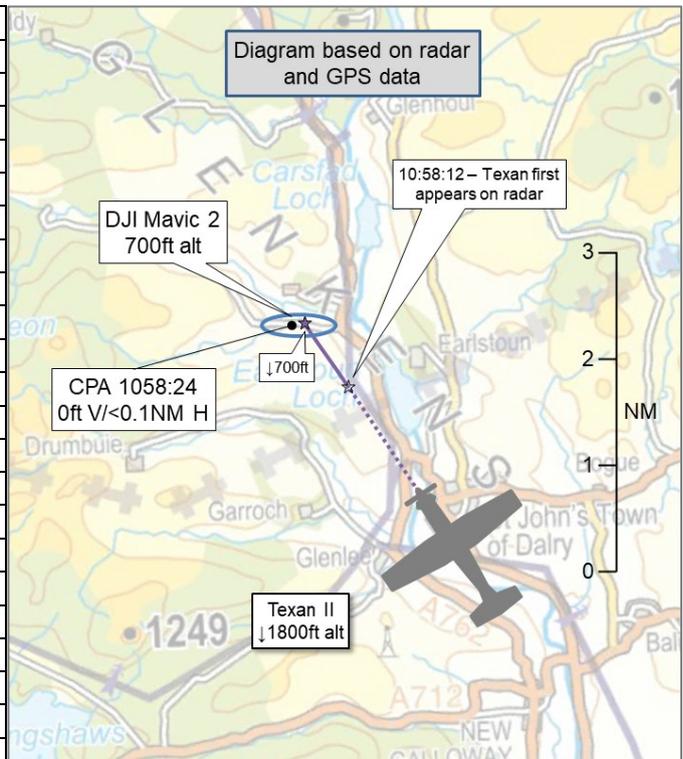


AIRPROX REPORT No 2021057

Date: 24 May 2021 Time: 1058Z Position: 5508N 00412W Location: 14NM NE of Newton Stewart

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	Scottish FIR	Scottish FIR
Class	G	G
Rules	VFR	VFR
Service	None	Listening Out
Provider	N/A	Low-level Common
Altitude/FL	700ft ¹	700ft
Transponder	Not fitted	A, C, S
Reported		
Colours	Grey	Black
Lighting	LEDs	HISLs, nav lights
Conditions	VMC	VMC
Visibility	>10km	20km
Altitude/FL	100m	1100ft
Altimeter	NK	QNH (1014hPa)
Heading	NK	330°
Speed	NK	240kt
ACAS/TAS	DJI AirSense	TCAS I
Alert	Information	None
Separation		
Reported	50ft V/0m H	Not Seen
Recorded	~0ft V/<0.1NM H ²	



THE DJI MAVIC 2 OPERATOR reports operating a DJI Mavic 2 Enterprise Advanced Drone on a mapping tasking at an altitude of 100m. Weather conditions were good. They had a DJI 'AirSense' Alert of a manned aircraft in the vicinity. They descended at high speed, with the Texan T1 passing at low-level from their 6 o'clock. The Mavic is a small drone and no avoiding action was taken by the aircraft.

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

THE TEXAN II PILOT reports that a land-away sortie to Prestwick was planned and flown on 24th May, departing at approximately 0940. All NOTAMs were checked and updated and presented on printed charts. Late warnings, CADS, PINS and gliders were checked during the out-brief process in operations. The sortie was flown and completed safely without incident. Using details supplied by Swanwick(Mil) they confirmed using their mission recordings that they were executing a simulated strafe manoeuvre at the time and the position of the initial report. Neither they nor the captain saw a drone, and being a DJI Mavic 2 (which is a very compact machine) it would be very difficult to acquire visually with any time to react at 240kts. Running the HUD recording did not display any images including a drone, though the resolution is poor. No avoiding action was taken as they were unaware of the proximity of the drone; they wondered if perhaps the drone pilot may have perceived their pitch up for the simulated strafe attack as an avoiding action. The drone being exceptionally dense, the potential damage if a collision took place at that speed would no doubt be significant.

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

¹ GPS-derived.

² Separation measured by comparison of GPS data from the DJI Mavic 2 and NATS radar replay data for the Texan II.

Factual Background

The weather at Prestwick Airport was recorded as follows:

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METAR EGPK 241050Z 26013KT 9999 FEW027 SCT045 11/06 Q0999=
METAR EGPK 241120Z 27013KT 9999 -RA FEW019 SCT037 11/07 Q0999=
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Analysis and Investigation

UKAB Secretariat

An analysis of the NATS radar replay was undertaken. The drone was not detected by the NATS radars; the Texan II first appeared on radar at 1058:12 at an altitude of 1400ft (QNH 1000HPa set in the radar, levels displayed in Flight Level (FL), giving a difference of -400ft applied to the display of FL) – see Figure 1. The Texan could be seen to descend rapidly over the next 3 radar sweeps – this is assessed to be part of the simulated strafe attack profile that is in the pilot's report. CPA occurred at 1058:24 as the Texan overflies the reported position of the drone – see Figure 2. Utilising the GPS data from the drone operator, it was possible to establish a vertical separation of ~0ft between the drone and the Texan. However, due to the resolution accuracy of the radar, it was only possible to resolve the horizontal separation to <0.1NM.

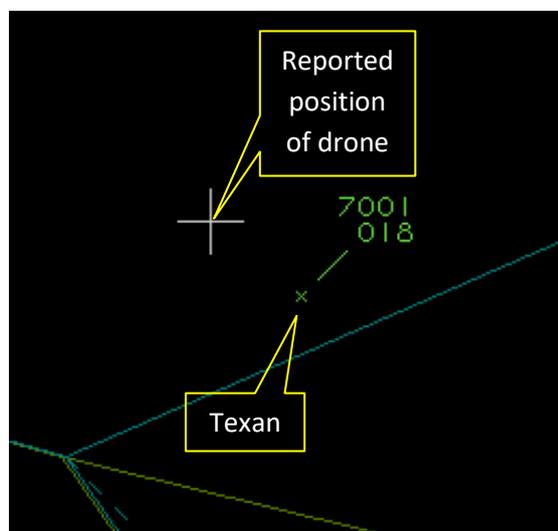


Figure 1 – 1058:12



Figure 2 – 1058:24 – CPA

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.³ 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.⁴

Occurrence Investigation

The Texan aircrew utilised CADS to plan a land-away to Prestwick on 24th May 21 and not been presented with any information regarding the Drone as its sortie had not been notified. The Texan sortie was flown and had unknowingly come into proximity with the Drone whilst conducting a practise strafing dive on its way to Prestwick.

³ (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

⁴ EASA Part UAS.OPEN.060 Responsibilities of the remote pilot (2)(b).

Comments

HQ Air Command

This occurrence was subject to a Local Investigation. It is heartening to see a drone operator filing an Airprox and taking avoiding action upon hearing an approaching aircraft. The Texan aircrew were unaware of a drone operating in the vicinity of the airprox as there was no information on CADS. Drone operators should be encouraged to inform the Military Airspace Management Cell who can upload their activity on to CADS. This can provide key situational awareness to crews planning and before they walk for their flight. The investigation opined that *'Drone operators are legally allowed to fly drones up to a max of 400ft AGL without [a specific CAA permission]. The UK military low level height is down as low as 250ft, therefore unless the CAA introduces a change to the regulation this type of event will possibly start to occur more regularly'*. It is worth noting that the Drone and Model Aircraft Code, Where Can You Fly,⁵ Point 3 states: *'Fly below 120m (400ft). Flying below the legal height limit of 120m (400ft) will reduce the risk of coming across other aircraft, which normally fly higher than this. Always look and listen out for other aircraft that may be flying below 120m (400ft), such as air ambulances and police helicopters'*. It might be worth adding some information on military low flying, which is predominantly at 250ft and below, to increase operators' awareness of military aircraft too.

Summary

An Airprox was reported when a DJI Mavic 2 drone and a Texan II flew into proximity 14NM NE of Newton Stewart at 1058Z on Monday 24th May 2021. Both pilots were operating under VFR in VMC; neither the drone operator nor the Texan pilot were in receipt of an ATS.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, GPS data from the drone operator 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.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided a combination of written contributions and dial-in/VTC comments.

