SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10268					
Classification	Accident	**Date**	24 February 2023	**Time**	2157Z	
Type of Operation	Remotely Piloted Aircraft System – Surveillance (Part 101)					
Location						
Place of Departure	Pullens Hope, Mpumalanga Province	**Place of Intended Landing**	Pullens Hope, Mpumalanga Province			
Place of Occurrence	Hendrina Power Station, Mpumalanga Province					
GPS Co-ordinates	Latitude	26° 1'37.58"S	Longitude	29°36'12.00"E	Elevation	5235.2ft
Aircraft Information						
Registration	ZT-XXN					
Make; Model; S/N	Arace Sirin (Serial number: SIR 0078)					
Damage to Aircraft	Substantial		Total Aircraft Hours	365.51		
Pilot-in-command						
Licence Type	Remote Pilot Licence (RPL)		Gender	Male	Age	23
Licence Valid	Yes	Total Hours	670.27	Total Hours on Type	667.35	
Total Hours Past 30 days	63.14		Total Hours on Type Past 90 days	155.32		
People Controlling	1	**Injuries**	0	**Fatalities**	0	**Other (on ground)** 0

What Happened

On 24 February 2023, an Arace Sirin remotely piloted aircraft (RPA) with registration ZT-XXN was launched for a surveillance operation at Pullens Hope in Mpumalanga province when the accident occurred. The flight was conducted beyond visual line of sight (BVLOS) by night and under the provisions of Part 101 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that after completing his pre-flight checks which were normal, he radioed another RPA pilot in the area to confirm their operating level. The RPA was set-up to return to launch position should it lose signal. At 2134Z, the RPA was launched to 300 feet (ft) above ground level (AGL) with 100% battery power. The RPA flew along the railway line for approximately 3 kilometres (km) and, after following a curve along the railway line, it lost signal. The pilot refreshed the controller unit after it had lost signal but with no success. Approximately 10 seconds later, he got into the car and drove towards the direction of the RPA with the hope of re-establishing the connection. The pilot also contacted the Dispatch division to confirm if the RPA was returning to launch. However, the Dispatch division was not tracking the RPA; they only gave the pilot the last known position. The RPA search yielded no positive results as it was nighttime; however, it was found inside one of the power station's cooling towers the following morning. According to Hendrina Power Station, the height of the cooling

tower is 116m (371 ft) and the base diameter is 80 metres (m) (256 ft). The RPA sustained substantial damage. No injuries were reported during this accident.

Figure 1: ZT-XXN at the accident site. (Source: Operator)

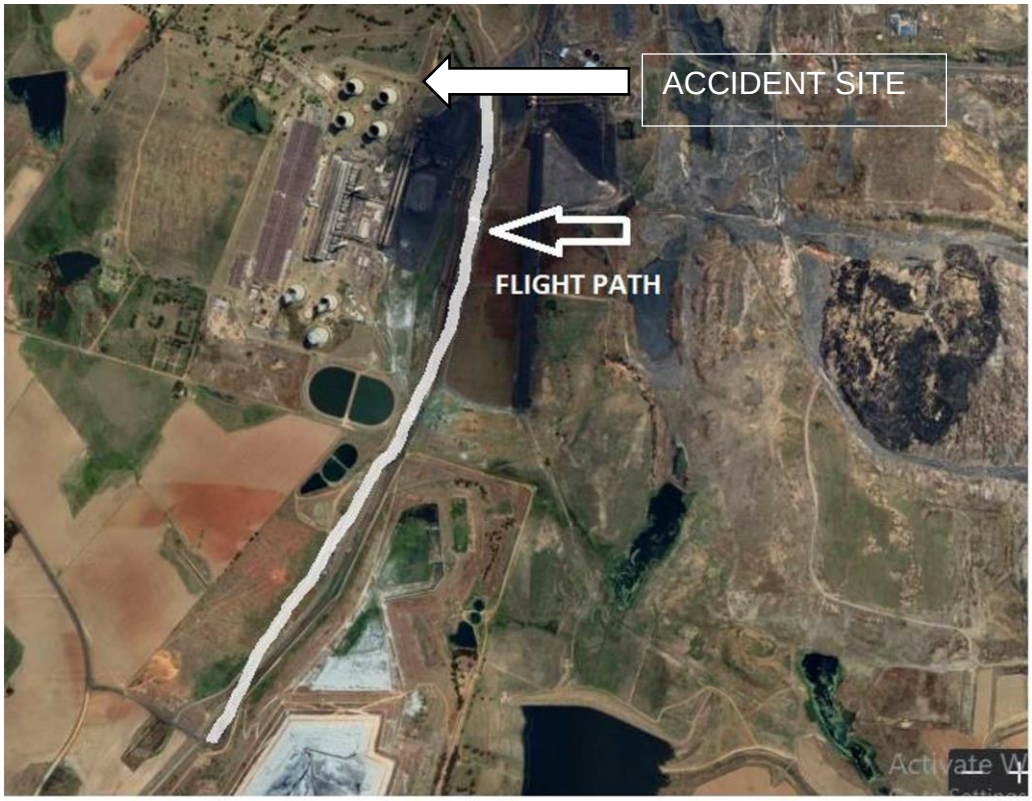

Figure 2: Aerial view of the accident site. The RPAS was flying in a northerly direction. (Source: Google Earth)

Findings

1. The pilot was issued a Remote Pilot Licence (RPL) with a beyond visual line of sight (BVLOS) rating on 21 December 2021, valid until 31 December 2023. His Class 3 medical certificate was issued on 4 December 2021 with an expiry date of 4 December 2023 and with distant vision correction eyewear restriction.

2. The Mandatory Periodic Inspection (MPI) carried out on the RPA prior to the accident was conducted on 9 December 2022 at 354.19 airframe hours. The RPA operated a further 11.40 hours after the inspection. The next MPI was due at 429.19 airframe hours.

3. The RPA was issued a Remotely Piloted Aircraft Systems Letter of Approval (RLA) on 12 April 2022 with an expiry date of 11 April 2023.

4. As per the pilot questionnaire, the weather was as follows: surface wind, north-westerly at 3 to 5 knots; temperature, 19°C; clouds, few (no level mentioned); visibility, greater than 10km.

5. The operator was issued an RPAS Operating Certificate (ROC) with an endorsement of Part 101 by the Regulator (SACAA) on 31 October 2022 with an expiry date of 31 October 2023.

6. The operator found that the pilot erred because he flew the RPA behind the cooling towers and, thus, it disconnected and switched to return-to-launch mode (RTL). The RTL flight is programmed to take a straight line back to launch location. In this instance, the RPA's RTL flight path cut through the cooling tower to reach launch location. The RTL altitude was set to 93.7m (300 feet), this caused the RPA to collide with the cooling tower.

Probable Cause

The RPA lost signal with the controller unit as it was flown behind the cooling towers which resulted in the RPA engaging a RTL mode; however, the programmed straight line RTL path cut through the cooling towers, and this led to the impact.

Contributing Factors

The RPA's flight path followed the railway line which curved behind the cooling towers, this led to the RPA engaging an RTL mode after losing signal, and thus, the subsequent impact with the tower.

Safety Action

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

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