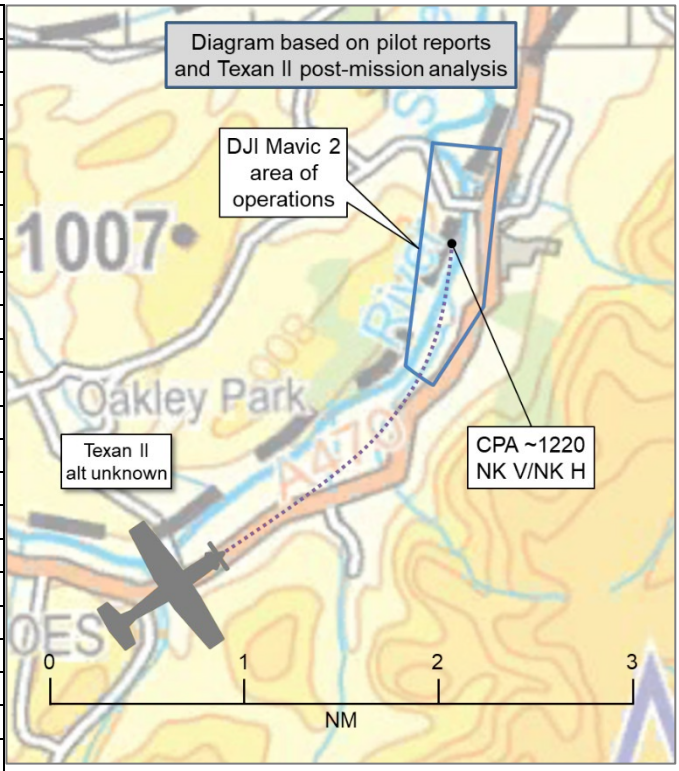
AIRPROX REPORT No 2022024

Date: 07 Mar 2022 Time: ~1220Z Position: 5229N 00326W Location: Llandinam

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	DJI Mavic 2	Texan II
Operator	Civ UAS	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	VLOS	VFR
Service	None	Listening Out
Provider	N/A	VHF LL Common
Altitude/FL	NR	NR
Transponder	Not fitted	A, C, S+
Reported		
Colours	Grey	NR
Lighting	'Standard'	NR
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	100m	250ft MSD
Altimeter	agl (N/A hPa)	RPS (1019hPa)
Heading	'North'	010°
Speed	0kt	240kt
ACAS/TAS	Not fitted	TCAS I
Alert	N/A	None
Separation at CPA		
Reported	60ft V/110m H	Not Seen
Recorded	NK V/NK H	



THE DJI MAVIC 2 OPERATOR reports that, early on the morning of the intended flight, they uploaded their flight plan to Drone Assist UK. They arrived on the site at around 1200 and noted the weather – sunny with some cloud, moderate ~16mph wind with occasional gusts. Excellent visibility. Low risk of rain. Nobody else was present on site and the nearby fields were clear of livestock. At around 1215 their 'spotter' arrived and they set up the drone, undertook calibration, checked the battery and wifi levels etc. The drone operator briefed their 'spotter' on the procedure should anyone approach and the return to home function should they become incapacitated. At around 1218 they took-off and commenced their flight. At 1220 their drone was at approximately 100m elevation and 160m to their east when they heard a distant buzzing, which they knew from their ATC days was a turboprop – commonly used for RAF training (they suspected a Tucano, but later ascertained that these were replaced by the Texan recently). They immediately started scanning for a distant plane and told their 'spotter' to watch for any aircraft. As they finished their sentence, the RAF Texan appeared from a bend in the valley, over the trees. They immediately considered reducing the height of the UAV but realised that if the pilot had spotted it they would stand a better chance of avoiding a static object than a moving object. Additionally, the UAV can only descend at ~2m/s. Within the split-second it took to appear, the Texan banked onto its port side and appeared to pass between their location and the drone at the same elevation. It appeared that the pilot may have attempted to fly directly over their heads, so was closer to them than the drone. They cannot emphasise enough that this was all within a split-second. The opportunity to react was solely instinct. They then considered what to do with the UAV. Their 'spotter' reminded them that training aircraft often travel in pairs or threes, so they descended the UAV. They then flew the UAV back to the landing point. At 1225 they called Welshpool ATC – they were unaware of any such aircraft in the area and suggested that they call RAF Valley, which they did. After 20+ min trying to get a response, they were finally put through to ATC, then Ops. RAF Valley could neither confirm nor deny whether they had aircraft in the area. RAF Valley Ops took their location, height of the incident, rough distance (at that point they estimated it was 200-300m away, but later confirmed it was only 160m away) and phone number. They asked if the flight was recorded on NOTAMs – the drone

operator explained that this was done via Drone Assist and asked if they needed to report this anywhere else and were told no – Valley would deal with it all from there. RAF Valley Ops called back to ascertain if they would be flying just that day or tomorrow too. The drone operator confirmed that it was just on that day. They asked whether RAF Valley knew that they were in the area (so they can continue) and, whilst they cannot confirm or deny what they can or can't see, or whether any of their aircraft will be in the area, they do at least now know the location of their drone operations for the afternoon. They later called [their operating organisation's] drone experts. Contrary to the advice from RAF Valley, they confirmed that an Airprox needed to be reported.

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

THE TEXAN II PILOT reports that, several days after completing their flight, they were made aware via email that a recreational [they believed] drone operator had filed an Airprox report, stating that they had come close to their drone at approximately 1220 in the vicinity of Llandinam, Powys, Wales. A NOTAMed route was loaded into the aircraft, and multiple hard copies of up-to-date, NOTAMed maps were carried by both aircrew. Nothing resembling a drone was seen at the time by either aircrew. Upon being informed of the Airprox report, the student pilot replayed the sortie recordings, which included a GPS ground trace, HUD tape and aircraft performance data. Nothing resembling a drone was seen on the HUD tape.

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

Factual Background

The weather at Shawbury was recorded as follows:

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METAR EGOS 071150Z 11011KT 9999 FEW025 BKN035 06/00 Q1025 NOSIG RMK BLU BLU=
METAR EGOS 071250Z 11012KT 9999 FEW028 BKN035 06/M01 Q1024 NOSIG RMK BLU BLU=
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Analysis and Investigation

UKAB Secretariat

An analysis of the NATS area radar replay was undertaken and, unfortunately, the event took place below the coverage of the NATS radars available at that time (the Clee Hill radar was unavailable on the day of the Airprox). However, the DJI Mavic operator supplied details of their notified (via Drone Assist UK) activity (see Figure 1) and the Texan II pilot report included a trace of the actual track flown by the Texan II see Figure 2). It has not been possible to measure a CPA due to the absence of GPS positional data at the time of the reported Airprox.

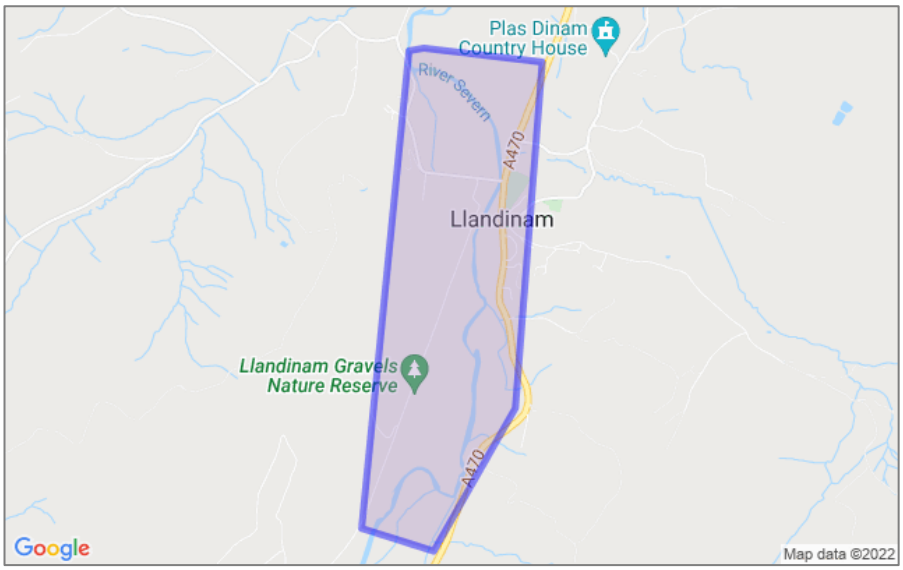


Figure 1 – Drone Assist UK depiction of DJI Mavic 2 operating area

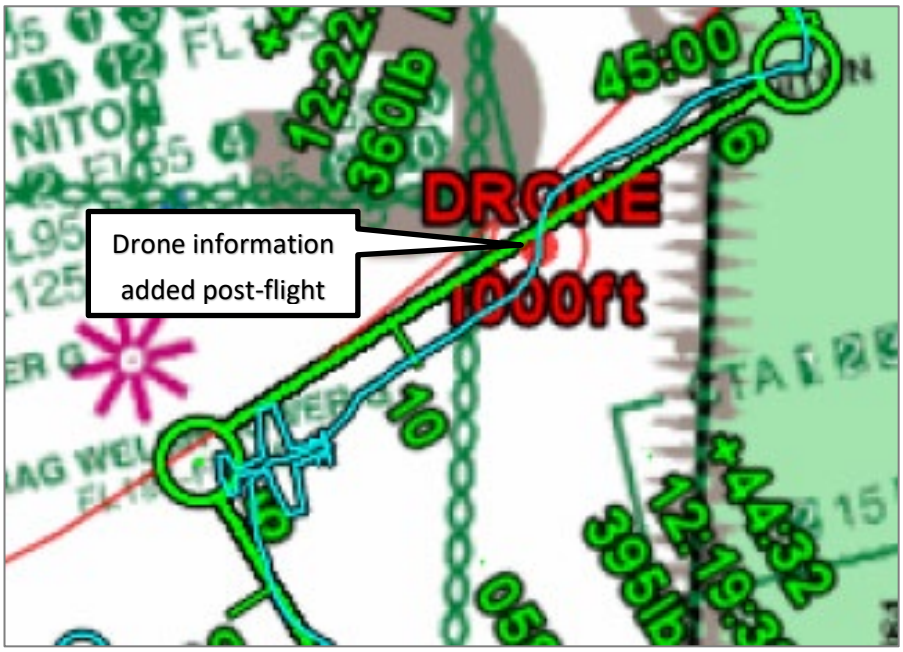


Figure 2 – Texan II post-flight mission download

The DJI Mavic 2 operator and Texan II pilot shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[1] During the flight, the remote pilot shall keep the unmanned aircraft in VLOS and maintain a thorough visual scan of the airspace surrounding the unmanned aircraft in order to avoid any risk of collision with any manned aircraft. The remote pilot shall discontinue the flight if the operation poses a risk to other aircraft, people, animals, environment or property.[2]

Comments

HQ Air Command

This Airprox was subject to a Local Investigation. The DJI Mavic 2 operator was legally operating their drone IVO of Powys, Wales, where the Airprox occurred. The Texan II crew did not see, or were not aware of, a drone operating in that area. The crew of the DJI Mavic 2 is to be commended for their pragmatism with reporting the Airprox and getting in touch with RAF Valley to highlight their presence. The DJI Mavic 2 operator uploaded their flight plan to Drone Assist UK; however, this is not checked by crews at RAF Valley and it doesn't produce NOTAM, which are thoroughly checked pre-flight. The current height deconfliction issue between civilian drone usage and MOD low-flying (below 2000ft agl) activity remains a concern for the MOD. As there is no current requirement to NOTAM civilian drone activity (outside restricted airspace) up to 400ft, this could potentially represent a severe Flight Safety hazard when considering military low-flying levels are routinely down to 100-250ft in various areas across the UK. Military crews, when conducting low-flying, will routinely be using the VHF Low-Level Common Frequency to broadcast their position to aid deconfliction to other users flying below 2000ft agl not in receipt of an ATS. If drone operators carried a VHF radio, this may give them an early 'heads-up' for an approaching low-flying aircraft and provide yet another barrier to avoid a Mid-Air Collision.

Summary

An Airprox was reported when a DJI Mavic 2 and a Texan II flew into proximity near Llandinam at approximately 1220Z on Monday 7th March 2022. The DJI Mavic 2 operator was operating under VLOS; the Texan II pilot was operating under VFR in VMC. Neither the drone operator nor the Texan II pilot were in receipt of an ATS.

[1] (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[2] EASA Part UAS.OPEN.060 Responsibilities of the remote pilot (2)(b).

