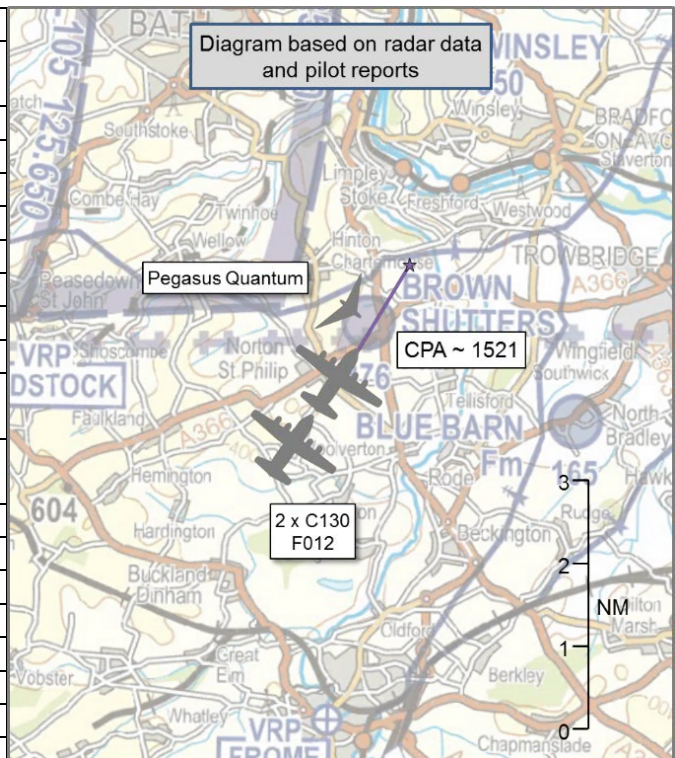


AIRPROX REPORT No 2018005

Date: 10 Jan 2018 Time: 1520Z Position: 5118N 00218W Location: Brown Shutters Farm

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Pegasus Quantum 15	C130
Operator	Civ Pte	HQ Air (Ops)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	None	None
Altitude/FL	NK	FL012
Transponder	Not fitted	A, C, S
Reported		
Colours	Black, Yellow, White	Green
Lighting	Strobes	Nav, Wingtip, HISLs
Conditions	VMC	VMC
Visibility	10km	10km
Altitude/FL	200-250ft	250ft
Altimeter	QFE (991hPa)	agl
Heading	015°	NK
Speed	48kt	210kt
ACAS/TAS	Not fitted	TCAS II
Alert	N/A	None
Separation		
Reported	0ft V/0.25nm H	Not seen
Recorded	NK	



THE PEGASUS QUANTUM PILOT reports that he made standard radio calls and pre-take off visual checks of the circuit, which was clear, as he took off from Brown Shutters Farm. When passing approx. 200ft in the climb, he saw two C130s flying in formation to his right, 2 o'clock, about ½ nm away, heading towards him. Within a few secs he assessed that they had not seen him and as they closed to about ¼ nm so he executed an avoidance turn; a steep 60°, side-slipping, descending turn to the right with increasing speed. The C130s were now behind him and appeared to cross directly over Brown Shutters Farm Airfield. He was now at about 150ft agl and made a turn to avoid farm buildings before climbing to circuit height of 800ft and returning to land. After landing, another pilot who witnessed the incident, remarked that it was 'bloody close' and that it looked like the No2 in the formation had climbed to avoid him; he estimated they flew overhead the airfield at 250-300ft. The Quantum pilot opined that last year Brown Shutters Farm was plotted onto the 1:250,000 chart and was added to SkyDemon; nevertheless, since then there had been an increase in aircraft passing overhead at various heights, including below circuit height. He suggested that the airfield appeared to be being used as a waypoint for navigational purposes and wanted to raise awareness that airfields plotted on charts should not be overflowed below circuit or joining heights during transit.

He assessed the risk of collision as 'High'.

THE C130 PILOT reports that the pair of C130s were flying in formation at low-level. The airfield in question lies in Class G airspace and is marked on the low-flying charts as a minor airfield only, offering it no protection other than 'see-and-avoid' he opined. It also does not appear on the list of local avoids [at RAF Brize Norton], which try to offer additional protection in order to keep local relations as positive as possible. He further commented that Brown Shutters Farm does not have any specific NOTAMS regarding the airfield itself or any activity associated with it, and was located in what could be regarded

as a choke point, with aircraft naturally funnelled between the SPTA and Keevil to the east, and Bristol CAS to the west. Whilst in general crews plan to avoid flight directly overhead marked airfields, he opined that there was no requirement not to overfly them and, in this instance, there were limited ground tracks that could be taken through that particular part of the low-level system.

