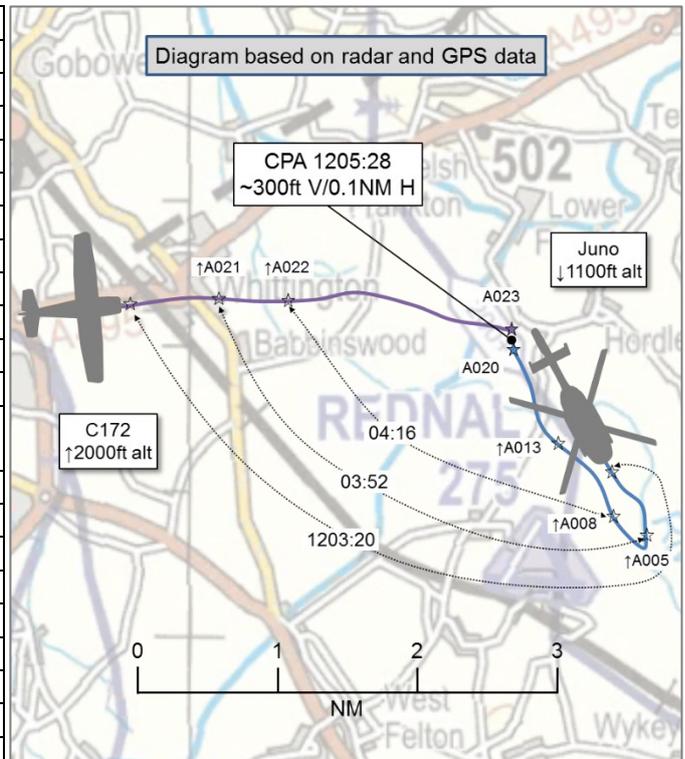


AIRPROX REPORT No 2020055

Date: 24 Jun 2020 Time: 1205Z Position: 5252N 00256W Location: 3NM E of Oswestry

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Juno	C172
Operator	HQ Air (Trg)	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	None
Provider	Shawbury LL	
Altitude/FL	2000ft ¹	2300ft
Transponder	A, C, S	A, C, S
Reported		
Colours	NR	White/Red
Lighting	Strobes, HISLs, Nav, Landing lights	Nav, Landing lights
Conditions	VMC	VMC
Visibility	25km	>10km
Altitude/FL	2400ft	2000ft
Altimeter	QNH (1020hPa)	QFE
Heading	320°	110°
Speed	65kt	90kt
ACAS/TAS	TCAS I	PCAS ²
Alert	TA	None
Separation		
Reported	100ft V/200m H	500ft V/600m H
Recorded	~300ft V/0.1NM H	



THE JUNO PILOT reports that, on completing an autorotation, the aircraft was being repositioned for the next exercise in a slight climb. The ACAS was painting a contact approximately 2NM away in the 1 o'clock and 400ft below. During the course of searching for this contact, another contact was sighted close-in, requiring avoiding action. The aircraft broke left and, as a result of the manoeuvre severity, the BACKUP SAS³ went offline. The SAS was re-engaged and an Airprox declared to Shawbury ATC. The other aircraft was re-acquired post-event, having maintained straight and level and believed to be inbound to Sleaf. In this instance, the ACAS did not provide an effective barrier to loss of safe separation in that it did not issue a Traffic Advisory or provide an indication of the traffic until after the closest point of approach.

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

THE C172 PILOT reports that the workload was low and that they had had a lot of recent flying. Their alertness level was high as they were approaching the final phases of flight; the airspace was a little busy but nothing extreme. They were approaching Sleaf airfield from the west. After being with Shawbury for about 15/20min, they announced their location to the Shawbury controller, which was 6NM away from the RW [at Sleaf] and the fact that they were changing frequency from Shawbury to Sleaf. The Shawbury controller confirmed their actions and instructed them to squawk 7000. All of that done, and talking to Sleaf, they were now 4NM away from the RW setting themselves up for an overhead join at 2000ft on Sleaf's QFE. They were using the PCAS in the aircraft which made them aware of an approaching aircraft (helicopter) from the right, 500ft below. When they looked right and noticed the helicopter they decided that no further avoidance action was required. However, the

¹ GPS-derived.

² Portable Collision Avoidance System.

