

UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10317						
Classification	Accident	Date	15 February 2023	Time	1245Z		
Type of Operation	Remotely Piloted Aircraft Systems – Surveillance (Part 101)						
Location							
Place of Departure	Chilwavhusika Mine, Bronkhorstspuit, Gauteng Province		Place of Intended Landing	Chilwavhusika Mine, Bronkhorstspuit, Gauteng Province			
Place of Occurrence	Chilwavhusika Mine in Bronkhorstspuit, Gauteng Province						
GPS Co-ordinates	Latitude	25°46'46.23" S	Longitude	028°48'47.40" E	Elevation	4 662 feet	
Aircraft Information							
Registration	ZT-XCI						
Make; Model; S/N	Matrice 300 (Serial Number: 1ZNBHBU00C00G0)						
Damage to UAS	Substantial		Total UAS Hours	82.56			
Pilot-in-command							
Licence Type	Remote Pilot Licence		Gender	Male		Age	36
Licence Valid	Yes	Total Hours	Unknown	Total Hours on Type		3.7	
Total Hours 90 Days	Unknown		Total Flying on Type Past 90 Days	Unknown			
People Controlling	1	Injuries	0	Fatalities	0	Injuries (on ground)	0
What Happened							
<p>On 15 February 2023, a pilot launched an Unmanned Aircraft System (UAS) with registration ZT-XCI for surveillance from Chilwavhusika Mine in Bronkhorstspuit, Gauteng 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 stated that the launch and the initial flight of the UAS were normal during the survey on the mine. About 10 minutes into the flight whilst he was on a radio call, he noticed that the UAS was no longer capturing images and that there was a “sensor system error return-to-home or land” message displayed on the remote pilot station. The pilot then engaged the return-to-home button, and the UAS executed the command. When the UAS was closer to the home point, it changed course and headed in the opposite direction. The pilot decreased altitude as much as possible to prevent the UAS from gaining height. Although the pilot had altitude under control, he had no directional control. The pilot then engaged the return-to-home button a few more times, but the UAS did not respond. Moments later, the UAS crashed. It sustained substantial damage; no injuries were reported on the ground.</p>							

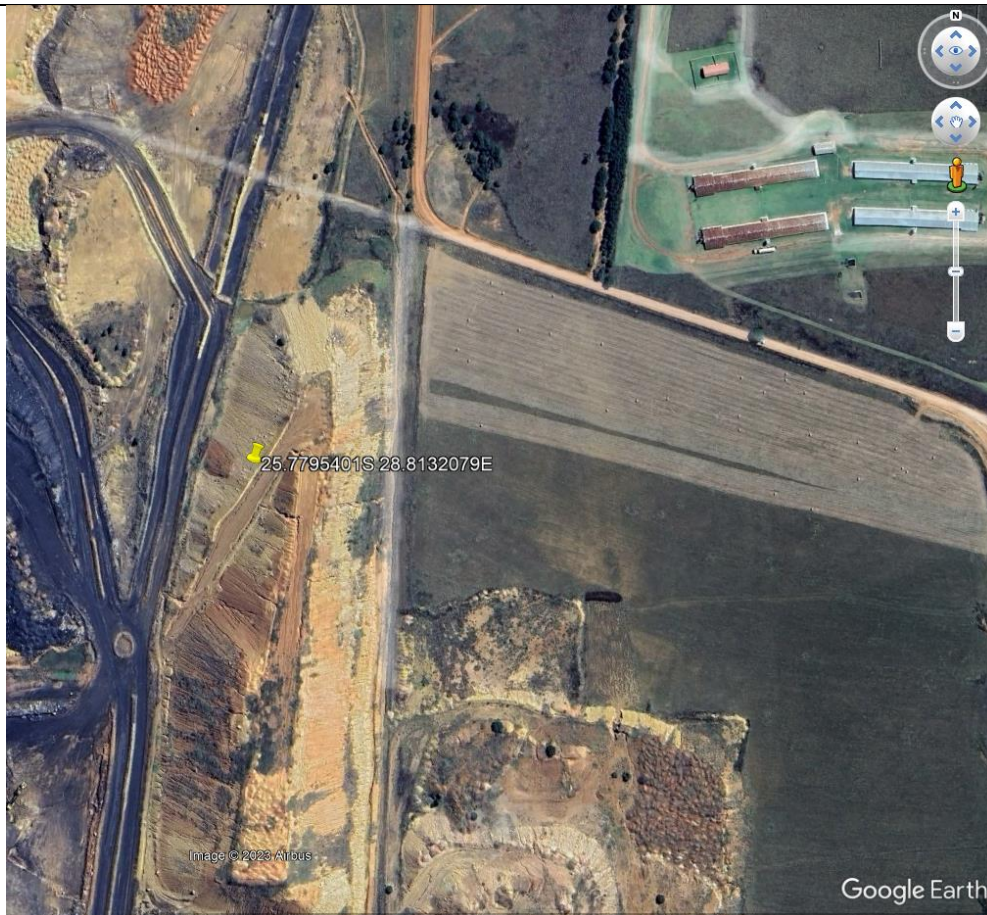


Figure 1: The yellow pin indicates the location where the UAS had crashed. (Source: Google Earth)



Figure 2: The UAS at the crash site. (Source: Operator)

Findings

1. The pilot had a Remote Pilot Licence (RPL) which was initially issued on 23 April 2021 with an expiry date of 30 April 2023.
2. The pilot had a Class 3 aviation medical certificate that was issued on 9 September 2020 with an expiry date of 9 September 2024 with the restriction to wear corrective lenses.
3. The pilot did not complete the pilot questionnaire, therefore, the pilot's hours on type were obtained from his application documents for BVLOS, obtained from the Regulator (SACAA).
4. The last maintenance inspection that was carried out on the UAS prior to the accident flight was certified on 12 December 2022 at 55.13 hours.
5. The Remote Maintenance Technician (RMT) was issued the RMT Licence on 9 September 2021 with an expiry date of 8 September 2023.
6. The UAS was issued a Remotely Piloted Aircraft Systems Letter of Approval (RLA) on 9 June 2021 with an expiry date of 8 June 2023.
7. The Certificate of Registration (C of R) was issued on 31 March 2021.
8. The operator was issued a Remotely Piloted Aircraft Systems Operating Certificate (ROC) by the Regulator on 29 June 2022 with an expiry date of 30 June 2023. The ROC had expired at the time of the accident.

9. General Requirements

101.04.1 (1) A person shall not operate a UAS in terms of this Part unless such person is a holder

of-

(a) in the case of commercial, corporate, and non-profit operation, a valid UASOC including the OpSpec attached thereto; and

(b) in the case of commercial operation, an air services licence issued in terms of the Air Services Licensing Act, 1990 (Act No. 115 of 1990).

Application

101.04.2 (1) An application for a UASOC, renewal or amendment thereof, shall be made to the Director on the appropriate form accompanied by—

(a) the appropriate fee as prescribed in Part 187;

(b) a copy of certificate of registration of each UA to be operated;

(c) a copy of a UASLA for each UAS to be operated; and

(d) an operations manual required by this Part.

(2) A UA shall not be registered under more than one UASOC.

Validity

101.04.3 (1) A UASOC shall be valid for a period of 12 months from the date of issue unless—

(a) it is surrendered by a holder thereof; or

(b) it is cancelled by the Director.

(2) A holder of a UASOC shall, at least 60 days immediately preceding the date on which such

certificate expires, apply for renewal of such certificate.

(3) A holder of a UASOC which is cancelled shall, within seven days from the date on which such

UASOC is cancelled, surrender such document to the Director.

10. The UAS was endorsed on the operator's operations specifications under Class 4A, issued by the Regulator effective 5 October 2022.

CLASS	TABLE 1: RPAS CLASSIFICATION			
	Line-of-Sight	Energy (kJ)	Height (ft)	MTOM (kg)
Class 1A	R-VLOS/VLOS	E < 15	h < 400	m < 1.5
Class 1B	R-VLOS/VLOS/EVLOS	E < 15	h < 400	m < 7
Class 1C	VLOS/EVLOS	E < 34	h < 400	m < 20
Class 2A	VLOS/EVLOS	E > 34	h < 400	m < 20
Class 2B	Experimental/Research			
Class 3A	BVLOS	E > 34	h < 400	m < 150
Class 3B	VLOS/EVLOS	Any	h > 400	m < 150
Class 4A	BVLOS	Any	h > 400	m < 150
Class 4B	Any	Any	Any	m > 150
Class 5	Reserved	Reserved	Reserved	Reserved

Table 1: The table shows the class of the UAS in the highlighted blue box.
(Source: SA-CATS 101.01.5)

11. The accident was reported 104 days later.

Accidents and Incidents

101.05.6 (1) An accident or serious incident involving a UA shall be reported as prescribed in Part 12.

(2) An incident involving a UA where loss of control occurred shall be reported to a holder of UASOC.

Notification of Accidents

12.02.1 (1) The PIC of an aircraft involved in an accident within the Republic, or if he or she is killed,

or incapacitated, a flight crew member, or if there are no surviving flight crew members or if they are incapacitated, the operator or owner, as the case may be, shall, as soon as possible but at least within

24 hours since the time of the accident, notify—

(a) the Director;

(b) an ATSU; or

(c) the nearest police station, of such accident.

Government Gazette states:

(2) If an ATSU or police station is notified of an accident in terms of sub regulation (1), such ATSU or police station shall, immediately on receipt of the notification, notify—

(a) the Director; and

(b) where such accident occurs on an aerodrome, the aerodrome manager.

Probable Cause

The investigation could not determine the reason the UAS changed course and flew in the opposite direction of the “home point” because the operator did not download the flight logs.

Contributing Factor(s)

None.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

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.

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.

Purpose

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.

Disclaimer

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