

AIRPROX REPORT No 2022083

Date: 12 May 2022 Time: 1225Z Position: 5204N 00032W Location: 3NM E Cranfield airfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Arcus	PA31
Operator	Civ Gld	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Listening Out	Basic
Provider	(Cranfield App)	Luton Radar
Altitude/FL	3410ft	3280ft
Transponder	Off	A, C, S
Reported		
Colours	White	White, Blue
Lighting	Nil	Nav, Strobes Landing/Taxi
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	3000ft	3000ft
Altimeter	QNH (~1016hPa)	QNH (NK hPa)
Heading	230°	350°
Speed	80kt	150kt
ACAS/TAS	PowerFLARM	TAS
Alert	None	None
Separation at CPA		
Reported	5ft V/50m H	200ft V/500m H
Recorded	130ft V/0.1NM H	



THE ARCUS PILOT reports that they were P2 in the back seat and working 'heads down' getting a range and bearing from Cranfield with a view to reporting an updated position. They were looking up regularly to see if the known traffic [which was] about to report beacon outbound was in sight, and spotted the twin. They called the possible conflict to P1 and tried to describe the relative position so they could avoid, it was taking time for them to acquire it so they took control and called "I have control" while rolling right at maximum rate to pass behind. They completed a 90° turn in about 5sec and the twin passed through the position they would have been if avoiding action had not been taken. The radius of turn for their glider is about 80-100m and that would be the probable separation distance, certainly not less than 50m. Their batteries cannot power the navigation equipment, radio and transponder for the duration of a normal flight so the transponder is used only in areas where other traffic might be on the approach i.e. Oxford or transiting Class D airspace, and was off at the time. Their [EC equipment] had been upgraded over the winter to show transponder [equipped traffic] information but did not give a traffic warning on this occasion.

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

THE PA31 PILOT reports that they were on a line training sortie with a Training Captain, also sat in the front. The Training Captain spent most of the time as a lookout aided by TAS and [other EC equipment]. They had initially talked to Luton then changed to Cranfield to give them information on their job and location but also for them to hear Traffic Information. On completing the task they headed [northbound] back to [destination airfield] via the overhead of Cranfield to keep clear of their instrument approaches. They were aware of a lot of GA activity to the north and that gliders were out and about. Having initiated the descent, [their EC equipment] alerted them to a glider in the vicinity, somewhere in the 10 o'clock, below. Having completed a lookout before descending and with the extra information, no-one could see the glider. They stopped the descent and eventually spotted it as it passed behind. At that point [their

EC equipment] once again alerted to another glider. This one was spotted a little quicker as it was flying roughly parallel at the same height but slightly behind, putting them in another awkward position but yet again a very late spot. They cannot remember if they decided to change heading but they think they passed ahead again. They have no idea which glider pilot reported the Airprox and, since they weren't on frequency, they didn't know it had been reported. They didn't believe that it was an Airprox from their position since they had spotted them and flown clear of them. That said, they have no idea what the clearance distance was accurately. They watched to see if the glider pilot took avoiding action as they passed but they had no indication that they knew they were even there. The topic was discussed in the safety part of the after flight brief and, as a result, they are looking into the sensor operators having [EC equipment] as well to assist the front end with their lookout. They already fly as standard with a lookout pilot for these tasks as the workload is high.

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

THE CRANFIELD APPROACH CONTROLLER reports that [the Arcus pilot] reported on the Approach frequency at 1218 with a courtesy call informing Cranfield that they were at Bedford remaining east and clear of the approach. The APP ATCO gave the QNH, runway, circuit and approach Traffic Information. No service was requested and none was imposed. At 1227 [the Arcus pilot] queried whether a Navajo was working the Cranfield frequency, to which the response was negative and the glider pilot was informed no medium twin aircraft were reported to be in the vicinity at that level, although generic information was passed on a Navajo that had conducted survey work in the vicinity of Leighton Buzzard that morning. [The Arcus pilot] returned to the gliding frequency. The Flight Progress Strips showed that [the Arcus pilot] had made contact on the APP frequency but that no service had been applied. Both transit and Cranfield traffic Flight Progress Strips indicated that there were no aircraft that resembled a Navajo on frequency at the time. The APP ATCO remembered the glider pilot questioning the Navajo and that they had told them about the traffic that they had spoken to that morning. They had no recollection of any other traffic on frequency at the time that could have been the subject aircraft.

