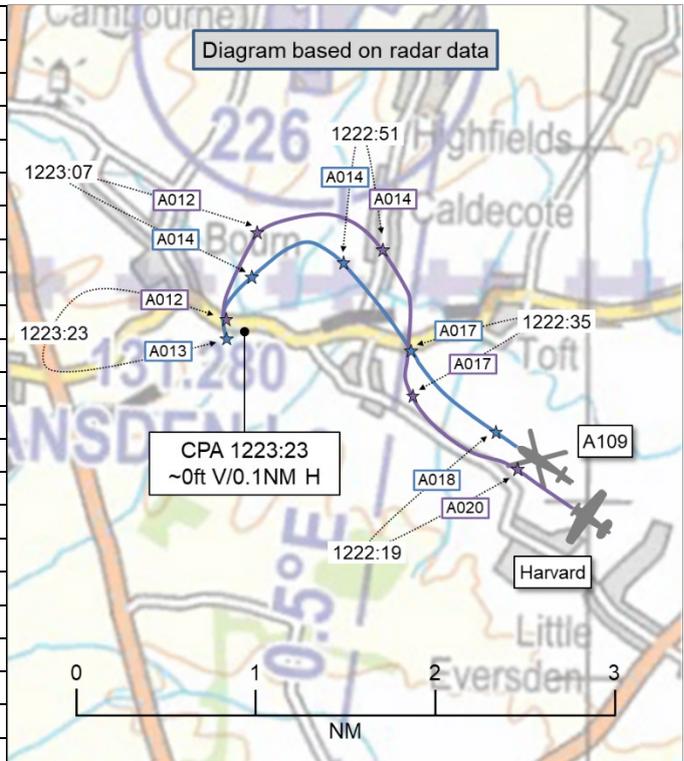


AIRPROX REPORT No 2022247

Date: 03 Oct 2022 Time: 1223Z Position: 5211N 00003W Location: 2NM S Bourn

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	A109	Harvard
Operator	Civ Helo	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Basic
Provider	Cambridge Radar	Duxford Info
Altitude/FL	1300ft ↓	1200ft ↑
Transponder	A, C, S	A, C, S
Reported		
Colours	Dark grey	Silver, yellow
Lighting	NR	None
Conditions	VMC	VMC
Visibility	NR	>10km
Altitude/FL	NR	2500ft
Altimeter	NR	QNH (1023hPa)
Heading	NR	090°
Speed	NR	130kt
ACAS/TAS	NR	SkyEcho
Alert	NR	None
Separation at CPA		
Reported	NR V/50m H	300ft V/500m H
Recorded	~0ft V/0.1NM H	



THE A109 PILOT reports that they were flying west at 3000ft. Cambridge ATC advised that there was a contact, 12 o'clock at 2000ft, and shortly afterwards updated that it was then 3000ft. [The pilot of the A109] saw the aircraft and identified it as a Harvard. They took avoiding action by turning hard right as the [Harvard] was slightly left of their nose, then hard left. It passed behind them but then turned to follow.

At this stage, [the pilot of the A109] estimated the separation to be dangerously close, approximately 50-100m. They continued to manoeuvre to try to avoid the Harvard by turning and changing altitude. The Harvard remained firmly in pursuit of [the A109]. They had two students onboard and the student in the cabin was giving a running commentary along the lines of 'Now in the 7 o'clock, same altitude, closing'. [The pilot of the A109] advised Cambridge ATC that they wished to report the incident, which was acknowledged. After three manoeuvring turns, [Cambridge] ATC advised that the Harvard was on Duxford's frequency and that Duxford had been asked to call it off. After about 3min, the Harvard peeled away in the direction of Duxford.

[Whilst reviewing the incident] post-flight, [the pilot of the A109] saw the flightpaths of both aircraft from ADS-B data [and opined that] it seemed obvious that the Harvard had deliberately followed [the A109]. They contacted both Duxford and Cambridge ATC units to advise that they would be filing a report on the event.

