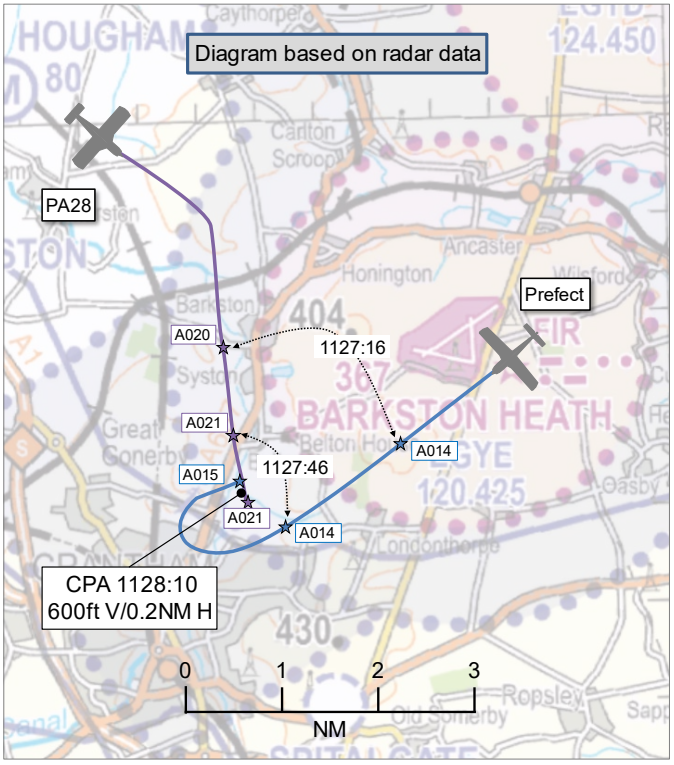
AIRPROX REPORT No 2024085

Date: 08 May 2024 Time: 1128Z Position: 5256N 00037W Location: IVO Barkston Heath

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect	PA28
Operator	HQ Air (Trg)	Civ FW
Airspace	Cranwell CMATZ	Cranwell CMATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	Basic
Provider	Barkston Tower	Waddington Zone
Altitude	1500ft	2100ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White/Blue	White/Green
Lighting	Nav, anti-collision (HISL) and landing	Beacon and wing tips
Conditions	VMC	VMC
Visibility	>10km	5-10km
Altitude/FL	1000ft	2100ft
Altimeter	QFE	QNH
Heading	030°	180°
Speed	120kt	103kt
ACAS/TAS	TAS	Not fitted
Alert	None	N/A
Separation at CPA		
Reported	500ft V/NK H	NK V/ NK H
Recorded	600ft V/0.2NM H	



THE PREFECT PILOT reports that they were on a student solo circuits sortie flying from RAF Barkston Heath (BKH). After completing 4 circuits, they departed the circuit to re-join via initial for RW06RH. Approximately three-quarters of the way round the turn towards the initial, they noticed a light-aircraft (type believed to be PA28) cross their flightpath from left-to-right (north to south) above the canopy. The minimum separation was judged to be approximately 500ft. They continued the level turn at 1000ft QFE and judged there was no longer any risk of collision as the aircraft was now flying away from them to the south. Barkston Tower then advised them of traffic 600ft above, to which they called *'Traffic in sight'*. They believed the separation of the aircraft compromised the safety of the flight. They opined, given the traffic location, it was uncertain whether the other aircraft infringed the Barkston Heath ATZ, though it was certainly well within the stub of the Barkston MATZ [sic]. They re-joined the circuit via initial and continued the sortie without further incident.

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

THE PA28 PILOT reports that Waddington Zone had provided a Basic Service from Gainsborough VRP. A Barkston Heath MATZ clearance for a track from Hougham microlight site direct to [destination] had been requested from Waddington Zone and a MATZ clearance was advised just prior to reaching Hougham. Just prior to entering the MATZ, the Waddington controller instructed a 20° turn to the right and then within seconds instructed a heading of 180° to avoid entering the Barkston Heath ATZ. Waddington did not advise the vicinity of any other aircraft or aircraft in the Barkston Heath circuit. After the MATZ was exited Waddington notified [them of] an aircraft below, similar heading, at low level and climbing. They were visual with this aircraft and there were no proximity issues. Waddington provided a service throughout and they were not instructed to call either Cranwell or Barkston Heath. It is assumed that the other aircraft involved was at a lower level and flying a heading such that it was hidden under either the port or starboard wing.

THE BARKSTON HEATH TOWER CONTROLLER/SUPERVISOR reports that RW06RH in use. They were the Air controller with Ground Movement Controller (GMC) positioned manned, working two solo trainees in the visual circuit with another [aircraft] inbound on an SRA to land. The reporting aircraft [Prefect] pilot called downwind to touch and go, and [the controller] stated that there was one ahead on radar and they elected to depart out to rejoin via initials, which was passed to Cranwell Approach at the Terminal Air Traffic Control Centre (TATCC). Simultaneously, the Cranwell Supervisor at TATCC called the GMC to impose a circuit restriction of 1500ft on the Barkston Heath QFE against traffic 3NM northwest of Barkston Heath, squawking Mode A 3605, and Mode S [PA28 callsign] heading towards the airfield. The Cranwell Supervisor stated that the aircraft was supposed to be routeing to Grantham, and was now just turning away from the ATZ.

They imposed the circuit restriction of not above height 1500ft stating '*due to MATZ crosser west by 2 and a half miles*'. At this point the reporting aircraft [the Prefect] was just outside the ATZ tracking 240° and the MATZ crosser [the PA28] was in their 2 o'clock, at 1NM, indicating 600ft above. As the [Prefect] turned right to initials, they provided specific Traffic Information to them on the [PA28] and [the Prefect pilot] reported visual. The track of the [Prefect] took it well ahead of the [PA28] then, as they turned right towards initials, they routed behind [the PA28]. The closest distance between the aircraft was with the [Prefect] tracking 060° and the [PA28] in their one o'clock position at 0.1NM with 600ft vertical separation indicated.

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

THE WADDINGTON LARS CONTROLLER reports that they were monitoring multiple frequencies and working a few tracks at the time. They took the position and were told that [the PA28] was routeing towards [their destination] and was given a Stub crossing of Barkston at 1600ft under a Basic Service. The aircraft was routeing via the Barkston stub when they (the controller) called for a MATZ crossing on a different aircraft. During the handover they heard a call from [the PA28 pilot] whom they believed had said they were entering the MATZ (but meaning the Stub part only as been cleared earlier from a different controller), so they acknowledged this call. They completed the handover and then noticed [the PA28] had turned more directly to [destination] via the Barkston overhead, they told the pilot to turn right 20° to avoid. The aircraft was still routeing towards [the Barkston overhead] so they gave [the PA28 pilot] a turn right heading 180° instruction to avoid and called traffic which was in the Barkston overhead indicating 600ft below. The [PA28 pilot] took the turn and routed via the Stub. The [PA28] did enter the Barkston MATZ by a mile but remained clear of the ATZ.

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

THE CRANWELL SUPERVISOR reports that Waddington LARS had coordinated a MATZ crossing of the Barkston Heath Stub via Grantham, with a squawk of 3605, at an altitude of 2000ft on the Barnsley Regional Pressure Setting (RPS) with Cranwell Approach.

They noticed that the track of the MATZ crosser [the PA28] was heading towards the [Barkston Heath] overhead. They moved down the room toward the Waddington LARS controller to ask what the track was doing, whilst then passing a circuit and climb out restriction of 1500ft Barkston QFE to Barkston Heath Tower, along with Traffic Information.

The [PA28] track then turned away from the MATZ and no further conflict was seen on radar.

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

Factual Background

The weather at Cranwell was recorded as follows:

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METAR EGYD 081120Z 16008KT 9999 FEW021 16/10 Q1029 NOSIG RMK BLU
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Analysis and Investigation

Coningsby A3 BM Safety

Summary of investigation; There was a review of all report narratives and liaison with both the Terminal Air Traffic Control Centre (TATCCs) and 3 FTS.

Sequence of events;

1119:23 The Waddington LARS [controller] requested a MATZ crossing of the Barkston Heath stub for the PA28 and identified the aircraft to Cranwell Radar. The PA28 position; Waddington, west ~7NM & 2000ft on the Barnsley [Regional Pressure setting (RPS)] 1023hPa, routeing southbound enroute to [destination]. The MATZ crossing was approved and radar traffic pointed out.

1125:58 The Waddington LARS [controller] gave the PA28 [pilot] a suggested turn to ensure they avoided the Barkston Heath ATZ. The PA28 had deviated from the expected route that was to go via Grantham (situated close to the southerly corner of the BKH stub).

1126:08 The Cranwell Radar controller called the Waddington LARS [controller] for traffic information on the PA28, [who] confirmed that the PA28 was turning to avoid the ATZ. The Cranwell Radar [controller] then asked the Cranwell Supervisor to inform the Barkston Heath Aerodrome Controller (ADC).

1126:23 The Cranwell Supervisor issued a circuit restriction at Barkston Heath of 1500ft 1016hPa to ensure vertical separation against the PA28 on the MATZ crossing. The Cranwell Supervisor rang the Barkston Heath Ground controller (GRD) and pointed out the PA28 on the Air Traffic Monitor (ATM). The Barkston Heath GRD informed the Barkston Heath Aerodrome Controller (ADC), who called the traffic to [the Prefect pilot who was] joining through initials.

1126:24 The Waddington LARS [controller] issued a heading of 180° to avoid Barkston Heath ATZ.

1127:01 The Barkston Heath ADC called Cranwell Radar to inform them that the [Prefect] was leaving the circuit for initials.

1127:25 The Barkston Heath ADC issued an ‘All Stations’ broadcast, issuing a circuit restriction of 1500ft due to the MATZ crosser, giving an approximate position.

1127:30 The Waddington LARS [controller] provided the PA28 [pilot] with Traffic Information on the Prefect, who reported visual.

11:28:02 The Barkston Heath ADC called the PA28 traffic to the Prefect pilot, who reported visual.

The minimum separation between the aircraft was approximately 600ft vertically with tracks merging.

Outcome; A [loss of separation] was declared by the [Prefect pilot] against a civilian aircraft transiting through the Barkston Heath MATZ.

Causes;

The Cranwell Radar controller had been given permission for the civil aircraft to cross the Barkston Heath stub, however the aircraft deviated from the expected route (via Grantham) and took up a more direct heading for [destination] which would have taken it through the Barkston Heath ATZ. This then created a loss of separation with a Prefect repositioning from the visual circuit for initials.

The LARS controller was controlling a number of aircraft on various frequencies, and conducting a handover at the time of acknowledging the MATZ entry call from [the PA28]. Thereby, close scrutiny

of the track of the aircraft was not made. The aircraft was under a Basic Service and the controller did not expect the aircraft to change routeing as a prior direction had been given.

The civilian pilot deviated from the anticipated route unexpectedly. The scenario was debriefed within TATCC, in particular ensuring both pilot and controllers are fully cognisant of each other's understanding of routeing and implications.