With regard to TCAS indications, without SSR the Pegasus Quantum would not show up on their TCAS and neither aircraft received any TCAS TAs or RAs for the duration of the entire sortie. The weather was good, and a lot of GA traffic was expected and briefed during the mission briefing. Numerous sightings occurred throughout the low-level route, particularly around the Yeovilton area. None were of any concern to either crew in the formation and standard see-and-avoid was observed by all parties. In the area in question, no traffic was seen close enough to the formation to raise concern. The crews were definitely not heads-in at the time, moreover the SOPs were for all flight deck crew to be heads out as much as possible in the low-level environment, with a minimum of 1 pilot looking out at all times. Because this sortie was a training trip, an additional pilot and loadmaster were carried on both aircraft, who were present on the flight deck and contributing to additional lookout. He confirmed that all standard planning and briefing protocols were completed for a sortie of this nature, and a very robust lookout was conducted throughout the trip.

Factual Background

The weather at Bristol was recorded as follows:

METAR EGGD 101520Z 16003KT 9999 FEW016 09/05 Q1005=

Analysis and Investigation

UKAB Secretariat

The Pegasus Quantum did not appear on radar. Figure 1 shows Brown Shutters Farm as indicated on the military 1:500,000 low-flying charts.

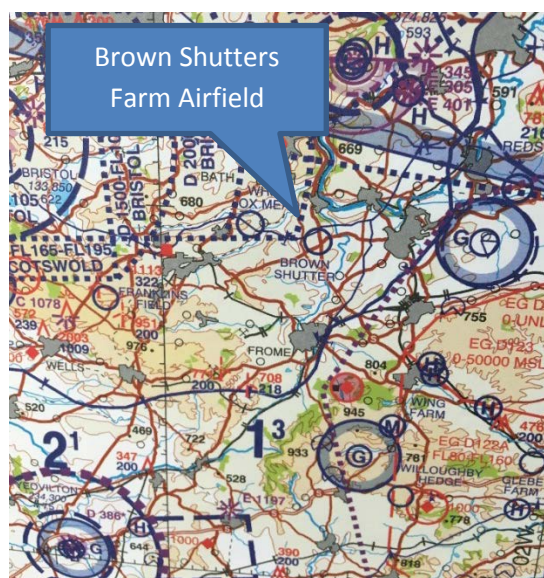


Figure 1

The Pegasus Quantum and C130 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard¹. 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 operation².

¹ SERA.3205 Proximity.

² SERA.3225 Operation on and in the Vicinity of an Aerodrome.

Comments

HQ Air Command

The crew planned and briefed this mission in accordance with extant procedures and guidance, including submission of the low-level element to CADS. However, the Quantum pilot had no access to CADS so could not have known the routing of the C-130 and the crew of the C-130 would not have received details of the Quantum pilot's intentions. That said, the C-130 crew had planned to overfly Brown Shutters Farm and deconflict through see-and-avoid as the area is fairly congested and there are a number of noise sensitive built-up areas. Each sortie has a 4½ hour planning cycle and, as this was an instructional sortie, the crews would have been working hard throughout this time. Sortie planning times have previously been reviewed and it was concluded that additional planning time would be detrimental to an already long mission time for the students.

With no means of electronic conspicuity fitted to the Quantum, the TCAS on the C-130 would not have detected the presence of the other aircraft and so this barrier was denied to both crews, as was the ATC barrier due to the encounter being at low level. Thus all parties relied on lookout as their primary means of detecting any conflict. The C-130 crews have robust SOPs regarding lookout at low level – in this case boosted by the carriage of an instructor pilot and instructor crewman on each of the two C-130s. However, neither crew saw the Quantum (which would clearly be difficult to acquire due to its size and the fact that it was lower than the C-130s). When the Quantum pilot sighted the approaching C-130s during his climb-out he took appropriate action to increase separation.

