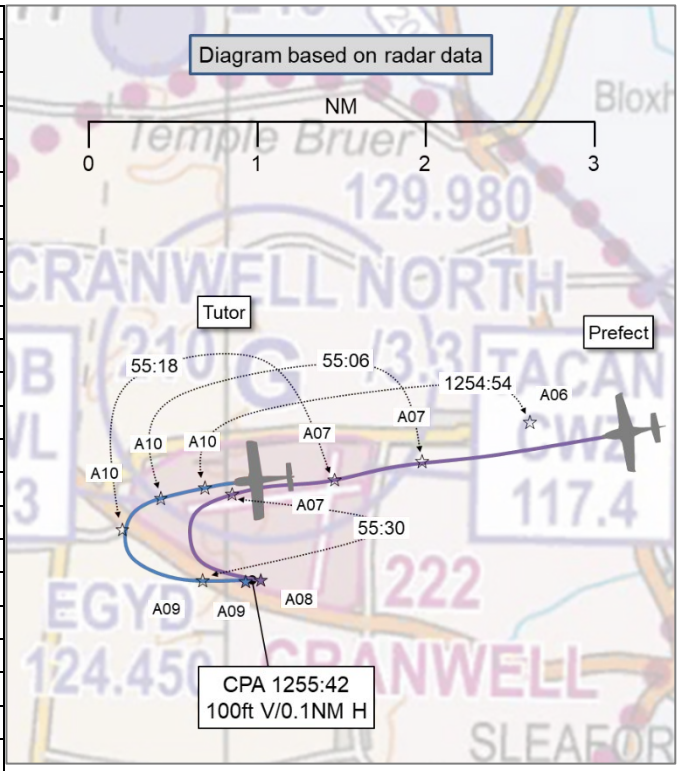
AIRPROX REPORT No 2024232

Date: 12 Sep 2024 Time: 1256Z Position: 5301N 00029W Location: RAF Cranwell

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect	Tutor
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Cranwell ATZ	Cranwell ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Cranwell Tower	Cranwell Tower
Altitude/FL	700ft	800ft
Transponder	A, C, S+	A, C, S+
Reported		
Colours	White, blue	White
Lighting	Strobe, nav	HISL
Conditions	VMC	VMC
Visibility	NR	>10km
Altitude/FL	800ft	700ft
Altimeter	NR	NR
Heading	NR	080°
Speed	NR	80kt
ACAS/TAS	TCAS I	TAS
Alert	NR	Alert
Separation at CPA		
Reported	Not sighted	100ft V / 1/8NM H
Recorded	100ft V/0.1NM H	



THE PREFECT PILOT reported being a Prefect trainee on fast jet lead-in, conducting a solo low-level navigation exercise (navex). Following a successful navex in good weather, they began the recovery to Cranwell and held northeast of the airfield, as the visual circuit was full. 9-10 Prefects had been programmed per wave that day, so holding before recovery was expected. When cleared inbound, they routed to the Initial point at 1000ft to line up for a Visual Run-In and Break (VRIAB) on RW26, as planned. After calling "[C/S], initial for the break", the Tower controller passed the positions of two other aircraft in the circuit: a Prefect on short final and a Tutor descending deadside. They quickly spotted the Prefect on short final and judged that it would not be a threat. Over the next 40sec they searched for the Tutor while descending to 500ft at 180kt. About 1NM short of the runway threshold they chose to press ahead with the planned VRIAB although they still could not see the Tutor, which was then downwind at 800ft. They arrived at the runway threshold, lost visual contact with the Prefect, and broke over the airfield. Now at 60° bank, they spotted the Prefect about 200ft below and behind them, climbing and manoeuvring to the deadside to avoid. As they realized what they had done, they unintentionally omitted the radio call and tried to focus on flying the turn. Rolling out downwind having climbed to 600ft, they heard a radio call "[Tutor C/S], I've just had a Prefect break in front of me". They did not see the Tutor, which took avoiding action. They later learned that, with the Tutor a little low at 700ft, they had had 100ft of vertical separation. The Prefect pilot commented that they wrongly allowed exuberance at the VRIAB to compromise safe flying. Moreover, in the period between calling Initial and arrival at the runway threshold, there was enough time in which to identify the other aircraft or, if unable to do so, to choose a safer alternative, such as extending upwind on the deadside before breaking, remaining on the deadside before going around at circuit height, or routeing back out toward Initial for another join. Purely due to good airmanship by the other pilots, and luck, they were able write this DASOR as a reminder to others of the importance of good lookout in the circuit and of being open to modifying your plan to fit in around circuit traffic. On reflection, this experience demonstrated a serious error of judgement and personal airmanship that endangered themself and two other aircraft and crews, causing both to take avoiding action. It is not a revelation that you must positively identify all the aircraft

in the circuit before joining – as learned in the safe circuits brief – however they now know that you cannot make an exception to this rule. They assumed that their intended recovery would fit in around the circuit traffic rather than taking proper care to fit in around others.

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

THE TUTOR INSTRUCTOR reported they were recovering to Cranwell with an international student who was working close to capacity [limit] at the end of a demanding composite sortie. They joined through initials at the normal Tutor circuit height of 800ft. At no point did they descend deadside and the instructor did not recall [the Tower controller] making this call to the Prefect [pilot] with respect to their position. In fact, they were turning onto the downwind leg as the Prefect [pilot] called 'Initials for the break' and they thought at the time they would almost certainly coincide abeam the threshold (the normal position from which to [commence the] break); they were particularly vigilant in watching the Prefect's flightpath whilst the student flew the aircraft. They subsequently watched the Prefect break immediately in front of them and 'belly up' to them. [The Prefect pilot] would not have been in a position to see them at all during the break. They immediately took control from the student (who was flying a little low at 700ft) and climbed and widened the downwind leg to ensure separation was maintained. They made a call along the lines of '…[Tutor C/S], downwind to initials, to rejoin to avoid the Prefect that has just broken in front of me…' to ensure air traffic knew they were visual with, and aware of, the Prefect. They maintained control for the subsequent rejoin and circuit and the student landed without further incident. Although the Prefect [pilot] did not have situational awareness of them, and separation was uncomfortably reduced, they were fully aware of their position and stated intention throughout and did not consider that they were close to colliding. The Tutor instructor noted that they welcomed the honest and open report from the trainee Prefect pilot who clearly identified a valuable lesson from the occurrence.

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

THE CRANWELL TOWER CONTROLLER reported operating on RW26, controlling at moderate intensity with nearly a full visual circuit. [Airprox] Prefect [pilot] called up requesting join, after being held off when the visual circuit was full moments earlier. They gave the [pilot] a clearance to join, stating the runway in use and QFE, along with the number of aircraft in the visual circuit and another aircraft that was upwind departing the aerodrome. As [the Airprox Prefect pilot] was positioning for the initial point, they had [another] Prefect on final and a Tutor on the deadside. When [the Airprox] Prefect [pilot] called 'initials for the break' at 500ft, they gave accurate positioning of all the aircraft with the surface wind. Once they had responded to the initials call, they started the handover to the oncoming [Tower controller]. Towards the start, they heard [the other] Prefect [pilot] called to go around, which they acknowledged, followed by positioning to the deadside which they also acknowledged. The oncoming [Tower controller] was questioning [the Airprox] Prefect [pilot's] actions when they broke. [The other] Prefect [pilot] called positioning deadside to take avoiding action on [the Airprox] Prefect, whose [pilot] broke over them. The Tutor [pilot] established downwind (standard circuit height 800ft) and had to take avoiding action as [the Airprox] Prefect [pilot] broke into confliction with them, and forced them to go wide out to initial. [The Airprox] Prefect [pilot] then called, 'finals, gear down' and, after confirming their intention to land, they then issued a positive clearance to [the Airprox] Prefect [pilot] to land.

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

THE CRANWELL SUPERVISOR reported they were positioned in the VCR to assist the [Tower controller] during medium traffic intensity and to liaise with [the radar control centre] to hold off/bring in other aircraft. The Tower controller narrative gave a full and accurate picture of events, with a good depiction of conflicting traffic given, as standard, to [the Airprox] Prefect [pilot] at the Initials point. As soon as [the Airprox] Prefect [pilot] flew over the Tower they broke left in close proximity to an overshooting Prefect and again within close range of a Tutor which was already downwind. The Duty Pilot immediately informed their Sqn of the incident and the [Tower controller], clearly shaken by the event, handed over the position to the oncoming controller.

Factual Background

The weather at Cranwell was recorded as follows:

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METAR EGYD 121320Z 31009KT 9999 FEW038 BKN150 13/05 Q1016 NOSIG RMK BLU BLU=
METAR EGYD 121250Z 31008KT 9999 FEW038 BKN150 14/06 Q1016 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

An Airprox occurred on 12 Sep 24, within the RAF Cranwell RW26 visual circuit at 1255 UTC. The Prefect [pilot] was conducting a Visual Run In And Break (VRIAB) join and in receipt of an Aerodrome Service from Cranwell Tower. The Tutor [pilot] had just completed their VRIAB join and was downwind, also in receipt of Aerodrome Service from Cranwell Tower.

Background
Utilising occurrence reports and information from the local investigations, outlined below are the key events that preceded the Airprox. Where available they are supported by screenshots to indicate the positions of the relevant aircraft at each stage. Screenshots are taken from Unit radar recordings and present the radar presentation of the Prefect and Tutor available to the Cranwell Tower controller through use of the Aerodrome monitor.

Sequence of Events

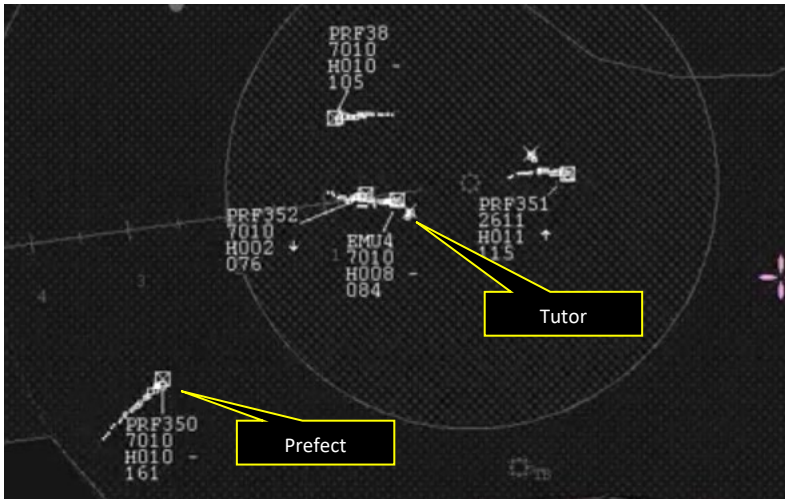


Figure 1 (1253:56). Prefect requested join.

At 1253:56, the Prefect [pilot] requested to join the visual circuit, positioning as standard via initial at 1000ft Cranwell QFE 1009hPa. The Cranwell Tower controller approved the join and provided initial circuit Traffic Information "*join runway 26 QFE 1009, 3 in, and 1 Prefect upwind departing*".

At 1254:36, the Prefect [pilot] reported at initial. The Cranwell Tower controller acknowledged this and provided standard circuit Traffic Information "*1 Prefect final, 1 Tutor deadside, wind 320 09".* Of the three originally reported as in, one had previously landed.
At 1254:49, a position handover of the Cranwell Tower position commenced with both the off-going and incoming controllers plugged in and the handover brief set to record.

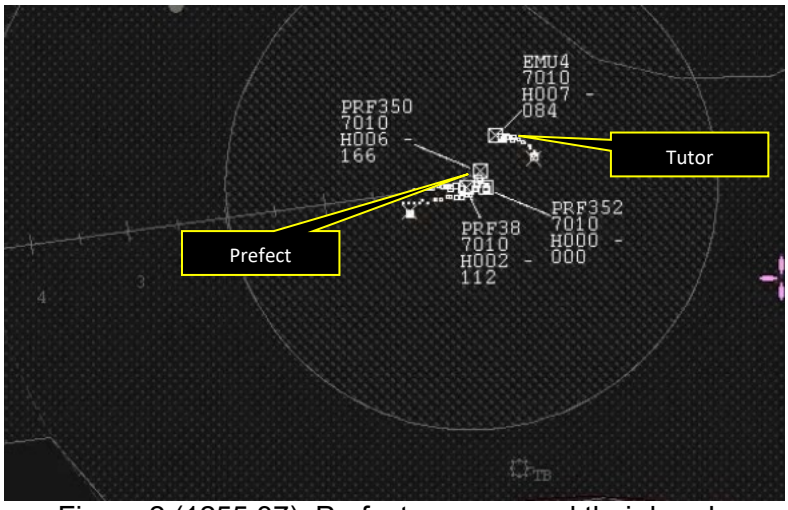


Figure 2 (1255:37). Prefect commenced their break.

