LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10374								
Classification	Accident		**Date**	10 October 2023		**Time**	1240Z		
Type of Operation	Private (Part 94)								
Location									
Place of Departure	Karoo Gateway Airport (FABW), Western Cape Province		Place of Intended Landing		Upington International Airport (FAUP), Northern Cape Province				
Place of Occurrence	R381 road between Loxton and Beaufort West, Western Cape Province								
GPS Co-ordinates	Latitude	32° 00' 20.85" S	Longitude	022° 25' 47.83" E		Elevation	4 874 feet		
Aircraft Information									
Registration	ZU-ITU								
Make; Model; S/N	Kitplanes for Africa; Safari (Serial Number: 054-05-20 SAF3)								
Damage to Aircraft	Substantial		Total Aircraft Hours	75.8					
Pilot-in-command									
Licence Type	Private Pilot Licence (PPL) Aeroplane		Gender	Male		Age	65		
Licence Valid	Yes	Total Hours	1 330	Total Hours on Type	100.2				
Total Hours 30 Days	5.2		Total Flying on Type Past 90 Days	12.2					
People On-board	1 + 1	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0		

What Happened

On Tuesday afternoon, 10 October 2023, a pilot and a passenger on-board the Safari LSA aircraft with registration ZU-ITU took off on a private flight from Karoo Gateway Airport (FABW) in Beaufort West, Western Cape province, with the intention to land at Upington International Airport (FAUP) in the Northern Cape province. The flight was conducted under visual flight rules (VFR) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

According to the pilot, take-off from FABW was uneventful. He stated that whilst at the top of the climb and levelling for cruise at 7500 feet (ft) above mean sea level (AMSL), he noticed that the engine's revolutions per minute (RPM) indication had dropped from 5300 to 4000, and that the electronic propeller pitch controller "Overload" indication light had illuminated (ON). The pilot then attempted to reset the electronic propeller pitch controller by closing the throttle and switching the controller to "OFF" and "ON" positions several times, but without success. Meanwhile, the manifold air pressure (MAP) and RPM were continuing to decrease, and the aircraft was losing height at approximately 550 feet (ft) per minute.

The pilot searched for a suitable spot to conduct a forced landing but found none that was suitable. He then decided to land on the R381 road which runs between Loxton and Beaufort West in the

Western Cape province. After touch down on the road, the aircraft drifted slightly to the right due to the camber (bend) of the road. The pilot then steered the aircraft to bring it to the centre of the road, however, the aircraft impacted some rocks which brought it to a stop. Both occupants exited the aircraft unassisted and uninjured.

The aircraft sustained damage to the propeller, airframe and the undercarriage. The accident occurred 21 nautical miles (nm) north-west of FABW.

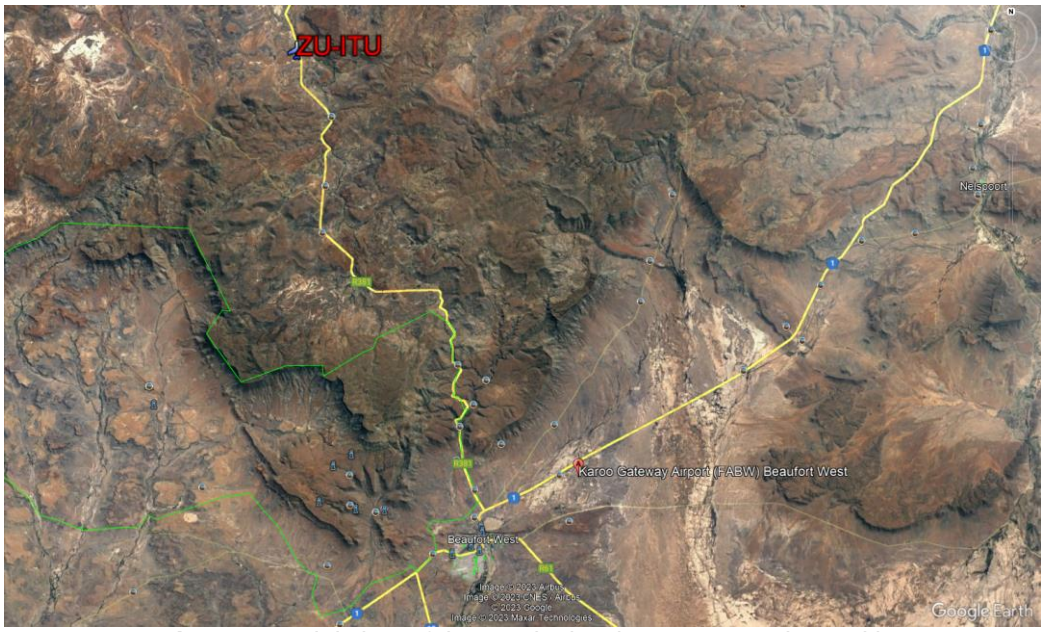

Figure1: Aerial view of the crash site. (Source: Google Earth)

Figure 2: The ZU-ITU as it came to rest next to the road. (Source: ARCC)

Figures 3 and 4: Damage to the left-wing support structure (left) and the engine cowling and propeller blades (in a coarse pitch position) (right). (Source: ARCC)

The aircraft was sent to an aircraft maintenance organisation (AMO) in Petit Airfield, Gauteng province, for further inspection. The following was discovered:

The pilot left the position of the blades in a coarse pitch and did not adjust the pitch manually or set the controller to manual but rather left it in auto and attempted to re-set by switching the controller to the "OFF" and "ON" positions whilst the controller was in auto. This aggravated the situation as the propeller runs through a sequence of pitching courser and then finer until it settles at the desired position for the rpm and throttle setting. It ended up pitching very course and, thereby, overloading the engine, resulting in the engine losing power. The pilot should have switched the controller to manual mode and continued to use the propeller as a standard variable pitch propeller.

Propeller Overload

Overloading of the propeller is caused by the pitch adjustment slider mechanism hitting the mechanical stop in a fully course pitch or it could be due to friction on the bearing surfaces due to insufficient lubrication of the roller bearings.

The propeller electronic controller has 3 modes that can be selected. These are: Constant Speed (CS), Automatic and Manual. In the Automatic mode the propeller follows a pre-programmed MAP vs RPM curve to match the engine type. In the manual mode the propeller pitch is adjusted by pushing the selector lever up for RPM plus and down for RPM minus. In the Constant Speed mode, the controller will adjust the RPM of the propeller to the selected RPM target chosen by the pilot. This is done by adjusting the large turn knob on controller to indicate the desired target RPM displayed on the screen. In CS mode the MAP is ignored and must be controlled manually by the pilot through the throttle setting. If the controller screen is showing OVERLOAD, The CS and Auto functions will stop functioning to protect the system. The correct procedure to reset the system is to

switch the propeller controller to manual function and relieve the pressure on the mechanical stop by setting the propeller pitch finer (hold the '+' toggle switch for approximately 1-3 seconds and release) then switch the propeller controller OFF and ON again to reset the controller, maintain a steady cruise RPM. With sufficient altitude, the pilot can attempt to switch to manual or CS mode again and monitor the controller. Should the error be displayed again then select manual as per above, relieve the pressure on the stop by pitching the prop as described. Leave the propeller in manual mode, the propeller will now act as a standard variable pitch propeller and must be controlled manually by the pilot. ***The propeller will function in manual mode even with the overload displayed on the screen.*** *Seek immediate assistance at a maintenance facility and do not attempt to fly the aeroplane until the stop limits have been reset and readjusted. This method is an added safety measure and should be used as such.*

Findings

1. The pilot was issued a Commercial Pilot Licence (CPL) Aeroplane on 27 June 2012 which expired on 31 July 2023. The pilot downgraded his licence from CPL to Private Pilot Licence (PPL), which was issued on 6 September 2023 with an expiry date of 30 September 2025. The pilot had a Class 2 aviation medical certificate that was issued on 25 August 2023 with an expiry date of 31 August 2024, and with the restriction to wear suitable corrective lenses for defective near vision. The pilot was medically fit to conduct the flight.

2. The last annual inspection that was conducted on the aircraft was certified on 11 November 2022 at 60.0 Hobbs hours. The aircraft was issued a Certificate of Release to Service (CRS) on 11 November 2022 with an expiry date of 10 November 2023 or at 125.3 Hobbs hours, whichever occurs first. The aircraft was flown a further 15.8 hours since the last inspection.

3. The aircraft had a valid Authority to Fly (ATF) which was initially issued on 26 October 2021. The ATF was last renewed on 29 November 2022 with an expiry date of 31 October 2023. The aircraft's Certificate of Registration (C of R) was issued to the current owner on 23 February 2021.

4. The Approved Person responsible for the maintenance of the aircraft had a valid Approved Person Certificate which was re-issued on 13 September 2023.

5. The pilot did not adjust the pitch manually or set the controller to manual, but rather left it in auto mode and attempted to re-set the electronic propeller pitch controller. This aggravated the situation as the propeller rotates (runs) through a sequence of pitching courser and then finer, until it settles at the desired position for the rpm and throttle setting. The propellers ended up pitching very course and, thereby, overloading the engine. Hence, the subsequent loss of power.

Probable Cause(s)

Engine power loss in-flight due to the propeller blades which were in course pitch; this resulted in engine overload and an unsuccessful forced landing.

Contributing Factor(s)

Not following the correct procedure after the propeller control unit failure which was set in auto mode. Failure of the electronic propeller pitch controller unit in auto mode.

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.
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South African Civil Aviation Authority
Republic of South Africa