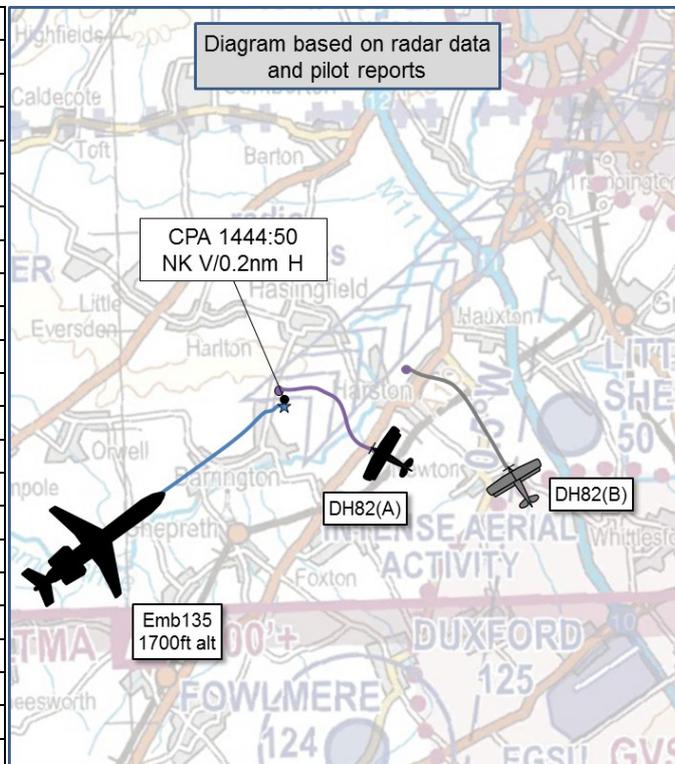


## AIRPROX REPORT No 2019072

Date: 17 Apr 2019 Time: 1444Z Position: 5208N 00002E Location: Cambridge

### PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

| Recorded    | Aircraft 1           | Aircraft 2     |
|-------------|----------------------|----------------|
| Aircraft    | EMB135               | DH82(A)        |
| Operator    | Civ Comm             | Civ FW         |
| Airspace    | London FIR           | London FIR     |
| Class       | G                    | G              |
| Rules       | Not reported         | VFR            |
| Service     | Traffic <sup>1</sup> | Basic          |
| Provider    | Cambridge            | Duxford        |
| Altitude/FL | 1700ft               | NK             |
| Transponder | A, C, S              | None           |
| Reported    |                      |                |
| Colours     | Not reported         | Camo, Yellow   |
| Lighting    | Not reported         | Not reported   |
| Conditions  | VMC                  | VMC            |
| Visibility  | Not reported         | >10km          |
| Altitude/FL | Not reported         | 1200ft         |
| Altimeter   | Not reported         | QNH            |
| Heading     | Not reported         | 300°           |
| Speed       | Not reported         | 70kts          |
| ACAS/TAS    | TCAS II              | Not fitted     |
| Alert       | None                 | N/A            |
| Separation  |                      |                |
| Reported    | N/R                  | 300ft V/500m H |
| Recorded    | NK V/0.2nm H         |                |



**THE CAMBRIDGE CONTROLLER** reports that he was providing a Traffic Service and vectoring an EMB135 onto the NDB final approach to land RW05 at Cambridge he recalled. DH82(B) pilot (not squawking) called to cross the instrument approach at 1200ft, 4 DME, so he asked them to keep clear of the instrument approach for a couple of minutes due to jet traffic established on the final approach. The DH82(B) pilot declined to comply with the request and stated he would track to the west (he assumed to increase vertical separation). He passed this Traffic Information to the EMB135. An unknown aircraft (not squawking) then popped up on the final approach, 1.8nm in front of the EMB135 [this was DH82(A)]. He passed Traffic Information on this aircraft to the EMB135 pilot and asked if he wanted to break off his instrument approach, which he did. He gave avoiding action and updated the Traffic Information on this popup aircraft as the EMB135 passed it at less than 0.25nm. He also updated the Traffic Information on DH82(B); the EMB135 pilot reported visual with the 2nd aircraft and continued the approach visually without further incident. Cambridge does not always operate with radar and if the EMB135 IFR arrival had been under a Procedural Service with Cambridge then it may not have had pertinent Traffic Information. The controller opined that another safety issue would have been wake turbulence from the EMB135, because it was “Medium” [ICAO wake turbulence category], as it overflew the light-aircraft.

