AIRPROX REPORT No 2020037

Date: 14 May 2020 Time: 0859Z Position: 5316N 00422W Location: RAF Mona

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Hawk	Texan
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR[1]	IFR
Service	None	Traffic
Provider		Valley
Altitude/FL	3600ft	5000ft
Transponder	A, C, S	A, C, S
Reported		
Colours	NK	NK
Lighting	NK	NK
Conditions	IMC	IMC
Visibility	NK	0km
Altitude/FL	NK	FL50
Altimeter	NK	1013hPa
Heading	NK	129°
Speed	NK	NK
ACAS/TAS	TCAS I	TCAS I
Alert	TA	TA
Separation		
Reported	100ft V/NK H	100ft V/NK H
Recorded	1400ft V/1.1NM H	

THE HAWK PILOT reports conducting a student QFI sortie that required teaching and practicing straight in PFLs. They were conducting the PFLs into Mona, using RW22. On one PFL they were slightly higher than the profile required for them to execute the approach so the Captain instructed the rear seat student QFI to break off the approach and reposition for another one; they were just IMC at this point in a thin layer of cloud. During the transition from the glide to going around, applying power and raising the gear, the TCAS alerted 'traffic'. Upon processing the TCAS info, with the traffic in the 12 o'clock and indicating 300ft above, the Captain instinctively adjusted the aircraft attitude to nose low and told the student QFI to descend to get some separation on the traffic. During this action the student QFI became visual with the Texan. At the time they both thought the traffic was in GH area north, overhead Mona. Upon reviewing the HAMPA replay video, the TCAS contact appeared on the display approximately 45sec before the alert but at this stage they were focusing on the parameters for conducting the PFL. After the alert, and the descending action taken, the TCAS contact appeared to be just within 2 miles and the transition from breaking off the approach to the descent meant the contact indicated, briefly, 100ft separation before the action took positive effect. It transpired that the contact was a Texan executing a SID from RW31 at RAF Valley, a profile that tracks through the Mona overhead. Unfortunately, the Texan video replay was not available to corroborate the lateral or vertical separation. In this instance TCAS was an invaluable SA builder that prevented a closer encounter; until the TCAS 'traffic' alert they were not aware of any other aircraft in the vicinity.

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

THE TEXAN PILOT reports conducting a student QFI sortie for instrument flying training prior to an instrument rating test. They had just departed RAF Valley on a SID 31 East. They had climbed and levelled at FL50, as requested by ATC and were tracking 129° on the penultimate leg of the SID before tracking the Valley 099° radial. The published SID 31 East has a not below height of FL50 (by the VYL

[1] IFR at point of CPA

039° radial) and the ground track takes the aircraft through the RAF Mona overhead. Meteorological conditions were generally VMC with few amounts of cumulus over Anglesey. As they approached the Mona overhead they entered the tops of a single cumulus cloud. At the same time as entering the cloud and going IMC the TCAS warning of 'Traffic, Traffic' alerted them to a possible contact on the left-hand side. They discussed the alert as a crew and acknowledged that they had not been made aware of any other traffic or any possible conflictions by ATC. The TCAS contact initially appeared close to their aircraft laterally and indicated 500ft below their flight level. However, it is sometimes difficult to ascertain range on the Texan TCAS display and contacts can be displayed with lag on the actual position. The TCAS contact rapidly climbed from 500ft below their level to indicating 100ft below. Despite discussing the contact in the cockpit, they chose not to take any avoiding action because they had not been made aware of any conflicting traffic. They presumed the contact was either further away or spurious. The contact appeared for approximately 30sec by which time they had exited the cloud tops. It was at this point they received a radio transmission from ATC about a radar contact 1NM north at a similar level. Due to the brief flight in IMC they were not visual with the reported traffic at any point.

They landed from the flight, debriefed and the instructor prepared for the second sortie. At the end of the flying day a call was made to the ATC supervisor to discuss the TCAS contact on the first sortie, at this point the instructor was still unaware of the seriousness of the incident. The supervisor commented that nothing had been reported and no concerns had been raised from the morning flying programme; each entity had continued with their daily programme. In order to find out more information the QFI decided to call the other Sqn and identify which crew had been operating at Mona that morning. Simply to get their version of events and to see if there was anything they could all learn from it. The other captain had also flown again that day and was still debriefing their second sortie at 1800hrs. It was not until later that evening that they spoke to each other. The Hawk captain had watched the video playback of the sortie and HAMPA video replay apparently showed 100ft separation, which coincided with the indications in the Texan cockpit. The QFI noted that as with most modern aircraft the Texan is equipped with a data transferring device (DTD or 'brick'). This records all aircraft parameters including what is displayed on the cockpit MFDs and all communications. Currently the flight data that is recorded on the brick cannot be saved, due to a pending software update, and is deleted after each sortie. Had they realised the seriousness of the incident at the time they would have impounded the brick. There is currently no ability to download flight data for later reference.