THE HARVARD PILOT reports that during a training flight from Duxford at approximately 1220, the [pilot of the] Harvard had completed a short aerobatic sequence running a line approximately north/south. The sequence was completed heading north and a climbing-turn to the east was commenced. The student in the front seat called that there was a helicopter passing clear from left-to-right and made a small course adjustment to the left to give good separation behind the traffic. At this time, the Harvard was estimated to have been heading east and the helicopter heading south-

southwest. The student announced that they thought it was their father's Agusta A109. The helicopter, now in the 2-3 o'clock position, reversed direction and appeared to be making its way back towards the Harvard. The student, an experienced pilot, performed a left 360° turn which positioned the Harvard behind and to the left of the helicopter at an estimated 500m. The helicopter had manoeuvred through north onto a northwesterly heading. The Harvard manoeuvred to the right of the helicopter, still remaining clear, at which point the student identified that it was not their father's helicopter. The Harvard turned right away from the helicopter and returned to Duxford. At no stage did either pilot in the Harvard feel there was any risk of a collision with the helicopter.

The pilot assessed the risk of collision as 'None'.

THE CAMBRIDGE RADAR CONTROLLER reports that whilst working as the Cambridge Radar ATCO they had been providing a Traffic Service to [the pilot of the A109] who was on a training flight. [The pilot of the A109] was booked out IFR but opted to [fly under] VFR to conduct general handling to the southwest of Cambridge prior to commencing instrument training. [The pilot of the A109] was maintaining an altitude of 3100ft and was passed Traffic Information on the aircraft with which they would ultimately have an Airprox. The Traffic Information was updated as they got closer, and the pilot of [the A109] reported visual with the traffic, reporting it as a T6 Harvard. [The Cambridge Radar controller] conducted a radar handover of another aircraft on the frequency to another ATSU and during the handover updated the Traffic Information again as they noticed they had become proximate. They confirmed with [the pilot of the A109] that they were still visual with the [Harvard], and they reported that they were, and that the [Harvard] appeared to be chasing them. The pilot of [the A109] was observed manoeuvring in both the horizontal and vertical plane to attempt to move away from the traffic. [The Cambridge Radar controller] opted to provide [the pilot of the A109] a level-band to manoeuvre in as they had already deviated from their agreed level for safety reasons.

At 1222, the pilot of [the A109] reported an Airprox against the Harvard which they believed was trying to formate with them. [The Cambridge Radar controller] believed that the [Harvard pilot] was working Duxford, having transferred one to them a few minutes prior in a similar area. [The Cambridge Radar controller] called them on the direct priority landline and asked them to tell the [Harvard pilot] to move away from [the A109]. The aircraft split and [the pilot of the A109] reported happy to continue their flight. [The Cambridge Radar controller] offered them the chance to land for a few minutes to compose themselves, however the crew opted to continue. The pilot of [the A109] reported that they wished to file an Airprox and that they felt that the strictest sanctions should be sought for the incident. [The Cambridge Radar controller] organised relief from their position, made the traffic safe, closed Radar and handed over to Cambridge Approach.

The controller perceived the severity of the incident as 'Medium'.

THE DUXFORD AFISO reports that [the pilot of the Harvard] called for a join following a local detail. [The pilot of the Harvard] was requested to 'hold off' due to a practice display in progress, and the pilot agreed. There were one or two other aircraft also holding off. They do not recall the exact sequence but at some stage they received a telephone call from Cambridge Radar informing them that [the pilot of the Harvard] was flying too close to a helicopter and could they be asked to 'move away'. The [Duxford AFISO] made the request and [the pilot of the Harvard] agreed to do so. The Duxford AFISO admitted that they *"used some non-standard phraseology to express surprise which was not intended to be a criticism of any party"*. The practice display finished and [the pilot of the Harvard] joined and landed normally. At this stage, there had been no report of an Airprox from any party. They were subsequently relieved for a routine break and returned to their office to complete some admin when they noticed an email from Cambridge advising that they were filing an Airprox.

Factual Background

The weather at Cambridge was recorded as follows:

EGSC 031220Z 19008KT CAVOK 17/08 Q1026

Analysis and Investigation

Cambridge City Airport

The RT and surveillance recordings were reviewed. A written report was received from the Cambridge Radar ATCO. The relevant FPS were reviewed. The occurrence was discussed with the commander of [the A109] and the Cambridge APS ATCO was de-briefed.

