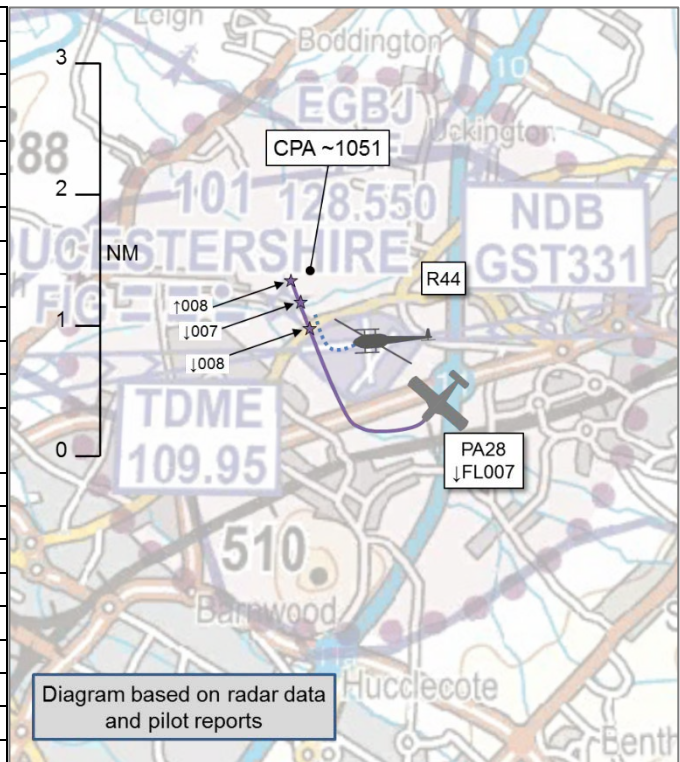


**AIRPROX REPORT No 2019192**

Date: 09 Jul 2019 Time: 1050Z Position: 5153N 00210W Location: Gloucestershire Airport

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	R44	PA28
Operator	Civ Helo	Civ FW
Airspace	Gloucestershire ATZ	Gloucestershire ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Gloster	Gloster
Altitude/FL		
Transponder	A, C, S	A, C
<b>Reported</b>		
Colours	Black	Red, White
Lighting	Strobes	Strobes, Nav, Landing
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	650ft	1000ft
Altimeter	QNH (1018hPa)	QFE
Heading	360°	360°
Speed	65kt	90kt
ACAS/TAS	Not fitted	Not fitted
<b>Separation</b>		
Reported	150ft V	Not seen
Recorded	NK	



**THE R44 PILOT** reports that he was conducting a PPL circuit-training flight using RW27R. They climbed into the crosswind leg, having just passed the golf course, and were passing through 650ft for 750ft when he noticed an aeroplane overtaking them at about 800ft. He immediately stopped his climb, let the aeroplane go ahead and then, after making a more accurate assessment of its height and checking their own pressure setting, reported it to the Tower. The Tower controller acknowledged with a ‘Roger’, but didn’t pass any further transmissions to the aeroplane, he then called the Tower again to inform them that he would be declaring an Airprox. Once on the ground he called ATC and was told the other aircraft was performing an overhead join for the fixed-wing circuit at 1000ft. The helicopter circuit is 750ft and he opined that fixed-wing aircraft below 1000ft was a constant problem at Gloucester, noting that the helicopters taking off cannot easily see fixed-wing aircraft joining from the south (deadside), causing a rapidly closing conflict. The area around the golf course was a particular hot-spot with helicopters climbing out often unaware of aircraft joining above, therefore they are completely reliant on the aircraft being at the correct level. To reduce the risk over the last year the helicopter training school had reduced circuit height to 600ft; however, certain exercises warrant 750ft.

The pilot assessed the risk of collision as ‘High’.

