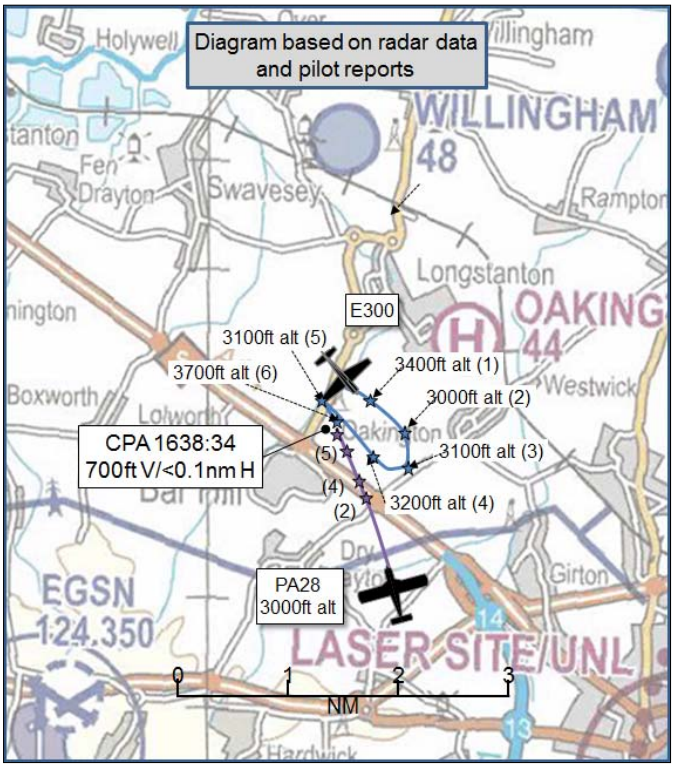
AIRPROX REPORT No 2016127

Date: 01 Jul 2016 Time: 1638Z Position: 5215N 00002E Location: 7nm NW Cambridge

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	E300	PA28
Operator	Civ Pte	Civ Trg
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	Basic
Provider	Cambridge	Cambridge
Altitude/FL		
Transponder	C, S	C, S
Reported		
Colours	NK	White, Red
Lighting	NK	Strobe, Landing
Conditions	VMC	VMC
Visibility	>10km	35km
Altitude/FL	3500ft	NK
Altimeter	QNH	QNH
Heading	090°	330°
Speed	130kt	105kt
ACAS/TAS	Unknown	Not fitted
Alert	Unknown	N/A
Separation		
Reported	300ft V/500m H	0ft V/1000m H
Recorded	700ft V/<0.1nm H	



THE E300 PILOT reports that he was carrying out high-energy aerobatic manoeuvres just north of the A14 between Bar Hill and Cambridgeshire Motorway Services at various levels between 2000ft and 4500ft QNH. He maintained contact with Cambridge Approach and his location was passed to relevant traffic and vice-versa. He checked the area was clear, and satisfied himself that his exact location had been clearly passed to other aircraft; he entered a looping manoeuvre and, whilst inverted he spotted traffic just about to pass beneath him (where the loop would finish and return to level flight). He took evasive action, which was to terminate the loop at the top and roll level.

He assessed the risk of collision as 'High'.

THE PA28 PILOT reports that he had been advised by Cambridge Approach of an aircraft operating in the vicinity of a place he wasn't familiar with, or able to locate on his chart, but which he understood was to the NW of Cambridge. His initial track was Duxford to Peterborough at somewhere around 3000ft. The RHS occupant saw the E300 in about the 3 o'clock at a similar altitude and a range of about 1500m in a moderate right-hand turn. The E300 rolled out on an approximately parallel track in his 2 o'clock and flew away from him. He took no action at this point. The E300 then pulled up into a loop, about one mile ahead in his 1 o'clock and rolled off the top, descending back towards him, offset to his right by about half a mile. During this manoeuvre he initiated a left turn to increase separation.

He assessed the risk of collision as 'Low'.

