**PRELIMINARY ACCIDENT REPORT**

## Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10518


**Figure 1:** The file picture of the ZU-RGR aircraft. (Source: The rescue team)

Description:

On Tuesday morning, 15 October 2024, a pilot on-board a Magni Gyro M-24 aircraft with registration ZU-RGR took off on a private flight from Nelspruit Airport (FANS) in Mbombela, Mpumalanga province, to Musina Aerodrome (FAMH) in Limpopo province. Reports revealed that the aircraft departed FANS at 0630Z but did not reach the destined aerodrome (FAMH) at the expected time. In the afternoon, a pilot's family member called him (the pilot) on his mobile phone but there was no response. The family member then called the aircraft operators at FAMH to enquire if ZU-RGR had landed at the aerodrome; the response was negative. On Wednesday, 16 October 2024, the pilot's family member notified the Aeronautical Rescue Coordination Centre (ARCC) office in Johannesburg (JHB) about the missing aircraft, as well as shared the last known location of the aircraft which was captured on her mobile phone during the last call with the pilot; the location was recorded at 0730Z on 15 October 2024. On Thursday, 17 October 2024, the ARCC officials initiated the official search and rescue operation which involved the South African Police Service (SAPS) Airwing and Drone Unit from Pretoria, a volunteer Search and Rescue Unit (V45 SARZA) from Tzaneen in Limpopo province, local private aircraft operators, and a private security company in Louis Trichardt, Limpopo province. Around 1400Z on 17 October 2024, the SAPS drone pilot spotted the wreckage near the top of Hanglip Mountain in Louis Trichardt. The aircraft had crashed and was destroyed by post-impact fuel-fed fire. The pilot was fatally injured.

## Occurrence Details

| | |
|---|---|
| **Reference Number** | **:** CA18/2/3/10518 |
| **Occurrence Category** | **:** Accident Category 1 |
| **Type of Operation** | **:** Private (Part 94) |
| **Name of Operator** | **:** Gerhard Cornelius Minnaar |
| **Aircraft Registration** | **:** ZU-RGR |
| **Aircraft Make and Model** | **:** Magni Gyro; M-24 Orion |
| **Nationality** | **:** South African |
| **Place** | **:** Hanglip Mountain in Louis Trichardt |
| **Date and Time** | **:** 15 October 2024 at 0730Z |
| **Injuries** | **:** Fatal |
| **Damage** | **:** Destroyed |

## Purpose of the Investigation

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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.*

*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.*

## Investigation Process

The Accident and Incident Investigations Division (AIID) was notified of the occurrence involving a Magni Gyro M-24 Orion which occurred near the top of Hanglip Mountain in Louis Trichardt, Limpopo province, on 15 October 2024. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and the ICAO Annex 13. The information contained in this preliminary report is derived from the information gathered during the on-going investigation into the occurrence. Later, an interim or final report may contain altered information in case new evidence is found during the on-going investigation that requires changes to the information depicted in this report.

*The AIID reports are made available to the public at:*
https://www.caa.co.za/industry-information/accidents-and-incidents/
*Notes:*

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   *Accident — this investigated accident*
   *Aircraft — the Magni Gyro M-24 Orion involved in this accident*
   *Investigation — the investigation into the circumstances of this accident*
   *Pilot — the pilot involved in this accident*
   *Report — this accident report*

2. *Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

3. **Disclaimer**

   

## Table of Contents

| Abbreviation | Description |
|---|---|
| ° | Degrees |
| °C | Degrees Celsius |
| a/c | Aircraft |
| AIID | Accident and Incident Investigations Division |
| ARCC | Aeronautical Rescue Coordination Centre |
| AGL | Above Ground Level |
| AMSL | Above Mean Sea Level |
| ATF | Authority-to-fly |
| CAR | Civil Aviation Regulations |
| C of A | Certificate of Airworthiness |
| C of R | Certificate of Registration |
| CRS | Certificate of Release to Service |
| CVR | Cockpit Voice Recorder |
| ELT | Emergency Locator Transmitter |
| FAPP | Polokwane Airport |
| FANS | Nelspruit Airport |
| FAMN | Musina Aerodrome |
| FATZ | Tzaneen Aerodrome |
| FALO | Louis Trichardt Airfield |
| FDR | Flight Data Recorder |
| Ft | Feet |
| GPS | Global Positioning System |
| JHB | Johannesburg |
| IAW | In Accordance With |
| ICAO | International Civil Aviation Organisation |
| IIC | Investigator-in-Charge |
| Km/h | Kilometres per Hour |
| Kt/s | Knot/s |
| Lbs | Pounds |
| L | Litres |
| M | Metres |
| MM | Millimetres |
| METAR | Meteorological Aerodrome Report |
| IMC | Instrument Meteorological Condition |
| QNH | Query: Nautical Height |
| RWY | Runway |
| SACAA | South African Civil Aviation Authority |
| SAPS | South African Police Service |
| SAWS | South African Weather Service |
| POH | Pilot’s Operating Handbook |
| PPL | Private Pilot Licence |
| SP | Student Pilot |
| TAF | Terminal Area Forecast |
| TBA | To Be Announced |
| TBO | Time Between Overhaul |
| TTSN | Total Time Since New |
| UTC | Co-ordinated Universal Time |
| VHF | Very High Frequency |
| VMC | Visual Meteorological Conditions |

| | |
|---|---|
| VDL | Corrective Lenses for Defective Distant Vision |
| Z | Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich) |

## 1. FACTUAL INFORMATION

### 1.1. History of Flight

1.1.1. On Tuesday morning, 15 October 2024, a pilot on-board a Magni Gyro M-24 aircraft with registration ZU-RGR was conducting a private flight from Nelspruit Airport (FANS) in Mbombela, Mpumalanga province, to Musina Aerodrome (FAMH) in Limpopo province. No flight plan was filed. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2. A witness who saw the aircraft before departure at FANS on Tuesday morning, 15 October 2024, stated that visibility was limited due to the fog in the area. The pilot taxied the aircraft to the threshold of Runway 22 and performed the pre-departure checks. Around 0630Z, the aircraft departed from FANS and headed in the direction of White River. In the afternoon of the same day, a pilot's family member called him (the pilot) on his mobile phone but there was no response. The family member later called the aircraft operators at FAMH to enquire if the ZU-RGR had landed at FAMH; the response was negative. On Wednesday, 16 October 2024, the pilot's family member notified the Aeronautical Rescue Coordination Centre (ARCC) office in Johannesburg (JHB); she also shared the last known location of the aircraft which was captured on her mobile phone during the last call with the pilot which was at 0730Z on 15 October 2024.

1.1.3. On Thursday, 17 October 2024, the ARCC initiated the official search and rescue operation which involved the South African Police Service (SAPS) Airwing and Drone Unit from Pretoria, a volunteer Search and the Rescue Unit (V45 SARZA) from Tzaneen in Limpopo province, local private aircraft operators, and a local private security company from Louis Trichardt in Limpopo province. Around 1400Z, the wreckage was spotted by the SAPS drone pilot near the top of Hanglip Mountain in Louis Trichardt, approximately 4 nautical miles (nm) south-west of Louis Trichardt Civil Airfield (FALO). Photographs taken by the drone pilot showed that the aircraft had crashed and was consumed by the fire. The drone pilot later searched for a suitable spot for the rescue team to land and commence with the recovery operation. On Saturday morning, 19 October 2024, the SAPS Squirrel helicopter departed Pretoria to Louis Trichardt. The Squirrel helicopter crew was joined by the V45 SARZA team and the investigator-in-charge (IIC) on a flight to the accident site. The V45 SARZA team and the IIC were hoisted down to the accident scene as it was inaccessible by road. The team found that the aircraft was destroyed by impact forces and the post-impact fuel-fed fire. The pilot was fatally injured.

1.1.4. Locals near the accident site at Louis Trichardt stated that there were low clouds in the morning of 15 October 2024 around the accident time, and that visibility was limited. Some of the locals recalled seeing a small aircraft heading in the direction of the mountain. The aircraft made a few turns before the engine sound went silent. None of

the locals recalled an impact sound, however, some stated that they had seen smoke later that day near the top of Hanglip Mountain which persisted until the arrival of the V45 SARZA team. The V45 SARZA team leader at the scene notified his organisation (SARZA) about the fire after which the Working on Fire company was contracted. The Working on Fire management dispatched a spotter aircraft and a helicopter to the accident site; the helicopter dropped about 18 buckets of water to put out the fire. The fire was contained but a large part of the site was already burnt.