Timeline of events:

- 1158:26 Cambridge Radar opened. [The pilot of the Harvard] was allocated a squawk of 6162.
- 1212:46 [The pilot of the Harvard] reported their detail was complete and returning to Duxford. Cambridge Radar controller instructed [the pilot of the Harvard] to report changing to their en-route frequency.
- 1214:34 [The pilot of the Harvard] reported changing frequency to Duxford Information. Cambridge Radar controller instructed [the pilot of the Harvard] to squawk conspicuity and to free-call en-route.
- 1217:17 Cambridge Radar controller instructed [the pilot of the A109] to squawk 6160 and enquired what type of service they required. [The pilot of the A109] requested a Procedural Service, the Cambridge Radar controller informed them that Radar was open and offered a Traffic Service which they accepted.
- 1217:54 [The pilot of the A109] was identified and a Traffic Service agreed. The Cambridge Radar controller advised [the pilot of the A109] of reduced Traffic Information due to limited surveillance performance.
- 1218:49 Cambridge Radar controller passed Traffic Information on traffic on their right, 1 o'clock, 4NM passing down their right-hand side indicating 2600ft, descending.
- 1220:19 Cambridge Radar controller updated [the pilot of the A109] on the previously called traffic which was now in their left, 11 o'clock, 2NM, converging from the left indicating 2200ft. This transmission was not acknowledged.
- 1220:50 Cambridge Radar controller, again updated [the pilot of the A109] on the traffic which had now climbed, was proximate to them, and indicated 2700ft. [The pilot of the A109] reported visual with the traffic and identified it as a Harvard.
- 1221:30 Cambridge Radar controller asked [the pilot of the A109] whether they were still visual with the Harvard on their left. [The pilot of the A109] responded with "*yeah, he seems to be chasing us for some reason*".
- 1221:44 Cambridge Radar controller offered [the pilot of the A109] a climb to altitude 4000ft. This transmission was not acknowledged.
- 1222:00 Cambridge Radar controller advised [the pilot of the A109] that they could manoeuvre as required in the band 1700-3000ft to assist with avoiding the traffic.
- 1222:27 Cambridge Radar controller updated [the pilot of the A109] on the traffic, which was immediately astern of them and indicating the same level, and enquired as to whether they were still visual. [The pilot of the A109] responded with "*[A109 callsign] er he is actually trying to formate on us, so I'd like to put an Airprox on him please*".
- 1222:55 [The pilot of the A109] transmitted the following "*...this guy is following us and trying to formate on us all the way round*".
- 1223:07 Cambridge Radar controller requested [the pilot of the A109]'s intentions when possible. [The pilot of the A109] responded with "*...if we can ever get rid of him, erm we'd like to continue the sortie*".
- 1223:17 The Cambridge Radar controller telephoned Duxford Aerodrome, however, the person who answered was not the AFISO on duty. The Cambridge Radar controller requested

that a message be passed to the Harvard pilot asking them to move away from the A109.

1223:51 Transmission from [the pilot of the A109]: “...and [A109 callsign], erm, not quite sure what we can do about that particular aircraft but erm I'd like to put in the most, er, highest level of complaint and report possible”.

1224:10 Cambridge Radar controller updated [the pilot of the A109] on the traffic which appeared to be diverging. [The pilot of the A109] responded with “yeah okay we've got him going away now but he did literally follow us round three turns, and climbed and descended with us”. The Cambridge Radar controller then asked whether [the pilot of the A109] wished to continue with their training sortie, they responded in the affirmative.

An examination of the events showed that an A109 helicopter was operating VFR on a training sortie and was booked-in to carry out a series of NDB holds and instrument approaches. The student pilot was wearing a view-limiting device ('foggles') to simulate operating in IMC. Also on board the helicopter was an instructor and another student pilot occupying one of the rear seats. The A109 pilot initially requested a Procedural Service (Radar had only just opened following a watch handover from the Approach Procedural controller). The Cambridge Radar controller offered the A109 pilot a Traffic Service which was then agreed.

Prior to the Airprox, the North American T-6 Harvard (initially squawking code 6162, then VFR conspicuity) had been operating to the north of Cambridge Airport conducting aerobatics and had been under a Basic Service from Cambridge Radar. After reporting that their detail was complete, the Harvard pilot left the Cambridge Approach frequency for Duxford Information.

The Harvard pilot was then observed to manoeuvre to the west of Cambridge Airport before routing eastbound towards Cambridge, and into conflict with the A109. The A109 crew reported that the Harvard pilot had joined formation with them. They went on to report that the aircraft followed them through a series of climbs, descents and turns.

Identification of the recovery factors revealed that timely and appropriate Traffic Information was passed to the A109 crew who had acquired the Harvard visually. When the Harvard and A109 became proximate, the Cambridge Radar controller offered the A109 crew deconfliction advice, initially in the form of a level band in which they could operate, then giving them the freedom to manoeuvre laterally and vertically as required to assist in them avoiding the traffic.