THE LUTON RADAR CONTROLLER contributed to the NATS investigation which is included in the report below.

Factual Background

The weather at Cranfield was recorded as follows:

METAR EGTC 121220Z 26012KT 9999 FEW048 15/05 Q1018

Analysis and Investigation

NATS Safety Investigations

An Arcus glider pilot reported an Airprox with a PA31 when they were 3NM south of Cranfield. The PA31 pilot was in receipt of a Basic Service from Luton Radar.

Information available to the investigation included:

- Pilot redacted report from [the Arcus pilot].
- Pilot redacted report from [the PA31 pilot].
- Radar and R/T recordings.

The pilot of [the Arcus] reported that they had departed [departure airfield] and at 1223, they were in communication with Cranfield on 122.850MHz but not in receipt of a service. Their reported altitude was 3000ft on 1016hPa.

The pilot of the PA31, reported that they had initially spoken with Cranfield and then with Luton Radar.

The pilot of [the PA31] contacted Luton (GW) approach frequency, 129.550MHz, at 1222:59 and requested a Basic Service. The Luton controller paused briefly then responded at 1223:11 and requested the pilot to say again their callsign.

Following confirmation, the Luton controller instructed [the PA31 pilot] to remain outside controlled airspace, to squawk 4673 and that the Luton QNH was 1018hPa. This was read back correctly by the pilot.

The Mode A changed from 7000 to 4673 on [the PA31] at 1223:30. There were no primary or secondary contacts observed near [the PA31] at this time. [The PA31] was 3.9NM north of Cranfield.

At 1223:52 the GW controller asked [the PA31 pilot] to pass their details. The pilot detailed “PA31, four persons on board.... Currently passing Cranfield, three thousand feet, one-zero-one-eight. requesting a Basic Service.” The GW controller advised [the PA31 pilot] that the service being provided was a Basic Service. This was acknowledged by the pilot who then advised that they wanted to climb to an altitude of 3300ft or 3400ft but they would like higher if it could be accommodated. The GW controller instructed [the PA31 pilot] to remain outside controlled airspace and to advise them when they required higher, but they had a few inbound to Luton at this time.

The GW controller then transmitted to other traffic including to a Luton inbound aircraft and another VFR aircraft that had transited the zone.

At 1225:20 the GW controller asked the pilot of [the PA31] to say again where they wished to operate. The pilot responded it was in the vicinity of [redacted] and another area (inaudible).

[The PA31 pilot] initiated a left turn and a primary contact was observed on radar to track southwest in close proximity at 1225:30 (See Figure 1) approximately 2.8NM east of Cranfield.



Figure 1

Referring to the pilot reports, Safety Investigations assessed the primary return to potentially be [the Arcus]. The pilot of [the Arcus] reported that the aircraft appeared on their right-hand side as they were tracking approximately 230°. This was the only visible radar interaction with [the PA31] near to Cranfield around the timings provided by the [Arcus] pilot.

[The Arcus pilot] reported that the Airprox occurred 3NM south of Cranfield and that the distance from first sighting was 45° starboard by about 500m. The pilot of [the Arcus] reported that minimum vertical separation was 5ft with minimum horizontal separation of 50m and assessed the risk of collision as high.

Note: The pilot report from [the PA31 pilot] detailed that the Airprox occurred following their task being completed and therefore the above confliction did not correspond with their report.

The GW controller had further discussions with [the PA31 pilot] that they would try to accommodate higher if they could and the pilot responded that they would try at their current altitude but would ask

for higher if they were struggling. The controller responded “*roger*” and then immediately spoke to an aircraft that had been co-ordinated by SVFR and then another inbound aircraft.

[The PA31 pilot] subsequently completed their task and the pilot advised Luton Radar at 1247:28 they were now routing direct back to [destination airfield] overhead Cranfield. [The PA31 pilot] changed Mode A to 7000 when 5.3NM east-southeast of Cranfield and the pilot advised they would contact [destination] next.

The pilot report from [The PA31 pilot] reported that they sighted a glider as they were returning after completing the task. A primary radar return crossed in the vicinity of [the PA31] at 1250:42 as they were 2NM north of Cranfield (Figure 2).



Figure 2

This interaction did not correlate with the geometry of the event as per the [Arcus] pilot’s report. Therefore, Safety Investigations assessed it more probable the previous interaction detailed in Figure 1 was the Airprox.

The pilot of [the Arcus] submitted an Airprox report with regards to a twin-engine aircraft that routed within proximity to them as they were operating in the vicinity of Cranfield at 3000ft.

The closest point of approach was determined to have occurred at 1225:30 and was measured as 0NM with no height information. The pilot report from [the Arcus] assessed the relative distance as approximately 5ft vertically and 50m laterally.

The incident was resolved by [the Arcus pilot] taking avoiding action in which they turned right at the aircraft’s maximum rate of turn, and they described the risk of collision as high.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and, although both aircraft were visible, there had been no altitude information available for the Arcus. However, both pilots were able to supply the UKAB Secretariat with GPS log files for their flights and, as these contained both lateral and vertical data, they have been used to measure the CPA.

The Arcus and PA31 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.¹ If the incident geometry is considered as converging then the PA31 pilot was required to give way to the Arcus.²

Comments

BGA

If the glider’s transponder had been switched on, it may have registered on either the PA31’s TAS or Luton’s radar, either of which could have warned the PA31 pilot of the impending conflict. Given recent rapid advances in rechargeable battery technology, owners of transponder-equipped gliders

¹ (UK) SERA.3205 Proximity.

² (UK) SERA.3210 Right-of-way (c)(2) Converging.

may wish to re-equip with higher-capacity batteries that allow them to run their transponders for longer in flight. Meanwhile, the Arcus' EC equipment should have been able to detect the PA31's transponder; it would be useful to understand why it did not.

Pilots are strongly recommended to contact aerodrome ATSU's before flying within 10NM of any aerodrome marked with instrument approach feathers. The PA31 crossed the Cranfield feathers just over a minute before CPA, and at about the same altitude as potential Cranfield IAP traffic. If the PA31 pilot had contacted Cranfield Approach beforehand, the PA31 and Arcus pilots would have had mutual SA which may have helped avert the conflict.

The PA31 pilot is to be commended for flying with landing lights switched on, which would have usefully increased its visual conspicuity from the glider pilot's perspective.

The Arcus P2 is to be commended for taking rapid, decisive action on sighting the PA31, including quickly taking control and making the appropriate radical manoeuvre to avert a collision.

Those in communication with an ATSU or listening out should make an initial report of an Airprox as soon as practicable by radio. They should prefix the message with the word 'Airprox'. Such initial reports act as an important trigger to allow the ATSU involved to preserve any information relevant to the incident, and for the controllers involved to note the circumstances of the incident for use in future investigations. (UK AIP ENR 1.14.3.2)

Summary

An Airprox was reported when an Arcus and a PA31 flew into proximity 3NM east of Cranfield airfield at 1225Z on Thursday 12th May 2022. Both pilots were operating under VFR in VMC, the PA31 pilot in receipt of a Basic Service from Luton Radar and the Arcus pilot not in receipt of an ATS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, GPS data files and reports from the air traffic controllers 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.

The Board first considered the actions of the Arcus pilot and members noted that, although the pilot had become visual with the PA31, this had been at a later than optimum time (**CF8**), by which point the required avoidance manoeuvre had become more severe. Members agreed that, prior to the point at which they had become visual, the Arcus pilot had not had any awareness of the presence of the PA31 (**CF5**) and also noted that, although an alert would have been expected, the EC equipment carried had given the Arcus pilot no indication of the presence of the PA31 (**CF7**). A discussion followed regarding the usage of transponders by glider pilots and members noted that the Arcus pilot reported that theirs had been turned off (**CF4**). It was agreed that this had been in accordance with regulation due to the limitations of the electrical power supply on the glider³ however, a glider pilot member stated that advances in battery technology now allow for increased use of transponders on gliders, and pilots should consider upgrading their batteries to facilitate this. Members had been encouraged that the Arcus pilot had contacted the Cranfield Approach controller to provide them with a position report; however, a gliding pilot member stated that for the same amount of effort, the Arcus pilot could have agreed a Basic Service, which would have been of added benefit to both the pilot and the controller.

Next, members considered the actions of the PA31 pilot and a GA pilot member stated that, as this flight had been both a line training sortie and an operational tasking, this would have been a busy flight, and members wondered whether the PA31 pilot may have been better served by requesting a Traffic Service from the Luton controller. Members also noted that the event occurred in close proximity to Cranfield airfield and its associated instrument approach procedures, and agreed it would have been appropriate for the PA31 pilot to have made contact with Cranfield (**CF3**), especially if they had had a

³ (UK) SERA.13001 paragraph (C).

second radio available. It was noted that the PA31 had been equipped with a TAS, however, as the transponder onboard the Arcus had been turned off, it had been rendered incompatible with the TAS (CF6). The Board discussed the glider sighting that the PA31 pilot had described and concluded that, because this had been on the northbound section of their route, this had been a different glider at a different stage of their sortie as the Airprox had occurred whilst they had been southbound. Members therefore agreed that the PA31 pilot had not had any awareness of the presence of the Arcus (CF5) and that they had not become visual with it at any point (CF9).

The Board then examined the involvement of the ground elements and quickly agreed that, as neither pilot had been in receipt of a service from the Cranfield Approach controller, there had been little that they could have done to prevent the Airprox. Members then considered the role of the Luton Approach controller and noted that, as the PA31 pilot had been in receipt of a Basic Service, the controller had not been required to monitor the flight (CF1). A civil ATC member noted that Luton Approach is equipped with STCA, however this had not been used as, due to their location, both of the aircraft would have been outside the select frame for the system (CF2), and the Arcus' transponder had been selected to off.

Finally, in assessing the risk of collision, the Board discussed that although the Arcus had EC equipment on board it had not alerted the pilot to the presence of PA31, and the PA31 pilot's TAS had been unable to detect the non-transponding Arcus. Also, the pilots of both aircraft had been on different VHF frequencies, with neither in receipt of a surveillance-based service and so neither pilot had had any awareness of the presence of the other aircraft. Lookout had been the remaining barrier against collision and, although the Arcus pilot had become visual with the PA31 in time to be able to take avoiding action, which had reduced the risk of collision, it had not removed it entirely. Members agreed that, in this case, safety had not been assured and that there had been a risk of collision (CF10). Accordingly, the Board assigned a Risk Category B to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2022083				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Ground Elements				
• Situational Awareness and Action				
1	Contextual	<ul style="list-style-type: none"> ANS Flight Information Provision 	Provision of ANS flight information	The ATCO/FISO was not required to monitor the flight under a Basic Service
• Electronic Warning System Operation and Compliance				
2	Technical	<ul style="list-style-type: none"> Conflict Alert System Failure 	Conflict Alert System did not function as expected	The Conflict Alert system did not function or was not utilised in this situation
Flight Elements				
• Tactical Planning and Execution				
3	Human Factors	<ul style="list-style-type: none"> Communications by Flight Crew with ANS 	An event related to the communications between the flight crew and the air navigation service.	Pilot did not request appropriate ATS service or communicate with appropriate provider
4	Human Factors	<ul style="list-style-type: none"> Transponder Selection and Usage 	An event involving the selection and usage of transponders	
• Situational Awareness of the Conflicting Aircraft and Action				
5	Contextual	<ul style="list-style-type: none"> Situational Awareness and Sensory Events 	Events involving a flight crew's awareness and perception of situations	Pilot had no, late, inaccurate or only generic, Situational Awareness
• Electronic Warning System Operation and Compliance				
6	Technical	<ul style="list-style-type: none"> ACAS/TCAS System Failure 	An event involving the system which provides information to determine aircraft position and is primarily independent of ground installations	Incompatible CWS equipment

7	Human Factors	• Response to Warning System	An event involving the incorrect response of flight crew following the operation of an aircraft warning system	CWS misinterpreted, not optimally actioned or CWS alert expected but none reported
• See and Avoid				
8	Human Factors	• Identification/ Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
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
• Outcome Events				
10	Contextual	• Near Airborne Collision with Aircraft	An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles	

Degree of Risk: B

Safety Barrier Assessment⁴

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

Ground Elements:

Situational Awareness of the Confliction and Action were assessed as **not used** because when providing a Basic Service, the controller is not required to monitor the flight.

Electronic Warning System Operation and Compliance were assessed as **not used** because the aircraft had been outside the select frame of the system and the Arcus pilot had selected their transponder to 'off'.

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because the PA31 pilot had not made contact with Cranfield Approach and the Arcus pilot had selected their transponder to off.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither pilot had any prior awareness of the presence of the other aircraft.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the EC equipment carried by the Arcus pilot would have been expected to issue an alert regarding the PA31 however none was reported, and the TAS carried on the PA31 had been unable to detect the glider pilot's transponder as it had been turned off.

See and Avoid were assessed as **partially effective** because the Arcus pilot had only become visual with the PA31 at a very late stage and the PA31 pilot had not become visual with the Arcus at any point.

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: 2022083		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								