AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9682		
Aircraft Registration	ZU-TEF	**Date of Accident**	23 January 2018			**Time of Accident**	11:10Z
Type of Aircraft	Savannah S		**Type of Operation**	Test Flight			
Pilot-in-command Licence Type	National Pilot		**Age**	59	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		1580.5		Hours on Type	1266.6	
Last point of departure	Robertsvale Aerodrome, Gonubie (Eastern Cape)						
Next point of intended landing	Robertsvale Aerodrome, Gonubie (Eastern Cape)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Private farm 3nm West of Kei Mouth at the GPS: S32° 41'33.67" E028° 19'30.59" Elevation: 40 feet							
Meteorological Information	Surface wind: 220° at 17 knots. Temperature 24°C. Visibility: 9999m						
Number of people on board	1 + 1	**No. of people injured**	0	**No. of people killed**	2		

Synopsis

On the 23rd January 2018, the pilot accompanied by a passenger took off from Robertsvale private airstrip for a test flight in the local area of Kei Mouth and back. The aircraft was reported missing by the manufacturer the following day on the 24th January 2018. The search for the missing aircraft commenced on the same day when the aircraft was reported missing. On Friday 26th January 2018 at approximately 0900Z the wreckage of the missing aircraft was located. The aircraft was found crashed into dense bush near the river on a farm near Morgan's bay in Kei Mouth. The aircraft was destroyed by a post impact fire and both occupants were fatally injured.

The investigation revealed that the aircraft's engine stopped due to fuel exhaustion and the pilot possible stalled the aircraft in an effort to extend his range to reach the airfield. The pilot exceeded stalling angle of the wing in an attempt to maximise lift in order to reach the alternate runway.

Probable Cause

The aircraft's engine stopped due to fuel exhaustion and the pilot possible stalled the aircraft in an effort to extend his range to reach the airfield. The pilot exceeded stalling angle of the wing in an attempt to maximise lift in order to reach the alternate runway.

SRP Date	22 January 2019	Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner	**:** Etna Farms CC
Name of Operator	**:** Etna Farms CC
Manufacturer	**:** Savannah Africa
Model	**:** Savannah S
Nationality	**:** South Africa
Registration Marks	**:** ZU-TEF
Place	**:** Kei Mouth
Date	**:** 23rd January 2018
Time	**:** Unknown

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 of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (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 establish blame or liability****.*

Disclaimer:

This report is produced without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 The aircraft was imported from Italy as a kit which assembled and an annual inspection carried out after the assembly on 10 November 2017. A release to service certificate was signed off on the same day with an expiry date of 09 November 2018 or at 100.00 hours whichever occurs first.

1.1.2 On the 23rd January 2018 the pilot accompanied by a passenger took off from Robertsvale private airstrip for a test flight in the local area of Kei Mouth and back. The distance from Robertsvale to Kei Mouth was approximately 27 nautical miles

and from Kei Mouth to the accident site was approximately 3 nautical miles. The aircraft did not reach Robertsvale private airstrip and it was reported missing the following day on the 24th January 2018. An official search for the missing aircraft was initiated on the same day the aircraft was reported missing. The search was co-ordinated by the Aeronautical Rescue Coordination Centre (ARCC).

1.1.2. On Friday 26th January 2018 at approximately 09:00Z the wreckage of the missing aircraft was located near the Kei Mouth River. The aircraft was found crashed into dense bush on a farm near Morgan's bay. Both occupants were fatally injured. The aircraft was destroyed by a post impact fire that erupted. The aircraft was being flown for the purpose of test flight as it was a newly assembled aircraft. The aircraft was being prepared for a client in Mozambique.

1.1.3. The aircraft was found at the GPS position: S32°41'33.67" E028°19'30.59 elevation 40ft" above sea level. The aircraft collided with a tree with its right wing first followed by the nose.

Figure 1: Aircraft prior to the accident

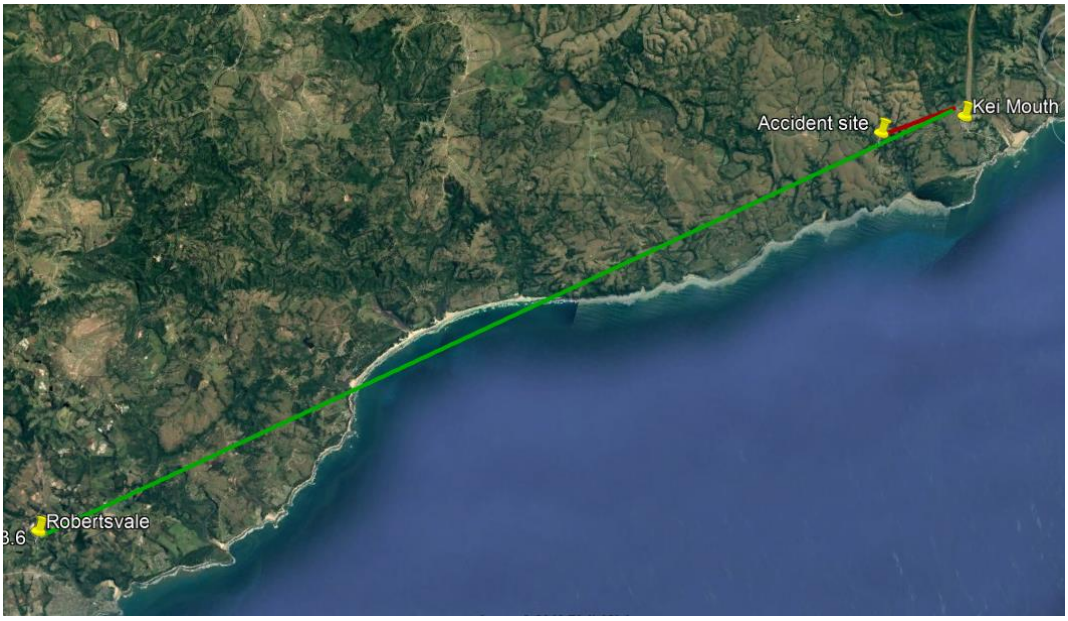


Figure 2: Approximate flight path

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed by post impact fire.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	59
Licence Number	XXXXXXXX	Licence Type	NPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Light Sports Aircraft				
Medical Expiry Date	31 December 2018				
Restrictions	Lenses				
Previous Accidents	Yes				

1.5.1 The pilot Light Sports Aircraft test was on 04 December 2017 and was to expire on 03 December 2019. His WCW was tested on 22 October 2007 and it expired on 21 October 2009. His medical certificate was issued on 18 December 2015 with an expiry date of 31 December 2018.

Flying Experience:

Total Hours	1580.5
Total Past 90 Days	18.2
Total on Type Past 90 Days	18.2
Total on Type	1266.6

1.6 Aircraft Information

Airframe:

Type	Savannah S
Serial Number	17-02-54-0524
Manufacturer	Savannah Africa
Year of Manufacture	2018
Total Airframe Hours (At time of Accident)	4
Last Annual Inspection (Date & Hours)	10 November 2017
Hours since Last Annual Inspection	4
C of A (Issue Date)	Test flight
C of R (Issue Date) (Present owner)	Test flight
Operating Categories	Part 148

1.6.1 The aircraft was still new and undergoing a process of a test flight. The aircraft manufacture was issued with and assigned with temporary registration, ZU-TEF for all new aircraft undergoing a test flights.

1.6.2 The certificate of release to service was issued on 10 November 2017 at 0.00 flying hours with an expiry date of 09 November 2018 or at 100.00 flying hours whichever occur first.

1.6.3 The aircraft was not issued with a proving flight authority to fly in terms of CAR 2011, Part 24 as stipulated in the manufacturing approval terms. The aircraft had flown for 4 hours since new.

1.6.4 The aircraft manufacturer's could not produce copies of fuel receipts or records indicating any fuel uplift as they refuelled from their own bowser, however they indicated that initially 30 litres was added to the aircraft and then another 60 litres of fuel was added in the aircraft. The total capacity of this aircraft is 80 litres (unusable fuel is 8 litres).

1.6.5 The aircraft fuel consumption is 17 litres/hour and the aircraft completed approximately 4.0 hours flights in four days. 4.0 hours would use up 68 litres of fuel in normal flight. This aircraft took off and landed at least 4 times which would significantly increase the fuel consumption.