The Board first considered the actions of the DJI Mavic 2 operator and agreed that, whilst there had been no requirement for them to notify their activity because it had all been contained below 400ft agl, it would have been useful if they had informed the Low Flying Coordination Military Airspace Management Cell (LFC MAMC) of their intended activity as this would have enabled dissemination of that information to all CADS⁶ users and the drone operator would have received generic information about planned activity in their area of operations. The Board recalled a previous Airprox involving a drone (2021012) where it was noted that any drone operator could call LFC MAMC on their booking number⁷ to pass on details about their drone operations if they thought they might conflict with military low-flying and that this would also provide the drone operator with an indication of what was booked into the low-flying system in their area of operation and cue them to be alert for the traffic, so the Board considered that Processes and Procedures had been partially lacking in this regard and that this had been contributory to the Airprox (**CF1**). The Board agreed that, as it was, the drone operator had not had any situational awareness of the presence of the Texan II (**CF2**) and so had been relying on looking and listening for other aircraft, as well as monitoring the proprietary warning system on the drone. Some members wondered whether the recent VHF Low Level Common Frequency Trial⁸ might have helped in this situation, should the drone operator have been able to listen-out on that frequency (noting that

⁵ <https://register-drones.caa.co.uk/drone-code/where-you-can-fly>

⁶ Centralised Aviation Data Service – a primarily military tool used for flight planning and pre-flight deconfliction purposes.

⁷ LFC MAMC number 01489 443100.

⁸ <https://www.caa.co.uk/General-aviation/Safety-information/VHF-Low-Level-Common-Frequency-Trial/>

its inception date was 1st June 2021 – after this Airprox took place), but others suggested that this would require equipment capable of receiving aviation VHF frequencies and that it would not be reasonable to expect drone operators to equip themselves with such radios on the off-chance that they may hear something that could affect their operations. Returning to the Airprox itself, the Board agreed that the drone operator had reacted appropriately to the warning received on their DJI AirSense equipment (CF3) in immediately initiating a descent and also agreed that, had the drone operator been relying purely on audio-visual cues, then they may not have had time to descend their drone out of the path of the Texan II. As it was, the Board considered that the drone operator had sighted the Texan II at a point where it would have been too late to initiate any avoiding action (CF4).

Turning to the actions of the Texan II pilot, the Board quickly agreed that there was little that they could have done to avoid the Airprox. Members also agreed that, without any prior notification of drone activity in the area, the Texan II pilot had not had any situational awareness of the presence of the drone (CF2) and had been relying purely on their lookout to detect airborne threats to their aircraft. The small size of the DJI Mavic 2 (~30cm across) would have meant that it would have been extremely difficult to acquire visually, particularly given that the pilot would have also been trying to locate their simulated target during their dive, and the Board agreed that the Texan II pilot had not seen the drone and that this had been contributory to the Airprox (CF4). The Board also heard from a military pilot member how the CAA's Drone and Model Aircraft Code advises drone operators to be aware that there may be other airspace users flying below 500ft agl, such as air ambulances and police helicopters, and wondered why there was no mention of low-flying military aircraft. Members agreed that this may have been an oversight and, in light of its contribution to this Airprox (CF1), resolved to recommend that 'The CAA should consider adding 'military low-flying aircraft' to the appropriate paragraph in the Drone and Model Aircraft Code.'

Finally, the Board considered the risk involved in this Airprox. Members took into account the drone operator's estimation of separation and the CPA measured through comparison of the GPS position of the drone and the NATS radar data for the Texan II. Some members considered that it had been entirely providential that the 2 aircraft had missed each other and that there had been a serious risk of collision, suggesting that this warranted a Risk Category A. Others felt that the actions of the drone operator on receiving the alert of an approaching aircraft had removed any risk of collision and argued that a Risk Category C should be applied. After further discussion, the Board agreed that safety had been much reduced and that there had been a risk of collision (CF5), but that this had been partially mitigated by the actions of the drone operator. Consequently, the Board assigned a Risk Category B to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021057			
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
	• Situational Awareness of the Conflicting Aircraft and Action			
2	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late or only generic, Situational Awareness
	• Electronic Warning System Operation and Compliance			
3	Contextual	• Other warning system operation	An event involving a genuine warning from an airborne system other than TCAS.	
	• See and Avoid			
4	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			

5	Contextual	• Near Airborne Collision with RPAS	An event involving a near collision with a remotely piloted air vehicle	
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Degree of Risk: B

Recommendation: The Drone and Model Aircraft Code, Point 3 currently states ‘Always look and listen out for other aircraft that may be flying below 120m (400ft), such as air ambulances and police helicopters.’ The CAA should consider adding ‘military low-flying aircraft’ to this paragraph.

Safety Barrier Assessment⁹

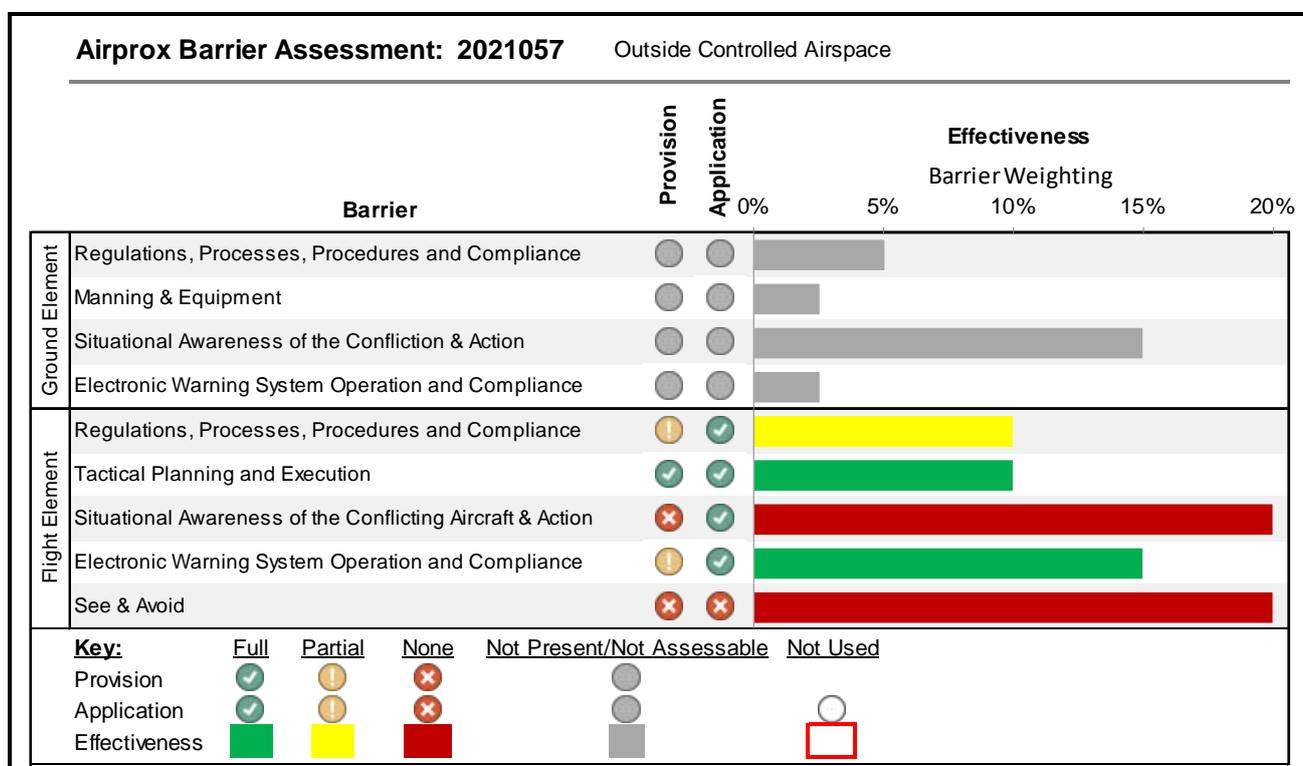
In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Drone and Model Aircraft Code does not currently advise readers to consider military low-flying aircraft flying below 400ft.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither the drone operator nor the Texan II pilot had had any prior warning of the presence of the other aircraft.

See and Avoid were assessed as **ineffective** because the Texan II pilot did not sight the drone and the drone pilot only saw the Texan II after they had received a warning from their DJI AirSense and already initiated avoiding action.



⁹ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).