

Safety Investigation Report

Ref. AAIU-2011-ULM-10
Issue date: 01 October 2018
Status: Final

Classification:	Accident	Occurrence category:	Fuel starvation
Level of investigation:	Desk	Type of operation:	Non-commercial – Ultralight - Training
Date and time:	24 September 2011 at 17:15 UTC	Phase:	Cruise
Location:	In a field located between two streets Kluisstraat and Beugelstraat, at Zottegem. 24.6 km NE of EBAM	Aircraft damage:	Visible limited damage on engine, NLG, wing and rudder. Airplane was written off.
Aircraft:	AirLony Skylane msn: 31	Operator:	Private
Departure airport:	Aerodrome of Amougies (EBAM)	Persons on board:	2
Destination airport	EBAM	Injuries:	None

FACTUAL INFORMATION

Narrative

On that day, the meteorological conditions were favourable for a training flight.
QNH 1025 hPa – CAVOK.

During a training flight, with an instructor and a student on board, the airplane was flying at 2000ft for 10 – 12 minutes on the left fuel tank when the engine experienced problems. The engine was operating at 4200 rpm and the indicated airspeed was around 150 km/h.

The engine started to run rough. The pilot then selected the right hand fuel tank and the engine stopped. All attempts to re-start the engine were unsuccessful.

The instructor took over and selected a field for an emergency landing

The approach speed was 100 km/h, the rate of descend was 500 ft/min and the flaps were lowered (2 notches). When reaching 300ft, the pilot set the master switch in the OFF position. Upon touchdown on the main wheels, the airspeed was down to 60 km/h.

The field was recently ploughed, and the pilot flew in direction of the furrows.

When the nose wheel contacted the ground, it sunk in the soft ground, causing the airplane to tip over.



Figure 1

The pilots climbed out, uninjured.

Airplane information

Type	Ultralight aeroplane	State of registry:	Belgium
Manufacturer:	AirLony	Number and type of engine(s):	1 reciprocating
Model:	AirLony Skylane UL	Engine:	Rotax 912UL (80 hp) sn 4409497
Built year:	2010	Propeller:	Peszke Mod AS1650 sn 366
Serial number:	31	Crew:	2
Maximum take-off weight:	450 kg	Wingspan:	8.95 m
Airworthiness:	Non-EASA Aircraft	Wing area	10.57 m ²
Certificate of Airworthiness:	Restricted Authorization for ULM issued by Belgian CAA on 9 May 2011	Maximum speed	207 km/h
Airworthiness Review Certificate:	Not applicable	Rate of climb	6 m/s

(Wikipedia)

The AirLony Skylane design was inspired by the much larger four-seat Cessna 182 Skylane, which it greatly resembles. The manufacturer calls it a "small Cessna".

The Skyline is a high-wing monoplane with a fixed nose-wheel landing gear and powered by a Rotax 912 piston engine. The enclosed cabin has side-by-side seating for two and dual yoke-style controls.

The aircraft is built from a combination of wood and composites. The fuselage is of composite construction, while the strut-braced wing is of wooden structure with a semi-laminar MS (1)-313 airfoil. The wing is fabric covered and has two integral 42 l (11 US gal) fuel tanks. The wooden structure, fabric-covered and electrically operated flaps cover 39% of the wing chord and can be lowered to fixed positions of 13°, 29° and 37°.



Figure 2

Fuel system

The fuel tanks are located in the wings. Each tank has a capacity of 42 liters, giving a total of 82 liters.

The fuel quantity indication occurs by direct reading of the remaining quantity through a translucent material in the side of each tank, visible in the cockpit. The indicators were not graduated.



Figure 3

The pilots stated that during briefing, they checked the fuel quantity and there were “two fingers height” of fuel visible through the indicator.

Inspection of the airplane

The airplane was inspected by JMB aviation, the owner of the airplane and importer of the airplane type that determined that the engine stoppage occurred due to fuel starvation and subsequent loss of fuel priming in the fuel feed line to the engine.

Student pilot information

Age:	19 years	Nationality:	Belgian
License:	Training license issued by BCAA	Injuries:	None
Flight experience:	15 FH on ULM		

Flight instructor information

Age:	50 years	Nationality:	Belgian
License:	ULM/DPM Pilot license issued by DGAC France	Injuries:	None
Flight experience:	Total Flight Experience on airplane: 280 FH The pilot held a Commercial Pilot Licence until 1996		

ANALYSIS

Fuel indication

The pilots stated that during briefing, they checked the fuel quantity and there was “two fingers height” of fuel visible through the looking glass of the indicator. This indication, being 25 % of the height of the indicator, the pilots assumed, through proportionality that 1/4th of the total fuel quantity in the tank was available (10 liters in each tank giving an expected endurance of 1h 30 min of flight).

