LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/1500								
Classification	Serious Incident		**Date**	29 August 2025			**Time**	1000Z	
Type of Operation	Private Operation of Non-type Certificated Aircraft (Part 94)								
Location									
Place of Departure	Wonderboom Aerodrome (FAWB), Gauteng Province			Place of Intended Landing			Wonderboom Aerodrome (FAWB), Gauteng Province		
Place of Occurrence	Kroon Airfield, Gauteng Province								
GPS Co-ordinates	Latitude	25°39'32.36" S		Longitude	028°00'20.73" E		Elevation	4 312 feet	
Aircraft Information									
Registration	ZU-WIL								
Make; Model; S/N	Jabiru J430 (Serial Number: 516)								
Damage to Aircraft	Minor			Total Aircraft Hours	1 361.3				
Pilot-in-command									
Licence Type	Commercial Pilot Licence			Gender	Male		Age	29	
Licence Valid	Yes	Total Hours		791.2	Total Hours on Type			27.6	
Total Hours 30 Days	26.4			Total Flying Hours on Type Past 90 Days	26.4				
People On-board	1 + 1	**Injuries**	0	**Fatalities**	0	**Other (on ground)**		0	

What Happened

On Friday morning, 29 August 2025, a pilot and a passenger on-board a Jabiru J430 aircraft with registration ZU-WIL departed from Wonderboom Aerodrome (FAWB) in Gauteng province with the intention to return to the same aerodrome. The flight was conducted under visual meteorological conditions (VMC) and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011, as amended.

The aircraft was refuelled on 21 August 2025 with 78 litres of Avgas, which brought the total amount in the two wing tanks to full capacity at 140 litres, of which 135 litres was usable. According to the pilot, the flight endurance was approximately 5 hours and 30 minutes. After taking off from FAWB at 0630Z, the pair flew to Bela Bela and, thereafter, to Rustenburg to tests survey equipment that was installed in the aircraft. The pilot stated that they experienced severe turbulence which caused rapid vertical and longitudinal movements and, thus, could not rely on the fuel sight gauges as the sloshing of fuel in the tanks made it difficult to obtain an accurate reading during the flight. He then opted to end the flight and return to FAWB.

During the return flight whilst approaching FAWB from the west at approximately 1 200 feet (ft) above ground level (AGL), the engine spluttered and, shortly thereafter, stopped. The pilot reported that he did not attempt to restart the engine as he did not have sufficient time to do so. He glided the aircraft to Kroon Airfield, which was straight ahead of their flight path. According to the pilot, at this stage, the aircraft had been airborne for 3 hours and 54 minutes (3.9 hours).

The pilot reported a presence of a 15-knot tailwind as they approached Runway 11 for landing at Kroon airfield, which resulted in a deep landing past the halfway mark of the 750-metre runway. He deduced he will not be able to bring the aircraft to a stop on the remaining runway; therefore, he was faced with two options: to continue straight into the trees beyond the end of the runway or to steer to the left and burst through the airfield's barbed wire perimeter fence; he elected the latter option. After the aircraft had come to a stop, he switched off the master switch and the pair disembarked from the aircraft; they were not injured.

After the serious incident, the pilot stated that the turbulence they experienced might have contributed to fuel leaking from the filler caps of both wing tanks as the aircraft rolled along the longitudinal axis, but this could not be confirmed as they did not observe any fuel leaks during the flight.

The serious incident occurred during the day at Global Positioning System (GPS) co-ordinates determined to be 25°39'32.36" South 028°00'20.73" East, at an elevation of 4 312ft.

Figure 1: The yellow pin indicates the position where the aircraft came to rest. (Source: Google Earth)

Figure 2: The aircraft after it had stopped. (Source: Pilot)

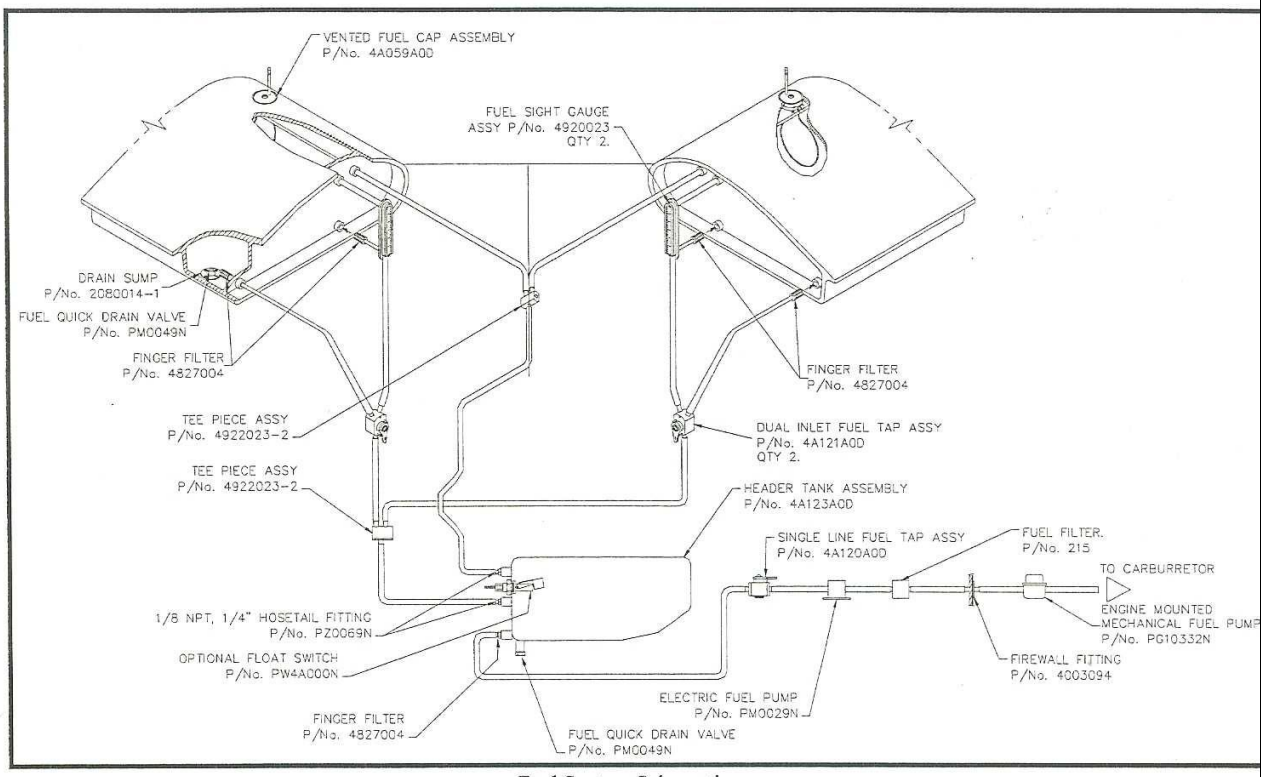
Figure 3: The barbed wire entangled around the propeller spinner and windshield. (Source: Pilot)