This Airprox highlights the weaknesses in all barriers to MAC: there was no electronic interaction between the aircraft; a surveillance-based Air Traffic Service cannot be delivered at low level; visual acquisition is sensitive to weather, light and individual factors; and SERA.3225 states that aircraft operating in the vicinity of an aerodrome must 'conform with or avoid the pattern of traffic formed by other aircraft in operation' – if the 'other aircraft in operation' remain undetected then it is natural to assume that there is no traffic pattern to avoid. It is impractical to avoid every minor aerodrome at low-level and selected routing has to be a balance between what is *known* to be there (e.g. built-up areas) and what *may* be there (in this case, traffic at the minor aerodrome). However, a major lesson from this Airprox is that overflight of minor aerodromes should be avoided wherever possible and practicable; often the traffic using these minor aerodromes carries no means of electronic conspicuity and is also very difficult to detect visually, defeating at least 2 of the most common barriers to MAC.

Summary

An Airprox was reported when a Pegasus Quantum and a C130 flew into proximity overhead Brown Shutters Farm airfield at 1520 on Wednesday 10th January 2018. Both pilots were operating under VFR in VMC, the Pegasus Quantum pilot in the circuit at Brown Shutters Farm, and the C130s operating low-level, neither were 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, and reports from the appropriate operating authorities.

The Board first discussed the actions of the Quantum pilot. Members noted that although he had seen the C130s at some distance (½nm) he became concerned when it became apparent that they hadn't seen him. GA members commented that he then took some fairly robust avoiding action and, whilst acknowledging that he would have needed to be especially cautious about wake-turbulence, wondered whether earlier, less aggressive avoiding action on first sighting the C130s would equally have achieved the purpose. That said, the Board noted that without an ATS or CWS there was no way for the Quantum

pilot to know that the C130s were heading in his direction prior to him seeing them, nor did he know their intentions other than that they were heading towards his airfield.

Turning to the C130 pilots, some members wondered why they had planned to fly over an airfield that was clearly marked on their maps. A military member informed the Board that the surrounding airspace was extremely constrained at low-level and that the C130s were conducting a task into nearby Keevil airfield that required a low-level approach which meant that they had little room to manoeuvre. The crew had briefed that the airfield was there, and that all the crew should keep a look out for light aircraft, but unfortunately this had not worked as a barrier; the Quantum was slow and only just airborne, and was probably difficult to spot against the backdrop of the ground. Given the constrained airspace and the known routing of the C130s, some members wondered whether the C130 squadron ops staff could have telephoned ahead to warn the airfields that the C130s were passing close by. However, this was quickly dismissed as being largely unworkable; although it was thought that flying directly over Brown Shutters Farm might have singled it out as a potential conflict, there were no doubt numerous other airfields on their route, and it would not be practical to contact them all. Notwithstanding, military members pointed out that GA pilots can telephone the Low-Flying Booking Cell to ask what military aircraft might be in their area of operation at low-level. The Board then entered a discussion about Rules of the Air (RoA) 2015 and the nuances between seeing-and-avoiding aircraft in a pattern of traffic (which is what the C130 crew were relying on), and remaining clear of the pattern of traffic formed by aircraft operating, as stipulated by RoA 2015. Although it was acknowledged that it was difficult to avoid the pattern of traffic formed by aircraft that you cannot see, the important distinction was one of an assumption of their presence rather than absence. The C130 crew were operating on the assumption that they would overfly the airfield if aircraft were not seen, rather than an assumption of avoiding an airfield if aircraft were not seen. The Board commented that the subtle difference was important, and that the latter perspective was the safe alternative.

In deciding upon the cause, the Board quickly agreed that the C130 pilots had not adequately avoided the pattern of traffic at Brown Shutters Farm and had flown into conflict with the Quantum. However, in acknowledgment of the difficulties that the C130 crew faced whilst planning the sortie, members agreed that a contributory factor had been the surrounding airspace, terrain and built-up areas had funnelled the C130s into the vicinity of Brown Shutters Farm. Given the Quantum pilot's description of the incident, and the fact that the C130 crews had not seen the Quantum, the Board agreed that safety had been much reduced below the norm; Category B.

During the discussions about RoA 2015 and the distinction between seeing-and-avoiding and remaining clear of the pattern of traffic, the Board resolved to make a recommendation that HQ Air Command should review the education of military pilots with regard to their responsibilities in respect of the avoidance of minor airfields. Furthermore, although not germane to the incident itself, the Board also noticed that the wording in MAA Regulatory Article 2307 did not reflect the new wording of SERA and RoA 2015 in respect of avoiding patterns of traffic and so they also resolved to recommend that the MAA review RA2307.