**THE EMB135 PILOT** reports that he was on a positioning flight. He requested an RNAV approach for RW05. Whilst being vectored by Cambridge the crew became aware of a light-aircraft, possibly a Tiger Moth, also working Cambridge and reported to be remaining south of the instrument approach. During the approach, ATC warned him that the light-aircraft was crossing the instrument approach in front of

<sup>1</sup> Traffic Service reported by controller, the Emb135 had not been provided with a service from Cambridge up to the time of the Airprox.

them and gave them the option of breaking off the approach. They were visual with the light-aircraft below them and heading away so they continued to make a visual approach. Separation distances were hard to judge.

**THE DH82(A) PILOT** reports that he was routing NW towards Wimpole Hall. As he neared his initial cruising altitude of 1200ft, he observed a business jet in his 10 o'clock, roughly 1/2nm away and a few hundred feet above. He chose to descend to increase separation, levelling at about 1000ft. As part of his flight planning, he plans his maximum altitude in the vicinity of the Cambridge airport approach feathers to be no more than 1200ft when Cambridge are likely to be using RW05. He also stays west of the M11.

## **Factual Background**

The weather at Cambridge was recorded as follows:

METAR EGSC 171420Z VRB03KT 7000 FEW030 17/10 Q1019

## **Analysis and Investigation**

### **CAA ATSI**

An Airprox was reported when an EMBRAER EMB135 (EMB135) and a DE HAVILLAND Tiger Moth (DH82) came into proximity 6nm west of Cambridge Airport. The EMB135 was positioning from Luton to Cambridge and was being vectored for an RNAV approach to RW05 at Cambridge at the time of the Airprox. The pilot report did not contain information on the type of flight rules that the aircraft was being operated under at the time of the Airprox. The type of ATC service being provided to the pilot had not been agreed. The Cambridge Radar controller stated in their report that they believed that they were providing a Traffic Service. As such this report was prepared using the assumption that a Traffic service was being provided to the EMB135 pilot.

The DH82 was one of two DH82 aircraft on local flights from Duxford. The DH82(B) pilot referred to throughout this report was not involved in the Airprox. The DH82(A) was involved in the Airprox and was not known traffic to the Cambridge Controller; the DH82(A) pilot was in receipt of a Flight Information Service from Duxford Information at the time of the Airprox.

The screenshots in this report have been taken from both the area radar recording, (which are not necessarily indicative of what was displayed on the Cambridge radar display), and the Cambridge radar recording, (which is indicative of what was displayed on the Cambridge radar display). This is particularly relevant due to both DH82 aircraft displaying consistently on the area radar replay but DH82(A) aircraft being described as pop-up traffic by the Cambridge controller. The R/T was constantly busy throughout the period leading up to the incident.

At 1440:00, the EMB135 pilot (transponding code 4226) made initial contact with the Cambridge Radar controller advising that they were at 4000ft routing direct to the CAM. The controller asked the pilot what type of approach and service they required. The pilot requested vectors for an RNAV approach RW05 but did not state what type of service they required. The controller instructed the pilot to turn left heading 270° and confirmed that it would be vectors for the RNAV approach RW05. The controller did not press the pilot for a response to the type of service required.

At 1440:20, the controller instructed the EMB135 pilot to continue the left turn heading 250°.

At 1440:30, an unrelated aircraft (transponding code 6163) called requesting a Basic Service. The pilot was instructed to standby.

At 1440:40, the controller instructed the EMB135 pilot to descend to altitude 2000ft QNH 1019.

At 1441:30, the controller talked to the unrelated aircraft, established that they wished to route west to east via the Cambridge overhead, agreed a Basic Service and passed Traffic Information on another unrelated contact.

At 1442:00 (Figure 1), the controller passed Traffic Information to the EMB135 pilot advising them that they had traffic in their right 2 o'clock, range of 4 miles, passing down their right-hand side, a caravan, maintaining 12,000 feet. The pilot responded with 'Roger'. This was followed by further traffic described as 12 o'clock, range 4 miles, indicating 2000 feet, westbound. The controller advised the pilot that they would be turning them before that traffic. The pilot responded with 'Roger'. The controller then asked the EMB135 pilot if they could accept one turn onto final approach. The pilot responded 'Affirm'.