A team from the original equipment manufacturer (OEM) in George was sent to recover the aircraft to the factory for repairs. The team arrived on 8 September 2025, 10 days after the serious incident had occurred. Fifteen (15) litres of fuel was drained from the quick-drain valve at the bottom of the header tank (see Figures 4 and 5).

Figure 4: Fuel is drained through the quick-drain valve at the bottom of the header tank.

Figure 5: The drained 15 litres of fuel.

Fuel is pump-fed from the two main fuel tanks located inside the wings via a 'dual inlet fuel tap' assembly located within the fuel lines either side of the door pillars. These lines feed the header tank, which has a total fuel capacity of 6.5 litres. From the header tank, fuel passes through a fuel filter (finger type) then through a third fuel tap/fuel shut-off valve assembly (see Diagram 1) to the carburettor. Two fuel pumps are incorporated in the system, one being the primary fuel pump (engine drive/mechanical type), and the other an electrical fuel pump in the cabin area. Positive ventilation is provided by vented fuel caps. The airspaces of all the tanks are connected to ensure even feeding.



Fuel System Schematic
Wet Wing, Header Tank & vented Caps

Diagram 1: Schematic diagram of the fuel system.

In the above diagram, the fuel quantity is visible via a sight gauge fitted on either side of the cockpit above the door pillar. The fuel supply from the wing tanks to the header tank is a gravity feed. The header tank is located underneath the right front seat.

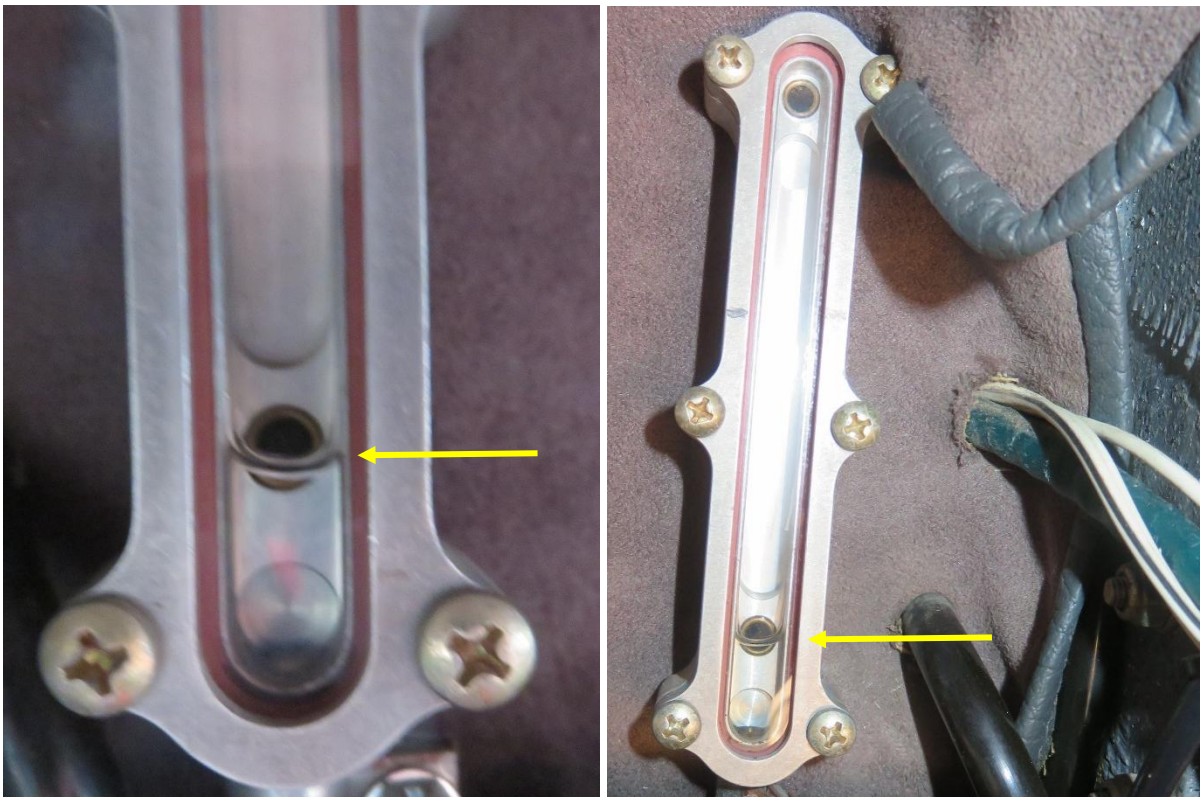


Figure 6: The fuel sight gauges on the left- and right-side wing tanks show depleted fuel.

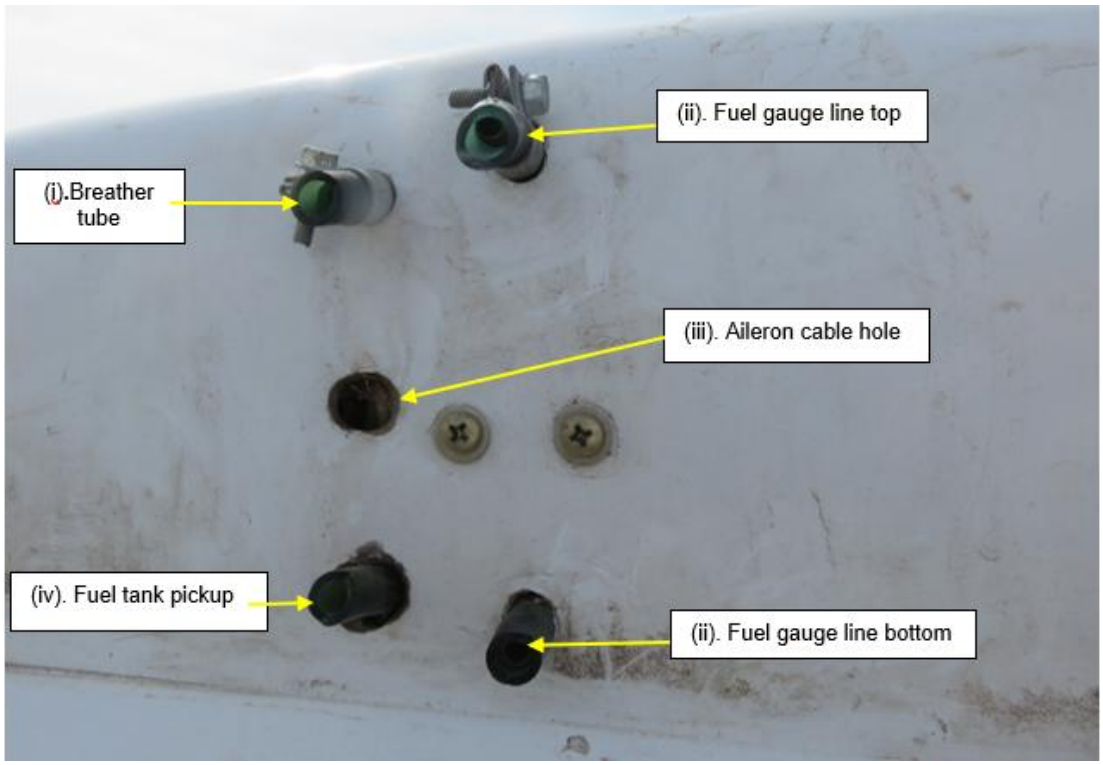


Figure 7: The aircraft wing root showing
(i) the breather tube, (ii) the two fuel gauge lines.
(iii) the aileron cable hole, and (iv) fuel supply line feeding the header tank.

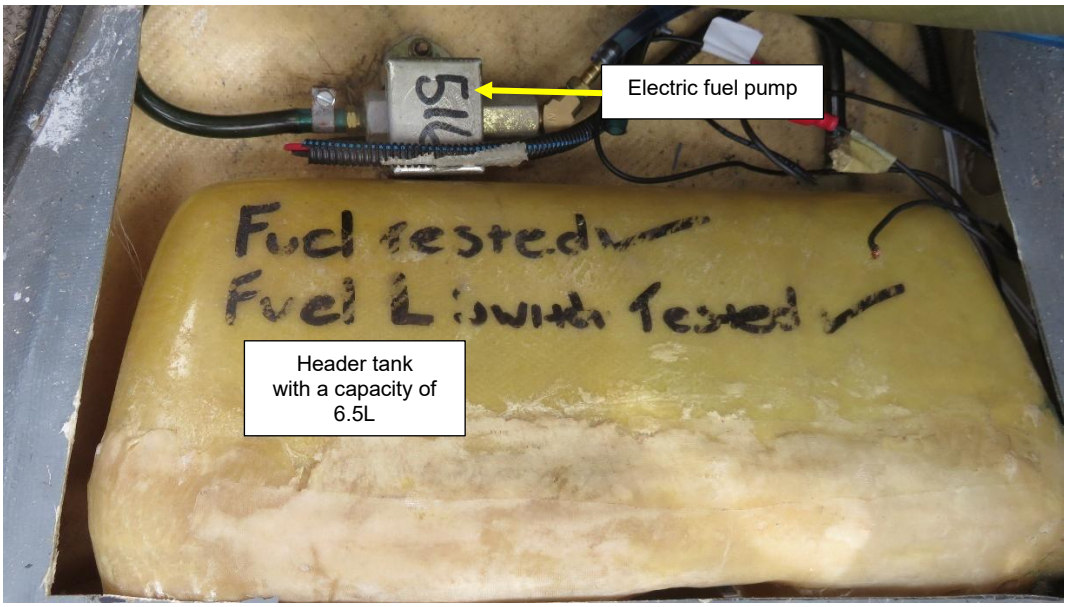
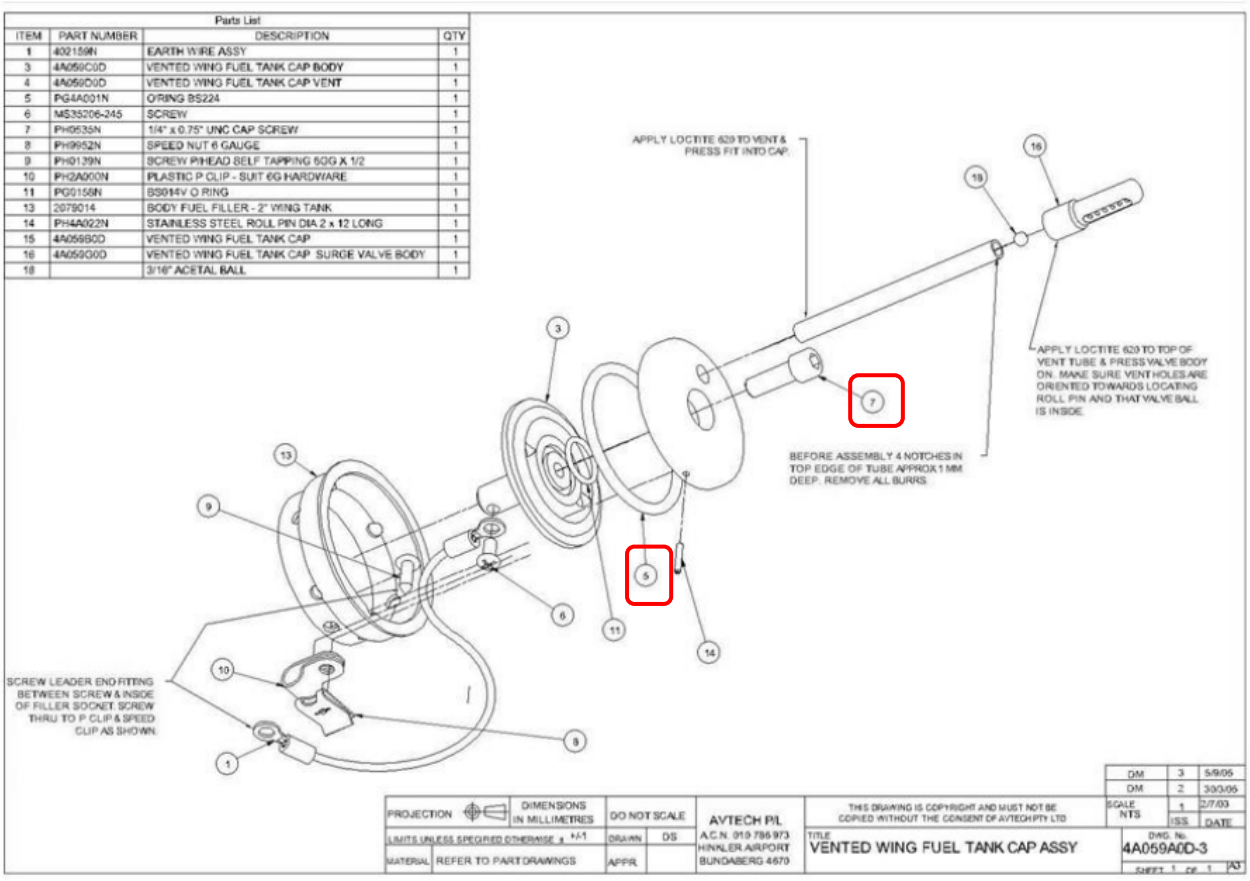


