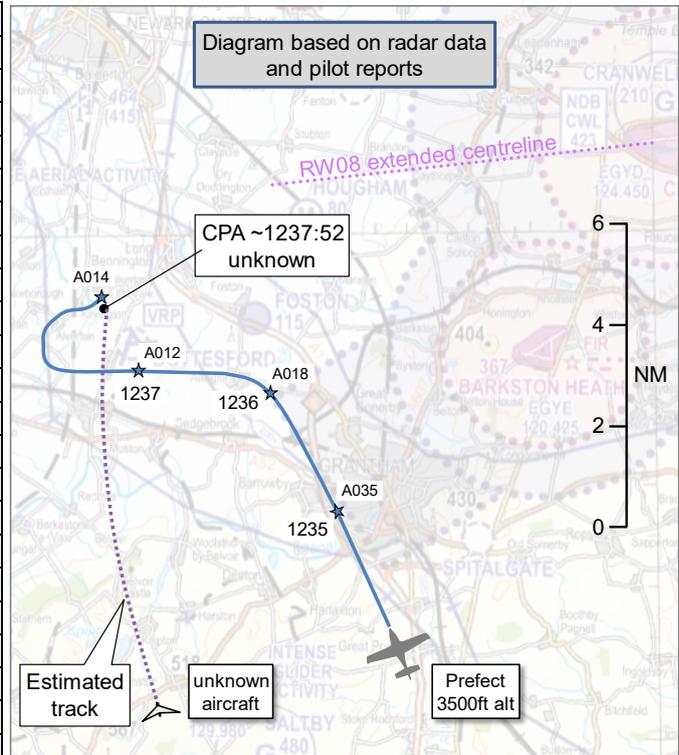


**AIRPROX REPORT No 2023101**

Date: 26 May 2023 Time: 1238Z Position: 5258N 00047W Location: 11NM WSW of Cranwell.

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect	Unk microlight
Operator	HQ Air (Trg)	Unknown
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Unknown
Provider	Cranwell Director	NK
Altitude/FL	NK	NK
Transponder	A, C, S	None
<b>Reported</b>		
Colours	White/Blue	NK
Lighting	Nav and strobes	NK
Conditions	VMC	NK
Visibility	>10km	NK
Altitude/FL	1500ft	NK
Altimeter	QFE (1024hPa)	NK
Heading	070°	NK
Speed	140kt	NK
ACAS/TAS	TAS	Unknown
Alert	None	Unknown
<b>Separation at CPA</b>		
Reported	0ft V/200m H	NR V/NR H
Recorded	NK V/NK H	



**THE PREFECT PILOT** reports that as staff [instructor] (QFI) they were acting as trainee, flying on instruments and conducting an instrument approach to RW08RH at RAF Cranwell. The [instructor] (QFI) under training was acting as the instructor and was conducting the lookout scan. They were under the control of Cranwell Director, on an intercept heading for a Precision Approach (PAR) of 070°M, level at 1500ft on the Cranwell QFE of 1024 at 140kt, [in visual conditions] below [cloud] and just west of Bottesford disused airfield. The visibility was good but hazy. At about 11NM to Cranwell the non-handling pilot saw a weight-shift microlight about 5° right of their track at a range of about 200m and on a reciprocal track. They took control and flew an emergency break to the left and reported [the incident] as an Airprox to Cranwell. The Cranwell Director confirmed that they did not see other aircraft on radar. There were no TAS or [other traffic alerting devices] indications, they had not seen the microlight again, and the instrument approach was continued without further incident. As captain, they had not seen the microlight at any stage.

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

**THE UNKNOWN MICROLIGHT PILOT** could not be traced.

**THE CRANWELL DIRECTOR CONTROLLER EXAMINER** reports as one of the Cranwell Radar Battlespace Management Unit Examiners (BMUEs) they were conducting a practical examination for the Cranwell Director local operating endorsement (LOE). The radar display was set up with cooperative Wide Area Multilateration (WAM) as the primary sensor and then the Cranwell and Coningsby [S-Band airport surveillance radar] as the non-cooperative secondary and tertiary sensors. The Cranwell Radar Supervisor in the next position had one of the auxiliary monitors connected to their laptop displaying a [traffic alerting device] website to provide additional situational awareness given that the weather conditions were perfect for gliders. The task of the Cranwell Director was to recover aircraft for IFR

approaches to both Cranwell and Barkston Heath. Cranwell was using RW08RH and Barkston Heath was RW06RH. Notified activity in the area included the Saltby glider site and Langar paratropping site.

At the time of the Airprox the trainee controller had one Phenom in the NDB hold overhead Cranwell at 4000ft. The Prefect that had the Airprox was handed over to the east of Saltby descending to a height of 3000ft (Cranwell QFE). The Prefect was passing between two tracks in the opposite direction. One was another Prefect indicating a height of 5500ft on Mode C and the second under the control of Waddington indicating 2500ft on Mode C, both of which had been called by the controller handing over. A Short-Term Conflict Alert (STCA) was generated against the second track which needed to be acknowledged by the trainee. Based on review of the 'Record and Replay' system, there was a primary-only track in the vicinity of Bottesford as marked on their radar map, but this had disappeared approximately 2min before the Airprox report. Once clear of the first two squawking tracks, a descent was given to 1500ft to get below further traffic under the control of Waddington that was tracking south through the RW08 extended centreline at about 7NM indicating 3000ft on Mode C. A left turn to 280° was given to gain lateral separation as the Prefect descended, which also offered time for the admin required to ascertain the type of recovery and procedure minima. The Phenom [pilot] had informed the trainee that they were looking to leave the hold for the NDB/DME procedure at about this time, which was approved. The Prefect was turned onto 060° for sequencing ahead of the Phenom but also to remain clear of the paratropping aircraft from Langar which appeared to be descending towards the Prefect having completed their drop.

At 1237:53 the pilot of the Prefect informed the trainee that they had had an Airprox with either a paraglider or a hang glider which was acknowledged by the trainee. At 1237:58 a primary contact popped up north of the Prefect by approximately 0.75NM. The Prefect crew had done a sharp left turn to the south [they recalled]. The trainee requested further details and stated that nothing was showing on radar or [other traffic alerting device] which was correct at the time of the Airprox. The captain had elected to continue with their instrument (IFR) approach and, following the sharp turn to the south and a left turn back on track, they were clear of the new contact (possibly the paraglider or hang glider) so the track was not called as the trainee was on the line to the Cranwell Precision Approach Radar (PAR) controller at the airfield to handover the Prefect. At the same time there was an exchange between the Phenom and Prefect crews to discuss where the Airprox had occurred. Immediately after the Prefect [pilot] had left the frequency the trainee received handovers on two additional Prefects for radar recoveries that needed to be sequenced through the same airspace while being deconflicted with the Phenom. The primary radar contact had disappeared again as it continued to track north and reappeared close to the Phenom on their outbound leg from the hold. This contact was called to the Phenom crew but was not sighted. The Phenom and remaining Prefects were recovered to both Cranwell and Barkston Heath without further incident.

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

**THE CRANWELL SAFETY MANAGER** reports [the incident as] interesting, as a "weight shift" hang glider (more correctly a foot launched powered hang glider or flex-wing hang glider) tends not to do much more than 30-40kt, (although up to 80 kts in a descent). The occasional contact with [the S-Band airport surveillance radar] would be consistent with it popping in and out of the 40kt filter as it was affected by head or tailwinds. If the filter were a blanket 'nothing below 78kts', then [they thought] it would have been [unable to] see anything at all. However, the wording of the Duty Holder's Advice Notes (DHAN) regarding picking up sub-78kt contacts is something along the lines of "unreliable under certain circumstances", which suggests that there is capability sometimes. This incident reinforces that, while [traffic alert devices] can be carried on flex-wings and paragliders they noticed that [there had been] no comment on whether an ADS-B trace was seen. They opined that, given the ease of carrying ADS-B, a lightweight battery transceiver mounted or carried, and a mount for an [electronic viewing device], and the additional benefits it provides over [other traffic alerting devices], moving map, controlled airspace avoidance, electronic flight bag (EFB), weather, NOTAMs etc, it seemed very likely that pilots of light-weight aircraft will move from [some traffic alerting devices] to ADS-B. [They had discussed previously, that] given the low speed of the contact they did not think that this was an [airport surveillance equipment] issue as the radar seemed to perform as well as anyone could expect, but it did support ADSB-In for them and, more particularly, increasing the visual conspicuity of their own

aircraft. If [the flex-wing pilot] sees them late [they] will have little ability to avoid a collision, but if seen early they can take avoiding action in good time.

