

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10267						
Classification	Accident	Date	11 January 2023		Time	2052Z	
Type of Operation	Remotely Piloted Aircraft System – Surveillance (Part 101)						
Location							
Place of Departure	Transnet, Camperdown, KwaZulu-Natal Province		Place of Intended Landing	Transnet, Camperdown, KwaZulu-Natal Province			
Place of Occurrence	Transnet grounds in Camperdown, KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	29° 43' 8.51" S	Longitude	30° 29' 37.14" E	Elevation	2713 ft	
Aircraft Information							
Registration	ZT-XOM						
Make; Model; S/N	UAV & Drone Solutions; Condor (Serial Number: CON0009)						
Damage to Aircraft	Substantial			Total Aircraft Hours	1.5		
Pilot-in-command							
Licence Type	Remote Pilot Licence (RPL)		Gender	Male		Age	28
Licence Valid	Yes	Total Hours	3052.4		Total Hours on Type	0.25	
Total Hours Past 90 Days	112.2		Total Flying Past 90 Days on Type	0.25			
People Controlling	1	Injuries	0	Fatalities	0	Other (on ground)	0
What Happened							
<p>On 11 January 2023, a remotely piloted aircraft (RPA) with registration ZT-XOM was engaged in a surveillance flight at a Transnet facility in Camperdown, KwaZulu-Natal province. Visual meteorological conditions (VMC) by night prevailed at the time of the flight which 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 reported that he configured the RPA for the first flight of the night and, thereafter, conducted a pre-flight inspection and created a waypoint. He then selected the vertical take-off and landing (VTOL) mode on the RPA unit controller and launched it. The RPA climbed to 145 feet (ft) above ground level (AGL). Twenty three (23) seconds later and approximately 2 metres (m) north of the pilot's position, the RPA motors (throttle) disarmed, and the RPA descended uncontrollably to the ground and crashed.</p> <p>The RPA sustained substantial damage; there was no reported injury to persons or damage to property.</p>							



Figure 1: The RPA at the accident site. (Source: Operator)



Figure 2: Aerial view of the accident site. (Source: Google Earth)

The weather information below was obtained from the Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS) on 11 January 2023 at 2100Z, recorded at Pietermaritzburg Airport (FAPM) which is 6 nautical miles (nm) north-west of the accident site.

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Wind Direction	110°	Wind Speed	2kts	Visibility	9999m
Temperature	22°C	Cloud Cover	CAVOK	Cloud Base	CAVOK
Dew Point	21°C	QNH	1018hPa		

Findings

1. The pilot was issued a Remote Pilot Licence (RPL) with visual line of sight (VLOS) and beyond visual line of sight (BVLOS) ratings on 14 April 2021 with an expiry date of 30 April 2023. His Class 3 medical certificate was issued on 25 January 2021 with an expiry date of 31 January 2025. The pilot had a medical restriction to wear corrective lenses.
2. On 28 December 2022, the pilot operated the Condor RPA for 0.25 hours as a trainee pilot in which he conducted a check ride together with the pilot-in-command (instructor). The next flight that the pilot undertook in which he operated the Condor RPA was the accident flight. The accident occurred shortly after take-off.
3. The operator had a Remotely Operated Aircraft System Operating Certificate (ROC) which was issued on 31 October 2022 with an expiry date of 31 October 2023. The approved operation specifications included aerial patrol and survey (G3) for night operations.
4. The RPA was issued a RPAS Letter of Approval (RLA) on 7 July 2022 with an expiry date of 6 July 2023.
5. The RPA had 1.5 flight hours at the time of the accident, therefore, a mandatory periodic inspection (MPI) had not yet been carried out.
6. Post-accident log analysis report (Source: Manufacturer)

Figure 3 below depicts the flight of the unmanned aircraft system:

At 7 minutes and 8 seconds the throttle was armed, 3 seconds later the unmanned aircraft system took off in VTOL mode and finally at 7 minutes and 34 seconds the throttle was disarmed.

	Flight time	Altitude	Home Dist	Type	Notification
A	<u>00m 24s</u>	1.0 ft	0 m	Mode	Mode changed to Throw
B	<u>00m 34s</u>	0.4 ft	0 m	Tip	EKF3 IMU0 origin set. EKF3 IMU1 origin set
C	<u>00m 39s</u>	-0.4 ft	0 m	Tip	EKF3 IMU1 is using GPS. EKF3 IMU0 is using GPS. AHRS: EKF3 active
D	<u>01m 27s</u>	-0.4 ft	1 m	Tip	Updating barometer calibration. Barometer calibration complete
E	<u>02m 21s</u>	-0.2 ft	1 m	Tip	Flight plan received
F	<u>02m 21s</u>	-0.6 ft	1 m	Tip	New mission. QuadPlane Frame: QUAD/X. GPS 1: specified as UAVCAN1-125
G	<u>05m 27s</u>	-0.2 ft	1 m	Tip	PreArm: Battery 1 below minimum arming voltage
H	<u>07m 08s</u>	0.2 ft	2 m	Tip	Throttle armed
I	<u>07m 11s</u>	-2.3 ft	2 m	Mode	Mode changed to 10
J	<u>07m 11s</u>	-2.3 ft	2 m	Tip	Mission: 1 VTOLTakeoff
K	<u>07m 34s</u>	145.3 ft	2 m	Tip	Throttle disarmed
L	<u>07m 37s</u>	-107.9 ft	7 m	Mode	Mode changed to Throw

Figure 3: Log analysis chart. (Source: Manufacturer)

Probable Cause(s)

The throttle was inadvertently disarmed shortly after take-off and the RPA descended uncontrollably to the ground.

Contributing Factor(s)

Inadequate experience on the RPA type.

Safety Action(s)

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

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