Figure 8: The header tank and the electric fuel pump are installed underneath the right front seat.

Figure 9: Fuel streak on top of the right wing indicates fuel leak from the wing tank.
(This photo was taken on 2 September 2025, four days after the serious incident flight).



Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY
1	402159N	EARTH WIRE ASSY	1
3	4A059C0D	VENTED WING FUEL TANK CAP BODY	1
4	4A059D0D	VENTED WING FUEL TANK CAP VENT	1
5	PG4A001N	O'RING BS224	1
6	MS35206-245	SCREW	1
7	PH0635N	1/4" x 0.75" UNC CAP SCREW	1
8	PH9952N	SPEED NUT 6 GAUGE	1
9	PH0139N	SCREW P/HEAD SELF TAPPING 6DG X 1/2	1
10	PH2A000N	PLASTIC P CLIP - SUIT 6G HARDWARE	1
11	PG0156N	BS014V O RING	1
13	2079014	BODY FUEL FILLER - 2" WING TANK	1
14	PH4A022N	STAINLESS STEEL ROLL PIN DIA 2 x 12 LONG	1
15	4A059B0D	VENTED WING FUEL TANK CAP	1
16	4A059G0D	VENTED WING FUEL TANK CAP SURGE VALVE BODY	1
18		3/16" ACETAL BALL	1

Diagram 2: Vented fuel tank cap assembly. (Source: Technical Manual for Jabiru Aircraft)