**THE PA28 PILOT** reports that he was flying a standard overhead join with a basic student who was in the early stages of his course. The student was flying but, as it was his first attempt at an overhead join, the instructor was helping with the geometry of the pattern and operating the radio. He was aware of a helicopter taking off from ‘Heli North.’ Usually at Gloucester, helicopters and fixed-wing aircraft are separated by track and altitude but, there being no set circuit pattern, sometimes the track is close. There is one part of the circuit when this is more likely than others and that is on the crosswind leg of an overhead join. He is very aware of this and is particular in emphasizing that the student maintains 1000ft on this leg. There will, of course, be fluctuations in height control with any student but in this case it was well within PPL limits and corrected promptly, so he made no comments. He believed that

the Airprox happened during the crosswind leg and had been informed that Gloucester ATC have since associated his aircraft with it, but at no stage was he informed of the proximity of another aircraft. He did not see the helicopter at any time, nor apparently did the helicopter pilot see the PA28 until he flew over it. He understood the other pilot's concern at seeing the PA28 for the first time within a few hundred feet on a similar track and endorsed his decision to file an Airprox; however, he did not consider there was any danger of a collision.

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

**THE GLOSTER CONTROLLER** reports that the R44 was operating a standard helicopter circuit on RW27 at 750ft when he reported that a Cherokee on the downwind leg was too low, reported at 800ft. The circuit height for fixed-wing aircraft is 1000ft. The PA28 made no height adjustment and shortly afterwards the R44 pilot advised that he would be filing an Airprox.

## Factual Background

The weather at Gloucestershire was recorded as follows:

METAR EGBJ 091050Z 35002KT 9999 FEW045 21/15 Q1021=

## Analysis and Investigation

### CAA ATSI

RW27 was in use at Gloucester, promulgated as a standard right-hand circuit pattern. The R44 pilot had just departed and was climbing through 650ft for the promulgated circuit height of 750ft QFE, on the crosswind leg, for the helicopter right-hand visual circuit RW27. The PA28 instructor was returning to the aerodrome from the north, with a student pilot flying their first attempt at an overhead join for the fixed-wing right-hand visual circuit RW27, which has a promulgated height of 1000ft QFE. The Gloster controller was providing a combined Aerodrome and Approach Non-Radar Service at the time of the Airprox. All control instructions were readback accurately by the pilots of both aircraft throughout the event.

At 1045:00, the PA28 student pilot reported 4nm north of the airfield and requested re-join. The pilot was cleared for a standard overhead join for RW27 right-hand, QFE 1018 and was instructed to report 3nm.

At 1047:40, the PA28 instructor reported 3nm to run and was instructed to descend on the deaside and report downwind.

At 1048:40, the R44 pilot requested circuits. The pilot was cleared for standard helicopter circuits based on RW27 right-hand and was cleared for take-off.

The Airprox occurred at approximately 10:50.54 (Figure 1). Only the PA28 was displayed on the Area Radar recording at this time and can be seen in the crosswind position indicating FL007. The QNH was 1022hPa, a difference of +9hPa from the SPS of 1013hPa. Applying a conversion from SPS to QNH ( $9 \times 27\text{ft} = 243\text{ft}$ ) results in the aircraft being at an altitude of 943 feet. The Aerodrome elevation at Gloucester is promulgated in the UK AIP as 101 feet resulting in a height of approximately 842ft QFE.