## Factual Background

The weather at Cranwell was recorded as follows:

METAR EGYD 261250Z 10008KT 9999 FEW030 18/10 Q1032 NOSIG RMK BLU

## Analysis and Investigation

### Military ATM

Utilising occurrence reports and information from the local investigation, 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. The screenshots were taken solely from unit radar recordings as the unknown aircraft was not displayed on National Air Traffic Service radars (they believed).

At the time of the Airprox the Cranwell Director had one additional aircraft under their control, a Cranwell based Phenom established in the Cranwell (NDB) hold. The Cranwell Supervisor was in position throughout, located alongside the Cranwell Director and, due to the weather conditions suiting gliding activity, was monitoring [common glider TAS display] through an auxiliary monitor.

### Sequence of Events



Figure 1 (1236:53). Prefect turned inbound for the instrument recovery. Separation unknown.

At 1236:53 the Prefect [pilot] was turned inbound for the instrument recovery with the Cranwell Director initially issuing a heading of 060° which was amended to 070° at 1237:34. During this period no radar returns were present between the Prefect and the extended centreline for Cranwell RW08RH.

At 1237:52 the Airprox was reported by the Prefect [pilot], who turned southbound to avoid.



Figure 2 (1237:59). Unknown radar contact displayed. Separation estimated as 1.0NM

At 1237:59 an unknown radar contact with a 'non-cooperative only' return was displayed to the north of the Prefect by approximately 1NM and tracking north. This radar contact was displayed intermittently on a northbound track crossing the extended centreline for Cranwell Runway 08RH. The closest point of approach was unknown but estimated by the Prefect [pilot] as 0.1NM and 0ft [vertical] separation.

### Local BM Investigation

The local investigation conducted by RAF Coningsby identified the cause of the Airprox as a loss of safe separation between a [Prefect and a] non-cooperating aircraft, as the unknown aircraft was not in communication with Cranwell [air traffic services] or displayed by radar. As a result of the other aircraft being unknown the only BM related causal/aggravating factor identified, that was believed to have contributed to the Airprox, was multiple light-aircraft sites located within the vicinity of Cranwell and specifically the Cranwell RW08RH approach. Ongoing engagement with local light-aircraft sites will emphasise the importance of informing Cranwell [air traffic control] when operating within the vicinity of Cranwell.

### 2 Gp BM Analysis

The Cranwell Director was unable to provide Traffic Information to aid the Prefect [pilot] in traffic avoidance as the unknown aircraft was not displayed prior to the Airprox being reported. Following the Airprox report the unknown radar contact was displayed intermittently which, based upon the reported nature of it being a microlight or hang-glider, would align with it not meeting the characteristics for [radar] display as outlined in Duty Holder Advice Notes.

### UKAB Secretariat

An analysis of the radar replay determined the position of the Prefect throughout but with no defined trace of the microlight or hang glider, although some intermittent primary returns were observed. A primary return observed briefly at 1235 reappeared at 1235:15 (Figure 3).

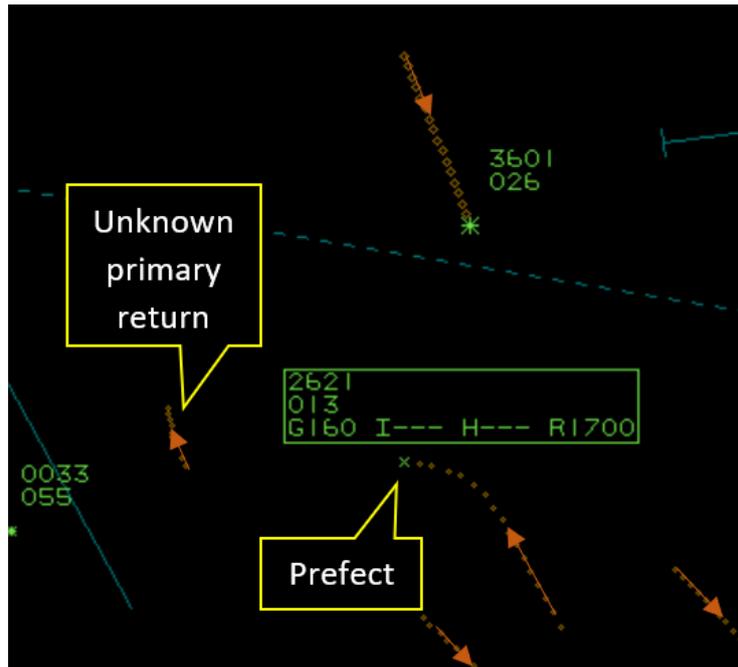


Figure 3 (1235:15) The Prefect turned on to heading 280° as directed.

At 1237:53 the Prefect pilot was reported as notifying the Cranwell Air Traffic Control trainee of an Airprox, which appeared to coincide with a right turn on to a heading of 060° as directed by the Cranwell Director, after which, at 1238:00, the Prefect pilot had turned on to an intercept heading for the approach to RW08. It could be seen on radar that at some point during or after the right turn, that a slight left turn was also depicted on the radar returns (Figure 4).

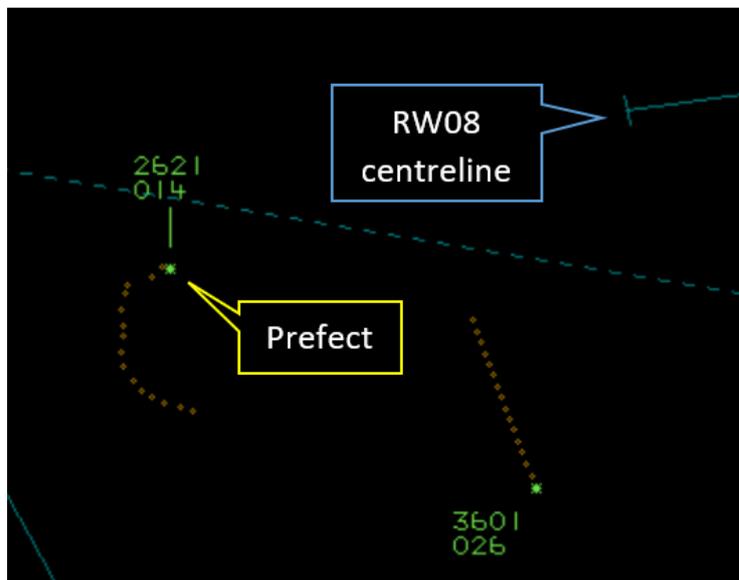


Figure 4 (1238:00) The Prefect in right turn to 060° for the approach to RW08.

The left hand turn and slight climb was interpreted as the most likely point of the reported closest point of approach, but the separation distances were unknown.

The Prefect and unknown aircraft pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.<sup>1</sup> If the incident

<sup>1</sup> (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

geometry is considered as converging then the Prefect pilot was required to give way to the unknown aircraft.<sup>2</sup>

## Comments

### HQ Air Command

The local investigation revealed that, if this was a microlight as described by the Prefect pilot, the radar system in use would have been unlikely to detect it. Small radar cross-section aircraft traveling at low groundspeed can be difficult to detect, especially if they are not carrying any electronic conspicuity. On this date, ATC was attempting to gain situational awareness on such aircraft via an online source, but it appeared that the microlight was not carrying any such equipment. The characteristic of this radar system was well understood, and the intermittent detection of the suspected microlight fell within the stated design specification. This was a known residual risk. Effort was underway to improve the electronic and visual conspicuity of the Prefect. Engagement with local airspace users is active, particularly regarding smaller airfields operating aircraft which may be difficult to detect on radar. The safety pilot should be commended for demonstrating an effective lookout to enable 'see-and-avoid' to prevent a collision; the likelihood is that this was the only remaining barrier to mitigate mid-air collision in the circumstances of the event.

## Summary

An Airprox was reported when a Prefect and an unknown microlight flew into proximity 11NM west-southwest of Cranwell at 1238Z on Friday 26<sup>th</sup> May 2023. The Prefect pilot was operating under VFR in VMC and in receipt of a Traffic Service from Cranwell Director, the unknown microlight pilot could not be traced.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available consisted of reports from the Prefect pilot, radar photographs/video recordings, reports from the air traffic controllers involved and a report from the appropriate operating authority. 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 discussed the good practice and handling of the Prefect pilot in circumstances and agreed that they had had no situational awareness of the position or proximity of the microlight traffic prior to the closest point of approach (**CF2**). It was considered fortunate that, having had the second pilot in the Prefect, the opportunity for a visual sighting of the unknown microlight had been much improved, albeit this had been a late sighting (**CF4**) which had led to immediate avoiding action by the Prefect pilot. It was further agreed that the microlight had not been detected by the Prefect pilot's TAS (**CF3**).

The Board was reminded of similar events in the area, where there are a number of light aircraft sites, and wondered how best to resolve any conflicts by improving the awareness of airspace users of the Cranwell approach areas, including the use of feathered approach indicators on airspace charts. In this regard, the Board noted that it had made a Safety Recommendation to the CAA (Airprox 2022250) and that the CAA had undertaken to include consideration of the possibility of marking military airfields with instrument approaches outside controlled airspace as part of their overall review of charting specifications for UK VFR charts. Members then went on to discuss the radar settings in use at Cranwell so that they could understand better why the settings were not adjusted to pick up slower moving targets, although it was acknowledged that the reports demonstrated occasional primary targets had been seen intermittently tracking approximately north, but there had been no sighting and insufficient information to provide the Cranwell controller with any situational awareness of the unknown microlight traffic (**CF1**) until after the Prefect pilot had reported the Airprox.

When determining the risk, the Board assessed the reports from the Prefect pilot and Cranwell controller together with the radar data. They noted that information available from either ground or flight electronic

---

<sup>2</sup> (UK) SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.

warning systems had been unable to aid the Prefect pilot's situational awareness, but they had seen the microlight, albeit late, and had managed to take last-minute avoiding action. For this reason they agreed that safety had been much reduced and there had been a risk of collision (**CF5**); Risk Category B.

## **PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK**

### Contributory Factors:

	2023101			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Ground Elements</b>				
<b>• Situational Awareness and Action</b>				
1	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
<b>Flight Elements</b>				
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>				
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
<b>• Electronic Warning System Operation and Compliance</b>				
3	Technical	• ACAS/TCAS System Failure	An event involving the system which provides information to determine aircraft position and is primarily independent of ground installations	Incompatible CWS equipment
<b>• See and Avoid</b>				
4	Human Factors	• Identification/ Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
<b>• Outcome Events</b>				
5	Contextual	• Near Airborne Collision with Aircraft	An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles	

Degree of Risk: B

### Safety Barrier Assessment<sup>3</sup>

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

#### **Ground Elements:**

**Situational Awareness of the Confliction and Action** were assessed as **ineffective** because the Cranwell Director controller had been unable to see the unknown microlight on radar until after the closest point of approach.

#### **Flight Elements:**

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **ineffective** because the Prefect pilot had no situational awareness of the presence of the unknown microlight.

**Electronic Warning System Operation and Compliance** were assessed as **ineffective** because the Prefect pilot had not received a Traffic Alert from the unknown microlight.

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

**See and Avoid** were assessed as **partially effective** because the Prefect pilot had sighted the unknown microlight at a late stage whereupon emergency avoiding action had been necessary.

<b>Airprox Barrier Assessment: 2023101</b>		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	⚠	⚠					
<b>Key:</b>								
	<u>Full</u>	<u>Partial</u>	<u>None</u>	<u>Not Present/Not Assessable</u>	<u>Not Used</u>			
Provision	✓	⚠	✗	○				
Application	✓	⚠	✗	○				
Effectiveness								