The pilot perceived the severity of the incident as 'High'.

THE MONA CONTROLLER reports that they were made aware by the Valley Approach controller that a Hawk T2 aircraft was about to conduct a straight-in PFL (SIPFL) at Mona. They advised the Approach controller that some vehicles had just been cleared onto the airfield to carry out daily checks, so agreed to allow a high approach only. The T2 did not come on to the Mona frequency as planned. For reasons unknown at the time, the pilot broke off the approach. They made a second attempt at which point the vehicles were clear of the runway and the standard procedure was followed. The controller was not aware of the incident with the Texan aircraft until told about it at a later date. Neither aircraft were under their control at the time of the incident.

THE VALLEY CONTROLLER reports that at the time of the occurrence they were band boxing all radar tasks (Radar, Approach/Director, LARS, Low-level) due to COVID restrictions. They were moderately busy with a mix of GH traffic, recovery into Mona, straight-in app at Valley, a prenote outbound, and rotary low level transiting outbound. They had recently taken over the position and were additionally catching up with associated 'admin' as the Electronic Tote (ET) had been U/S all morning, meaning that the weather was a printed sheet and there was no record of what aircraft were airborne. Flight Strips were prepared pending departures and recovery strips for those aircraft already airborne in order to reduce the workload during the pending recovery phase. A Texan was prenoted outbound to depart SID East, FL50 for a practice diversion to Liverpool. At a similar time, a recovering T2 had called for a SIPFL at Mona. The Hawk was 30NM SE of Mona with the intentions of touch-and-go to join the circuit. As the Texan climbed out of RW31RH the controller selected the track predict in order to assess the speeds of the 2 aircraft, was confident that the Hawk would be ahead of the Texan, so instructed the Texan pilot "SID East, climb FL50, Traffic Service". The normal liaison calls to Mona Tower were carried out for the turn inbound and joining clearances, and the Hawk was released to Mona Tower. Although

they couldn't recall the exact timeline, around this time they remembered being caught off guard by the appearance of the Texan emerging SE of Mona overhead approximately 2NM from the T2, which was immediately called as Traffic Information, to which the pilot replied they had it on TCAS. The controller reported that they hadn't noticed the Texan disappear from radar as it approached the SSR radar overhead but was unsure which of the additional tasks they were focused on at the time. They also noted that from an Air Traffic and procedures perspective, historically, SID East was used primarily for airways joining traffic at ROLEX/REXAM and was usually with an associated climb to FL90. This could explain why confliction between such departures and SIPFL descending inbound from 7000ft had not occurred before.

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

Factual Background

The weather at Valley was recorded as follows:

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METAR EGOV 140850Z 30005KT 9999 FEW035 11/02 Q1025 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

The Valley Approach controller was band-boxing all radar positions in order to meet social distancing regulations as part of the COVID-19 crisis. At the time of the incident they were moderately busy with an IFR departure (the Texan), Radar PFLs (the Hawk), another Hawk conducting a Flapless approach to Valley and a Station based helicopter on a VFR departure. Additionally, the Valley Supervisor noted that the track of the Texan would have taken it through the SSR overhead (which is situated at Mona) and through an area of radar weakness.

Figures 1-5 show the positions of the Texan and the Hawk at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using NATS radars, which are not utilised by RAF Valley, therefore are not representative of the picture available to the controller.

Having completed one approach, the Hawk pilot climbed out of Mona with the intention of completing another PFL. The Texan had departed Valley and was level at FL50. This was the first time that both aircraft were displayed on the radar replay and separation between the aircraft was 12.5NM at this point.

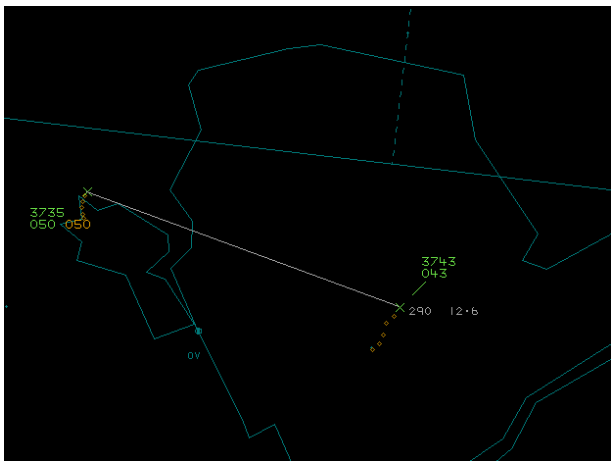


Figure 1: Both aircraft on radar

As part of the Radar PFL profile, the Hawk had been cleared to descend to 3000ft and had begun a turn inbound to Mona whilst there was still 12NM separation between the aircraft. At this point, the Valley Approach controller began liaising with the Mona Tower Controller to agree a joining level and also coincided with a call from another aircraft. The liaison with Mona Tower was protracted

due to a comms issue and by the fact that a working party had been given permission to enter the Mona runway. At the end of this landline call the Hawk was transferred to Mona Tower. Separation had decreased to 6.5NM and 300ft by this point.

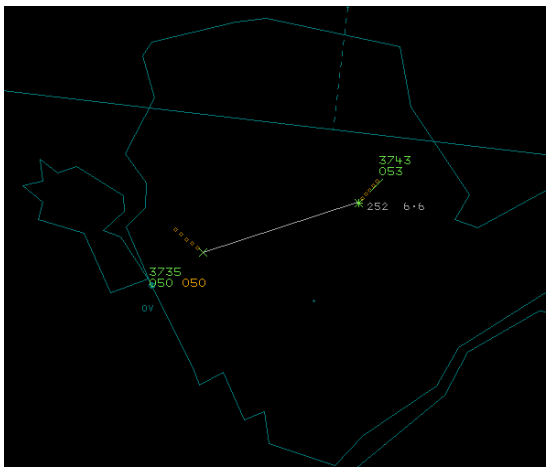


Figure 2: Hawk transferred to Mona

Immediately following the transfer of the Hawk, the Valley Approach controller received another call pre-noting another departure from Valley as well as a call from another aircraft. At the end of this sequence of events, separation between the aircraft had decreased to 3.3NM and 500ft.

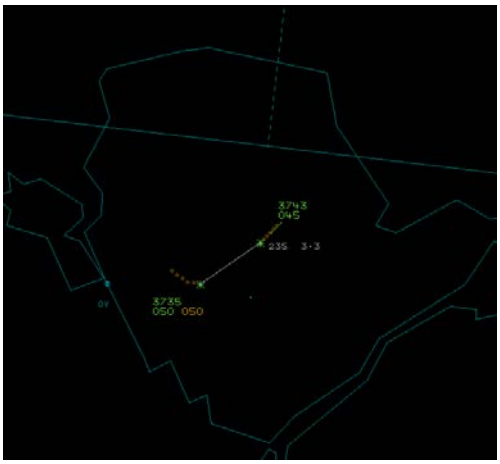


Figure 3: Separation decreased below 5NM.

The Hawk instructor reported that the aircraft was too high to complete the PFL approach and instructed the student to re-set for an additional PFL. Because of this, the Hawk pilot did not actually call Mona Tower and was thus not receiving an ATS at the time of the incident. The radar replay shows the Hawk beginning a climb at a rate of approximately 500ft per minute. At 1.7NM this rate of climb is reversed and is likely coincident with the Hawk instructor receiving a TCAS TA and instructing the student to descend. The Valley Approach controller passed Traffic Information to the Texan for the first time approx. 10sec after the Hawk began the descent noted above. The Texan pilot reported having seen the conflicting traffic on TCAS. At this point separation was 1.7NM and 200ft and was the closest point vertically that the aircraft came to each other.

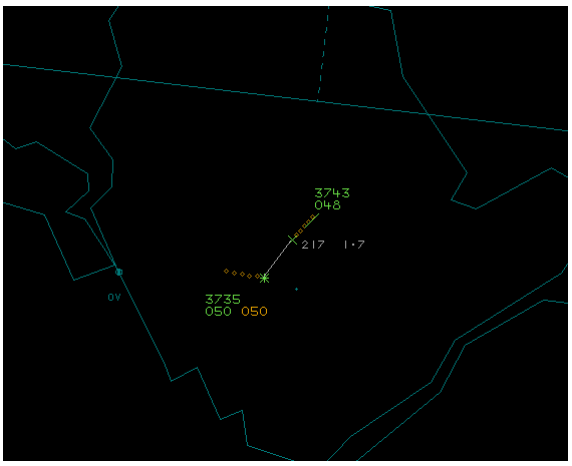


Figure 4: Vertical CPA

Allowing the radar replay to continue showed that lateral separation decreased to a minimum of 1.1NM but by this time, horizontal separation had increased to 1400ft.

