AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

		Reference:		**CA18/2/3/9962**	
Aircraft Registration	ZS-JSR	**Date of Accident**	3 March 2021	**Time of Accident**	1426Z
Type of Aircraft	Rallye 235E		**Type of Operation**	Private (Part 91)	
Pilot-in-command Licence Type	Private Pilot Licence		**Age**	26	**Licence Valid**	Yes
Pilot-in-command Flying Experience	**Total Flying Hours**		714.5	**Hours on Type**	221
Last Point of Departure	Orient Airfield (FAOI) , Gauteng Province				
Next Point of Intended Landing	Wonderboom Airport (FAWB), Gauteng Province				
Damage to Aircraft	Substantial				

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)

Maize farm near FAOI, Gauteng Province, at GPS co-ordinates reading: S 26º 02' 54.36", E 027º 36' 20.32" at an field elevation of 5138ft

Meteorological Information	Wind direction: 180°; Wind speed: 5 kts; Temperature: 27°C; Visibility: 9999m; Cloud cover: 2/8; Cloud base: SCT040						
Number of People On-board	1 + 0	**Number of People Injured**	0	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On 3 March 2021, a solo pilot on-board a Rallye 235E aircraft with registration ZS-JSR took off from Orient Airfield (FAOI) on a private flight with an intention to land at Wonderboom Airport (FAWB). During climb out at approximately 500 feet (ft) above ground level (AGL) when the aircraft commenced a turn to the left, the pilot noticed the engine power reading fluctuating. The pilot immediately switched on the booster pump, deselected the left fuel tank and selected the right fuel tank; thereafter, the engine regained full power. The pilot continued with a turn to the left with an aim to return to the airfield for a precautionary landing on Runway 36. However, as the aircraft proceeded with the turn, the engine power reading began to fluctuate again. The pilot checked the engine temperature and the pressure readings, and all was in order. He then put the fuel mixture to rich, however, the engine did not provide sufficient power nor stop fluctuating.

At that time, the pilot had a realisation that the aircraft would not make it to Runway 36 as it was rapidly losing height and forward speed. He then opted to execute a forced landing straight ahead onto a maize crop field. During the forced landing, the aircraft came into contact with the maize crops, resulting in the nose landing gear breaking off, causing damage to the propeller and the right-side leading edge.

The pilot disembarked the aircraft unassisted, removed all important documents from the aircraft, and moved to a safer distance. No injuries were sustained by the pilot; however, the aircraft was substantially damaged during the accident sequence.

Probable Cause/s and Contributory Factors

The aircraft experienced engine power reading fluctuations while climbing and the pilot managed to recover the aircraft briefly. However, the aircraft engine power reading fluctuated again, but this time, the pilot was unable to maintain the aircraft's altitude and forward speed, which was rapidly dropping following a left turn to return to the airfield. The pilot immediately levelled off the aircraft to carry out a forced landing on a maize crop field, which was unsuccessful. The cause of engine fluctuation could not be determined.

SRP Date	8 June 2021	Publication Date	9 June 2021

INTRODUCTION

Reference Number	**:** CA18/2/3/9962
Name of Owner/Operator	**:** M Myburgh
Manufacturer	**:** Socata
Model	**:** Morane Saulnier Rallye 235E
Nationality	**:** South African
Registration Marks	**:** ZS-JSR
Place	**:** Maize farm near FAOI, Gauteng Province, with GPS co-ordinates reading: S 26º 02' 54.36", E 027º 36' 20.32" with a field elevation of 5138ft.
Date	**:** 3 March 2021
Time	**:** 1426Z

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 was notified to the Accident and Incident Investigations Division (AIID) on 3 March 2021 at about 1526Z. The investigator conducted a desktop investigation. The investigator co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID is leading the investigation as the Republic of South Africa is the State of Occurrence.

Notes:
1. Whenever the following words are mentioned in this report, they shall mean the following:

- *Accident — this investigated accident*
- *Aircraft — the Rallye 235E 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.

Disclaimer:

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ABBREVIATION	DESCRIPTION
º	Degree
ºC	Degree Celsius
'	Minutes of co-ordinates
"	Seconds co-ordinates
AIID	Accident and Incident Investigations Division
AGL	Above Ground Level
AMSL	Above Mean Sea Level
AMO	Aircraft Maintenance Organisation
CAR	Civil Aviation Regulations
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FAOI	Orient Airfield
FAWB	Wonderboom Airport
FAMB	Middleburg Airfield
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
Kts	Knots
METAR	Meteorological Terminal Aviation Routine Weather Report
MPI	Mandatory Periodic Inspection
MSB	Mandatory Service Bulletin
No.	Number
PIC	Pilot-in-Command
POH	Pilot Operating Handbook
PPL	Private Pilot Licence
QNH	Query Nautical Height
RPM	Revolution per minute
RWY	Runway
SB	Service Bulletin
SI	Service Instruction
UTC	Co-ordinated Universal Time
VHF	Very High Frequency
Z	South African Standard Time is UTC plus 2 hours

FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On 3 March 2021, an aircraft type – a Rallye 235E – registered ZS-JSR with one occupant on-board was involved in an accident. The aircraft took off from Orient Airfield (FAOI) on a private flight to Wonderboom Airport (FAWB); the pilot intended to return to home base (FAOI) for a full-stop landing later the same day. Before take-off from Runway (RWY) 18 at FAOI, all ground checks and runs were conducted by the pilot and were found to be satisfactory. The pilot had then lined up the aircraft for take-off. Soon after, a take-off roll was conducted, followed by rotation at 66 knots (kt) until the aircraft reached 80kt and began climbing; no anomalies were noted. The pilot had then commenced with after-take-off checks whilst climbing to an altitude of approximately 6500 feet (ft).

Figure 1: The aircraft's route from take-off to turn back point. (Source: Google Maps)

1.1.2 Following the after-take-off checks and during a left turn, the pilot noted that the aircraft's engine power reading was fluctuating. He immediately switched the fuel booster pump back to ON position and changed the fuel selector from the left-side to the right-side fuel tank. Thereafter, the engine power reading stopped fluctuating and the pilot opted to return to FAOI. While continuing with the left turn, the engine power reading began to fluctuate again and, this time, the aircraft started to lose height and a significant forward speed. The aircraft was, at the time, flying over a maize crop field. The pilot deduced that the aircraft would not make it to FAOI and he then levelled off the aircraft and aimed to undertake an emergency landing on the maize crop field ahead on his path. However, during landing, the aircraft impacted the maize crops and the aircraft's nose landing gear broke off, causing the aircraft to sustain damage to the propeller and the right-side leading edge. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.3 The aircraft accident occurred during daylight in visual meteorological conditions (VMC) on a private maize crop farm near FAOI (to the left of Runway 18) at Global Positioning System co-ordinates reading: S26º 02' 54.36", E027º 36' 20.32" at a field elevation of 5138ft.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-Board	Other
Fatal	-	-	-		-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	1	-	-	1	-
Total	1	-	-	1	-

Note: Other means people on ground.

1.3. Damage to Aircraft

1.3.1 The aircraft sustained substantial damage to the nose landing gear, the propeller and the right-side wing leading edge.

Figure 2: The damaged aircraft as it was found at the accident site. (Source: Picture courtesy of the pilot)

1.4. Other Damage

1.4.1 Some of the maize crops were also damaged during the accident sequence.

1.5. Personnel Information

Nationality	South African	Gender	Male	Age	26
Licence Number	0272480054	Licence Type	Private Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, Tug Pilot				
Medical Expiry Date	31 July 2024				
Restrictions	Corrective lenses + spare pair				
Previous Accidents	None				

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

Flying Experience:

Total Hours	714.5
Total Past 24 Hours	0.34
Total Past 7 Days	0.34
Total Past 90 Days	0.34
Total on Type Past 90 Days	0.34
Total on Type	221

1.5.1 The pilot had a Private Pilot Licence issued by the Regulator on 14 September 2020 following a competency revalidation, with an expiry date of 31 August 2021. His Class 2 aviation medical certificate was issued by the Regulator on 19 July 2019 with an expiry date of 31 July 2024. The aircraft was endorsed on his licence. The pilot had not flown an aircraft or conducted any other flying activities in approximately four months prior to this accident flight.

1.6. Aircraft Information

Airframe:

Manufacturer/Model	Socata/Morane Saulnier Rallye 235E	
Serial Number	12730	
Year of Manufacturer	November 1976	
Total Airframe Hours (At Time of Accident)	1361.24	
Last MPI (Date & Hours)	27 October 2020	1356.6
Hours Since Last MPI	4.64	
C of A (Issue Date)	1 November 2020	
C of A Expiry Date	30 November 2021	
C of R (Issue Date) (Present Owner)	3 February 2014	
Type of Fuel Used in the Aircraft	Avgas Fuel Type (100LL)	
Operating Categories	Standard Part 91	
Previous Accidents	None	

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

Engine:

Manufacturer/Model	Lycoming 0-540-B4B5
Serial Number	L-17615-40
Part Number	N/A
Hours Since New	1361.24
Hours Since Overhaul	TBO not yet reached

Propeller:

Manufacturer/Model	Hartzell: HC-C2YK-1BF
Serial Number	CH 12345
Part Number	N/A
Hours Since New	1361.24
Hours Since Overhaul	TBO not yet reached

1.6.1 The Morane Saulnier Rallye 235E is an all-metal, single-engine four seats, low-wing airplane with a conventional tail. The aircraft is fitted with fixed tricycle landing gear and it also has a conventional landing gear option. A two-bladed propeller is fitted to achieve maximum thrust for effective operation.

1.6.2 A review of aircraft maintenance records, including logbooks and mandatory periodic inspections (MPI) and all technical publications (Service Bulletin, Technical Instructions, Mandatory Service Bulletin, Service Instructions, etc.) by both airframe manufacturer and engine manufacturer, were signed out. According to the records, maintenance was conducted in accordance with the manufacturer's recommended procedures. The last maintenance conducted on the aircraft was on 27 October 2020 by a Regulator-approved aircraft maintenance organisation (AMO) that held a valid AMO certificate issued on 19 September 2020 with an expiry date of 31 August 2021. The aircraft was issued a Release to Service Certificate on 27 August 2020 with an expiry date of 28 October 2021, or at a total airframe hours of 1456.60, whichever occurs first.

1.6.3 According to the aircraft folio history, on 30 October 2020, the pilot flew the aircraft from FAWB to Aero Park Zynkraal (AP) Airfield for approximately 0.4 hours. Later on the same day, the aircraft was flown to Potgietersrus Airfield (PAQR) for about 1 hour where approximately 225 litres of Avgas (fuel) was uplifted. On the same date (30 October 2020) following fuel upliftment, the aircraft was flown to Middleburg Airfield (FAMB) at a flight duration of approximately 0.9 hours. On 2 November 2020, the aircraft was flown from FAMB back to FAOI at a flight duration of about 1.2 hours where the pilot performed two landings; thereafter, the aircraft was parked in the hangar after a full-stop landing. Following maintenance on the dates between 30 October 2020 and 2 November 2020, the aircraft accumulated a total of 4.3 hours. Approximately four months later, on the date of the accident of 3 March 2021, the aircraft flew for approximately 0.34 hours, this includes the accident flight.

The aircraft type has a total capacity of 280 litres (74 US gallons). Only 270 litres (71.32 US gallons) are useable. A full fuel capacity tank warrants 5.5 hours of flight, depending on the flight conditions. The aircraft type is equipped with a Lycoming O-540-B4B5 engine. While the lead content is far lower than automotive fuel used to be, it does still contain some (lead), due to the age of the engine design. It also burns around 14 gallons of fuel per hour.

1.6.4 Aircraft fuel system

The information below was extracted from the aircraft's Pilot Operating Handbook (POH)

The fuel system is contained within two metal tanks, each located in a wing spar box. Each tank is connected to a 3-way, 3-position (left, close, right) cock through a pipe. This cock is actuated by means of a control pedestal. The contact for the Fuel cock red warning light is actuated by a cam integral with the cock control. This light is energized as soon as the cock is closed or in operation. It goes out when the cock is open on left or right position. A pipe passing through the firewall feeds the fuel from cock to the electrical booster pump fitted with a filter. Through a pressure switch a green warning light shows that the booster pump is operating.

From the booster pump, the fuel is fed to the engine-driven pump. An electrical sensor, located at the carburettor inlet, transmits the fuel pressure data to an indicator located on the centre of the instrument panel strip. Each fuel tank is fitted with 2 float type transmitters which always allow the available fuel quantity to be known. Fuel content indicators are located on the centre of the instrument panel strip. Each tank is provided with a filling neck, a bleed and drain block located on the wing lower surface and a venting device consisting of a tube fitted with a check-valve opening on the wing lower surface. A cock located between each tank and the fuel shut-off cock is accessible from under the fuselage.

1.6.5 According to the pilot, during pre-flight inspection, he purged the fuel for contaminants from the allocated drain valve, and there was no water content. The pilot, during pre-flight, stated that he ran the engine a bit longer than normal to check if there were any fuel contaminant signs. Also, according to the AMO that recovered the aircraft, they had conducted the fuel test for water contaminant, and all was in order.

1.6.6 The information below was extracted from the Rallye 235e Flight Manual.

The aircraft take-off procedure

Parking brake	*:released, light off*
Align the aircraft	
Set progressively to full throttle	
Avoid braking during rolling	
Lift off the nose wheel	*:11km/h-59kt-68mph*
Take-off cleanly	*:VI=120km/h-65kt-75mph*
Brake	
Climb to 300ft	*:VI=130km/h-70kt-81mph*
Booster pump	*:Off, lights off*
	:Correct pressure

CLIMB

Normal climb with L.E slats retracted
Increase speed until slats close
Proceed with optimum climb speed
VOM=170km/h-92kt-106mph minus 7km/h-4kt-4mph every 5000ft
Carry out the climb with full throttle
Check the temperature

Engine failure during after take-off

Make use of available power to assist in reaching selected landing ground ahead. When sure that the selected ground can be reached, extend the flaps fully. Speed should not drop under VI=130km/h-70kt-81mph.
Before touchdown:

- *Cut -off magneto switch*
- *Cut-off main switch*
- *Close fuel cock*

CAUTION: DO NOT ATTEMPT TO TURN
The altitude drop and the increase in stalling speed resulting from a turn may cause an untimely touchdown in a hazardous attitude.

1.7. Meteorological Information

1.7.1 Meteorological information was provided by the pilot through the pilot accident questionnaire form.

Wind Direction	180°	Wind Speed	5kts	Visibility	9999m
Temperature	27°C	Cloud Cover	2/8	Cloud Base	SCT040
Dew Point	14°C	QNH	Unknown		

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA) for the aircraft type. There were no recorded defects with the navigation system prior to the flight.

1.9. Communication

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

1.10. Aerodrome Information

1.10.1 The aircraft accident occurred after take-off on a maize crop field, which was approximately 0.40 nautical miles (nm) left of Runway 18, facing 113º south-east.

Aerodrome Location	Orient Airfield, Krugersdorp, Gauteng Province	
Aerodrome Status	Licensed	
Aerodrome Co-ordinates	S 26º 02' 54.36", E 027º 36' 20.32"	
Aerodrome Altitude	5100ft	
Runway Headings	18/36	11/29
Runway Dimensions	(1500X30)m	(1000X30)m
Runway Used	18	
Runway Surface	Tar	
Approach Facilities	None	
Radio Frequency	TBA	

1.11. Flight Recorders

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

1.12. Wreckage and Impact Information

1.12.1 The aircraft accident occurred after take-off at FAOI after a reported engine power reading fluctuation. The aircraft, during contact with the maize crops, caused damage of

approximately 15 metres (m) (to the crops) before coming to a full stop. The ground contact marks were observed approximately 7m from the first point of (ground) impact to a full stop position.

Figure 3: Damaged propeller blades.

1.12.2 The aircraft contacted the ground with the nose landing gear first, causing it to break off. The propeller struck the ground and sustained substantial damages. The damages on the propeller indicated that the engine was turning with power at the time of contact with both the maize crops and the ground during the accident sequence.

1.12.3 Both wings sustained damages to the leading edges. The damages on both leading edges were consistent with damages caused by impact with the maize crop during the initial contact speed of the aircraft.

Figure 4: Damage sustained by the aircraft.