THE Cambridge APPROACH CONTROLLER reports that the E300 was manoeuvring to the West of Cambridge up to altitude 4000ft whilst receiving a Basic Service from Cambridge Approach. The PA28 was routing northbound and was receiving a Basic Service from Cambridge approach having reported at altitude 3000ft. He passed Traffic Information to both pilots on each other. A few minutes

later, the E300 reported that he had to roll out of a manoeuvre to avoid North-Westbound traffic at 3500ft. He looked at the ATM in the VCR and strongly suspected that the aircraft in question was the PA28. The pilot of the E300 called the tower on landing and said he wished to file an Airprox.

Factual Background

The weather at Cambridge was recorded as follows:

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METAR EGSC 011520Z 24014KT 9999 FEW037 19/09 Q1006
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Analysis and Investigation

CAA ATSI

The Cambridge controller was operating in the tower and providing a combined Aerodrome and Approach Control Service. Although the controller had a functioning Aerodrome Traffic Monitor, this is not authorised to provide surveillance-derived traffic information to aircraft. The controller was also emphasising the lack of radar to those aircraft contacting them on the approach frequency. The E300 was carrying out "high-energy aerobatics" approximately 7nm to the north-west of Cambridge, observed to be manoeuvring at levels between FL034 and FL048 (3265-4665ft Cambridge QNH), and in receipt of a Basic Service from Cambridge Approach.

At 1634:10 the PA28 pilot contacted Cambridge Approach, passing his position, routing and level (reported as 3000ft) and requested a Basic Service, which was agreed by the Cambridge controller.

At 1634:40 the controller passed traffic information to the PA28 on the E300, advising them that it was operating in the vicinity of Bar Hill, 5nm to the west of Cambridge, and up to 4000ft.

At 1634:50 the controller passed traffic information to the E300 on the PA28, advising them that this aircraft was to the south-west of Cambridge, northbound at 3000ft. The E300 acknowledged this, confirming that they would maintain a good look-out (Figure 1).

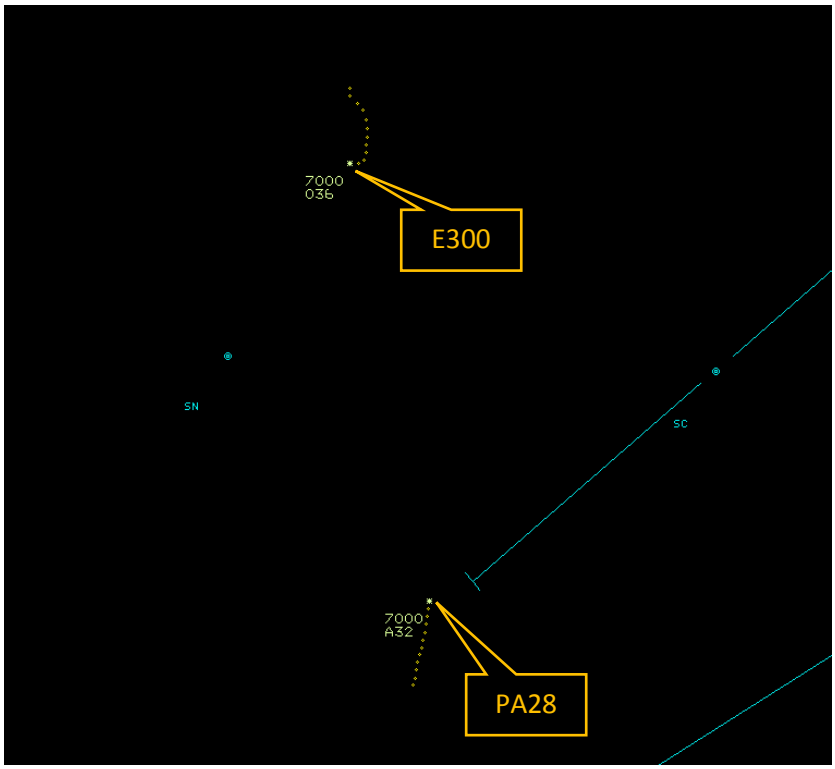


Figure 1 – Swanwick MRT – 1634:50

At 1638:15 the E300 was observed having completed a manoeuvre taking it as high as FL048 before descending to FL035/034 tracking south-east and then southbound (Figure 2 at 1638:15).

