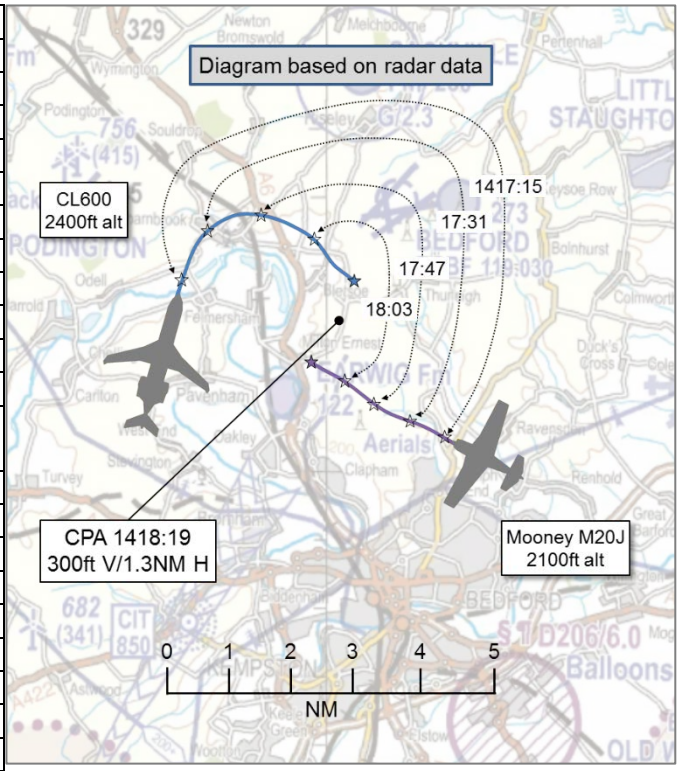
AIRPROX REPORT No 2020017

Date: 05 Feb 2020 Time: 1418Z Position: 5212N 00030W Location: 4NM NNW of Bedford

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	CL600	Mooney M20J
Operator	Civ Comm	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	VFR
Service	Procedural[1]	Listening Out
Provider	Cranfield	Luton
Altitude/FL	2400ft	2100ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White/Grey/Green	White/Blue/Red
Lighting	Strobes, anti-cols, nav, landing	Anti-cols
Conditions	IMC	VMC
Visibility	8km	8km
Altitude/FL	2500ft	2000ft
Altimeter	QNH (1037hPa)	QNH
Heading	130°	330°
Speed	160kt	130kt
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation		
Reported	Not seen	Not seen
Recorded	300ft V/1.3NM H	



THE CL600 PILOT reports that he was following the procedure for ILS RW21 at Cranfield. When the aircraft was on base-leg at 8NM, the TCAS displayed a target bearing 080°, range 3NM and 300ft below them, directly under the Localiser course for RW21. With the autopilot engaged in NAV mode, he flew 'beacon outbound', descending to the platform altitude of 2500ft QNH. The aircraft started the turn inbound to intercept the Localiser from the west but, because the target was still indicating the same position, he put the aircraft into Heading Hold mode and manoeuvred around the target to re-intercept the Localiser from the east at approximately 6.5NM. Whilst capturing heading mode, a TCAS TA was received. His aircraft was in intermittent IMC and cockpit workload was high due to completing the landing checklist and keeping a good lookout when in VMC. On those occasions that he was in VMC, he could not acquire the other aircraft visually. He captured the Localiser and Glideslope and landed normally.

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

THE MOONEY M20J PILOT reports that the route was planned in order to verify that the two VOR boxes were synchronised with each other and both showing the same track. As the pilot-in-command on a previous flight, he had his doubts that this was the case so he took the co-owner, who has over 36 years flying experience, with him in order to check. The pilot's role was to fly the aircraft and track Box 1 Nav while his passenger would operate the radios and tune Box 2 Nav as required and verify that both boxes were working and displaying correctly. His route was via Brookmans Park (BPK), Barkway (BKY) then direct to his destination. Because they would be passing near the end of the marked instrument approach 'feathers' for the Cranfield VOR, they had researched the let-down plate for the ILS RW21 and VOR/DME into Cranfield, and planned their maximum altitude to take them below

[1] The pilot reported that he had agreed a Basic Service but the RTF recordings showed that he was under a Procedural Service.

the ‘level’ section between 6.6NM DME and 8.6NM DME. Furthermore, they ensured that they had 1000ft clearance above the Maximum Obstacle Height as shown on the chart for their route. He therefore chose an altitude of 2100ft, which gave them 400ft under the ‘flat section’ and 1100ft above MSA.

Because the airspace they operate out of is very busy, and they were not a training flight where the instructors get the students to practise asking for and receiving a Basic Service, they used the listening squawks for Stansted and Luton and set Box 1 radio to the appropriate frequencies. This gave them comfort that the controllers would call them if they were about to infringe any airspace and also that, in the event of a traffic conflict alert showing up, they would alert them. At no point on the flight did they see or encounter any aircraft that they believed to be a conflict threat, nor did any controller alert them to the same. At the time in question they were VMC, albeit not very good VMC as the cloud-base had lowered and they had just popped out of a brief period of being IMC. Previously, they had entered the cloud thinking it was a brief blip (lasting a few seconds); they were surprised it wasn’t (it lasted about 3-4mins) and they were about to upgrade the listening squawk to a full Traffic Service when they popped straight out again. They are both of the opinion that, had there been a conflict with any aircraft while they were in IMC, then ATC would have called them, otherwise what's the point of having a listening squawk?

On checking both his SkyDemon log and his colleague’s ForeFlight log (which gives more detail), at the period 14:18, their altitude was 2006ft to 2141ft. Their actual track (from ForeFlight) appears to show them passing approximately 7.5NM NE of Cranfield, at that point slightly to the left of their desired track. It is possible that he had begun to focus on his descent into their destination at this point and, because they had finished proving that the VORs worked correctly, begun to position towards the aerodrome. He has checked with his pilot passenger, and at no time did they see any aircraft that remotely appeared to be a conflict to them, and they certainly did not see a Challenger jet which, bearing in mind its size, is not easy to miss.

The pilot did not make an assessment of the collision risk.

THE CRANFIELD CONTROLLER reports that he remembers the CL600 pilot reporting traffic to him, and that he had no known traffic in the area at the time. He checked the position of the only other traffic he had, which was not in the vicinity.

Factual Background

The weather at Cranfield was recorded as follows:

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METAR EGTC 051420Z 25003KT 210V270 9999 SCT023 07/06 Q1036=
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Analysis and Investigation

UKAB Secretariat

At 1415.10 the Cranfield controller cleared the CL600 pilot for the ILS procedure, maintaining 3500ft until ‘beacon outbound’. The CL600 pilot then announced *“beacon outbound”* at 1415:30 and, 30secs later, requested permission to descend to 2500ft, which was approved by the controller and the pilot was instructed to *“report reaching”*. At 1416:30, the NATS radar replay showed the CL600 established on the outbound track and descending to 2500ft; the Mooney M20J is 8.3NM east of the CL600 at this point (Figure 1).

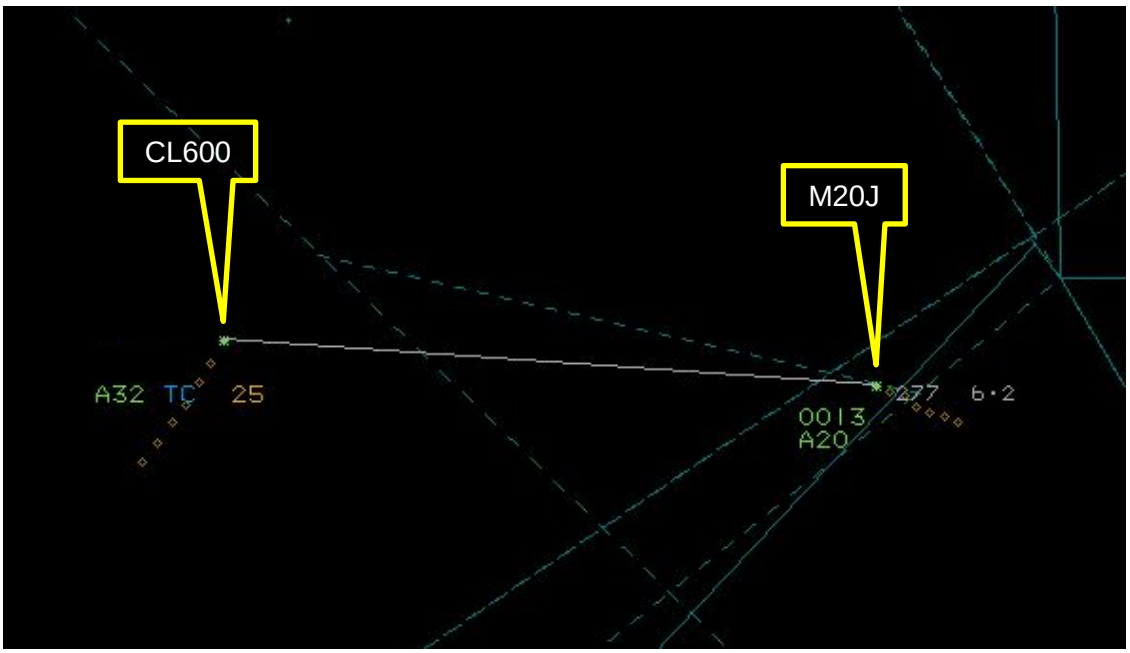


Figure 1 – 1416:30

In his report, the CL600 pilot states that he sighted an aircraft on TCAS and placed the aircraft into Heading Hold mode in order to steer around the TCAS contact (Figure 2); the 2 aircraft are separated by 400ft and 2.7NM. CPA occurred at 1418:18, with the aircraft 1.3NM and 300ft apart (Figure 3).

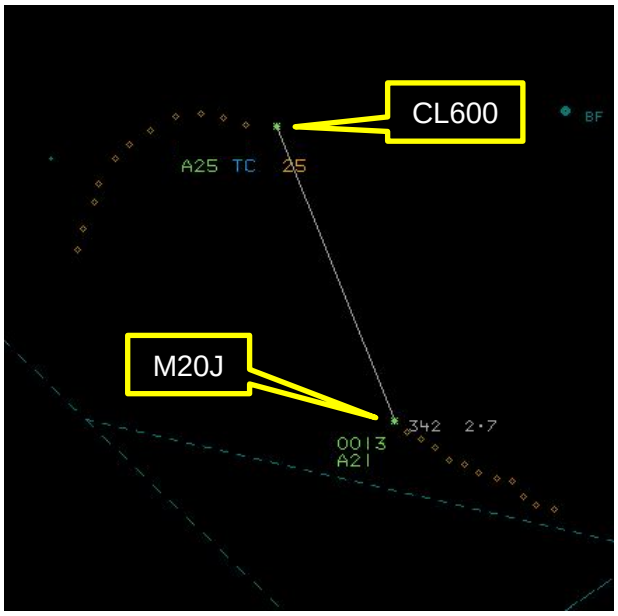


Figure 2 – 1417:54

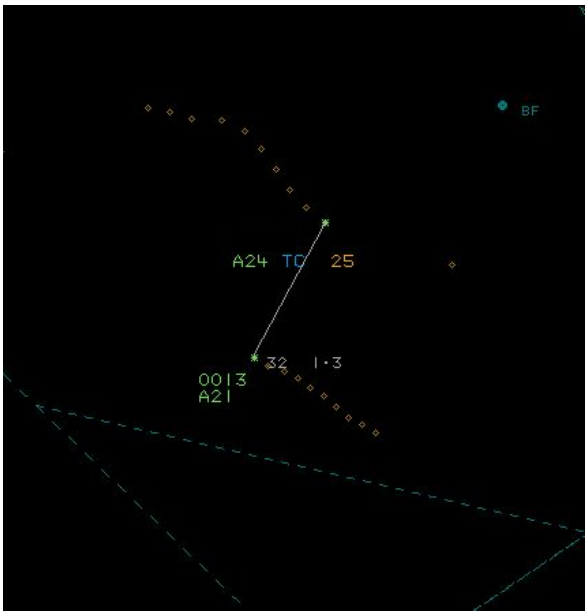


Figure 3 – 1418:18 (CPA)

At 1418:25, the CL600 pilot reported to the Cranfield controller that there was an aircraft in the vicinity of the instrument approach procedure, an extract of which can be seen at Figure 4.

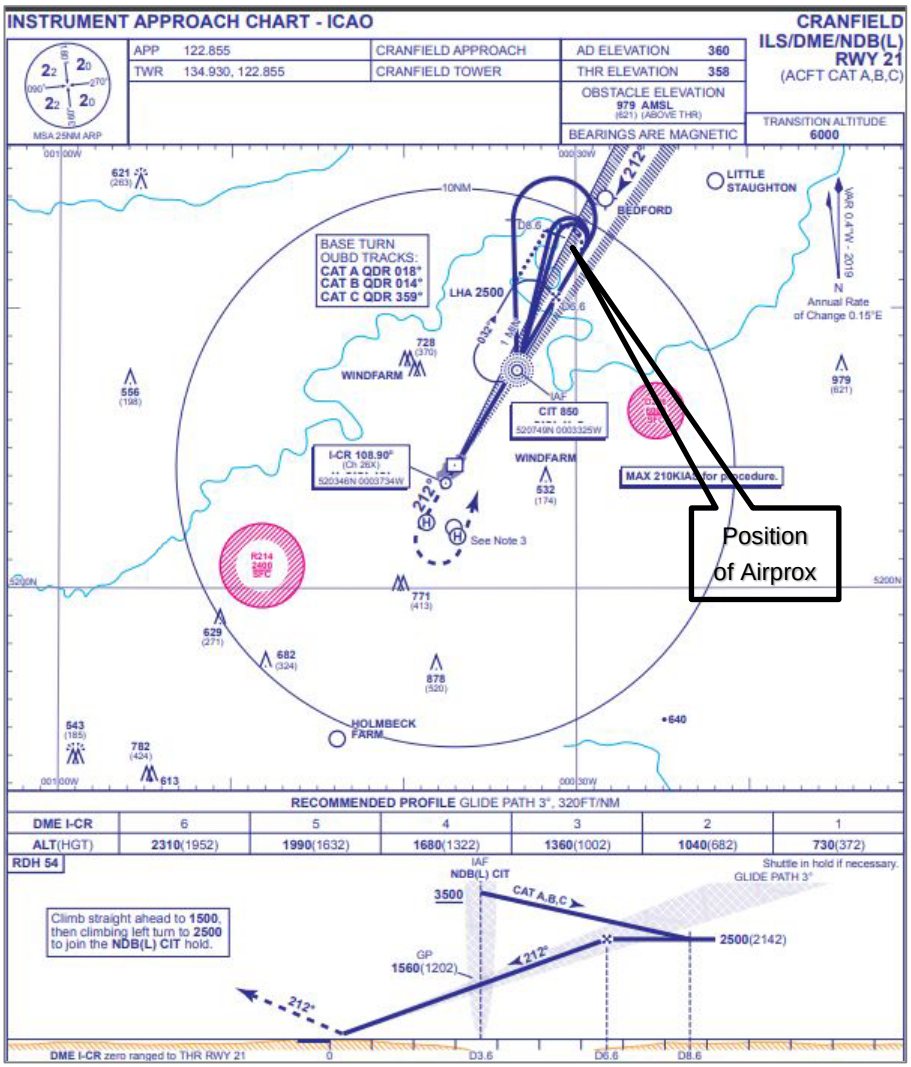


Figure 4 – Extract from Cranfield ILS RW21 procedure

The CL600 and Mooney 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] Pilots intending to fly within 10NM of any part of the Instrument Approach Procedure symbol are strongly advised to contact the aerodrome ATSU.[3]

Summary

An Airprox was reported when a CL600 and a Mooney M20J flew into proximity near Cranfield at 1418Z on Wednesday 5th February 2020. The CL600 pilot was operating under IFR in intermittent VMC and the Mooney M20J pilot was operating under VFR in VMC. The CL600 pilot was in receipt of a Procedural Service from Cranfield and the Mooney M20J pilot was not in receipt of an ATS.

[2] SERA.3205 Proximity.
[3] CAA VFR charts, legend and notes panes.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, recordings of the relevant RT frequencies, radar photographs/video recordings and a report from the air traffic controller involved. 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. Although not all Board members were present for the entirety of the meeting and, as a result, the usual wide-ranging discussions involving all Board members were more limited, sufficient engagement was achieved to enable a formal assessment to be agreed along with the following associated comments.

The Board first considered the actions of the CL600 pilot and noted that, on having seen a contact on his TCAS and having been concerned that it would have affected his intended flightpath (**CF7**), he had taken positive action to maintain safe separation. Airline pilot members of the Board wished to reiterate that TCAS operating procedures dictate that aircraft should generally not be manoeuvred in azimuth in response to a TCAS indication, because the bearing information can be unreliable and the system only uses range-rate and altitude in calculating when to issue a TA or RA. Thus, some members felt that the pilot may have been better served by increasing his altitude rather than steering around the contact; it could not be determined if the pilot's actions had, in fact, contributed to the generation of the TCAS TA (**CF8**). That being said, the Board was unanimous in commending the pilot for his actions when, having been flying in intermittent IMC and unsighted on an aircraft that he had known to be there (**CF9**, **CF10**), he had at least taken action to resolve the perceived conflict.

Turning to the actions of the Mooney M20J pilot, the Board was encouraged that he had taken account of the Cranfield instrument approach procedure in his pre-flight preparation. However, members wondered why he had not then called Cranfield as he had passed close to the procedure to inform the controller of his intentions (**CF5**). This had denied the controller not only situational awareness of the Mooney's presence (**CF1**), but also the opportunity to identify that a possible confliction existed (**CF2**) and to therefore pass reciprocal Traffic Information to both pilots, thus preventing the Mooney pilot having any situational awareness of the presence of the CL600 (**CF6**). Members also considered that the Mooney pilot could have chosen a lower transit altitude when flying in the vicinity of the Cranfield instrument approach (**CF4**), which may also have permitted him to remain in VMC when flying under Visual Flight Rules (**CF3**) and possibly have permitted him to visually acquire the CL600 on the occasions where that aircraft was also in VMC. As it was, the Mooney pilot had not sighted the CL600 (**CF10**) as both aircraft had been in intermittent IMC (**CF9**). Finally, the Board was disappointed that the Mooney pilot's report stated that he expected to be warned by ATC of any conflicting aircraft. Use of frequency monitoring codes ('listening squawks') does not imply that any form of Air Traffic Service (ATS) is being provided; the facility exists so that controllers can warn pilots of an impending or actual airspace infringement into controlled airspace. Should a pilot require Traffic Information then they should agree a surveillance-based ATS with an appropriately-equipped Air Traffic Services Unit.

In considering the risk, the Board took into account the distance between the 2 aircraft at CPA. Some members felt that a separation of 1.3NM and 300ft represented normal safety standards and parameters for flight in Class G airspace and so argued that a risk classification of E be assigned to this event. However, because risk category E represents 'normal operations' in the FIR, others felt that flying in IMC under VFR for an extended period of time without receipt of a formal surveillance-based Air Traffic Service could not be considered 'normal operations'. Therefore, after further discussion, the Board agreed that, although there had been no risk of collision, safety had been degraded and so assigned a risk category of C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2020017		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Situational Awareness and Action		
1	Contextual	• Situational Awareness and Sensory Events	The controller had only generic, late or no Situational Awareness
2	Human Factors	• Conflict Detection - Not Detected	
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
3	Human Factors	• Flight Operations Documentation and Publications	Regulations and/or procedures not complied with
	• Tactical Planning and Execution		
4	Human Factors	• Action Performed Incorrectly	Incorrect or ineffective execution
5	Human Factors	• Communications by Flight Crew with ANS	Pilot did not communicate with appropriate ATS provider
	• Situational Awareness of the Conflicting Aircraft and Action		
6	Contextual	• Situational Awareness and Sensory Events	Pilot had no, late or only generic, Situational Awareness
7	Human Factors	• Interpretation of Automation or Flight Deck Information	Pilot was concerned by the proximity of the other aircraft
	• Electronic Warning System Operation and Compliance		
8	Contextual	• ACAS/TCAS TA	
	• See and Avoid		
9	Contextual	• Poor Visibility Encounter	One or both aircraft were obscured from the other
10	Human Factors	• Monitoring of Other Aircraft	Non-sighting or effectively a non-sighting by one or both pilots

Degree of Risk: C

Safety Barrier Assessment[4]

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 **ineffective** because the Mooney M20J pilot did not contact the Cranfield controller to inform him of his aircraft's position and intentions.