Under a Traffic Service, controllers are not required to achieve deconfliction minima, and the pilot remains responsible for collision avoidance. Deconfliction advice is not provided under a Traffic Service, however, in order to discharge their duty-of-care requirement, it is reasonable to argue that the Cambridge Radar controller, given the proximity of the Harvard to the A109, and the nature of the Harvard pilot's manoeuvres, they considered this to be a high-risk confliction. The Cambridge Radar controller, therefore, provided an appropriate level of deconfliction advice given the situation.

The Cambridge Radar controller telephoned Duxford to request that a message be passed to the Harvard pilot for them to move away from the A109. The person who answered the telephone was not the Duty FISO but was evidently in a position to relay a message to them. It is not known however whether this message was passed to the Harvard pilot.

The identification of failure of any of the recovery factors revealed that, when the Harvard pilot reported to Cambridge Radar that their detail was complete and that they were returning to Duxford, the Cambridge Radar controller made a reasonable assumption that they would continue on a southerly track towards Duxford Aerodrome. Having no traffic to affect at that time, they transferred the aircraft to their en-route frequency.

Despite having previously availed themselves of an ATS from Cambridge, the Harvard pilot did not re-establish communications with Cambridge Radar when they subsequently turned eastbound, therefore, the intentions of the Harvard pilot were not known to the Cambridge Radar controller when the Harvard became traffic to the A109.

Cambridge Airport is in Class G (outside controlled) airspace and, therefore, the Harvard pilot was under no obligation to either be in RTF communications with, or obtain a service from, Cambridge.

Having reviewed the RTF and surveillance recordings, and having spoken to the A109 pilot, it would appear that the Harvard pilot joined formation with the A109 and then manoeuvred proximate to it.

In conclusion, the Airprox occurred in Class G airspace when the Harvard came into conflict with the A109. Cambridge Radar provided appropriate Traffic Information and, when the two aircraft became proximate, offered deconfliction advice.

CAA ATSI

ATSI is satisfied that the Cambridge controller had fulfilled their responsibilities in accordance with the service being provided.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft could be positively identified from Mode S data. It could be seen on radar that, at approximately 1220:53, the pilots of the A109 and Harvard had been heading towards each other on reciprocal tracks. The pilot of the A109 had commenced a turn to the left and the pilot of the Harvard remained on an approximately easterly track. From the radar data, the aircraft had been separated by 100ft vertically and 0.1NM horizontally (see Figure 1).

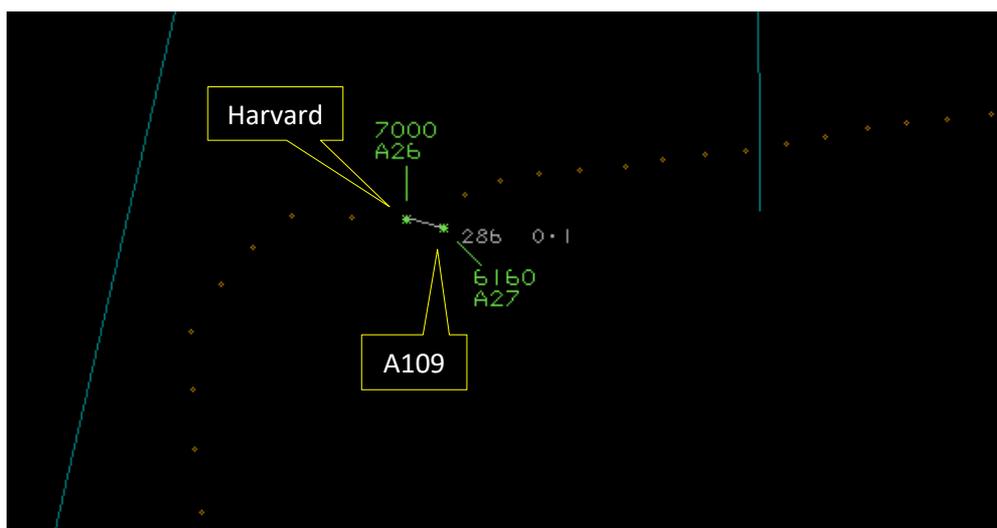


Figure 1 - 1220:53 - Separation had been 100ft V / 0.1NM H

The pilot of the A109 continued their turn to track eastwards and then turned to the north. Meanwhile, the pilot of the Harvard commenced a left-hand orbit and appeared to 'tuck-in' behind the A109. The pilot of the A109 continued to track to the north and northwest whilst descending, and finally turned to the south and commenced a climb. The pilot of the Harvard appeared to have followed closely throughout. The CPA was determined to have occurred between the radar sweeps at 1223:19 and 1223:23 when both aircraft were on a southerly track (see Figures 2 and 3). The separation at CPA was 0.1NM horizontally and was estimated as 0ft vertically as the Harvard had been descending from 1300ft to 1200ft and the A109 had been climbing from 1200ft to 1300ft. The pilot of the A109 subsequently turned eastwards and the pilot of the Harvard continued southwards.

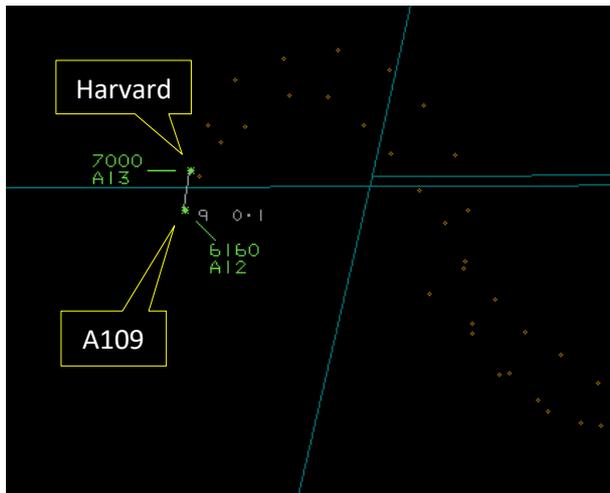


Figure 2 – 1223:19 – 100ft V / 0.1NM H

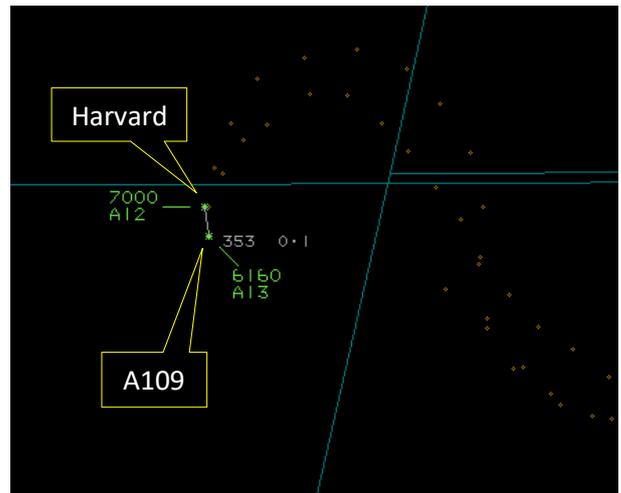


Figure 3 – 1223:23 – 100ft V / 0.1NM H

The A109 and Harvard 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 head-on or nearly so then both pilots were required to turn to the right.² If the incident geometry is considered as overtaking then the A109 pilot had right of way and the Harvard pilot was required to keep out of the way of the other aircraft by altering course to the right.³ Aircraft shall not be flown in formation except by pre-arrangement among the pilots-in-command of the aircraft taking part in the flight.⁴

Summary

An Airprox was reported when an A109 and a Harvard flew into proximity 2NM south of Bourn at 1223Z on Monday 3rd October 2022. Both pilots were operating under VFR in VMC, the A109 pilot in receipt of a Traffic Service from Cambridge Radar and the Harvard pilot in receipt of a Basic Service from Duxford Information.

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 considered the actions of the pilot of the Harvard. Noting that the pilot had been asked to 'hold off' from returning to Duxford, which had therefore necessitated an adaption of their initial plan, members pondered the first encounter with the A109 that had been tracking directly toward the Harvard. Members noted that the EC equipment fitted to the Harvard had not been capable of detecting the presence of the A109 (**CF6**) and that the pilot of the Harvard had not had any Situational Awareness of the A109 until it had been visually acquired (**CF5**). Acknowledging that the pilot of the Harvard had initially manoeuvred to remain clear, members were very surprised that the pilot had subsequently turned to follow the A109. Whilst it was understood by members that it may have been distracting to have sighted a familiar aircraft, the course of action that unfolded was deemed to have been an ill-considered dynamic plan (**CF3**). In consideration of the most probable intention of the pilot of the Harvard, some members suggested that there had been an intention to chase the A109, others suggested that there had been an intention to formate. Notwithstanding, members were fully satisfied

¹ (UK) SERA.3205 Proximity.

² (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on.

³ (UK) SERA.3210 Right-of-way (c)(3) Overtaking.

⁴ (UK) SERA.3135 Formation flights.

that there had been no prior agreement between the aircraft commanders to have flown in formation, and that the pilot of the A109 had not had any intention to participate in a pursuit.

Members next noted that the Harvard pilot's flight had taken them close to Cambridge Airport, and that they had remained on the Duxford frequency. Members considered it imprudent not to have re-tuned to the Cambridge frequency, and agreed that to have done so may have enabled the pilot of the Harvard to have learned of their misidentification of the A109 sooner.

Members wished to emphasise that all pilots have a responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard. Members were in agreement that, in this case, the pilot of the Harvard had not flown in accordance with this responsibility (**CF1**, **CF2**). It was further agreed that the actions of the pilot of the Harvard had reduced the separation between the aircraft to such an extent that members concluded that the pilot had deliberately flown into conflict (**CF8**), and that the proximity had caused the A109 pilot considerable concern (**CF7**).

Turning their attention to the role of the Instructor in the Harvard, members were surprised that no action had been taken to curtail the pursuit of the A109. That such action had not been taken appeared to members to have conferred tacit approval for the pursuit to have continued (**CF4**).

Members next considered the actions of the pilot of the A109. They had been in receipt of a Traffic Service, and members agreed that that the Traffic Information with which they had been provided by the Cambridge controller had enabled them to build generic Situational Awareness of the actions of the Harvard pilot during the pursuit (**CF5**). The A109 crew members had provided useful updates and supplementary information too, and members praised their assistance. Notwithstanding, it was clear to members that the conflict had caused the pilot of the A109 considerable concern (**CF9**). Suggesting that there had been little else that the pilot of the A109 could have done to have reduced the risk of this encounter, members indicated that they had nothing further to add.

Turning their attention to the ground elements, members praised the actions of the Cambridge controller, firstly for passing useful Traffic Information and for providing a level-band in which the pilot of the A109 could operate, but also for contacting the Duxford AFISO to relay a message to the pilot of the Harvard. Members were heartened that the coordination between the Cambridge controller and the Duxford AFISO had helped bring a swift end to the incident.

Concluding their deliberations, members were satisfied that there had not been any intention by the pilot of the Harvard to have deliberately caused a collision, but were in full agreement that normal safety standards had been eroded so considerably that a genuine risk of collision had existed (**CF10**). Had it not been for the best efforts of the pilot of the A109 manoeuvring to remain clear, the actions of the Cambridge controller telephoning the Duxford AFISO to 'call off' the Harvard pilot, and for the crew members of the A109 calling out information on the Harvard's position, the incident may have concluded with a catastrophic outcome. As such, the Board assigned Risk Category B to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2022247				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Flight Elements				
• Regulations, Processes, Procedures and Compliance				
1	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with
• Tactical Planning and Execution				
2	Human Factors	• Action Performed Incorrectly	Events involving flight crew performing the selected action incorrectly	Incorrect or ineffective execution

3	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
• Situational Awareness of the Conflicting Aircraft and Action				
4	Human Factors	• Mentoring	Events involving the mentoring of an individual	
5	Contextual	• 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	• 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
• See and Avoid				
7	Human Factors	• Lack of Individual Risk Perception	Events involving flight crew not fully appreciating the risk of a particular course of action	Pilot flew close enough to cause concern
8	Contextual	• Loss of Separation	An event involving a loss of separation between aircraft	Pilot flew into conflict
9	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
• 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 Assessment⁵

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

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the pilot of the Harvard had operated in such proximity to the A109 as to create a collision hazard.

Tactical Planning and Execution was assessed as **ineffective** because the pilot of the Harvard had not adapted their dynamic plan adequately to have remained clear of conflict with the A109.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the pilot of the A109 had had generic Traffic Information on the Harvard.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the EC equipment fitted to the Harvard would not have been expected to have detected the presence of the A109.

See and Avoid were assessed as **partially effective** because the pilot of the Harvard had flown into conflict with the A109.

⁵ 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: 2022247

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 Conflicition & 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								