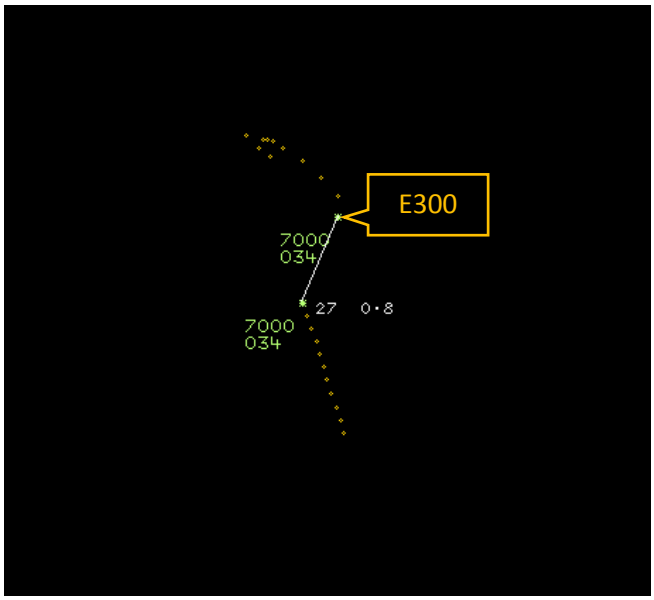


Figure 2 – Swanwick MRT – 1638:15

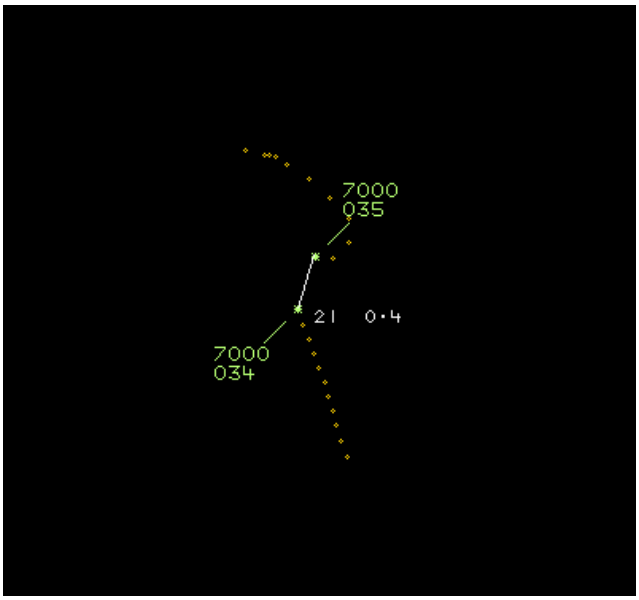


Figure 3 – Swanwick MRT – 1638:23

The E300 then made a turn to the right, towards, and placing it within 0.4nm laterally and 100ft vertically of the PA28 (Figure 3 at 1638:23). The report from the pilot of the PA28 indicated that somewhere around this point they acquired and then maintained visual contact with the E300 through to the end of its next manoeuvre. The E300 was observed to pull ahead of the PA28 (Figures 4 & 5), before commencing a further climb.

