



**Accident** to the JODEL - D140 C  
registered **F-HJLB**  
on 21 May 2022  
at Les Adrets (Isère)

<b>Time</b>	Around 16:45 <sup>1</sup>
<b>Operator</b>	Aéroclub du Dauphiné
<b>Type of flight</b>	Introductory (sightseeing) flight
<b>Persons on board</b>	Pilot and four passengers
<b>Consequences and damage</b>	Pilot and passengers fatally injured, aeroplane destroyed
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.	

**Transition to the backside of the power curve, collision with a line of trees, post-impact fire, during an introductory (sightseeing) flight in the mountains**

**1 HISTORY OF THE FLIGHT**

*Note: the following information is principally based on statements, radiocommunication recordings, and flight data transmitted by the aircraft.*

The pilot, accompanied by four passengers, took off at 16:39 from paved runway 04 at Grenoble-Le Versoud aerodrome (Isère) for his second<sup>2</sup> sightseeing flight of the afternoon. The pilot climbed on the axis and then turned right (see Figure 1, point **2**) into the Les Adrets valley, flying alongside the northern slope of the mountain to the south of Les Adrets. Witnesses saw the aeroplane heading east at low height and flying “slowly” (point **3**). A few minutes later, the aeroplane crashed through a line of trees into a field. When it collided with the ground, the aeroplane caught fire.

<sup>1</sup> Except where otherwise indicated, the times in this report are in local time.

<sup>2</sup> The first sightseeing flight was made with three passengers on the DR401/155 registered F-GNXT.

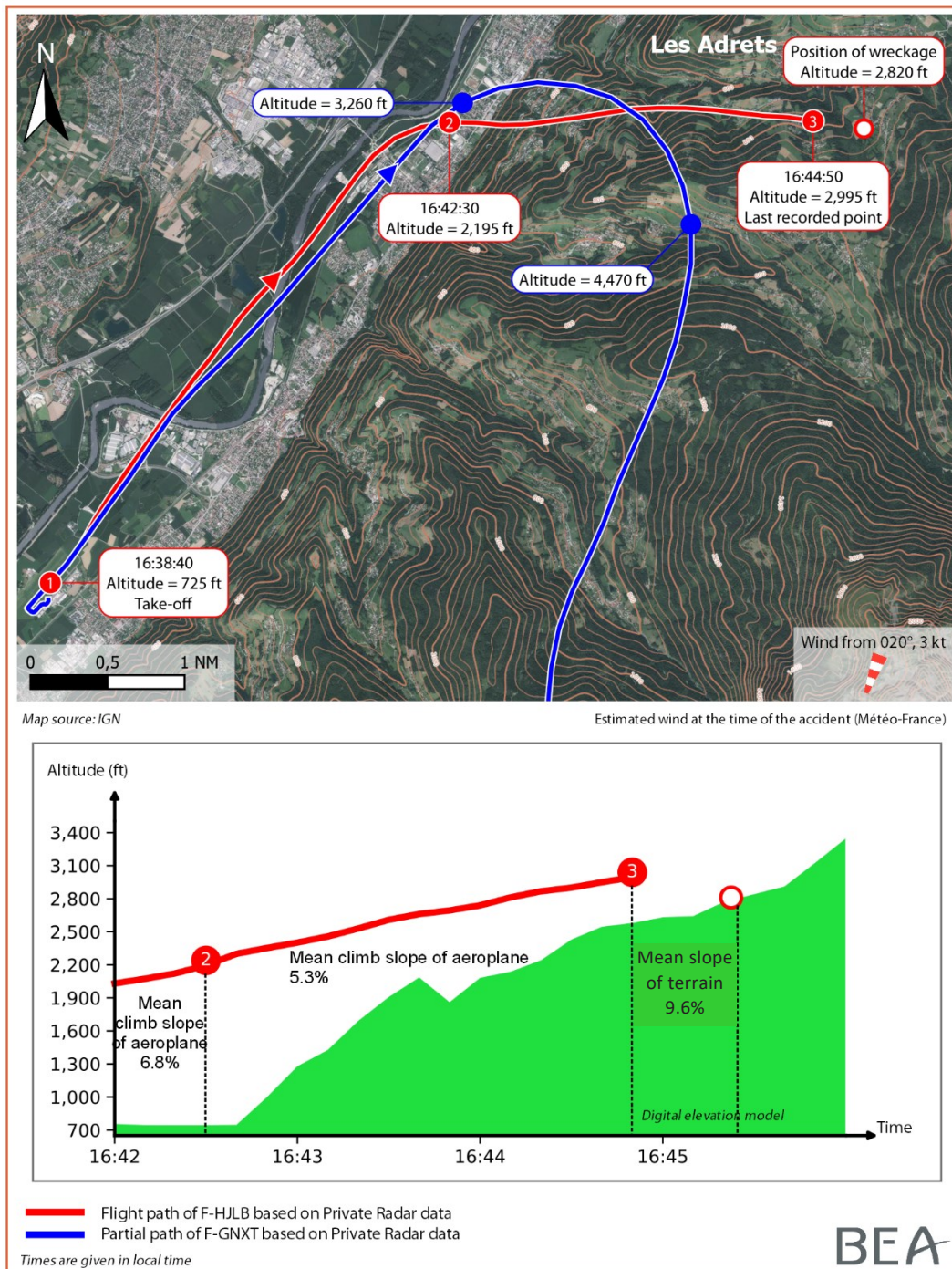


Figure 1: paths followed on the two sightseeing flights

## 2 ADDITIONAL INFORMATION

### Examination of site and wreckage

The wreckage was found in the commune of Les Adrets, about 11 km from Grenoble-Le Versoud aerodrome, at an altitude of 860 m (2,820 ft) in a meadow surrounded by trees about 20 to 25 m high.

The accident site is located in the extension of the recorded path and 0.4 NM<sup>3</sup> from the last recorded point.

The aeroplane flew through the trees on a path of approximately 100°. The wings were torn off. The forward section of the fuselage hit the ground and the aeroplane turned upside down. A fire broke out, destroying most of the wreckage.

Several branches were severed by the propeller as the aeroplane flew through the trees, indicating that the propeller was rotating and that the engine was delivering power, without it being possible to determine how much power.

The aeroplane was intact when it collided with the vegetation. The flight control linkages were continuous. The position of the flaps and position of the elevator trim could not be determined.

The propulsion system and associated circuits were largely destroyed in the fire. The functionality of the fuel and ignition systems could not be checked.

The internal examination of the engine and equipment (magnetos, filter, carburettor, mechanical pump) did not reveal any anomaly likely to have contributed to the accident.

## **Pilot information**

The 66-year-old pilot held a Private Pilot Licence - Aeroplanes (PPL(A)) obtained in 2016. He had logged 400 flight hours, 92 of which in the last 12 months. He had made 92 sightseeing flights in the last 12 months for the flying club, half of which on D140s and the other half on DR400s and DR401/155s.

The pilot's last two flights on F-HJLB, before the accident flight, were on 27 March 2022 and were sightseeing flights.

On the afternoon of 21 May 2022, at around 14:00, the pilot made a first sightseeing flight (see Figure 2) on the DR401/155, registered F-GNXT, powered by a TAE 125-02-114 engine. The engine is turbocharged and develops a maximum power output of 155 hp.

---

<sup>3</sup> Corresponding to 20-30 s of flight at a speed of 60 kt (see para. 2.1.3 for speed estimation).

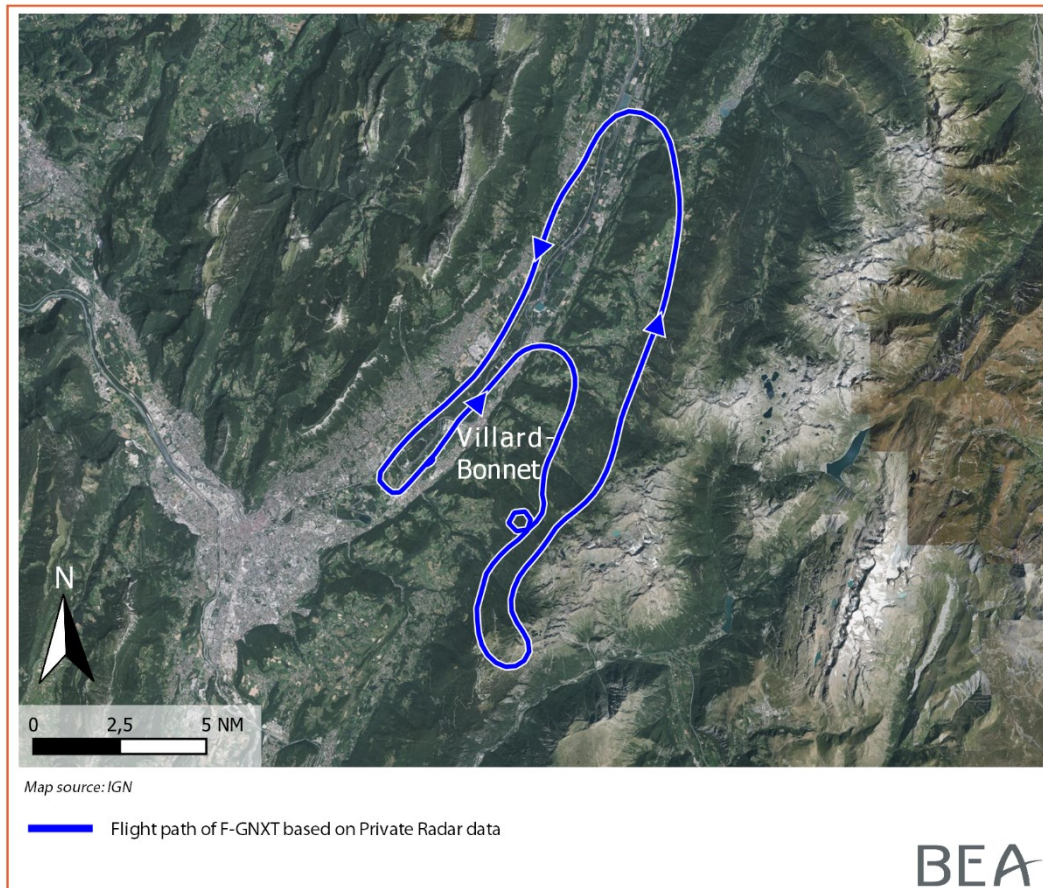


Figure 2: path of the first sightseeing flight on 21 May 2022

### Meteorological conditions

The data measured by the weather station at Grenoble-Le Versoud aerodrome between 16:00 and 17:00 was as follows:

- northerly wind of 3 kt;
- CAVOK;
- temperature in the shade of 32 °C;
- QNH 1017 hPa.

The meteorological conditions estimated by Météo-France for the accident area were as follows:

- north-easterly wind of 5 kt;
- clear to slightly cloudy, no low cloud;
- a warm, dry air mass with a humidity of around 40 %, with no risk of icing.

### Aeroplane information

#### 2.1.1 General

F-HJLB is a Jodel D140 C low-wing monoplane made of wood and canvas, equipped with conventional landing gear. It is powered by a Lycoming O-360-A3A engine developing 180 hp and a two-blade, fixed pitch metal propeller.

The aeroplane can carry up to five people with luggage. On the day of the accident, it was equipped with skis. These were due to be removed at the end of May.

The aeroplane was fitted with a position-tracking system by the flying club, and GNSS flight path data was recovered.

The aeroplane was returned to service on 19 May 2022 following a report of a power problem with the engine, which led to the carburettor being replaced. Before the accident flight, five flights were made: three flights on 20 May and two flights in the morning of 21 May, for a total duration of 3 hours 30 minutes, without any power anomaly being reported by the pilots or entered in the aeroplane's logbook.

### 2.1.2 Weight and balance

For the accident flight, the pilot had 120 litres of fuel, 90 litres in the front tank and 30 litres in the rear tank, equivalent to around 85 kg. The four passengers were distributed as follows: one adult in the front right seat, one adult in the rear centre seat and two children in the rear left and rear right seats. The empty weight of the aeroplane with skis was 714 kg (weighing report dated 27 December 2019). The weight of the pilot and passengers was estimated at 332 kg.

At the time of start-up, the aeroplane's weight was estimated at 1,131 kg for a maximum permissible take-off weight of 1,200 kg. The balance was slightly aft, within the permitted flight envelope range.

The flight lasted around seven minutes, to which the time on the ground from engine start-up to take-off must be added, i.e. around 10 minutes, with an estimated average fuel consumption of around 35 l/h. During the accident, the weight of the aeroplane was therefore estimated to be around 1,125 kg.

The flight manual indicates an optimum climb speed of 150 km/h and a stall speed in flaps-retracted configuration of 92 km/h.

### 2.1.3 Performance

Using the chart in section 5 of the aeroplane's flight manual, in daylight conditions (ISA<sup>4</sup> + 18°C), at an altitude of 2,800 ft and a weight of 1,125 kg, the climb performance of the aeroplane in the no skis configuration was approximately 530 ft/min<sup>5</sup>.

The influence of the skis on the aeroplane's performance is not indicated in the flight manual. Nevertheless, according to pilots experienced in mountain flying on D140s, the presence of skis can reduce performance by around 20%, i.e. a theoretical rate of climb of around 430 ft/min.

During the initial climb, the ground speed was around 65 kt (120 km/h). When the pilot entered the Les Adrets valley (see Figure 1, point ②), the ground speed gradually decreased, reaching 57 kt (103 km/h) at the last recorded flight point (point ③), a few seconds before the accident.

The aeroplane's climb slope on the second part of the flight was 5.3 %, i.e. approximately 350 ft/min at 120 km/h (or 290 ft/min at 103 km/h). The height in relation to the terrain was

---

<sup>4</sup> Standard atmospheric conditions.

<sup>5</sup> At the minimum weight of 900 kg in standard atmospheric conditions, the theoretical rate of climb is 950 ft/min.

around 250 ft (76 m) at the last recorded point and decreasing. The average slope of the terrain after this point is 9.6 %, without taking into account the vegetation (conifers that can reach several dozen metres in height).

Given the slope of the terrain after the last recorded point, in optimum climb conditions (150 km/h), in order to maintain a constant height above the terrain, it would have been necessary to maintain a climb speed of around 780 ft/min<sup>6</sup>, which is almost double the climb speed observed on the path.

By way of comparison, on the first sightseeing flight made by the pilot on the DR401/155, the calculated rate of climb, according to section 5.5 of the reference manual, was 765 ft/min for an average rate of approximately 750 ft/min observed on the actual path of this flight.

The theoretical rate of climb was calculated with the following conditions:

- ISA conditions + 18°C;
- full main tank 110 litres (88 kg);
- three passengers, weight 288 kg (including the pilot);
- 3,000 ft;
- take-off weight of around 1,000 kg.

## Flight context

The sightseeing flight was booked on 18 May for three people by one of the family members on the flying club's website. A DR400 aeroplane was allocated for this flight. On the day of the accident, following a change in the number of passengers from three to four, the pilot had to change the aeroplane and use the Jodel D140 in order to be able to take them on board the same flight.

## Organisation of sightseeing flights at the flying club

The flying club has an Operations Manual (OM).

In the "Rules and procedures applicable before the flight" section of the OM, paragraph "2.4 Flight preparation" indicates:

- For the meteorological section:
  - The pilot-in-command must obtain the meteorological information and forecasts needed to decide on the flight to be undertaken.
  - Based on the documentation provided, the pilot must deduce the weather conditions on departure, during the flight, and on arrival. On the basis of this systematic study, the pilot can confirm or disprove certain operational choices (route, altitude, fuel) or the feasibility of the flight.
- For the weight and balance calculation section:
  - Before each flight, the pilot-in-command must calculate the aeroplane's weight and balance. These two calculations are essential.
- For the aeroplane performance section:
  - The pilot-in-command must check that the aeroplane's take-off, landing and climb performances are compatible with the planned flight (taking into account the obstacles to be cleared).