³ Stability Augmentation System.

helicopter did make a left turn and there was now significant danger which required evasive action. They did not see reporting as necessary as they did not see it as a dangerous situation, especially due to the class of the airspace, VFR and being visual with the traffic.

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

THE SHAWBURY LOW LEVEL CONTROLLER reports that they were the RA Controller working one aircraft in the RTC⁴ and a number of aircraft under Basic Services operating in LFA⁵ 9; workload and task difficulty were assessed as low. At 1204Z, a pilot reported an Airprox versus a piston light-aircraft in the vicinity of Baggy Moor, approximately 10NM NW of Shawbury in a known area of poor radar performance. Neither aircraft was showing on radar.

The controller perceived the severity of the incident as 'Low'.

THE SHAWBURY ZONE CONTROLLER reports they were the Zone controller when the RA controller said that an aircraft had called Airprox on the Low Level frequency. They recall working a Basic Service transiting from the N/NW inbound for Sleaf. They do not recall the Basic Service aircraft painting on radar until the pilot had called going en-route and was close to the Sleaf ATZ boundary.

The controller perceived the severity of the incident as 'Low'.

THE SHAWBURY SUPERVISOR reports that they were conducting a handover of the Supervisor role at the time the Airprox was reported. They noted down the details as the controller iterated them and were able to view the radar screen. Neither aircraft involved was showing on radar. They reported the incident and had the tapes impounded by the ATC safety team.

Factual Background

The weather at RAF Shawbury was recorded as follows:

```
METAR EGOS 241150Z 14003KT CAVOK 26/14 Q1020 NOSIG RMK BLU BLU=
METAR EGOS 241220Z 15007KT CAVOK 27/14 Q1020 NOSIG RMK BLU BLU=
```

Analysis and Investigation

Military ATM

The Juno pilot was conducting autorotation training serials to the northwest of RAF Shawbury in receipt of a Basic Service from the Shawbury Low-Level Controller. Having been alerted by the ACAS of a conflictor 2NM away (not the C172), the crew began a visual search for this aircraft. Whilst conducting this search, they became aware of the C172 at close range and initiated avoiding action which was severe enough to cause the backup SAS to go offline. Separation was estimated at 200m lateral and 100ft vertical.

The C172 pilot was returning to Sleaf following a local sortie. Although the C172 had been receiving a Basic Service from Shawbury Zone, approximately 90sec prior to CPA the pilot had changed frequency to Sleaf Radio. Whilst setting up for an overhead join at a reported 2000ft, the C172 pilot reported seeing the Juno following a PCAS notification and that no avoiding action was required. The C172 pilot reported monitoring the situation which developed and, due to significant danger, initiated avoiding action. The C172 pilot reported the separation as 600m lateral and 500ft vertical.

Figures 1-3 show the positions of the Juno and C172 at relevant times in the lead-up to and during the Airprox. The screenshots are taken from a replay using NATS Radars, which are not utilised by RAF Shawbury, therefore are not representative of the picture available to the controllers.

⁴ Radar Training Circuit.

⁵ Low Flying Area.

The C172 pilot free-called Shawbury Zone requesting a Basic Service inbound to Sleaf; the Service was agreed at 1148:48. Shortly afterwards, at 1200, the Zone Control position was handed over to another controller. During the handover, comment was made about the C172 and the fact that it was in an area of known poor radar performance and had not displayed on the radar screen. (Note: this area of poor radar performance was previously noted in Airprox 2019278). Separation at this point was 8NM and 1200ft (see Figure 1). At 1204, the C172 pilot reported changing frequency to Sleaf radio and was instructed to squawk 7000. Separation at this point was 3NM and 1400ft. The Juno can be seen climbing away from an autorotation at this point (see Figure 2).

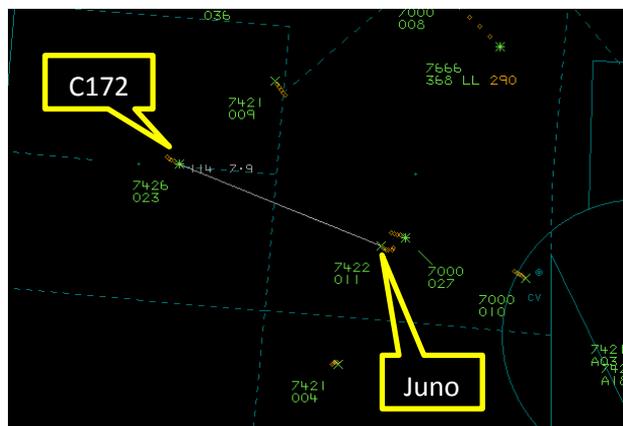


Figure 1 – Controller Handover

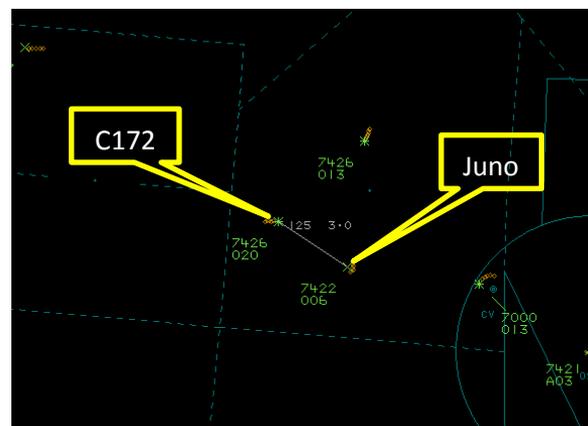


Figure 2 – C172 Frequency Change

Up until the point of this frequency and squawk change, the C172 squawk had been visible on the radar replay provided. Following the change to Sleaf, the C172 squawk was no longer visible, possibly because the transponder was turned to standby while the pilot selected the code to 7000. This may account for the Juno pilot reporting that no ACAS warning was received. Allowing the radar replay to run shows that the radar returns merged at 1205:30 but no estimation of vertical separation could be given due to the lack of a squawk from the C172. Following CPA, the Juno pilot reported the Airprox to the Shawbury Low-Level Controller who reported that neither aircraft were displaying on their surveillance systems.

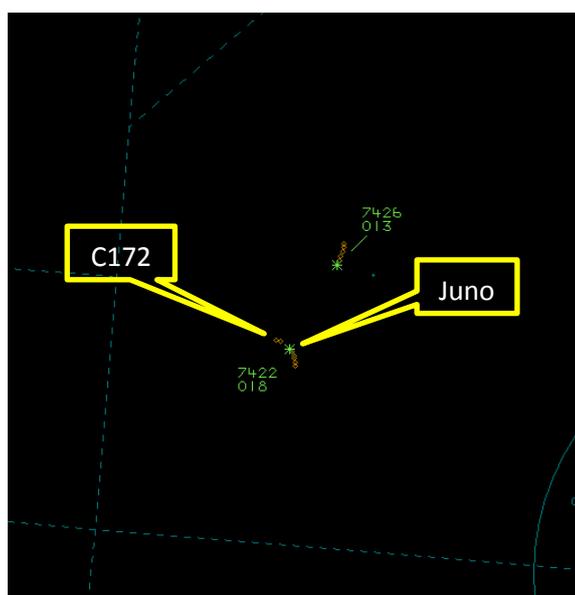


Figure 3 – CPA

This incident took place in an area of known poor radar performance with neither aircraft displaying on Shawbury surveillance systems, meaning that no action could be taken by the controllers involved to prevent the incident from occurring.

UKAB Secretariat

The Juno and C172 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.⁶ If the incident geometry is considered as converging then the C172 pilot was required to give way to the Juno.⁷

Comments

HQ Air Command

This Airprox occurred on a busy day of GA activity, with over 100 movements recorded in and out of Sleep airfield. Although the Juno appeared on the C172 pilot's CWS, which led to the C172 pilot becoming visual with the Juno in good time, the C172 did not appear on the Juno pilot's CWS until after CPA. It is possible that the C172's transponder was either put into standby or automatically went into standby during the process of changing squawk following their frequency change to Sleep. This would provide an explanation as to why the C172 only appeared on the Juno's CWS after CPA. Regardless, both pilots became visual with each other's aircraft prior to CPA and were able to make timely manoeuvres to avoid collision – reinforcing the importance of a robust lookout scan in all stages of flight.

Finally, this Airprox happened in an RAF Shawbury area of poor radar performance and neither aircraft appeared on Shawbury radar screens. This specific area to the northwest of Shawbury is caused by topography affecting the performance of the Primary Radar head. It is a well-known factor affecting flying operations and is often briefed pre-flight by Shawbury-based crews. Unfortunately, on the day this Airprox occurred, Shawbury ATC was operating on SSR only (this had been NOTAM'd). Wide Area Multilateration (WAM) might have improved radar coverage, but this was removed at Shawbury some 16 months previously due to incompatibility with non-compliant transponders. This incompatibility is currently being investigated and implementation of WAM remains a high priority at RAF Shawbury. RAF Shawbury maintains a close liaison with Sleep Airfield in the interests of co-ordinating activity and continually improving Air Safety.

Summary

An Airprox was reported when a Juno and a C172 flew into proximity 3NM east of Oswestry at 1205Z on Wednesday 24th June 2020. Both pilots were operating under VFR in VMC, the Juno pilot in receipt of a Basic Service from Shawbury Low Level and the C172 pilot was not in receipt of an ATS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and 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.

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 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 C172 pilot and was impressed that they had clearly taken several steps to assist in their situational awareness: they had equipped themselves with an ACAS; sought an ATS and used this information to assist with their lookout. Although members agreed that

⁶ SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

⁷ SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.

the selection of a Basic Service in this encounter had not contributed to the Airprox (neither aircraft had been displayed on either of the controllers' radar screens) the Board nonetheless wished to highlight that Traffic Information cannot normally be expected to be forthcoming when under a Basic Service and that, if a pilot wishes a controller to warn them of aircraft in proximity, then a surveillance-based ATS should be requested. In this case, the C172 pilot had been alerted to the presence of the Juno by their PCAS (CF6) and had used the information presented to become visual with the Juno. The Board agreed that the C172 pilot, on initial sighting of the Juno, had assessed there to be no conflict (CF9) but that the subsequent manoeuvring of the Juno pilot had necessitated action on the part of the C172 pilot.

Turning to the actions of the Juno pilot, the Board agreed that they had had no situational awareness of the presence of the C172 (CF4) and concluded that the most likely explanation that the C172 had not been detected by the Juno's TCAS was that the C172 pilot had been in the process of setting their transponder code to 7000 on instructions from the Shawbury Zone controller, and that the equipment had ceased to transmit for the period of the code change (CF5). Members agreed that the Juno pilot's late sighting of the C172 (CF8) had been due, in part, to their looking for another contact in their 1 o'clock that had been displayed to them by their TCAS (CF7).

The Board heard from the military ATC advisor that the event occurred in an area of known poor radar performance and that the controllers were working with Secondary Surveillance Radar only (CF1); therefore neither aircraft had been visible to either controller (CF3). Controller members discussed the possibility of generic situational awareness being passed to the pilots by their respective controllers, but other members felt that, given the lack of radar-derived information, the inaccuracies of this information would mean that any Traffic Information would have been unlikely to have been helpful to either pilot. As it was, neither controller had been required to monitor either aircraft under their agreed respective Basic Services (CF2) and so this MAC barrier had not been employed.

Considering the risk involved in this event, the Board discussed the discrepancies between each pilot's perception of the collision risk against the measured separation achieved, and wished to thank the C172 pilot for providing their GPS route information because this had permitted an assessment of vertical separation to be made. Although the Juno pilot had clearly been alarmed at the proximity of the C172 on first sighting, members felt that this was mostly due to them having no prior warning of the presence of the C172. Although the aircraft had passed each other with little lateral separation, the Board agreed that, although safety had been degraded, sufficient vertical separation had existed to effectively remove any collision risk and assigned a Risk Category C to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2020055			
CF	Factor	Description	Amplification
Ground Elements			
• Manning and Equipment			
1	Technical	• Aerodrome and ATM Equipment	Non-functional or unavailable equipment
• Situational Awareness and Action			
2	Contextual	• ANS Flight Information Provision	Not required to monitor the aircraft under the agreed service
3	Contextual	• Situational Awareness and Sensory Events	The controller had only generic, late or no Situational Awareness
Flight Elements			
• Situational Awareness of the Conflicting Aircraft and Action			
4	Contextual	• Situational Awareness and Sensory Events	Pilot had no, late or only generic, Situational Awareness
• Electronic Warning System Operation and Compliance			
5		• Any other event	Target aircraft transponder in standby during code change
6	Contextual	• Other warning system operation	Warning from a system other than TCAS or TAS
• See and Avoid			

7	Human Factors	• Distraction - Job Related	Pilot looking elsewhere
8	Human Factors	• Monitoring of Other Aircraft	Late-sighting by one or both pilots
9	Human Factors	• Perception of Visual Information	Pilot perceived there was no conflict

Degree of Risk: C

Safety Barrier Assessment⁸

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

Ground Elements:

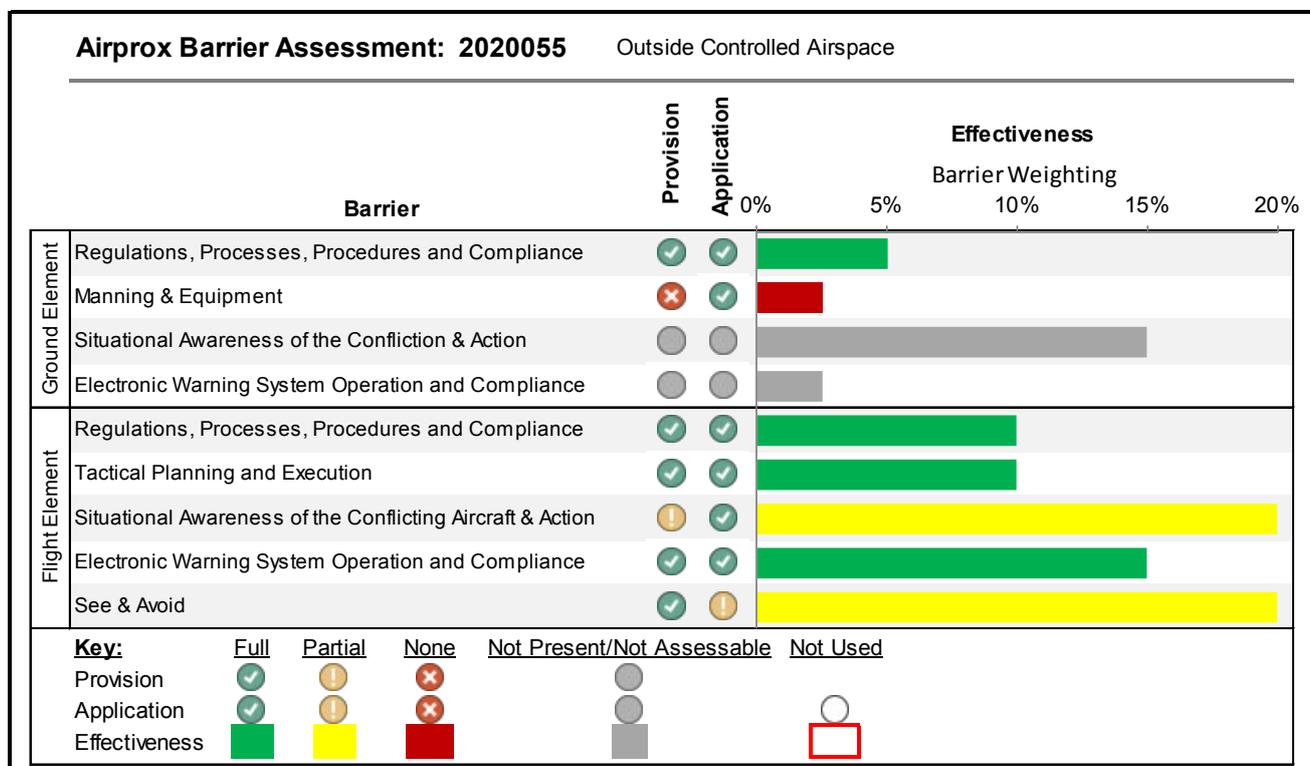
Manning and Equipment were assessed as **ineffective** because the Shawbury controllers were working with SSR only and neither aircraft appeared on the Shawbury controllers’ radar screens due to the Airprox occurring in an area of known poor radar performance.

Situational Awareness of the Confliction and Action were assessed as **not used** because neither controller was required to monitor the aircraft under the terms of the agreed Service.

Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Juno pilot had no awareness of the presence of the C172 as they had not received any Traffic Information nor did the C172 appear on the Juno’s ACAS.

See and Avoid were assessed as **partially effective** because the Juno pilot did not see the C172 until immediately prior to CPA due to their searching for a different TAS contact and, when the Juno pilot manoeuvred, the C172 pilot then had to take late avoiding action.



⁸ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).