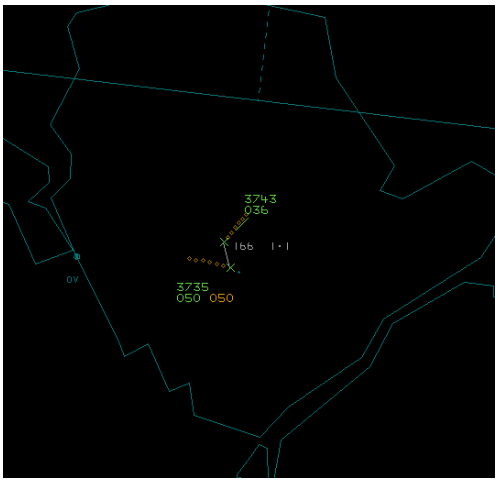


Figure 5: Lateral CPA

It is unfortunate that in the lead up to this incident, the Valley Approach controller was engaged in other control-related tasks. This coupled with the loss of SSR data on the Texan and its path through an area known for weak radar returns meant that neither aircraft were offered Traffic Information on each other until after the event had occurred. Thankfully, the TCAS warning received by the Hawk pilot was acted upon ensuring that separation was maintained between the aircraft involved.

RAF Valley Occurrence Investigation DDH Comments

This incident has highlighted the risk of confliction between aircraft on the SID East profile and aircraft conducting SIPFL at Mona, which on this occasion also coincided with a radar blind spot. The ORG has concluded with 3 recommendations which should prevent this incident occurring again. In the long term, a re-route of the SID East profile will take departing IFR traffic away from the Mona overhead and also away from the radar blind spot. In the short term, all 4FTS aircraft are to climb to FL 90 which will keep them well clear of the Mona overhead. In addition, increased communication between Valley and Mona ATC will ensure greater SA throughout. With the flying rate across all RAF Valley platforms increasing each Sqn is to ensure that they have a full understanding of other types' procedures; this is being tested through a new question bank for Question of the Day. The lack of retention of Texan HUD tapes has also been addressed which in future will be retained for at least 90 days post flight.

UKAB Secretariat

The Hawk and Texan pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[2] If the incident geometry is considered as converging then the Hawk pilot was required to give way to the Texan.[3]

Comments

HQ Air Command

This Airprox was subject to an Occurrence Safety Investigation (OSI), which resulted in 5 Causal Factors and 3 Recommendations. The number one air safety risk at RAF Valley is MAC between non-cooperating aircraft and the recommendations from the investigation will provide new mitigations to reduce that risk. It also highlights the importance of a Collision Warning System (CWS), in this instance the TCAS on the Hawk T2, undoubtably preventing a more serious incident occurring. Two of the recommendations focus on the SID East profile; in the short term raising the level from FL50 from FL90 to increase the vertical deconfliction of the Mona overhead. Longer term, there will be a total redesign of the SID East profile to avoid Mona. The third recommendation considers informing aircraft conducting approaches to Mona that an aircraft has departed Valley on the SID East profile and to state the type, building a more comprehensive air picture.

The additional demands and stressors of operating in ATC during COVID-19 social distancing restrictions coupled with poor, out of date equipment cannot be overlooked. An extensive programme to update ATC equipment (Project Marshall) is several years behind schedule. In this occurrence, ATC had to work with both primary and secondary radar 'blind spots', ATC landlines where speech was broken/inaudible and an ET system being U/S. Along with the increase in flying rates, the demands on the controllers remain high during COVID-19. Crews should be alive to this and trust the information presented to them on their CWS along with a robust lookout scan to avoid a Loss of Safe Separation. The actions taken by the Hawk T2 crew on receipt of the TCAS TA meant that the risk of collision was low.

Summary

An Airprox was reported when a Hawk and a Texan flew into proximity overhead RAF Mona at 0859Z on Thursday 14th May 2020. Both aircraft were IFR at the time of the Airprox, in proximity to a thin layer of cloud and the Texan pilot was in receipt of a Traffic Service from Valley App.

