PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10070

Figure 1: Evektor SportStar, ZU-EIJ. (Source: Ben Snyman)

Description:

On Tuesday afternoon, 7 December 2021, an Evektor SportStar light aircraft with registration ZU-EIJ took off from Springs Aerodrome (FASI) with a pilot on-board. The ZU-EIJ pilot was accompanied by a friend flying his own aircraft with registration ZU-AZY. This was a private flight to the Bronkhorstspruit Dam and the pilots intended to land back at FASI. While flying over the dam from a northerly to a southerly direction, the left outer wing section of the ZU-EIJ aircraft failed in-flight. The pilot lost control of the aircraft and it twirled downward before it impacted the ground. The pilot was fatally injured in the accident. The flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

DESCRIPTION OF THE ACCIDENT

Reference number	**:** CA18/2/3/10070
Name of the owner	**:** AA Spring & Wire (Pty) Ltd
Type of operation	**:** Private (Part 94)
Manufacturer	**:** Evektor Aerotechnik A.S.
Model	**:** SportStar
Nationality	**:** South Africa
Registration markings	**:** ZU-EIJ
Place	**:** Bajadam Resort at Bronkhorstspruit Dam, Gauteng Province
Date	**:** 7 December 2021
Time	**:** 1520Z

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 (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****.*

Any person who has information concerning this accident should contact the Accident and Investigations Division (AIID) on AIIDinbox@caa.co.za

Investigation Process:

The AIID was informed of the accident by the Aeronautical Rescue Co-ordination Centre (ARCC) on 7 December 2021 involving an Evektor SportStar that occurred at Bajadam Resort at Bronkhorstspruit Dam. The AIID has appointed an investigator-in-charge (IIC) and will lead the investigation and issue the final report. The State of Design and Manufacture of the aircraft, the Czech Republic, was informed of the accident as per ICAO Annex 13 protocol and they have appointed a non-travelling Accredited Representative.

The information contained in this preliminary report is derived from the factual information gathered during the on-going investigation into the occurrence. Later, an interim report or the final report may contain altered information in case new evidence is found during the on-going investigation that require changes to the information depicted in this report.

The AIID reports are made available to the public at:
http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx

Notes:

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

   - Accident – this investigated accident
   - Aircraft – the Evektor SportStar involved in this accident
   - Investigation – the investigation into the circumstances of this accident
   - Pilots – the pilot involved in this accident
   - Report – this accident report

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

Disclaimer:

Abbreviation	
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AP	Approved Person
˚C	Degrees Celsius
CAR	Civil Aviation Regulations
CAVOK	Cloud and Visibility OK
CVR	Cockpit Voice Recorder
FASI	Springs Aerodrome (ICAO code)
FAKT	Kitty Hawk Aerodrome (ICAO code)
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
ICAO	International Civil Aviation Organisation
IIC	Investigator-in-charge
kW	Kilowatt
m	Meter
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
MTOW	Maximum Take Off Weight
nm	nautical miles
PIC	Pilot-in-command
POH	Pilot's Operating Handbook
QNH	Barometric Pressure Adjusted to Sea Level
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	Co-ordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
Z	Zulu (Term for Universal Coordinated Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Tuesday afternoon, 7 December 2021, an Evektor SportStar light aircraft with registration ZU-EIJ was on a private flight from Springs Aerodrome (FASI) with the intention to land back at FASI. The pilot was the sole occupant on-board the aircraft. A friend of the pilot who was flying his own aircraft with registration ZU-AZY (Zenair Zodiac 601HD), accompanied him. The ZU-AZY pilot had a passenger on-board. According to available information, the two aircraft took off from FASI at 1430Z.

1.1.2 During an interview with the pilot of the ZU-AZY aircraft, he stated that they had made a detailed assessment of the weather before the flight as they had intended to fly towards Fortuna Dam near Nigel, which is on the south of FASI. However, after take-off, they decided to fly to the north, over Bronkhorstspruit Dam, as weather conditions were not favourable towards the south. He indicated that they were flying in a loose formation (some distance apart) and visibility towards the north was good as he was able to see Bronkhorstspruit Dam after flying over the N12 freeway. He further stated that the ZU-EIJ pilot informed him (ZU-AZY) that he is going to fly past them on their left side. At this point, the aircraft were probably about 5-10 nautical miles (nm) south-west of the dam. Weather over the dam was clear.