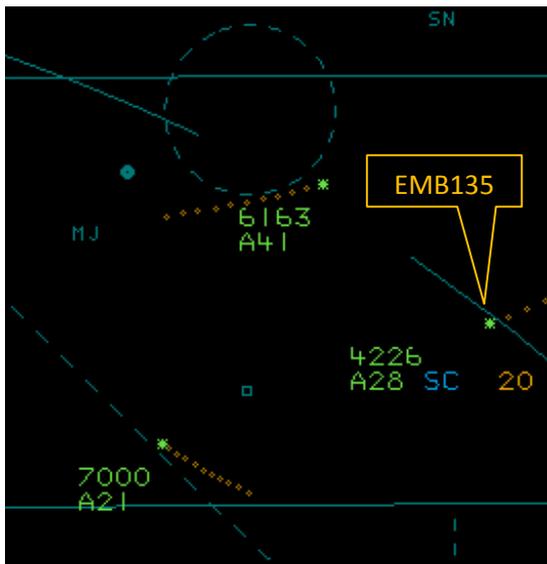


Figure 1-1442:00 Area Radar

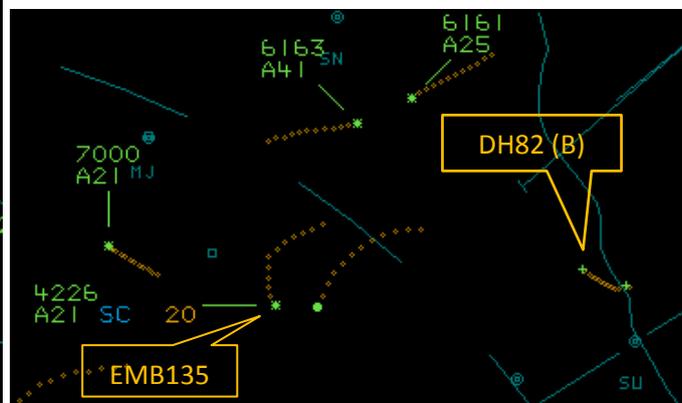


Figure 2-1442:50 Area Radar

At 1442:10, the pilot confirmed that they could accept one turn onto final approach and the controller instructed the pilot to turn left heading 080° and report established on the final approach track.

At 1442:30, the controller then turned their attention to the two unrelated aircraft who were operating to the north of the EMB135 and were approaching each other head on. Two-way traffic information was passed to the pilots and acknowledged.

At 1442:50 (Figure 2), the controller turned their attention back to the EMB135 pilot and instructed them to continue their left turn onto heading 060°.

At 1442:57 (Figure 3), only one DH82 (DH82(B)) was displayed on the Cambridge Radar Display.



Figure 3-1442:57 Cambridge Radar

At 1443:00, an unrelated aircraft called advising that they were changing frequency. The controller acknowledged.

At 1443:29 (Figure 4), DH82(A) first appeared on the Cambridge Radar Display.



Figure 4-1443:29 Cambridge Radar

At 1443:40 (Figure 5), the DH82(B) pilot made initial R/T contact with the Cambridge Radar controller and requested a Basic Service. The controller responded that it would be a Basic Service, QNH 1019, and asked the pilot to confirm what level they were climbing to. The pilot advised that they were level at 1200 feet on 1019 and that they would report at Maddingly. The controller passed Traffic Information on the EMB135 advising that it was 9 miles on final approach RW05, at 2000ft descending with the procedure, inbound to Cambridge. The pilot acknowledged with their callsign.

