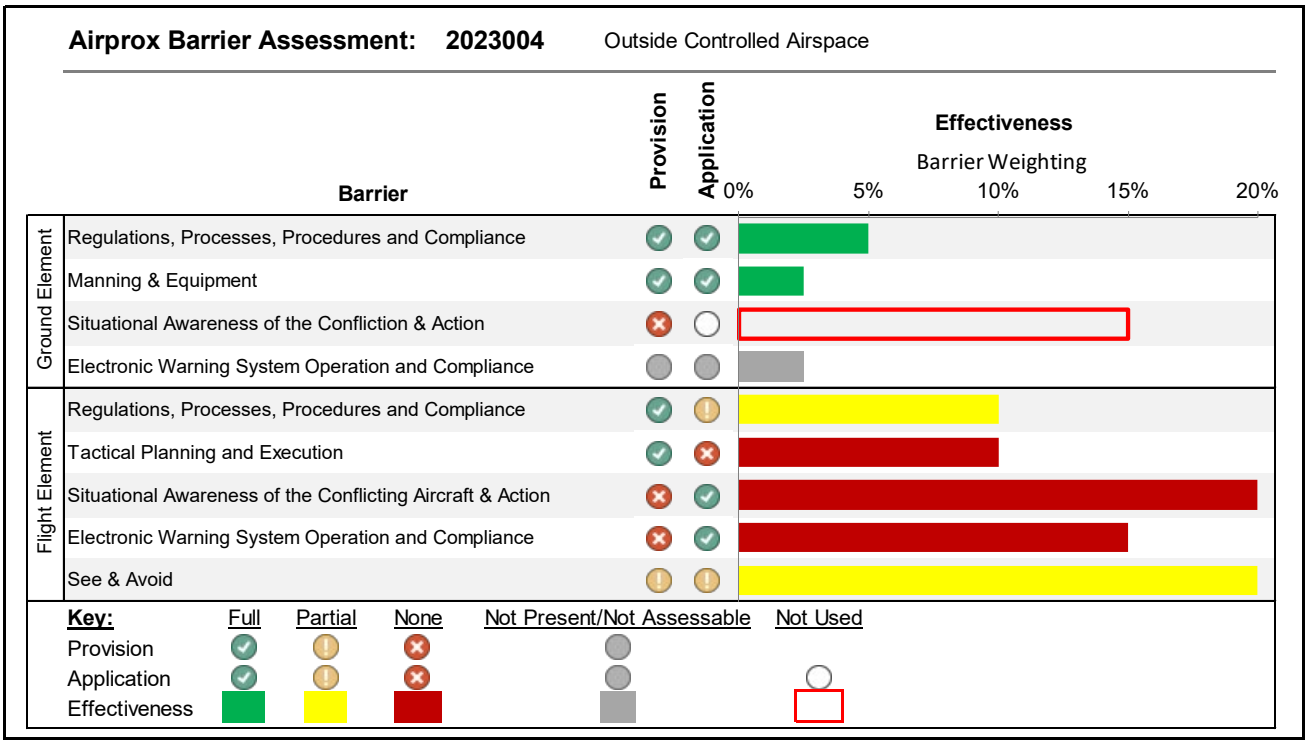
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Extra had been conducting aerobatics without its transponder turned on.

Tactical Planning and Execution was assessed as **ineffective** because the Extra pilot had been operating without the aircraft's transponder turned on, and could have called Cambridge ATC to advise that they were operating in the area.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither pilot knew that the other had been in the vicinity.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the CWS on the Cessna Caravan could not detect the Extra without its transponder on.

See and Avoid were assessed as **partially effective** because, although it had been a late sighting by the Cessna caravan pilot, they had managed to take avoiding action.



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