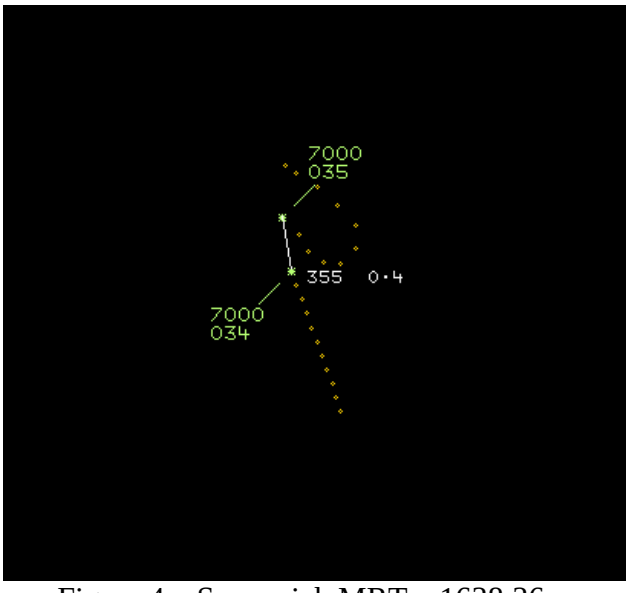


Figure 4 – Swanwick MRT – 1638:36

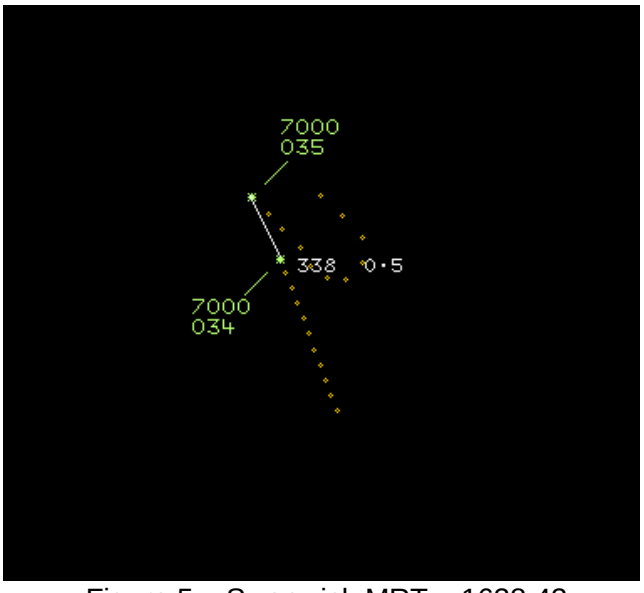


Figure 5 – Swanwick MRT – 1638:43

Having passed FL038 in a rapid climb, the radar replay then showed the E300, now at FL042, turning onto a reciprocal track and back towards the opposite direction PA28, (Figure 6 at 1638:50). The report from the pilot of the E300 stated that they were completing a looping manoeuvre, at the top of which they sighted the PA28 below.

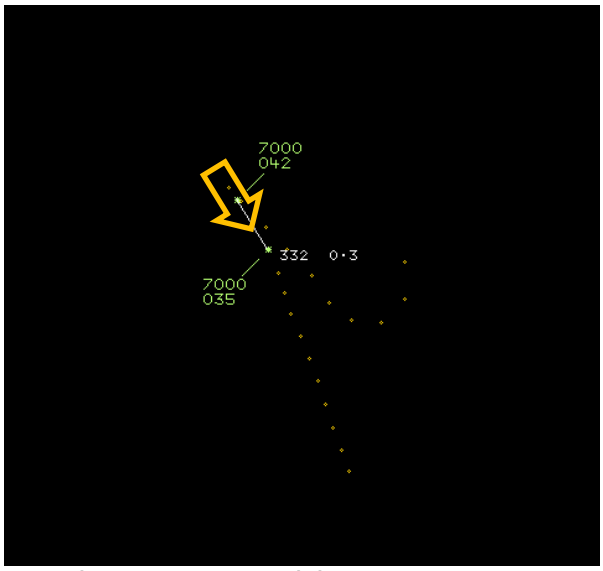


Figure 6 – Swanwick MRT – 1638:50

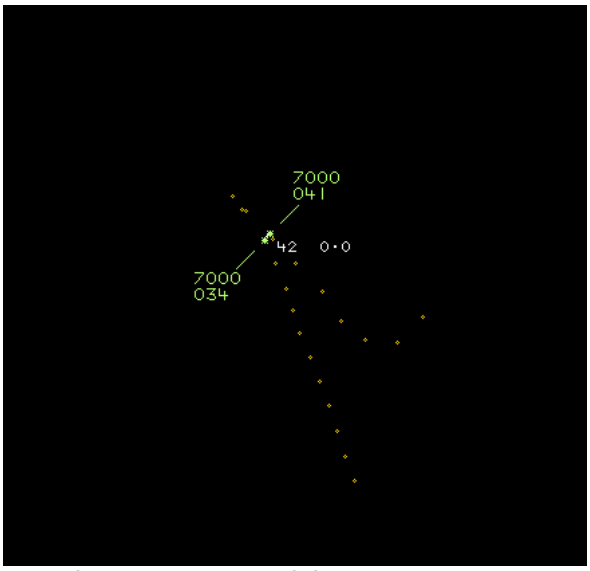


Figure 7 – Swanwick MRT – 1638:54

CPA was at 1638:54, with a minimum distance of <0.1nm laterally and 700ft vertically (Figure 7) with both pilots reporting taking action to either avoid or to increase separation from each other.