At 1255:37, the Prefect [pilot] commenced their break from deadside to downwind. At 1255:43, the Tutor [pilot] reported "*downwind subject to a Prefect break in front of me, downwind to rejoin through initials*".

CPA occurred at 1255:46 and was recorded as 0.1NM horizontal and 100ft vertical separation.

Local BM Investigation(s)
RAF Cranwell, in conjunction with 3 Flying Training School, conducted a local investigation to identify the ATS-related causal and aggravating factors. The investigation found that the Cranwell Tower controller had provided standard circuit Traffic Information throughout, and that the Prefect [pilot] had mis-interpreted them and built an incorrect situational awareness of the visual circuit.

2 Gp BM Analysis
The actions of the Cranwell Tower controller were standard throughout, providing accurate and timely circuit Traffic Information. As identified in the local investigation, there were no ATS-related causal or aggravating factors.

UKAB Secretariat

The Prefect and Tutor 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]

Occurrence Investigation

The Cranwell investigation found the following outcome, cause and causal factors:

Outcome: A Prefect [pilot] flew into confliction with circuit traffic (one Prefect and one Tutor) when conducting a VRIAB to join the visual circuit.

Cause: Based on the Traffic Information call received at the Initial point for RW26, the trainee built a flawed mental model of the position of circuit traffic. As a result, [they] did not gain visual with the Tutor upwind (visual with the Prefect) but believed [their] situational awareness to be sufficient to continue with the VRIAB.

Causal factor: Misinterpretation of the Traffic Information call provided by the Tower controller at the Initial point prior to the VRIAB. The trainee believed the call to be 'One Tutor deadside descending'

[1] MAA RA 2307 paragraphs 1 and 2.
[2] MAA RA 2307 paragraph 17.

however the actual call was 'One Tutor deadside'. The trainee therefore believed there was sufficient separation to break in front of the Tutor and not be a confliction, due to relative speed and altitude (800ft versus 500ft, 180kts versus 80kts). In all probability, this also contributed to the trainee not gaining visual with the Tutor due to looking in the wrong place.

Causal factor: Misinterpretation of the Traffic Information call provided by the Tower controller at the Initial point prior to the VRIAB. The trainee was informed that there was one Prefect final with which they initially gained visual. However, unbeknown to the trainee at this point, the Prefect was on a 'Continue' due to another Prefect on the runway post landing. The Prefect on final then went around resulting in them being much closer to the trainee who had initiated the VRIAB by this point.

Causal factor: The trainee was positioned in the right hand seat so, despite initially being visual with the Prefect on approach, at the point of executing the VRIAB the body of the aircraft was obscuring the Prefect which was now going around. The trainee only visually reacquired the Prefect as they turned into the VRIAB. Aircraft ergonomics are not assessed to have had any bearing on gaining visual with the Tutor.

Causal factor: The course syllabus dictates that trainees are taught the VRIAB on the Maximum Rate Turns sortie at the end of the General Handling phase. The VRIAB solo clearance should then be granted on Formation 4 as part of the Formation solo clearance prior to the Formation solo. The only other sortie where the syllabus states trainees practice a VRIAB solo is on Composite 3 towards the end of the course. The trainee in question, and some of [their] peers, had been cleared solo for the VRIAB early and an annotation to that effect made in their training folders.

Causal factor: Through anecdotal evidence from the investigatory interviews, it was suggested that there was a culture among [the course] trainees that the VRIAB was a high visibility and desirable manoeuvre which sets them apart from trainees on other courses. There was, therefore, a perception that trainees may develop a pre-meditated decision to conduct a VRIAB regardless of other circuit traffic. During interview, the trainee in this incident did not feel this culture affected them and their decision making process. This potential culture came to light during interviews with other key people in the investigation.

The Cranwell investigation made the following recommendations:

1. Consideration of VRIAB in the [] Course Syllabus. Review of the [] course wrt VRIAB teaching, solo clearance and conduct including placement within the syllabus and appropriateness for solo trainees.

2. VRIAB inclusion in Safe Circuits Brief. To ensure the appropriate inclusion of VRIAB in the Safe Circuits Brief and consider if a bespoke brief is required as part of the [] course.

[Supervisory] comment: I commend the trainee on their frank and honest report; however, I think they have been a little harsh on themselves – trainees make errors. Working at capacity, they executed a manoeuvre based upon a flawed mental model of where the other circuit traffic was positioned. They correctly highlight what they should have done instead – remain deadside and continue on a safe vector until all traffic is correctly identified before breaking or repositioning back out to initials. The awareness of the other 2 [pilots] was spot on. The student 3 digit callsign (the “L-plates” of the sky) marked them for additional tracking, and the other Tutor and Prefect QFI’s did a good job in sidestepping [the] errant trainee. I agree with the recommendation to review placement of the solo clearance for the VRIAB in the [] course. I fully support and positively encourage our instructors to tailor the training they deliver to the student before them; we should not limit this. However, it seems sensible that we can introduce and teach the VRIAB at an earlier stage if appropriate, but should limit the students’ ability to conduct the manoeuvre solo to the correct place in the syllabus to ensure they have the right amount of experience.

Comments

HQ Air Command

It's clear that the lessons have been identified by the Prefect pilot. When joining the visual circuit you must have full SA of where all the traffic is prior to fitting-in. Cranwell is a busy airfield operating three different training aircraft types. There will frequently be potential for confliction around the circuit as a result and careful supervision of this operation is required. The flying training school has reviewed all matters arising from the investigation and the transparent nature of this provides reassurance that the individual and organisation are willing to learn. It's also reassuring to see the Tutor pilot maintaining high standards of lookout such that avoiding action could be taken.

Summary

An Airprox was reported when a Prefect and a Tutor flew into proximity in the Cranwell visual circuit at 1256Z on Thursday 12th September 2024. Both pilots were operating under VFR in VMC, both in receipt of an Aerodrome Service from Cranwell Tower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, a report from the air traffic controller 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 pilots' actions and noted that the Prefect pilot's report had identified the root cause, that full and specific situational awareness had been required before the break into the visual circuit was commenced. In this case the Prefect pilot's situational awareness had been incorrect (**CF4**) in that they recalled the Tutor as having been reported descending deadside when it had in fact been level on the deadside to turn downwind at the upwind end of the airfield. The Tutor pilot had had specific and correct situational awareness on the arriving Prefect and had used that to its intended effect by achieving visual contact, assessing the position of the Prefect breaking in front of them and maintaining sufficient separation to mitigate any risk of collision. A military member commented that the visual circuit at Cranwell could be home to a variety of aircraft types with significantly different performance levels and, therefore, that a supervisory element was key in order to maintain an appropriate level of safety assurance. However, no matter the degree of supervisory oversight, a highly dynamic event such as a VRIAB ultimately relied on a pilot correctly applying the associated procedural rules, with an important emphasis on the options available if other aircraft in the visual circuit had not been sighted, namely to continue on the deadside without breaking into the visual circuit. In that regard the Prefect pilot had not complied with the VRIAB procedure (**CF1**) because they had not sighted all of the traffic reported as being in the visual circuit, i.e. the Tutor, before commencing the break. Members felt that this had been an incorrect adaptation of their plan (**CF2**) for the reasons discussed previously and, therefore, that the Prefect pilot had not integrated correctly into the visual circuit (**CF3**). In terms of the remaining barriers to mid-air collision, the Prefect pilot's TAS had alerted but in such close proximity to the Tutor that they had not been able to use it to build situational awareness (**CF5**) and had sensibly focused on flying their aircraft. Although the Prefect pilot had not seen the Tutor (**CF6**), the Tutor pilot had been aware of the approaching Perfect and had seen it in sufficient time to mitigate any risk of collision, albeit with an entirely understandable concern as to its proximity (**CF7**).

Turning to the ATC input, the Board felt that the Cranwell Tower controller had issued the correct clearances and passed Traffic Information as required and the military ATC advisor commented that there had been little they could have done to alleviate the situation because the safety of the manoeuvre relied mainly on pilot situational awareness and lookout. The Board members commended the Prefect pilot for their full and frank report and agreed with the Cranwell occurrence investigation supervisory comment, that they had perhaps been overly harsh on themselves. Trainees were expected to make errors, which is why more than one safety barrier had existed, which in this case had mitigated the collision risk to an acceptable level, Risk C.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2024232			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Flight Elements			
	• Regulations, Processes, Procedures and Compliance			
1	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with
	• Tactical Planning and Execution			
2	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
3	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
	• Situational Awareness of the Conflicting Aircraft and Action			
4	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
	• Electronic Warning System Operation and Compliance			
5	Contextual	• Other warning system operation	An event involving a genuine warning from an airborne system other than TCAS.	
	• See and Avoid			
6	Human Factors	• Monitoring of Other Aircraft	Events involving flight crew not fully monitoring another aircraft	Non-sighting or effectively a non-sighting by one or both pilots
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: C.

