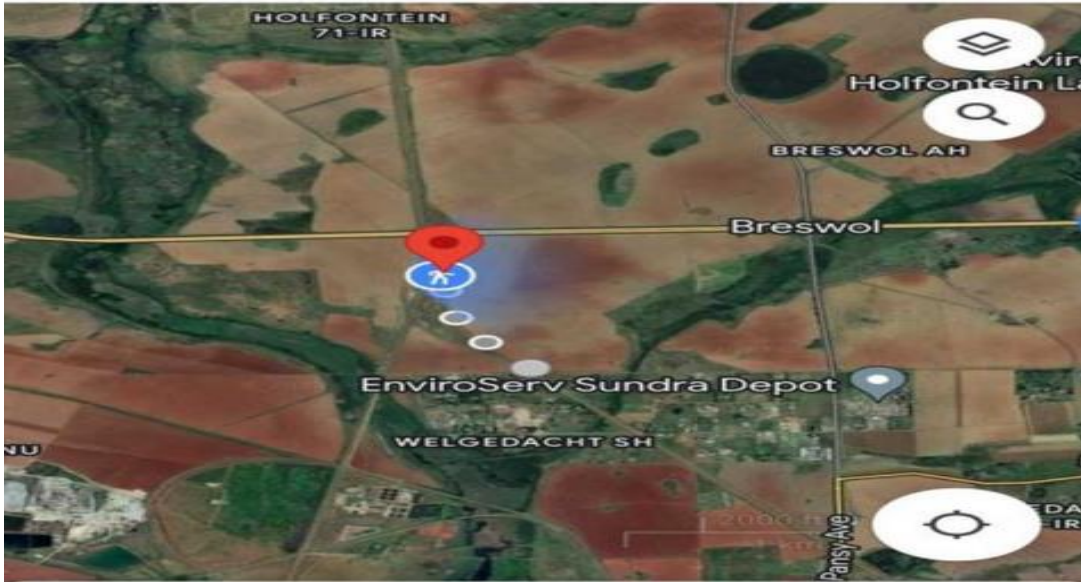


**UAS LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL**

<b>Reference Number</b>	CA18/2/3/10313						
<b>Classification</b>	Accident	<b>Date</b>	28 May 2023		<b>Time</b>	1802Z	
<b>Type of Operation</b>	Unmanned Aircraft System – Surveillance (Part 101)						
<b>Location</b>							
Place of Departure	Welgedacht near Springs, Gauteng Province		Place of Intended Landing	Welgedacht near Springs, Gauteng Province			
Place of Occurrence	Welgedacht near Springs, Gauteng Province						
GPS Co-ordinates	Latitude	26°12'43.91"S	Longitude	28°30'04.08"E	Elevation	5 237ft	
<b>Aircraft Information</b>							
Registration	ZT-XDT		Class	3A			
Make; Model; S/N	Arace Sirin (Serial Number: SIR0004)						
Damage to Aircraft	Substantial		Total UAS Hours	1460.36			
<b>Pilot-in-command</b>							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male	Age	22	
Licence Valid	Yes	Total Hours	166.02	Total Hours on Type	166.02		
Total Hours 30 Days	27.6		Total Flying on Type Past 90 Days	82.9			
<b>People Controlling</b>	1	<b>Injuries (On ground)</b>	0	<b>Fatalities</b>	0	<b>Fatalities (on ground)</b>	0
<b>What Happened</b>							
<p>On Sunday night, 28 May 2023, an unmanned aircraft system (UAS) with registration ZT-XDT was engaged in a surveillance flight over Transnet railway lines at Welgedacht near Springs, Gauteng province, when the accident occurred. 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 at 1726Z with 99% battery voltage and 60 minutes endurance. The pilot reported that he engaged the Loiter mode (manually operated) and climbed to 400 feet (ft) above ground level (AGL) for surveillance for approximately 9 kilometres (km) over a 36-minute period. When the battery voltage dropped to 29%, the pilot decided to bring in the UAS for landing so as to change the battery. Whilst flying the UAS back, the pilot was fatigued and he struggled to keep his eyes open and eventually fell asleep. Later when he woke up, he could not locate the UAS on his remote pilot station unit. The pilot contacted the dispatcher to ask for a pin drop of the UAS's last location. The pilot and the security official tracked the UAS from the last recorded location, which was approximately 2 kilometres from the launch site. They found it crashed on the ground, and the two landing legs were broken.</p>							

There was no reported damage to property or injury to personnel on the ground.

According to available information, the pilot was working from 17h00Z to 01h00Z, six days a week, followed by a five-day rest. During the change-over shift (day to night shift or vice versa) the pilot received a day's rest. On the day of the accident, the pilot had a changeover shift, meaning that he rested for one day.



**Figure 1:** A view of the UAS's location from the launch site. (Source: Google Earth)



**Figure 2:** The UAS at the accident site. (Source: Operator)

### Findings

1. The pilot was initially issued a Remote Pilot Licence (RPL) by the Regulator (SACAA) on 8 November 2022 with an expiry date of 31 November 2023. The pilot had a visual line of sight (VLOS) and a beyond visual line of sight (BVLOS) ratings which were endorsed on his licence. The pilot conducted a skills test for BVLOS rating on 7 November 2022.
2. The pilot's Class 3 medical certificate was issued on 27 August 2022 with an expiry date of 31 August 2026.
3. The UAS's mandatory periodic inspection (MPI) was certified on 20 May 2023 at 1412.31 total airframe hours with an expiry date of 20 November 2023 or at 1660.36 airframe hours, whichever occurs first. At the time of the accident, the RPA had accumulated 1460.36 airframe hours. The UAS was flown a further 48.05 airframe hours since the last MPI. The MPI is conducted every six months or at 200 hours.
4. The UAS's Certificate of Registration (C of R) was issued to the current owner on 29 April 2021.
5. The UAS was issued an Unmanned Aircraft Systems Letter of Approval (UASLOA) by the Regulator on 6 August 2021 with an expiry date of 5 August 2023.
6. The operator had an UAS Operating Certificate (UASOC) that was issued by the Regulator on 31 October 2022 with an expiry date of 31 October 2023.
7. According to the operating specifications certificate, ZT-XDT was a class 3A UAS.
8. The investigation found that the UAS was airworthy, and that the battery voltage was sufficient for the UAS to return to the launch site.

9. The investigation concluded that the pilot had not rested enough prior to reporting for duty, which resulted in him being fatigued and falling asleep, and thus, the UAS ran out of battery power and crashed.
<b>Probable Cause</b>
The pilot fell asleep whilst flying the UAS and, thus, the battery depleted as the UAS was not monitored. The UAS subsequently crashed.
<b>Contributing Factor</b>
The pilot was fatigued and fell asleep.
<b>Safety Action(s)</b>
None.
<b>Safety Message and/or Safety Recommendation/s</b>
None.
<b>About this Report</b>
<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>
<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>
<b>Purpose</b>
<i>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.</i>
<b>Disclaimer</b>
<i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i>

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