Both aircraft were operating VFR in Class G airspace, and as such the pilots were responsible for their own collision avoidance.

UKAB Secretariat

The E300 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[1]. If the incident geometry is considered as converging [in the early stages of the encounter] then the PA28 pilot was required to give way to the E300[2]. If the incident geometry is considered as head-on or nearly so [in the latter stages of the encounter] then both pilots were required to turn to the right[3] [accepting that the E300 was inverted at this point].

Summary

An Airprox was reported when an E300 and a PA28 flew into proximity at 1638 on Friday 1st July 2016. Both pilots were operating under VFR in VMC, both pilots in receipt of a Basic Service from Cambridge Approach.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board began by looking at the actions of the PA28 pilot and agreed that it was unfortunate that the pilot could not find Bar Hill on his map in order to positively identify the area in which the E300 was operating. Notwithstanding that Cambridge ATC had provided a generic location report for Bar Hill based on a bearing and distance from Cambridge airport, members opined that the PA28 pilot could have requested more information from ATC as to Bar Hill's location in order to improve his situational awareness regarding the aerobatic E300. Furthermore, as a matter of good airmanship, they felt that the PA28 pilot could have in any case altered his routing to increase the separation from

[1] SERA.3205 Proximity.
[2] SERA.3210 Right-of-way (c)(2) Converging.
[3] SERA.3210 Right-of-way (c)(1) Approaching head-on.

the general area that the E300 was carrying out aerobatics; such a small deviation from his track would not have increased the track miles on his route by very much. The Board noted that the PA28 pilot was visual with the E300 prior to its pilot commencing his aerobatic manoeuvre and, knowing that the E300 was conducting aerobatics, members felt that the PA28 pilot could have acted sooner to increase the separation between the aircraft.

The Board then looked at the actions of the E300 pilot. Again, they were mindful that the E300 pilot had been informed of the location, height and route of the PA28 and therefore opined that it was not wise to commence his aerobatic manoeuvre until he was visual with it and had ascertained whether or not it was a threat. Part of his safety checks prior to and during aerobatics required the E300 pilot to ensure it was safe to manoeuvre in an area of clear sky; the Board agreed that having been given information that another aircraft was transiting through the area, the E300 pilot was ill-advised to have continued with his high-energy manoeuvres until he had ensured that the PA28 was not a factor; to have done so would have only resulted in a minor delay to the commencement of the aerobatic manoeuvre. That being said, the Board agreed that, when the E300 pilot did become visual with the PA28, he had acted appropriately by stopping his manoeuvre and rolling wings level.

The Board then looked at the barriers that were contributory factors to this Airprox and decided that:

- **Flight Crew Acting on Information** had been **ineffective** because neither pilot had acted on the information that ATC had given them about the other.
- **Flight Crew Operational Threat Awareness and Management** was only **partially effective** because although they were aware of each other, neither pilot fully assimilated the other aircraft into their dynamic planning.
- **Flight Crew Electronic Warning System and Resolution Action** was deemed to be **not available** because although it was unknown if the E300 had an electronic warning system fitted, the PA28 did not.
- **See and Avoid** had been only partially effective because, although the PA28 saw the E300 in plenty of time (and was aware of its pilot's intentions to conduct aerobatics) he did not actively avoid the E300 until it descended after the top of the loop. Furthermore, and notwithstanding that the E300 would have been belly-up to the PA28 in the latter stages of his turn to position for the loop, the fact was that the E300 pilot did not see the PA28 until he was inverted at the top of his loop and so this had been a late sighting on his behalf.

The Board then considered the cause of the Airprox and agreed that, fundamentally, both pilots could have done more to avoid the conflict occurring if they had acted on the information that they had been given by ATC. That being said, members recognised that, once they had recognised the conflict, both pilots had acted appropriately to resolve the situation. Some members opined that the cause was that the PA28 had flown into conflict with the E300 that he could see and to which he was nominally required to give way. Other members thought the reverse, and that the E300 pilot had flown into conflict with the PA28 by conducting unpredictable high-energy manoeuvres when he knew that the other aircraft was in the vicinity. As a result, the Board agreed that the best description of the incident was that it had been a conflict in Class G resolved by both pilots. Turning to the risk, the Board agreed that safety had been degraded, particularly because the PA28 pilot could not have known what manoeuvre the E300 pilot might have commenced as the 2 aircraft closed in proximity. Nevertheless, because the PA28 pilot had been visual with the E300 throughout, the Board decided that there had been no risk of collision and the risk was therefore assessed as Category C.

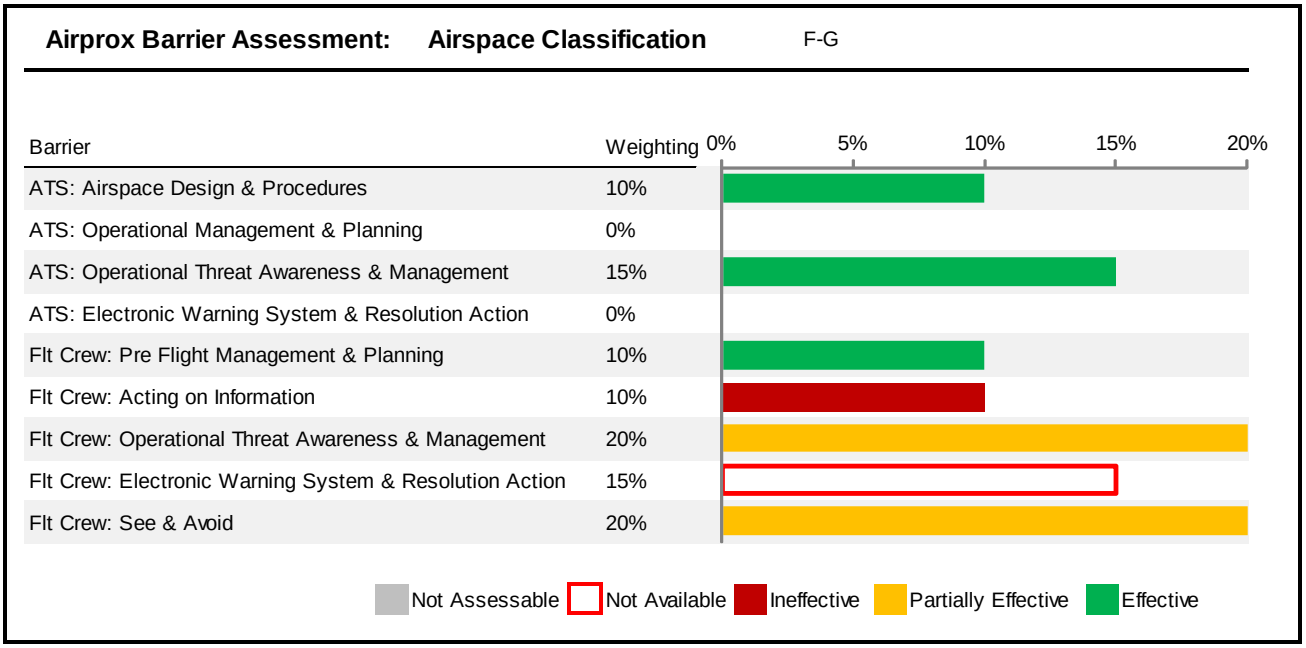
PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G resolved by both pilots.

Degree of Risk: C.

Barrier Assessment:

Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA, MAA and UKAB, the following table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace).[4]* The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, Not Available, or Not Assessable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident.



[4] Barrier weighting is subjective and is based on the judgement of a subject matter expert panel of aviators and air traffic controllers who conducted a workshop for the UKAB and CAA on barrier weighting in each designation of airspace.