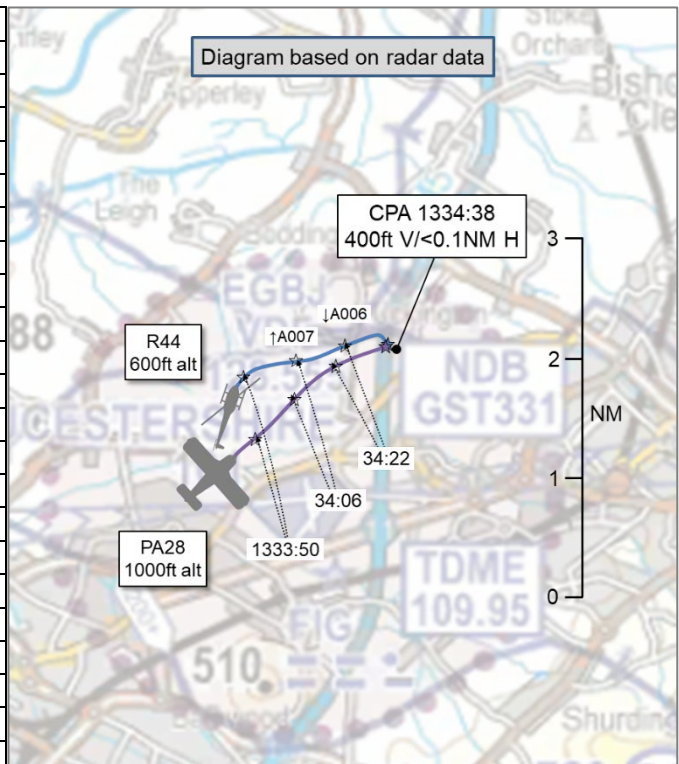


**AIRPROX REPORT No 2021123**

Date: 20 Jul 2021 Time: 1335Z Position: 5155N 00209W Location: Gloucestershire ATZ

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

Recorded	Aircraft 1	Aircraft 2
Aircraft	R44	PA28
Operator	Civ Helo	Civ FW
Airspace	Gloucester ATZ	Gloucester ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Gloster Tower	Gloster Tower
Altitude/FL	600ft	1000ft
Transponder	A, C, S	A, C, S
<b>Reported</b>		
Colours	Black	Dark blue, silver
Lighting	Strobes	Nav, beacon, strobe
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	650ft	1000ft
Altimeter	QFE (1016hPa)	QFE (1016 hPa)
Heading	090°	090°
Speed	90kt	85kt
ACAS/TAS	Not fitted	Not fitted
<b>Separation</b>		
Reported	100ft V/0.25NM H	Not Seen
Recorded	400ft V/<0.1NM H	



**THE R44 PILOT** reports that they and their PPL student had been carrying out helicopter circuits based on RW27RH for approximately the previous 45min, using the QFE of 1016hPa as given by the ATIS. Helicopter circuits at Gloucester are conducted without RT, so no position calls were being made. Just before they turned onto downwind at approximately 600-650ft, speeding up to 90kts, they both noticed a fixed-wing shadow on the ground but neither of them could identify the actual position of the aircraft that had cast it. No radio calls had been made to advise of an aircraft carrying out low-level circuits or anything to indicate a fixed-wing [aircraft] may be in an unusual position. The pilot and their student were both on high alert as they could not spot the aircraft that had cast the shadow. The student, who thankfully is a 1000hr+ fixed-wing pilot with good airmanship skills, was keeping a sharp eye out for the aircraft. The student spotted the aircraft initially in their 5 o'clock high and called this out. They were in the late downwind position at this point, soon to turn right onto base leg. The aircraft being on their right-hand side was a surprise, as the typical fixed-wing circuit would put the other aircraft on their left-hand side which is where the instructor was initially looking for it. Being sat in the left seat, this meant the aircraft was squarely in the instructor's blind spot because the aircraft canopy obstructed their view. The instructor only managed to positively identify the aircraft after they had taken control and then put the helicopter in a left-hand descent to avoid the approaching aircraft, which allowed the PA28 to come into view in their 3 o'clock high as they rolled the helicopter left. At this point, the fixed-wing aircraft flew across their track, right-to-left and at best approximately 150ft above in order to position itself for its base turn as it was very tight downwind. The instructor then immediately asked the Tower to confirm the height of the aircraft that had just flown over them. The Tower controller asked the aircraft to confirm its height. The response was that they were at 800ft. The Tower controller only then reminded the aircraft that the correct circuit height for fixed-wing aircraft was 1000ft on the QFE. Upon hearing that the aircraft was only at 800ft the instructor then immediately asked the Tower controller to capture the information as they would be filing an Airprox. They usually fly their helicopter circuits at 600ft despite the helicopter circuit being up to 750ft. The reason they conduct circuits 150ft lower than the maximum height of the circuit is partly to allow students who may inadvertently gain height to be safer by not encroaching into the fixed-wing circuit. The main reason, however, is to allow a greater separation from

the fixed-wing circuit, as fixed-wing aircraft at Gloucester are often not at the correct circuit height as has been evidenced by a previous Airprox (No 2019192) and led to the [helicopter] flying school dropping its standard circuit height to 600ft. They do, however, have to climb to 700-750ft in order to carry out certain exercises such as fan stops and engine-off landings. There is also no official published pattern to fly for either fixed-wing or helicopters. Home-based operators generally fly a similar pattern to each other but it varies based on aircraft type and the PIC. There is no official published pattern despite a steering committee by the airport to create one started approximately 3yrs ago with no progress made. The instructor's view is that it is very unusual that an airfield as busy as Gloucester would have no official circuit. With the aircraft 200ft lower than it should have been at 800ft, and their maximum height in the circuit being 750ft, that means that the separation could easily have been a mere 50ft, and even less if the 750ft height was not kept by a student in training. They would rate the potential for collision in this instance to have been 'High' because, without the airmanship skills of their PPL student and their ability to maintain height, this could very easily have ended in a collision or a proximity of a mere 50ft and they do not believe that the fixed-wing [pilot] was aware of them at any point until after they reported that [the fixed-wing aircraft] had flown over them.

