

Accident to the ROBIN - DR400 – 160 registered F-GKQG and the ROBIN – DR400 – 120 registered F-GXJR on 05 June 2021 at Loudun (Vienne)

⁽¹⁾ Except where otherwise indicated, the times in this report are in local time.

Time	Around 15:30 ⁽¹⁾
Operator	Aero Club Rennes Ille-Et-Vilaine
Type of flight	Cross-country
Persons on board	Pilot and two passengers
Consequences and damage	Aeroplane destroyed

Time	Around 15:30 ⁽¹⁾
Operator	Aéroclub Loudunais
Type of flight	Instruction
Persons on board	Student-pilot and one instructor
Consequences and damage	Aeroplane destroyed

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in December 2021. As accurate as the translation may be, the original text in French is the work of reference.

Loss of control during take-off, collision with an aeroplane parked in the parking area

1 - HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and on the examination of the site and the wreckage.

The three occupants of the DR400-160 F-GKQG took off from Rennes airport (Ille-et-Vilaine) in the morning bound for Loudun aerodrome (Vienne) to have lunch there. A pilot change was made for the return flight in the afternoon. Take-off took place at about 15:30 from grass runway 26. The aeroplane rose a few metres and gradually deviated to the left. A few seconds later, it touched down again outside the runway and ran in a direction of 30° in relation to the runway centreline. It reached and crossed the flying club's parking area, where its right wing hit the left wing of the parked DR400 registered F-GXJR. A student and an instructor were preparing for start-up on board the parked aeroplane. The collision caused the parked aeroplane to rotate by 180 degrees and F-GKQG to rotate by 90 degrees. The elevator of F-GKQG struck the door of the hangar, and the trailing edge of its left wing struck the self-service refuelling station before the aeroplane came to a stop (see [Figure 1](#)).



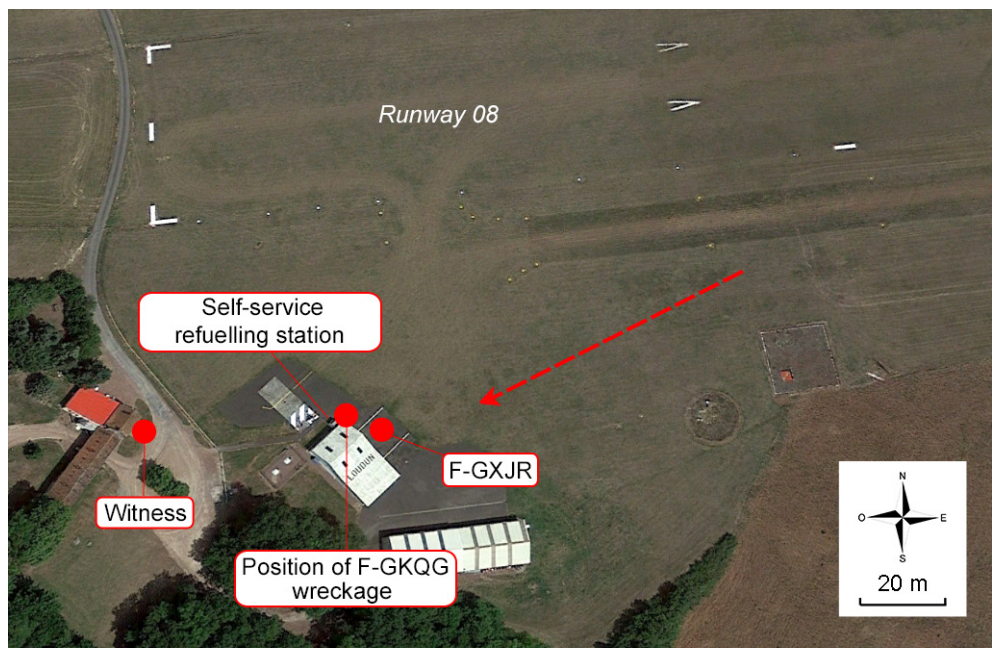
Source: BEA

Figure 1: Accident site

2 - ADDITIONAL INFORMATION

2.1 Examination of the site and the DR400 registered F-GKQG

The DR400 registered F-GKQG was located in the parking area of the Aéroclub Loudunais, at a lateral distance of about 50 m from the threshold of runway 08 (see Figure 2). Run marks were observed at an angle of about 30° in relation to the runway, starting in the grass, through the signal area and continuing down to the wreckage. The spacing of the marks showed that the aeroplane had skidded during part of the run.



 Approximate path of F-GKQG based on markings on the ground

Figure 2: Diagram of the accident site

⁽²⁾ The design of the locking system makes it non-reversible. Unlocking can only be done by pressing the button at the end of the control lever.

The fuselage was cut in two, approximately 50 cm aft of the wing's trailing edge, behind the cabin. The flaps were damaged.

The observed flap position, combined with the continuity of the control linkage, is consistent with the flap control lever⁽²⁾ locked in the fully extended position. The damage observed on the self-service refuelling station and the distortions found on the left flap confirm that the flaps were fully extended when they struck the refuelling station (see Figure 3).

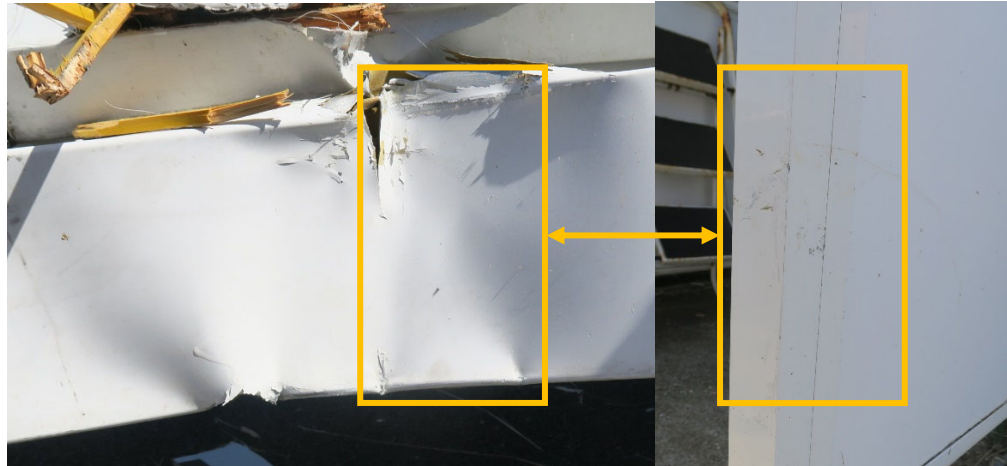


Figure 3: Damage to the left flap and impact marks on the self-service refuelling station

The flight control linkages were continuous. No anomaly was observed, except for difficulties acting on the pedals during the braking tests. It is likely that these friction points were due to damage resulting from the accident.

The braking tests performed by pushing the aeroplane did not reveal any anomaly.

The tyres were in good condition. The nose gear locking/unlocking system was operating normally.

2.2 DR400-160 information

The DR400-160 flight manual indicates that normal or short take-offs are performed with the flaps in the first detent position. In both cases, the rotation speed is 100 km/h. There is no information about take-offs with flaps in the fully extended position.

2.3 DR400 F-GKQG pilot information

The 67-year-old pilot held a Private Pilot Licence - Aeroplanes (PPL(A)) issued in 2011. He had logged 246 flight hours at the time of the accident.

In 2021, he had made six flights, two of which in instruction and three of which in a DR400-120, totalling four hours. His last flight in a DR400-160 (F-GKQG) was on 20 July 2020. He was flying to Loudun for the first time.

2.4 Meteorological information

The meteorological conditions estimated by Météo-France at the time of the accident at Loudun aerodrome were as follows: visibility greater than 10 km, an average wind of 8 kt from 320° with gusts up to 13 kt, a few cumulus with a base at 5,000 ft and an outside air temperature of 21°C.

2.5 Aerodrome information

Loudun aerodrome is an uncontrolled aerodrome open to public air traffic. The pilots use the A/A frequency. It comprises a single unpaved runway 08/26 measuring 790 x 60 m.

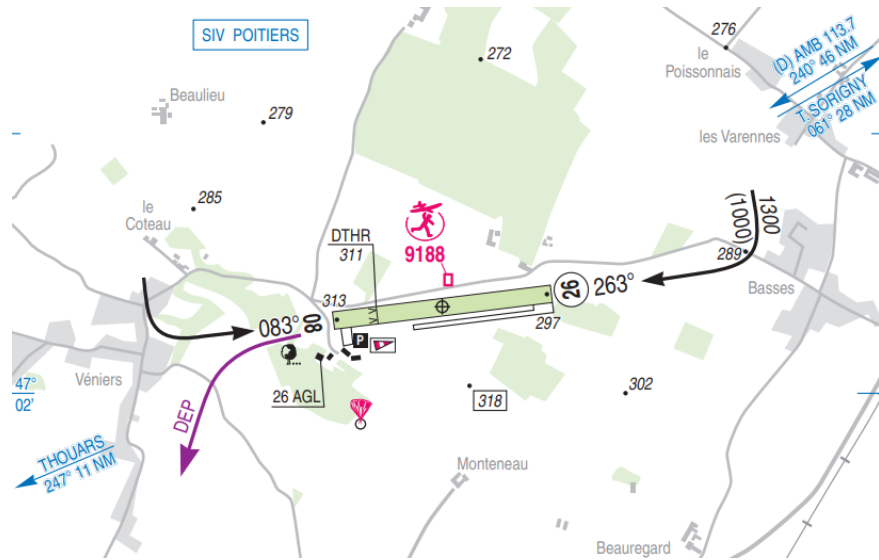


Figure 4: Extract from the Loudun aerodrome VAC chart

2.6 Engine effects

2.6.1 Yaw

At take-off, the helical blast (airflow created by the propeller), which wraps around the structure, creates an asymmetric airflow on the tail fin. Changing the tail fin's angle of incidence causes a lateral resultant force. Since the DR400-160 propeller turns clockwise⁽³⁾, this force causes a left rotation around the yaw axis.

⁽³⁾ As seen from the pilot's seat.

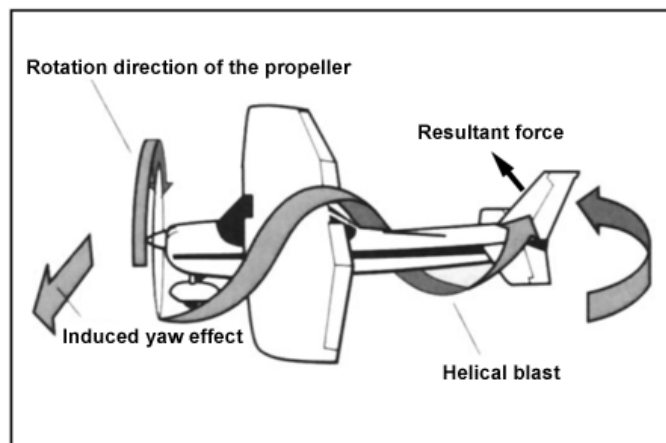


Figure 5: Representation of the helical blast

This phenomenon is heightened when the flaps are in the fully extended position during take-off, as the lift increase leads to a decrease in rotation speed at take-off. At low speed and high engine speed, the airflow is more lateral on the tail fin, and the yaw effect is stronger.

In addition, the rudder is less effective at lower speeds.

A stronger input on the right pedal is therefore required to anticipate and correct the yaw when the aeroplane is in the full flaps configuration.

2.6.2 Roll

The engine rotation induces a rotational reaction movement on the airframe in the opposite direction to the propeller (due to the torque action and reaction principle), that is to say a roll to the left in the case of the DR400-160.

The yaw movement to the left described above increases the roll to the left (induced roll phenomenon).

2.7 Statements

2.7.1 F-GKQG pilot's statement

The pilot stated that to take-off, he had applied power while braking and that before the rotation, at about 105 km/h, the aeroplane had started to deviate to the left at high speed. He made an input on the right pedal and the right stick to correct the path, but the aeroplane continued to deviate. He then reduced the power. He did not feel the aeroplane leave the ground and thought it had exited the runway. He stated that he had set the flaps to the first detent position for take-off, as he systematically does, and that he had then not operated the flap control.

He had planned to initiate the rotation at 110 km/h because the aeroplane was carrying load. The pedals were not blocked. He was used to sparing the nose wheel on unpaved runways during take-off runs. According to him, it is possible that the latter got stuck when it was no longer in contact with the ground.

2.7.2 Front right seat passenger's statement

The passenger in the front seat also held a Private Pilot Licence - Aeroplanes (PPL(A)) at the Aéroclub Rennes Ille-et-Vilaine (ACRIV) and knew the pilot well. He had flown the aeroplane during the outbound flight.

He indicated that, at the time of take-off, the wind had been close to zero. He stated that immediately after the rotation, the aeroplane had taken off and had then deviated slowly to the left. He remembered telling the pilot to correct to the right. The aeroplane had been very low, then it had touched down again outside the runway. He had not felt any shock. It had seemed to him that the aeroplane had not responded to the pilot's input on the right pedal and the right stick.

He added that the aeroplane had been on the runway centreline during the take-off run. He remembered looking at the speed and that it had seemed normal to him.

He had not paid particular attention to the position of the flaps but thought that the latter had been set to the first detent.

2.7.3 Witness

An onlooker seated in the flying club's bar said that he had seen the aeroplane in flight for a short time. The aeroplane, at an altitude that he estimated to be around five metres, had deviated left of the runway and had been making wing movements in roll. He had lost sight of the aeroplane before seeing it run very fast towards the hangar.

2.7.4 Pilot instructor's statement (chief pilot of the Rennes flying club)

According to his instructor, the pilot was used to the DR400-120. He may have been unsettled by flying a DR400-160, which is more powerful, and by not having recent experience in this type of aeroplane. In addition, the pilot was used to flying with only one passenger on the DR400-120. He may also have been surprised by the aeroplane's balance, which was further aft due to the presence of a rear passenger.

3 - CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

During the take-off bound for Rennes-Saint-Jacques airport, the pilot probably took off with the flaps in the fully extended position without realising it. Shortly after the rotation, the aeroplane's path deviated to the left. The aeroplane touched down again and continued its run until it struck an aeroplane, located in the parking area, and then a hangar.

Contributing factors

The following factors may have contributed to the loss of control during take-off:

- Failure to check the flap position prior to take-off, or insufficient checking of the flap position.
- Unexpected take-off due to unintentional full extension of the flaps.
- Inputs on the controls resulting in lower-than-expected performance (acceleration, climb), given the configuration.
- Insufficient corrective action on the right pedal resulting in a deviation of the path to the left.
- Lack of recent experience of the pilot in a DR400-160, more used to flying aeroplanes equipped with a less powerful engine (like the DR400-120) and for which the engine effects are less perceptible.