---

<sup>6</sup> At 120 km/h on a 9.6 % slope, the rate of climb to be maintained would have been around 620 ft/min. At 103 km/h on a 9.6 % slope, the rate of climb to be maintained would have been 530 ft/min.

In the “Particular activities” section of the OM, paragraph “5.5 Sightseeing flight” sets out the regulatory experience requirements for pilots (see para. 2.1.5), the conditions under which sightseeing flights are made and the undertakings of the pilots making these flights.

The list of pilots authorised to make these flights is drawn up by the chief-pilot and approved by the president of the flying club.

The section entitled “Instructions for conducting sightseeing flights” specifies that particular attention will be paid to flight preparation: weight and balance estimates, verification of the day’s performance.

### **Radio communications**

At 16:32, the pilot contacted the aerodrome controller and indicated that he wanted to taxi to the holding point for a 30-minute flight and that after take-off he would exit the area via the north and then head south. Five minutes later, the controller cleared the pilot to line up and take off from runway 04.

At 16:41, the pilot indicated that he was crossing the Brignoud toll at 2,000 ft in climb and that he was leaving the frequency. Until the accident, no other radio messages were recorded.

### **Statements**

#### **2.1.4 Witnesses**

Several witnesses in the commune of Les Adrets said they saw the aeroplane fly by at low height. They described the path as a straight line running from west to east, along the slope of the mountain south of Les Adrets. According to them, the engine noise was steady. Some witnesses reported that they did not hear the noise of the engine for a few seconds before hearing it again just before the sound of the aeroplane colliding with the trees, while other witnesses reported hearing the engine noise continuously until the end.

Two witnesses located below the aeroplane’s path indicated that the aeroplane was flying low and slowly in an easterly direction. One of them estimated that the aeroplane flew at a height of around 20 m over the roof of his house. They confirmed that the engine noise was steady and unvarying before stopping as the aeroplane flew through the forest to the east of their position and before the accident site.

*Note: it is possible that the vegetation and undulating terrain near the accident site masked the engine noise at times, given the low height at which the aeroplane was flying.*

#### **2.1.5 Flying club chief-pilot's statement**

The chief-pilot indicated that pilots authorised to make sightseeing flights at the flying club are selected on the basis of recent experience (25 flying hours in the last 12 months) and total experience (200 flying hours after obtaining their licence) in accordance with the regulations governing sightseeing flights. He specified that the number of pilots is intentionally limited to six to eight pilots.

These pilots are on call at the flying club to welcome passengers. He specified that the choice of aeroplane is based on the number of passengers. He added that these pilots are brought together once a year to remind them of the rules for sightseeing flights, and to review the charter covering undertakings and good conduct.

With regards to the sightseeing flight circuits, he indicated that, although not described in the OM, there are two: a “North” circuit tracking the Isère valley and a “South” in the direction of Lac Laffrey<sup>7</sup> or the Drac valley<sup>8</sup>. During these flights, the flight altitude is set at a minimum of 4,000 ft and the flight must be sufficiently far from the terrain.

In addition, as the aeroplanes are equipped with position-tracking systems, he said that he regularly checked the flight paths to ensure that there was no drift.

As far as the accident flight is concerned, he was unable to provide an explanation for this path or the aeroplane’s height overhead the terrain.

#### **2.1.6 Flying club president's statement**

According to the president of the flying club, the pilot was in charge of “monitoring and safety” aspects among the authorised pilots. On the day of the accident, he was the pilot designated to welcome passengers and make sightseeing flights.

It added that sightseeing flights are suspended when the outside temperature is above 35°C<sup>9</sup>.

#### **2.1.7 Flying club pilot's statement**

A pilot from the flying club present at the aerodrome stated that he helped the pilot take F-HJLB out of the hangar in which it was parked. He added that the pilot was frustrated by this change of aeroplane at the last minute. He also specified that he suggested that the pilot stay in the valley due to the high outside temperature.