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. 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. Although not all Board members were present for the entirety of the meeting and, as a result, the usual wide-ranging discussions involving all Board members were more limited, sufficient engagement was achieved to enable a formal assessment to be agreed along with the following associated comments.

The Board first considered the actions of the Hawk crew. They were conducting multiple PFL approaches to Mona and on this occasion elected to break off the approach and climb to re-position for a further PFL. The Valley controller had sent them to the Mona frequency, although due to the decision

[2] MAA RA 2307 paragraphs 1 and 2.
[3] MAA RA 2307 paragraph 12.

to break off the approach, they did not call on the Mona frequency nor did they call back on the valley approach frequency. This was probably as a result of the increased workload associated with breaking off the approach, repositioning themselves and reacting to the TCAS alert. Consequently, they were not receiving an ATS at the time, and did not receive any Traffic Information from ATC, or situational awareness from hearing the Texan on the frequency (**CF7**). As they climbed up through a thin layer of cloud they received a TCAS TA on the Texan (**CF9**) and elected to descend as avoiding action. The crew did not become visual with the Texan until after the descent had commenced (**CF11**) and so the Board concluded that it was this descent that prevented the incident becoming a more serious event.

Turning to the Texan crew, they were conducting a SID E from Valley, which the Board noted routed directly through the Mona overhead and into potential conflict with PFL traffic there. They were heartened to hear that Valley had already put procedures in place to prevent a similar occurrence and would be redesigning the SID E in due course (**CF1**). The Texan crew had been cleared to follow the procedure but were routing through an area of poor radar performance, so, although on a Traffic Service, were not passed Traffic Information and therefore had no knowledge that the Hawk was in their vicinity (**CF7**). Members noted that the Texan was in and out of IMC and, whilst noting that for RAF training sorties crews wanted the freedom to manoeuvre as required, still wondered whether they would have been better served requesting a Deconfliction Service in such circumstances. The TCAS in the Texan alerted to indicate the proximity of the Hawk (**CF9**), but the crew discounted it as spurious or further away than indicated, due to not receiving any Traffic Information from ATC and elected not to take action (**CF8, CF10**). Members cautioned pilots against relying solely on Traffic Information from ATC, and reminded them that under a Traffic Service separation is the responsibility of the pilot. Unfortunately, the Texan was within a thin layer of cloud at the time and so the crew did not see the Hawk (**CF11**).

When looking at the actions of the Valley controller, the Board were concerned by the situation that the controller was placed in by having so many frequencies and tasks band-boxed onto one position. Whilst the restrictions on controllers due to COVID-19 was necessary, still members opined that the flying task should also have been reduced accordingly (**CF2**). To make matters worse, various equipment issues within the tower increased the controller's workload still further, including a poor landline between Valley and Mona and the lack of the ET (**CF3, CF6**). At the point of the Airprox, the Texan was routing through an area of known poor radar performance and the SSR overhead, military advisors informed the Board that it was written into Valley orders that the area exists and so the controller was not required to remind the pilot about the possible reduced service, which was unfortunate, because a reminder may have alerted the pilot to the need to focus their look-out. As a consequence of the SSR overhead, the controller could not see that the Hawk Mode C was indicating that it was climbing out of Mona (**CF4**) and so did not provide Traffic Information (**CF5**).

Finally, in considering the risk, members agreed that the 1400ft vertical separation at CPA would usually lead them to attribute a Risk Category C, no risk of collision. But they thought that this would not fully address the potential for a more serious event, given the closing speed of the two aircraft, or acknowledge that the avoiding action taken by the Hawk pilot was instrumental in achieving that separation. Accordingly, the Board unanimously agreed to assigning a Risk Category B; safety much reduced (**CF12**).

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2020037		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Regulations, Processes, Procedures and Compliance		
1	Organisational	• ATM Information Provision	Inadequate regulations or procedures
	• Manning and Equipment		

2	Organisational	• ATM Staffing and Scheduling	Sub-Optimal establishment or scheduling of staff
3	Technical	• Aerodrome and ATM Equipment	Non-functional or unavailable equipment
	• Situational Awareness and Action		
4	Human Factors	• Conflict Detection - Not Detected	
5	Human Factors	• Conflict Resolution – Not provided	
6	Human Factors	• Distraction - Job Related	Controller engaged in other tasks
	Flight Elements		
	• Situational Awareness of the Conflicting Aircraft and Action		
7	Contextual	• Situational Awareness and Sensory Events	Pilot had no, late or only generic, Situational Awareness
8	Human Factors	• Understanding/Comprehension	Pilot did not assimilate conflict information
	• Electronic Warning System Operation and Compliance		
9	Contextual	• ACAS/TCAS TA	
10	Human Factors	• Interpretation of Automation or Flight Deck Information	CWS misinterpreted or not optimally actioned
	• See and Avoid		
11	Contextual	• Poor Visibility Encounter	One or both aircraft were obscured from the other
12	Contextual	• Near Airborne Collision with Aircraft, Balloon, Dirigible or Other Piloted Air Vehicle	Piloted air vehicle

Degree of Risk: B.

Safety Barrier Assessment[4]

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 Valley SID East profile conflicted with traffic at Mona.

Manning and Equipment were assessed as **ineffective** because the Valley ATC manning was inadequate for the task and unserviceable equipment increased the controller's workload.

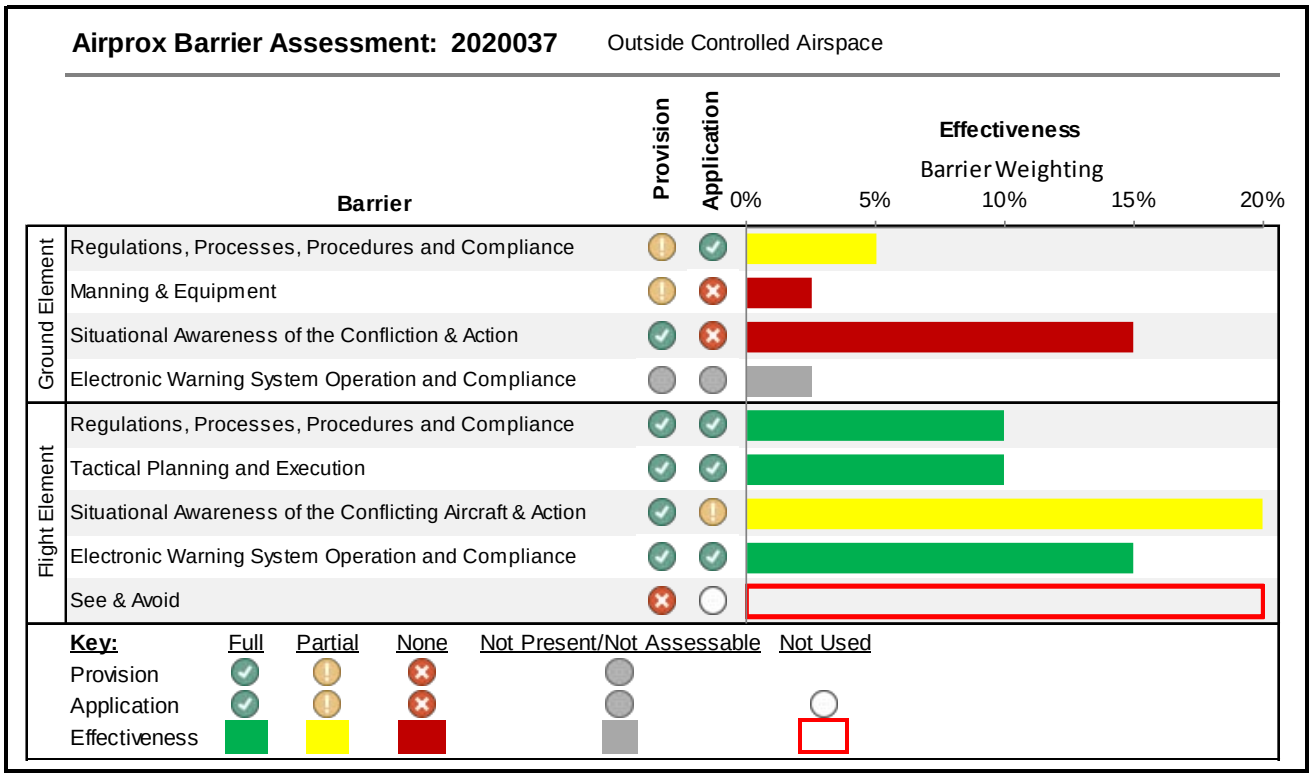
Situational Awareness of the Confliction and Action were assessed as **ineffective** because the App controller did not assimilate that the Texan would conflict with the Hawk.

Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Texan crew did not act upon the SA provided by the TCAS.

See and Avoid were assessed as **not used** because both aircraft were within a thin layer of cloud and the crews could not see the other aircraft.

[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: 2020037
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 Confliction & 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