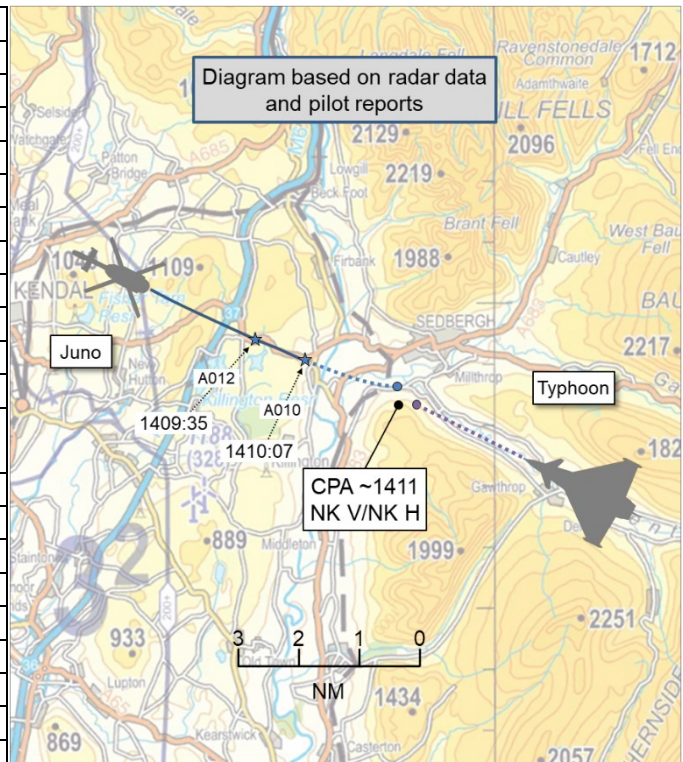


**AIRPROX REPORT No 2023169**

Date: 03 Aug 2023 Time: ~1411Z Position: 5420N 00237W Location: 4NM E Kendal

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	Juno	Typhoon
Operator	HQ Air (Trg)	HQ Air (Ops)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Listening Out	Listening Out
Provider	Low Level Common	Low Level Common
Altitude/FL	NK	NK
Transponder	A, C, S	None <sup>1</sup>
<b>Reported</b>		
Colours	Black, yellow	Grey
Lighting	Strobes, nav, landing	Strobe, nav
Conditions	VMC	VMC
Visibility	>10km	NR
Altitude/FL	200ft	NR
Altimeter	NR	NR
Heading	80°	NR
Speed	110kt	NR
ACAS/TAS	TAS	Unknown
Alert	None	None
<b>Separation at CPA</b>		
Reported	300ft V/300ft H	NK V/NK H
Recorded	NK V/NK H	



**THE JUNO PILOT** reports that, after briefing the second part of their sortie at Blackpool, they crewed the aircraft. Due to serviceability issues on start, they lifted approximately 40min later than planned. They considered amending their CADS booking but, due to time pressures of getting back for RAF Shawbury airfield closure, they elected to continue. They conducted the navigation to Windermere and Kendal without any issues. Upon proceeding east from Kendal, the left-hand-side pilot (student aircrew under instruction) called "bird, 12 o'clock" immediately followed by "Typhoon!" at which point the [handling pilot] put in an avoiding action. They broke left due to the Typhoon moving left-to-right and it was then in their 1230, therefore separation was increased by moving left. Simultaneously, the Typhoon pilot also broke left and levelled-out. The rear-crew instructor kept eyes-on the Typhoon as it passed down their starboard side at approximately 300ft laterally and to their rear. The Typhoon then climbed, rolled to the right, and disappeared from view. Shortly afterwards, a low-level radio call was heard from the Typhoon pilot. Post immediate action, all crew members looked at the [navigation display] to see if there was any ACAS (Aircraft Collision Avoidance System) traffic but nothing was showing. At this point, the instructor took charge of the navigation to allow the students to regain their composure.

[The Juno pilot commented that] the main issue was that the ACAS on the Juno failed to alert the crew to the location and proximity of the Typhoon.

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

**THE TYPHOON PILOT** reports that, 2 days after landing from a sortie which included low flying in LFA17, it was reported that an Airprox had occurred with a Juno. They were not aware of the Airprox whilst airborne.

<sup>1</sup> Reportedly, no squawk was observed by ATC.

[The Typhoon pilot commented that] the Typhoon radar had been unserviceable. Also, that on exiting low-level, ATC noted that no squawk was observed despite in-cockpit indications being normal. Some transponder modes may have been working but they were unable to assess which were working.

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

## Factual Background

The weather at Leeming was recorded as follows:

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METAR EGXE 031420Z 01008KT 9999 FEW030 BKN070 19/11 Q1007 NOSIG RMK BLU BLU
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## Analysis and Investigation

### UKAB Secretariat

An analysis of the NATS radar replay was undertaken. The Juno was identified using Mode S data and was observed to have been east of Kendal when the radar returns faded. The Typhoon was not observed on radar, nor could it be observed during a review of MLAT and ADS-B data. The track of the Typhoon in the diagram above has been shown as an approximation of the actual track which could not be determined. The exact moment of CPA, and the separation of the aircraft at CPA, could not be determined.

The Juno and Typhoon 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>2</sup> If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right.<sup>3</sup>

## Comments

### HQ Air Command

One of the mitigations to Mid-Air Collision (MAC) in the UK Low Flying System (UKLFS), 2000ft AGL/AMSL or lower, is the use of the Centralised Aviation Data Service (CADS). This is a computer-based deconfliction tool into which every planned military sortie in the UKLFS is published prior to flight with the appropriate route waypoints, timings and altitudes. As part of the pre-sortie briefing, each crew 'plays' their route on CADS to check for any potential conflicts with other inputted sorties. The information is only valid, however, if the sortie is flown to the planned timings and does not allow for airborne route/timing changes due to weather or other constraints. CADS is a tool to highlight potential conflicts, it does not replace the requirement for lookout and/or the use of on-board systems to detect and avoid other aircraft. Crews must ensure that effective lookout remains a fundamental discipline for avoiding MAC.

During the pre-sortie brief, the Juno crew checked CADS and noted the conflicts. They lifted 40min later than planned for the first leg of the sortie to Blackpool. They briefed the second leg of the sortie at Blackpool and checked CADS for this element of the sortie. No-one, however, amended the delayed timings for their route, and the conflict with the Typhoon was not displayed because it did not exist for the original timings. Had either crew had awareness that their routes crossed in the same place at the same time, this would have required pre-flight deconfliction or, if not possible, it might have prompted a blind-call on the Low Level Common frequency and allowed for airborne deconfliction arrangements. With the almost head-on geometry involved in this Airprox, the Juno pilot did very well to spot the Typhoon approaching at a high speed to allow avoiding action to be taken. The Juno investigation made 3 recommendations to review procedures pertaining to CADS, pre-sortie briefing and land-aways.

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<sup>2</sup> MAA RA 2307 paragraphs 1 and 2.

<sup>3</sup> MAA RA 2307 paragraph 13.

It is unfortunate that it appears that the Typhoon's transponder stopped transmitting halfway through the sortie, with no indications to the pilot. The Juno's TAS therefore had nothing to detect and could not alert the Juno crew. If it had been fully serviceable, the terrain in the area may have only allowed for a late TAS alert. This event is a timely reminder of the crucial role that a deconfliction tool can play in mitigation against MAC.

## Summary

An Airprox was reported when a Juno and a Typhoon flew into proximity 4NM east of Kendal at approximately 1411Z on Thursday 3<sup>rd</sup> August 2023. Both pilots were operating under VFR in VMC, and listening out on the Low Level Common frequency.

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

Information available consisted of reports from both pilots, radar photographs/video recordings 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 first considered the actions of the pilot of the Typhoon. Noting that the transponder and the radar fitted to the Typhoon had been unserviceable at the moment of the Airprox, a member with particular knowledge of military fast-jet operations explained that the radar had not been a mandatory item for the flight in question. In contrast, the carriage of a serviceable transponder had been a mandatory item for this particular sortie. Further analysis of the radar replay revealed that the Typhoon's transponder had been operational at the start of the sortie, and a corresponding squawk had been observed on the radar replay up to the moment when the Typhoon pilot had entered the area to the east of Kendal. Members therefore considered it very unfortunate that the transponder had ceased to operate in the moments leading up to the Airprox.

Turning their attention to the matter of CADS, it was explained to members that the system is used, not only to 'book into' a low-level area for a particular sortie, but also to alert pilots to other flights that might conflict with their own. Members agreed that it had been the case in this instance that the pilot of the Typhoon had not been alerted to the flight of the Juno given that the times for the respective flights, as entered into CADS, had not coincided.

The Board next considered the actions of the pilot of the Juno, and members pondered the timings of their sortie. Noting that there had been an unforeseeable serviceability issue with the helicopter which had caused a 40min delay, members wondered why the pilot of the Juno had not found a moment to have updated the booking of their flight in CADS. A member with knowledge of the CADS booking system explained that such an amendment could have been made by making a telephone call to the relevant operational team at RAF Shawbury. Members were in agreement that the pilot of the Juno had not complied with the procedure to update their flight in CADS, and were disappointed that they had "*considered amending their CADS booking...but elected to continue*" despite being fully aware that the timings for their flight had changed significantly (**CF1**).

Further, given that the pilot of the Juno had reported that they had been under a time pressure to get "*back for RAF Shawbury airfield closure*", members surmised that this additional time pressure had given rise to incomplete pre-flight preparation being undertaken (**CF2**). Additionally, members wondered why the pilot of the Juno had elected to continue a navigational exercise from their current location at Blackpool, directly away from Shawbury, north to Windermere and Kendal, such that it had placed a seemingly unnecessary time pressure to return to Shawbury before the airfield would close.

In consideration of the aspects of EC, members agreed that the TAS fitted to the Juno had been unable to detect the presence of the Typhoon on account of the unserviceability of the transponder fitted to the latter. It was further agreed that the EC equipment fitted to the Typhoon had not, at that time, been able to have detected the presence of the Juno (**CF4**). Incorporating their thoughts from their earlier

discussion regarding the booking of the respective flights in CADS, members concluded that neither pilot had had situational awareness of the other aircraft (**CF3**). Nevertheless, members were in agreement that it had been commendable that the student pilot in the Juno had visually acquired the Typhoon, especially given the small cross-section of the fuselage that had been presented and the high closing speed. Although it was agreed that the pilot of the Juno had visually acquired the Typhoon late (**CF5**), members commended the pilot to have reacted quickly to 'break left', an action which, the Board agreed, had likely increased separation between the aircraft at the last minute. Members noted that the pilot of the Typhoon had not visually acquired the Juno during the encounter (**CF6**).

In summary of their discussion, members agreed that the circumstances of this incident highlighted the importance of fully attending to pre-flight preparation. Members were in agreement that the pilot of the Juno had not updated the booking of their flight in the CADS system in accordance with the relevant procedure and that neither pilot had had situational awareness of the other aircraft. Further, the EC equipment fitted to each aircraft could not have alerted the respective pilot accordingly. Consequently, members concluded that safety margins had been much reduced below the norm (**CF7**) and that it had been the late visual acquisition of the Typhoon by the pilot of the Juno, and their subsequent urgent avoiding action, that had increased separation at the last minute. As such, members assigned Risk Category B to this event.

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

#### Contributory Factors:

2023169				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Flight Elements</b>				
<b>• Regulations, Processes, Procedures and Compliance</b>				
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
<b>• Tactical Planning and Execution</b>				
2	Human Factors	• Pre-flight briefing and flight preparation	An event involving incorrect, poor or insufficient pre-flight briefing	
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>				
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
<b>• Electronic Warning System Operation and Compliance</b>				
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
<b>• See and Avoid</b>				
5	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
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
<b>• Outcome Events</b>				
7	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>4</sup>

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 **ineffective** because the pilot of the Juno had not complied with the procedure to amend the booking of their flight in CADS.

**Tactical Planning and Execution** was assessed as **ineffective** because the pilot of the Juno had not attended sufficiently to their pre-flight preparation.

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **ineffective** because neither pilot had had situational awareness of the presence of the other aircraft.

**Electronic Warning System Operation and Compliance** were assessed as **ineffective** because the TAS equipment fitted to the Juno could not have detected the presence of the Typhoon given that the latter had an unserviceable transponder.

**See and Avoid** were assessed as **partially effective** because the pilot of the Typhoon had not visually acquired the Juno.

Airprox Barrier Assessment: 2023169		Outside Controlled Airspace		Effectiveness				
Barrier		Provision	Application	Barrier Weighting				
				0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	●	●					
	Manning & Equipment	●	●					
	Situational Awareness of the Conflicion & 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>		Full	Partial	None	Not Present/Not Assessable	Not Used		
Provision	●	●	⊗	●				
Application	●	●	⊗	●	○			
Effectiveness	■	■	■	■	□			

<sup>4</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).