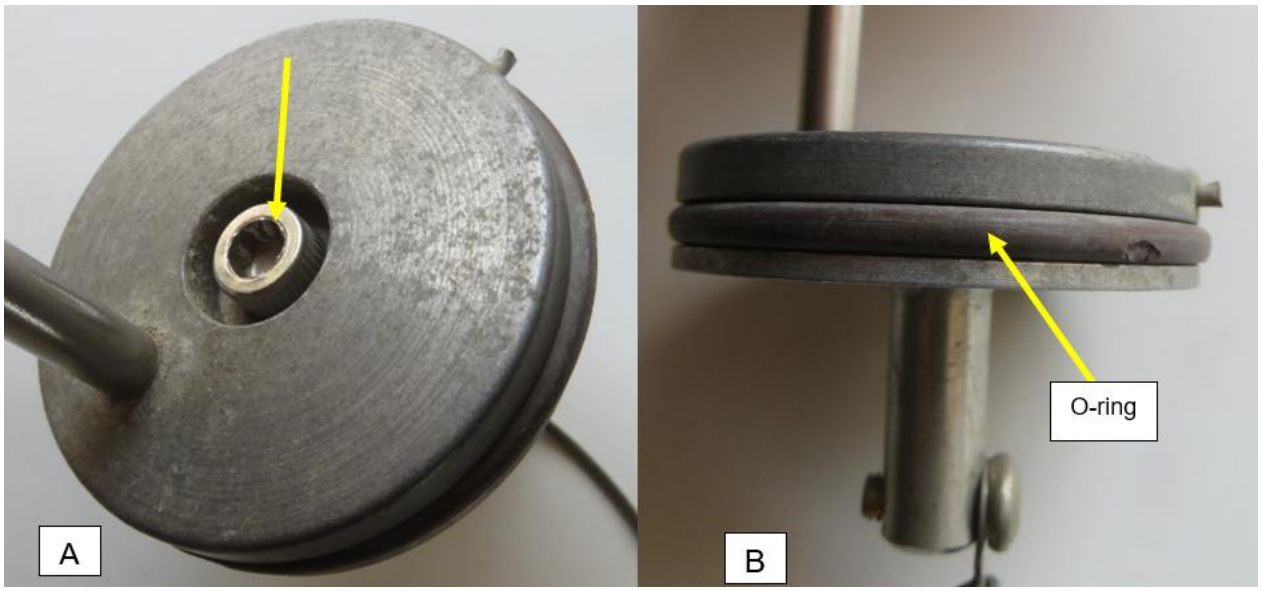


Figure 10: (a) The cap screw, which is used to tighten the fuel cap, was found to be elongated. (b) A side view of the fuel cap with the O-ring visible. The O-ring expands when the cap screw is tightened, securing the fuel cap to the fuel tank filler body.

Figure 10 displays the right-wing tank fuel cap. The cap screw on the left side also displays the same type of wear and tear.

The cap screw is tightened using either a Hex T bar or an Allen key, which is an L-shaped tool designed to turn bolts and screws with a hexagonal (six-sided) socket.

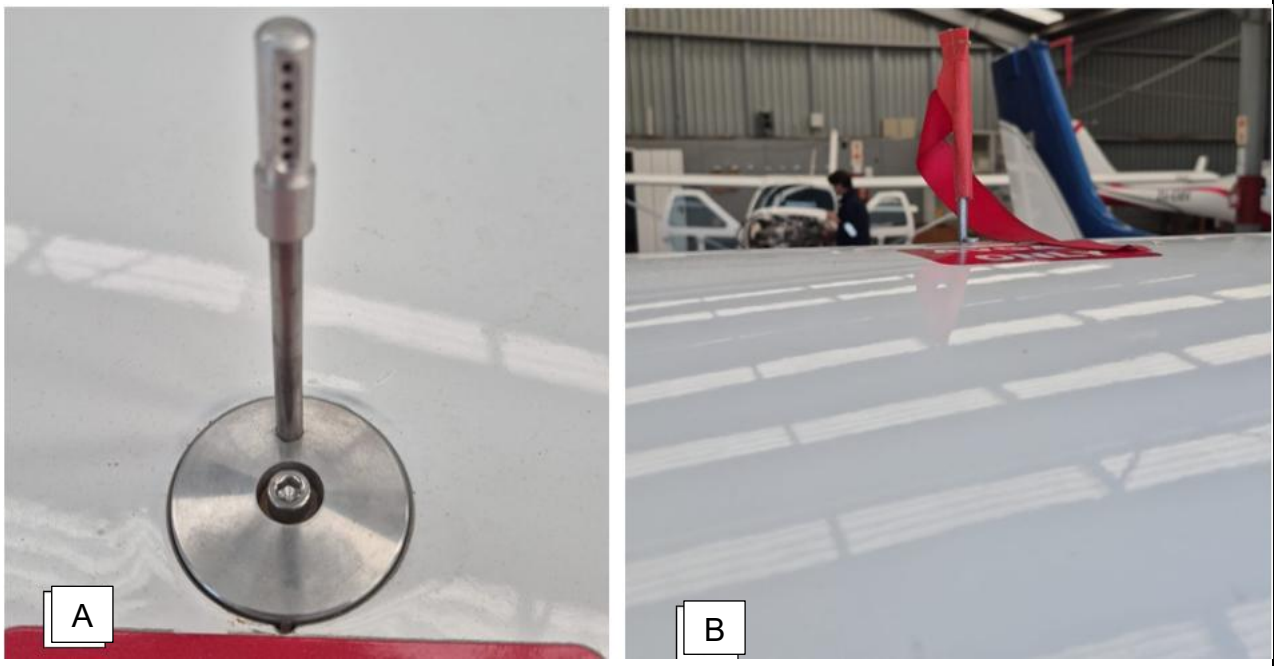


Figure 11: (a) Displays a new fuel cap.
(b) Indicates the fuel cap with the cover used to prevent insects and dirt from entering the vent holes.
(Source: Jabiru Aircraft manual)

Figure 12: A Hex T bar (left) and an Allen key (right).

Figure 13a and b display the total amount of fuel that was drained from the left- and right-wing tanks purge valves on 2 September 2025.

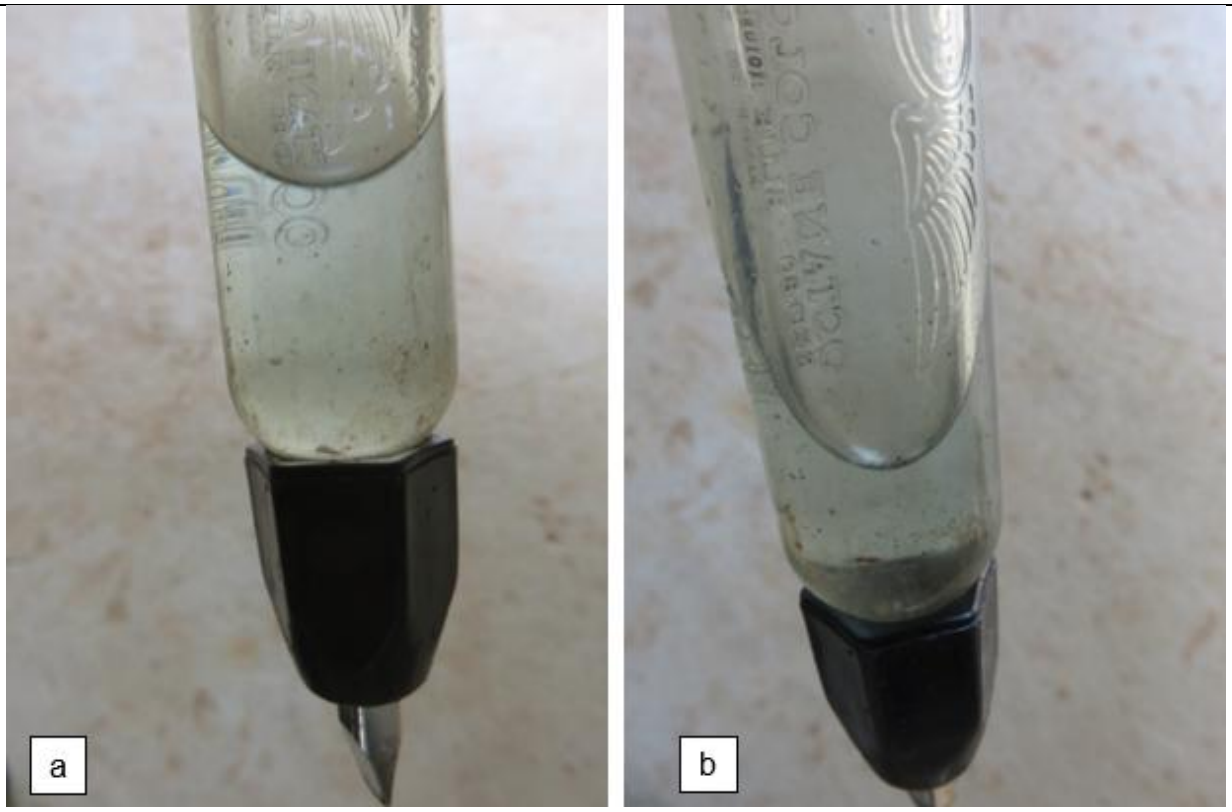


Figure 13: The fuel drained from the left-wing (a) and right-wing (b) tanks.

Figure 14: A photograph of the right-wing tank taken on 2 September 2025. The tank was empty after the fuel tank cap was removed.

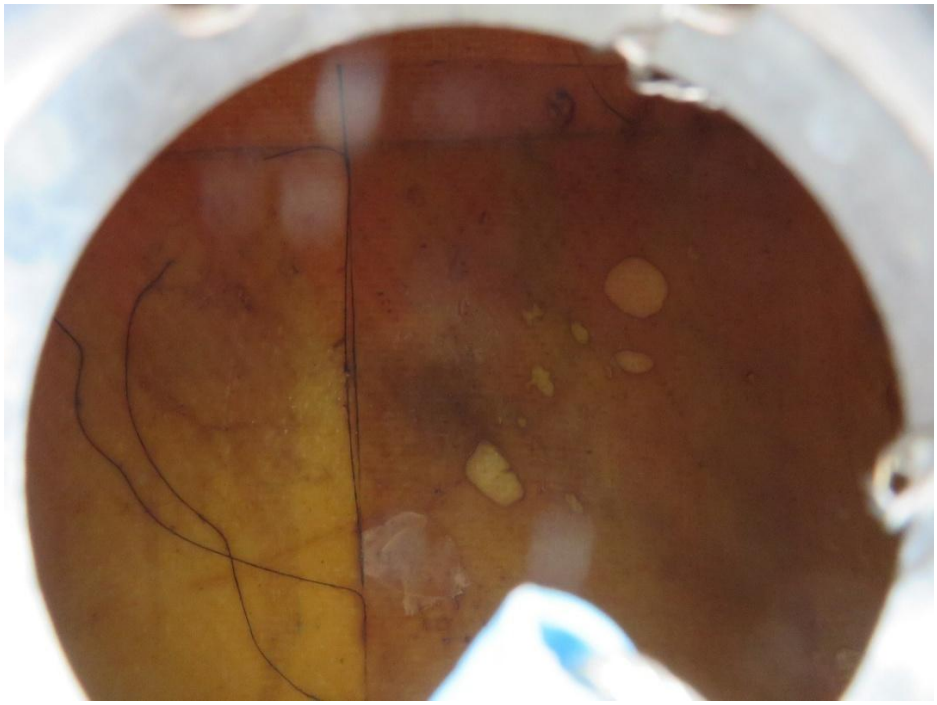


Figure 15: A photograph of the left-wing tank taken on 2 September 2025. The tank was empty after the fuel cap was removed.

Aircraft Flight Folio

The table below shows ZU-WIL flights and fuel uplifts recorded in the flight folio:

Date	From	To	Flight duration as per Hobbs Hours	Fuel uplifts in litres (L)	Place of Fuel uplift	Average fuel consumption for each flight
26/03/2025	FASH	FAGG	2.6	27	FASH	
15/04/2025	FAGG	FASH	2.2	52	FAGG	20.0
24/06/2025	FASH	FAWEL	0.9	----------	----------	
9/07/2025	FAWEL	FASH	0.5	----------	----------	
8/08/2025	FASH	FABW	2.8	72	FASH	21.7
8/08/2025	FABW	FABL	3.2	58	FABW	18.1
9/08/2025	FABL	FAWB	3.3	78	FABL	24.4
11/08/2025	FAWB	FAWB	1.1	----------	----------	
12/08/2025	FAWB	FAWB	1.1	37	FAWB	
14/08/2025	FAWB	FAWB	3.9	----------	----------	16.8
15/08/2025	FAWB	Airspan	4.0	87	FAWB	22.3
15/08/2025	Airspan	FAWB	0.8	68	FAWB	17.0
19/08/2025	FAWB	Airspan	4.1	16	FAWB	20.0
19/08/2025	Airspan	FAWB	3.7	69	FAWB	16.8
21/08/2025	FAWB	FAWB	3.8	68	FAWB	18.4
29/08/2025	FAWB	Forced landing	3.9	78	FAWB	20.0

Based on the fuel uplift data, the average fuel consumption was 18.94 litres per hour. It could not be determined if the aircraft was refuelled to maximum capacity each time fuel was uplifted.

