



UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number		CA18/2/3/10332							
Classification		Accident	Date		15 June 2023	Time		1711Z	
Type of Operation		Remotely Piloted Aircraft Systems – Aerial Survey (Part 101)							
Location									
Place of Departure		Anglo American Platinum – Mogalakwena Mine, Limpopo Province		Place of Intended Landing		Anglo American Platinum – Mogalakwena Mine, Limpopo Province			
Place of Occurrence		Anglo American Platinum – Mogalakwena Mine, central pit block near Waterberg							
GPS Co-ordinates		Latitude	23° 57' 21.78" S	Longitude	028° 53' 04.43" E	Elevation	3 569 ft		
Aircraft Information									
Registration		ZT-XHU		Class		4A			
Make; Model; S/N		DJI; Matrice 300 RT (Serial Number: 1ZNBj6R00C005Q)							
Damage to Aircraft		Substantial		Total RPAS/UAS Hours			98.10		
Pilot-in-command									
Licence Type		Remote Pilot Licence (RPL)		Gender		Male		Age	27
Licence Valid		Yes	Total Hours		161.54	Total Hours on Type		161.54	
Total Hours 30 Days		11.53		Total Flying on Type Past 90 Days			29.57		
Injuries	0	Injuries (On ground)	0	Fatalities	0	People Controlling	2		
What Happened									
<p>On Thursday, 15 June 2023, a DJI Matrice 300 RT Unmanned Aircraft System (UAS) with registration ZT-XHU was launched for a time study on the quarry pit blast block at Anglo American Platinum Mogalakwena Mine, Limpopo province. The flight was conducted under beyond visual line of sight (BVLOS) rules by day and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot who was the secondary pilot-in-control (S-PIC) reported that the controls of the UAS were handed over from the primary pilot-in-command (P-PIC) who was busy with the ground control points (GCP) plotting. He stated that he set up and conducted a pre-flight inspection on the UAS and, thereafter, attached the camera. He then launched the UAS as per the mission plan. As the UAS was en route to the starting position, three error messages popped up on the remote pilot station screen. He then observed the UAS spiral down uncontrollably and, moments later, it crashed. The S-PIC and P-PIC rushed to the crash site to find the UAS substantially damaged. There were no injuries reported on the ground.</p> <p>Post-flight inspection revealed that one of the propeller blades had detached in-flight. The S-PIC had conducted the pre-flight inspection in haste and did not ensure that the propeller was secured properly.</p>									



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



Figure 2: An example of a DJI Matrice 300 similar to the one that was involved in an accident.
(Source: <https://enterprise.dji.com/ecosystem/hovermap>)

Findings

The Pilot

1. The S-PIC was initially issued a Remote Pilot Licence (RPL) by the Regulator (SACAA) on 16 July 2019. His renewed licence was issued on 21 January 2022 with an expiry date of 31 January 2024. The S-PIC had a BVLOS and multirotor ratings which were endorsed on his licence.
2. The S-PIC pilot's Class 4 medical certificate was issued on 5 February 2019 with an expiry date of 31 May 2026 with no waivers.

<p>The Aircraft</p> <ol style="list-style-type: none"> 3. The UAS was initially issued a Remotely Piloted Aircraft System Letter of Approval (LOA) by the Regulator on 31 August 2021. The LOA was reissued on 11 August 2022 with an expiry date of 30 August 2023. The UAS Certificate of Registration (C of R) was issued to the current owner on 20 July 2021. 4. The UAS mandatory periodic inspection (MPI) was conducted on 20 April 2023 at 90.53 hours. The UAS had operated a further 7.56 hours at the time of the accident. The remote maintenance technician (RMT) who conducted the said maintenance was issued the RMT Licence on 1 September 2021 with an expiry date of 31 July 2023. 5. The UAS Operating Certificate was issued on 31 October 2022 with an expiry date of 31 October 2023. The approved operation specifications included aerial patrol and survey (G3) for night operations. 6. Post-flight inspection revealed that one of the propeller blades had detached in-flight.
<p>Probable Cause(s)</p> <p>In-flight propeller blade detached, which led to loss of control due to the propulsion imbalance and, hence, the subsequent crash.</p>
<p>Contributing Factor(s)</p> <p>Improper pre-flight inspection.</p>
<p>Safety Action(s)</p> <p>None.</p>
<p>Safety Message and/or Safety Recommendation/s</p> <p>Pilots are encouraged to conduct thorough pre-flight checks for the safety of persons and aircraft.</p>
<p>About this Report</p> <p><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></p> <p><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></p>
<p>Purpose</p> <p><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></p>
<p>Disclaimer</p> <p><i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i></p>

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