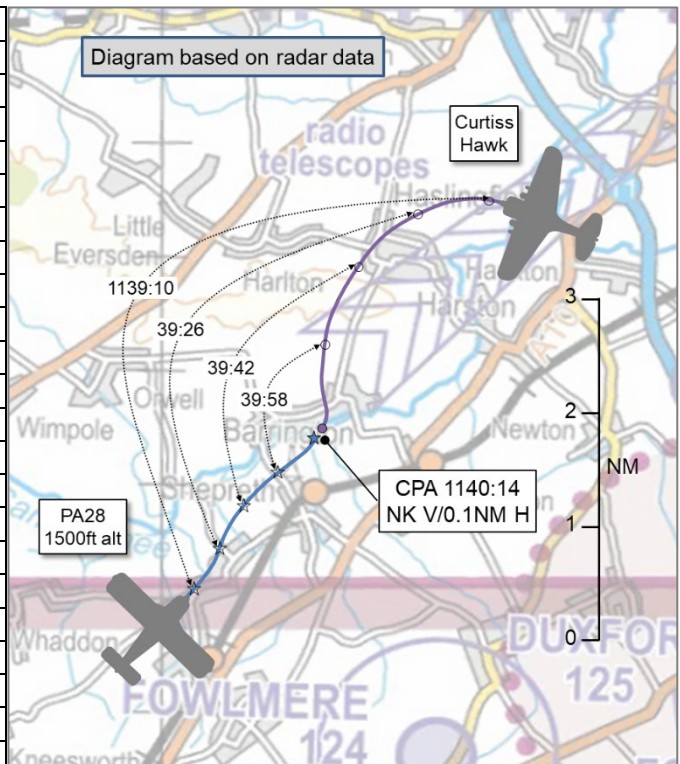


AIRPROX REPORT No 2021174

Date: 01 Sep 2021 Time: 1140Z Position: 5208N 00002E Location: 7NM SW Cambridge Airport

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	PA28	Curtiss Hawk
Operator	Civ FW	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	AFIS
Provider	Cambridge App	Duxford Info
Altitude/FL	A015	NR
Transponder	A, C, S	Off
Reported		
Colours	White	Grey, green, brown
Lighting	NR	Nil
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1400ft	1400
Altimeter	QNH (NK hPa)	QFE (NK hPa)
Heading	050°	'Southerly'
Speed	100kt	165kt
ACAS/TAS	Not fitted	Not fitted
Separation at CPA		
Reported	0ft V/<1NM H	100ft V/0.3NM H
Recorded	NK V/0.1NM H	



THE CAMBRIDGE APPROACH CONTROLLER reports that they were working as the APS ATCO. [The PA28 pilot] reported CAM outbound for a procedural NDB approach RW05. They made a call to Duxford in accordance with their LoA informing them of the activity on the RW05 instrument approach. They replied that they had Sally B outbound from them (unknown direction) and a warbird, a Curtiss [Hawk], out shortly too. The Cambridge controller passed updated Traffic Information to [another aircraft] on a previously called primary-only traffic, allowing [the PA28 pilot] to complete their base turn so, when the controller called traffic to them, they were facing in the correct direction to spot the traffic. As [the PA28 pilot] established on final approach, there was a faint primary contact north of the RW05 final approach. The controller called the traffic, which was at a range of 3 miles in [the PA28 pilot's] 11-12 o'clock routing NW, and rang ADI who reported visual with the traffic operating at the base of cloud coverage. The controller reported this to the pilot and asked if they wished to continue the approach and if they were visual. The pilot reported that they were visual and happy to continue the approach. The unknown aircraft then turned at [the PA28] and the controller updated the Traffic Information; however, not knowing the level left the controller very limited options for avoiding action. The pilot then reported breaking-off the approach and continuing visually. The controller asked the pilot if they were happy to continue maintaining their own separation, which they confirmed that they were. They asked the pilot if they wished to file an Airprox, to which they replied in the negative and then accepted the controller's offer of radar vectors for an ILS approach RW23.