The Prefect pilot had not fully [processed] the information on the MATZ crossing traffic as it had been part of an 'all stations' broadcast and they had already broken out of the circuit. The solo trainee Prefect pilot was unaware of the presence of the other aircraft and became visual late, just prior to a bespoke Traffic Information call. Although a late-notice broadcast was made to enact a circuit restriction, followed by information of the location of the MATZ crosser, the trainee did not recall hearing the MATZ crossing warning. Although it was late notice, there was a broadcast on Tower frequency warning of a MATZ crosser, and the PA28 [pilot] was visual with the Prefect after receiving Traffic Information from Waddington LARS. Furthermore, a degree of separation was in place due to the restriction (heard by the Prefect pilot) of not above 1500ft Barkston Heath QFE and the [PA28] being at 2100ft QNH (which provided 600ft separation between the actual altitudes of the Prefect and the PA28, and 200ft separation for any circuit traffic flying at the maximum circuit height restriction)[1]. Barkston Heath ATC acknowledged that additional information could have been supplied to the trainee in a more timely fashion, but were unaware that they hadn't assimilated the initial call.

Barkston Heath would not ordinarily expect Traffic Information on MATZ crossers where there was no anticipated confliction, which was anticipated to be the case [with a civilian aircraft] being cleared through the stub at 2000ft. This led to the late restriction and calling of traffic. Controllers were reminded of the need for timely liaison. TATCC is requested to consider ensuring Barkston Heath Tower is aware of all MATZ crossers rather than just those expected to affect. As this would be workload dependant, this would not be a binding agreement. The Air Traffic Monitor is for situational awareness of the controller only, and not for controlling. Therefore the prime situational awareness tool is lookout.

The decision to extend to initials, effectively leaving the ATZ/circuit, meant that the Prefect flew into confliction with the MATZ crosser. Although there is an option to go around at circuit height, this can also introduce issues and therefore not deemed appropriate to dictate one or other option.

The passing of information on the track deviation was convoluted. Only the Cranwell bank had direct communication with Barkston Heath, so it was necessary for Waddington to then liaise with the Cranwell Supervisor who then imposed the restriction and provided Traffic Information to Barkston Heath Ground, who then relayed the information to the Barkston ADC etc.

Though protracted this was still the most expedient way to get information to Barkston Heath.

2 Gp BM Analysis

The Waddington Lower Airspace Radar Service controller was proactive in their identification of the PA28's unexpected routeing. Their decision to instigate an initial turn and then a more directive heading ensured that ATZ penetration did not occur. The Traffic Information provided to the PA28 pilot was accurate and timely ensuring that, when combined with the vertical position, safe separation was ensured throughout.

The combination of actions by the Cranwell Radar Supervisor and Cranwell Approach controller to identify the PA28's conflicting routeing, liaise with the Waddington Lower Airspace Radar Service controller and then provide accurate information to Barkston Heath aided to ensure situational awareness for all parties. The application of the circuit and climb-out restriction was applied in a timely manner and prevented the PA28's routeing conflicting with any departures from the Barkston Heath circuit, including the Prefect.

[1] This sentence has been altered from the original by UKAB for clarity as agreed by Coningsby A3 BM Safety.

Overall, the combination of actions taken by Waddington Radar, Cranwell Radar and Barkston Heath controllers ensured separation was achieved and reacted effectively to an unexpected routeing by the PA28 pilot. As outlined in the local investigation, the event reaffirms the requirement for clarity in understanding of routeing agreements between ATC and aircrew.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft were positively identified using Mode S data. After the PA28 entered the Barkston Heath MATZ, the Prefect passed from left-to-right ahead of it (Figure 1).