1.1.5. The accident occurred during daytime at Global Positioning System (GPS) co-ordinates determined to be 22°59' 38.6" South 29°54' 19.9" East, at an elevation of 4 770 feet (ft).


**Figure 2**: The accident site and Louis Trichardt Civil Airfield (FALO). (Source: Google Earth)

## 1.2. Injuries to Persons

| Injuries | Pilot | Crew | Pass. | Total On-board | Other |
|---|---|---|---|---|---|
| Fatal | 1 | - | - | 1 | - |
| Serious | - | - | - | - | - |
| Minor | - | - | - | - | - |
| None | - | - | - | - | - |
| **Total** | **1** | **-** | **-** | **1** | **-** |

Note: Other means people on the ground.

## 1.3. Damage to Aircraft

1.3.1 The aircraft was destroyed by impact forces and the post-impact fuel-fed fire.


**Figure 3:** The wreckage with the tail number still visible. (Source: ARCC)

## 1.4. Other Damage

1.4.1. None.

## 1.5. Personnel Information

| | | | | | |
|---|---|---|---|---|---|
| Nationality | South African | Gender | Male | Age | 52 |
| Licence Type | National Pilot Licence (NPL) | | | | |
| Licence Valid | Yes | Type Endorsed | Yes | | |
| Ratings | None | | | | |
| Medical Expiry Date | 28 February 2026 | | | | |
| Restrictions | Suitable corrective lenses for defective distant vision (VDL) | | | | |
| Previous Accidents | TBA | | | | |

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

**Flying Experience:**

| | |
|---|---|
| Total Hours | 938.0 |
| Total Past 24 Hours | To be discussed in the final report |
| Total Past 7 Days | To be discussed in the final report |
| Total Past 90 Days | To be discussed in the final report |
| Total on Type Past 90 Days | To be discussed in the final report |
| Total on Type | To be discussed in the final report |

1.5.1. The pilot's logbook was unavailable at the time of drafting of this preliminary report, therefore, the pilot's flying hours at the time of the accident flight could not be determined. The approximate hours shown above were obtained from the pilot's file which were kept

at the Regulator's (SACAA) premises. The hours were recorded during the pilot's licence renewal on 25 February 2023.

1.5.2. The pilot was initially issued a National Pilot Licence (NPL) on 27 November 2014 in accordance with (IAW) Part 61 of the CAR 2011. The licence was revalidated on 25 February 2023 with an expiry date of 24 February 2025.

1.5.3. The pilot was issued a Class 4 medical certificate on 23 February 2023 with an expiry date of 24 February 2026 with a restriction to wear suitable corrective lenses for defective distant vision (VDL).

## 1.6. Aircraft Information

1.6.1. Aircraft Description (Source: Pilot Operating Handbook [POH])

*The Magni Gyro M-24 Orion is a two seat, side-by-side, enclosed cockpit aircraft powered by a 115 horsepower (hp) Rotax 914-UL turbocharged piston engine driving a 3-bladed Ecoprop GL-3 ground adjustable propeller, and a 2-bladed rotor mounted on a mast above the pod. The aircraft is certified for day operation only and under VFR. The maximum operating altitude of the aircraft is 13 000ft density altitude and maximum take-off weight is 450 kilograms (kg) / 992 pounds (lbs). The aircraft comprises 82 litres (l) fuel tank capacity, providing 4 hours of flight endurance at a cruise speed of between 120 and 150 kilometres per hour (km/h).*

**Airframe:**

| | | |
|---|---|---|
| Manufacturer/Model | Magni Gyro / Orion M-24 | |
| Serial Number | 24169574 | |
| Year of Manufacture | 2016 | |
| Total Airframe Hours (At Time of Accident) | TBA | |
| Last Annual Inspection (Date & Hours) | 25 March 2024 | 610.6 |
| Hours Since Last Inspection | TBA | |
| CRS Issue Date | 25 March 2024 | |
| ATF (Issue Date & Expiry Date) | 2 May 2024 | 31 March 2025 |
| C of R (Issue Date) (Present Owner) | 26 September 2024 | |
| Type of Fuel Used | Avgas 100LL | |
| Operating Category | Part 94 | |
| Previous Accidents | TBA | |

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

Note*: The total airframe hours at the time of the accident and the hours flown since the last annual inspection could not be determined because the Hobbs meter and Tachometer, as well as the flight folio were destroyed by the post-impact fire during the accident sequence.

**Engine:**

| | |
|---|---|
| Manufacturer/Model | Rotax / 914-UL |
| Serial Number | 9575461 |
| Hours Since New | 610.6 |
| Hours Since Overhaul | TBO is 2 000 hours – TBO not reached |

**Propeller:**

| | |
|---|---|
| Manufacturer/Model | Magni / Ecoprop GL-3 |
| Serial Number | 369 |
| Hours Since New | 516.4 |
| Hours Since Overhaul | TBO is 3 000 hours - TBO not reached |

## 1.7. Meteorological Information

1.7.1. The weather information below was obtained from the South African Weather Service (SAWS). The meteorological aerodrome report (METAR) message was recorded at Polokwane Airport (FAPP) on 15 October 2024 at 0815 (local time). FAPP is the closest location to the accident site.

1.7.2 The satellite indicated low clouds with possible clouds below 10 000 feet (ft); however, the METAR recorded at FAPP indicated that the lowest clouds were 2 000ft above ground level (AGL) and scattered. This aligns with the METAR and Terminal Area Forecast (TAFs) on the day in terms of wind and temperatures, but the clouds observed were higher than what was forecasted.

| | | | | | |
|---|---|---|---|---|---|
| Wind Direction | 060° | Wind Speed | 6 kt | Visibility | Limited |
| Temperature | 11°C | Cloud Cover | OVC - FEW 2000 ft | Cloud Base | 2000ft |
| Dew Point | Nil | QNH | 1027 hPa | | |

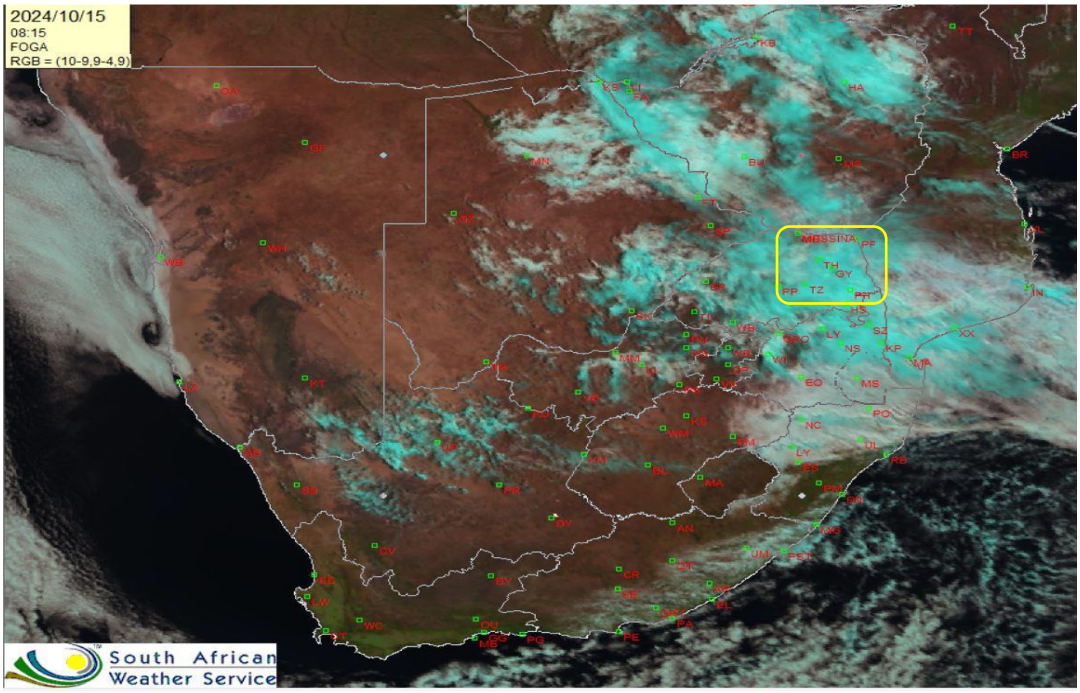


**Figure 4**: The satellite image at 08:15 (local time) on 15 October 2024.

## 1.8. Aids to Navigation

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records indicating that the navigational equipment was unserviceable prior to the flight.

## 1.9. Communication

1.9.1. The aircraft was equipped with a standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the flight.

## 1.10. Aerodrome Information

| | |
|---|---|
| Aerodrome Name | Louis Trichardt Civil Airfield (FALO) |
| Aerodrome Location | Limpopo Province |
| Aerodrome Status | Licensed |
| Aerodrome GPS coordinates | 23°3'.72" South 29°51'.89" East |
| Aerodrome Elevation | 3 025 feet |
| Runway Headings | 10 / 28 |
| Dimensions of Runway | 1 200m X 18 |
| Surface of Runway | Asphalt |
| Approach Facilities | Runway lighting |
| Radio Frequency | None |

## 1.11. Flight Recorders

1.11.1. The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the aircraft type.

## 1.12. Wreckage and Impact Information

1.12.1. The aircraft crashed near the top of Hanglip Mountain at an elevation of approximately 4 770ft. The elevation (to the top of the mountain) is 5 640ft. The aircraft initially impacted trees on the east side of the mountain at a heading of approximately 331°. It was evident that a significant amount of the energy at impact was absorbed by the canopy before the aircraft reached the ground. The aircraft was destroyed by the post-impact fuel-fed fire. Despite the extensive damage to the aircraft structure due to impact and the fire blaze, it was possible to establish that the aircraft was intact at the time of the accident. There was no evidence of any pre-impact damage to either the propeller or main rotor blades. The rudder had remained attached to the keel. The right horizontal stabiliser was undamaged, however, the left fin and the left horizontal stabiliser sustained substantial damage.


**Figure 5:** The tail section and the damaged left fin/horizontal stabiliser.

1.12.3 The fuel pump toggle switches and the ignition key were found in the “on” position; some switches had broken off. Most of the instruments were destroyed by the fire blaze. The beams supporting the pilot’s side of the seat had bent rearwards. The buckles on each of the four-point harnesses were connected and in the “locked” position and all the seat harness attachment fittings were still attached to the aircraft’s structure. The nosewheel fork had broken which was consistent with the impact force. The main landing gear beams and wheel assemblies were still attached; however, the tyres were burnt. The door frames and the windshield were destroyed by the post-impact fire.


**Figure 6:** The fuel pumps switches and the ignition key in the “on” position.

1.12.4 Before impact with the ground, one of the aircraft’s main rotor blades severed one of the tree branches at an estimated height of approximately 3 metres (m). The tree was damaged by the turning rotor, an indication that the engine was producing substantial power at the time of the accident.

1.12.5 The main rotor blade tip that hit the tree was severed. The rotor head was in place; however, one of the rods had bent slightly.

**Figure 7:** The area where a tree branch separated after it was hit by the rotating main rotor blade.

**Figure 8:** The severed tree branch.

**Figure 9:** The severed tip of the main rotor blade that hit the tree branch.

**Figure 10:** The main rotor head and the bent rod.

## 1.13. Medical and Pathological Information

1.13.1. To be discussed in the final report.

## 1.14. Fire

1.14.1. There was a post-impact fuel-fed fire that erupted and consumed a large part of the aircraft structure. The trees at the accident site were set alight by post-impact fire.

## 1.15. Survival Aspects

1.15.1. The accident was considered not survivable due to the impact damage and post-impact fuel-fed fire that compromised the structural integrity of the aircraft. The pilot was fatally injured during the accident.

1.15.2. The aircraft was not equipped with an emergency locator transmitter (ELT), and it was not a requirement IAW Part 91.04.23 (b) of the SACAA regulations.

## 1.16. Tests and Research

1.16.1. To be discussed in the final report.

## 1.17. Organisational and Management Information

1.17.1. This was a private flight that was conducted under the provisions of Part 94 of the CAR 2011 as amended.

1.17.2 The approved person (AP) who conducted the last 100-hour annual inspection of the aircraft had an Approved Person Certificate that was issued by the SACAA on 1 March 2023 with an expiry date of 28 February 2025.

## 1.18. Additional Information

1.18.1. Minimum heights:

**91.06.32** *(1) Except when necessary for taking off, or landing, or except with prior written approval of the Director, no aircraft –*

*(a) shall be flown over congested areas or over an open-air assembly of persons at a height less than 1 000 feet above the highest obstacle, within a radius of 2 000 feet from the aircraft;*

*(b) when flown elsewhere than specified in paragraph (a), shall be flown at a height less than 500 feet above the ground or water, unless the flight can be made without hazard or nuisance to persons or property on the ground or water and the PIC operates at a height and in a manner that allows safe operation in the event of an engine failure; and*

*(c) shall circle over or do repeated overflights over an open-air assembly of persons at a height less than 3 000 feet above the surface.*

1.18.2. Meteorological conditions:

***91.07.9*** *(1) On a flight, conducted in accordance with VFR, the pilot shall not commence take-off unless current meteorological reports, or a combination of current reports and forecasts, indicate that the meteorological conditions along the route, or that part of the route to be flown under VFR, shall, at the appropriate time, be such as to enable compliance with the provisions prescribed in this Part.*

*(2) A flight, to be conducted in accordance with IFR—*

*(a) shall not take-off from the departure aerodrome unless meteorological conditions, at the time of use, are at or above the operator's established aerodrome operating minima for that operator; and*

*(b) shall not take off or continue beyond the point of in-flight pointer-planning, unless at the aerodrome of intended landing or at each alternate aerodrome to be selected in accordance with regulation 91.07.7, current meteorological reports, or a combination of current reports and forecasters indicate that the meteorological conditions will be, at the estimated time of use, at or above the operator's established aerodrome operating minima for that operation.*

## 1.19. Useful or Effective Investigation Techniques

1.19.1. To be discussed in the final report.

## 2. FINDINGS

### 2.1. General

From the available evidence, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings —** are statements of all significant conditions, events, or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

### 2.2. Findings

2.2.1. The pilot was initially issued a National Licence (NPL) on 27 November 2014 IAW Part 61 of the CAR 2011. The licence was revalidated on 25 February 2023 with an expiry date of 24 February 2025.

2.2.2. The pilot was issued a Class 4 medical certificate on 23 February 2023 with an expiry date of 24 February 2026 with a restriction to wear suitable corrective lenses for defective distant vision (VDL).

2.2.3. The pilot did not have an instrument flight (IF) rating; thus, he was only allowed to fly under visual flight rules (VFR) by day and in clear weather conditions.

2.2.4. The last 100-hour annual inspection was certified on 25 March 2025 at 610.6 total airframe hours.

2.2.5. The AP who conducted the last 100-hour annual inspection of the aircraft had an Approved Person Certificate that was issued by the SACAA on 1 March 2023 with an expiry date of 28 February 2025.

2.2.6. The aircraft was issued a Certificate of Release to Service (CRS) on 25 March 2024 with an expiry date of 23 March 2025 or at 710.6, whichever occurs first.

2.2.7. The aircraft was re-issued an Authority-to-Fly (ATF) on 2 May 2024 with an expiry date of 31 March 2025.

2.2.8. The aircraft was issued a Certificate of Registration (C of R) under the present owner on 26 September 2024.

2.2.9. The aircraft's impact point was near the top of the Hanglip Mountain in Louis Trichardt, Limpopo province. The aircraft was destroyed by impact forces and the post-impact fuel-fed-fire; the pilot was fatally injured.

2.2.10. The aircraft type is certified for day operation only under VFR. Information gathered during the investigation revealed that visibility was restricted when the aircraft departed FANS which was a contravention of the CAR 2011, Part 91.07.9.

2.2.11. The aircraft was flown 870ft below the highest point of Hanglip Mountain which was a contravention of the CAR 2011, Part 91.06.32.

## 3. ON-GOING INVESTIGATION

3.1. The AIID investigation is on-going, and the investigator will be investigating other aspects of this accident which may or may not have safety implications.

## 4. SAFETY RECOMMENDATIONS

4.1. **General**

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2. **Safety Recommendation/s**

4.2.1. None.

## 5. APPENDICES

5.1. None.

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