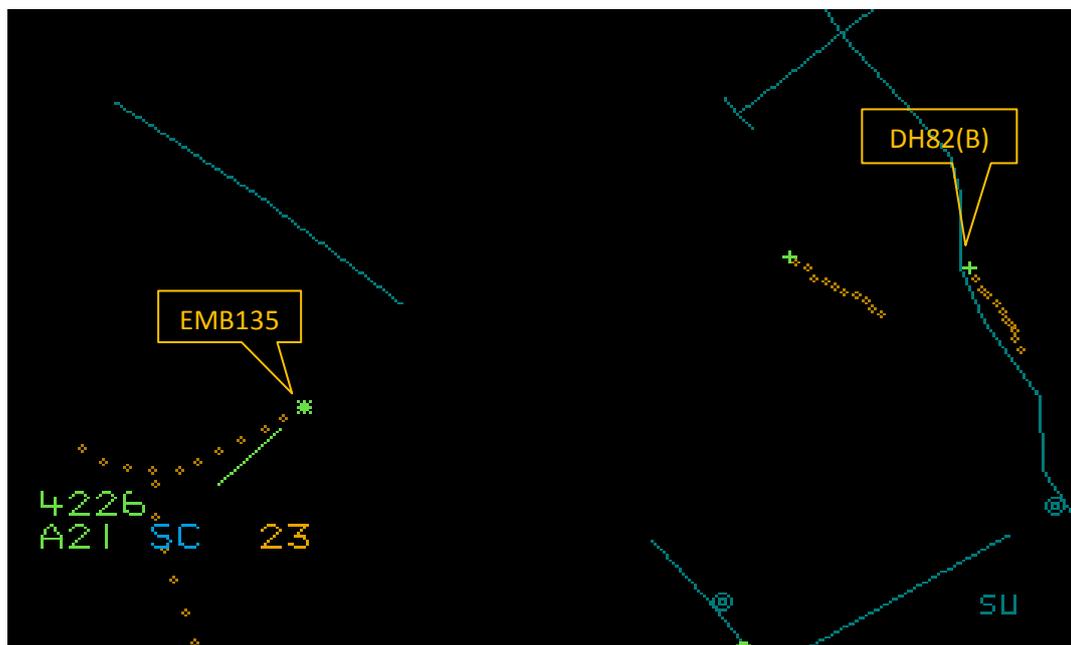


Figure 5-1443:40 Area Radar

At 1443:45, the EMB135 pilot reported established inbound on final approach. The controller responded with 'Roger'.

At 1443:58 (Figure 6), the radar contact for DH82(A) was fully established on the Cambridge radar with a history trail.



Figure 6-1443:58

At 1444:00 (Figure 7), the controller passed Traffic Information to the EMB135 pilot, described as “right, half-past one, range of 5 miles, believed to be a Tiger Moth at 1200ft”. The pilot responded with ‘Roger’.

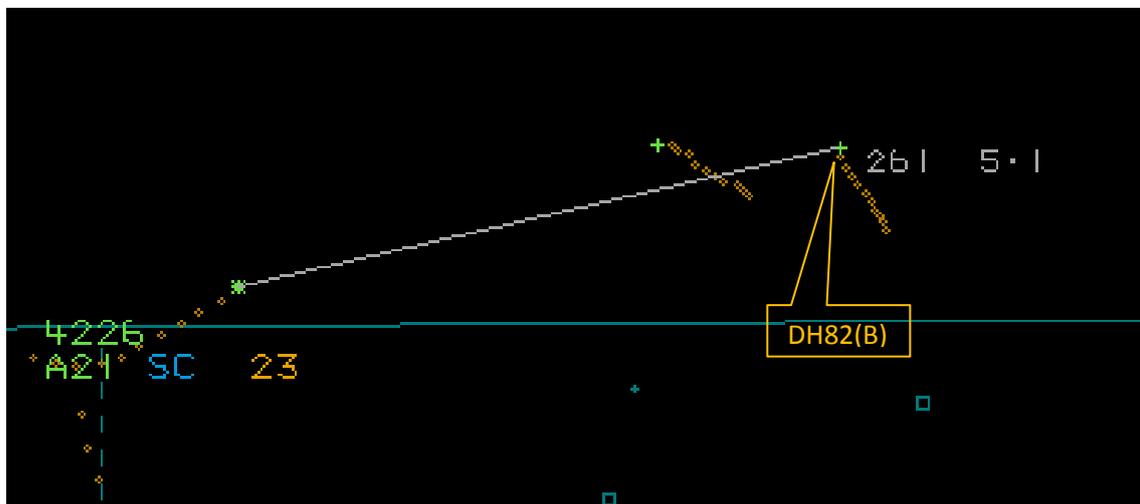


Figure 7-1444:00 Area Radar

At 1444:15, the controller turned their attention to the DH82(B) pilot and said “can I ask you to take a (undetermined word) in your present position till you get the jet traffic in sight to the... er ....pretty close to you?” The DH82(B) pilot responded that they would vary and go to the west now, keeping clear of the centreline. The controller responded with ‘Roger’.

At 1444:20, the controller passed traffic information to the EMB135 pilot advising that they had further traffic that had just popped up in their 12 o’clock at a range of just under 2 miles, with no height information, crossing their track right to left and asked the pilot if they wanted to break off the approach. The pilot responded with ‘Affirm’.

At 1444:30 (Figure 8), the controller responded with “turn right now, avoiding action turn right heading 090°”. The pilot read back ‘turn right 090°’.