The aircraft had a usable fuel load of 135 litres. Considering the serious incident flight, after being airborne for 3 hours and 54 minutes (3.9 hours), approximately 78 litres of fuel was used. If the aircraft had been refuelled to capacity before the flight, about 57 litres of usable fuel would have remained in the wing tanks. During the dismantling of the aircraft on 8 September 2025 for transportation purposes, 15 litres of fuel was drained; 6.5 litres was from the header tank and 8.5 litres should have been from the fuel lines and wing tanks. This indicated that approximately 48 litres of fuel from the wing tanks was unaccounted for if the aircraft was refuelled to capacity before the flight. The pilot stated in a questionnaire form (CA 12-03) that 1 hour and 50 minutes duration of fuel should have remained in the fuel tanks when he landed at Kroon Airfield, which would equate to approximately 38 to 40 litres.

The last two pages of the flight folio document referenced above contained several inaccurate entries; moreover, not all flights were recorded. Part 91.03.5 of the CAR read in conjunction with the South African Civil Aviation Technical Standards (SA-CATS) 91.03.5 state that this document should be maintained accurately and legibly.

On 9 August 2025, the flight folio indicated that 123 litres of fuel was uplifted at Bram Fischer International Aerodrome (FABL) in Bloemfontein; this amount was entered in error as the actual amount uplifted was 78 litres (information was obtained from the official invoice). The next morning (10 August 2025), the aircraft was flown from FABL to Potchefstroom Aerodrome (FAPS) where 46 litres of fuel was uplifted. There was neither an entry in the flight folio that reflected the flight from FABL to FAPS, nor was there any record that fuel was uplifted. No entry in the flight folio reflected the flight from FAPS to FAWB as illustrated in the table below. The flight time for both flights was unknown to the investigator and was, therefore, left blank (on the table below).

Date	From	To	Flight duration as per Hobbs Hours	Fuel uplifts in litres (L)	Place of Fuel uplift	Average fuel consumption for each flight
9/08/2025	FABL	FAPS		46	FAPS	N/A
9/08/2025	FAPS	FAWB				N/A

According to available information, the last fuel uplift before the serious incident flight was on 21 August 2025 during which 78 litres of fuel was uplifted. The aircraft was then parked in a hangar until the flight on 29 August 2025. According to the pilot, he physically checked the fuel content of both wing tanks during the pre-flight inspection.

Fuel Records

Part 91.03.6 (1) The owner or operator shall maintain fuel records to enable the Director to ascertain that, for each flight under his or her control, the requirements of regulation 91.07.12 are complied with.
(2) The PIC of the aircraft shall enter the fuel and oil records referred to in subregulation (1) in the flight folio.
(3) The owner or operator shall maintain oil records to enable the Director to ascertain that trends for oil consumption are such that an aircraft has sufficient oil to complete each flight.

Extract from Jabiru J430 Owner's Manual

Section 3, Emergency Procedures
ENGINE FAILURE DURING FLIGHT

1 Airspeed	*Best Glide Angle 80 KIAS*
2 Carburettor Heat	*ON*
3 Fuel Shut-off Valve	*ON*
4 Fuel Pump	*ON*
5 Ignition Switches	*ON*

A slightly higher speed may give better distance over the ground if gliding into wind; a slightly lower speed if gliding downwind.

In the event that the engine is stopped during flight, it may be restarted by application of fuel and ignition, provided that the propeller is still windmilling.

The propeller may stop windmilling below 80 KIAS.

The JABIRU 3300 engine is a high compression (8:1) engine & therefore air-starts when the propeller has stopped rotating, without the use of a starter, are unlikely before reaching Vne.

(3.3.3.) Forced Landing

EMERGENCY LANDING WITHOUT ENGINE POWER

1 Airspeed	*80 KIAS (flaps UP) Approach 65 KIAS (flaps DOWN)*
2 Fuel Shut-off Valve	*OFF*
3 Fuel Pump	*OFF*
4 Ignition Switches	*OFF*
5 Wing Flaps	*as required*

6 Master Switch	*OFF*
7 Touchdown	*Slightly Tail Low*
8 Brakes	*as required*

Meteorological Conditions

The closest licensed aerodrome to Kroon Airfield is Wonderboom Aerodrome (FAWB), approximately 12 nautical miles to the east. *FAWB has an official weather station*. The Meteorological Aerodrome Report (METAR) that was issued on 29 August 2025 at 1000Z for FAWB indicated the weather to be fine as tabled below.

FAWB 291000Z AUTO 34008KT //// // ////// 27/M01 Q1024=

Wind Direction	340°	Wind Speed	8kt	Visibility	9999m
Temperature	27°C	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	-1°C	QNH	1024hPa		

Engine Ground Run

Figure 16: Image taken during the engine ground run test.

The engine, a Jabiru 3300A with serial number 33A-1743, was not damaged during the serious incident. An engine test run was conducted with the engine in the airframe after the aircraft was recovered to the OEM in George; during the test, a loaner propeller was fitted and the engine

cowlings and wings were removed. The engine started without difficulty, and normal engine operating parameters were met during the ground run. The engine was switched off, and a restart was conducted without difficulty. The electrical fuel pump was tested and found to be functional. The electrical fuel pump was also switched on and off during the engine ground run with no indication of variation in engine revolutions per minute (RPM) which indicated that the mechanical fuel pump was also serviceable. No fuel leaks were identified during the ground run test.

Findings

1 Personnel

1.1 The pilot had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator (SACAA) on 24 March 2020. The reissued CPL was valid until 31 July 2026. The pilot had flown 791.2 hours of which 27.6 hours were on the aircraft type.

1.2 The pilot had a Class 1 aviation medical certificate that was issued on 1 November 2024 with an expiry date of 30 November 2025. He had the following limitation on his medical certificate: Valid only with correction for defective distant vision (VDL).

1.3 According to the pilot, he checked the fuel levels in the wing tanks during the pre-flight inspection using one of his fingers (to determine the levels).

1.4 The aircraft experienced severe turbulence, and the pilot opted to return to FAWB before completing the intended survey equipment testing.

1.5 The pilot did not conduct an engine restart after it had stopped as he had insufficient time to do so.

2 Aircraft

2.1 The aircraft was manufactured in 2008 by the original equipment manufacturer (OEM) in George, South Africa.

2.2 The last annual inspection of the aircraft was conducted on 9 July 2025 at 1 322.6 airframe hours. The aircraft had accrued 38.7 hours after this inspection.

2.3 The aircraft was reissued an Authority-to-Fly (ATF) Certificate on 22 July 2025 with an expiry date of 31 July 2026.

2.4 The aircraft Certificate of Registration (C of R) was issued to the present owner on 18 January 2022.

2.5 The Certificate of Release to Service (CRS) was issued on 9 July 2025 with an expiry date of 9 July 2026 or at 1 422.6 airframe hours, whichever comes first.

2.6 The aircraft was airborne for approximately 3 hours and 54 minutes (3.9 hours) when the engine stopped.

2.7 The two fuel taps on the door pillars were in the “open” position when the investigator inspected the aircraft on Tuesday, 2 September 2025, at Kroon Airfield. The third fuel tap in the centre console in the cockpit was also found in the “open” position, as required for the flight.

2.8 During the inspection of the aircraft on 2 September 2025 at Kroon Airfield, both fuel sight gauges indicated empty wing tanks (see Figure 6). Fuel was drained from the purge valves of both wing tanks using a fuel tester; a small amount of fuel was drained from each wing tank (see Figure 14). No fuel was visible in either of the wing tanks when the fuel caps were removed (see Figures 14 and 15).

2.9 Neither of the fuel tank cap screws could be loosened or tightened with a Hex T bar or an Allen key as required before and after refuelling because the cap screw sockets were widened. The fuel caps were, therefore, pressed into position but were not secured as required.

2.10 Fifteen (15) litres of fuel was drained from the aircraft on 8 September 2025 via the header tank drain valve. The header tank contained 6.5 litres of fuel; the fuel that remained in both wing tanks combined was approximately 8.5 litres. Approximately 48.5 litres of fuel from the wing tanks was unaccounted for if the tanks were filled to maximum on 21 August 2025.

2.11 The engine was not damaged during the serious incident. The engine test run (with the engine in the airframe) was conducted after the aircraft was returned to the OEM in George. The engine started without difficulty, and normal engine operating parameters were met during ground runs.

2.12 There was no oversight conducted by the owner/operator of the aircraft regarding data recordings in the flight folio, especially fuel uplifts and route information. This was in contravention of the provisions of the Civil Aviation Regulations 2011.

3 Meteorological Conditions

3.1 The pilot stated that they had severe turbulence during the flight and he opted to return to FAWB without completing the survey.

4 Aerodrome

4.1 Kroon Airfield is an unlicensed aerodrome with a single runway orientated 11/29. It has a grass runway surface which is 750m long at an elevation of 4 330 feet.

4.2 The aircraft touched down approximately 400m past the threshold of Runway 11.

4.3 After landing, the pilot opted to steer the aircraft to the left, through the airfield's perimeter fence due to insufficient runway surface available to bring the aircraft to a safe stop.

5 Flight Folio

5.1 The last two pages of the flight folio (the pages that were assessed in respect of this serious incident) contained several inaccurate entries which were in contravention of Part 91.03.5 and 91.03.6 of the Civil Aviation Regulations 2011.

6 Investigation

6.1 No on-site investigation was conducted by the Accident and Incident Investigations Division (AIID), but a follow-up investigation was conducted post-recovery of the aircraft.

6.2 No fuel tank vent covers were present in the aircraft during the inspection on 2 September 2025.

Probable Cause

The engine was likely starved of fuel after interruption of fuel supply due to an unknown amount of fuel being siphoned from the fuel tanks in-flight as the fuel caps were not properly secured. The pilot executed a forced landing at Kroon Airfield Runway 11 and touched down deep (more than halfway down the runway) due to the prevailing tailwind which led to a runway excursion.

Contributing Factors

1. Flying in severe turbulence conditions could have caused an unknown amount of fuel to leak from the wing tanks. These conditions could also have caused the fuel to slosh (bubble) in the tanks, which is where air mixes with fuel and increases the formation of fuel vapour.

2. Due to the severe turbulence, the pilot could not make an accurate assessment of the amount of fuel that remained in the wing tanks during the flight.

Safety Action

The flight folio lacked accurate fuel upliftment data as well as flight route information which is attributed to poor oversight by the aircraft owner; this is in contravention of the provisions of the Civil Aviation Regulations 2011. The Regulator (SACAA) should address this contravention with the aircraft owner.

Safety Message

1. It is recommended that all aircraft owners and pilots flying the Jabiru series fitted with wing tanks consider the necessary safety precautions with special emphasis on the correct opening and closing of the fuel caps, as well as ensuring that the vent holes are not blocked by fitting vent covers. Large O-rings are fitted to the fuel cap; these fuel caps are exposed to constant environmental conditions which could deteriorate the condition of the O-rings in a short period. These are on-condition items and need to be replaced as soon as they display evidence of wear and tear. The neglect of these units could also cause water to enter the fuel tanks.

   It is important to ensure that the fuel tanks are correctly closed with the use of a Hex T bar or an Allen key to tighten the cap screw. In this serious incident, this was not possible due to the widened cap screw sockets. The fuel caps, therefore, did not close as required, and fuel siphoned from the tanks in-flight. In high-wing aircraft, the pilot is not likely to see fuel leaking from the tanks. As the tanks empty, a vacuum or partial vacuum could form in the tanks, restricting fuel flow to the engine via the header tank.

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.

Disclaimer
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This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa