BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

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INVESTIGATION REPORT

Accident to Skyleader 200 identified 47-XW on 17 June 2017 at Parisot (82)

Time	Around 17:35[1]
Operator	Private
Type of flight	General aviation
Persons on board	Pilot and one passenger
Consequences and damage	Pilot and passenger fatally injured, aircraft destroyed

[1]Unless otherwise specified, the times in this report are expressed in local time.

Loss of control during a stall exercise, collision with the ground

1 - HISTORY OF THE FLIGHT

Note: this paragraph is based on witness accounts and recorded data extracted from the electronic instruments of the aircraft.

At the end of a rally at the Villefranche-de-Rouergue aerodrome (Aveyron), the pilot and owner of the ULM, accompanied by a passenger who was also a pilot, took off for a local flight. He made a few circuits on the private runway of the pilot's son.

He then headed south and performed five stall exercises. The height at which these exercises began was about 1,000 feet.

During the last exercise, the ULM made more than three complete rotations around its roll axis accompanied by significant movements around its pitch axis.

The aircraft struck the ground with a steep nose-down attitude in a field and came to a halt against a hedge of bushes.

The parachute of the ULM was not activated by the occupants. After the death of the occupants was confirmed by the emergency services, demining services had to be used before the wreckage could be accessed again.

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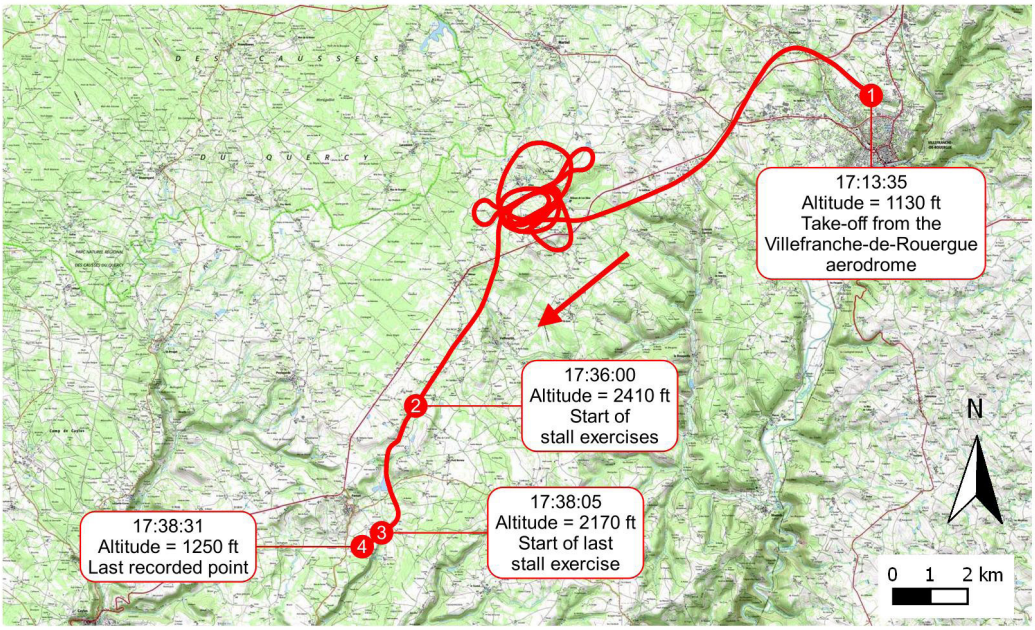

Cartographic source: IGN

Flight path of the 47-XW from the Skyview D1000 from the take-off to the last recorded point

Times given are local

2 - ADDITIONAL INFORMATION

2.1 Occupant information

The owner of the aircraft was sitting in the right seat. He was 66 years old, held a PPL license obtained in 1996 associated with a valid SEP qualification and a basic aerobatic qualification. He also held a UL license (fixed wing, flex-wing and powered paraglider). According to the information provided by the Civil Aviation Safety Directorate (DSAC), his total experience in August 2011 was 600 flight hours.

The second occupant was seated in the left seat. He was 53 years old, held a PPL license obtained in 1990 associated with a valid SEP qualification and an advanced aerobatic qualification. He also held a UL license (fixed wing, flex-wing and powered paraglider). According to the information provided by the DSAC, his total experience in May 2016 was 620 flight hours.

The autopsies did not bring to light any element likely to explain the accident.

2.2 Recorded data

The ULM was equipped with a Dynon Avionics Skyview D1000 avionics system that displays flight parameters and engine parameters and records them. The following curves come from these recordings. A Garmin GPSMAP695 portable GNSS system, which records the flight path, was also present on board.

The parameters associated with the engine are mutually consistent and show no anomaly.

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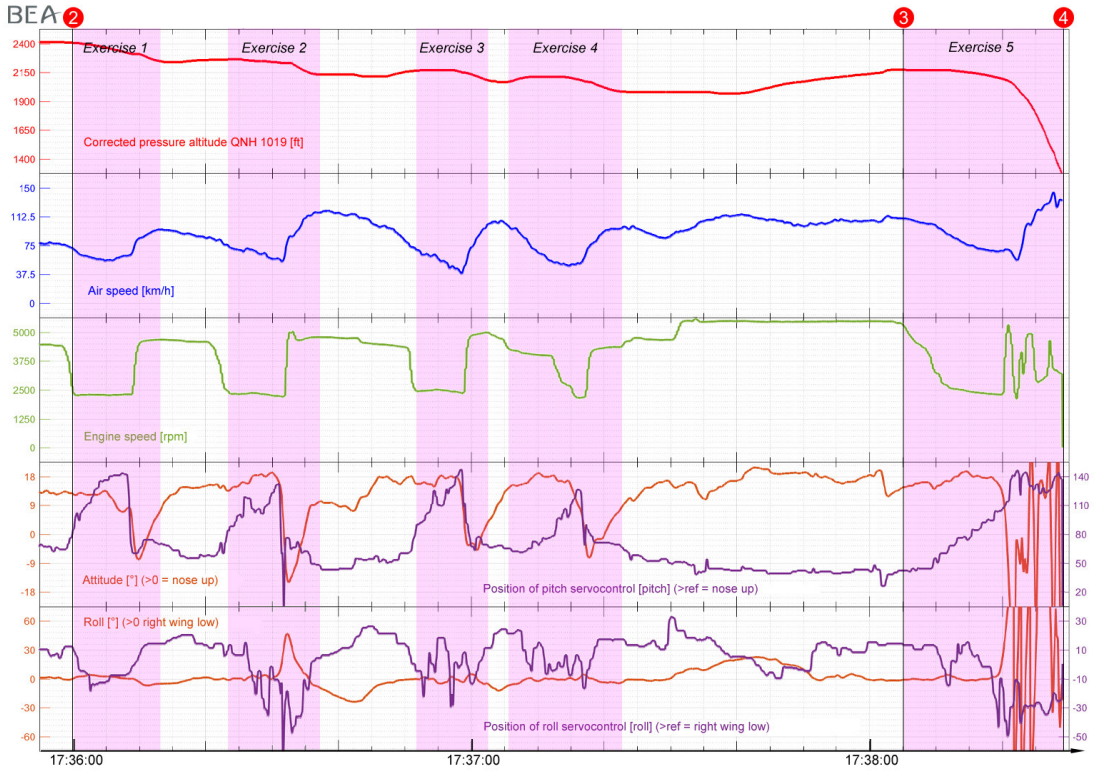
The parameters of the servo controls of the autopilot make it possible to deduce the direction of the inputs (nose-up, nose-down, to the right, to the left) but do not make it possible to identify precisely the neutral positions, or the deflection values of the control column or the control surfaces.



Stall nos. 1, 3 and 4 do not show significant roll motion. Stall no. 2 indicates a right roll movement (up to about 45°) associated with a short movement of the control column to the left.

Stall no. 5 did not result in a nose-down input. Left roll inputs were also recorded as the aircraft engaged a rapid right-hand rotation. The load factor recorded in the last moments reached 4 g.

The minima indicated airspeeds are close to the stall speed values indicated in the flight manual (from 56 to 71 km/h according to the position of the flaps, at maximum weight).

The positions of the flaps and that of the landing gear were not recorded.

Around thirty flights preceding the accident were also recorded. The oldest flight is dated 24 March 2017. The maximum roll and pitch values recorded do not show any manoeuvres of the roll or loop type. One flight has a maximum recorded pitch of 35° and a maximum bank angle of 60°. For the other flights, the maximum pitches recorded are less than 20° and the maximum bank angles less than 55°.

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2.3 Wreckage and Impact Information

The wreck was complete. There was no evidence of an anomaly prior to the accident. Observations tend to indicate that the landing gear was extended. The position of the flaps could not be precisely determined (flaps retracted or close to this position). The asymmetrical deformations observed on the wreck, mainly on the wing and the elevators, confirmed a rotational roll movement to the right on impact. It cannot be ruled out that some of these deformations are related to the aerodynamic forces exerted on the airframe during the movements that preceded the impact.

2.4 Meteorological Information

The meteorological conditions estimated by Météo France at the accident site were as follows:

- ground wind from 320° to 350°, 5 to 10 kt, maximum 15 kt;
- wind at 1000 ft / ground and 2000 ft / ground from 350°, 10 kt;
- visibility greater than 10 km;
- no significant cloud;
- temperature 30°C.
- QNH 1019 hPa.

3 - LESSONS LEARNED AND CONCLUSION

The accident was due to the non-recovery from a voluntary stall manoeuvre (or approach to stall). Maintaining the nose-up inputs during this manoeuvre and the decision to start the exercise at low height are contributing factors.

The investigation failed to determine the reasons why this nose-up input was maintained when a decrease in this input was recorded for the previous stalls. Similarly, it was not possible to specify whether the configuration of the flaps was identical, or whether these exercises were performed by the same pilot.

Apart from a specific procedure described in the flight manual, the recovery from a stall requires a nose-down input to reduce the angle of attack. If a rolling motion begins, the pilot may have a tendency to reflexively counter it by an input on the roll control. This input can locally generate an increase in the angle of attack and drag in the section of the wing where the aileron has been lowered (and therefore the lower wing), and can thus contribute to increasing the initial roll movement. Rudder inputs are used to control the symmetry and the roll (by the induced roll phenomenon) until the angle of attack has decreased. If the engine is delivering power, its effects also exert an influence.

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