THE PA28 PILOT reports that the purpose of the flight was to provide instrument training for the owner of [the PA28] whose IR(R) had lapsed. On the flight into Cambridge from [their departure airfield], on first contact with Cambridge, they were offered a radar service. Subsequently, they were cleared for an NDB/DME approach to RW05 at Cambridge. During the approach, the Cambridge controller advised them of, initially, contact with a Tiger Moth and then a DH Rapide; neither contact posed a threat. After leaving the hold at CAM NDB, they descended to the platform altitude of 1600ft QNH and established on the inbound track at 1600ft QNH at 8.5DME. Between 8.5DME and top of descent at 5.5DME, the Cambridge controller started advising them of an unknown contact at unknown altitude tracking straight

towards them and asking if they were visual with that contact. Fortunately, the pilot was in VMC at that time and visual contact was made with an aircraft coming straight towards them at what was judged to be the same altitude and on a track of around 200°. The pilot of the other aircraft appeared not to have seen them, as no attempt was made by the other pilot to turn right to pass behind them [they thought]. A right turn by the pilot of the other aircraft would have resolved the conflict easily. Because they judged that a collision was imminent, and the other pilot appeared to have not seen them – i.e. they maintained heading and height – and a turn to the right by the PA28 pilot would have resulted in certain collision, they made the decision to turn towards the conflicting aircraft to go behind it. At that point, they believe the pilot of the other aircraft – a vintage warbird of unspecified type – saw them and took similar evading action – a turn to the left. The PA28 pilot understands that the pilot of the other aircraft was not transponding nor talking to Cambridge ATC, despite flying through Cambridge’s published instrument approach track. Hence the Cambridge controller had no idea what altitude this aircraft was flying at and was unable to offer avoidance advice. Note that, at a closing speed of probably in excess of 200kt, the 3NM from 8.5 to 5.5DME gave the PA28 pilot less than 1min to identify the threat, assess the threat and take appropriate action.

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

THE CURTISS HAWK PILOT reports that they were in a left turn when they saw the other aircraft head-on at their 1 o’clock and at an estimated range of 2000-3000ft. They increased their left turn as this would create separation and, when de-conflicted, reversed hard right to keep the other aircraft in sight.

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

THE DUXFORD AFISO reports that neither FISO on duty can recall any Airprox reports being made, either by RTF or by telephone. They were unaware of this Airprox prior to receiving a request from the UKAB Secretariat for the RTF recordings.

Factual Background

The weather at Cambridge City Airport was recorded as follows:

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METAR EGSC 011120Z 04009KT 9999 VCSH FEW010 BKN015 16/12 Q1032=
METAR EGSC 011150Z 02008KT 9999 VCSH SCT015 BKN035 17/12 Q1032=
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Analysis and Investigation

Cambridge City Airport ATC

The APS ATCO was working under moderate traffic levels and made all of the required calls in accordance with the Cambridge/Duxford LOA. [The PA28 pilot] was given Traffic Information when the primary-only aircraft was deemed to be a conflict (it had previously been diverging). The APS ATCO took all reasonable steps at their disposal to ensure the aircraft was safe and took all practicable steps under the provision of a Traffic Service.

CAA ATSI

The PA28 pilot was carrying out an RNP approach to RW05 at Cambridge for IR training and in receipt of a Traffic Service from Cambridge ATC. The Curtiss Hawk was on a VFR local flight to the north of Duxford and was still on the Duxford Information frequency. The Hawk pilot reported being in receipt of an “*Aerodrome Information Service*”, but this would not have been an applicable service in the area within which they were operating. ATSI had access to reports from both pilots, and the Cambridge controller and unit investigation reports. A review of the recordings of the relevant Cambridge and Duxford RTF was also completed. Snapshots included in this report have been taken from the area radar replay and do not represent the situational display available to the Cambridge radar controller at the time.

At **1133:30** the PA28 pilot reported *“Beacon outbound”* for the RW05 RNP approach to Cambridge (Figure 1). The Cambridge radar controller instructed the PA28 pilot to descend in accordance with the procedure and requested a *“base-turn complete”* call, which was acknowledged by the pilot. The controller then passed Traffic Information on a contact, which they believed to be a Tiger Moth operating to the west of Cambridge city, not above 1500ft. This was based on previous information passed to them by the pilot of that aircraft which was receiving a Basic Service from Cambridge. The controller then went on to pass reciprocal Traffic Information to the pilot of the Tiger Moth on the PA28. At **1134:38** the controller instructed the pilot of the PA28 to *“squawk ident”* and requested their level. The controller identified the PA28 and a Traffic Service was agreed. The controller then provided updated Traffic Information on the Tiger Moth at **1134:42** (Figure 2).

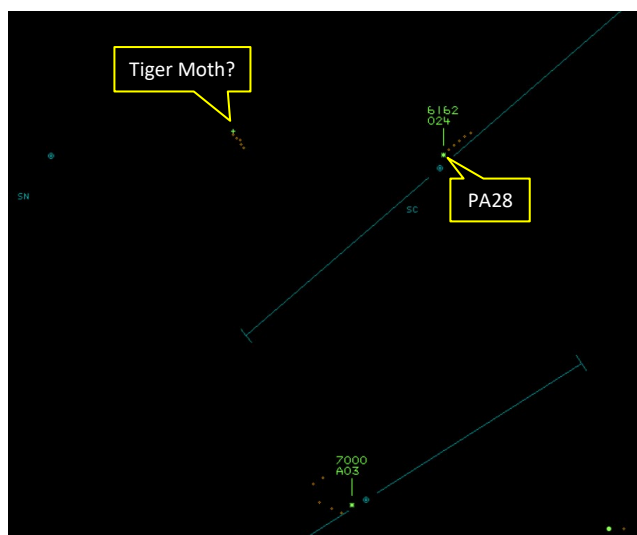


Figure 1 – 1133:30

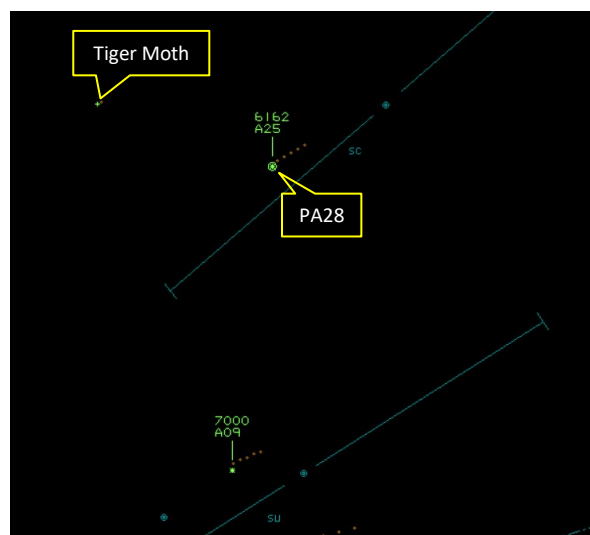


Figure 2 – 1134:42

At Duxford, the Curtiss Hawk [pilot] reported ready for departure. At **1135:35** the Duxford AFISO advised the Hawk pilot *“just caution, the 05 RNP is active at Cambridge....”* which was acknowledged by the pilot; *“Roger. Hawk copied information, taking-off Grass 06”*. At **1137:05** the Cambridge controller again passed Traffic Information to the pilot of the PA28 on the Tiger Moth, following which the pilot of the Tiger Moth advised the controller of their exact position and intentions. At **1137:26** a contact believed to be the Curtiss Hawk appeared on the area radar replay (Figure 3). At **1137:55** the controller passed Traffic Information to another aircraft before, at **1138:18**, going on to pass the PA28 pilot their instructions following the approach (Figure 4).

