SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10298						
Classification	Serious Incident		**Date**	30 April 2023		**Time**	0050Z
Type of Operation	Remotely Piloted Aircraft Systems – Surveillance (Part 101)						
Location							
Place of Departure	Vryheid, KwaZulu-Natal Province		Place of Intended Landing	Vryheid, KwaZulu-Natal Province			
Place of Occurrence	Vryheid, KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	27°48'3.78" S	Longitude	30°44'33.75" E		Elevation	3789 ft
Aircraft Information							
Registration	ZT-XNI						
Make; Model; S/N	Arace Industrial Solutions; Sirin (Serial Number: SRI0032)						
Damage to Aircraft	Substantial			Total Aircraft Hours	656		
Pilot-in-command							
Licence Type	Remote Pilot Licence (RPL)		Gender	Female		Age	28
Licence Valid	Yes	Total Hours	499.85	Total Hours on Type	499.85		
Total Hours Past 30 Days	148.24		Total Flying Hours on Type Past 90 Days	148.24			
People Controlling	1	**Injuries** 0	**Fatalities**	0	**Other (on ground)**	0	

What Happened

On Sunday morning, 30 April 2023 at approximately 0050Z, a Remotely Piloted Aircraft (RPA) Arace Sirin with registration ZT-XNI was engaged in railway surveillance when the incident occurred. The flight 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.

According to the pilot, she conducted a pre-flight inspection on the RPA with no anomalies observed. The RPA was launched at approximately 0030Z with 98% battery power, and stability was obtained at a satisfactory height and, thereafter, the RPA commenced with the operation. According to the pilot, the RPA was on a return flight at approximately 0050Z and, after the RPA made a turn, about 8km from the launch station, the remote controller unit screen froze, and the command-and-control link disconnected from the RPA. The pilot engaged the navigational lights to have the visual of the RPA but without success. Also, the failsafe mode did not come into effect, and thus, the RPA did not return to home as programmed.

The pilot drove to the RPA's last known location that was recorded in the remote controller unit; she

found it crashed with substantial damage to the propeller blades and landing gear. No person was injured on the ground.

The accident occurred during the night at Global Positioning System (GPS) co-ordinates determined to be 27°48'3.78" South, 30°44'33.75" East at an elevation of 3789 feet (ft).

Figure 1: The crash site. (Source: Pilot)

Figure 2: The RPA post-accident. (Source: Pilot)

The following information is an extract from www.araceuas.com/sirin

The Sirin can be airborne up to 85 minutes and cover more than 40 kilometres (km) 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 3-4x as much a traditional LiPo batteries which is what is used on most commercially available drones.

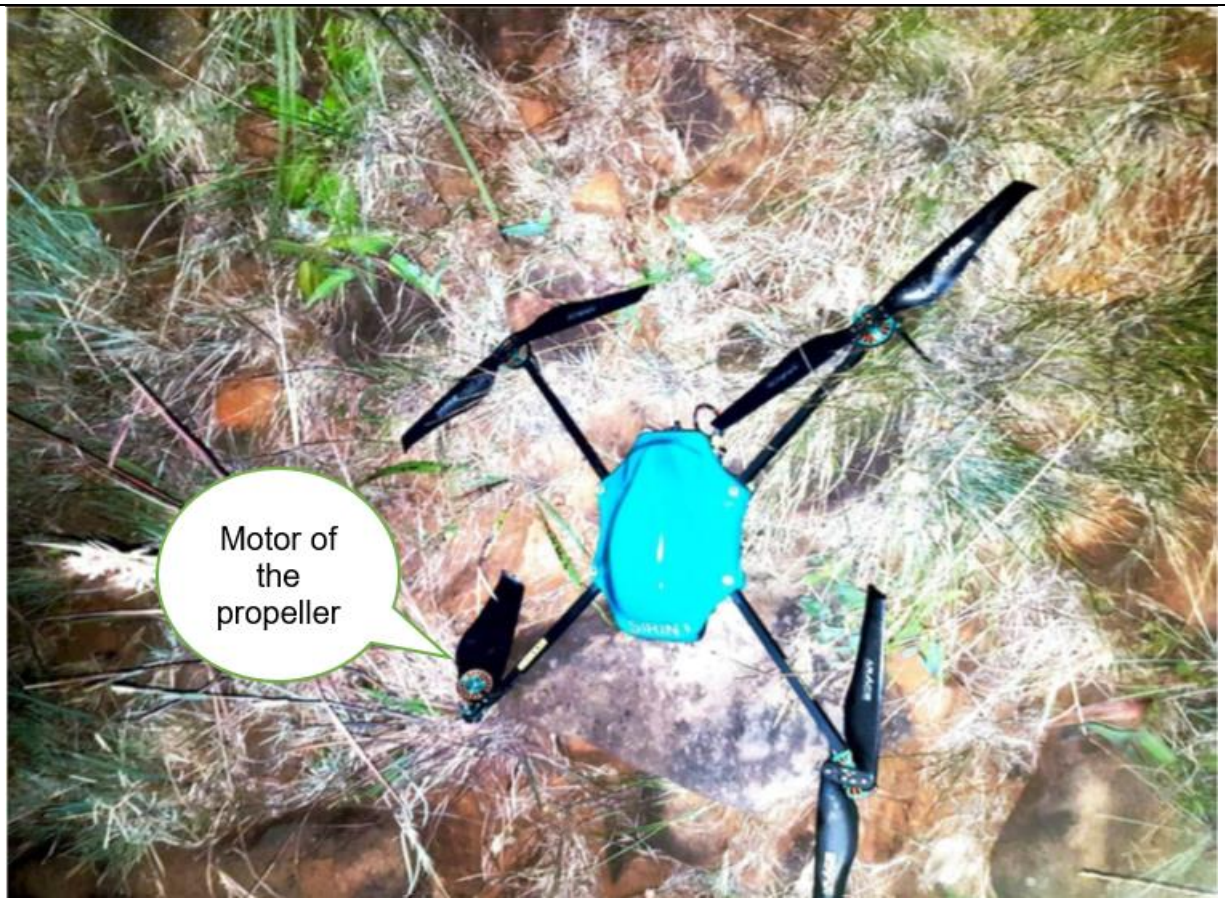

Figure 3: The RPA post-accident. (Source: Pilot)

The sequence of events

Post-accident log analysis report was reviewed by the operator, and it revealed the following:

At 00:19 UTC: The pilot armed the aircraft in ‘Alt hold’ and ascended to 22 feet.

At 00:19 UTC: The pilot then switched to ‘loiter’ and ascended further to 230 feet and started the operation.

At 00:38 UTC: 19 minutes into the flight, the aircraft lost communication, about 7km out and switched to return-to-launch (RTL) mode.

At 00:39 UTC: The aircraft crashed into a mountain.

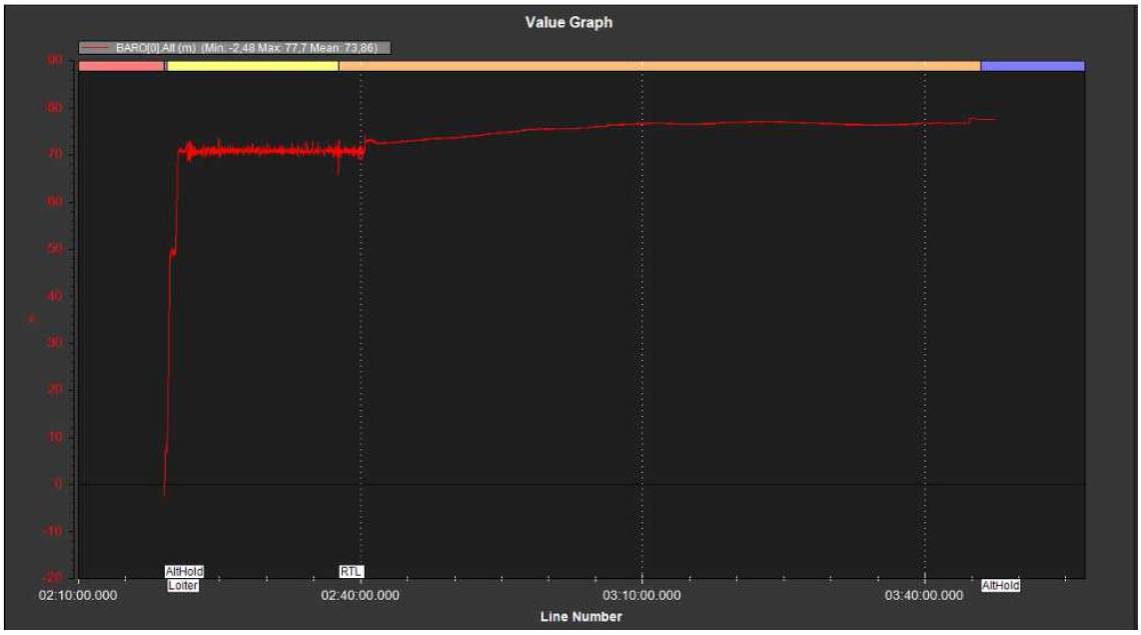

Figure 4: The data indicates that the aircraft did not descend or land.

Figure 5: The GPS was in normal range.

Findings

- The pilot was initially issued a Remote Pilot Licence (RPL) by the South African Civil Aviation Authority (SACAA) on 19 December 2022 with an expiry date of 18 December 2024. The pilot had a BVLOS rating which was issued on 7 July 2022.

- The pilot had the RPA type endorsed on her licence. The pilot had a valid Class 4 aviation medical certificate, which was issued on 22 January 2022 with an expiry date of 31 January 2023.

- The RPA was initially issued a valid Remotely Piloted Aircraft System Letter of Approval (RLA) on 27 October 2021, which was renewed on 21 September 2022 with an expiry date of 26 October 2023.

- The operator was issued a valid Remotely Piloted Aircraft System Operating Certificate (ROC) on 31 October 2022 with an expiry date of 31 October 2023.

- The operator had a valid landowner permission certificate that was issued on 14 December 2022 with an expiry date of 31 December 2023.

Probable Cause

A possible loss of command-and-control link caused the RPA to lose communication with the pilot's controller unit.

Contributing Factor

None.

Safety Action(s)

None.

Safety Message

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

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