



UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL
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Reference Number	CA18/2/3/10293						
Classification	Accident	Date	24 April 2023		Time	1615Z	
Type of Operation	Remotely Piloted Aircraft Systems – Surveillance (Part 101)						
Location							
Place of Departure	Dumbe, KwaZulu-Natal Province		Place of Intended Landing	Dumbe, KwaZulu-Natal Province			
Place of Occurrence	6 nautical miles north-east of Dumbe, KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	27° 21' 02.00" S	Longitude	030° 53' 42.00" E	Elevation	5009 ft	
Aircraft Information							
Registration	ZT-XSH		Class	3A			
Make; Model; S/N	DJI Mavic 2 Enterprise (Serial Number: Mav0055)						
Damage to Aircraft	Minor		Total UAS Hours	1358.48			
Pilot-in-command							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male		Age	33
Licence Valid	Yes	Total Hours	115.0		Total Hours on Type	115.0	
Total Hours 30 Days	100		Total Flying on Type Past 90 Days	100			
People Controlling	1	Injuries	0	Fatalities	0	Injuries (On ground)	0
What Happened							
<p>On Monday, 24 April 2023, a DJI Mavic 2 Unmanned Aircraft System (UAS) with registration ZT-XSH lifted off from the launch pad approximately 6 nautical miles (nm) north-east of Dumbe in KwaZulu-Natal province to conduct surveillance of the freight railroad. The flight was conducted beyond visual line of sight (BVLOS) rules by night (evening twilight). The flight was conducted under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot reported that there were no anomalies detected after conducting the pre-flight checks. He then conducted six uneventful flights. On the seventh flight, he launched the UAS with 100% battery power at 1556Z. The mission lasted 19 minutes with approximately 25% battery capacity remaining. The pilot had the UAS in his line of sight whilst it was on its way to the launch pad. The pilot disembarked from the motor vehicle in which he was operating from and, whilst the UAS was on final approach, he accidentally knocked the throttle selector stick on the pilot remote station which caused the UAS to accelerate, and it eventually crashed on the cone that was placed at one of the corners of the landing pad. The UAS sustained damage to the propeller blades. No persons on the ground were injured.</p>							



Figure 1: A view of the accident site. (Source: Google Earth)



Figure 2: The aircraft after recovery. (Source: Operator)



Figure 3: The red arrow points to the cone that the UAS struck. (Source: Operator)



Figure 4: A similar model to the DJI Mavic 2 UAS. (Source: dji.com)

The information below is an extract from the Mavic 2 Enterprise User's Manual:

The DJI Mavic 2 Enterprise advanced drone is the latest commercial RPA with an advanced flight control system, featuring omnidirectional Vision System and Infrared Sensing System. It is constructed with a magnesium aluminium composite shell and carbon fibre arms that hold the motors and landing struts. During the flight, these arms are raised to allow unobstructed view from the camera that is suspended by the gimbal below the RPA. DJI technologies such as obstacle sensing, and the advance pilot assistance system help to capture complex shots effortlessly. Additional features like the built-in air sense makes the pilot aware of their surrounding airspace, and password protection helps maintain

secure access to aircraft and protect data. The RPA features a fully stabilised 3-axis gimbal camera that shoots 4k video, 12-megapixel photos, supports 2x optical zoom, 24-48 mm lens and supports filters.

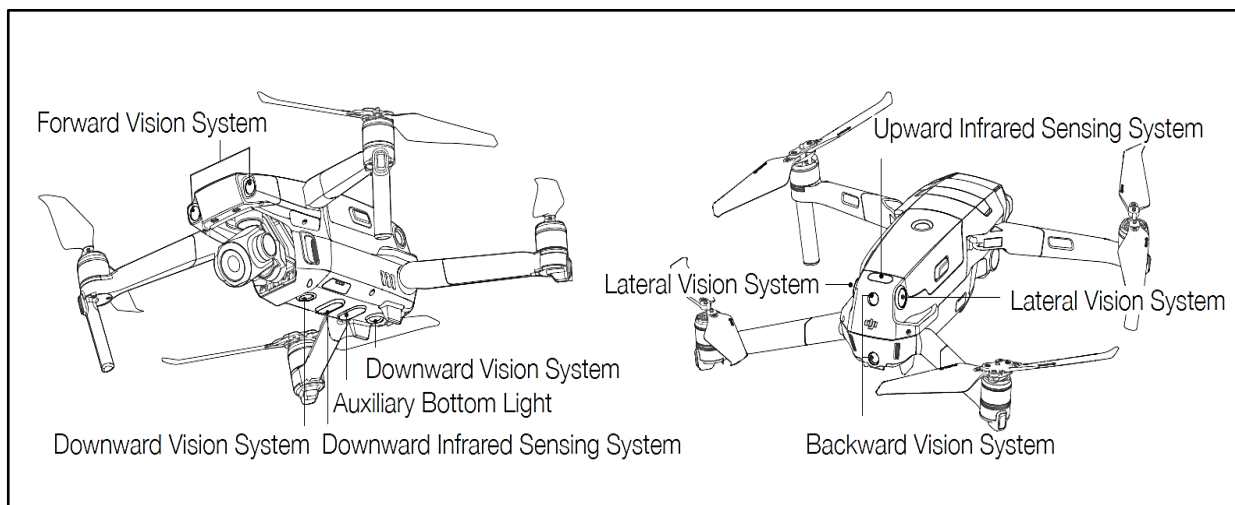


Diagram 1: An illustration of the DJI Mavic 2 Enterprise UAS schematic. (Source: DJI Mavic 2 User Manual)

Findings

The Pilot

1. The pilot was initially issued a Remote Pilot Licence (RPL) by the Regulator (SACAA) on 27 October 2022 with an expiry date of 31 October 2024. The pilot had a BVLOS rating which was endorsed on his licence.
2. The pilot's Class 3 medical certificate was issued on 17 September 2022 with an expiry date of 30 September 2026.

The Aircraft

1. The UAS was issued a Remotely Piloted Aircraft Systems Letter of Approval (LOA) by the Regulator on 1 February 2022; it was reissued on 12 January 2023 with an expiry date of 31 January 2024. The UAS Certificate of Registration (C of R) was issued to the current owner on 15 November 2021.
2. The UAS mandatory periodic inspection (MPI) was conducted on 15 April 2023 at 1318.04 hours. The UAS was operated for a further 40.44 minutes at the time of the accident. The remote maintenance technician (RMT) who conducted the said maintenance was issued an RMT licence on 20 September 2022 with an expiry date of 19 September 2024.
3. The UAS Operating Certificate was issued on 31 October 2022 with an expiry date of 31 October 2023. The operator's operation specifications included aerial patrol and survey (G3) for night operations.

4. The pilot accidentally knocked the throttle whilst landing the UAS and it crashed on the cone which was placed on one of the corners of the launch pad. The propeller blade was damaged as a result.
Probable Cause
The UAS propeller blade struck a cone during landing.
Contributing Factor(s)
None.
Safety Action(s)
None.
Safety Message and/or Safety Recommendation(s)
None.
About this Report
<i>The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.</i>
<i>All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.</i>
Purpose
<i>In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.</i>
Disclaimer
<i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i>

This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa