

UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10303					
Classification	Accident	Date	12 May 2023	Time	0037Z	
Type of Operation	Remotely Piloted Aircraft Systems – Aerial Survey (Part 101)					
Location						
Place of Departure	Lonmin Mine, near Marikana, North West Province		Place of Intended Landing	Lonmin Mine, near Marikana, North West Province		
Place of Occurrence	Lonmin Mine, near Marikana, North West Province					
GPS Co-ordinates	Latitude	25°42'48.97" S	Longitude	027°31'02.31" E	Elevation	3670 ft
Aircraft Information						
Registration	ZT-XXC		Class	3A		
Make; Model; S/N	Arace Sirin (Serial Number: SIR0061)					
Damage to Aircraft	Minor		Total UAS Hours	702.17		
Pilot-in-command						
Licence Type	Remote Pilot Licence (RPL)		Gender	Male		Age 27
Licence Valid	Yes	Total Hours	1127.57	Total Hours on Type	1127.57	
Total Hours 30 Days	71.7		Total Flying on Type Past 90 Days	215.23		
People Controlling	1	Injuries	0	Fatalities	0	Injuries (On ground) 0
What Happened						
<p>On Friday, 12 May 2023, an Unmanned Aircraft System (UAS) with registration ZT-XXC was engaged in an aerial survey operation at Lonmin Mine near Marikana, North West province. The flight was conducted under beyond visual line of sight (BVLOS) rules and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot stated that after conducting the pre-flight checks with no anomalies detected, he launched the UAS with 99% battery power at 0003Z. The surveillance mission was uneventful and lasted approximately 36 minutes, thereafter, the pilot engaged the return-to-launch button (RTL). However, during the final approach for landing, the pilot realised that the UAS was in speed (manual) mode, and he lost control of it. The UAS crashed on the fence and sustained damage to the propellers and the landing gear. There were no reported injuries to persons on the ground.</p> <p>Description of the aircraft (Source: www.araceuas.com/sirin/)</p> <p><i>The Sirin can be airborne up to 85 minutes and cover more than 40km in a single flight. Field deployment takes less than 1 minute and requires no assembly. Folds into a compact size for easy storage and transportation (including backpack options). Li-ion battery which can be recharged 3-4 times as much a traditional LiPo batteries which is what is used on most commercially available drones. Also, it only needs a single battery to fly.</i></p>						

Multiple redundancy for safe operation:

- *Triple IMUs*
- *Dual Compass*
- *Dual GNSS/GPS (multi constellation)*
- *No pre-flight calibration is required.*
- *Numerous built-in failsafe features.*

It can be equipped with various state-of-the-art, single, or dual sensor payload. Long range, optical zooming daylight cameras, as well as thermal cameras.

Operational radius of up to 20 km and can act as a relay with ARACE point to multi-point Mobile Remote Viewing Terminal (MRVT).

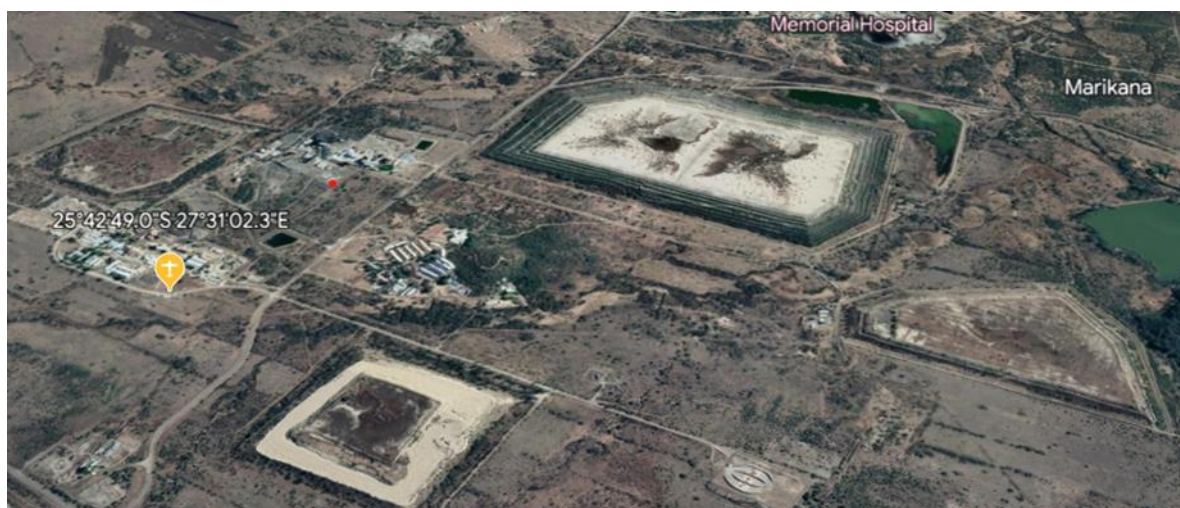


Figure 1: A view of the accident site. (Source: Google Earth)



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



Figure 3: The damaged propeller, motor and landing gear assembly. (Source: Operator)



Figure 4: A similar Arace Sirin UAS. (Source: araceuas.com)

Findings

1. The pilot was issued a Remote Pilot Licence (RPL) by the Regulator (SACAA) on 15 November 2021 with an expiry date of 31 December 2023. The pilot had a BVLOS rating which was endorsed on his licence.

2. The pilot's Class 3 medical certificate was issued on 20 November 2021 with an expiry date of 20 November 2025.
3. The UAS was issued an Unmanned Aircraft Systems Letter of Approval (LOA) by the Regulator on 7 May 2022. It was reissued on 18 February 2023 with an expiry date of 6 April 2024.
4. The UAS mandatory periodic inspection (MPI) was conducted on 8 April 2023 at 607.49 hours. The UAS was operated for a further 62.03 minutes at the time of the accident. The UAS Certificate of Registration (C of R) was issued to the current owner on 20 January 2022.
5. The remote maintenance technician (RMT) who conducted the last inspection was issued a RMT licence by the Regulator (SACAA) on 27 March 2018, which was reissued on 27 July 2022 with an expiry date of 26 July 2024.
6. The operator had an Unmanned Aircraft Systems Operating Certificate (ROC) that was issued by the Regulator on 31 October 2022 with an expiry date of 31 October 2023. The operation specification of the UAS type was endorsed on the ROC with an effective date of 10 November 2022.
7. The Arace Sirin is a vertical take-off multirotor with an endurance of up to 85 minutes.

Probable Cause

Incorrect flight mode selection led to the loss of control and the subsequent crash during landing.

Contributing Factor

Failure to monitor the flight mode.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation(s)

None.

About this Report

The decision to conduct a limited investigations 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

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**