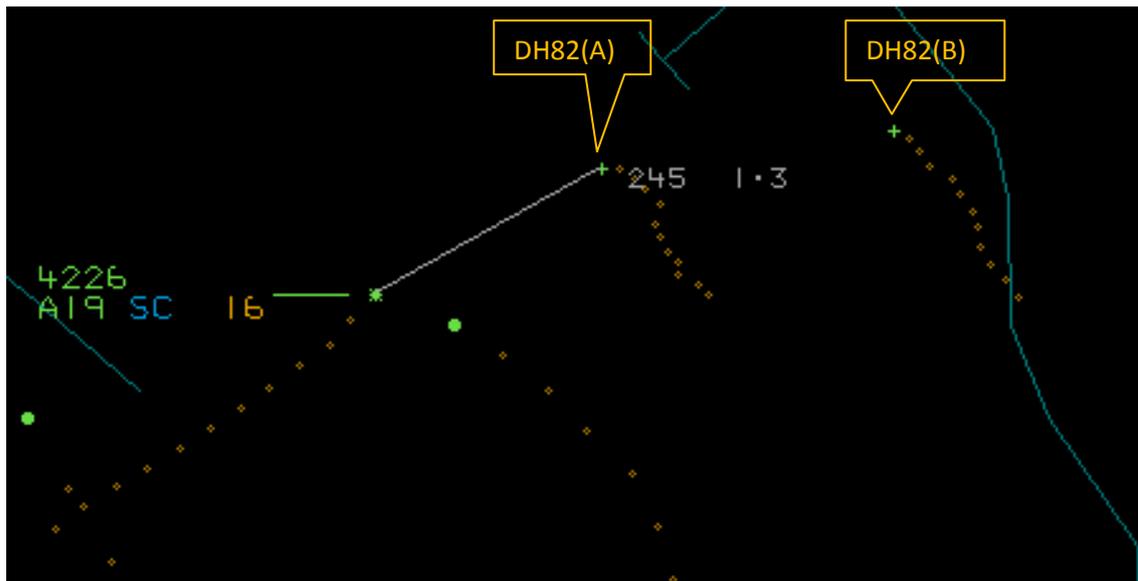


Figure 8-1444:30

At 1444:40 the pilot of an unrelated aircraft requested a climb to 5000ft and the controller responded that there was no traffic to affect.

CPA occurred at 1444:50 (Figure 9), with the aircraft separated by 0.2nm horizontally, the vertical separation could not be measured.

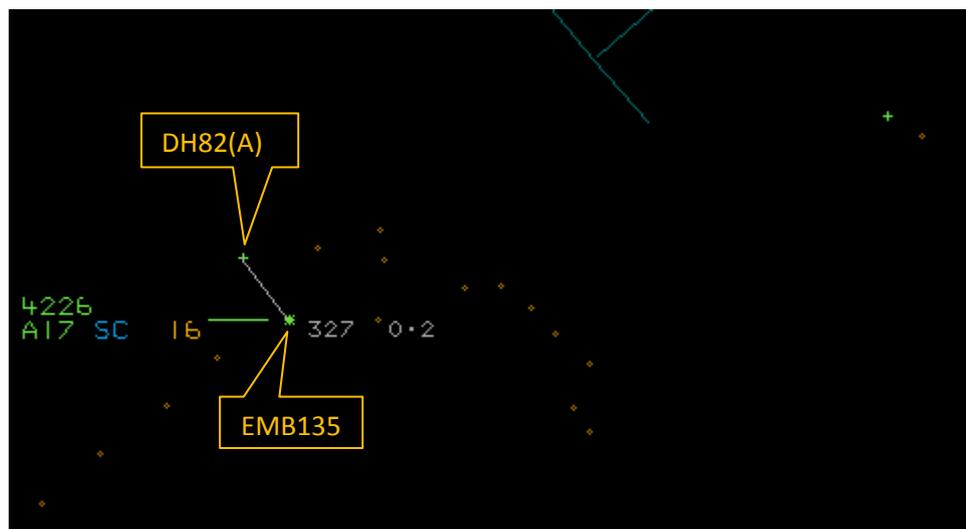


Figure 9-1444:50

At 1445:00, the controller advised the EMB135 pilot that the traffic had now just passed down their left-hand side by a quarter of a mile, with no height information and that there was further traffic just left of their 12 o'clock at a range of 1 mile, believed to be a Tiger Moth at 1200 feet. The pilot reported visual with the Tiger Moth.

At 1445:20, the pilot advised that they were happy to accept a visual approach now and the controller cleared them for a visual approach, straight-in for RW05.

The Airprox took place in class G airspace under a Traffic Service where collision avoidance is ultimately the responsibility of the pilot.

The EMB135 pilot was not advised on initial contact with the controller that their aircraft had been identified in accordance with CAP 493 Section 1, Chapter 6, Paragraph 9.1 and Section 12, Paragraph 3D.1 and no agreement was reached in accordance with CAP 493 Section 1, Chapter 12, Paragraph 1H.1 between the EMB135 pilot and controller regarding the type of ATS to be provided (although the controller asked the pilot what type of service they required on initial R/T contact, the pilot did not provide a response). Where the type of service to be provided is not agreed there is no clear understanding of what the pilot can expect by way of assistance from the controller to enable them to discharge effectively their responsibilities for collision avoidance.

The controller believed that they were providing a Traffic Service to the EMB135 pilot.

### RELEVANT CAP 493 EXTRACTS

*Traffic Service is a surveillance-based type of UK FIS where, in addition to the provisions of Basic Service, the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the pilot remains responsible for collision avoidance.*

*“The controller shall pass traffic information on relevant traffic and shall update the traffic information if it continues to constitute a definite hazard, or if requested by the pilot. However, high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information.”*

*“There may be circumstances that prevent controllers from passing timely traffic information and/or deconfliction advice, e.g. high workload, areas of high traffic density, unknown aircraft conducting high energy manoeuvres, or when traffic is not displayed to the controller or is obscured by surveillance clutter. Controllers shall inform the pilot of reductions in traffic information along with the reason and the probable duration as soon as practical.”*

### RELEVANT CAMBRIDGE MATS PART 2 EXTRACTS

A Letter of Agreement exists between Duxford FISO Unit and Cambridge ATC, details of which are contained within the Cambridge MATS Part 2. The relevant paragraphs are:

Agreed actions by IWM Duxford FISO Unit

*“Should the Duxford FISO become aware that an aircraft working Duxford FISO will be transiting or planning to operate north of Shelford they will endeavour to transfer the Aircraft to the Cambridge ATCO clear of any known conflicts and as soon as is practicable. Should the pilot for any reason not be prepared to contact Cambridge ATC, traffic information should be passed to Cambridge via the direct telephone line.”*

*“Duxford FISO's will endeavour to encourage departing aircraft not to route directly toward Cambridge Airport on departure with the exception of aircraft inbound to Cambridge.”*

At 1443:29, the unknown DH82(A) radar contact first appeared on the Cambridge radar display with no history trail. The history trail was displayed at 1443:58, and the controller passed Traffic Information to the EMB135 pilot on the ‘pop-up’ DH82(A) traffic at 1444:20, asking the pilot if they wished to break off the approach. CPA occurred 30secs later.

The following recommendations have been made by CAA ATSI:

*That Cambridge Unit Management issue a reminder to all controllers of the CAP 493 requirements and procedures for the:*

- I. Identification of aircraft when providing surveillance services in Class G airspace.
- II. Importance of reaching an agreement with the pilot regarding the type of service to be provided.
- III. Use of the current phraseology when issuing avoiding action.

That Cambridge Unit Management engage with Duxford FISO Unit to ensure that the terms of the existing Letter of Agreement that exists between the two units remains relevant and is clearly understood by all concerned.

### UKAB Secretariat

The EMB135 and DH82 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard<sup>2</sup>. If the incident geometry is considered as converging then the EMB135 pilot was required to give way to the DH82<sup>3</sup>.

