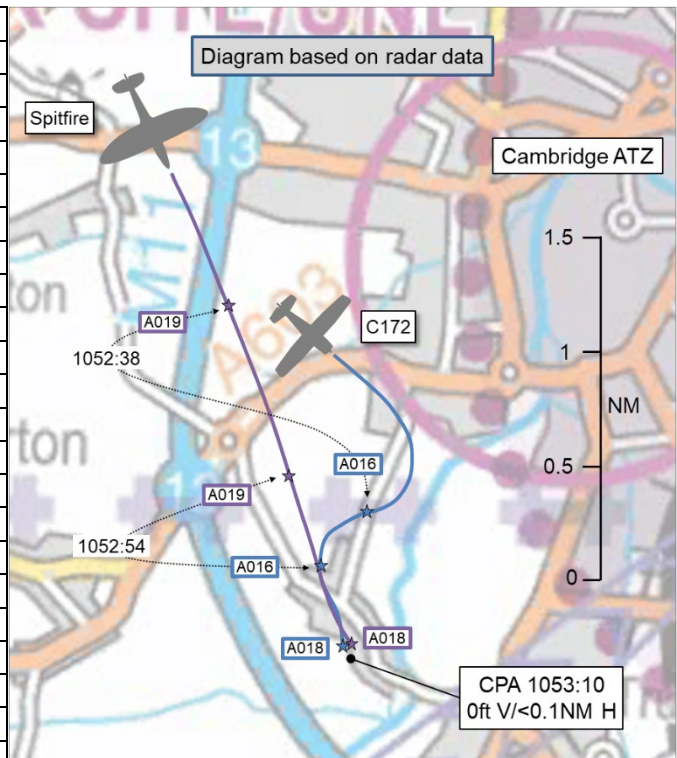


AIRPROX REPORT No 2023186

Date: 19 Aug 2023 Time: 1053Z Position: 5211N 00005E Location: 3.5NM SSW Cambridge

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C172	Spitfire
Operator	Civ FW	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Listening Out	Listening Out
Provider	Cambridge Appr.	Duxford Information
Altitude/FL	1800ft	1800ft
Transponder	A, C, S	A, C, S
Reported		
Colours	Cream	Green, grey
Lighting	Strobes, beacon	Nil
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1600ft	1500ft
Altimeter	QNH (1013hPa)	QNH (NK hPa)
Heading	170°	135°
Speed	100kt	200kt
ACAS/TAS	SkyEcho	Not fitted
Alert	None	N/A
Separation at CPA		
Reported	100ft V/0m H	200ft V/600ft H
Recorded	0ft V/<0.1NM H	



THE C172 PILOT reports that they were conducting a trial lesson (Exercise 3). They were nearing the end of the 30min flight and were WSW of Cambridge Airport, heading towards Duxford. They were listening-out on Cambridge Approach (although no service is provided at weekends). A formation of two Spitfires passed directly above them, heading in approximately the same direction. They were alarmed by their sudden appearance and proximity, and concluded that they must not have seen [the C172]. Shortly afterwards, the [pilot of the C172] changed to Duxford FIS and requested a join, intending to position on a right-base for RW24. They were passed Traffic Information on the Spitfires which, by this time, had made a run-and-break into the RH circuit for RW24 and were no longer in formation. They were visual with the Spitfires, and widened their approach to allow them to turn base-leg ahead of them. [The pilot of the C172] was using SkyDemon and [an EC device] configured with ADS-B-in and out. The Spitfire formation was not observed on SkyDemon.

