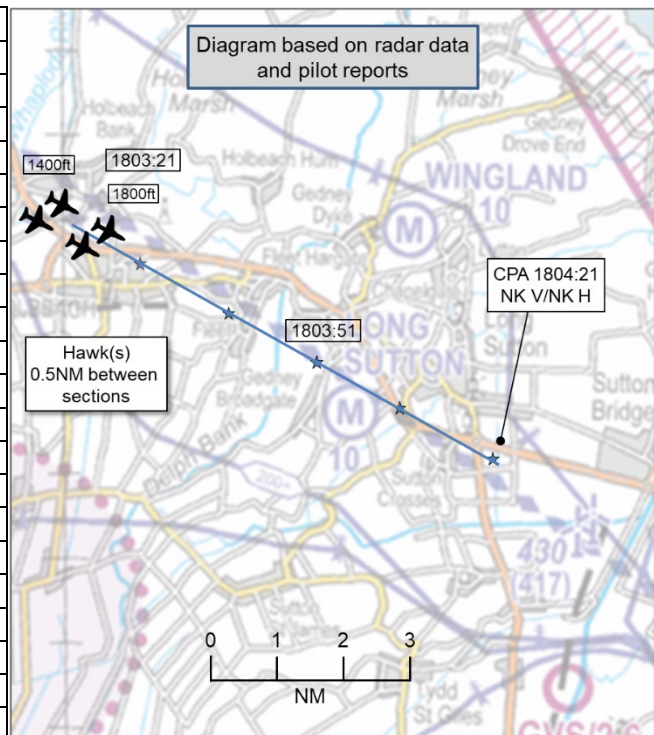


AIRPROX REPORT No 2023121

Date: 15 Jun 2023 Time: 1804Z Position: 5246N 00008E Location: Sutton Bridge

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Hawk	Microlight
Operator	HQ Air (Ops)	NK
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	NK
Service	Traffic	NK
Provider	Waddington Radar	NK
Altitude/FL	1800ft	NK
Transponder	A, C, S	NK
Reported		Not reported
Colours	NR	
Lighting	Yes	
Conditions	VMC	
Visibility	>10km	
Altitude/FL	1800ft/1400ft	
Altimeter	RPS (1016hPa)	
Heading	120°	
Speed	360kt	
ACAS/TAS	SkyEcho	
Alert	N/A	
Separation at CPA		
Reported	20ft V/50m H	NK V/NK H
Recorded	NK V/NK H	



THE HAWK PILOT reports that during the transit to a tasked flypast, the formation had been split into 2 sections - the front section at approximately 1800ft AGL and the rear section half a mile in trail and approximately 400ft below the front section. As the rear section had been passing the town of Holbeach [they recall], a microlight had been spotted on the nose in very close proximity. Elements of the rear section had just sufficient time to 'flinch' upwards and flew over the top and slightly to the right of the microlight at approximately 20ft miss-distance. The formation had been in receipt of a Traffic Service and of note a minute or so earlier the controller had begun to call a contact but then called 'disregard'. The formation transit route had been subject to NOTAM and the formation had been on track and on time as per the NOTAM.

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

THE MICROLIGHT PILOT could not be traced.

THE WADDINGTON RADAR CONTROLLER reports that they had been the Lincs TATCC Waddington Radar controller on duty for a formation departure and recovery. Prior to the duty, they had received an e-mail regarding the intent for [the formation] to fly a route in Lincolnshire, at approximately 1000ft, remaining under a Traffic Service throughout. The route took them clockwise from Waddington to the southeast, around Fenland, up past the east of Wittering and back to Waddington. Amongst other things, the e-mail stated that the [formation] had been advised of the limits of Waddington radar coverage at certain areas around their intended route, particularly when at range from the radar sensors. On the day, the pilot called to confirm the route. They stated their SOPs to call additional nearby air traffic units on secondary radios for Traffic Information, whilst remaining with the Waddington Radar controller on a primary radio throughout. The [formation] departed as planned and were placed under a reduced Traffic Service for terrain and Traffic Information from below. At 1803, the Waddington Radar controller began to call traffic in the [formation's] 12 o'clock, however, as soon as they had begun

calling the traffic it faded from radar, so told the [formation] to disregard as the conflicting traffic was no longer there. At 1805, with the [formation] in the vicinity of Sutton Bridge, the Waddington Radar controller received a garbled transmission that they could not understand. They had asked the pilot if they were turning southwest and they acknowledged that they were. When closer to Waddington, the [formation] confirmed that garbled transmission was a report of an Airprox with a microlight. The Waddington Radar controller quarantined the radar replay and observed that at the time of the report of the Airprox by the [formation] the radar replay showed no traffic in the vicinity. They had asked Marham to check their record and replay, but Marham stated they observed no conflicting tracks either.

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

Factual Background

The weather at Waddington was recorded as follows:

METAR EGXW 151750Z 09012KT 9999 FEW045 22/10 Q1021 NOSIG RMK BLU BLU=

The [formation] flight had been publicised by NOTAM:

H3249/23 NOTAM

Q) EGTT/QWVLW/IV/M /W /000/030/5254N00013W029

A) EGTT B) 2306151757 C) 2306151820

E) FORMATION TRANSIT BY MULTIPLE ACFT ROUTING:

530958N 0003126W RAF WADDINGTON (EGXW) 1757

530733N 0002039W E OF METHERINGHAM 1759

525427N 0001652W W OF DONINGTON 1801

524333N 0001357E VCY OF WALPOLE ST PETER 1804

523414N 0000637E N OF MARCH 1806

524359N 0002734W VCY OF WITHAM ON THE HILL 1810

530430N 0003125W E OF WELBOURN 1814

531027N 0003202W RAF WADDINGTON 1815

531501N 0003244W VCY OF LINCOLN 1816

531546N 0002942W S OF NETTLEHAM 1817

530958N 0003126W RAF WADDINGTON (EGXW) 1820

ACFT EXPECTED TO TRANSIT BTN 250FT AGL-2000FT AGL. TIMINGS, HGT AND ROUTE ARE APRX AND SUBJ TO CHANGE. 2023-06-0460/AS1.

F) SFC G) 3000FT AMSL

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 are taken from Unit radars only as the microlight was not displayed on NATS radars. The Unit radars provide the exact radar view seen by the controllers.

The Waddington Radar controller had been previously briefed on the [formation's] transit route as part of their Waddington flypast with confirmation that, as part of the route selection, the [formation] had been advised of the Waddington surveillance coverage limitations. Prior to departure the [formation] had confirmed their routing with the Waddington Radar controller and stated they would utilise adjacent Air Traffic Service agencies such as Marham to supplement the limited surveillance coverage available from Waddington. With the flypast occurring outside routine operating hours and the [formation] being the only movement, no Waddington Supervisor was established with the Waddington Radar controller being the Air Traffic Controller in charge. As per local orders the

following surveillance sensors were selected: WAM¹, Cranwell STAR-NG² and Coningsby STAR-NG.

Sequence of Events

The [formation] departed Waddington as briefed, transiting at low-level in receipt of a reduced Traffic Service from the Waddington Radar controller.



Figure 1 (1803:06). Non-cooperative contact displayed on radar.

At 1803:06, a non-cooperative lone radar contact had been displayed to the southeast of the [formation]. The radar contact had been updated twice providing an initial radar trail that indicated a slow southwest track.

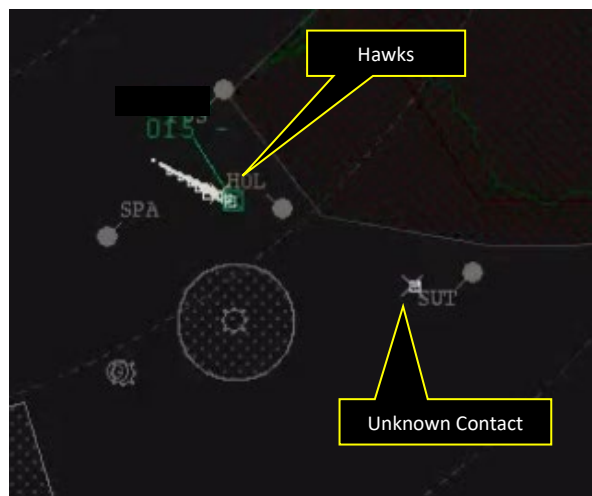


Figure 2 (1803:17). Traffic Information provided to the [formation].

At 1803:17, with the non-cooperative radar track still displaying, the Waddington Radar controller had begun to pass Traffic Information to the [formation]. However, simultaneously the radar track stopped being displayed, and the Waddington Radar controller stopped passing Traffic Information. *“Traffic... (radar track no longer displayed)...Disregard it’s faded from radar.”*

The non-cooperative radar track did not display again before the [formation] declared an Airprox with a microlight at 1805:21. It cannot be confirmed if the non-cooperative radar track temporarily shown had been the Airprox microlight.

¹ Wide-Area Multilateration, co-operative sensor.

² Non-cooperative sensor.

CPA was reported by the [formation] as 0.0NM and 0ft.

Local BM Investigation(s)

The local investigation conducted by RAF Coningsby³ identified the cause of the Airprox as outside service control as the microlight had been flying in Class G airspace in the vicinity of a NOTAM'd formation flying route and not communicating with Air Traffic Control. Several BM related causal/aggravating factors have been identified that were believed to have contributed to the Airprox:

a. The planned route for the [formation] had been both at a distance and height that limited the surveillance coverage available from Waddington. The likelihood of microlight detection had been considerably low, as supported by the fact the Marham STAR-NG also had not displayed a radar track aligned with the Airprox.

b. Traffic Information had initially been started but then stopped as the radar contact disappeared. With the characteristics of the MARSHALL surveillance sensor equipment, and method in which radar contacts are displayed in accordance with achieving characteristics, the understanding behind radar tracks fading has changed and potentially the Traffic Information should have been continued. A review into Traffic Information provision for disappearing contacts was recommended.

2 Gp BM Analysis

The transit route selected by the [formation] had been both at a range and distance from Waddington that significantly limited the surveillance coverage provision available. However, this had been suitably briefed to the aircrew during the planning phase and then re-iterated when airborne with the application of a reduced Traffic Service. The Waddington Radar controller correctly assessed the requirement to provide Traffic Information when observing the radar contact. Their decision to stop passing Traffic Information when it had no longer been displayed was based upon long-standing teaching regarding the provision of Traffic Information and the 'control what you see' methodology. In line with the local investigation recommendation, work is ongoing to understand if this methodology needs to develop to ensure BM policy and teaching aligns with the current surveillance system.

UKAB Secretariat

Radar replays available for this event show the lead [formation] Hawk throughout via Mode S. The formation operated as 2 sections separated by 0.5NM (approximately 5sec) with the rear section operating 400ft below the level of the lead section. CPA is considered to have been between the unidentified microlight and the rear section. Figure 3 shows the reported position of the Airprox with the white cross indicating their ground reference point for that event (Sutton Bridge).

³ Waddington Radar is part of the Lincs TATCC located at RAF Coningsby and supported by the Coningsby Station Safety Cell.

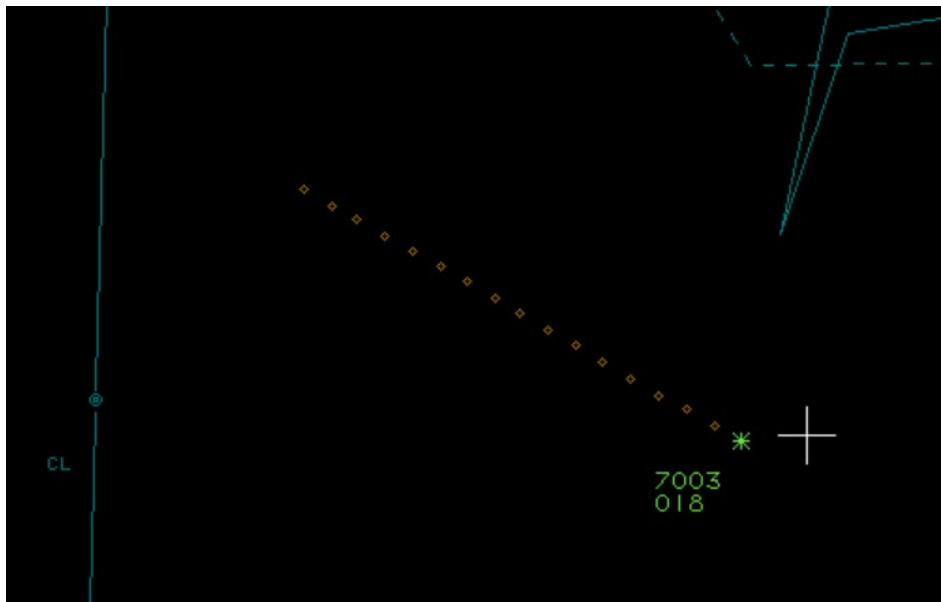


Figure 3 'CPA' 1804:21 NK V/NK H

The Hawk and microlight pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.⁴ If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right.⁵ If the incident geometry is considered as converging then the microlight pilot was required to give way to the Hawk.⁶

Comments

HQ Air Command

This sortie was flown in the UK low flying system to enable a formally tasked flypast to be conducted at a height of between 500-1000ft AGL. The flypast had been tasked over a specific point and at a specific time, and the formation had been positioned to enable this. More broadly, the formation deliberately conducts transits in the UK low flying system to maintain a presence in the public eye whilst maintaining the flexibility to operate under any poor weather. This is part of their mandate as a display team. Flight at that height carries risks which are under constant review, as are the mitigations. In this case the pilots had published their carefully planned route, internally via CADS, and externally via NOTAM. Consideration was made to transit at higher altitude, but given the potential to encounter weather, which would be difficult to pass a large formation through, the transit had been planned at lower altitude. Once airborne, a radar service had been obtained from Waddington, with additional calls planned to surrounding ATC units on auxiliary radios. In-cockpit, ADS-B transmissions from participating pilots had also been monitored. There had been little else that [the formation] could reasonably do to reduce these risks any further. Turning to the radar service, the STAR-NG systems in-use had not consistently tracked the microlight, but they had been working below the stated base of radar coverage for some of these sensors. An ATC training review over provision of Traffic Information based on the information provided by Programme MARSHALL equipment has been recommended. This should provide clearer guidance over when to call intermittent radar contacts to pilots. Likewise, internal communication of the performance limits of MARSHALL equipment is underway to better educate pilots in their understanding of ATS provision. It is unfortunate that the microlight pilot could not be traced to assess the above mitigations against their version of events.

⁴ (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

⁵ (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on. MAA RA 2307 paragraph 13.

⁶ (UK) SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.

Summary

An Airprox was reported when a Hawk formation and a microlight flew into proximity near Sutton Bridge at 1804Z on Thursday 15th June 2023. The Hawk pilots were operating under VFR in VMC and in receipt of a Traffic Service from RAF Waddington. The microlight pilot could not be traced.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the Hawk pilot, 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.

Members firstly noted that it was disappointing that the microlight or its operator had not been traced despite the significant efforts of the UKAB Secretariat. They noted that with the proliferation of SDR (single-seat de-regulated) airframes and their similarity to microlights, it is increasingly common to see these craft in operation and that, in this case as with others, it may be that the very late sighting may have confused the Hawk pilot in their recollection of the second aircraft and therefore led to incorrect tracing action. Members agreed that operation of the microlight at its chosen altitude was not unreasonable under normal circumstances, but that in this case it had been flying in proximity to the NOTAM'd Hawk transit event.

Members went on to discuss the Hawk pilot's actions, agreeing that the Hawk formation had notified their route by NOTAM and enabled air traffic control surveillance coverage for the duration of their flight, acknowledging that the altitude planned for the flight had been driven by concerns of weather and operation of a multi-aircraft formation, but that the lower operating altitude had made comprehensive radar coverage difficult. They had established a plan to contact alternative radar operators via 2nd radio sets to add to their situational awareness as they progressed. The Board recognised that with the microlight apparently carrying or using no electronic warning systems (**CF4**), the Radar controller and Hawk formation had not had any situational awareness of its presence (**CF2**, **CF3**); therefore the principle of see and avoid had been the only viable barrier to the Airprox. With a limited visible cross-section, it had proven ineffective in this case, with the Hawk pilot having seen the microlight too late to have taken effective avoiding action, then the Board agreed that it had been effectively a non-sighting (**CF5**).

The Board then discussed the actions of the Waddington Radar controller, focussing on the initiation then cessation of a radio call relating to an intermittent primary-only contact approximately 1min ahead of the ultimate CPA. Members recognised that with the use of new surveillance equipment, it might be appropriate to review techniques and training (**CF1**) for all controllers to ensure premium utilisation of such technological upgrades, but did accept that the principle of 'control what you see' was valid and could have been reinforced with a reminder by the controller to the Hawk pilot as they had approached the earlier (partially) reported position of the non-persistent radar contact.

When assessing the risk, members considered the report from the Hawk pilot, the radar replay and the military investigation. They noted that the separation between the Hawk and the microlight had been at a bare minimum and that the incident was described by the Hawk pilot as a last minute sighting with little time to react. Although the Hawk pilot reports having 'flinched', members thought that this had not been early enough to materially increase the separation, that providence had played a major part in the event and that there had been a definite risk of collision (**CF6**). Accordingly the Board awarded a Risk Category A to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2023121			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
	Ground Elements			

• Regulations, Processes, Procedures and Compliance				
1	Organisational	• Aeronautical Information Services	An event involving the provision of Aeronautical Information	The Ground entity's regulations or procedures were inadequate
• Situational Awareness and Action				
2	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
Flight Elements				
• Situational Awareness of the Conflicting Aircraft and Action				
3	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				
4	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
• See and Avoid				
5	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
• Outcome Events				
6	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: A.

Safety Barrier Assessment⁷

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

Ground Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the advent of new surveillance equipment has identified that there may be a need for confirmation of Traffic Information provision for disappearing contacts.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Waddington Radar controller had no situational awareness of the microlight.

Flight Elements:

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

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the EC equipment carried by the Hawks could not detect the presence of the microlight.

See and Avoid were assessed as **ineffective** because the Hawk pilot sighted the microlight too late to materially increase separation.

⁷ 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: 2023121		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 Conflicition & 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:		<u>Full</u>	<u>Partial</u>	<u>None</u>	<u>Not Present/Not Assessable</u>	<u>Not Used</u>		
Provision								
Application								
Effectiveness								