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

**THE PA28 PILOT** reports that they were flying with a colleague, returning from [name of airfield supplied] and, with 20 miles to run, received the ATIS. They then called Gloster and requested an early direct downwind join to RW27RH. This was refused, and they were ordered [to join via the overhead at] '2000ft'. They responded confirming a standard overhead join. Following the descent, the crosswind was flown marginally above 1000ft on the given QFE. The radio was quite busy all this time. They turned onto downwind at 1000ft and remarked to their colleague that it was imperative to maintain an accurate 1000ft, particularly as this had been firmly discussed with their CFI during their check ride in Spring 2020. From the radio transmissions, they were aware that there was a helicopter in its circuit below them, although they were unable to see it. They were not especially perturbed as they were aware that the helicopter circuit was 250ft below them. Tower then advised that they were No 2, and they replied that they were visual with No 1. Subsequently, late downwind, they saw [the aircraft ahead] low over the threshold and landing. They turned appropriately on to right base for RW27 in customary fashion and, shortly after their left wing was 'covering' GCHQ, they turned right on to final RW27 for the usual uneventful descent onto the 'piano keys', with a marginally late landing clearance call from the Tower. Both they and their colleague are surprised at this 'outcome' and would be interested to know just where an Airprox is supposed to have occurred.

**THE PASSENGER IN THE PA28** reports that they were in the right-hand seat of the PA28. They were returning from [name of airfield supplied] inbound to Gloucestershire. On initial contact, they were given a standard overhead join. QFE 1016hPa was set and they commenced an overhead join. After descending deadside and turning crosswind they observed a helicopter well below, apparently having lifted-off and heading north. Turning downwind at 1000ft, they were advised that they were No 2 to land. They believe there was a third aircraft just joining overhead. The PIC confirmed that they had No 1 in sight and turned onto right base for RW27RH. They could see that No 1 was about to touch down and could not see any other traffic, so [the pilot] continued to final and to land on RW27. The radio seemed very busy. They talked to three different controllers from initial contact to clearance to taxi from the pumps to the parking on the apron.

**THE GLOSTER TOWER CONTROLLER** reports that, at 1335, [the pilot of] a Robinson R44 within the helicopter circuit declared wishing to file a report of an Airprox with a Piper Cherokee PA28 in the fixed-wing circuit, RW27RH, late downwind position. [The PA28 pilot], who had not yet contacted Tower and had not reported "overhead", nor "descending deadside", made their first call to the Tower frequency (122.905MHz) when late crosswind, turning downwind. All along, the Tower ATCO, ATS assistant and APP ATCO were trying to establish which 4th aircraft was seen to be coming from 2NM NW to the overhead at the same time as 3 others were also joining overhead. The aircraft carried on to the overhead whilst another one was already on deadside descending, and one other (a student) approaching the overhead from 1.5NM east. They tried to establish the identity of the aircraft, but only managed to read the registration when it was late deadside, turning crosswind, at which point it was then transferred from the APP frequency (128.555MHz) to the Tower frequency. At 1333, the Tower

ATCO established communications with [the PA28 pilot] as the aircraft was late crosswind, turning right downwind for RW27, at which time they were instructed to "*report final number 2 follow a DR40 on base leg*", which the PA28 [pilot] read back correctly. At 1335, [the R44 pilot] flying within the helicopter circuit requested the level of the aircraft above them, to which the Tower ATCO asked [the PA28 pilot] to "*report your level*"; [the PA28 pilot] replied "*800ft*". The Tower ATCO then reminded [the PA28 pilot] "*fixed-wing circuit level is 1000ft, and helicopter circuit not above 750ft QFE*". [The R44 pilot] then straightaway reported (twice) that they would be filing a report of an Airprox with the PA28 upon completion of the helicopter circuit. The Tower ATCO acknowledged the request with "*Roger*".

## Factual Background

The weather at Gloucestershire airport was recorded as follows:

METAR EGBJ 201320Z 29005KT CAVOK Q1019=

METAR EGBJ 201350Z 30005KT 230V340 CAVOK 30/16 Q1019=

## Analysis and Investigation

### Gloucestershire Airport

The first call from [the PA28 pilot] (1322) was 15 miles (west) for joining instructions, requesting direct downwind for RW27. The APP controller gave a standard overhead join for RW27 but to report at five miles for a possible direct join. At the time (1328) that [the PA28 pilot] reported five miles, other joining traffic also called and was instructed to "standby, controller handover". It appears that [the PA28 pilot] was not transferred to Tower at this point as the next transmission on APP was to query [the PA28 pilot]'s position, to which they replied "*in the overhead, turning downwind*". They were promptly transferred to TWR.

On TWR, the first contact was from [the R44 pilot] who (at 1334:50) said "*[R44 c/s], can I take the height of that (traffic) downwind in the circuit?*" TWR queried the level, to which [the PA28 pilot] said "*800 feet, turning base leg*". As reported, the TWR controller reminded [the PA28 pilot] of the correct circuit height for fixed-wing and rotary traffic. At 1335 [the R44 pilot] stated their intention to file an Airprox and re-iterated this at 1337 after [the PA28] had landed.

The first issue that was highlighted here is that [the PA28 pilot] was not transferred to Tower until very late and already within the fixed-wing circuit. The call at 5NM was missed but, after listening to the recordings, it could have been quite easy to have done so; there was also a controller handover in progress which may have compounded the situation slightly. Normally, traffic for an overhead join is transferred at 3NM, not 5NM which again might have been slightly confusing. It is unknown why the pilot of the PA28 did not make any further transmissions or query if they could get a direct join or if they should just continue with the overhead join. However, whilst this call was missed, it is not believed to be a contributory factor for the Airprox. What was of initial concern was that the ATCO report stated that 4 aircraft were joining overhead, it is however noted on the debrief that there were only 2 routing to the overhead, one deadside and one crosswind. The PA28 was believed to be the 4th aircraft joining from the NW which was unknown traffic at the time. This is also not believed to be a contributory factor.

The Airprox is believed to have occurred on the base leg due to the pilot of the PA28 descending below the prescribed 1000ft to 800ft. The R44 pilot was contacted following the Airprox and they had stated that if they had been at 750ft then it could have been much more of an issue, a common concern for this operator. It is unknown if the pilot of the R44 had to take any avoiding action. Whilst there were a few points raised on the lead-up to the Airprox which have been dealt with at unit level, the ultimate contributory factor was the level of the PA28 in the circuit. This has been raised before and the unit has considered many different options to try and alleviate the problem. Some options include raising the fixed-wing circuit height, putting a descent restriction on deadside descending traffic and imposing specific tracks across the ground for fixed-wing and helicopter operators to fly, all of which come with advantages and disadvantages. Immediately following this Airprox, a safety bulletin was sent to all operators reminding them about the importance of height keeping in the

circuit, amongst other safety-related items. It is the intention to try and re-engage the fixed-wing and helicopter operators to see if any other ideas can be brought to the table to try and increase safety assurance in this area without impacting on the risk to safety in other areas.

## CAA ATSI

The R44 [pilot] was conducting circuits in the helicopter circuit at Gloucestershire Airport based on RW27RH. The PA28 [pilot] was returning from a VFR flight to [name of airfield redacted] to land at Gloucestershire. ATSI had access to area radar recordings, Gloucestershire ATC RTF recordings for Approach and Tower, reports from both pilots, the Tower controller and a unit investigation report. Aircraft levels in the radar replay snapshots are displayed as a Flight Level. The datum used in this report is the threshold elevation for RW27 which is 87ft. The difference between FL and the system QNH is 162ft, therefore the aircraft heights within the screenshots can be taken as 100ft above the aircraft indicated levels.

At **1322:28** the PA28 [pilot] called the Gloucestershire Approach controller, reporting 15NM to the west and requesting a direct join for downwind RW27RH. The controller acknowledged the call, requested their range again, advised that it was a Basic Service and then instructed the pilot to standby as they would call them back shortly. The controller then dealt with another inbound aircraft, transferring them to the Tower, and then a helicopter transit leaving the frequency. [The pilot of] another aircraft, a DR40, then called for join. The controller did not answer this call but went back to the PA28 [pilot] to pass Traffic Information on that DR40 believed to be ahead of the PA28, which was acknowledged by the pilot. At **1324:38** an outbound PA18 called the Approach controller and a Basic Service was agreed. Then, between **1325:10** and **1326:00**, the Approach controller entered into a discussion with the pilot of a transiting helicopter, about flying through the instrument approach area. (The pilot had previously reported leaving the frequency but was found to still be monitoring it).

At **1326:20** the DR40 [pilot] called again, reporting at 5 miles, and advising that they were still waiting for joining instructions. The Approach controller passed the DR40 pilot Traffic Information on the outbound PA18 and then instructed them to join downwind right-hand for RW27. The DR40 pilot requested an overhead join instead, and so was instructed to make a standard overhead join for RW27RH. The DR40 pilot was then transferred to the Tower (Figure 1).

At **1326:45** the Approach controller passed Traffic Information to the outbound PA18 on the inbound DR40 (but not the following PA28). At **1327:06** the Approach controller instructed the PA28 [pilot] to make a standard overhead join for RW27 and to report with 5 miles to run, advising that they might still be able to clear them for a direct right-hand downwind join. The PA28 pilot replied; *“roger that, standard overhead left, otherwise right. Currently about five miles to the west of you”* (Figure 2).

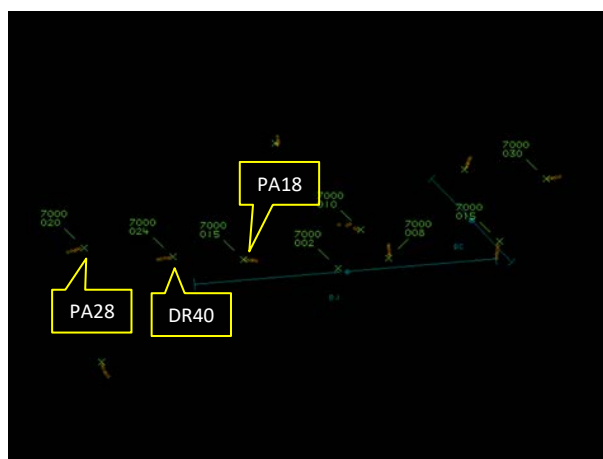


Figure 1 – 1326:20

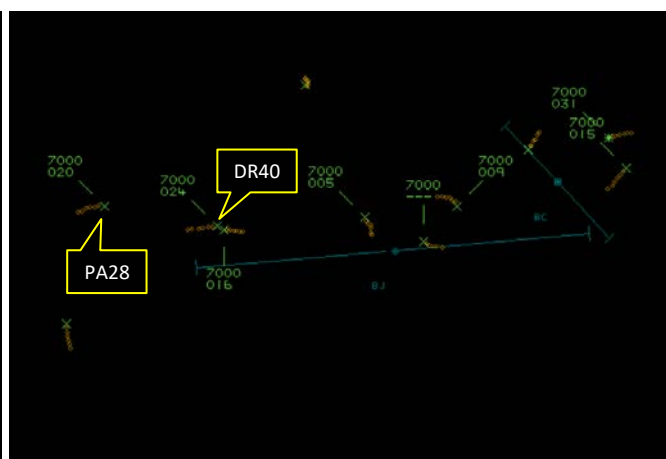


Figure 2 – 1327:06

The controller did not acknowledge the 5-mile call by the PA28 [pilot] nor clarify the pilot's readback as [the pilot of] another PA28 (PA28(1)), inbound from the NE, called. The PA28(1) [pilot] reported at 5 miles, was passed Traffic Information on the transiting helicopter, the fixed wing circuit at the airfield and the DR40 inbound from the west and was then transferred to the Tower.

At **1328:30** another DR40(1) [pilot] called and was told to standby "*due controller handover*". However, the outbound PA18 [pilot] then reported going en-route which was acknowledged by the first controller.

Meanwhile, with the Tower controller was an aircraft lined-up for departure, the PA28(1) inbound from the north-east holding in an orbit (as instructed by the controller) and the first DR40 transferred from Approach earlier which was routing through the overhead. At **1330:08** the Tower controller passed Traffic Information to the departing aircraft on the DR40 in the overhead, the second DR40(1) inbound from the west (still on the Approach frequency), and the active helicopter circuit before then clearing them for take-off. The DR40 [pilot] reported on the dead-side and was passed Traffic Information on the departing aircraft and instructed to report downwind. The PA28(1) [pilot], orbiting to the NE, reported their orbit complete and was instructed to report in the overhead and before descending.

On the Approach frequency there had been no further calls until **1330:25** when the DR40(1) [pilot] called again, advising they were 4 miles west for an overhead join. The new Approach controller acknowledged this, passed Traffic Information on the PA28 ahead of them and instructed them to route for a standard overhead join for RW27RH. This was read-back by the pilot who reported approaching 3 miles. The controller advised that both the fixed-wing and helicopter circuits were active and transferred them to the Tower (Figure 3).

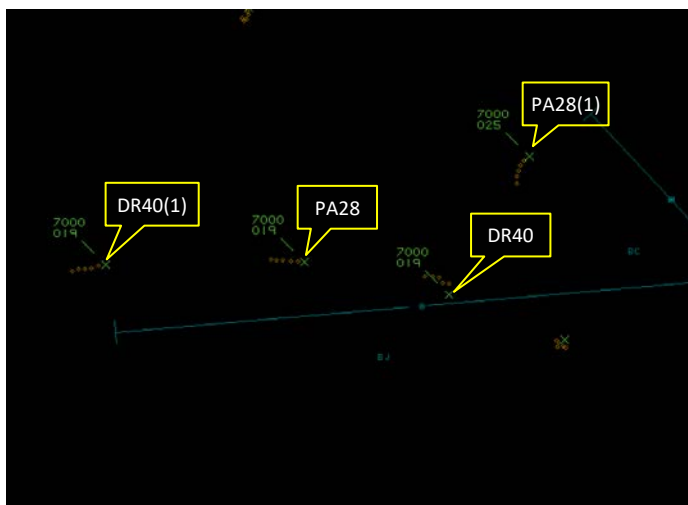


Figure 3 – 1330:25

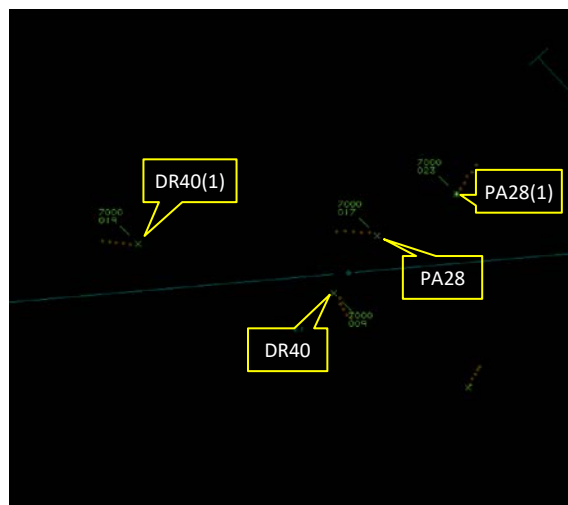


Figure 4 – 1331:45

At **1332:08** the Tower controller asked the PA28(1) [pilot] if they were "*in the overhead, or just about 1 mile to the east of the field?*" The pilot reported "*just about to become overhead*". Then, at **1332:24**, the PA28(1) [pilot] reported in the overhead and was instructed to report descending on the deadside (Figure 5). At **1332:40** the Tower controller again asked the PA28(1) [pilot] to confirm their position as now being on the deadside, which was confirmed by the pilot. Five seconds later, on the Approach frequency, the PA28 [pilot] reported in the crosswind position. Having missed the callsign of the PA28, the Approach controller asked the aircraft calling to repeat their call, but there was no response. At **1333:05** the Approach controller asked the PA28 [pilot] to report their range (Figure 6).



Figure 5 – 1332:24

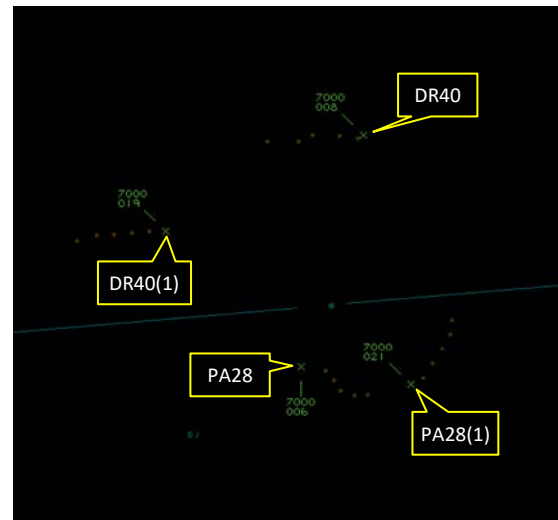


Figure 6 – 1333:05

The PA28 pilot reported “*in your overhead and turning into the downwind for 27*”. The Approach controller replied “*you were asked to report at 5 miles, I need to transfer to Tower, they’ve got other traffic. Keep a good lookout, there’s traffic in the circuit – contact Tower (freq)*”. The pilot replied “*er keep a good look-out. We were already in the circuit.*”

Having previously reported downwind at **1332:48** on the Tower frequency, the DR40 pilot had been advised by the Tower controller that they were Number 1 and had been instructed to report final. Then a further departing aircraft was cleared for take-off, having received Traffic Information on the two PA28s, reported as descending on the deadside. At **1333:20** the Tower controller asked the DR40(1) [pilot] if they were crosswind. The pilot replied, “*negative, we’re just in the overhead on the live side, shortly to turn deadside*”.

Note: At this point the R44 was observed on the Area Radar replay to be airborne in the helicopter circuit and to the north of the PA28.

The Tower controller advised the DR40(1) pilot that there was a PA28 descending on the deadside and instructed them to also report descending on the deadside. The pilot of the DR40(1) reported being visual with that traffic. At **1333:40** the pilot of the PA28 made their first call on the Tower frequency with their abbreviated callsign only; “*downwind now for 27*” (Figure 7). The Tower controller advised them that they were Number 2 and to follow the DR40 turning base. The PA28 pilot reported having that traffic in sight. At **1334:15** DR40(1) [pilot] reported descending deadside, adding that there was glider activity in the overhead at 3000ft (Figure 8).

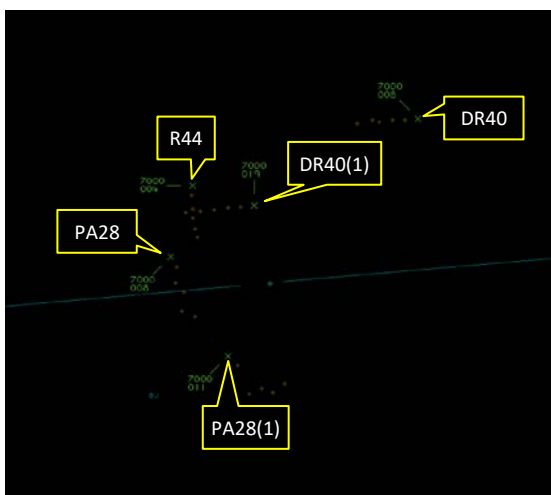


Figure 7 – 1333:40

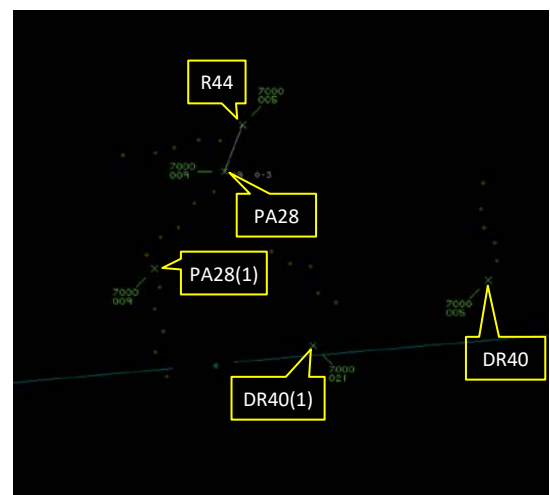


Figure 8 – 1334:15

At **1334:37** the pilot of the R44 in the helicopter circuit asked; *“can I take the er height of that one above us in the er circuit?”*. CPA occurred at **1334:38** with the aircraft separated by less than 0.1NM laterally and 400ft vertically (Figure 9). At **1334:54** the Tower controller requested the PA28’s level which was reported as 800ft. The Tower controller reminded them that the fixed-wing circuit level was 1000ft and the helicopter circuit *“not above 750 QFE”*.