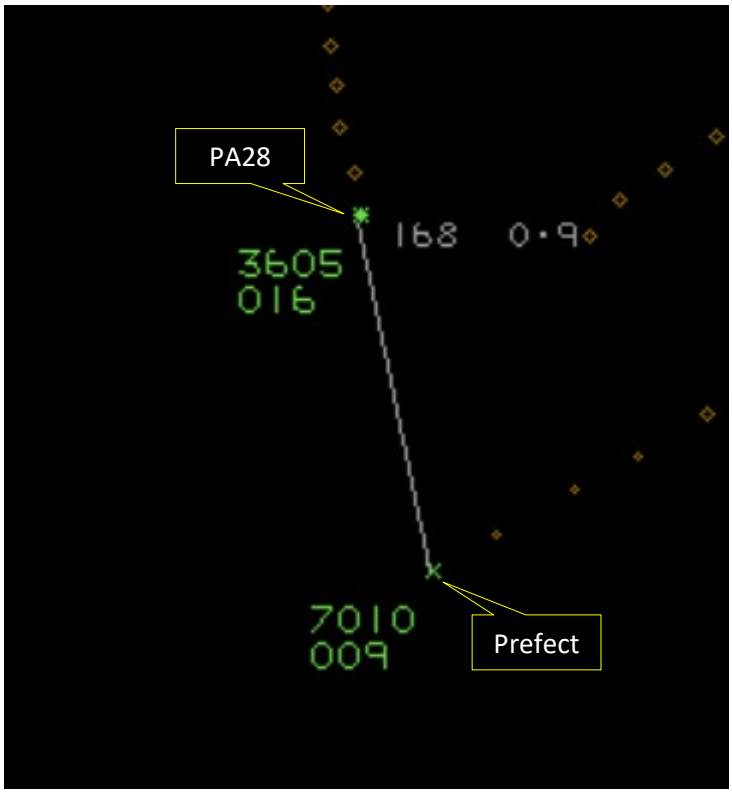


Figure 1- Time 1127:50 Prefect passed in front of the PA28 700ft below at 0.9NM

The Prefect pilot made a right turn, passing behind the PA28 which passed from left-to-right ahead of it. The point of CPA was at 1128:10 with 600ft vertical and 0.2NM horizontal separation (Figure 2).

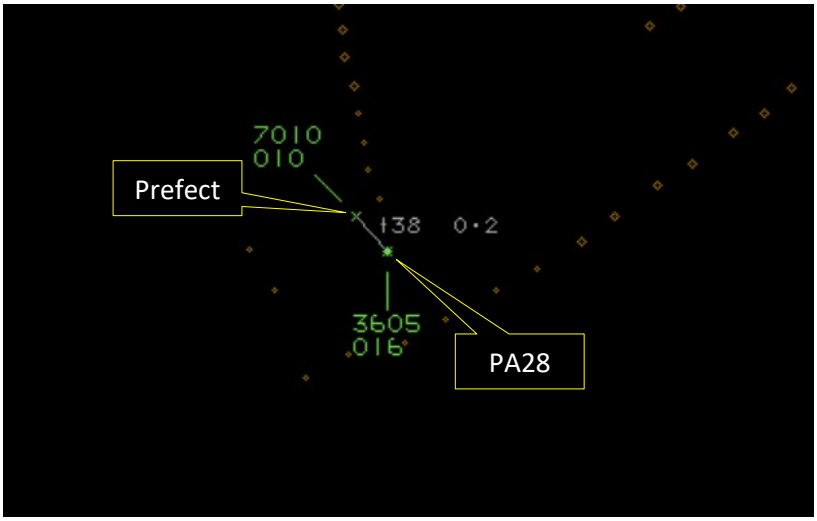


Figure 2 – Time 1128:10 CPA 600ft and 0.2NM separation

The Prefect and PA28 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 PA28 pilot was required to give way to the Prefect.[3] 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.[4]

Comments

HQ Air Command

This is a timely reminder that MATZs only offer limited protection; civilian aircraft are at liberty to transit and deviate from the agreed track within the MATZ. In this instance, the aircraft were coordinated and the PA28 pilot was visual with the Prefect, so the risk of collision was low. However, the proximity surprised the Prefect student and the investigation has raised some good findings and considerations.

AOPA

It is surprising the TAS did not alert the pilot, leaving an effective lookout as the only tool to avoid a mid-air collision.

