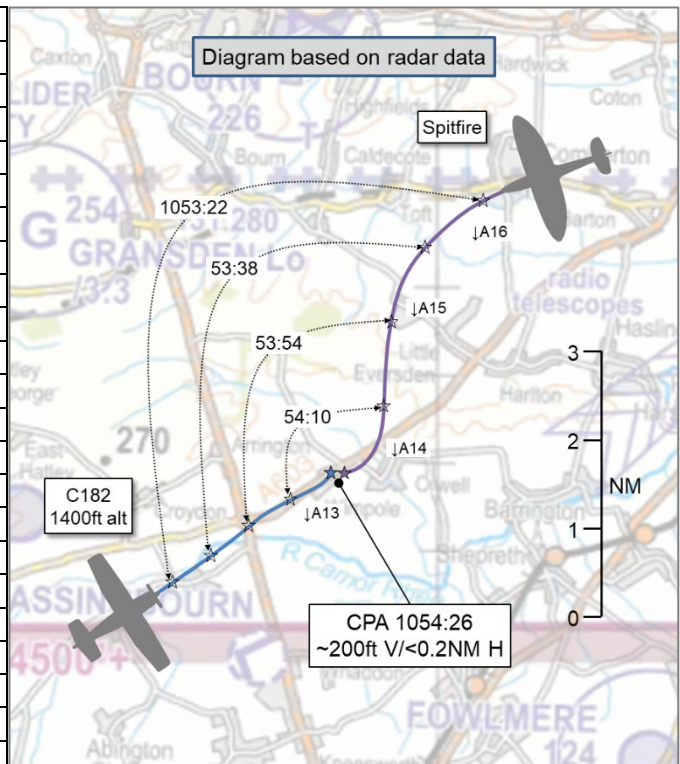


AIRPROX REPORT No 2022058

Date: 26 Apr 2022 Time: 1054Z Position: 5208N 00236W Location: 7NM WNW of Duxford

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C182	Spitfire
Operator	Civ FW	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	None
Provider	Cambridge App	N/A
Altitude/FL	~1200ft	1400ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White	Brown, Green
Lighting	Strobe, Nav, Ldg	Nil
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1500ft	1800ft
Altimeter	QNH (1022/3hPa)	QNH (NR hPa)
Heading	060°	230°
Speed	120kt	200kt
ACAS/TAS	Not fitted	Not fitted
Separation at CPA		
Reported	100ft V/<50m H	500ft V/0.5NM H
Recorded	~200ft V/<0.2NM H	



THE C182 PILOT reports that they were 10NM southwest of Cambridge airport at 1500ft on a direct track towards [their destination]. They had made contact with Cambridge Approach who informed them of various traffic which included Spitfires operating in the area. They shortly then saw a Spitfire fast-moving (approximately 200kt average cruise speed) which would pass in front of their aircraft moving from left-to-right at a distance of approximately 1-2NM and at a similar altitude (100-200ft above). The Spitfire then made a quick right turn towards their path to then become opposite direction traffic. The conflicting aircraft initially appeared as if it would pass along their right-hand side. They rocked their aircraft's wings to make themselves more visible; they then started to turn the aeroplane left at a bank angle of 10-15° to create more separation. The conflicting aircraft continued a shallow descending turn to the right becoming a constant bearing target to their aircraft. With a very fast closing speed of ~300kt there was little time to take avoiding action. They did not want to turn right and/or climb because, if the Spitfire pilot became visual with their aircraft, they would have expected their avoiding action to be a climbing left turn. Between 5 and 10sec before a potential collision it was clear that they had not been seen so they initiated a steep descent to take avoiding action, at which point the Spitfire flew over the top of their aircraft at roughly 100ft.

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

THE SPITFIRE PILOT reports that their flight with a passenger originated from [departure airfield] and, after some 22-23min of flying, a white Cessna high-wing aircraft was spotted a little to the right of the nose and some 500ft below. In their opinion, there was no need to take evasive action as there was little risk of collision and so no action was taken to avoid the aircraft seen. The pilot made a comment to their passenger in case they saw the aircraft and made any comment, because the pilot had asked them to spot other aircraft on the brief prior to departure. They did not call Cambridge Approach because of the additional workload of changing frequency and losing SA on Duxford aircraft. Also, there is additional time spent with the head in the cockpit setting a transponder code soon after take-off while monitoring gear retraction, rad flap position, squelch on the intercom and coolant temperatures, not

forgetting passenger welfare. Their aircraft, amongst others, will soon have [additional electronic conspicuity equipment] or similar warnings in the busy environment of a warbird cockpit.

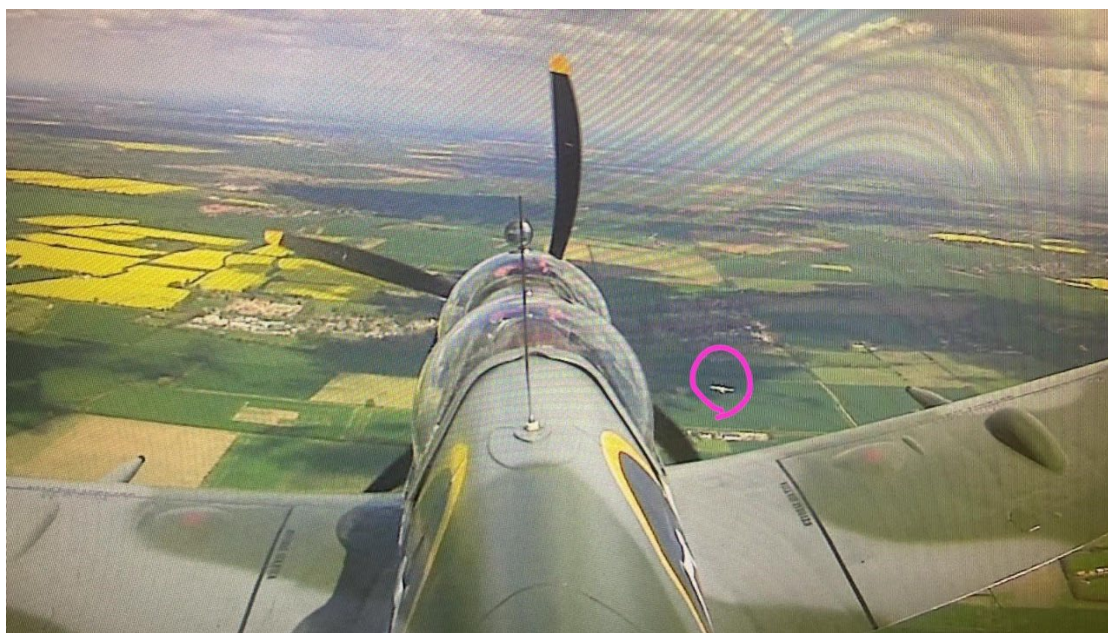


Figure 1 – video capture from camera mounted on the tail of the Spitfire (C182 circled)

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

THE CAMBRIDGE APPROACH CONTROLLER reports that they were called up by [the pilot of the] Cessna 182 which was to the southwest of the airport routing inbound to land. They provided a Basic Service to the [pilot of the] aircraft inbound and warned them of gliding activity in the vicinity and of two Spitfires operating to the southwest of the field which had been reported to the controller by a previous inbound aircraft. [The C182 pilot] was then handed-over to the Tower when it was 5 miles out for joining instructions. [The C182 pilot] filed an Airprox after landing but they did not declare this on frequency, which has [contributed to a delay in the submission] of this report.

THE DUXFORD AFISO reports that [the C182] was unknown to Duxford. Cambridge advised that they *may* be reporting. The incident was beyond the vicinity of the Duxford ATZ and the aircraft were not on the Duxford primary AFIS frequency. The FISO reports being unaware of an Airprox. A Duxford safety report has been filed and the R/T impounded.

Factual Background

The weather at Cambridge Airport was recorded as follows:

METAR EGSC 261050Z 01009KT 330V040 9999 FEW035 14/01 Q1022=

Analysis and Investigation

Cambridge ATC

ADI [Tower] and APP services were split, the weather was good. The traffic situation was generally quite busy in the surrounding airspace; Duxford traffic (including warbird aircraft), an inbound from Biggin Hill (PC12) and gliders transiting to the east from Gransden Lodge.

At 1033, the Tower assistant contacted the Approach controller: "*Duxford have rung to advise that 2 Spitfires were heading east now heading more to the north, towards us.*" This was acknowledged by the APP controller.

It is evident that the APP controller provided good Traffic Information to all aircraft based on the known traffic situation. At 1053 the controller advised [the C182 pilot], that there were multiple gliders and Spitfires in their vicinity (as they routed from the southwest).