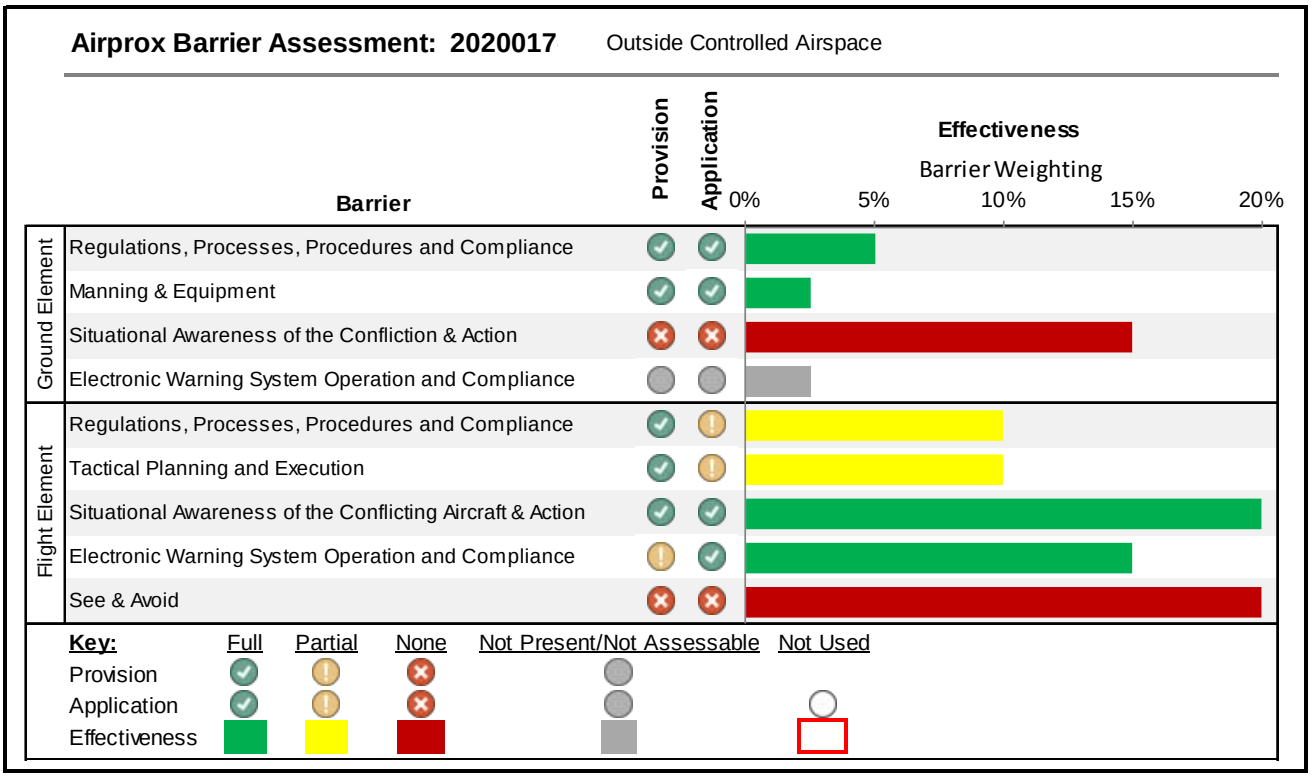
Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Mooney M20J pilot did not remain in VMC while flying under Visual Flight Rules.

Tactical Planning and Execution was assessed as **partially effective** because the Mooney M20J pilot took account of the Cranfield Instrument Approach Procedure in his pre-flight planning but did not inform the Cranfield controller of his position while under-flying the procedure.

See and Avoid were assessed as **ineffective** because both aircraft were intermittent IMC and neither pilot saw the other aircraft.

[4] 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: 2020017
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