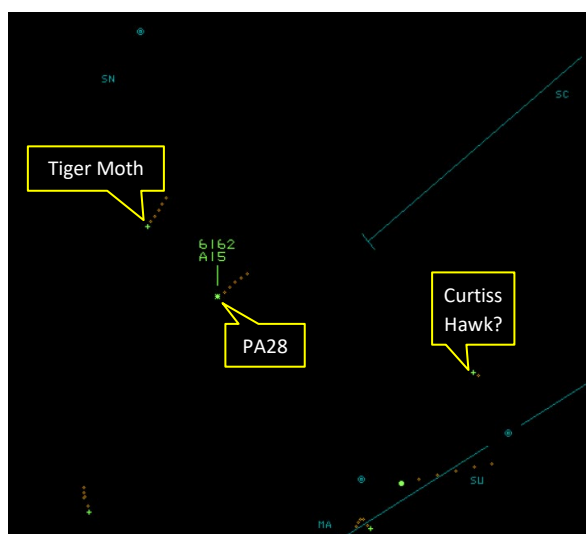


Figure 3 – 1137:26

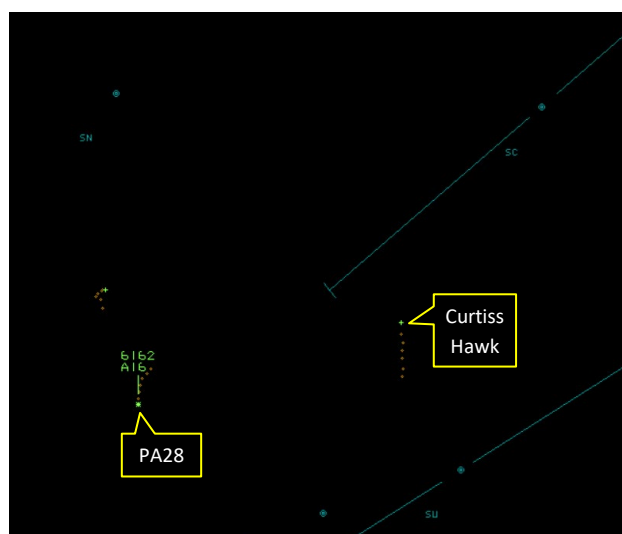


Figure 4 – 1138:18

At **1139:00** the contact believed to be the Curtiss Hawk passed through the Cambridge RW05 instrument approach area (Figure 5). At **1139:15** the Cambridge controller passed Traffic Information to another aircraft (Figure 6).

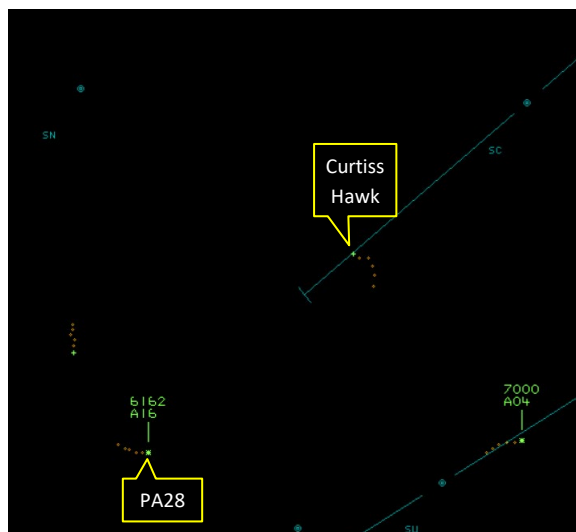


Figure 5 – 1139:00

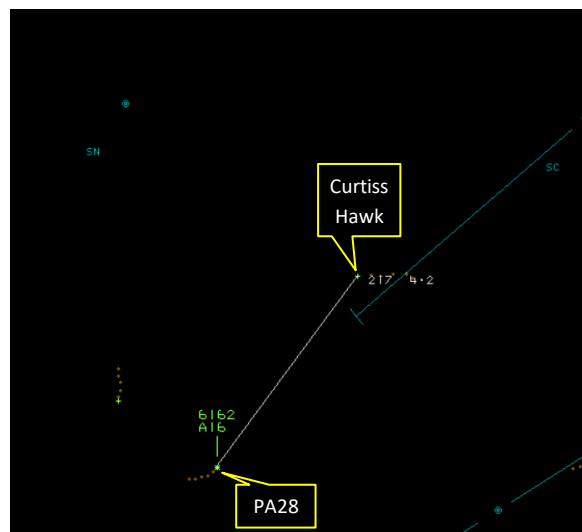


Figure 6 – 1139:15

At **1139:28** the Cambridge controller passed Traffic Information to the PA28 pilot on the Curtiss Hawk; “*traffic left 11 o’clock, 3 miles, manoeuvring, no height information - believed to be a Curtiss*”, to which the PA28 pilot replied; “*looking*”. The controller then went on to say; “*there was traffic observed from the control tower, approximately at the base of solid, er correction, of the cloud base. Suggest about 1500ft or below. Do you have the traffic in sight?*” (Figure 7). The PA28 pilot replied; “*er looking – er visual (callsign)*”. The controller asked; “*you happy to continue the approach?*”, to which the PA28 pilot confirmed that they were. Then at **1140:08** the PA28 pilot called; “*er, we’ve changed our approach, erm, we’re converging*” (Figure 8).

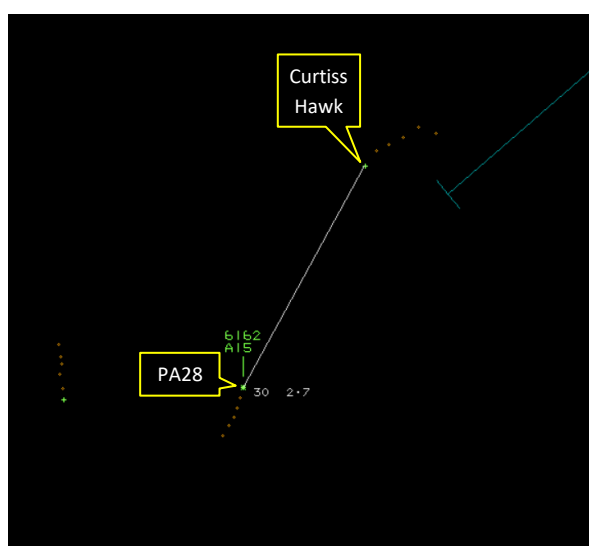


Figure 7 – 1139:40

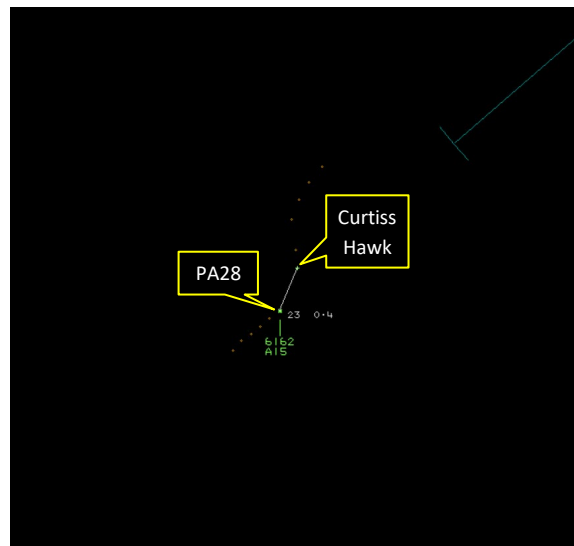


Figure 8 – 1140:08

The controller asked, at **1140:15**; “*roger – just confirm you’re visual and happy to take your own avoiding action?*” (Figure 9). The PA28 pilot replied; “*er, we’ve already avoided him and er we’ll go back to a visual approach*” (Figure 10). The radar contact for the Curtiss Hawk was subject to jitter between **1140:15** and **1140:19** and so the exact CPA could not be determined.

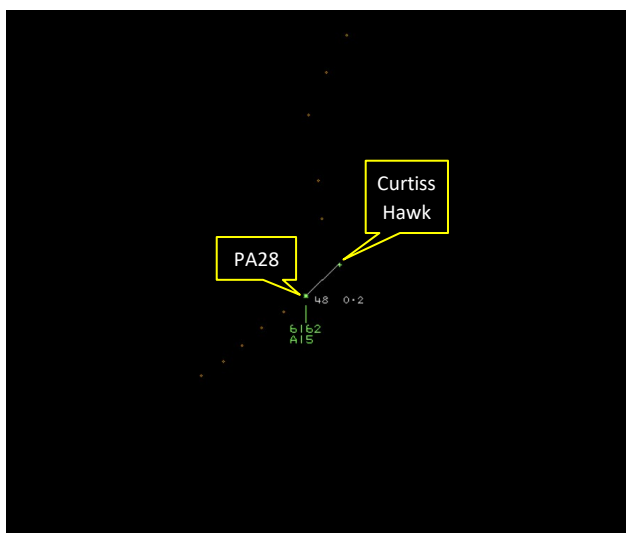


Figure 9 – 1140:15

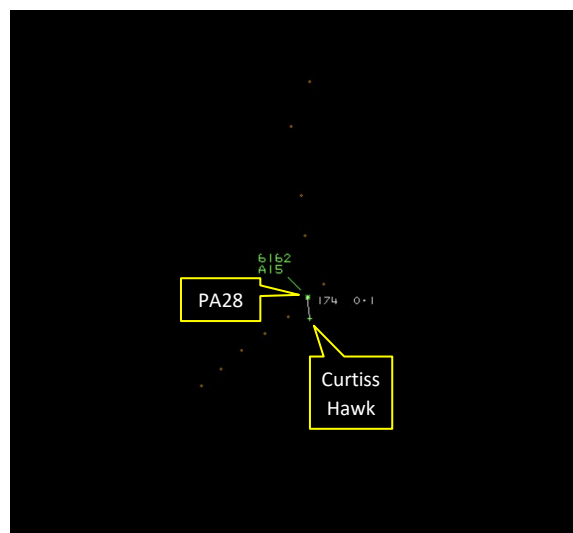


Figure 10 – 1140:19

Having been in the Cambridge hold and passed through the Cambridge radar overhead, the Cambridge radar controller correctly re-identified the PA28 to provide a Traffic Service and went on to pass good Traffic Information on the traffic in their vicinity, including the Curtiss Hawk. The Traffic Information on the Hawk was passed nearly 1min before the estimated CPA, with the PA28 pilot reporting visual with it approximately 30sec before that point. Under a Traffic Service, the pilot remained responsible for collision avoidance, and the controller also confirmed with the PA28 pilot at the time that they were happy to continue their approach having acquired visual contact with the Hawk.

The pilot of the PA28 reported having to take an avoiding action turn to the left, and then seeing the Curtiss Hawk apparently also taking avoiding action to the left.

The pilot of the Curtiss Hawk reported that they were already in a left turn before then becoming visual with the PA28 “*head-on*”, and so increased their rate of turn “*as this would create separation*”, suggesting that, up until that point, they had neither been aware of the presence of the PA28 nor visual with it.

The example set by the pilot of the Tiger Moth, which was not transponding, by contacting Cambridge Radar and keeping them informed as to their level and intentions whilst flying in the vicinity of Cambridge Airport, provided all with good situational awareness, and allowed the PA28 to complete their training without interruption.

A letter of agreement exists between Duxford and Cambridge ATSUs, requiring Cambridge to notify Duxford of any aircraft carrying out instrument approaches to RW05 at Cambridge. The Duxford AFISO is then to “*inform any traffic they believe is intending to cross the Cambridge Final Approach Track of the traffic making an approach to Runway 05 at Cambridge and advise the aircraft to call Cambridge APP/APS when possible*”. The Duxford AFISO had advised the pilot of the Hawk of the active status of the Cambridge RW05 instrument approach, and this had been acknowledged by the pilot. No evidence could be found that the Duxford AFISO had suggested to the pilot of the Hawk that they contact Cambridge. The pilot of the Tiger Moth, which had departed Duxford earlier, advised the Duxford AFISO that they were going to contact Cambridge without any such prompt. The Curtiss Hawk, which was neither transponding nor [was the pilot] in communication with Cambridge ATC, then proceeded to fly through the Cambridge instrument approach to RW05.

UKAB Secretariat

The PA28 and Curtiss Hawk 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

¹ (UK) SERA.3205 Proximity.

is considered as converging then the Curtiss Hawk pilot was required to give way to the PA28.² When an aircraft carries a serviceable SSR transponder, the pilot shall operate the transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where SSR is used for ATS purposes.³

Summary

An Airprox was reported when a PA28 and a Curtiss Hawk flew into proximity 7NM SW of Cambridge Airport at 1140Z on Wednesday 1st September 2021. Both pilots were operating under VFR in VMC, the PA28 pilot in receipt of a Traffic Service from Cambridge Approach and the Curtiss Hawk pilot in receipt of an AFIS from Duxford Information, although outside the operational coverage for this type of ATS.

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.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided a combination of written contributions and dial-in/VTC comments.

The Board first considered the actions of the PA28 pilot. Members noted that they had been established on the instrument approach procedure at Cambridge and that the controller had passed them Traffic Information on the Curtiss Hawk, albeit this had been without a definitive altitude and so had only provided the PA28 pilot with generic situational awareness (**CF7**). That said, members agreed that the passage of Traffic Information had permitted the PA28 pilot to become visual with the Curtiss Hawk at an early enough stage to be able to monitor the situation as it developed. The Board then heard from a pilot member with experience of instructing instrument training that, once established on the procedure, any unplanned deviation would necessitate the whole procedure being re-started. This then prompted a discussion about whether or not the PA28 pilot had taken early enough action once they had sighted the Curtiss Hawk or whether they had continued on the procedure to a point where their only option had been to take avoiding action. Whilst some members felt that the PA28 pilot may have been able to manoeuvre to ensure separation from the Curtiss Hawk slightly earlier, the Board acknowledged that this would have been detrimental to their training objectives and so, given that the PA28 pilot had been visual with the Curtiss Hawk, did not consider that their actions had been contributory to the Airprox.

Turning to the actions of the Curtiss Hawk pilot, the Board wondered why they had not turned their transponder on, in accordance with the requirements of (UK) SERA.13001. This action had denied information to the Cambridge controller and, although the PA28 had not been fitted with any additional electronic conspicuity equipment in this instance, may also have denied situational awareness of the Curtiss Hawk's presence to other aircraft in the area; the Board agreed that the Curtiss Hawk pilot's decision to leave their transponder off had contributed to the Airprox (**CF3, CF6**). Members noted that the Duxford AFISO had informed the Curtiss Hawk pilot prior to their departure that the instrument approach to RW05 at Cambridge had been active, and the Board felt that the Curtiss Hawk pilot may have been better served by calling Cambridge ATC to inform them of their intentions or perhaps to have modified their intended area of operation (**CF4, CF5**). The Board agreed that, without the benefit of any information from the Cambridge controller regarding the activity of the PA28, the Curtiss Hawk pilot had only had generic situational awareness that the Cambridge RW05 approach had been active (**CF7**). This had left the Curtiss Hawk pilot relying on lookout to detect other aircraft and, specifically, any aircraft established on the RW05 instrument approach. Members agreed that the Curtiss Hawk pilot

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

³ (UK) SERA.13001 Operation of an SSR transponder (a).

had taken evasive action as soon as they had sighted the PA28, but that their sighting of the PA28 had been late (CF8).

The Board then considered the actions of the Cambridge controller and the Duxford AFISO. Members noted that the Cambridge controller had informed Duxford of the active instrument approach to RW05 in accordance with their Letter of Agreement (LoA) with Duxford. However, the Board also noted that this LoA requires that the Duxford AFISO inform pilots intending to operate in that area of the active instrument approach and, importantly, suggest that pilots contact Cambridge Approach; this latter element of the requirements on Duxford had not been implemented by the Duxford AFISO and the Board agreed that this had been contributory to the Airprox (CF1). Members noted that the Curtiss Hawk had appeared unexpectedly on the Cambridge Approach controller's radar and that the controller had been concerned by the proximity of the Curtiss Hawk to the PA28 (CF2). The Board applauded their efforts in passing the most accurate Traffic Information that they could have, given that the Curtiss Hawk had not been transponding, and ensuring that the PA28 pilot had been in a position to sight the Curtiss Hawk.

Finally, the Board considered the risk involved in this Airprox. Members noted that, although the Curtiss Hawk had not been transponding, the NATS radars had captured a primary-only track and this had enabled a lateral separation to be measured on the radar. The Board then discussed the vertical element of the separation as this had not been recorded and noted that neither pilot had assessed the vertical separation to be any more than 100ft. Whilst some members felt that this had represented a close encounter, the fact that the PA28 pilot had seen the Curtiss Hawk with sufficient time to assess the situation and take avoiding action when deemed necessary had effectively removed any collision risk. Therefore, the Board agreed that, whilst safety had been reduced, there had been no risk of collision and accordingly assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021174			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Ground Elements				
• Regulations, Processes, Procedures and Compliance				
1	Human Factors	• ATM Regulatory Deviation	An event involving a deviation from an Air Traffic Management Regulation.	Regulations and/or procedures not fully complied with
• Situational Awareness and Action				
2	Human Factors	• Expectation/Assumption	Events involving an individual or a crew/team acting on the basis of expectation or assumptions of a situation that is different from the reality	Concerned by the proximity of the aircraft
Flight Elements				
• Regulations, Processes, Procedures and Compliance				
3	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				
4	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
5	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
6	Human Factors	• Transponder Selection and Usage	An event involving the selection and usage of transponders	
• Situational Awareness of the Conflicting Aircraft and Action				
7	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late or only generic, Situational Awareness
• See and Avoid				

8	Human Factors	• Identification/Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
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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:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Duxford AFISO did not suggest to the Curtiss Hawk pilot that they contact Cambridge Approach (in accordance with the Letter of Agreement between the 2 ATC units).

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Curtiss Hawk pilot had selected their transponder off, contrary to the requirements of (UK) SERA.13001.

Tactical Planning and Execution was assessed as **ineffective** because the Curtiss Hawk pilot had planned to operate in the vicinity of the Cambridge Airport instrument approach lane whilst it was active and did not contact the Cambridge Approach controller.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Curtiss Hawk pilot had only generic situational awareness that the Cambridge instrument approach was active, and the PA28 pilot did not have any height information in relation to the Curtiss Hawk.

See and Avoid were assessed as **partially effective** because the PA28 pilot delayed taking action once they had sighted the Curtiss Hawk, and the Curtiss Hawk pilot did not see the PA28 until a late stage.

⁴ 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: 2021174 Outside Controlled Airspace

Barrier		Provision	Application	Effectiveness		
				Barrier Weighting		
		0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	✓	⚠	[Yellow bar: 0% to 5%]		
	Manning & Equipment	✓	✓	[Green bar: 0% to 2.5%]		
	Situational Awareness of the Confliction & Action	⚠	✓	[Green bar: 0% to 15%]		
	Electronic Warning System Operation and Compliance	⊘	⊘	[Grey bar: 0% to 2.5%]		
Flight Element	Regulations, Processes, Procedures and Compliance	✓	⚠	[Yellow bar: 0% to 10%]		
	Tactical Planning and Execution	✓	✗	[Red bar: 0% to 10%]		
	Situational Awareness of the Conflicting Aircraft & Action	⚠	✓	[Yellow bar: 0% to 20%]		
	Electronic Warning System Operation and Compliance	⊘	⊘	[Grey bar: 0% to 15%]		
	See & Avoid	✓	⚠	[Yellow bar: 0% to 20%]		
Key:		Full	Partial	None	Not Present/Not Assessable	Not Used
Provision	✓	⚠	✗	⊘		
Application	✓	⚠	✗	⊘	⊘	
Effectiveness	Green	Yellow	Red	Grey	Red box	