SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10104										
Classification	Accident	**Date**	16 January 2022	**Time**	2003Z						
Type of Operation	Remotely Piloted Aircraft (Part 101)										
Location											
Place of Departure	Glencore Goedgevonden Near Ogies, Mpumalanga Province	Place of Intended Landing	Glencore Goedgevonden Near Ogies, Mpumalanga Province								
Place of Accident	Goedgevonden Mine near Ogies										
GPS Co-ordinates	Latitude	S 26°03'31.4"	Longitude	E029°03'26.9"	Elevation	5 200 feet					
Aircraft Information											
Registration	ZT-WUL										
Model/Make	DJI Matrice-200 (Serial Number: M200-27)										
Damage to Aircraft	Destroyed	Total Aircraft Hours	211.4								
Pilot-in-command											
Licence Type	Remote Pilot Licence (RPL)	Gender	Male	Age: 24							
Licence Valid	Yes										
Total Hours on Type	136.05	Total Flying Hours	1 455.32								
People On-board	N/A	Injuries	0	Fatalities	0	Other (on ground)	0				
What Happened											

On 16 January 2022 at about 2003Z, a DJI Matrice-200 remotely piloted aircraft (RPA) with registration ZT-WUL took off on a surveillance flight near Ogies in Mpumalanga province with the intention to return to launch facility. The surveillance flight was conducted in visual line of sight (VLOS) by night and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that he was notified that his assistance was required to track down people on the mine's property at Glencore Goedgevonden Mine who stole a power cable. The aircraft, which was approximately 500 metres (m) from the pilot, had good connection. The pilot spotted eight suspects carrying the cable and notified the security guards of the position of the suspects.

The pilot continued to survey the suspects and provided their location to the guards. After 12 minutes and 45 seconds into the flight, an Electronic Speed Control (ESC) malfunctioned, which resulted in the aircraft spiralling down and crashing, thereafter, disconnected from the pilot's controller unit. At the time the aircraft crashed, it was being flown about 134 feet (41 metres) above ground level (AGL). Upon searching for the aircraft, the pilot only recovered pieces of the rotor and

the tracking unit; however, the aircraft was not found at the crash site. The aircraft had 60% battery power remaining at the time of accident.

According to the operator, a comma-separated values (CSV) in Figure 4 shows a compass interference normally caused by a motor spooling up and interfering with internal compass of the RPA. During the compass interference, the left front motor failed, causing the aircraft to spin and crash.

No injuries were reported during the accident sequence.

Figure 1: Retrieved parts of the RPA. *Note that the core of the remotely piloted aircraft was missing, presumably stolen.* (Source: Operator). **Figure 2:** A Matrice M200 picture taken from the DJI website.

Figure 3: Airdata – a notification tab shows that the RPA gave an ESC warning during flight. (Source: Operator)

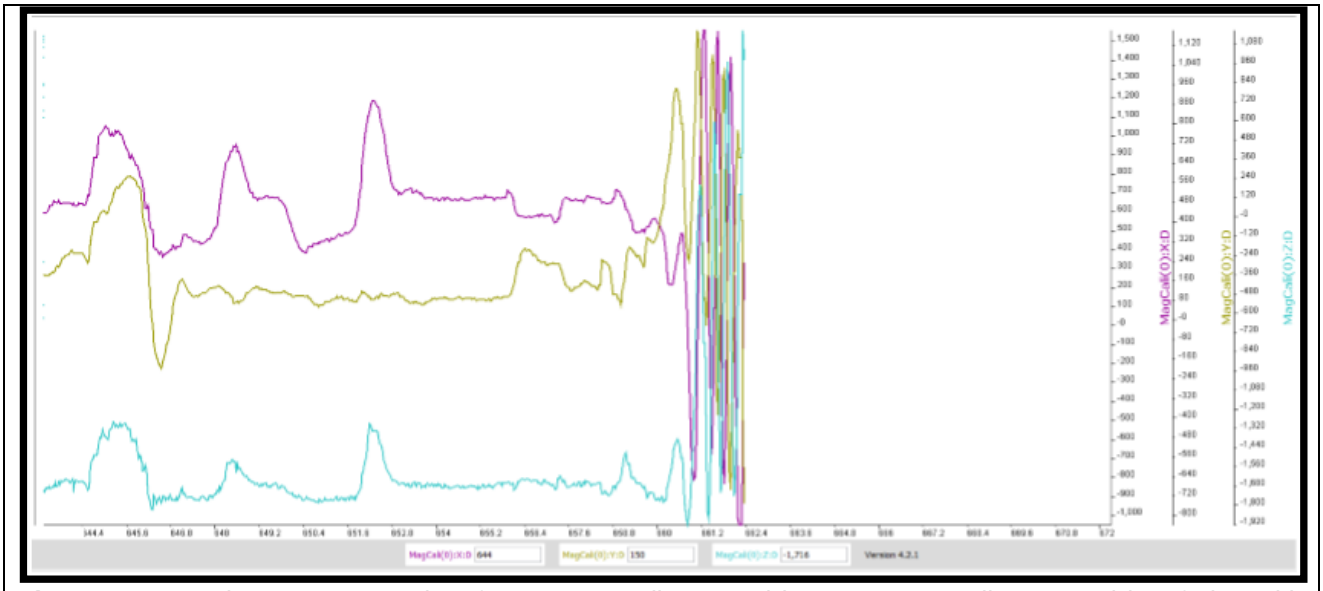

Figure 4: CSV View – Compass interference normally caused by a motor spooling up and interfering with the internal compass of the RPA.

Note: *A CSV file is a text file that has a specific format which allows data to be saved in table-structured format.*

What was found

- The pilot had a Remote Pilot Licence (RPL) initially issued by the Regulator (SACAA) on 31 January 2019 with an expiry date of 28 February 2023. His Class 4 medical certificate was issued by the Regulator on 30 August 2018 with an expiry date of 31 August 2023. The pilot was qualified for the flight operation and his licence was endorsed as a multirotor remotely piloted aircraft operator. The pilot's licence had VLOS type rating endorsed on it. The pilot had a total of 135.06 aircraft type operating hours and had the aircraft type endorsement rating on his licence.

- The operator was in possession of a remotely piloted aircraft system letter of approval (LOA) issued by the Regulator on 22 October 2021 with an expiry date of 31 October 2022. During the investigation, records of the operator's maintenance and pre-flight checks (including flight and function tests) were reviewed.

- The investigation found that there was compass interference which was caused by a motor spooling up and interfering with the internal compass of the RPA.

- The aircraft was registered with the Regulator on 12 November 2020. The aircraft had operated approximately 211.4 flight hours since new. The operator had an operating certificate issued by the Regulator on 25 October 2021 with an expiry date of 31 October 2022.

Probable cause

It is most likely that the accident was caused by the failure of the left front motor of the RPA, resulting in the RPA spiralling out of control and, subsequently, crashing.

Contributing factor Component or hardware failure.
Safety Action/s
None.
Safety Message and/or Safety Recommendation/s
None.
Purpose of the Investigation
In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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****.*
About this Report
Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no 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 brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information 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 accident. *This report provides an opportunity to share safety message/s in the absence of an investigation.* *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.*
Disclaimer
This report is produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa