LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/1504						
Classification	Accident	**Date**	24 September 2025		**Time**	0537Z	
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Silver Creek Gorge Airfield, North West Province	Place of Intended Landing	Bapsfontein Airfield (FABA), Gauteng Province				
Place of Occurrence	Approximately 2.3 nautical miles (nm) south-east of Silver Creek Gorge Airfield, North West Province						
GPS Co-ordinates	Latitude	25° 48' 57.33" S	Longitude	27° 33' 30.68" E	Elevation	4 753 ft	
Aircraft Information							
Registration	ZU-CZI						
Make; Model; S/N	Magni Gyro; M16 (Serial Number: 16032174)						
Damage to Aircraft	Substantial	Total Aircraft Hours	687.9				
Pilot-in-command							
Licence Type	National Pilot Licence (NPL)	Gender	Male	Age	63		
Licence Valid	Yes	Total Hours	10 362	Total Hours on Type	198		
Total Hours 30 Days	27	Total Flying on Type Past 90 Days	19				
People On-board	1+1	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Wednesday, 24 September 2025, a flight instructor (FI) and a student pilot (SP) on-board a Magni Gyro M16 aircraft with registration ZU-CZI were engaged in a training flight from Silver Creek Airfield in North West province to Bapsfontein Aerodrome (FABA) in Gauteng province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provision of Part 141 of the Civil Aviation Regulations (CAR) 2011, as amended.

The FI initially stated that whilst en route to FABA and overhead the Magaliesberg mountain range, they noticed a reduced rate of climb and, thus, engaged the turbo. The rate of climb did not improve and, therefore, assumed it was engine failure. The FI elected to execute a forced landing on the mountain, north of Magaliesberg ridgeline, approximately 2.3 nautical miles (nm) south-east of Silver Creek Gorge Airfield. The aircraft came to rest on its left side.

The aircraft sustained damage to the undercarriage and rotor blades. The FI and the SP were uninjured.

After the accident, the aircraft was disassembled at the scene of the accident and recovered to the owner's hangar where the engine and turbo monitoring systems were downloaded by a Regulator (South African Civil Aviation Authority) approved person.

Figure 1: The aircraft at the accident site. (Source: Pilot)

The following weather information was provided by the pilot via the pilot questionnaire form.

Wind Direction	40°	Wind Speed	12 kts	Visibility	CAVOK
Temperature	21°C	Cloud Cover	Nil	Cloud Base	N/A

Weather Averages

Historical weather averages in the Mooinooi area, 3.8 nautical miles north of the accident scene, indicated average wind speeds of between 4 -12 knots (kts) in the month of September 2025. This aligned with the pilot's reported wind speed of 12 kts.

Terrain Elevations

The Silver Creek Gorge Airfield elevation is 4246.4 feet (ft) and the section of the Magaliesberg mountain ridgeline (that the aircraft was approaching about 3.5 nautical miles south-east of the airfield) has an elevation of approximately 5683.2 ft.

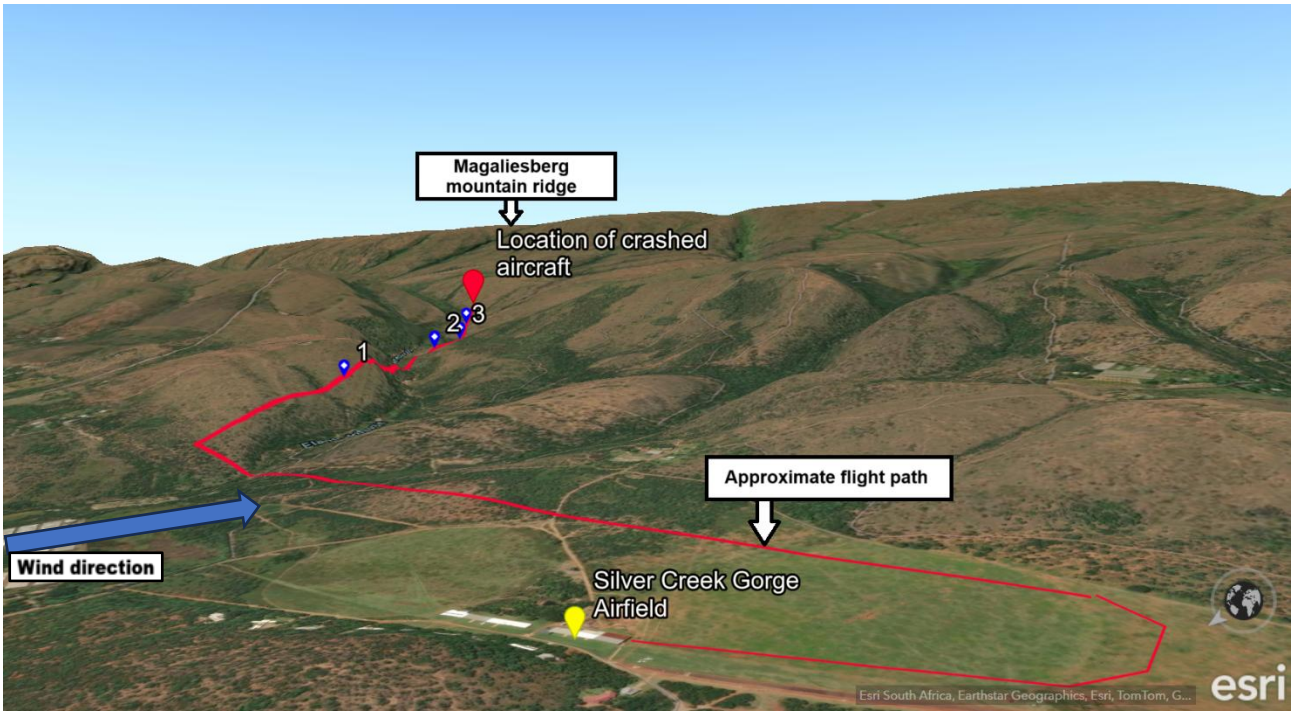


Figure 2: The flight path, terrain and approximate wind direction. (Source: ArcGis online map hosted by Esri South Africa)

X Country Application Data

Data downloaded from the X Country flight tracking app used by the SP provided the following information:

- After take-off, the flight had a duration of approximately 4 minutes.
- The aircraft flew at an altitude of between 100 ft and 200 ft above ground level until it was forced-landed.
- In Figure 2, the aircraft's ground speed at point 1 was 48.5 kts and when it reached point 3 the ground speed had decreased to 32.5 kts.

SPEEDS

V_Y	Best Rate of Climb speed	55 Kn
V_{NE}	Never Exceed Speed	87 Kn
V_{MIN}	Min level flight speed	35 Kn
V_{APP}	Landing approach speed	55 Kn
V_{MC} Power Off	Min Control Speed - Power Off	20 Kn
V_{MC} Power On	Min Control Speed - Power On	20 Kn
V_{NO}	Normal Operating (Cruise) Speed	78 Kn

Figure 3: Aircraft operating speeds from the Magni Gyro M16 Owner's Manual.

Aircraft Engine Turbo Control Unit (TCU) and Engine Monitoring Instrument System (FLYDAT) Downloads

The aircraft was fitted with a Rotax 914 UL engine equipped with a TCU and FLYDAT which recorded engine parameters when the engine was in operation. Data downloaded from both the TCU and FLYDAT indicated that the engine operated normally from take-off to the point of the forced landing with no abnormal drop in engine operating revolutions per minute (RPM), airbox pressure or throttle position. The TCU recorded data in 1-minute intervals and the FLYDAT recorded data in 6-minute intervals.

3.7.2 ENGINE OPERATION LIMITS

Operating Temperatures

	Min	normal	Max
OIL	50	90-110	130
CHT	50	90-110	135
EGT		750-850	950
OIL (bar)	1.5	2.5	7
Rpm			5800
Cruising		to 75% of power	
Rpm			5000
MAP			30.5

Figure 3: Normal engine operating parameters. (Source: Magni Gyro M16 Owner's Manual)

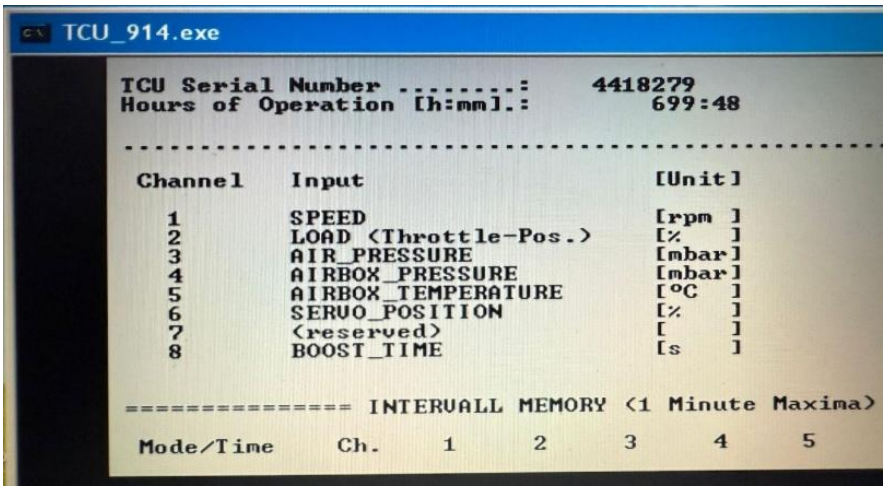


Figure 4: Turbo Control Unit data channel list. (Source: Owner)

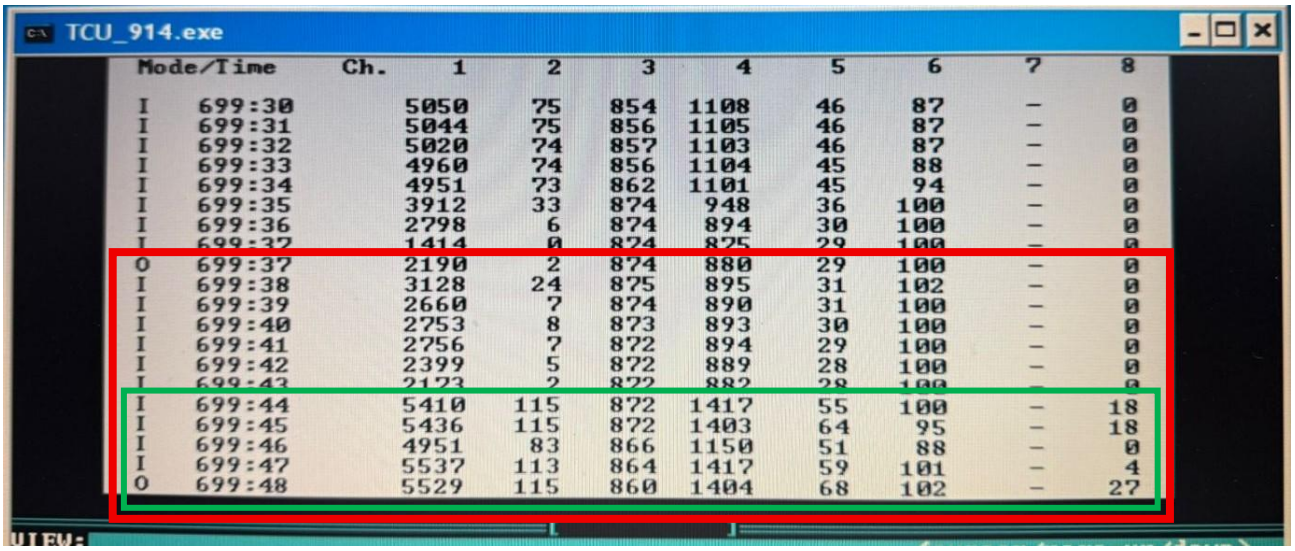
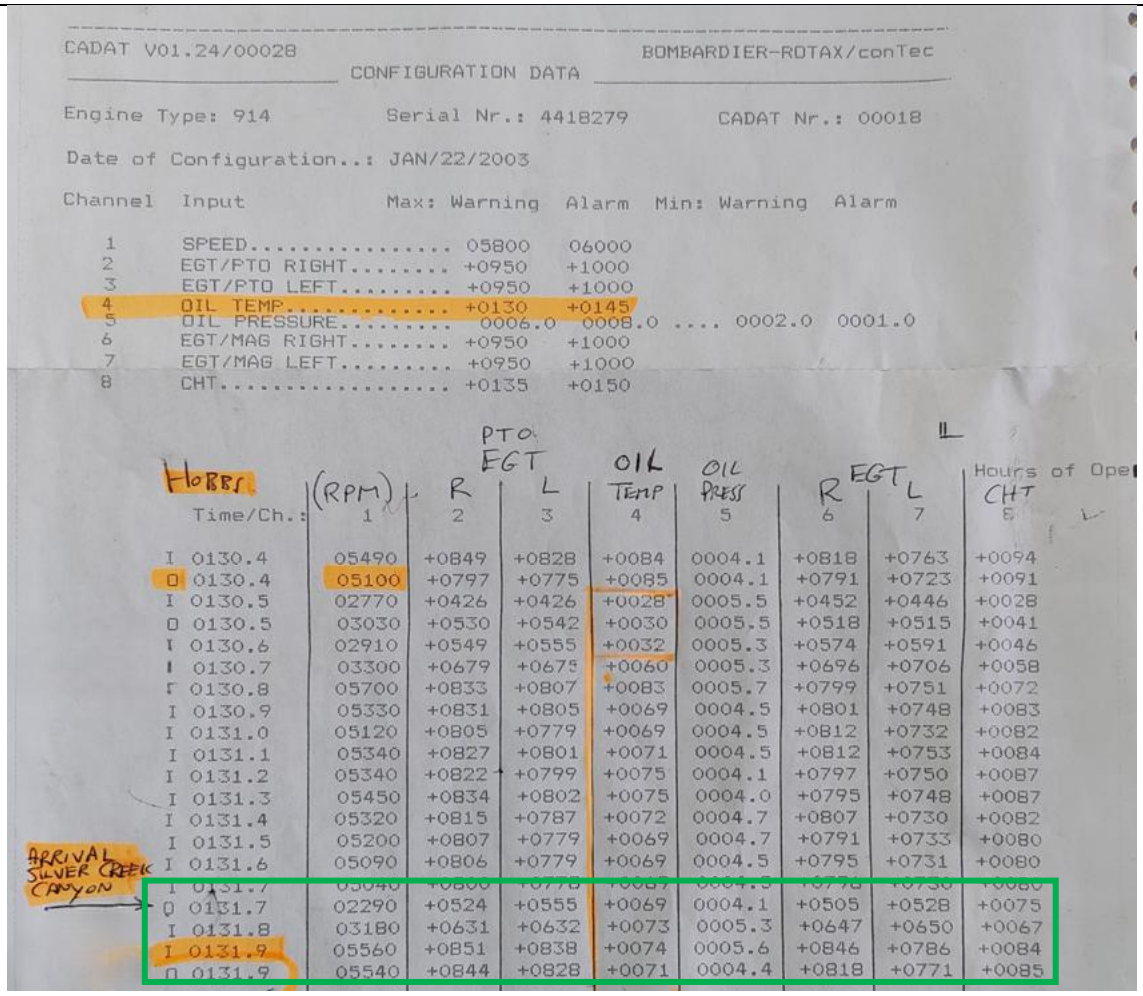


Figure 5: Turbo Control Unit data for the accident flight. Circled in red is the entire engine cycle from start to shut down; and circled in green is the engine cycle from take-off to shut down. (Source: Owner)



CADAT V01.24/00028 BOMBARDIER-ROTAX/conTec

CONFIGURATION DATA

Engine Type: 914 Serial Nr.: 4418279 CADAT Nr.: 00018

Date of Configuration..: JAN/22/2003

Channel	Input	Max: Warning	Alarm	Min: Warning	Alarm
1	SPEED	05800	06000		
2	EGT/PTO RIGHT	+0950	+1000		
3	EGT/PTO LEFT	+0950	+1000		
4	OIL TEMP	+0130	+0145		
5	OIL PRESSURE	0006.0	0008.0	0002.0	0001.0
6	EGT/MAG RIGHT	+0950	+1000		
7	EGT/MAG LEFT	+0950	+1000		
8	CHT	+0135	+0150		

HOBBS

Time/Ch.:	(RPM) 1	PTO EGT R 2	PTO EGT L 3	OIL TEMP 4	OIL PRESS 5	EGT R 6	EGT L 7	CHT 8
I 0130.4	05490	+0849	+0828	+0084	0004.1	+0818	+0763	+0094
O 0130.4	05100	+0797	+0775	+0085	0004.1	+0791	+0723	+0091
I 0130.5	02770	+0426	+0426	+0028	0005.5	+0452	+0446	+0028
O 0130.5	03030	+0530	+0542	+0030	0005.5	+0518	+0515	+0041
I 0130.6	02910	+0549	+0555	+0032	0005.3	+0574	+0591	+0046
I 0130.7	03300	+0679	+0675	+0060	0005.3	+0696	+0706	+0058
I 0130.8	05700	+0833	+0807	+0083	0005.7	+0799	+0751	+0072
I 0130.9	05330	+0831	+0805	+0069	0004.5	+0801	+0748	+0083
I 0131.0	05120	+0805	+0779	+0069	0004.5	+0812	+0732	+0082
I 0131.1	05340	+0827	+0801	+0071	0004.5	+0812	+0753	+0084
I 0131.2	05340	+0822	+0799	+0075	0004.1	+0797	+0750	+0087
I 0131.3	05450	+0834	+0802	+0075	0004.0	+0795	+0748	+0087
I 0131.4	05320	+0815	+0787	+0072	0004.7	+0807	+0730	+0082
I 0131.5	05200	+0807	+0779	+0069	0004.7	+0791	+0733	+0080
I 0131.6	05090	+0806	+0779	+0069	0004.5	+0795	+0731	+0080
O 0131.7	02290	+0524	+0555	+0069	0004.1	+0505	+0528	+0075
I 0131.8	03180	+0631	+0632	+0073	0005.3	+0647	+0650	+0067
I 0131.9	05560	+0851	+0838	+0074	0005.6	+0846	+0786	+0084
O 0131.9	05540	+0844	+0828	+0071	0004.4	+0818	+0771	+0085

ARRIVAL SILVER CREEK CANYON

Figure 6: FLYDAT data download with engine parameters circled in green. (Source: Owner)

Aircraft Weight at Take-off

The Magni Gyro M16 has a maximum take-off weight of 500 kilograms (kg). According to the information supplied by the FI, the aircraft had 40 litres (L) of 95 Octane Unleaded fuel on-board at take-off, which is equivalent to approximately 31 kg of fuel. The FI and SP weighed 95 kg and 86 kg, respectively, and the aircraft had an empty weight of 285 kg. There was no baggage on-board at the time of the accident.

Item	**Weight in kilograms (Kg)**
Aircraft empty weight	285 kg
Flight instructor	96 kg
Student pilot	86 kg
40 Lt of fuel	31 kg
Total take-off weight	498 kg

The aircraft was within the weight limitations.

Mountain Winds

Flight Environment: Prevailing Winds (Source: National Weather Service of the United States; https://www.weather.gov/source/zhu/ZHU_Training_Page/winds/Wx_Terms/Flight_Environment.htm)

Hills and valleys substantially distort the airflow associated with the prevailing pressure system and the pressure gradient. Strong up and down drafts and eddies develop as the air flows up over hills and down into valleys. Wind direction changes as the air flows around hills. Sometimes lines of hills and mountain ranges will act as a barrier, holding back the wind and deflecting it so that it flows parallel to the range. If there is a pass in the mountain range, the wind will rush through this pass as through a tunnel with considerable speed. The airflow can be expected to remain turbulent and erratic for some distance as it flows out of the hilly area and into the flatter countryside.

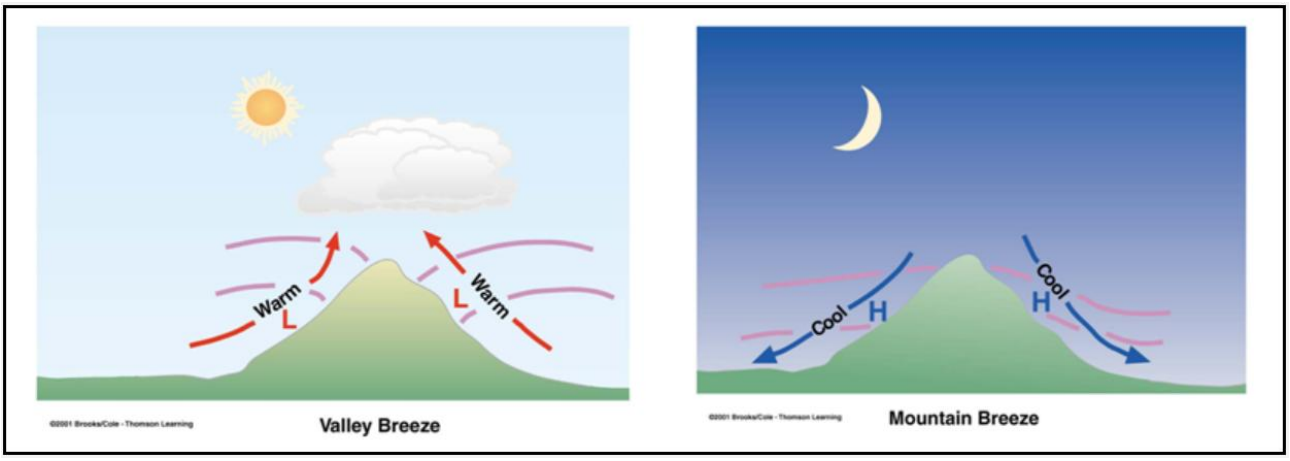


Figure 7: Airflow in mountainous areas.

Daytime heating and nighttime cooling of the hilly slopes lead to day to night variations in the airflow. At night, the sides of the hills cool by radiation. The slopes of hills not covered by snow will be warmed during the day. The air in contact with them becomes warmer and less dense and, therefore, flows up the slope. This is an anabatic wind (or valley breeze).

In mountainous areas, local distortion of the airflow is even more severe. Rocky surfaces, high ridges, sheer cliffs, steep valleys, all combine to produce unpredictable flow patterns and turbulence.

Findings

1. Personnel Information

1.1. The FI had a National Pilot Licence (NPL) that was reissued on 20 February 2025 with an expiry date of 19 February 2027. The FI had the aircraft type endorsed on his licence. He had accumulated 10 362 hours total flying hours of which 198 hours were on the aircraft type. The FI had last flown the aircraft type on 19 September 2025 for 1 hour.

1.2. The FI had a Class 4 aviation medical certificate that was issued on 27 November 2024 with an expiry date of 30 November 2027. According to his medical certificate, he had a restriction to wear suitable corrective lenses.

1.3 The instructor held a Grade C instructor rating issued on 11 August 2025 with an expiry date 10 August 2027.

2. Aircraft

2.1 The aircraft Authority-to-Fly (ATF) Certificate was issued on 27 August 2025 with an expiry of 26 August 2026.

2.2 Maintenance records indicated that aircraft maintenance was up to date and was conducted by a Regulator-approved person (AP). The last annual inspection of the aircraft was certified on 30 June 2025 at 685 airframe hours after which a Certificate of Release to Service (CRS) was issued with an expiry date of 29 June 2026 or at 785 airframe hours, whichever comes first.

2.3 The aircraft had a total of 687.9 airframe hours at the time of the accident.

2.4 Although the FI initially stated that the aircraft had an engine failure, data downloaded from the engine's TCU and FLYDAT confirmed that the engine was operating normally at the time of the accident.

2.5 The X Country application data download indicated that prior to the forced landing, the aircraft was flown between 80 ft and 200 ft AGL parallel to the hillside and gradually climbing with the slope towards the Magaliesberg mountain ridgeline, south of its position. The aircraft was also losing speed; and was flying below the manufacturer's suggested best rate of climb speed of 55 kts.

2.6 The take-off weight was 498 kg which was within the take-off weight limitation for the aircraft.

3. Environment

3.1. The aircraft was flown over a mountainous terrain and could have been affected by downdrafts, wind shear and turbulence.

4. Organisation

4.1 The organisation has an approved Declared Training Organisation certificate (DTO 0030) issued on 14 May 2025.

Probable Cause(s)

The aircraft was flown into a mountainous area at a low altitude and was likely affected by downdrafts or turbulent airflow which caused a significant loss of positive rate of climb; the pilot forced-landed the aircraft.

Contributing Factor(s)

None.

Safety Action(s)

None.

Safety Message

Pilots are reminded to exercise extreme caution when flying over mountainous terrain as the local airflow conditions are distorted by the temperature and topography. The best practise is to maintain a 1000 ft altitude clearance when approaching a mountain ridgeline in low to moderate prevailing wind speeds, and to maintain a 2000 ft altitude clearance when approaching a mountain ridgeline in moderate to high prevailing wind speeds.

About this Report

The decision to conduct a limited investigation is based on factors2 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