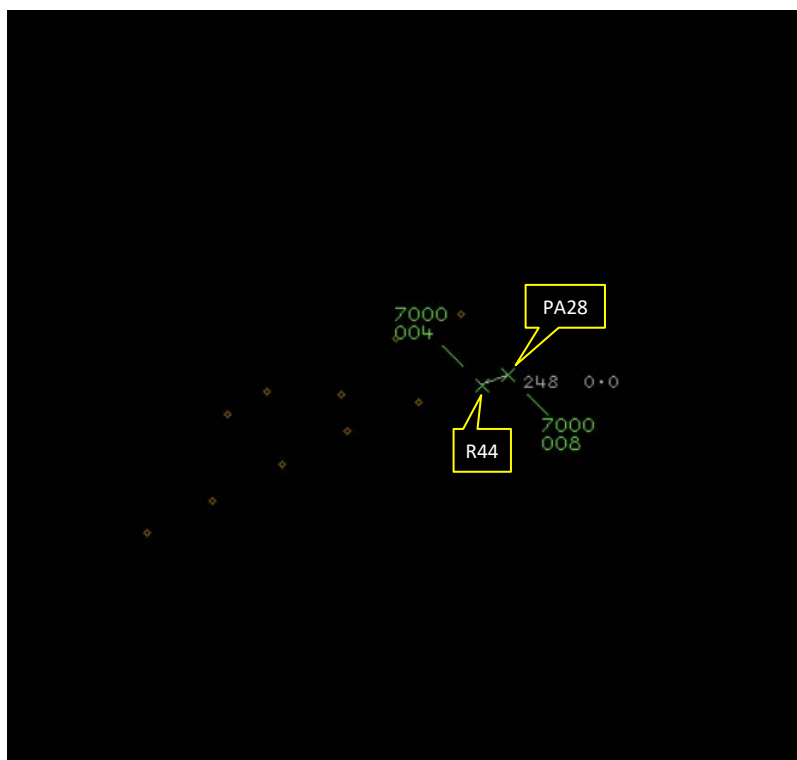


Figure 9 – 1334:38 – Radar CPA

The Gloucestershire Tower controller was providing an Aerodrome Control Service and the Gloucestershire Approach controller was providing an Approach Control Service or Basic Service. Both controllers are co-located in the Gloucestershire tower, with the Approach controller sitting to the right of, and at right-angles to, the Tower controller, facing up the RW27 final approach. There is a primary radar available for use as an ATM in the tower.

According to the unit MATS Pt 2, the standard join for fixed-wing aircraft is via the overhead, although direct downwind joins can be accommodated. [Pilots] are expected to have established communications with Gloucestershire ATC at least 5 minutes before their ETA for the overhead and no closer than 5 miles. The preferential circuit direction for RW27 is right-hand for noise abatement. Fixed-wing circuits are to be flown at 1000ft QFE, based on the RW27 threshold QFE. Helicopter circuits are flown parallel to, and inside, the fixed-wing circuit, to a maximum level of 750ft, again based on that threshold QFE. Helicopter circuits are flown autonomously with no calls being made, and pilots maintaining a listening watch on the Tower frequency.

Whilst there were a number of issues relating to the integration of the PA28, the Airprox between the R44 and the PA28 appears to have occurred due to the low level of the PA28 in the circuit. Both a readback made by the pilot of the PA28 at **1327:06** in response to the Approach controller’s instruction to route to the overhead to join; *“roger that, standard overhead left, otherwise right, currently about five miles to the west of you”*, and then the initial pattern and descent profile flown by the pilot, appear to suggest that the pilot might have been disorientated, and initially positioning for a different runway, in this instance downwind right-hand for RW09. This thinking was further reinforced by the pilot reporting crosswind after they had just crossed the approach lane for RW27 and were deadside, and again when the aircraft was observed as descending to as low as an indicated height of 600ft when south of the climb-out lane for RW27. It was then observed to have

climbed to 800ft as it flew through the RW27 climb-out lane, possibly as a result of the pilot realising their error.

When the first Approach controller passed relevant Traffic Information to the departing PA18 pilot, they omitted information on the position of the PA28. When the PA28 pilot responded to a subsequent request for a position report that they were 5 miles west, the Approach controller did not acknowledge this report. After the change of Approach controller, the second Approach controller asked the PA28 pilot for a position report and the pilot responded that they were in the overhead. The response from the controller would indicate that they were taken aback by this and immediately transferred the pilot to the Tower frequency. This may indicate that neither of the Approach controllers had fully assimilated the position of the PA28 until after it was in the overhead.

Prior to the PA28 [pilot] arriving on the Tower frequency and the Tower controller being aware of the presence of the PA28 in the circuit, they had twice queried the position of the PA28(1). It may be that the controller had the PA28 in sight and not the PA28(1) and was having difficulty correlating what they could see with the position reports being provided by the PA28(1) pilot.

The opportunity for the Tower controller to spot and rectify the lower-than-normal circuit level and positioning of the PA28 may have been lost due to the very late transfer of control of the PA28 from the Approach frequency. The Approach controller had entered into a conversation with a transit helicopter at a time when other aircraft were inbound to the airfield, and this may have distracted them. The pilots of at least 3 aircraft, including the PA28, received delayed joining instructions as a result of this conversation and a subsequent controller changeover. As such, the PA28 [pilot] entered the airfield overhead whilst still on the Approach frequency. It is not mentioned in the unit investigation report what coordination was taking place between the Approach and Tower controllers, nor the contents of the handover between the two Approach controllers. The presence of the second PA28(1) may have further compounded both Tower and Approach controllers' confusion as to which aircraft was which.

According to the unit MATS Pt 2 transfer of an inbound VFR flight for:

*a) Overhead joins and standard helicopter arrivals should be transferred to ADC when 'field in sight' and prior to ATZ entry, but at not more than 3 NM.*

According to the MATS Pt 2, the Approach controller is responsible for, amongst other things:

- b) Ensure that arrivals are spaced to allow not more than two aircraft to enter the overhead simultaneously. Additional joining flights should be staggered, integrated for direct joins or held off as necessary;*
- c) Advise ADC of the number and tracks of pending overhead joins;*
- d) Co-ordinate 'direct' joins as appropriate, when requested by pilots or when direct integration may be operationally advantageous;*
- e) Advise joining aircraft of the activity of fixed-wing/helicopter circuits prior to transfer to ADC;*

The pilot of the R44 who was instructing an experienced fixed-wing pilot reported having been in the circuit for a while, and their first indication that another aircraft was in their vicinity was seeing a shadow on the ground. The student pilot spotted the PA28 in their 5 o'clock position and the instructor, having already taken control, made a descending turn to the left, estimating the PA28 to be 150ft above them. The pilot of the PA28 reported that they were aware of the helicopter circuit being active but did not see the R44. Their passenger reported seeing a helicopter apparently departing to the north whilst they were in the crosswind position. The report filed by Gloucestershire ATC stated that during the whole of this period both Tower and Approach controllers were trying to identify one of the aircraft in the overhead.

The Gloucestershire ATC unit investigation was filed by email to UKAB. It highlighted the delayed transfer of the PA28 due to other aircraft calls and the controller changeover. The report went on to state that circuit heights at Gloucestershire have been reviewed in the past, a safety bulletin has been sent to all operators reminding them of the importance of maintaining the correct circuit height, and that they are willing to engage further with the operators to review the issue.



## Conclusion

The pilot of the PA28 flew their circuit below the promulgated level, bringing them into much closer proximity to the R44 than would normally be expected by the pilot of the R44.

The sequencing and late transfer of the PA28 from Approach to Tower reduced the Tower controller's ability to correlate the positions of aircraft in the circuit, and their associated flight progress strips, with the positions of the aircraft as seen from the window.

Gloucestershire ATC is reminded of its obligations under Regulation (EU) 376/2014 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, Article 4, paragraphs 6(d) and 7, to submit a mandatory occurrence report, within 72 hours of when they are first made aware of an occurrence, and to conduct an analysis of the occurrence, in order to identify any safety hazards, followed by submission of follow up reports, in accordance with the 30 day and 3 month timescales contained in Article 11 of the regulation.

## UKAB Secretariat

The R44 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.<sup>1</sup> An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation.<sup>2</sup>

## Summary

An Airprox was reported when an R44 and a PA28 flew into proximity in the Gloucestershire visual circuit at 1335Z on Tuesday 20<sup>th</sup> July 2021. Both pilots were operating under VFR in VMC and both pilots were in receipt of an ACS from Gloucester Tower.

## **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 a report from the appropriate 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.

The Board first considered the actions of the R44 pilot and members noted that, at Gloucester, helicopter circuits are conducted without RT. The Board understood the rationale for reducing the number of calls made in 2 overlapping circuits, but observed that the lack of positional calls from pilots in the rotary-wing circuit could deny situational awareness to pilots in the fixed-wing circuit. In this instance, however, it was clear to the Board that the R44 pilot had not had any situational awareness of the presence of the PA28 (**CF8**) because the first that they knew of its position was when they sighted the shadow on the ground. The Board noted that the R44 instructor's view to the rear and right of the aircraft had been hindered by the aircraft's structure (**CF10**), albeit they would have been expecting fixed-wing aircraft to be out to their left, and agreed that this had led to the R44 pilot becoming concerned by the perceived proximity of the PA28 (**CF11**).

Turning to the actions of the PA28 pilot, the Board heard from a GA pilot member that the published circuit joining procedures<sup>3</sup> are, in their view, very well written and describe in detail what is expected of pilots and what pilots can expect from ATC. The Board noted that the PA28 pilot had been speaking to the Approach controller and was waiting to be transferred to the Tower frequency as they approached the overhead of the airfield. Noting that the Approach controller was quite busy at the time, some pilot members wondered why the PA28 pilot did not change to the Tower frequency as they joined through the overhead, whilst controller members considered that the PA28 pilot had been correct in not

<sup>1</sup> (UK) SERA.3205 Proximity.

<sup>2</sup> (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome.

<sup>3</sup> <https://www.gloucestershireairport.co.uk/wp-content/uploads/2016/05/Guide-to-Flying.pdf>

changing frequency until instructed to do so by the Approach controller (although they agreed that the PA28 pilot might have been better served by prompting the controller for a frequency change prior to arrival in the overhead). The Board agreed that the PA28 pilot's entry into the visual circuit whilst still on the Approach frequency had been contributory to the Airprox (**CF7**). There then followed a lengthy discussion regarding the PA28 pilot's height-keeping in the circuit. It was clear to the Board that the PA28 pilot had been conscious of the importance of maintaining an accurate circuit height due to the possible conflicts with helicopter traffic in the rotary-wing circuit below. The Board noted that the PA28 pilot's height – taken from their Mode C readout – had reached as low as 700ft aal at one point, but that their height had been steady at 900ft aal in the minute leading up to the Airprox. Therefore, the Board considered that the PA28 pilot's height-keeping in the fixed-wing circuit had not been a contributory factor in this Airprox. However, the Board wished to highlight that the height-keeping requirements for PPL and CPL holders is  $\pm 150$ ft, so it is possible that a fixed-wing pilot could be flying 100-150ft low while a rotary-wing pilot could be flying 100-150ft high; with only 250ft separating the fixed-wing and rotary-wing circuits at Gloucester, the Board felt that the local procedures for the separation of these circuits had been contributory to this Airprox (**CF6**). Members recalled another Airprox at Gloucester (Airprox number 2019192) which led to the Board making a safety Recommendation that '*Gloucester considers reviewing fixed-wing and rotary-wing circuit separation.*' It was noted that this Recommendation had been partially accepted, pending the outcome of an application for development of the north side of the airfield. Whilst the Board was unaware of the status of this potential development, members noted that, in the interim, Gloucester Airport had issued an advisory notice to pilots regarding the importance of height-keeping in the visual circuit. The Board judged that, considering the tolerances for PPL and CPL holders' height-keeping, this reliance of pilots flying an accurate height in the circuit (to more stringent requirements than their license demands) did not provide adequate mitigation against loss of separation. However, given that a Safety Recommendation had already been made in this regard, the Board stopped short of re-issuing a Recommendation but wished to encourage Gloucester Airport to revisit their circuit procedures in light of the north-side development. Returning to the specifics of this Airprox, the Board noted that the PA28 pilot had been passed information that the rotary-wing circuit had been active but, with helicopters operating without RT when in the circuit, the PA28 pilots situational awareness regarding the position of the R44 had only been generic (**CF8**). This had left the PA28 pilot relying on the see and avoid barrier for the detection of possible conflicts and members agreed that the PA28 pilot had not sighted the R44 in the circuit below them (**CF9**).