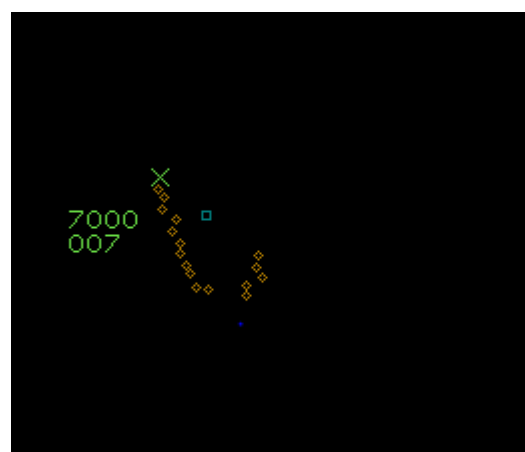


Figure 1 - 10:50.54

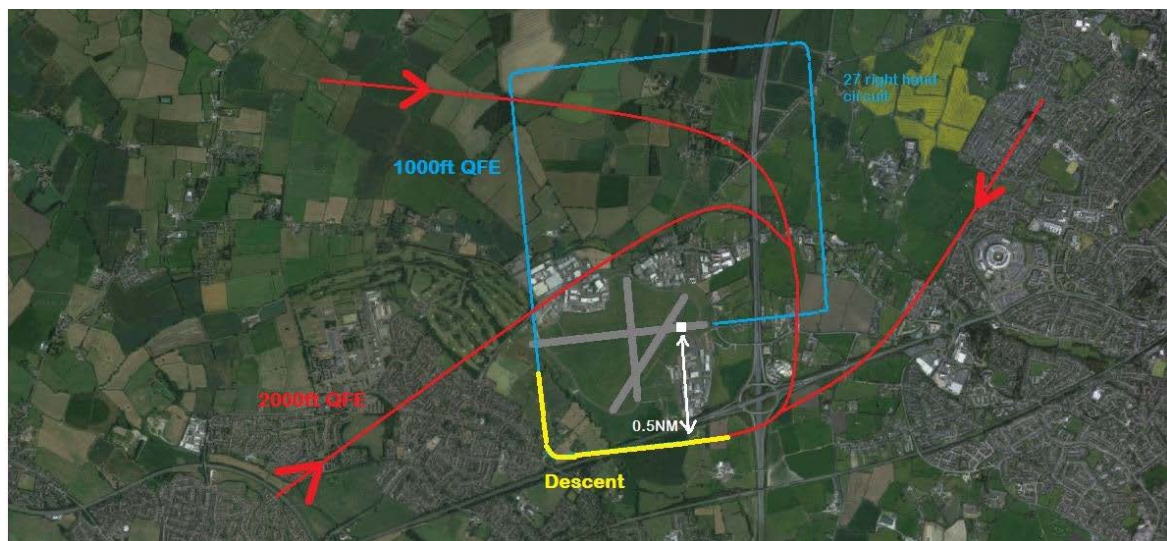
At 1051:20, the PA28 instructor reported downwind to land and was instructed to report final.

At 1051:30, the R44 pilot advised the controller that the fixed wing aircraft ahead of them was at 800 feet. The controller acknowledged.

At 1052:00, the R44 pilot advised the controller that they would be filing an Airprox and asked the controller to obtain the details of the other aircraft.

Below is a diagram taken from the Gloucester Guide-to-Flying document:

*The picture below shows three typical overhead joining profiles for a right-hand circuit on Runway 27. The blue circuit phase is simply indicative, its shape and size will depend on other traffic:*



Relevant extracts from CAP 493 (Aerodrome Control) are:

#### 7. Information to Aircraft

##### 7A. Traffic Information and Instructions

7A.1 Traffic information and instructions shall be passed to aircraft on any occasion that a controller considers it necessary in the interests of safety, or when requested by a pilot. Aerodrome Control shall provide:

generic traffic information to enable VFR pilots to safely integrate their flight with other aircraft;  
specific traffic information appropriate to the stage of flight and risk of collision;

timely instructions as necessary to prevent collisions and to enable safe, orderly and expeditious flight within and in the vicinity of the ATZ.

7A.2 MATS Part 2 shall detail local procedures for the integration of aircraft in the vicinity of the Aerodrome.

##### 18A. Joining Circuit

18A.2 Aircraft may be cleared to position overhead the aerodrome for a standard overhead join. In these circumstances the aircraft will report overhead at 2,000 feet above aerodrome elevation, subject to remaining in VMC; and, when cleared to descend will route to the dead side of the circuit descending to circuit height. The aircraft will then cross the upwind end of the runway in use at circuit height, then position accordingly into the existing traffic pattern to report downwind. Any variance on this procedure must be notified in MATS Part 2 and the phraseology "standard overhead join" must not be used in such circumstances.

Relevant extracts from Gloucester MATS Part 2 are:

## 2.6 Re-join Procedures

2.6.1 The default re-join procedure for VFR traffic is the standard overhead join. Subject to co-ordination, a direct joining clearance may be issued to any point within the circuit. Details of co-ordination are contained within the Aerodrome Control and Approach Control sections of this document.

### 2.2.15 Information to Circuit Aircraft

ADC must advise all arriving traffic and departures joining the circuit of the number of aircraft in and joining the fixed wing and heli circuits. Additional position information may be passed as required to assist pilots.

The Airprox occurred in Class G airspace, in the visual circuit at Gloucester with both pilots receiving an Aerodrome Control Service from Gloucester ATC. The PA28 pilot had been cleared to carry out a standard overhead join, from the north, for the promulgated right-hand fixed wing visual circuit RW27. The fixed wing circuit has a promulgated height of 1000ft QFE. The R44 pilot had been cleared to carry out a standard right-hand helicopter visual circuit for RW27. The helicopter circuit has a promulgated height of 750ft QFE. The R44 did not display on the Area radar recording until after the event (10:53.00) and, as such, CPA could not be measured. Neither of the pilots had received Traffic Information on each other at any point prior to the Airprox occurring.

## 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 1050hrs on Tuesday 9<sup>th</sup> July 2019. Both pilots were operating under VFR in VMC, both in receipt of an ACS from Gloster 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 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 R44 pilot. He had been given permission to take-off and climb into the helicopter circuit but, on climbing crosswind, was overtaken by the PA28 which he perceived to be at 800ft. Noting that he hadn't been given any Traffic Information by ATC (**CF7**) and that he had commented that it was difficult to see aircraft joining the fixed-wing circuit at that particular point (**CF11**), the Board felt that there was little he could have done about the situation and would have every expectation that joining aircraft would integrate and avoid him. That being said, some members wondered whether, assuming that he had been on the same frequency at the time, he might have been able to have gained some situational awareness from the PA28 pilot's calls that an aircraft was conducting an overhead join. Given that he was clearly attuned to the crosswind confliction problem, this may have at least prompted him to seek further information from ATC, or perhaps to delay his take-off until he was sure of where the PA28 was. Helicopter members with experience of Gloucestershire agreed that the two circuits became very adjacent to each other at points, and that safe separation critically relied upon pilots flying accurate heights in the circuit. Ultimately, given the geometry of the

<sup>1</sup> SERA.3205 Proximity.

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

PA28 as it overtook from behind, the R44 pilot did not see it until CPA and was therefore not able to take any avoiding action (**CF12**).

For his part, the PA28 pilot was joining the fixed-wing circuit from an overhead join but he also did not receive any Traffic Information from ATC about the R44 in the heli-circuit (**CF7**). Again, members wondered whether the instructor should have assimilated the radio call from the R44 when it was given clearance to take-off (**CF8**), and therefore might have foreseen the potential conflict and so made sure his student maintained the correct circuit height (**CF9**). A discussion then followed about what was the acceptable height tolerance for a PPL student and members were informed that it was considered acceptable for a student to be +/-150ft of target height. Despite this, members thought that, knowing as he did that the fixed-wing circuit became adjacent to the helicopter circuit at this point, the instructor should have ensured the student maintained not below the correct circuit height as they flew crosswind (**CF5, CF6**) because, in this case, it was for him, as the joining aircraft, to integrate with the other circuit traffic (**CF10**).

Turning to the role of ATC, the Board thought that the controller should have done more to ensure that both pilots were aware of each other. He knew about both aircraft, but did not provide Traffic Information to either pilot (**CF2, CF4**). Notwithstanding that the PA28 was slightly low in the fixed-wing circuit, the Board felt that the controller should also have been aware of the potential confliction crosswind and they opined that he should have been more cognisant of the need to monitor both aircraft at that point; as it was, he wasn't aware that the confliction had occurred until the R44 pilot reported it (**CF3**).

There then followed a lengthy discussion about the circuit procedures at Gloucestershire. Noting that the circuit is extremely complex with many aircraft types and procedures, members commented that the Pooleys entry evidenced the particularly busy nature of the airfield, and some thought that perhaps Gloucestershire was in danger of trying to achieve too much. Given that the helicopter and fixed-wing circuits had the potential to conflict at various points with only a notional 250ft vertical separation, they thought that the current procedures were at risk of exacerbating the problem (**CF1**); it only took one PPL student to be 150ft high and the other to be 150ft low to generate a serious risk of collision. Some members wondered whether Gloucestershire would be better placed having helicopter circuits in the opposite direction to the fixed-wing circuit, and others wondered whether it would be better to raise the fixed-wing circuit to 1200ft. However, without the full knowledge of local procedures or noise abatement requirements it was not for members to offer solutions, instead the Board resolved to recommend that Gloucester consider reviewing fixed-wing and rotary-wing circuit separation.

Finally, in assessing the risk, the Board noted that it had been entirely providential that the R44 pilot had yet to reach his target height of 750ft when the PA28 flew overhead at the calculated height of 840ft, and that the PA28 pilot never saw the R44. As a result, some members thought that the risk should be assessed as Category A to reflect the fact that luck had played a major part. Others noted that, assuming the R44 pilot had stopped his climb at 750ft, there would have been a minimum of about 90-100ft vertical separation and so, whilst acknowledging that safety had been much reduced below the norm, they opined that this had not reflected a situation which had stopped just short of a collision. The debate ebbed and flowed and, in the end, the Chair called a vote from which the latter view prevailed. Accordingly, the risk was assessed as Category B.



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

	2019192		
CF	Factor	Description	Amplification
	<b>Ground Elements</b>		
	<b>• Regulations, Processes, Procedures and Compliance</b>		
1	Organisational	• Organisational Documentation and Publications	Inadequate regulations or procedures
2	Human Factors	• ATM Regulatory Deviation	Regulations and/or procedures not complied with
	<b>• Situational Awareness and Action</b>		
3	Human Factors	• Conflict Detection - Not Detected	
4	Human Factors	• Traffic Management Information Provision	Not provided, inaccurate, inadequate, or late
	<b>Flight Elements</b>		
	<b>• Regulations, Processes, Procedures and Compliance</b>		
5	Human Factors	• Flight Crew ATM Procedure Deviation	Regulations/procedures not complied with
	<b>• Tactical Planning and Execution</b>		
6	Human Factors	• Action Performed Incorrectly	Incorrect or ineffective execution
	<b>• Situational Awareness of the Conflicting Aircraft and Action</b>		
7	Contextual	• Situational Awareness and Sensory Events	Generic, late, no or incorrect Situational Awareness
8	Human Factors	• Understanding/Comprehension	Pilot did not assimilate conflict information
9	Human Factors	• Mentoring	Sub-Optimal
10	Human Factors	• Monitoring of Other Aircraft	Pilot did not sufficiently integrate with the other aircraft
	<b>• See and Avoid</b>		
11	Contextual	• Poor Visibility Encounter	One or both aircraft were obscured from the other
12	Human Factors	• Monitoring of Other Aircraft	Non-sighting or effectively a non-sighting by one or both pilots

**Degree of Risk:** B

**Recommendation:** Gloucester considers reviewing fixed-wing and rotary-wing circuit separation.

**Safety Barrier Assessment<sup>3</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 **ineffective** because the controller did not give Traffic Information to either pilot.

**Situational Awareness of the Confliction and Action** were assessed as **ineffective** because the controller did not know that the PA28 was low in the fixed-wing circuit.

<sup>3</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

**Flight Elements:**

**Regulations, Processes, Procedures and Compliance** were assessed as **partially effective** because the PA28 dipped below the fixed-wing circuit height.

**Tactical Planning and Execution** was assessed as **partially effective** because the PA28 instructor should have been more alive to the potential for conflict and ensured that his student did not fly below the standard circuit height.

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **ineffective** because neither pilot received any Traffic Information, and neither assimilated the RT calls of the other.

**See and Avoid** were assessed as **ineffective** because neither pilot saw the other in time to take effective avoiding action.

Airprox Barrier Assessment: 2019192		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 Conflicting Aircraft & 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 Used			
Provision	✓	⚠	✗	○				
Application	✓	⚠	✗	○	○			
Effectiveness	■	■	■	■	□			