

UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10315						
Classification	Accident	Date	30 May 2023			Time	0049Z
Type of Operation	Remotely Piloted Aircraft Systems – Surveillance (Part 101)						
Location							
Place of Departure	Zungwini near Vryheid, KwaZulu-Natal Province		Place of Intended Landing		Zungwini near Vryheid, Kwa-Zulu-Natal Province		
Place of Occurrence	Zungwini near Vryheid, KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	27° 37'49" S	Longitude	20° 49'35" E	Elevation	3805ft	
Aircraft Information							
Registration	ZT-XUR		Class	3A			
Make; Model; S/N	Arace Sirin (Serial Number: SIR0064)						
Damage to Aircraft	Substantial		Total UAS Hours	698.46			
Pilot-in-command							
Licence Type	RPL Multirotor		Gender	Male		Age	29
Licence Valid	Yes	Total Hours	728.09	Total Hours on Type		493.81	
Total Hours 30 Days	92.17		Total Flying on Type Past 90 Days		266.67		
People Controlling	1	Injuries	None	Injuries (On ground)	0	Fatalities	0
						Fatalities (on ground)	0
What Happened							
<p>On 30 May 2023, an Arace Sirin Unmanned Aircraft System with registration ZT-XUR was launched for security surveillance at Zungwini railway lines in Vryheid, KwaZulu-Natal province. The operation was conducted under beyond visual line of sight (BVLOS) rules by night and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot stated that he conducted a pre-flight inspection, and no anomalies were found. The battery was at 99% prior to take-off. After the UAS was launched, it climbed to 402.672 metres (1321.102 feet [ft]) above ground level (AGL). Twelve minutes into the flight at approximately 2.4 kilometres (km) from the take-off position, the UAS lost Command and Control (C2) connection with the remote pilot station and crashed. The pilot waited a few minutes for the UAS to activate the return-to-launch (RTL) function, however, the UAS did not return. The pilot set out to look for it at its last known location and found it on the ground after it had impacted a tree (Figure 1).</p> <p>The UAS had damage to the landing gear, arm, gimbal and propeller blades.</p>							



Figure 1: The ZT-XUR at the crash site. (Source: Operator)

Post-accident

- In the pilot questionnaire, the pilot had stated that the UAS lost control due to radio and Ground Control Station (GCS) fail safe. During the post-accident interview, he stated that he could not remember the specific details of the accident flight.
- According to the post-accident log analysis report (LAR), about 11 minutes into the flight the pilot engaged a slight roll and forward pitch. The UAS flew towards a forest and lost C2 connection with the transmitter. The UAS initiated a return-to-launch (RTL) mode but it crashed after impacting a tree.
- The CAR 2011 Part 101.01.5 prohibits flights above 400ft AGL for a Class 3A UAS, and the UAS was flown at a maximum height of 1321ft AGL.

Findings
<ol style="list-style-type: none"> 1. The pilot was initially issued a Remote Pilot Licence (RPL) on 18 May 2022 with an expiry date of 31 May 2024. A visual line of sight (VLOS) and beyond visual line of sight (BVLOS) ratings were endorsed on his licence. His Class 3 medical certificate was issued on 23 April 2022 with an expiry date of 30 April 2026 with no restrictions. 2. The last inspection conducted on the UAS prior to the accident flight was on 24 May 2023 at 665.53 hours. The UAS had accumulated 698.46 hours at the time of the accident. The UAS had flown a further 62.56 hours after the said inspection. 3. The operator was issued a Remotely Piloted Aircraft Systems Letter of Approval (LOA) on 12 April 2022, which was renewed on 24 April 2023 with an expiry date of 11 April 2024. The operator was issued an RPAS Operating Certificate (ROC) on 31 October 2022 with an expiry date of 31 December 2023. 4. The pilot made inputs to the UAS and it flew towards a forest and lost C2 connection with the pilot remote station. The UAS initiated a RTL but it crashed into a tree. The pilot lost situational awareness of the terrain and hazards in the UAS's flight path. 5. The CAR 2011 Part 101.01.5 prohibits flights above 400ft AGL for Class 3A UAS, and the UAS was flown at a maximum height of 1321ft AGL. 6. Fine weather conditions prevailed at the time of the flight. The weather did not have a bearing to this accident.
Probable Cause
The UAS lost a C2 connection after the pilot's slight roll and forward pitch inputs; the UAS descended and impacted a tree.
Contributing Factor(s)
None.
Safety Action(s)
None
Safety Message and/or Safety Recommendation(s)
None.
About this Report
<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>

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**