Summary

An Airprox was reported when a Prefect and a PA28 flew into proximity in the vicinity of Barkston Heath at 1128Z on Wednesday 8th May 2024. Both pilots were operating under VFR in VMC, the Prefect pilot in receipt of an ACS from Barkston Tower and the PA28 pilot in receipt of a Basic Service from Waddington Zone.

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.

The Board first discussed the actions of the PA28 pilot and noted that the pilot had reported that a request had been made for a Cranwell MATZ crossing with Waddington which would allow them to route direct to their destination. Members were concerned that either the pilot may have misheard the instruction from the Waddington controller, or that the Waddington controller may not have effectively communicated the routeing to the pilot and, as the Board was unable to get clarity from the saved recordings which had, disappointedly they felt, not covered that portion of the communications between the pilot and controller, they were unable to assess the relevance of those communications or their influence on the Airprox. Nonetheless, in discussing the PA28 pilot's expectations, as was apparent by the PA28's heading to its destination, members agreed that the pilot could have queried the direct clearance which would have taken them through the Barkston Heath ATZ as well as the MATZ, for which no clearance was determined to have been given. The Board ascertained that if the direct clearance had been given for the PA28 pilot to cross the MATZ to their destination, then that instruction may have led to a potential Airprox, and members were reassured that the PA28 pilot had followed the heading changes given to them as directed by the Waddington controller who had just taken the position over from the previous controller.

Turning their attention to the Prefect pilot, members noted that the solo student had not heard or assimilated an 'all stations' broadcast regarding the MATZ crosser (**CF3**) which had occurred at or

[2] (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[3] (UK) SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.
[4] (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome. MAA RA 2307 paragraph 17.

marginally after the student pilot had made the decision to depart the circuit and rejoin via initials, and they had been outside the Barkston Heath ATZ when the Traffic Information and circuit restriction had been passed. The Board agreed that only after the Prefect student pilot had been passed further specific information about the PA28 had they gained late situational awareness of it (**CF2**), and that this may have been improved had the Prefect's EC device received the emissions from the PA28's transponder, as would have been expected (**CF4**).

Moving their attention to the Military ATS units involved, the Board made a number of observations, some of which were addressed when covering the PA28 pilot's actions. A discussion ensued regarding the difficulty of uploading large amounts of data in order to provide information, which was considered to be essential to this Airprox, and members were heartened to learn that new equipment was in place, alongside training to ensure that all pertinent recordings will be available for future investigations. Looking specifically at the original MATZ crossing clearance to the PA28 pilot, the Board agreed that the Waddington controller, who had taken over the position, had had an incorrect or different mental model of the clearance from that of the PA28 pilot, and that their expectation had been for the PA28 to have routed through the stub of the MATZ via Grantham, which was a standard Cranwell MATZ crossing clearance from Waddington for traffic approaching from that vicinity (**CF1**). Members could not be certain whether the controller handover had played a part in the forming of those expectations.

In determining the risk involved in this Airprox, members acknowledged that the startle effect of the unexpected appearance of the PA28 had been enough for the solo student Prefect pilot to have been concerned by the proximity of the PA28 (**CF5**) and the Board agreed that the combined actions of the controller and reactions of the PA28 pilot, with 600ft vertical separation between the Prefect and PA28, the aircraft proximity was such that no risk of collision had existed: Risk Category C.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2023085			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Situational Awareness and Action			
1	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			
	• Situational Awareness of the Conflicting Aircraft and Action			
2	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late, inaccurate or only generic, Situational Awareness
3	Human Factors	• Understanding/ Comprehension	Events involving flight crew that did not understand or comprehend a situation or instruction	Pilot did not assimilate conflict information
	• Electronic Warning System Operation and Compliance			
4	Human Factors	• Response to Warning System	An event involving the incorrect response of flight crew following the operation of an aircraft warning system	CWS misinterpreted, not optimally actioned or CWS alert expected but none reported
	• See and Avoid			
5	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: C.

Safety Barrier Assessment[5]

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

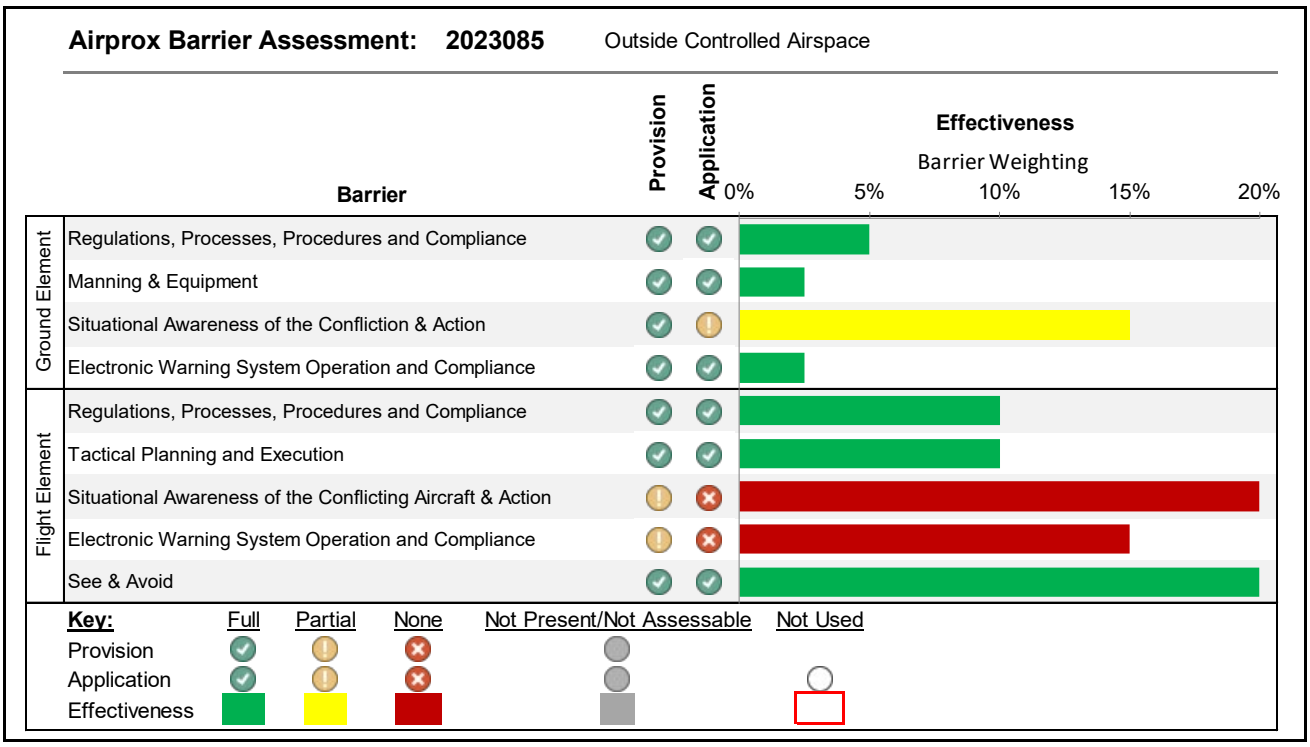
Ground Elements:

Situational Awareness of the Confliction and Action were assessed as **partially effective** because the Waddington controller had an incorrect mental model of the routeing of the PA28 pilot through the Cranwell MATZ creating the necessity to later re-route the PA28.

Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Prefect pilot had not assimilated the 'all stations' broadcast that provided Traffic Information on the PA28 making a MATZ stub crossing and, therefore, had late situational awareness of the presence or position of the PA28.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because, although it would have been expected that the TAS on the Prefect would detect the transponder emissions on the PA28, no alert was reported.



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