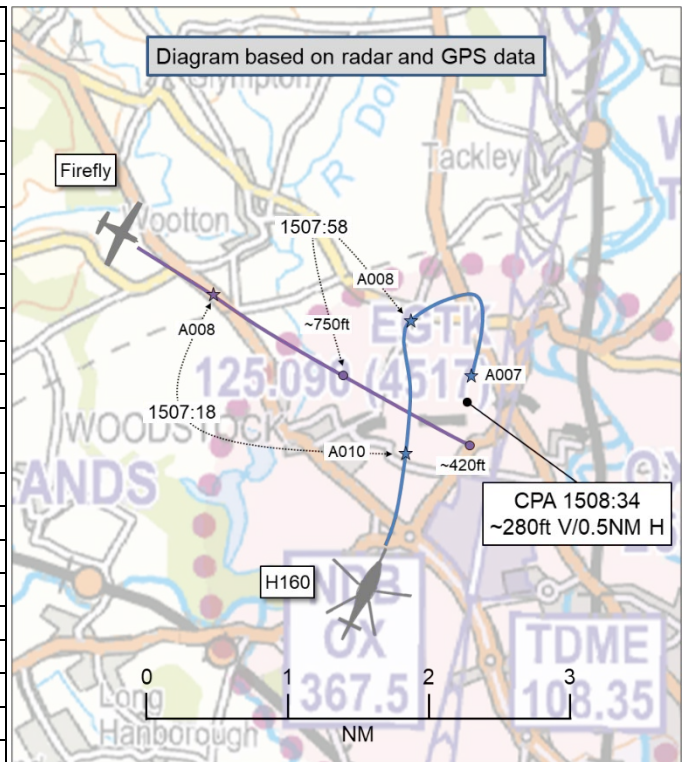


AIRPROX REPORT No 2024222

Date: 23 Aug 2024 Time: 1509Z Position: 5152N 00119W Location: Oxford ATZ

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	H160	Firefly
Operator	Civ Comm	Civ FW
Airspace	Oxford ATZ	Oxford ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Oxford Tower	Oxford Tower
Altitude/FL	700ft	~420ft
Transponder	A, C, S+	A, C, S
Reported		
Colours	White, red, blue	Blue, white
Lighting	Anti-col, position, searchlights	Nav, HISL, landing
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	400ft	500ft
Altimeter	QNH (1006hPa)	QNH (1006hPa)
Heading	190°	100°
Speed	80kt	110kt
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation at CPA		
Reported	0ft V/400m H	0ft V/300m H
Recorded	~280ft V/0.5NM H	



THE H160 PILOT reports that they were downwind (heading north) right-hand for RW19 at Oxford Airport at 1000ft QNH when they were informed of a Firefly approaching from the west to join right-hand to RW19. They did not see this aircraft at first and, as fixed-wing [aircraft] usually join at 1500ft QNH, their scan was too low to see it. As they started to turn onto base leg they saw the [Firefly] in their 8 o'clock at the same level at approximately 1NM on a reciprocal heading (approximately south). [The pilot of the H160] was in the left-hand seat and temporarily lost sight of [the Firefly] as it passed behind. They assumed [the Firefly] was joining number 2 behind them. They do recall the [Firefly pilot] being informed of [the H160] and to join behind. They informed their student (who was in the right-hand seat) of the [traffic] and they looked out but could not see it as it was obscured by the aircraft structure. [The pilot of the H160 commented that] this had been a training sortie with an approach to land with one engine.

As the [pilot of the H160] rolled onto final, ATC cleared them to land at their discretion to helicopter training area 1. This was acknowledged. [The pilot of the H160] then re-acquired the target aircraft in their 2 o'clock at the same level crossing right-to-left. It passed in front of them level at approximately 400m. [The H160] is fitted with TCAS II but the RA is suppressed below 900ft AGL and the TA aural announcements are suppressed on approach. [However,] the [Firefly] did trigger a visual TA on the TCAS system. If the RA had not been suppressed, the [system] would have armed and activated an RA [they believe]. As the risk of collision was low, and no avoiding action was required as the Firefly was crossing at speed, they continued the approach and informed Oxford Tower of the Airprox. The [Firefly] continued at speed to a very short right base and performed an aggressive turn to align with the runway. Tower then informed [the pilot of the Firefly] that they had cut across [the H160].

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

THE FIREFLY PILOT reports that this had been a visual join from the 4th instructional flight of the day. The helicopter was first seen at range, crossing right-to-left, too far away to make out the type of aircraft, and initially thought to be traffic downwind left to RW19, i.e. to the east of the runway. Traffic Information was passed by the Tower controller on the traffic [and the Firefly pilot] resolved it as the Airprox helicopter which was west of the runway, routing to the north and who called as being 'in the helicopter circuit', or words to that effect.

[The pilot of the Firefly] continued the join to a 'tight right base' position but should have requested this with the Tower controller (normal base-join to RW19 is to a position about 1.5NM on final). The helicopter turned left and they passed left-to-left at a range of about 300m. [The Firefly pilot] wagged wings and assumed the helicopter pilot had seen them. After that, the helicopter turned right and positioned on finals to the helicopter operating area to the west of RW19.

The [pilot of the Firefly] could not recall when they were cleared to land but they continued on a short right-base to land. They then heard the helicopter pilot declare an Airprox. They offered to go-around and were told that they might as well continue to land. [The pilot of the Firefly commented that] this was a poorly executed join, a much better plan would have been to stick to the 'normal' right base join, joining behind (to the north of) the helicopter. The Tower controller was unable to affect the outcome because they had insufficient situational awareness of their routing and, no doubt, quite rightly expected a right base join at the normal position. [The pilot of the Firefly commented that they] were in visual contact with the helicopter throughout and ensured there was no risk of collision.

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

THE OXFORD CONTROLLER reports that they had multiple VFR departures and a DA40 IFR trainer to depart, an H160 in the heli-circuit not above 1000ft, and a Firefly joining from the west. RW19 was in use. They got all the VFR aircraft away in relative short-order and left the IFR trainer until last in the sequence. The Firefly pilot was told to join right base for RW19. The H160 pilot reported downwind for Heli Area 1 so they told them of the inbound traffic from the west, and told the Firefly pilot of the helicopter in the helicopter circuit not above 1000ft.

Having got the VFR aircraft away, they lined-up the IFR trainer on the runway and obtained the release from Radar. Meanwhile, the H160 pilot called final for Area 1 so they cleared them to land on Area 1 at their discretion (as is the norm for Oxford Airport to this area) though this may have happened before they obtained the release (they can't remember). The Firefly pilot hadn't reported right-base, so they looked up, towards right base and saw the Firefly at only a few hundred feet cut straight in front of the helicopter on the tightest right base they have ever seen (that was, from their perspective, on the aerodrome boundary). They assessed that there was no risk of collision (the H160 didn't alter course and was quite slow on approach). They quickly cleared the DA40 for take-off to get them off the runway, then told the Firefly pilot that they had cut in front of the helicopter. [The pilot of the Firefly] said something about whether they should continue and was told to continue their approach as they had already passed in front of the H160. The DA40 got airborne and the Firefly pilot was cleared to land. The H160 pilot said that they wished to file an Airprox.

Factual Background

The weather at Oxford was recorded as follows:

METAR EGTK 231520Z 24015KT 9999 FEW046 20/06 Q1007

The entry for Oxford/Kidlington in the UK AIP provides the following diagram showing the location of Heli Area 1:

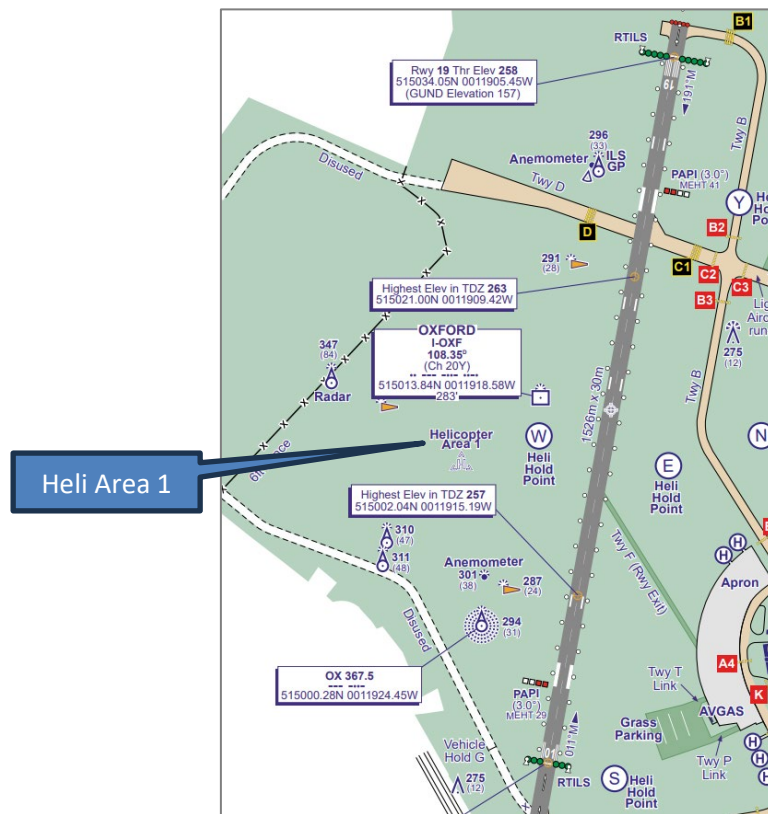


Figure 1 – The location of Heli Area 1

At the time of compilation of this report, the hyperlink to the page ‘OXF / EGTK Circuit Pattern’ on the website for Oxford Airport was not functional.

Analysis and Investigation

Oxford Airport Unit Investigation

The UA was conducted the day following the event. RT and radar recordings were reviewed, together with a brief interview with the controller involved. The workload at the time was found to be moderate, GMC was open but very shortly after the Airprox report was closed to allow the Tower (Air) controller to be relieved.

Timeline:

1506

Firefly pilot contacted Oxford Tower to report at 5 miles.

Oxford Tower controller: *“join and report right base runway 19”*.

1507

H160 pilot reported downwind to Area 1

Oxford Tower controller: *“report final area 1, traffic joining from the west to right base is a Firefly”*

Oxford Tower controller: *“traffic late downwind righthand not above 1000ft in the helicopter circuit is a H160 for Area 1”*.

1508

H160 pilot: *“Turning final area 1, visual with previous traffic”*

Firefly pilot: *“right base”*

Oxford Tower controller: *“[H160 c/s], area 1 wind 260 15kt land at your discretion”*

Firefly pilot: ([Firefly c/s] student reads back instead) *“land our discretion”*

Oxford Tower controller: *“[Firefly c/s] report final, DA40 to roll”*

[The pilot of the H160] had been operating 'standard' right-hand circuits to Heli Area 1. [The pilot of the Firefly] first made contact with the Oxford Tower controller at 1506 and was instructed to, "*join and report right base runway one-nine*", which was readback by the pilot. At 1507, [the pilot of the H160] reported downwind to Heli Area 1, whereby the controller instructed them to report final and passed Traffic Information on [the Firefly] as, "*traffic joining from the west to right base is a Firefly*". This Traffic Information was reciprocated and passed to [the pilot of the Firefly] as, "*traffic late downwind righthand not above one-thousand-feet in the helicopter circuit is a H160 for area 1*". On first contact with the Tower controller, it was observed that the Firefly was indicating approximately 900ft on their Mode C. The fixed-wing circuit at Oxford is promulgated as altitude 1500ft (QNH). With Heli Area 1 being promulgated up to 1000ft, which should have allowed for 500ft vertical deconfliction.

On interview with the controller, they declared that they'd first got sight of the Firefly as it was crossing in front of [the H160] and that it was felt there was very little they would have been able to have done in those circumstances to have prevented the Airprox from occurring. It was agreed that the level at which the [pilot of the Firefly] joined was below the fixed-wing circuit altitude and the circuit was significantly 'tighter' and closer to the runway threshold than it would have been reasonable to expect.