The Board then considered the actions of the Gloucester Approach and Tower controllers and noted that a handover of Approach controllers had been taking place as the PA28 pilot had been approaching the overhead of the airfield. The Board agreed that this had probably led the Approach controller to become distracted (**CF4**) and, although the PA28 pilot had made the requested 5NM radio call, this had not been acknowledged by the Approach controller. Therefore, the PA28 pilot had not been transferred to the Tower frequency at the prescribed distance from the airfield (**CF1**) and the Board felt that the timing of the Approach controller handover had been at an inopportune moment and had been contributory to the Airprox (**CF2**). Furthermore, the Board concluded that the late transfer of the PA28 pilot to the Tower frequency had, in turn, hampered the Tower controller's situational awareness regarding the position of the Airprox PA28 (**CF5**) because they had had a PA28 in sight but the positional calls from the other PA28 pilot (PA28(1)) – who had already been on the Tower frequency – had not equated to what the Tower controller could see in the visual circuit. Consequently, members agreed that the Tower controller had not detected the possible conflict between the R44 and the PA28 (**CF3**).

Finally, the Board considered the risk involved in this Airprox. Members noted that the R44 pilot had assessed the vertical separation to be in the order of 100ft but that the radar data had shown a vertical separation of 400ft. Notwithstanding the PA28 pilot had been flying slightly below the promulgated fixed-wing circuit height, the Board agreed that this had been within the parameters required for a PPL holder and, in any case, the R44 pilot had also been flying lower than the maximum height for the rotary-wing circuit. Therefore, the Board agreed that, although safety had been degraded, there had been no risk of collision. Accordingly, the Board assigned a Risk Category C to this event.

**PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK****Contributory Factors:**

	2021123			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Ground Elements</b>				
<b>• Regulations, Processes, Procedures and Compliance</b>				
1	Human Factors	• ATM Regulatory Deviation	An event involving a deviation from an Air Traffic Management Regulation.	Regulations and/or procedures not fully complied with
<b>• Manning and Equipment</b>				
2	Organisational	• ATM Staffing and Scheduling	An event related to the planning and scheduling of ATM personnel	
<b>• Situational Awareness and Action</b>				
3	Human Factors	• Conflict Detection - Not Detected	An event involving Air Navigation Services conflict not being detected.	
4	Human Factors	• Task Monitoring	Events involving an individual or a crew/ team not appropriately monitoring their performance of a task	Controller engaged in other tasks
5	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late or no Situational Awareness
<b>Flight Elements</b>				
<b>• Regulations, Processes, Procedures and Compliance</b>				
6	Organisational	• Flight Operations Documentation and Publications	Flight Operations Documentation and Publications	Inadequate regulations or procedures
<b>• Tactical Planning and Execution</b>				
7	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
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>				
8	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
<b>• See and Avoid</b>				
9	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
10	Human Factors	• Perception of Visual Information	Events involving flight crew incorrectly perceiving a situation visually and then taking the wrong course of action or path of movement	Pilot was concerned by the proximity of the other aircraft
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

**Safety Barrier Assessment<sup>4</sup>**

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

**Ground Elements:**

**Regulations, Processes, Procedures and Compliance** were assessed as **partially effective** because the Gloster Approach controller did not transfer the PA28 pilot to the Tower controller in time for the Tower controller to assimilate the position of the PA28.

<sup>4</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

**Manning and Equipment** were assessed as **partially effective** because the Gloster Approach controller handed over to a new Approach controller as the PA28 was joining the visual circuit.

**Situational Awareness of the Confliction and Action** were assessed as **ineffective** because the Gloster Tower controller only had generic situational awareness of the position of the PA28 joining the circuit and did not detect the conflict between the joining PA28 and the R44 established in the helicopter circuit.

**Flight Elements:**

**Regulations, Processes, Procedures and Compliance** were assessed as **partially effective** because the promulgated fixed-wing and rotary-wing circuit heights at Gloucester do not afford sufficient vertical separation between circuits for pilots flying within normal PPL and CPL height-keeping requirements.

**Tactical Planning and Execution** was assessed as **partially effective** because the PA28 pilot entered the visual circuit at Gloucester while still on the Approach frequency.

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **partially effective** because the R44 pilot did not have any situational awareness of the joining PA28 and the PA28 pilot only had generic situational awareness that the helicopter circuit was active.

**See and Avoid** were assessed as **partially effective** because the R44 instructor's view of the area from which the PA28 was approaching was hindered by the R44's canopy arch and the PA28 pilot was flying a tighter and lower downwind leg that the R44 pilot was expecting.

Airprox Barrier Assessment: 2021123		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	⚠	⚠					
<b>Key:</b>			Full	Partial	None	Not Present/Not Assessable	Not Used	
Provision	✓	⚠	✗	⊖				
Application	✓	⚠	✗	⊖		⊖		
Effectiveness	■	■	■	■		□		