#### **Comparison of the two sightseeing flights**

During the first sightseeing flight in F-GNXT, the pilot reached the northern exit point (Brignoud toll) at an altitude of 3,200 ft, i.e. an altitude gain since take-off of 2,475 ft. When the pilot initiated the right turn, still in climb, the aeroplane was at an altitude noticeably level with the ridge line (highest point around 3,300 ft) that it had to clear and the aeroplane’s rate of climb was over 700 ft/min. As it flew over the ridge line, the aeroplane was at an altitude of 4,450 ft, i.e. more than 1,000 ft above it.

During the second sightseeing flight in F-HJLB, when the pilot reached the northern exit point, the altitude was 2,200 ft, i.e. an altitude gain of 1,475 ft in about 4 NM. The pilot then headed towards the Les Adrets valley and chose to fly alongside the mountain slope while continuing the climb in a straight line. The entrance to the Les Adrets valley is narrow, making it difficult to turn around<sup>10</sup>. From the northern exit point, the remaining distance to the accident site is 2.9 NM.

---

<sup>7</sup> Lake located 23 km south of Grenoble.

<sup>8</sup> Valley south of Grenoble.

<sup>9</sup> This limitation is not specified in the OM.

<sup>10</sup> At 60 kt, with a 30° bank angle, the turning radius of the D140 is around 170 m.



The climb performance of F-HJLB<sup>11</sup> is not sufficient for it to clear the ridge line (1,000 m/3,300 ft) or the Col du Lautaret pass (964 m/3,162 ft), which is the lowest point. The end of the Les Adrets valley is wider, making a turn-around possible, provided the aeroplane's speed is sufficient in relation to the stall speed in turn.

### 3 CONCLUSIONS

*The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.*

#### Scenario

On the day of the accident, as part of the sightseeing flight, the pilot had to change his choice of aeroplane so that he could take four people on board instead of the three initially planned. He chose to use a Jodel D140-C. The outside temperature was around 32°C at the aerodrome.

The pilot took off from runway 04 and, reaching the exit point to the north of the aerodrome, turned towards the Les Adrets valley.

The investigation was unable to determine whether the route through the Les Adrets valley was the pilot's choice or whether he was constrained by the terrain and altitude. It is nevertheless likely, given the radio message sent to the controller before take-off, that the pilot intended to follow a circuit similar to that of the first sightseeing flight made a few hours earlier aboard F-GNXT, which, equipped with a turbocharged engine, has better climb performance than F-HJLB.

Flying alongside the terrain in climb and following a straight path, the pilot probably estimated that he would be able to gain enough altitude to clear the ridge line to his right and rejoin the circuit he flew previously.

The position of the accident site, in the extension of the path followed and close to the last recorded point, and the analysis of the wreckage seemed to indicate that the pilot did not attempt to turn around to the left in the valley before colliding with the vegetation.

The slowness of the flight described by the witnesses and the observed decrease in ground speed recorded with a very light wind, as well as the altitude of the site slightly lower than the last recorded point, could correspond to a gradual transition to the backside of the power curve without the pilot noticing. He probably increased the aeroplane's pitch attitude gradually, in the absence of a natural horizon, which led to a gradual reduction in the aeroplane's speed and climb performance. The plane stopped climbing and collided with trees.

#### Contributing factors

The following factors may have contributed to the collision with the trees:

- Overestimation by the pilot of the actual performance of the aeroplane used. It is possible that the use of a different and more powerful aeroplane on the previous flight contributed to this misperception.

---

<sup>11</sup> Under the load (maximum weight), configuration (skis), pressure and temperature conditions of the day.

- Continuing the climb with an insufficient safety margin in relation to the terrain, whereas the aeroplane's performance, given its take-off weight and the temperature conditions on the day, did not allow clearance of the ridge.
- The aeroplane's transition to the backside of the power curve: a nose-up by the pilot on the stick probably led to a reduction in speed below the optimum climb speed, in a context where there is no natural horizon in a mountainous region.

*The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.*