However, due to the wing profile, the wing dihedral, the location of the fuel line port in the tank and the airplane attitude on the ground, the indication of fuel level seen through the looking glass is not linearly proportional to the actual quantity available in the tank.

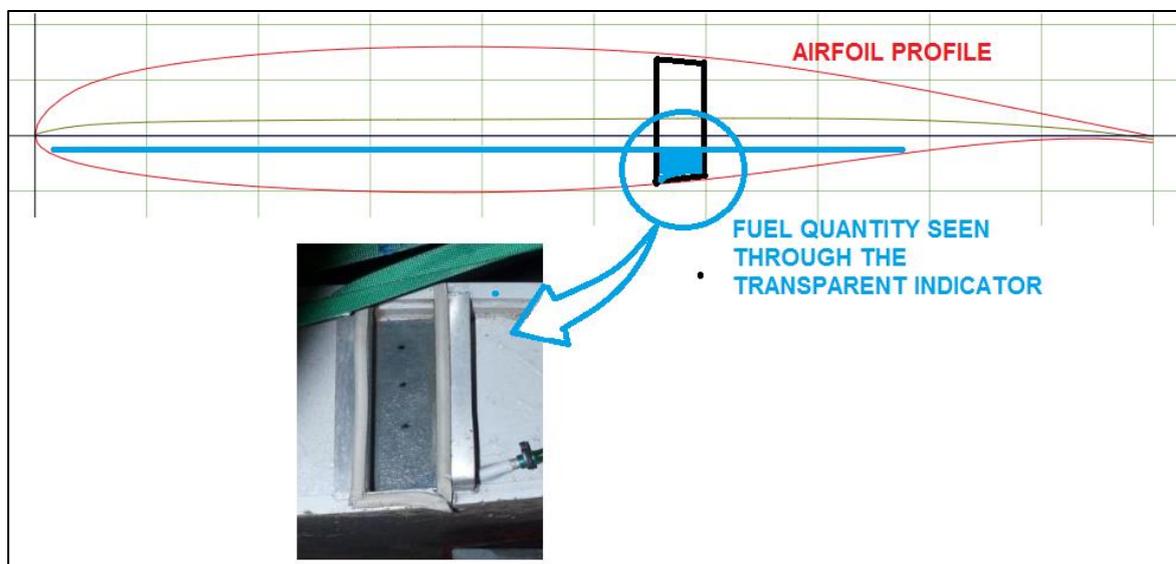


Figure 4: The fuel quantity indication on the LH wing

The available fuel quantity in the aircraft was not sufficient for the intended flight. The engine experienced problems due to fuel starvation. When the crew switched to the RH tank, the fuel line ran empty and the engine stopped.

CONCLUSION

Cause

The accident is caused by fuel starvation, due to the unreliability of the fuel quantity indicators.

SAFETY ACTIONS

Immediately after the event, JMB Aviation stated its intention to apply the following actions:

- Inform the manufacturer of the AirLony Skylane UL about the event and the suspected cause, being the unreliability of the fuel quantity indicators.
- Perform the calibration of the fuel quantity indicator on each of his aircraft and all aircraft being imported in Belgium, involving;
 - Determination of the unusable fuel quantity by running the engine on the ground until it stops, making the fuel level by a red line and adequately shading the area below.
 - Graduating the indicator by a line for each addition of 5 liters fuel in the tank.
- Revise the flight manual to outline the meaning of the added graduation on the indicators. A note will be include to stress the importance of the red line.
- Issue a bulletin to inform all other Belgian owners of AirLony Skylane about the procedure to follow in order to calibrate the fuel quantity indicator.

About this report

As per Annex 13 and EU regulation EU 996/2010, each safety investigation shall be concluded with a report in a form appropriate to the type and seriousness of the accident and serious incident. For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report.

It is not the purpose of the Air Accident Investigation Unit to apportion blame or liability. The sole objective of the investigation and the reports produced is the determination of the causes, and, where appropriate define recommendations in order to prevent future accidents and incidents.