Safety Barrier Assessment[3]

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

Flight Elements:

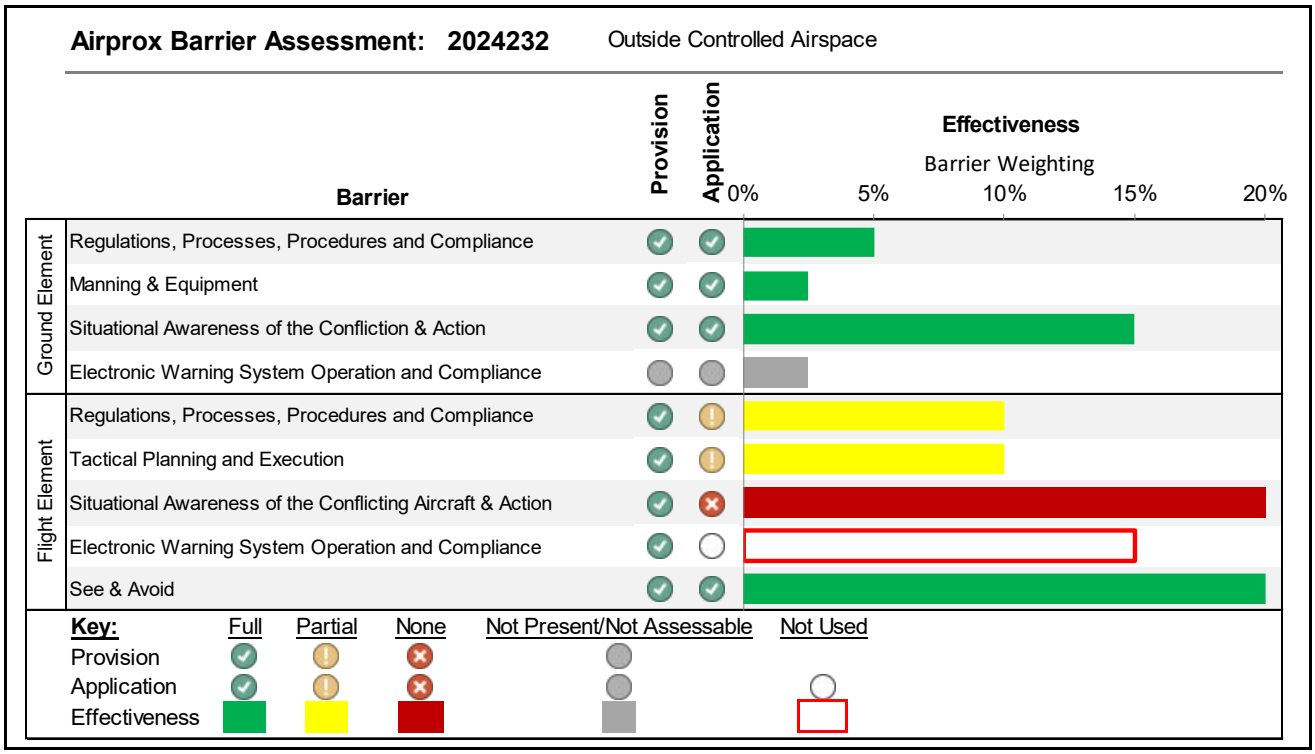
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Prefect pilot did not continue with an alternative option when they did not see the Tutor, iaw VRIAB procedures.

Tactical Planning and Execution was assessed as **partially effective** because the Prefect pilot broke into the visual circuit without first seeing the Tutor.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Prefect pilot had had incorrect situational awareness on the Tutor, believing it to have been descending deadside when in fact it had been level deadside, shortly turning downwind.

Electronic Warning System Operation and Compliance were assessed as **not used** because although TAS alerts were received, the proximity of the aircraft were such that the Tutor pilot had visually avoided the Prefect and the Prefect pilot had focused on flying the VRIAB manoeuvre.

[3] 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: 2024232
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