1.1.3 The pilot of ZU-AZY stated that while he was flying over the western shore of the dam, the pilot of ZU-EIJ reported that he was over the dam wall. At this stage, the pilot flying ZU-AZY still had sight of the other aircraft. When they (ZU-AZY) flew over the ridge to the north of the dam, the pilot turned east; at that stage, his passenger said that he saw something fall from the sky. He then asked his passenger to point him to that direction; which was to the south, over the ridge. As they approached the location, the ZU-AZY pilot saw ripples (waves) on the surface of the dam. He proceeded to call the other aircraft over the radio several times, but he was unable to establish communication with the pilot. As they flew over the ridge, they encountered extremely turbulent conditions.

1.1.4 When overhead the crash site, the pilot tried to lower the right wing to have a better view of the site. The turbulence at that point was severe and he could not complete the manoeuvre, nor could he see (clearly) the site. He proceeded to turn to the right as he wanted to orbit the site. At this point, the turbulence was severe and he could only manage to slightly bank to the right to get out of the turbulence. The pilot stated that every time he turned, it felt as if the turbulence was going to overturn the aircraft. He indicated that he intended to return to FASI, but weather conditions deteriorated suddenly towards the south and he decided to divert to Kitty Hawk Aerodrome (FAKT), where they landed safely.

1.1.5 According to eyewitnesses staying next to the dam, they saw the aircraft flying over the dam from the north to the south, and towards the eastern side of the dam. At the time, a strong wind was blowing in the area. The eyewitnesses saw something (blue in colour) breaking off the aircraft fuselage while it was flying over the dam, whereafter, the pilot most probably lost control of the aircraft. The aircraft was seen twirling in the sky while descending before it impacted terrain (open field) on the southern side of the dam. The outer section of the left wing that failed was located approximately 100 metres (m) from the main wreckage, closer to the water line.

1.1.6 The accident occurred during daylight at Bajadam Resort at Global Positioning System (GPS) co-ordinates determined to be: 25°53'52.44" South, 028°42'38.00" East, at an elevation of 4 740 feet (ft).

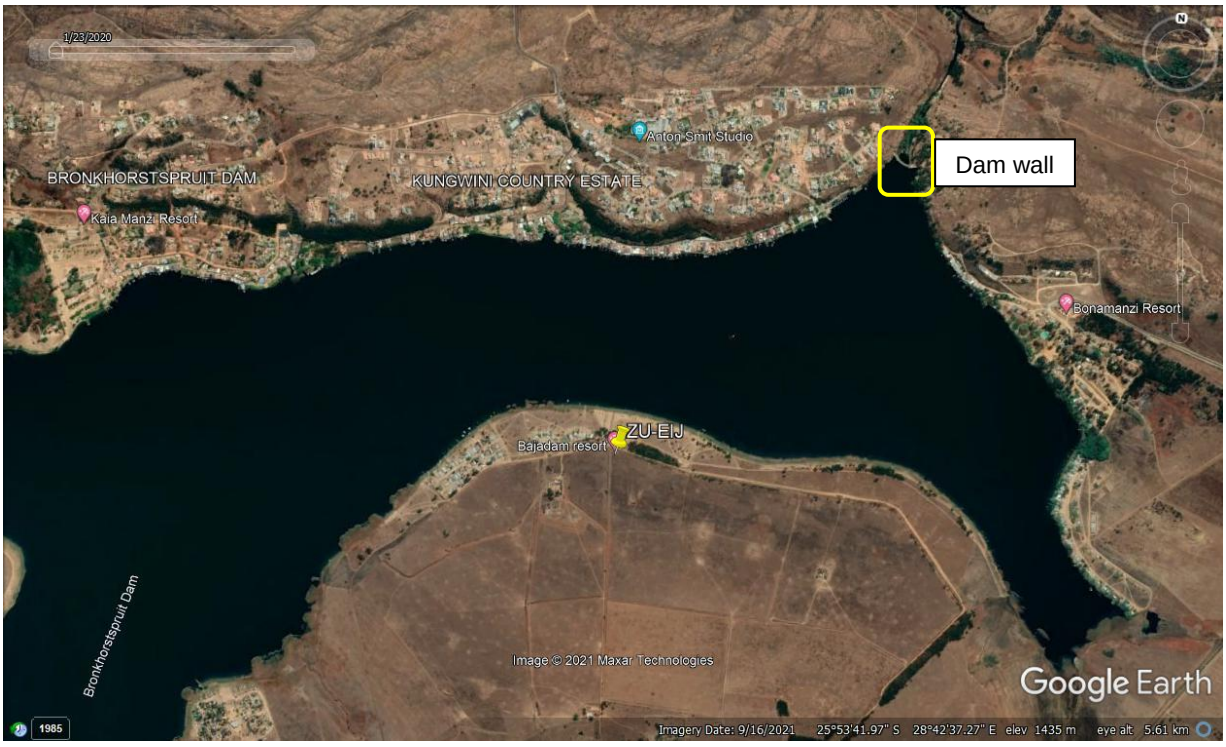


Figure 2: Overlay of the position of the accident site, yellow pin ZU-EIJ. (Source: Google Earth)

1.1 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during the impact sequence.

Figure 3: The main wreckage as it came to rest.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	49
Licence Number	027 228 0629	Licence Type	National Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 June 2022				
Restrictions	Hypertension Protocol				
Previous Accidents	None				

According to the pilot's logbook, he started flying on 3 July 2007 and, on 12 June 2008, he obtained his National Pilot Licence. During this period, he had flown 66.9 hours. He

continued to fly until 4 June 2009, when he stopped. He again started with flight training on 12 July 2018 and, on 2 September 2018, he passed his skills test and was issued a National Pilot Licence after he had flown 30.2 hours. During the period 30 June 2021 to 2 July 2021, the pilot conducted his conversion onto the Evektor SportStar, with 3.4 dual hours flown with a flight instructor. From 5 July 2021 to 11 October 2021 (the last entry in his pilot logbook) he had flown 44.7 hours as pilot-in-command (PIC) on the accident aircraft. The accident flight was his first flight after the flight on 11 October 2021.

Flying Experience:

Total Hours	333.8
Total Past 90 Days	28.4
Total on Type Past 90 Days	28.4
Total on Type	48.1

1.6 Aircraft Information

1.6.1 Aircraft description

Source: Pilot Operating Handbook (POH), Pg. 1-4

The Evektor SportStar aircraft is an all-metal low-wing of semi-monocoque structure with two side-by-side seats and three-wheel landing gear. The wings are of rectangular shape, single spar structure with the auxiliary spar with suspended ailerons and split wing flaps. Riveting is used for connecting individual structural elements. Fiberglass wing tips are riveted on the wing ends. The standard powerplant consists of Rotax 912 ULS engine, which produces 73.5 kilowatt (kW) and is fitted with a Woodcomp SR3000, three-blade propeller which is electrically adjustable. The maximum positive load factor is +4g and the maximum negative load factor is -2g.

Airframe:

Type	Evektor SportStar	
Serial Number	2006-0714	
Manufacturer	Evektor Aerotechnik A.S.	
Year of Manufacture	2006	
Total Airframe Hours (at time of the accident)	564.0	
Last Annual Inspection (hours & date)	515.4	7 June 2021
Hours Since Last Annual Inspection	48.6	
Authority to Fly (issue date)	16 September 2019	

Authority to Fly (expiry date)	30 September 2022
C of R (issue date) (Present Owner)	30 June 2021
Operating Categories	Production Built
MTOW	550kg

Engine:

Type	Rotax 912 ULS
Serial Number	5647035
Hours Since New	564.0
Hours Since Overhaul	TBO not yet received

Propeller:

Type	Woodcomp SR3000/3
Serial Number	PT276
Hours Since New	564.0
Hours Since Overhaul	TBO not yet reached

1.7 Meteorological Information

1.7.1 An official weather report was obtained from the South African Weather Service (SAWS). The closest weather station to the accident site is Irene, Pretoria. The weather information entered on the table below was captured at 1500Z at Irene.