1.6.6 The last weight and balance was signed out on 09 November 2017 and it was recorded that the total empty weight is 311.25.

1.6.7 The following Service Bulletins were signed out at 0.00 flying hours on 10 November 2017:

- Rotax S1-912-06 selection of operating fluid
- Rotax S1-912-1997 Oil level check
- Rotax S1-912-018 Purging of lubrication system and rocker arm clearance.
- ROtax S1-912-081 Magnetic plug check.
- Rotax S1-912-068 Stampedon data plate PLT-01
- Rotax S1-912-070 Inspection valve push rods

Engine:

Type	Rotax 912ULS
Serial Number	6786858
Hours since New	4
Hours since Overhaul	Not Yet Reached

NOTE: The engine tear down was not possible due to burn damage sustained by the engine.

Propeller:

Type	DUC Swirl Inconel
Serial Number	8828/8827
Hours since New	4
Hours since Overhaul	Not Yet Reached

1.7 Meteorological Information

1.7.1 Weather information as obtained from the South African Weather Services

Wind direction	220°	Wind speed	17 knots	Visibility	9999m
Temperature	24°C	Cloud cover	SCT at 2400ft AGL	Cloud base	600 to 999m
Dew point	17°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation instruments as per the manufacturer's design. Based on the records reviewed there were none which were reported unserviceable prior to the accident.

1.9 Communications.

1.9.1 The aircraft was equipped with the standard communication equipment as per the manufacturer's design. Based on the records reviewed there were none which were reported unserviceable prior to the accident.

1.10 Aerodrome Information

1.10.1 The accident did not occur at or near the aerodrome

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information

1.12.1 The aircraft collided with a tree with its right wing before it hit the ground followed by the post impact fire.

Figure 3: Accident site was approximately 3nm south west of Kei Mouth.

Figure 4: The tail section resting on its right hand side

1.13 Medical and Pathological Information

1.13.1 The Post Mortem concluded that incapacitation of the pilot was likely as a result of a heart attack and the cause of death was severe multiple injuries due to blunt trauma.

1.14 Fire

1.14.1 The post impact fire destroyed the aircraft.

1.15 Survival Aspects

1.15.1 The Accident was considered unsurvivable due to the damage of the cabin area as a result of the impact with the ground and subsequent post impact fire which destroyed the aircraft. It was not possible to determine if both occupants were strapped or not due to the safety harness being destroyed by fire.

1.16 Tests and Research

1.16.1 The engine was recovered and sent to a maintenance organisation for further investigation. The engine was destroyed by post impact fire and it was not possible to dismantle any component for further investigation as a result the possibility of determining if the engine was a factor in the accident could not be determined.

1.17 Organizational and Management Information

1.17.1 The aircraft was undergoing test flights and the manufacturer was issued a test flight registration ZU-TEF for all aircraft test on 19 September 2017. The manufacturer was also issued with an approval certificate (Approval no.M689) in accordance with CAR Part 148, Subpart 1 & 2 on 26 June 2017.

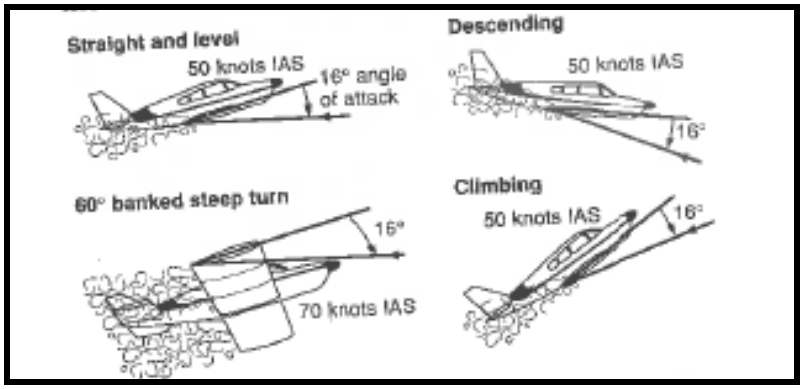
1.17.2 The manufacturer was issued a manufacturing approval with terms of comformance to CAR 2011, Part 42. Part 42 requires that the aircraft must be issued a proving flight authority to fly and neither the authority was issued for this aircraft. The manufacture allowed the carriage of passengers in this fatal flight which is prohibited by Part 42.

1.18 Additional Information

The following information is extracted from Trevor Thom Manual 1

1.18.1 Stall- streamline flow over the wings breaks down and becomes turbulent when the critical angle of attack is exceeded. This causes:

- Buffeting of the airframe, felt through the controls
- A marked decrease in lift resulting in sinking
- Rearward movement of the centre of pressure (through which lift act) resulting in the nose dropping
- A marked drag increase



Stalling will occur whenever the critical angle of attack is exceeded irrespective of airspeed. The only way to recover is to decrease the angle of attack (i.e relax the back pressure and/or move the control column forward).

The pilot can increase the angle of attack (and reduce airspeed) by pulling the control column back. This happens in many manoeuvres such as:

- Establishing slow flight
- Turning (especially steep turns)
- Pulling out of a dive and
- Landing

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1 The pilot had a valid national pilot's licence, was properly rated at the time of the accident. The pilot had approximately 1580.5 total flying hours. The pilot had a valid aviation medical certificate and was valid at the time of the accident.

2.2 The post mortem concluded that the pilot was incapacitated and the cause of his incapacity was likely due to a heart attack. The cause of death was multiple injuries due to blunt force tromaur.

2.3 The investigation revealed that the aircraft had 90 litres of fuel on board which was consumed over four separate days. After approximately 4 hours of flying and having not refuelled the aircraft. The aircraft's engine stopped due to fuel exhaustion and the pilot possibly stalled the aircraft in an effort to extend his range to reach the airfield.

2.4 The Aircraft was being flown for the purpose of test flight as it was newly assembled. The aircraft was issued with temporary (experimental) aircraft registration which was ZU-TEF. At the time of the accident the aircraft was not registered with the SACAA. There was no record of fuel uplift as the aircraft had caught fire.

2.5 The weather on the day of accident not a contributory factor to the accident.

2.6 According to Civil Aviation Regulation of 2011, only essential crew members, including those persons assigned to carry out in-flight inspections may be carried on board the aircraft during flights conducted in terms of a test flight authority.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot had valid national pilot licence with the aircraft type endorsed on his licence prior to the accident.

3.1.2 The pilot had a valid aviation medical certificate at the time of the accident. The certificate, which was issued on 18 December 2015 and was expiring on 31 December 2018.

3.1.3 It is probable that the pilot became incapacitated due to a heart attack, which resulted in him not being able to control the aircraft, and as a result, he crashed.

3.1.4 The Aircraft was being flown for the purpose of test flight as it was newly assembled and not registered nor issued with a flying permit.

3.1.5 Due to the post impact fire that destroyed the wreckage, it could not be determined if there was any component failure during the accident flight, both the aircraft and its components were destroyed.

3.1.6 Weather was not a contributory factor to the accident.

3.1.7 The time of the accident is unknown since aircraft was missing for two days before it was found.

3.1.8 The aircraft was destroyed by post impact fire and the pilot and the passenger suffered fatal injuries.

3.1.9 The manufacturer could not provide any evidence of the fuel uplift prior to the accident flight, however the owner's spouse estimated that there were 60 litres of fuel in the aircraft.

3.1.10 The engine was consumed by fire and was not possible to determine any

malfunction before the accident.

3.1.11 The investigation revealed that the pilot became incapacitated likely due to a heart attack caused by a pre-existing heart condition which resulted in him not being able to control the aircraft and as a result he lost control and crashed.

3.2 Probable Cause/s

3.2.1 The aircraft's engine stopped due to fuel exhaustion and the pilot possible stalled the aircraft in an effort to extend his range to reach the airfield. The pilot exceeded stalling angle of the wing in an attempt to maximise lift in order to reach the alternate runway.

4. SAFETY RECOMMENDATIONS

4.1 Safety Message

4.1.1 It is recommended that Pilots must always disclose their medical reports and medical condition from their general practitioner (GP) to the Designated Aviation Medical Examiner (DAME) this will assist in the process of medical fitness assessment for the pilot and it will prevent potential incapacitation of the pilot during flight.

5. APPENDICES

5.1 None