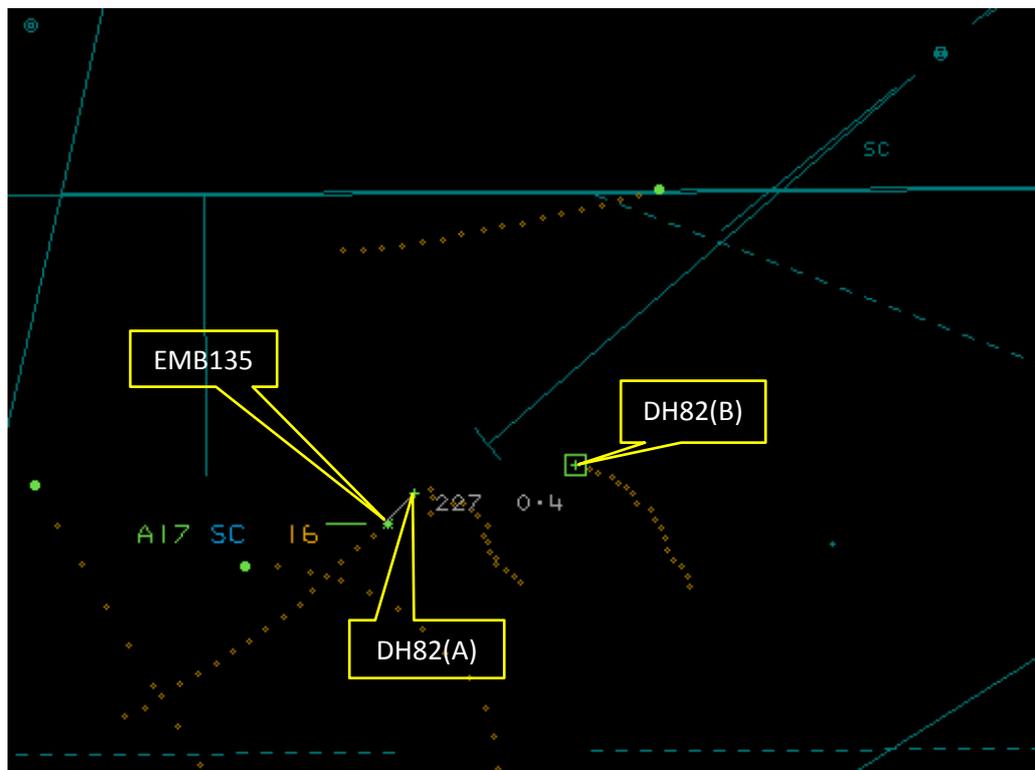


Figure 10: 1444:46

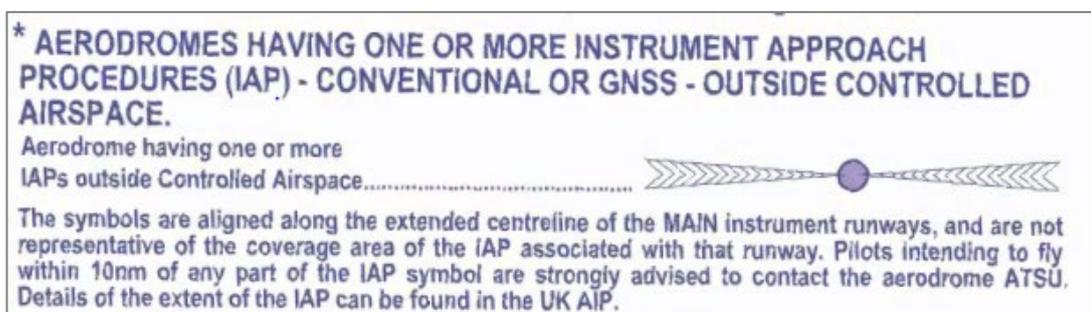


Figure 11: Extract from Topographical Air Charts Legend

### Summary

<sup>2</sup> SERA.3205 Proximity.

<sup>3</sup> SERA.3210 Right-of-way (c)(2) Converging.

An Airprox was reported when an EMB135 and a DH82 flew into proximity near the Cambridge Approach Path at 1444hrs on Wednesday the 17<sup>th</sup> of April 2019. Both pilots were operating under VFR in VMC, the EMB135 pilot effectively in receipt of a Traffic Service from Cambridge (albeit not formally agreed) and the DH82 pilot in receipt of a Basic Service from Duxford.

## **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 Cambridge controller. Controller members noted that the controller had not informed the EMB135 pilot that his aircraft was identified, and that, although the controller asked the EMB135 pilot what type of service he required, the EMB135 pilot did not reply, the controller did not repeat the question (**CF8**), and that therefore the EMB135 pilot was not formally receiving a service whilst the Cambridge controller was vectoring the EMB135 for an instrument approach (**CF1**). Notwithstanding, the controller was *de facto* applying a Traffic Service to the EMB135 and so, although undoubtedly a background factor perhaps influenced by the busy R/T at the time, the lack of a formal ATS agreement was not considered seminal to the incident. However, controller members also noted that the DH82(A) had been displaying on the Cambridge radar for 51secs before the controller passed Traffic Information (TI) to the EMB135 pilot (**CF2 & 4**) and asked if they wished to break-off the approach (**CF3**), and they wondered whether this also was perhaps attributable to the controller being busy with other traffic at the time.

The Board then turned to the actions of the DH82(A) pilot and agreed that although entitled to fly where they were in Class G airspace, it was inadvisable to fly through the 'feathers' of the Cambridge RW05 Instrument Approach Procedure (as shown in Figure 10) without contacting Cambridge ATC as advised in Figure 11 (**CF6, 7, 8 & 9**). As a result, the Cambridge controller did not have situational awareness of his intentions until later than desirable and could not therefore pass timely TI to the EMB135 or the DH82(A) pilot regarding arriving or departing aircraft. Establishing communications with the appropriate ATCU in the vicinity of the feathers is especially important for non-transponding aircraft so that an accurate understanding of the traffic situation can be achieved. Notwithstanding, the Board noted that the DH82(A) pilot had seen the EMB135 and had descended to increase separation.

The Board then looked at the actions of the EMB135 pilot. His aircraft was fitted with TCAS II but this could not detect DH82(A) because it was not fitted with a transponder, thus negating the Electronic Warning System barrier (**CF11**) and concomitantly reducing the EMB135 pilot's situational awareness. Nevertheless, the EMB135 pilot was passed Traffic Information on DH82(A) by the controller, albeit later than desirable (**CF10**), such that they were able to gain visual contact and choose to break-off their instrument approach and continue with a visual approach.

The Board then turned to the risk and noted that although the controller was concerned that DH82(A) was a risk to the EMB135 on the IAP (**CF5**), this was because he did not know that the DH82(A) pilot was visual with the EMB135. In the end, both pilots were visual with the other aircraft and did not report being concerned about a risk of collision, and so the Board agreed that although safety had been reduced because the DH82(A) pilot had flown through the feathers without contacting the Cambridge controller, there had been no risk of collision; risk Category C.

The Board were heartened to hear that Cambridge and Duxford now have an agreed procedure that will increase the liaison calls between the 2 agencies if Duxford aircraft operate close to the Cambridge approach/climb-out lanes and decide not to talk to Cambridge ATC. Notwithstanding, the Board reiterated that pilots should contact the controlling authority if their route will take them close to an Instrument Approach, and especially if they intend to pass through feathers marked on the VFR chart.

**PART C: ASSESSMENT OF CAUSE AND RISK****Contributory Factors:**

| 2019072-Barriers  |               |  |   |
|---|---------------|--|---|
| CF  | Factor        | Description                                | Amplification   |
| <b>Ground Elements</b>  |               |  |   |
| <b>• Regulations, Processes, Procedures and Compliance</b>            |               |  |   |
| 1   | Human Factors | • ATM Regulatory Deviation                 | Regulations and/or procedures not complied with                           |
| <b>• Situational Awareness and Action</b>                             |               |  |   |
| 2   | Human Factors | • Conflict Detection - Detected Late       |   |
| 3   | Human Factors | • Conflict Resolution - Provided Late      |   |
| 4   | Human Factors | • Traffic Management Information Provision | Not provided, inaccurate, inadequate, or late                             |
| 5   | Human Factors | • Personnel Perception Events              | Concerned by the proximity of the aircraft                                |
| <b>Flight Elements</b>  |               |  |   |
| <b>• Tactical Planning and Execution</b>                              |               |  |   |
| 6   | Human Factors | • No Decision/Plan                         | Inadequate planning   |
| 7   | Human Factors | • Accuracy of Communication                | Ineffective communication of intentions                                   |
| 8   | Human Factors | • Communications by Flight Crew with ANS   | Appropriate ATS not requested by pilot                                    |
| 9   | Human Factors | • Communications by Flight Crew with ANS   | Pilot did not communicate with appropriate airspace controlling authority |
| <b>• Situational Awareness of the Conflicting Aircraft and Action</b> |               |  |   |
| 10  | Contextual    | • Situational Awareness and Sensory Events | Pilot had no, only generic, or late Situational Awareness                 |
| <b>• Electronic Warning System Operation and Compliance</b>           |               |  |   |
| 11  | Technical     | • ACAS/TCAS System Failure                 | Incompatible CWS equipment  |

**Degree of Risk:** C.

**Safety Barrier Assessment<sup>4</sup>**

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 **ineffective** because the Cambridge controller did not agree a service with the EMB135 pilot.

**Situational Awareness of the Confliction and Action** were assessed as **partially effective** because the Cambridge controller identified the conflict late.

**Flight Elements:**

**Tactical Planning and Execution** was assessed as **partially effective** because the DH82(A) pilot chose to remain on the Duxford frequency rather than communicate with Cambridge when they flew through the IAP feathers.

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

**Electronic Warning System Operation and Compliance** were assessed as **ineffective** because the EMB135's TCAS could not detect the non-transponding DH82's.