The importance of maintaining an effective scan was feedback to the controller, although, given the workload at the time, it was appreciated that spotting this conflict (considering how unexpected the manoeuvre was) would have been difficult. Specific Traffic Information was accurately passed on each aircraft and was acknowledged by the pilots. It was noted that the passing of generic Traffic Information when [the pilot of the Firefly] first made contact with the Tower controller may have been beneficial in aiding [the Firefly pilot's] integration.

In conclusion, this Airprox was primarily caused by the unexpected manoeuvre of the Firefly pilot joining far 'tighter' than the Tower controller could realistically have anticipated. Traffic Information was correctly passed and acknowledged by both pilots. With this, feedback in regards to scanning and the passage of generic Traffic Information was passed and well received by the controller involved.

Investigation: From experience, [the pilot of the Firefly] is known for making very tight base joins compared to pilots of other training aircraft.

A generic traffic call of Area 1 being active on initial contact may have stopped [the pilot of the Firefly] from doing a tight base join, but specific Traffic Information was passed as they got closer, which is arguably better. [The pilot of the Firefly] was well below circuit altitude when entering the ATZ. When [the pilot of the Firefly] was passed specific Traffic Information, they could have been asked to report visual with [the H160]. [The pilot of the H160] did report visual with [the Firefly] when turning onto final, but aircraft joining on right base do typically join wider than the Area 1 circuit so they probably didn't expect the aircraft to turn inside them.

Overall, [the Investigator finds that] the Tower controller did handle it well and the few comments above may have alleviated the situation but, ultimately, it was [the Firefly pilot's] responsibility to have joined appropriately with the known traffic.

Root Cause Analysis: A non-standard manoeuvre by the Firefly pilot joining the circuit and turning inside the H160.

Root Cause Corrections: Aircraft joining the circuit should be at circuit altitude when entering the ATZ unless advised otherwise by ATC.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft could be positively identified from Mode S data (Figure 2). Both aircraft were depicted as flying at Flight Levels. A suitable correction was applied to determine their altitudes. The radar returns from the Firefly faded at

1507:18. However, the pilot of the Firefly kindly provided GPS data for their flight. The diagram was constructed and the separation determined by combining the various data sources.

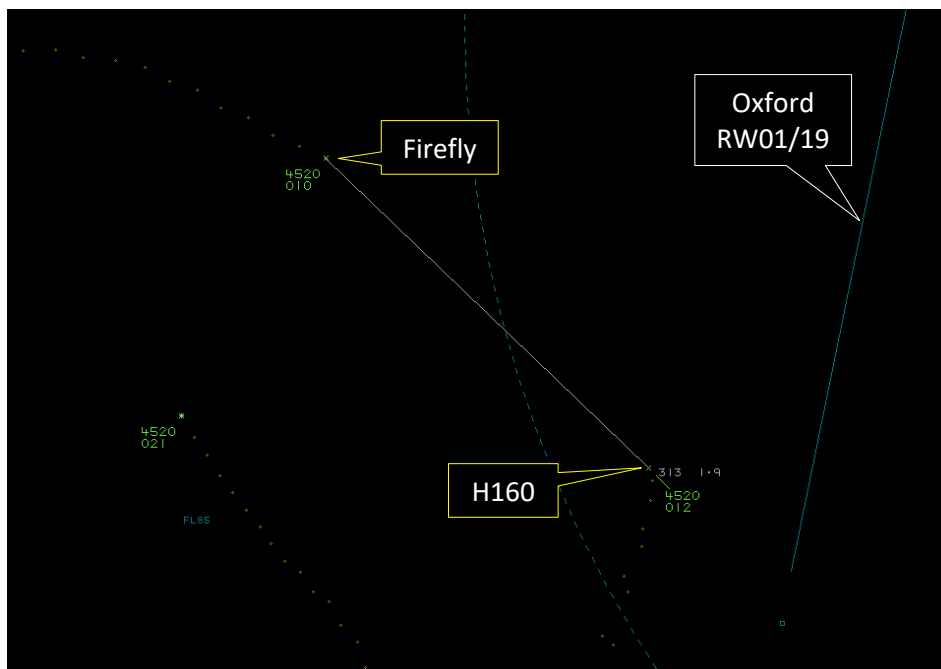


Figure 2 - 1507:18. The last radar return from the Firefly

The H160 and Firefly 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 An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation.²

Summary

An Airprox was reported when an H160 and a Firefly flew into proximity in the Oxford ATZ at 1509Z on Friday 23rd August 2024. Both pilots were operating under VFR in VMC and in receipt of an ACS from Oxford Tower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, GPS track data for the flight of the Firefly and a report from the air traffic controller involved. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

The Board first considered the actions of the pilot of the H160. Members noted that they had been conducting circuit training to the west of RW01/19 and had been passed Traffic Information on the Firefly. It was also noted the TCAS fitted to the H160 had detected the presence of the Firefly. Members next noted that the pilot of the H160 had visually acquired the Firefly in their 8 o'clock position but had lost sight of it as it had passed behind them. Members reviewed the timeline provided in the Oxford Airport Unit Investigation and noted that, at approximately 1508, the pilot of the H160 had reported that they were "*Turning final area 1, visual with previous traffic*", a transmission which was followed by the pilot of the Firefly transmitting that they were "*right base*". It was appreciated by members that the pilot of the H160 may have therefore assumed that the Firefly pilot would have been 'number 2' and would have landed after them. However, some members pointed out that the Oxford Tower controller had given 'Area 1' to the pilot of the H160 to "*land at your discretion*", but the response to that transmission had been by the student in the Firefly that they would "*land at our discretion*". Notwithstanding that the

¹ (UK) SERA.3205 Proximity.

² (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome.

H160 and Firefly had been to land at different areas, Heli Area 1 and RW19 respectively, members appreciated that the pilot of the H160 may have believed that the landing order had been implicit. However, members agreed that the aircraft had not been sequenced by the controller and that it had been the responsibility of each pilot to have conducted their approach and landing appropriately. Members noted that the pilot of the H160 had re-acquired the Firefly ahead of them, that it had been “*crossing at speed*” and that “*no avoiding action was required*”. Nevertheless, members were in agreement that its proximity had caused the H160 pilot concern.

Members next turned their attention to the actions of the Oxford Tower controller. It was noted that they had passed Traffic Information to the pilot of the H160 on the position and intentions of the Firefly pilot but had not passed their altitude. Members next noted that the fixed-wing circuit at Oxford is promulgated as 1500ft AMSL and the Heli Area 1 circuit is promulgated as 1000ft. It was clear to members that the Oxford Tower controller had assumed that the pilot of the Firefly would have joined at the fixed-wing altitude and, therefore, that there would have been sufficient vertical separation between the H160 and Firefly. However, members noted that the Oxford Tower controller had not appreciated that the Firefly had been significantly lower than the fixed-wing circuit altitude and agreed that, consequently, they had not detected a potential conflict between the aircraft.

Turning their attention to the actions of the pilot of the Firefly, members noted that they had called the Oxford Tower controller for joining when they had been at a range of 5NM. It was noted that the Oxford Tower controller had subsequently requested that they “*join and report right base runway 19*” and members were in agreement that they had joined in accordance with that instruction. Members noted that there had been no altitude information passed, or requested, by either party. Notwithstanding, it was apparent that the pilot of the Firefly had intended to join at an altitude that had been significantly below the ‘normal’ circuit altitude for fixed-wing aircraft and which may have conflicted with traffic operating in the helicopter circuit. As such, members agreed that the pilot of the Firefly had not relayed their intentions to the Oxford Tower controller in sufficient detail to have aided their situational awareness and, indeed, to have aided the situational awareness of the H160 pilot.

Members next noted that there were no published or specific instructions for the joining procedure and, therefore, without the Oxford Tower controller having established the order for landing, it had been the pilots’ responsibility to have arranged their respective flights to have conformed with, or to have avoided, any circuit traffic. Members agreed that, although the pilot of the Firefly had visually acquired the H160, they had positioned their aircraft (horizontally and vertically) in such a way that they had neither conformed with, nor had sufficiently avoided the pattern of traffic formed by the H160 and had flown close enough to the H160 to have caused its pilot concern.

Concluding their discussion, members were in agreement that the pilot of the Firefly had been in visual contact with the H160 throughout the encounter and that the separation between the aircraft had remained such that no avoiding action had been necessary by either pilot. Consequently, members were satisfied that there had not been a risk of collision and turned their attention to the consideration of whether there had been a reduction in safety.

Some members suggested that, although the pilot of the Firefly had not communicated their intention to join at an ‘unexpected’ altitude, the separation between the Firefly and H160 had been sufficient for the safety of the aircraft to not have been compromised. However, other members countered that the overall nature of the join by the pilot of the Firefly, that had not been expected by the H160 pilot nor the Oxford Tower controller, had reduced safety margins. A vote was conducted and the former view prevailed. Members concluded that, in the absence of a published joining procedure or direct instructions from the Oxford Tower controller, ultimately, the pilot of the Firefly had used their discretion during their landing to have avoided the H160 with reasonable separation (albeit having caused some concern) and had positioned their aircraft safely for landing. The Board assigned Risk Category E to this event and agreed on the following contributory factors:

CF1: The Oxford Tower controller had not detected a potential conflict between the Firefly and H160.

CF2: The Oxford Tower controller had assumed that the pilot of the Firefly would have joined at the promulgated fixed-wing circuit altitude.

CF3: The pilot of the Firefly had not relayed their intention to have joined lower than the promulgated fixed-wing circuit altitude.

CF4: The pilot of the Firefly had not conformed with, nor had sufficiently avoided, the pattern of traffic formed by the H160.

CF5: The TCAS fitted to the H160 had detected the presence of the Firefly.

CF6: The pilot of the Firefly had flown close enough to the H160 to have caused its pilot concern.

CF7: The pilot of the H160 was concerned by the proximity of the Firefly.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2024222				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Ground Elements				
• Situational Awareness and Action				
1	Human Factors	• Conflict Detection - Not Detected	An event involving Air Navigation Services conflict not being detected.	
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	
Flight Elements				
• Tactical Planning and Execution				
3	Human Factors	• Accuracy of Communication	Events involving flight crew using inaccurate communication - wrong or incomplete information provided	Ineffective communication of intentions
4	Human Factors	• Monitoring of Environment	Events involving flight crew not to appropriately monitoring the environment	Did not avoid/conform with the pattern of traffic already formed
• Electronic Warning System Operation and Compliance				
5	Contextual	• ACAS/TCAS TA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system traffic advisory warning triggered	
• See and Avoid				
6	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
7	Human Factors	• Perception of Visual Information	Events involving flight crew incorrectly perceiving a situation visually and then taking the wrong course of action or path of movement	Pilot was concerned by the proximity of the other aircraft

Degree of Risk: E.

Safety Barrier Assessment³

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

³ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

Ground Elements:

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the Oxford Tower controller had assumed that the pilot of the Firefly would have joined at fixed-wing circuit height and, consequently, had not detected a potential conflict with the H160.

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because the pilot of the Firefly had not conformed with, nor sufficiently avoided, the pattern of traffic formed by the H160.

Airprox Barrier Assessment: 2024222		Outside Controlled Airspace					
Barrier	Provision	Application	Effectiveness				
			Barrier Weighting				
			0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	✓	✓	[Green bar to 5%]			
	Manning & Equipment	✓	✓	[Green bar to 2.5%]			
	Situational Awareness of the Confliction & Action	✓	✗	[Red bar to 15%]			
	Electronic Warning System Operation and Compliance	○	○	[Grey bar to 2.5%]			
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✓	[Green bar to 10%]			
	Tactical Planning and Execution	✓	!	[Yellow bar to 10%]			
	Situational Awareness of the Conflicting Aircraft & Action	✓	✓	[Green bar to 20%]			
	Electronic Warning System Operation and Compliance	!	✓	[Green bar to 15%]			
	See & Avoid	✓	✓	[Green bar to 20%]			
Key:							
	Full	Partial	None	Not Present/Not Assessable	Not Used		
Provision	✓	!	✗	○			
Application	✓	!	✗	○	○		
Effectiveness	[Green]	[Yellow]	[Red]	[Grey]	[Red Box]		