PART C: ASSESSMENT OF CAUSE AND RISK

<u>Cause:</u>	The C130 pilots did not adequately avoid the pattern of traffic at Brown Shutters Farm and flew into conflict with the Pegasus Quantum.
<u>Contributory Factor:</u>	The airspace, terrain and built-up areas around Brown Shutters Farm funnels military low-flying aircraft into its vicinity.
<u>Degree of Risk:</u>	B.
<u>Recommendations:</u>	<ol style="list-style-type: none"> 1. HQ Air Command reviews the education of military pilots with respect to the avoidance of minor airfields. 2. MAA reviews the wording of RA2307 to reflect The Rules of the Air Regulations 2015 and SERA wording.

Safety Barrier Assessment³

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

Flight Crew:

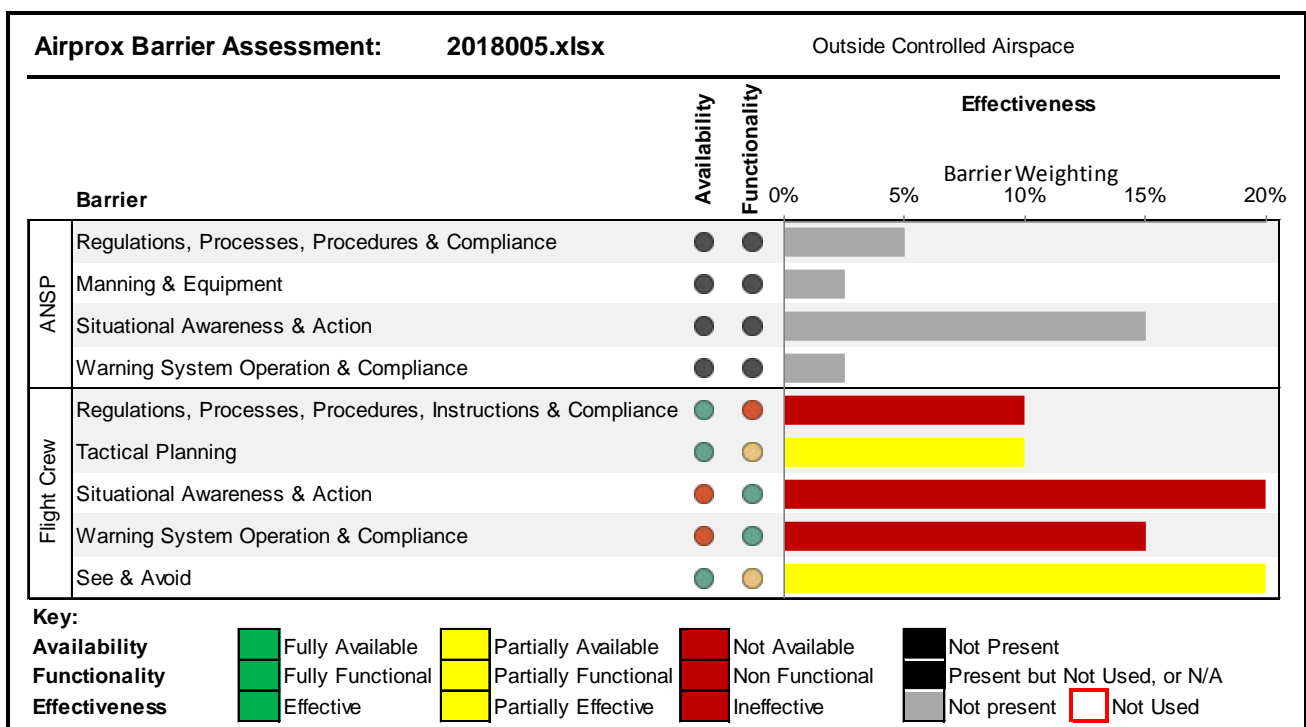
Regulations, Processes, Procedures, Instructions and Compliance were assessed as **ineffective** because the C130s did not avoid the Brown Shutters Farm Airfield pattern of traffic.

Tactical Planning was assessed as **partially effective** because although the C130s had briefed its presence on a see-and-avoid basis, they did not plan to avoid Brown Shutters Farm Airfield.

Situational Awareness and Action were assessed as **ineffective** because neither pilot had any awareness of the other prior to the Quantum pilot seeing the C130.

Warning System Operation and Compliance were assessed as **ineffective** because the C130 and Quantum did not have compatible CWS equipment.

See and Avoid were assessed as **partially effective** because the Quantum pilot only took late avoiding action and the C130 pilots did not see the Quantum.



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