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

THE SPITFIRE PILOT reports that they were leading a 2-ship Spitfire formation, returning from their normal operating area. Whilst inbound, following the M11 and monitoring the Duxford frequency, a Cessna was heard returning from the Cambridge area with the intention of joining the traffic pattern on a right base-leg to land on RW24. This was also [the Spitfire pilot’s] intention as per Duxford’s General Flying Orders, which utilises right-hand circuit patterns for high-energy aircraft to segregate them from their lower energy counterparts, which fly a left-hand pattern when using RW24. Approaching the 10NM point where initial contact [with Duxford] was made, the frequency was blocked by some domestic chatter which delayed the initial approach call and joining information. In the meantime, without any visual contact of the preceding traffic being made, a shallow left turn was initiated. Shortly after this, the Cessna appeared from the blind spot below the nose and passed below the right wing. The frequency was, by this time, clear, and the normal inbound report was made together with confirmation that the inbound Cessna was no longer a factor.

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

THE DUXFORD AFISO reports that [the lead-pilot of a] Spitfire formation called to join and was given normal joining information. [The Spitfire pilot's] initial call reported passing a Cessna.

Two or three minutes later, [the pilot of the C172] called to join and was given normal re-join information. All three pilots joined and landed in accordance with their normal procedures. No Airprox reports were made on RT. [The pilot of the C172] subsequently visited the tower to say that they were considering filing [an Airprox report].

Factual Background

The Duxford General Flying Orders, as published on the website for Duxford aerodrome, provide the following procedures (excerpts reproduced):

3.2 Circuit Pattern

3.2.4 Aircraft departing to the north to operate outside the Duxford ATZ are strongly advised to contact Cambridge Approach/Radar.

3.3 Joining Procedures – Radio Telephony (RTF)

3.3.1 During Operational Hours

Initial call Duxford Information 10NM from the circuit to enable airfield and Traffic Information to be given; circuit joining procedures as per Order 3.2.

Run and break joins subject to traffic.

The weather at Stansted was recorded as follows:

METAR EGSS 191050Z AUTO 21017KT 9999 SCT026 BKN032 BKN043 22/15 Q1014

Analysis and Investigation

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft could be positively identified from Mode S data. The diagram was constructed and the separation at CPA determined from the radar data.

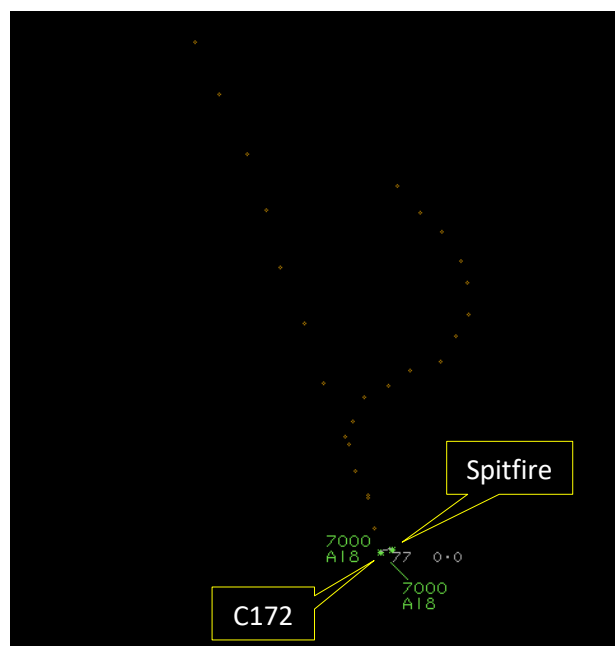


Figure 1 – CPA at 1053:10

The Spitfire and C172 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 C172 pilot was required to give way to the Spitfire.² If the incident geometry is considered as overtaking then the C172 pilot had right of way and the Spitfire pilot was required to keep out of the way of the other aircraft by altering course to the right.³

Summary

An Airprox was reported when a C172 and a Spitfire flew into proximity 3.5NM south-southwest of Cambridge at 1053Z on Saturday 19th August 2023. Both pilots were operating under VFR in VMC, the C172 pilot listening-out on the Cambridge Approach frequency and the Spitfire pilot listening-out on the Duxford Information frequency.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings and a report from the AFISO 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 pilot of the C172, and the matter of the frequency to which they had tuned their radio. Members noted that the pilot of the C172 had been operating outside the Cambridge ATZ, but had transited through an area where it had been reasonable to have expected to have encountered traffic departing from Cambridge. It was proffered, therefore, that to have tuned their radio to the Cambridge frequency had been prudent. However, an opposing view was presented that, in accordance with the Duxford General Flying Orders, the pilot of the C172 should have contacted the Duxford AFISO when 10NM from the aerodrome given that they had intended to join, and had been approximately 5NM from the aerodrome at the moment of CPA. The latter view prevailed and it was agreed that the pilot of the C172 had not contacted the appropriate provider (**CF1**). Notwithstanding, some members commented that such a procedure may have been apposite for when the Duxford AFISO could have liaised with the Cambridge controller for awareness of the traffic situation, but that this encounter had occurred on a Saturday, and that there had not been a controller present at Cambridge. In such circumstances, members agreed that it may have been prudent for the pilot of the C172 to have conducted their flight away from the Cambridge departure area.

Members noted that the EC device fitted to the C172 would not have been expected to have detected the presence of the Spitfire (**CF3**). Consequently, it was agreed that the pilot of the C172 had not had situational awareness of the presence of the Spitfire (**CF2**).

Reviewing the timing of the encounter, and noting that the pilot of the C172 had been conducting turns and manoeuvres in the course of their instructional sortie, members surmised that there may have been an opportunity to have visually acquired the Spitfire approaching, and were keen to emphasise the imperative to have maintained a thorough and effective lookout. Members agreed that to have first sighted the Spitfire as it passed overhead had effectively constituted a non-sighting (**CF4**). It was appreciated that the encounter had caused the C172 pilot alarm.

Members next turned their attention to the actions of the pilot of the Spitfire. A member with particular knowledge of the Spitfire design explained that the pilot's view from the cockpit is restricted due to the front fuselage and engine. It was agreed that for the pilot to have maintained an effective lookout, and to have mitigated the risk of encountering an aircraft below and in close proximity (as had been the case on this occasion) had required careful consideration. Members noted that the Spitfire had not been fitted with an additional EC device and it was agreed that, without any on-board equipment to alert them

¹ (UK) SERA.3205 Proximity.

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

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

to the presence of the C172, the pilot of the Spitfire had not had situational awareness of the presence of the C172 (**CF2**).

Acknowledging that the installation of an EC device might be aesthetically incongruent with the appearance and authenticity of an iconic aircraft, members were keen to highlight the significant benefit to safety, and situational awareness for the pilot, that such equipment might have provided.

Notwithstanding, it was suggested that more effective visibility forwards may have been achieved by 'weaving' or otherwise manoeuvring in such a way as to maximise the area being scanned. By reference to the narrative report provided by the pilot of the Spitfire, members noted that the C172 had not been sighted until the moment of CPA and agreed that, effectively, it had been a non-sighting (**CF4**).

Concluding their deliberations, members agreed that neither pilot had had situational awareness of the presence of the other aircraft. Additionally, neither pilot had visually acquired the other aircraft in time to have taken any avoiding action. Members agreed that the separation between the aircraft had been reduced to the bare minimum and had only stopped short of an actual collision because providence had played a major part in events (**CF5**). As such, the Board assigned Risk Category A.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2023186				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Flight Elements				
• Tactical Planning and Execution				
1	Human Factors	• 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
• Situational Awareness of the Conflicting Aircraft and Action				
2	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				
3	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				
4	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				
5	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: A.

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:

Flight Elements:

⁴ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

Tactical Planning and Execution was assessed as **partially effective** because the pilot of the C172 had not followed the published procedure to have contacted the Duxford AFISO at 10NM from the aerodrome when intending to join.

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

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the EC device fitted to the C172 would not have been expected to have detected the presence of the Spitfire.

See and Avoid were assessed as **ineffective** because neither pilot had sighted the other aircraft before the moment of CPA.