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 DJI Matrice operator and noted that they had taken reasonable steps to publish their activity on a common drone-users' application and had thoroughly briefed their observer. A military pilot member informed the Board that there is a telephone number that drone operators (and others) can call to inform the military low flying operations organisation of activity that may be of interest to them,[3] and the Board wished to highlight this to any drone operators or pilots reading this report. Members also discussed a recent Safety Recommendation made in relation to Airprox 2021156[4] ('*The CAA considers highlighting the utility of monitoring relevant air communication frequencies to all drone operators, either through training syllabi or other appropriate media'*) and heard that the CAA had partially accepted the Recommendation in that the CAA believed that the majority of drone operators in the 'Open' category would gain little benefit from monitoring air communication frequencies without additional training, which would be disproportionate. However, the CAA agreed to:

1. Recommend to providers of drone flight control software applications that increased aviation-related hazards (such as microlight activity, glider sites, unlicensed airfields etc) be represented within that software; and

2. Review 'Open' category training material, AMC and guidance material, and website information to ensure a greater understanding amongst drone operators of hazards to their operations *outside* FRZs.

Returning to the Airprox itself, the Board noted that the drone had not been equipped with any electronic conspicuity equipment that could have warned the operator of the approaching Texan II but that the operator had heard aircraft noise shortly before sighting the aircraft. Therefore, members agreed that the drone operator had gained late situational awareness of the approaching Texan II (**CF3**). Furthermore, due to the nature of the Texan II pilot's low-flying training, the Board considered that the Texan II had been obscured from the drone operator's view by the topography and, as it flew closer, the trees (**CF7**) which had led to a late sighting of the aircraft on the part of the drone operator (**CF5**).

Turning to the actions of the Texan II pilot, the Board noted that the drone activity had only been notified on a drone-users' application and that the Texan II pilot had not had access to that information (**CF2**). There then followed a lengthy discussion on how users of the UK Military Low Flying System, and other operators with a CAA permission to operate at less than 500ft from any person, vessel, vehicle or structure (ORS4 No.1496),[5] could gain access to information regarding drone operations at or below 400ft agl. The Board noted that there is no mandate for this information to be published (**CF1**) and members considered that this did not assist those that operate in a similar height-band to mitigate the risk of mid-air collision with a drone. Therefore, the Board resolved to recommend that '*The CAA and MAA jointly consider a coherent means by which non-recreational drone activity can be promulgated by drone operators and an associated method through which this information can be made available to other air users operating in either the UK Military Low Flying System or with a CAA permission to operate outside the provisions of ORS4 No.1496'*. Returning to the circumstances of this Airprox, the Board agreed that the lack of information regarding the drone operation, coupled with the fact that their TCAS I equipment had no means of detecting the non-transponder-equipped drone (**CF4**) had meant that the Texan II pilot had not had any situational awareness of the presence of the drone (**CF3**). Members agreed that, as with the drone operator's perspective of the encounter, the drone operation had been obscured from the Texan II pilot's view (**CF7**) and they had never sighted the drone (**CF6**).

[3] Military Airspace Management Cell (Low Flying): +44 (0)800 515544
[4] https://www.airproxboard.org.uk/Documents/Download/1708/0cb047ad-d908-4aae-92d5-a3dd205ae514/2663
[5] https://publicapps.caa.co.uk/docs/33/ORS4%20No.1496.pdf

Finally, the Board considered the risk involved in this event. Members noted that, because the Airprox took place below the coverage of the NATS area radars, there was no recorded data available with which a CPA could be measured. However, the Board took into account the drone operator's estimate of separation and assessment of the risk of collision, and noted that the drone operator did not feel that there had been sufficient time for them to descend their drone away from the path of the approaching Texan II. This, coupled with the fact that the Texan II pilot did not see the drone, led the Board to conclude that safety had not been assured an a risk of collision had existed (**CF8**). Consequently, the Board assigned a Risk Category B to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2022024			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Flight Elements			
	• Regulations, Processes, Procedures and Compliance			
1	Organisational	• Flight Operations Documentation and Publications	Flight Operations Documentation and Publications	Inadequate regulations or procedures
	• Tactical Planning and Execution			
2	Organisational	• Flight Planning Information Sources	An event involving incorrect flight planning sources during the preparation for a flight.	
	• 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	• 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
7	Contextual	• Visual Impairment	Events involving impairment due to an inability to see properly	One or both aircraft were obscured from the other
	• Outcome Events			
8	Contextual	• Near Airborne Collision with RPAS	An event involving a near collision with a remotely piloted air vehicle	

Degree of Risk: B

Recommendation: The CAA and MAA jointly consider a coherent means by which non-recreational drone activity can be promulgated by drone operators and an associated method through which this information can be made available to other air users operating in either the UK Military Low Flying System or with a CAA permission to operate outside the provisions of ORS4 No.1496.

Safety Barrier Assessment[6]

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

Flight Elements:

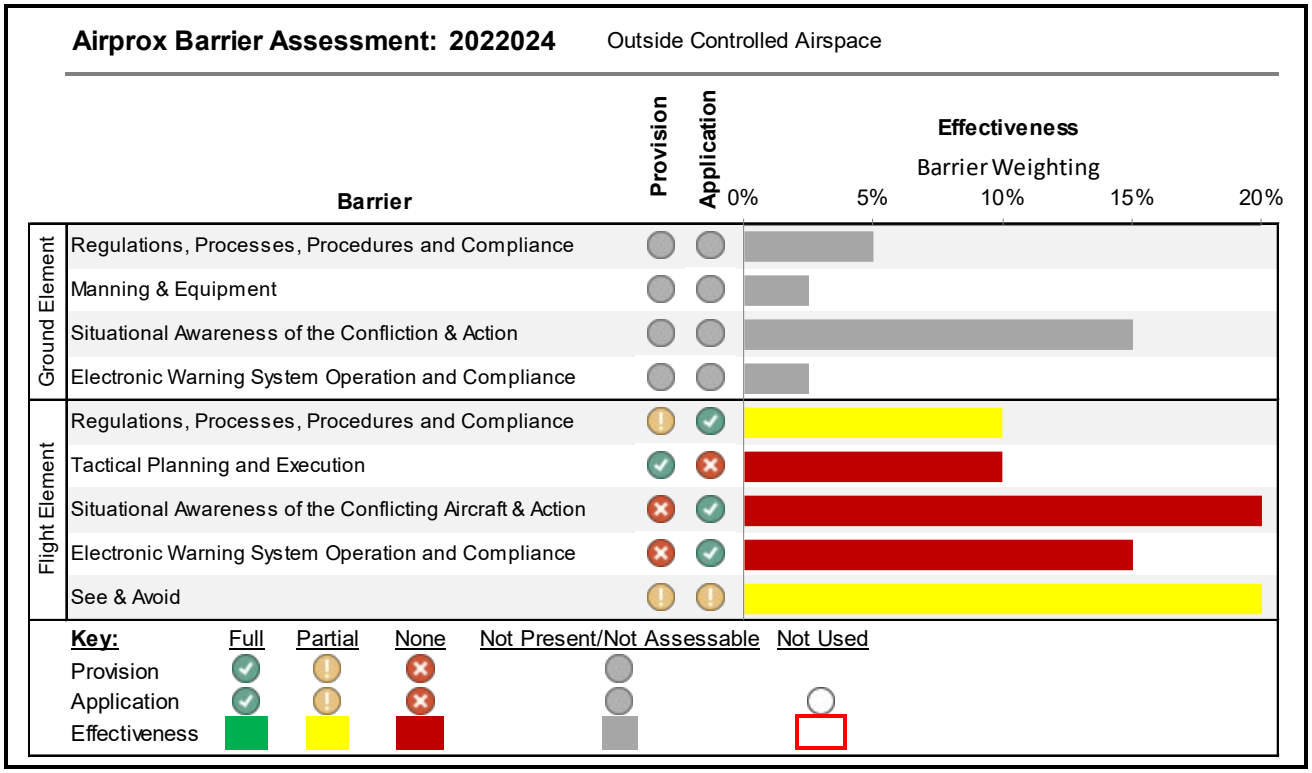
Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because there is no mandate for drone operators to inform other air users of their drone activity below 400ft agl, which means that pilots of, for example, military low-flying aircraft, HEMS, NPAS etc cannot establish where drone activity is taking place that may affect their flight.

Tactical Planning and Execution was assessed as **ineffective** because there is no procedure for the Texan II pilot to access Drone Assist UK (or other proprietary drone information applications) in their pre-flight planning.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Texan II pilot did not have any situational awareness of the presence of the drone.

Electronic Warning System Operation and Compliance were assessed as **ineffective** because the TCAS I equipment on the Texan II could not detect the presence of the non-transponding drone.

See and Avoid were assessed as **partially effective** because both the drone operator's and Texan II pilot's ability to sight the other aircraft early was hindered by the topography, leading to a non-sighting on the part of the Texan II pilot and a late sighting on the part of the drone operator.



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