Wind Direction	285˚	Wind Speed	5 knots	Visibility	+ 10 km
Temperature	27.1˚C	Cloud Cover	5 octas	Cloud Base	3 500ft
Dew Point	13.3˚C	QNH	850hPa		

1.7.2 Satellite image

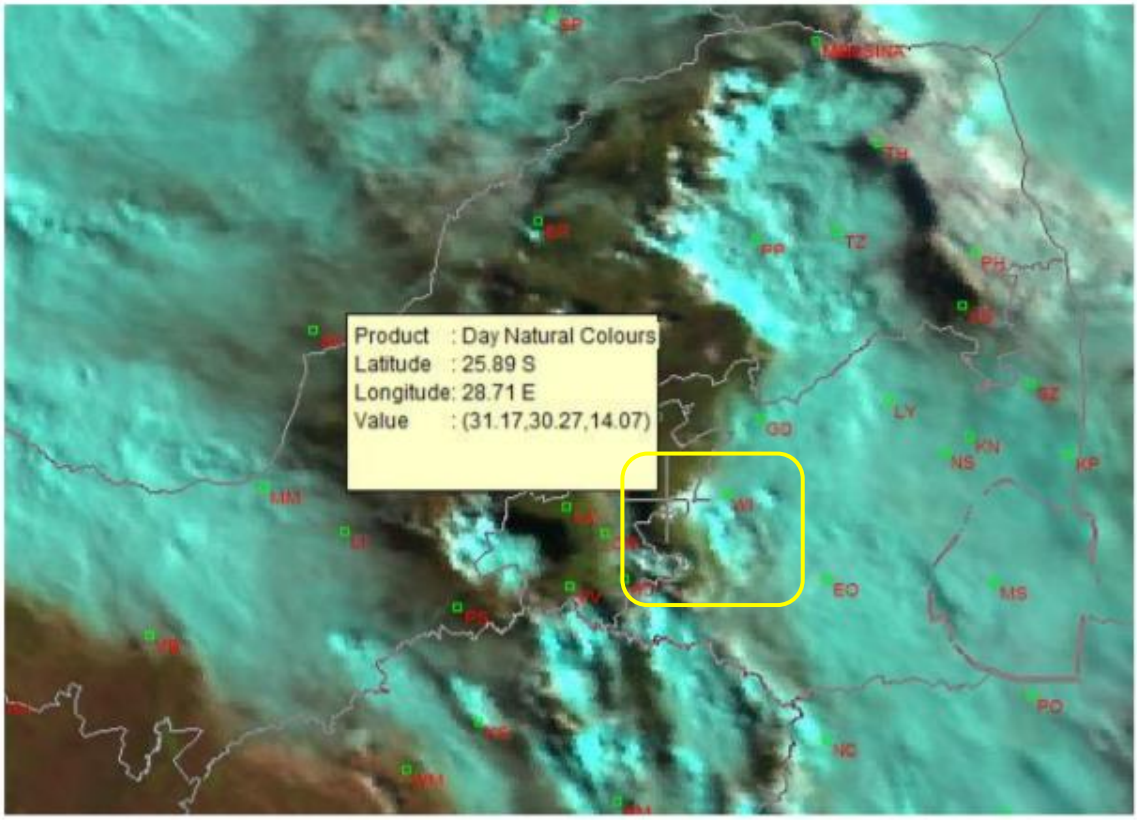
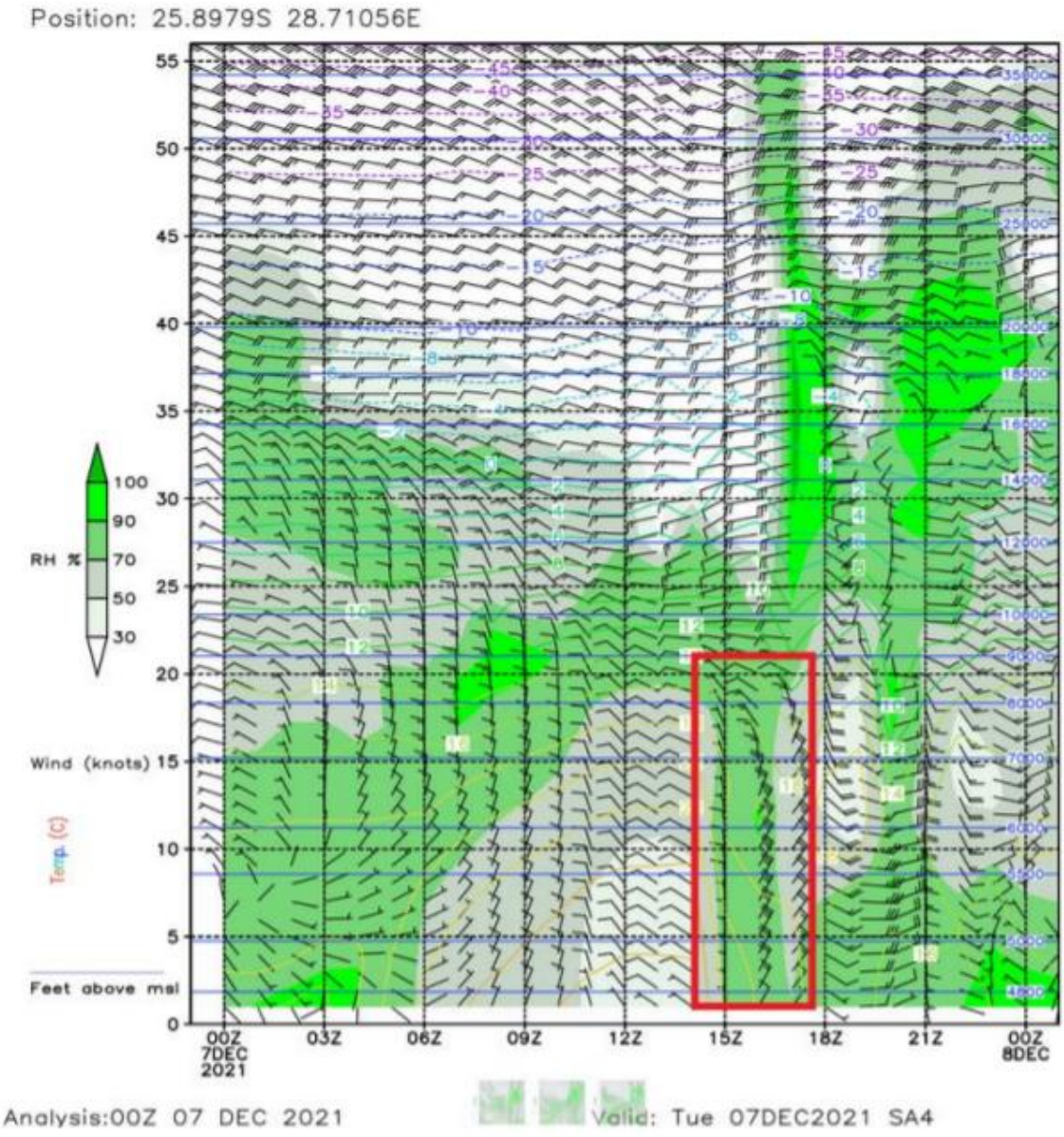


Figure 4: Satellite image of the accident site marked with a cross in the yellow frame.

The accident site (cross mark) is situated to the west of thunderstorms, which are visible in the Witbank (FAWI) area (overshooting tops can be seen). From this satellite image, it seems possible that cumulus/towering cumulus clouds were present in the area. The eyewitnesses report did not mention any significant clouds, so it is possible that this development might have been to the immediate east of the dam. It should also be noted that turbulence can be expected in any area where cumulus clouds are present.

1.7.3 Wind chart



The above images represent Unified Model data on 7 December 2021. The accident occurred at roughly 1515Z (contained inside the red rectangle). From the wind charts, the winds above the surface were expected to pick up to about 25 knots after 1500Z.

1.7.4 Conclusion

It seems possible that cumulus/towering cumulus clouds were present in the area along with relatively strong winds in the lower levels, which could have caused turbulence.

1.7.5 Weather observation

The investigator-in-charge (IIC) was contacted by a person who was fishing at the dam around the time of the accident. He stated that he had been fishing at the dam for several years. At 1447Z, he decided to take a few photographs of the prevailing

weather conditions. He took photographs towards the north, east, south and west, which he made available to the IIC.

Figure 5: This photograph was taken at 1447Z in a northerly direction. (Source: Brian Kriedemann)

Figure 6: This photograph was taken at 1447Z in an easterly direction. (Source: Brian Kriedemann)

At 1538Z, he again took several photographs of the prevailing weather conditions. He stated that this was after a *gale force wind* had passed over the area. He further stated that the conditions went from basically no wind to gale force wind in about 5 minutes. The wind was so strong that he could not take any more photographs during that period.

*NOTE: According to the Beaufort wind scale, a *gale force wind* is a wind between 34 to 40 knots (63 to 75 km/h).

Figure 7: This photograph was taken at 1538Z in an easterly direction. (Source: Brian Kriedemann)

Figure 8: This photograph was taken at 1538Z in a southerly direction. (Source: Brian Kriedemann)

1.8. Aids to Navigation

1.8.1 The aircraft were equipped with standard navigational equipment as approved by the Regulator. There were no records that indicated that the navigation system was unserviceable prior to the flight.

1.9 Communication

1.9.1 The aircraft were equipped with standard communication equipment as approved by the Regulator.

1.9.2 The two pilots were in radio communication with each other during the flight on the very high frequency (VHF) 125.40-Megahertz (MHz).

1.10 Aerodrome Information

1.10.1 This accident did not occur at or close to an aerodrome.

1.11 Flight Recorders

1.11.1 This aircraft were not equipped with flight data recorders (FDR) and cockpit voice recorders (CVR), nor was it required in accordance with the Regulations.

1.12 Wreckage and Impact Information

1.12.1 Following the failure of the outer section of the left wing in-flight, the aircraft was seen twirling towards the ground and impacted terrain (an open field) in a westerly direction. During the impact sequence, the right wing broke off whilst the inner section of the left wing remained attached to the fuselage. The entire propeller spinner assembly broke off from the the front section of the engine, all three propeller blades were severed at their respective roots and were accounted for along the impact line. This was indicative of an engine that was producing power on impact. The wreckage was severely disrupted during the impact sequence and most of the cockpit instruments ejected from the instrument panel. The empennage remained attached to the aft fuselage, and all control surfaces were accounted for. The main wreckage came to rest approximately 20m after the initial impact, with the right wing located to the left of the impact line. The left-wing outer section was located approximately 100m from the main wreckage.

Figure 9: The first point of impact with the main wreckage visible along the impact line.

Figure 10: An Aerial photograph of the impact point, the right wing and the main wreckage.

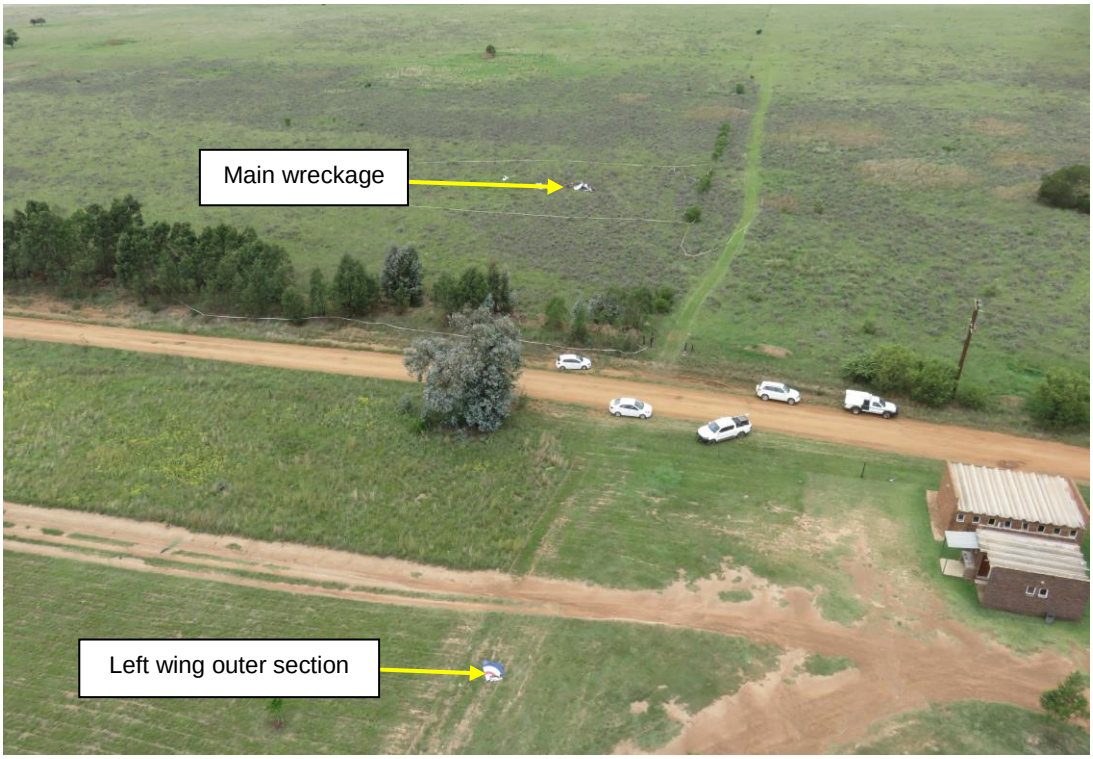


Figure 11: An aerial photograph of the main wreckage and the left-wing outer section.

Figure 12: The left wing, which was found still attached to the main wreckage.

Figure 13: The left-wing outer section.

1.13 Medical and Pathological Information

1.13.1 To be included in the final report.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 This accident was not survivable.

1.16 Tests and Research

1.16.1 The entire left wing (both sections) as well as the main wing spar centre section were recovered from the accident site and were sent for metallurgical examination, which the results would be discussed in the final report.

1.17 Organisational and Management Information

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

1.17.2 The last annual inspection that was carried out on this aircraft prior to the accident flight was certified on 7 June 2021 at 515.4 airframe hours by an Approved Person (AP). A further 48.6 hours were flown post-inspection.

1.18 Additional Information

1.18.1 To be discussed in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed in the final report.

2. Findings

2.1 General

From the evidence available, the following preliminary findings were made with respect to this incident. 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 conclusions heading:

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

2.2 Findings

Although the investigation is on-going, the following provisional findings were made:

The pilot

2.2.1 The pilot was in possession of a National Pilot Licence (NPL). According to his logbook, he had flown a total of 333.8 hours, of which 48.1 hours were on the aircraft type.

2.2.2 The PIC was issued a valid Class 4 aviation medical certificate with an expiry date of 30 June 2022.

2.2.3 The pilot had conducted his type conversion onto the aircraft over the period 30 June 2021 to 2 July 2021; during this period, he flew 3.4 dual hours with a flight instructor.

The aircraft

2.2.4 The aircraft was issued an Authority to Fly on 21 April 2021 with an expiry date of 30 April 2022.

2.2.5 The aircraft was issued a Certificate of Registration on 30 June 2021.

2.2.6 The last annual inspection carried out on the aircraft prior to the accident flight was certified on 7 June 2021 at 515.4 airframe hours. The aircraft had accumulated a further 48.6 airframe hours since the said inspection.

2.2.7 A Certificate of Release to Service was issued on 7 June 2021, which would lapse at a total of 615.4 hours of flight time or on 7 June 2022, whichever occurs first.

2.2.8 The outer section of the left wing failed in-flight and broke off the aircraft.

2.2.9 The entire left wing (both sections) was recovered from the accident site and was sent for metallurgical examination.

Environment

2.2.10 According to the eyewitnesses interviewed, a sudden wind from the east, described by one of the eyewitnesses to be a *gale force wind,* blew in the area around the time of the accident for a period of approximately 5 to 10 minutes before it calm down (died down).

2.2.11 The pilot flying the ZU-AZY aircraft stated that while flying over the dam, they (him and the passenger) encountered extremely turbulent flying conditions and could see waves (ripples) on the water surface. He was unable to orbit to the accident site as it felt like the aircraft was going to overturn.

2.2.12 The pilot flying the ZU-AZY aircraft also stated that he was unable to return to FASI due to deteriorating weather conditions towards the south and he opted to divert to FAKT.

3. On-going Investigation

3.1 The AIID investigation is on-going and will look into all other aspects of this accident, which may or may not have safety implications.

4. Safety Recommendations

4.1 None.

5. Appendices

5.1 None.

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