

UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10330						
Classification	Accident	Date	11 June 2023	Time	2320Z		
Type of Operation	Remotely Piloted Aircraft Systems – Surveillance (Part 101)						
Location							
Place of Departure	Karan Beef Farm in Nigel, Gauteng Province		Place of Intended Landing	Karan Beef Farm in Nigel, Gauteng Province			
Place of Occurrence	Nigel, Gauteng province						
GPS Co-ordinates	Latitude	26° 36' 27" S	Longitude	28° 19' 13" E	Elevation	5 311 ft	
Aircraft Information							
Registration	ZT-YOS	Class	3A				
Make; Model; S/N	Arace Sirin (Serial Number: SIR132)						
Damage to Aircraft	Substantial		Total UAS Hours	282.57			
Pilot-in-command							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male	Age	31	
Licence Valid	Yes	Total Hours	267.24	Total Hours on Type	267.24		
Total Hours 30 Days	60.0		Total Flying on Type Past 90 Days	183.15			
People Controlling	1	Injuries (On ground)	0	Fatalities	0	Fatalities (on ground)	0
What Happened							
<p>On Sunday evening, 11 June 2023, an Unmanned Aircraft System (UAS) Arace Sirin with registration ZT-YOS was launched from Karan Beef Farm in Nigel, Gauteng province, to conduct security surveillance in the area before returning to the take-off launch pad. The flight was conducted 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>According to the pilot, this was the fifth flight of the night. He reported that he launched the UAS to a height of 6.3 feet (ft) and switched to Global Positioning System (GPS) mode. The aircraft immediately lost control and began spinning; moreover, it was unresponsive to the pilot's commands. The aircraft eventually struck a tree approximately 10 metres from the launch site and, thereafter, fell to the ground. The pilot stated that the aircraft's GPS had previously been malfunctioning and had been sent for repairs two days prior to this occurrence.</p> <p>The UAS sustained substantial damage to one landing gear and one propeller. No persons on the ground were injured.</p>							

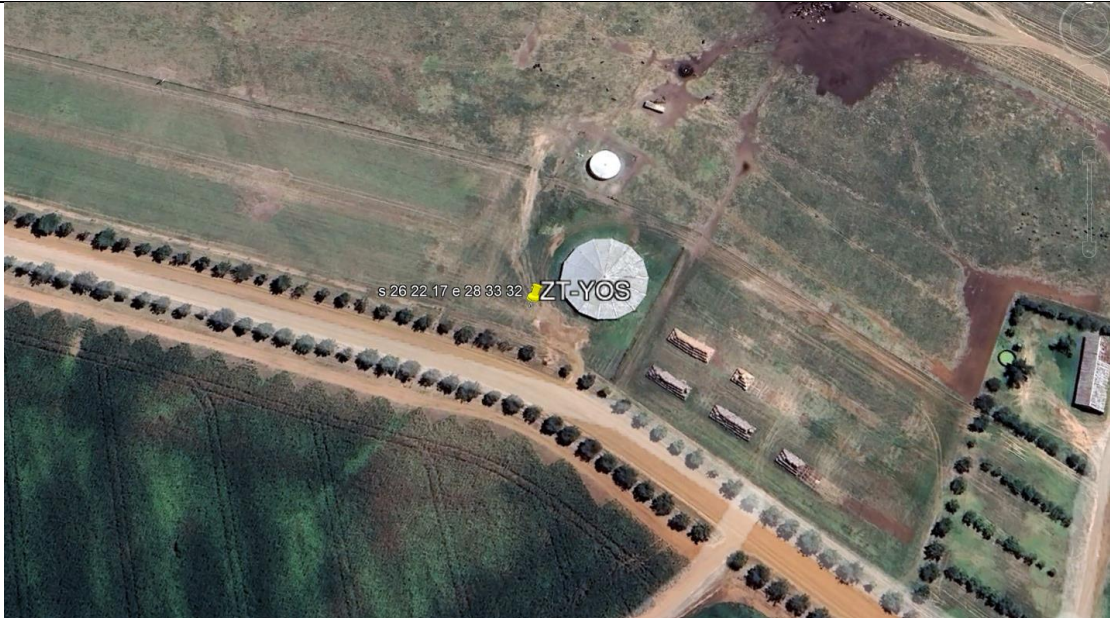


Figure 1: The view of the accident site. (Source: Google Earth)

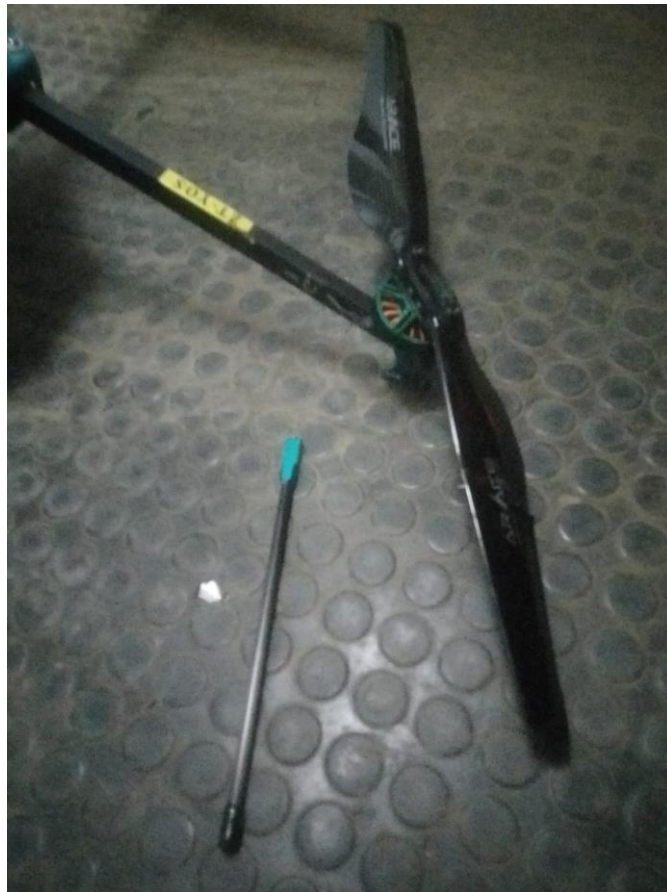


Figure 2: Damage to the UAS propeller and landing leg. (Source: Operator)



Figure 3: The damaged propeller. (Source: Operator)

The operator downloaded the flight log which revealed the following:

- The flight log showed that the UAS had more than 20 satellites in view (connected) at the time of the accident.
- The pilot armed the UAS in “Alt Hold” mode and switched to “Auto” mode. The UAS rejected the command. The pilot switched to “Loiter” mode then tried to take-off in “Auto” mode, but again the UAS rejected this command.
- The pilot then engaged the “Loiter” mode and the UAS took off and climbed to 6.3 ft above ground level (AGL) then switched to “Auto” mode; the UAS flew to a waypoint without gaining altitude. The pilot switched back to the “Loiter” mode and the UAS drifted towards a tree approximately 10 metres away from the home location.

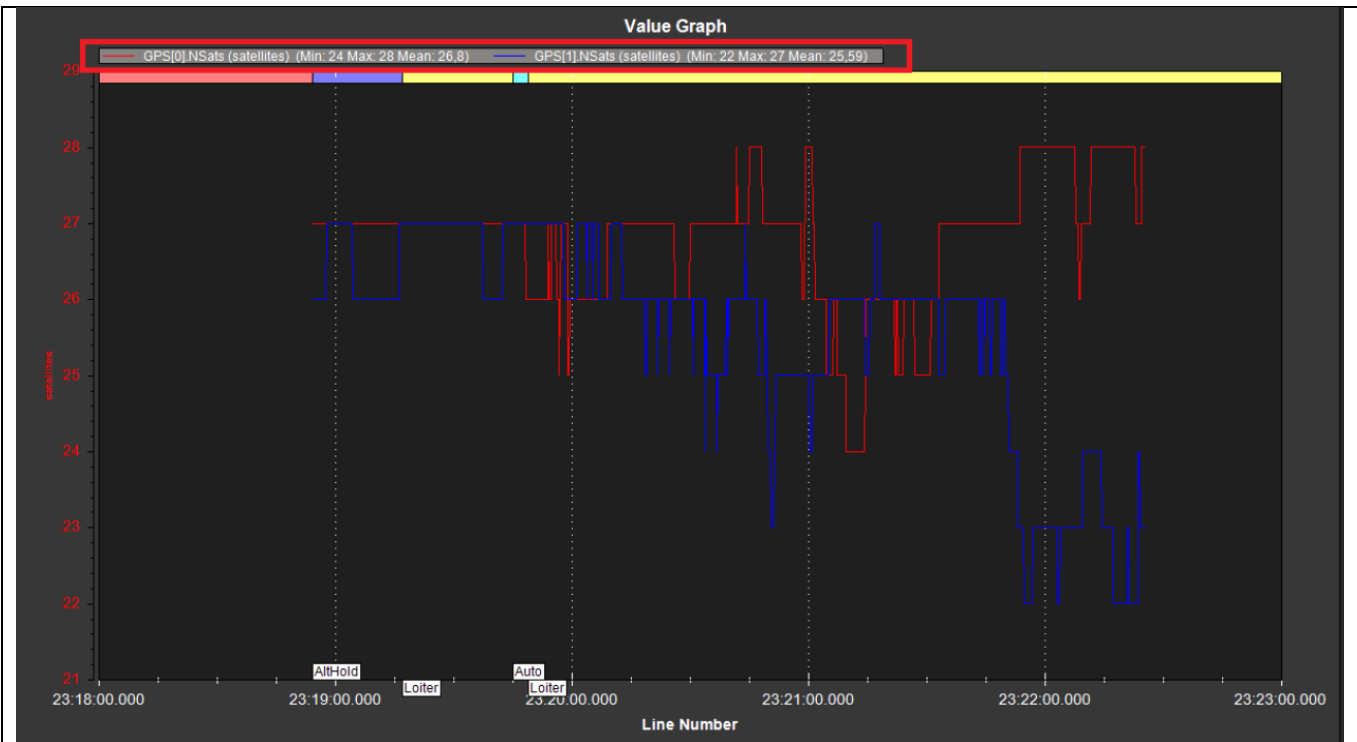


Figure 4: The flight log shows that the UAS had more than 20 satellites in view during the flight. (Source: Operator)

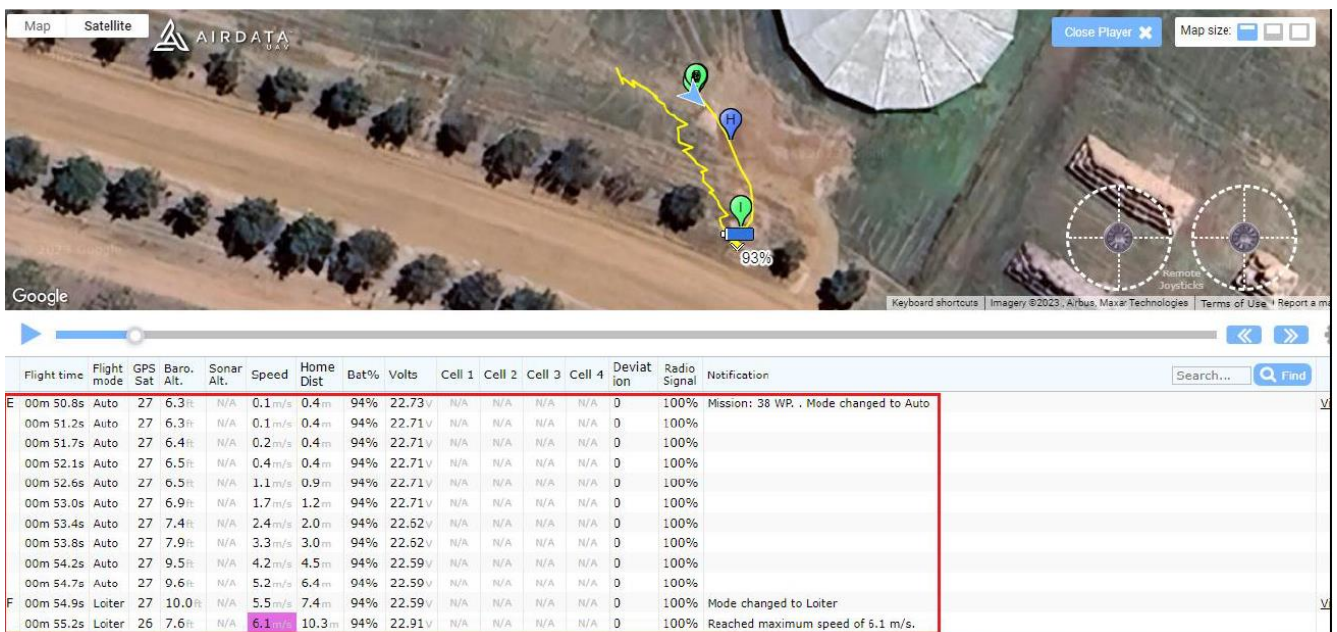


Figure 5: The flight log shows that the pilot switched back to 'Loiter' mode before the accident. (Source: Operator)

Findings

- The pilot was issued a Remote Pilot Licence (RPL) with visual line of sight (VLOS) and beyond visual line of sight (BVLOS) ratings on 26 September 2022 with an expiry date of 30 September 2024.
- His Class 3 medical certificate was issued on 27 August 2022 with an expiry date of 31 August 2026 with no medical restrictions.

- The operator was issued a Remotely Piloted Aircraft Systems Operating Certificate (ROC) on 31 October 2022 with an expiry date of 31 October 2023.
- The operator was initially issued a Remotely Piloted Aircraft Systems Letter of Approval (LOA) on 7 November 2022 with an expiry date of 6 November 2023.
- The last mandatory periodic inspection (MPI) was conducted on the UAS on 14 May 2023 at 221.56 total hours with the expiry date of 14 November 2023 or at 296.56 hours. The aircraft had accumulated a further 61.01 airframe hours since the said MPI. The UAS GPS defect was recorded on 9 June 2023 prior to the accident flight. The GPS had failed, and the defect was rectified on the same day, and signed out on the job card.
- The flight log showed that the UAS had more than 20 satellites in view during the flight.
- The UAS was registered to the present owner on 18 August 2022.
- The pilot switched to “Loiter” mode without choosing the start waypoint or conducting a proper pre-flight check. The UAS drifted towards a tree and impacted it.

Probable Cause

The UAS was configured incorrectly for the flight and, after the pilot switched to “Loiter” mode, the UAS drifted towards a tree and impacted it.

Contributing Factor

Poor pre-flight check.

Safety Action(s)

None.

Safety Recommendation

To avoid injury and damage to property, UAS pilots should ensure proper pre-flight checks by correctly configuring the UAS prior to launch.

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**