The radar recording has been reviewed. The Airprox was believed to have occurred at 1054:24, approximately 8 miles to the southwest of Cambridge. A return believed to be [the Spitfire] was seen squawking 7000, positioning back to Duxford from the north. Mode C indications from both aircraft appeared to be at 1500ft (altitude).

[The C182] then landed without further incident. After landing [the pilot] advised the Tower controller that they had had to take 'quite severe avoiding action' as they saw the Spitfire. The pilot then telephoned the Tower and it was agreed that an Airprox would be filed by both the pilot and ATC. ATC then contacted Duxford to confirm the details of the other aircraft. They confirmed that they believed the aircraft to be [the Spitfire].

In summary, the APP controller provided adequate Traffic Information to [the C182 pilot] and, due to the type of service provided, could do nothing additional to reduce the chance of an Airprox occurring. The incident occurred in Class G airspace and, under a Basic service, pilots are responsible for their own separation from conflicting traffic.

CAA ATSI

The C182 pilot reported that they were inbound to [destination] at the time of the Airprox and were on a direct track from [departure], which is approximately 25NM southwest of Cambridge. The pilot was receiving a Basic Service from Cambridge Approach, which was operating without the benefit of radar.

The Spitfire pilot was on a local flight from [departure airfield] and had departed as part of a formation of two Spitfire aircraft. After departure, the pilots of both aircraft had transferred to frequency 121.405MHz. This frequency is referred to within Duxford procedures as "Duxford Reserve" and is mainly used when display flying, or formation work is being carried out. The FISO monitors this frequency and can talk directly with the pilot.

The Spitfire formation subsequently split and the pilots went their separate ways, approximately 16min prior to the Airprox. The Spitfire pilot subsequently involved in the Airprox reported that they believed they were in receipt of an AFIS from Duxford (122.080MHz) at the time of the event; however, the investigation has established that their RTF call requesting re-join on this frequency took place after the Airprox had occurred.

ATSI had access to reports from the C182 and Spitfire pilots, the Cambridge Approach controller, and the Duxford AFISO. Unit Investigation reports were also made available by Cambridge and Duxford. The RTF recordings from Duxford Information, Cambridge Approach and Cambridge Tower were reviewed for the relevant period. A recording of the Duxford Reserve frequency was also made available and reviewed by ATSI. The poor quality of the transmissions on this frequency made it challenging for the investigator to determine exactly what was said on this frequency. The Area Radar recording was reviewed for the relevant period and the screenshots within this report have been taken from the Area Radar recording.

At 1028:43 the Spitfire pilot reported that the formation was lined-up for departure at Duxford. Prior to lining-up, the Spitfire pilot subsequently involved in the Airprox had advised the AFISO that the formation would be departing to the west, with the Spitfire subsequently involved in the Airprox undertaking a 30min sortie and the other Spitfire a 20min sortie, and that after departure both pilots would change to the Duxford Reserve frequency (121.405MHz).

At 1031:34 the Spitfire formation was issued with an instruction to take off at their discretion.

The Cambridge unit investigation report included a paragraph confirming that Duxford had called Cambridge Tower and advised that there were two Spitfires heading in the Cambridge direction.

The Tower assistant called the Cambridge Approach controller at 1033:00 and passed this information on.

At 1033:05 the Spitfire formation received Traffic Information on unrelated traffic from the Duxford AFISO, and the pilot advised that they were changing to the Reserve frequency (Figure 2). At 1033:24 the Spitfire pilots were heard checking-in with each other on the Reserve frequency. At 1038:23 one of the Spitfire pilots was heard on the Reserve frequency saying, “going off the air” and the other “see you later” (Figure 3).

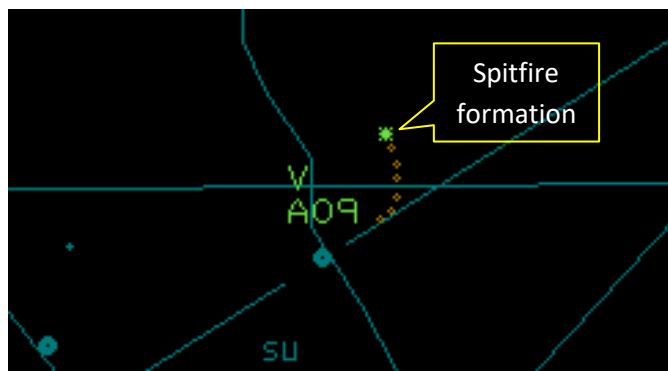


Figure 2 – 1033:05

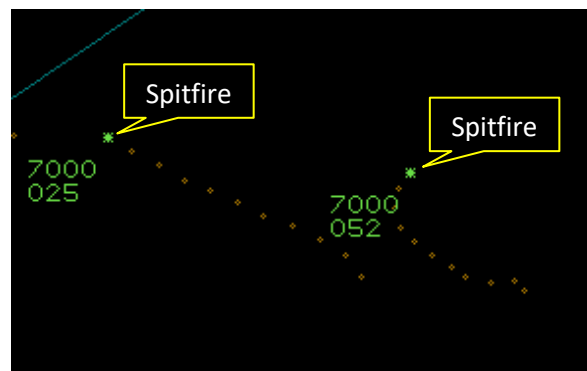


Figure 3 – 1038:23

At 1053:30 the C182 pilot made initial contact with the Cambridge Approach controller, “Hello again [callsign] 15 miles to the southwest, information Hotel, QNH 1023, request Basic Service please.” The controller responded, “[callsign] Cambridge Approach good afternoon, the QNH 1022, Basic Service inbound, squawk 6176”. The pilot correctly read back the squawk and the QNH.

At 1053:40 the controller passed generic Traffic Information to the C182 pilot, “[callsign] just caution out to the southwest, I’ve got intensive gliders with 22 gliders out of Gransden Lodge and a couple of Spitfires currently general handling”. The pilot responded, “roger [callsign]” (Figure 4). At 1054:26 CPA occurred, with the aircraft separated by an indicated 0.2NM laterally and 100ft vertically (Figure 5).

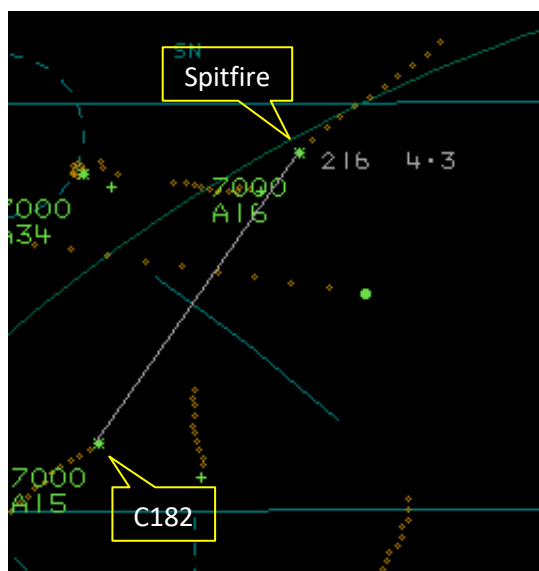


Figure 4 – 1053:40

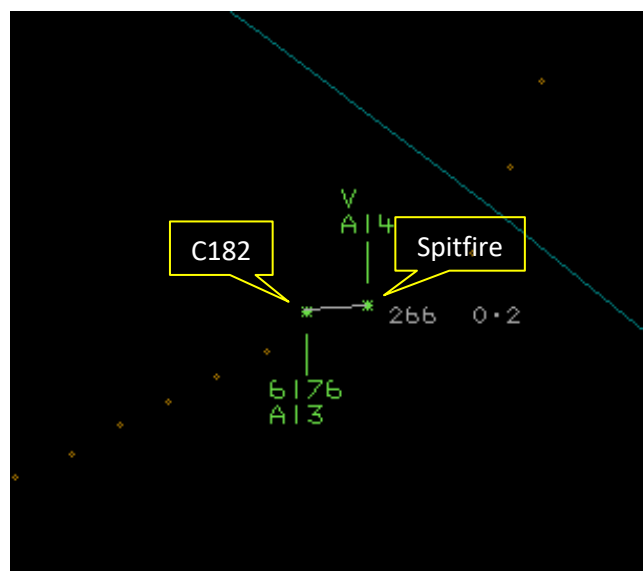


Figure 5 – 1054:26 – CPA

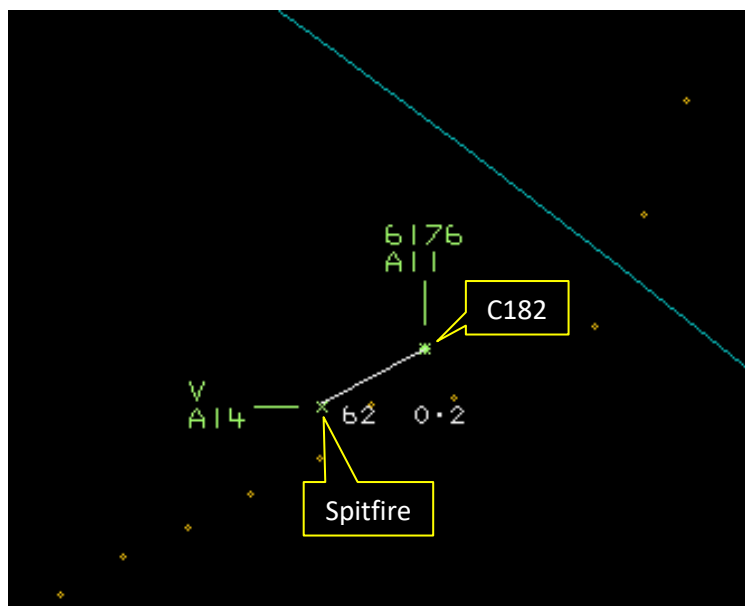


Figure 6 – 1054:30 (tracks crossed)

At 1055:53 the Spitfire pilot called Duxford Information and requested re-join.

At 1056:10 the C182 pilot was transferred from the Cambridge Approach frequency to the Tower frequency. After landing the pilot advised the Tower controller, *“When I was on approach, I was let know of some Spitfire traffic, and I was about 10 miles to the southwest and I saw the aircraft, and I had to take quite serious avoiding action to avoid a head on collision, it went over about 100 feet. Approach were quite busy, so I didn’t get a chance to tell them, so I thought I’d just let you know”*. The Tower controller asked the pilot if they were able to give the Tower a call on the landline to discuss it and the pilot confirmed that they would make the call when they got inside.

Duxford AFIS unit had provided an early ‘heads-up’ to Cambridge ATC that the Spitfires were planning to operate in the Cambridge area, and this enabled generic Traffic Information to be passed by the Cambridge Approach controller to the C182 pilot. The Airprox occurred 21min after the Spitfire had left the primary Duxford Information frequency. The Cambridge controller passed generic Traffic Information to the C182 pilot on the Spitfires as soon as the C182 pilot checked-in on the Cambridge Approach frequency. The Spitfire pilot was not in receipt of an AFIS or ATC service at the time of the Airprox.

Duxford did all that they could in terms of sharing the general location of the Spitfire pilot with Cambridge at the earliest opportunity, and the Cambridge Approach controller passed generic Traffic Information on the Spitfires to the C182 pilot as soon as the C182 pilot came onto the Cambridge Approach frequency. This Traffic Information assisted the C182 pilot to gain visual contact with the Spitfire and take avoiding action.

UKAB Secretariat

An analysis of the NATS radar replay and GPS log file supplied by the C182 pilot was undertaken. Both aircraft were detected by the NATS area radars and so the CPA was measured from this source. As indicated in the screenshots within the ATSI report, the recorded separation prior to the aircraft crossing flightpaths was measured at 0.2NM horizontally and 100ft vertically. However, on the next radar sweep (4sec later) the separation was measured at 0.2NM horizontally and 300ft vertically. Therefore, the CPA is assessed to have occurred between radar sweeps at a separation of <0.2NM horizontally and ~200ft vertically.

The C182 and Spitfire 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

¹ (UK) SERA.3205 Proximity.

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 converging then the Spitfire pilot was required to give way to the C182.³

Summary

An Airprox was reported when a C182 and a Spitfire flew into proximity 7NM west-northwest of Duxford at 1054Z on Tuesday 26th April 2022. Both pilots were operating under VFR in VMC, the C182 pilot in receipt of a Basic Service from Cambridge Approach and the Spitfire pilot not in receipt of a FIS.

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 controller and AFISO involved and a report from the appropriate operating authority. 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 C182 pilot and heard from a GA pilot member that the area in which the Airprox took place can be quite busy with various users from differing provenances sharing the same Class G airspace. The Board heard that several meetings have been conducted that have brought together some of these interested parties to better understand each other's operations in the vicinity of Cambridge and Duxford and members were heartened to hear about this initiative. Returning to the Airprox itself, the Board noted that the C182 pilot had been passed generic Traffic Information by the Cambridge controller regarding Spitfire activity in the vicinity (**CF4**) and considered it likely that this had assisted the C182 pilot in gaining visual contact with the Spitfire. The Board also agreed that the C182 pilot, on sighting the Spitfire as it turned over the top of their aircraft, had become concerned by its proximity (**CF6**) and so had descended to maintain adequate separation.

The Board then considered the actions of the Spitfire pilot and noted that they had selected a frequency on departure that had allowed them to operate as a formation with another aircraft, but that they had no longer been operating as a formation for some 16min prior to the Airprox. There then followed a discussion on the relative advantages of seeking an ATS from Cambridge and members felt that, as a professional pilot, the Spitfire pilot may have been better served in seeking an ATS from Cambridge for their flight (**CF2**). The Board heard from a GA pilot member that the availability of a surveillance-based ATS from Cambridge can be sporadic, but that this should not prevent pilots from contacting Cambridge ATC as the controller's situational awareness (and, therefore, the situational awareness of other pilots communicating with Cambridge) would be enhanced. Furthermore, limited detail of the pilot's intended routing when 'booking out' further strengthens the advantages of communicating with ATC once airborne. The Board also noted that the Spitfire pilot had been operating within 10NM of Cambridge Airport, which has instrument approach procedures, and wished to remind pilots of the note printed on CAA VFR charts, namely: *'Pilots are strongly recommended to contact aerodrome ATSU before flying within 10NM of any aerodrome marked with instrument approach feathers. Note that the feathers only align with the main instrument runway. There may also be approaches to other runways as well. Detailed IAP information is shown in the UK AIP.'* The Board agreed that, in the event, the Spitfire pilot had not had any situational awareness of the presence of the C182 (**CF4**) but had nonetheless sighted the C182 as they proceeded on a southerly track. Members then discussed the Spitfire pilot's actions on sighting the C182 and could not understand why they had turned close to the Cessna and also descended, which had caused the C182 pilot some concern (**CF3**, **CF5**). The Board was, however, heartened to hear that the Spitfire was soon to be carrying additional EC equipment and also wished to encourage the warbird community's attendance at the local airspace users' meetings mentioned above.

Turning to the actions of the Cambridge controller and Duxford AFISO, the Board heard from an ATC advisor that there is an agreement between Duxford and Cambridge regarding warbird operations, where Duxford will pass any information they have regarding the warbirds' intended area of operation to the Cambridge controllers. However, the often sparse information available to the Duxford AFISOs limits the effectiveness of this agreement and the Board wished to highlight the utility of pilots either

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

³ (UK) SERA.3210 Right-of-way (c)(2) Converging.

passing detailed information of routing intentions prior to taxi or, preferably, contacting Cambridge once airborne. The Board agreed that, in the event, the generic nature of the information available to the Duxford AFISO – and hence the Cambridge controller – meant that the Cambridge controller had only had generic situational awareness of the Spitfire's presence (**CF1**) which had limited the usefulness of the Traffic Information that they had passed to the C182 pilot.

Finally, the Board considered the risk involved in this Airprox. Members noted that the pilots' respective estimates of separation differed greatly, and that the C182 pilot had been concerned enough by the proximity of the Spitfire to initiate a descent to maintain separation. Members also took into account the separation recorded by the NATS radars and noted that, although there had only been approximately 200ft of vertical separation, the lateral separation had been in the order of 0.1-0.2NM. Additionally, the Board noted that the Spitfire pilot had had the C182 in sight throughout their turn and, therefore, members agreed that this had removed any risk of collision. Accordingly, the Board assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2022058				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Ground Elements				
• Situational Awareness and Action				
1	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
Flight Elements				
• Tactical Planning and Execution				
2	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
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	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
• See and Avoid				
5	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
6	Human Factors	• Perception of Visual Information		Pilot was concerned by the proximity of the other aircraft

Degree of Risk: C

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:

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

Situational Awareness of the Confliction and Action were assessed as **partially effective** because the Cambridge Approach controller had only generic information regarding the operations of the Spitfires (which they passed to the C182 pilot).

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because the Spitfire pilot chose not to communicate with the Cambridge Approach controller, and took insufficient action to ensure adequate separation from the C182 when they sighted it.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the C182 pilot had only generic situational awareness that there were Spitfires operating in the vicinity of Cambridge, and the Spitfire pilot had no situational awareness regarding the presence of the C182.

See and Avoid were assessed as **partially effective** because the Spitfire pilot, having sighted the C182, flew close enough to the C182 to cause its pilot concern.