1.13. Medical and Pathological Information

1.13.1 None.

1.14. Fire

1.14.1 There was no evidence of a pre- or post-impact fire during the accident sequence.

1.15. Survival Aspects

1.15.1 The aircraft accident was considered survivable as the aircraft did not sustain damage to the cockpit area that might have compromised the safety of the pilot. The pilot had also made use of the safety harness equipped in the aircraft during flight.

1.16. Tests and Research

1.16.1 The aircraft wreckage was recovered by an AMO that also conducted the post-accident inspection. According to the AMO, there were no anomalies found on the engine specifically. The engine runs could not be conducted due to the damage on the engine which occurred when the propeller struck the ground during impact. At the time of compiling this report, the shock load inspection was not yet conducted. All airframe and engine damages were accounted for, which were sustained as a result of impact during the accident sequence.

1.17. Organisational and Management Information

1.17.1 The aircraft was privately owned, and the flight was operated under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.17.2 The AMO which carried out the last maintenance inspection of the aircraft prior to the accident flight was in possession of an AMO approval certificate that was issued by the SACAA on 19 September 2020 with an expiry date of 31 August 2021.

1.18. Additional Information

1.18.1 Sources of potential fuel contamination (Information was extracted from www.skybrary.aero/fuel contamination

The most common contaminants are particulates, water, other petroleum products or their residues and microbial growth:

- ***Particulates*** *- despite the increasing use of protective coatings on the interior surfaces of fuel tanks and pipes predominantly made of steel or its alloys, the main source of particulate contamination is rust and scale. The presence of even small quantities of water ensures that almost any distribution process will be the source of some rust contamination. Other sources of particulates include airborne solids that enter through tank vents or slip past the seals of floating roof tanks (dust and pollen), solids entering through from damaged hoses and filters (especially rubber particles and fibres) and solids from microbial infestation (cellular debris and microbial by-products).*

- ***Water*** *- the accumulation of water is almost inevitable in stored aviation fuels even if it has a low water content at airport delivery because of a number of opportunities for moisture to be taken up. These include free water in low spots in a pipeline, rainwater*

leaking past the seals in floating-roof tanks and moist outside air entering the vents of fixed roof storage tanks. Air flowing in and out of a fixed-roof tank as fuel is added or removed may also change the moisture content of air in contact with fuel. The temperature of the fuel itself may change in association with the diurnal variation in outside air temperature or for other reasons so that the chances of water condensing out (or not being absorbed) are altered. Also, if fuel from underground tanks or pipelines is cooled during surface transmission into a fuel bowser or via a fuel dispensing vehicle linked to a hydrant system directly into an aircraft and the fuel involved is near to water saturation, then excess water may condense out.

- ***Other Petroleum Products*** *- if a batch of aviation fuel is found to have been contaminated with another petroleum product to the extent that the specification requirements are no longer met then there is no remedy and the fuel concerned must be returned to a refinery for reprocessing. However, there are situations where very minor amounts of product mixing may occur without the specification being compromised but even here, if the contaminant is a surfactant, caution is required because the effect can be to degrade water separability. One contaminant which has been encountered in airport supply systems in recent years is Fatty Acid Methyl Ester (FAME) which is most likely to be found when biodiesel fuel has passed through a common unsegregated fuel distribution system.*

- ***Microbial growth*** *- although aviation fuels are sterile when first produced, they inevitably become contaminated with micro-organisms that are omnipresent in both air and water Micro-organisms found in fuels include bacteria and fungi. Solids formed by microbial growth are very effective at plugging fuel filters and some micro-organisms also generate acidic by-products that can accelerate metal corrosion. Since most micro-organisms need (at least) free water to grow, microbial growth is most commonly found at any fuel-water interface that may exist. Higher ambient temperatures favour microbial growth. The most effective way to prevent microbial contamination is by minimising the presence of free water. The use of biocides may sometimes be an option if this type of contamination reaches problem levels, but their use is not necessarily an appropriate or complete response.*

1.19. Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1. General

From the available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any particular organisation or individual.

2.2. Analysis

2.2.1 The pilot had a Private Pilot Licence issued by the Regulator on 14 September 2020 following a competency revalidation, with an expiry date of 31 August 2021. His Class 2 aviation medical certificate was issued by the Regulator on 19 July 2019 with an expiry date of 31 July 2024. The aircraft was endorsed on his licence. The pilot was qualified and licensed for the flight in accordance with existing regulatory requirements.

2.2.2 The pilot had not flown the aircraft or conducted any other flying activities in approximately four months prior to this accident flight as he was the owner and the only person who flies the aircraft. The aircraft, prior to this flight, was parked with sufficient fuel on-board for a

period of four months without any operational activities. The length of time the aircraft was parked with fuel in the tanks was likely to form/create contaminants as a result of microbial growth, water accumulation and other petroleum products, which are inevitable. However, as indicated by the AMO that recovered the aircraft and drained the fuel, there was no evidence of any contaminants in the fuel.

2.2.3 The aircraft was airworthy at the time of the accident as it had been issued a Certificate of Airworthiness by the Regulator on 1 November 2020 with an expiry date of 31 November 2021. The aircraft was maintained by a Regulator-approved AMO that held a valid AMO certificate issued on 19 September 2020, with an expiry date of 31 August 2021. Following the maintenance, the aircraft was issued a Certificate of Release to Service by the AMO on 27 August 2020 with an expiry date of 28 October 2021 or at total airframe hours of 1456.60, whichever occurs first.

2.2.4 The aircraft was privately owned, and the flight was operated under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

2.2.5 There was enough fuel in the aircraft with no visual contamination. The aircraft type with full fuel tanks guarantees a fuel endurance of approximately 5.5 hours flight duration. The aircraft consumes 14 USG per hour which equates to 53 litres per hour, thus, 53 litres multiplied by 4.3 hours flown since the last fuel uplift equate to 228 litres, which indicate that the aircraft had 42.1 litres useable fuel left in its tanks at the time of the accident.

2.2.6 There were no anomalies noticed on both the airframe and engine. All damages were a result of impact during the accident sequence. The engine control connections were still intact with movement continuity. The investigation could not determine the cause of engine power reading fluctuation.

3. CONCLUSION

3.1. General

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

To serve the objective of this investigation, the following sections are included in the conclusion 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.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability.

3.2. Findings

3.2.1 The pilot had a Private Pilot Licence issued by the Regulator on 14 September 2020 following a competency revalidation, with an expiry date of 31 August 2021. His Class 2 aviation medical certificate was issued by the Regulator on 19 July 2019 with an expiry date of 31 July 2024. The aircraft was endorsed on his licence. The pilot was qualified and licensed for the flight in accordance with existing regulatory requirements.

3.2.2 The pilot had not flown an aircraft or conducted any other flying activities in approximately four months prior to this accident flight.

3.2.3 The aircraft had a valid Certificate of Airworthiness issued by the Regulator on 1 November 2020 with an expiry date of 31 November 2021. The aircraft was maintained by a Regulator-approved AMO that held a valid AMO certificate issued on 19 September 2020 with an expiry date of 31 August 2021.

3.2.4 The last maintenance was carried out on 27 October 2020 at 1356.6 flying hours and following the maintenance, the aircraft was issued a Certificate of Release to Service on 27 October 2020 with an expiry date of 28 October 2021, or at total airframe hours of 1456.6 or whichever occurs first.

3.2.5 The aircraft was privately owned, and the flight was operated under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

3.2.6 There was enough fuel in the aircraft with no visual contamination. The aircraft type with full fuel tanks guarantees a fuel endurance of approximately 5.5 hours flight duration.

3.2.7 The pilot, following the first fluctuating engine power reading, opted to return to the airfield but lost significant height and ended up crash-landing on the maize crop field.

3.2.8 There were no anomalies noticed on both the airframe and engine. All damages were a result of impact during the accident sequence. The engine control connections were still intact with movement continuity. The investigation could not determine the cause of engine power reading fluctuation.

3.3. Probable Cause/s

3.3 1 The aircraft experienced engine power reading fluctuations while climbing and the pilot managed to recover the aircraft, however, the engine power reading fluctuated again, resulting in the pilot being unable to maintain the aircraft's altitude and forward speed, which was rapidly dropping following a left turn to return to the airfield. The pilot immediately levelled off the aircraft to carry out a forced landing on a maize crop field, which was unsuccessful. The cause of engine fluctuation could not be determined.

3.4. Contributory Factors

3.4.1 None.

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