



Accident to the JODEL - D113 V
registered **F-PLUM**
on 23 June 2022
on the Argentière glacier

Time	Around 16:20 ¹
Operator	Private
Type of flight	Instruction flight
Persons on board	Instructor and student pilot
Consequences and damage	Instructor and student pilot 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.

Collision with glacier surface, in mountains, fire

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, video surveillance footage and the observations made at the accident site.

The student pilot, accompanied by an instructor, took off from paved runway 23 at Albertville aerodrome at around 15:10. After flying a runway circuit, they left the sector of the aerodrome and headed for the Mont-Blanc mountain range.

During the evening, a member of the flying club observed on the video surveillance camera that the hangar doors were still open and that the aeroplane was not parked in the hangar. He gave the alert. The wreckage of the aeroplane was found the following morning on the Argentière glacier, situated 65 km north-east of Albertville (see *Figure 1*).

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

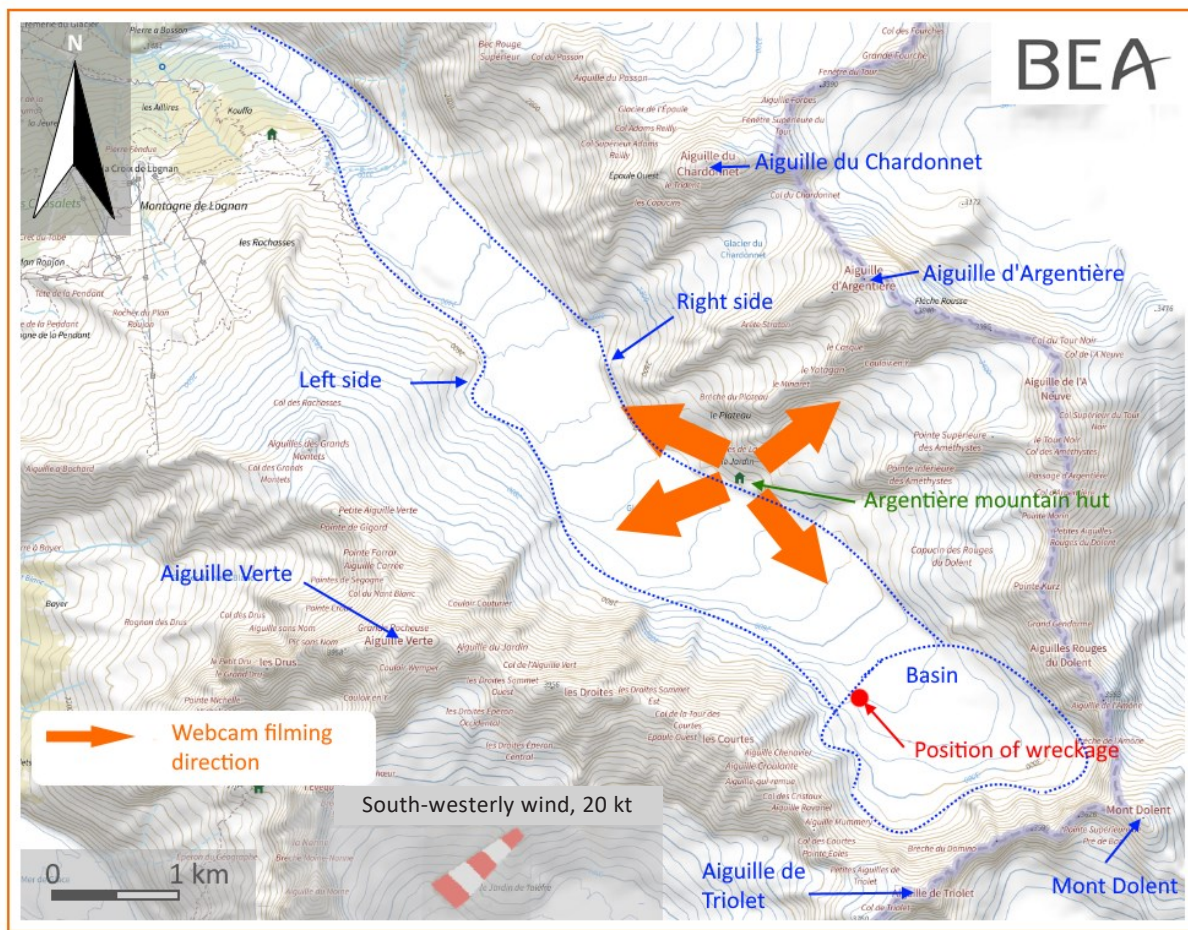


Figure 1: key features of Argentière glacier and surrounding terrain (source: Géoportail, IGN map annotated by the BEA)

2 ADDITIONAL INFORMATION

2.1 Examination of site and wreckage

The accident site was situated in the Argentière glacier basin at an altitude of 2,840 m (i.e. 9,317 ft).

The aeroplane wreckage was dispersed, oriented on a west-north-west heading, facing the valley. Three distinct areas could be identified:

- In the first area, there was a very clear, deep imprint caused by the aeroplane's tail coming into contact with the surface of the glacier. Some pieces of wood debris from the structure of this part of the aeroplane were also present.
- The second area, at a distance of around eight metres from the first, corresponded to the impact of the fuselage with the surface of the glacier. The crater measured approximately four meters long by two meters wide and one metre deep. The main components in the crater were the wood parts of the structure, some of the rear fuselage² skin along with the deformed canopy arch and fragments of Plexiglas. The flight logbook and other material generally placed behind the pilots during the flight as well as the three broken propeller blades, found in the ice, were present in this area. The positions of the three blades indicated that the engine was providing power before the collision with the glacier.

² Part between the backs of the seats and the tail.

- The third area, around five metres from the second area, contained the wings with the main landing gear, the engine, the fuel tank, the instrument panel and the flight controls. Nearly all of the parts in this area were destroyed by the fire.

The observation of the site and wreckage found that the aeroplane had collided with the surface of the glacier as it was heading towards the valley. The tail of the aeroplane came into contact with the ground first while the aeroplane had a nose-up attitude. The engine was producing power without it being possible to determine the level. The aeroplane then probably bounced, tipped forward and collided with the surface of the glacier again. The size of the crater indicates substantial energy. During this collision, the fuselage ruptured in line with the pilot seats. All of the parts forward of this rupture point were projected further on before catching fire. The crater observed in the third area was caused by the heat of the fire which melted the ice.

2.2 Aircraft information

The JODEL D113 V is a side-by-side two-seat aircraft with conventional landing gear of wood and fabric construction. F-PLUM was equipped with a Rolls Royce O-200-A engine and a DUC composite three-blade propeller. It held a restricted certificate of airworthiness (CNRA) valid until August 2023. It was equipped with skis during the accident flight.

F-PLUM's en-route speed declared on the CNRA sheet was 160 km/h (for the version with skis) and the stall speed was 75 km/h. The maximum allowable weight was 617 kg and the empty weight was 390 kg.

The aeroplane's last flight recorded in the logbook was in May 2022. The aeroplane had logged a total of 1,927 flight hours. The instructor had taken on board 32 litres of fuel³ before the accident flight. During the accident flight, the weight and balance of the aircraft was within the authorized flight envelope.

The president of the Albertville flying club indicated that the instructor was the exclusive user⁴ of F-PLUM and that an availability agreement with respect to the aeroplane had been signed between the instructor and the flying club. The purpose of this agreement was to offer its members the possibility of flying (accompanied mandatorily by the instructor) on an aircraft adapted for mountain flying on wheels or skis, for introductory mountain flights or training for various mountain ratings.

2.3 Persons on board information

The 31-year-old student pilot had totalled around eight flight hours all in dual flight on the DR400.

The 62-year-old instructor held a commercial (aeroplane) pilot licence along with aeroplane flight instructor and "wheel" and "ski" mountain instructor ratings. He had logged around 2,000 flight hours. He lived in the Paris region and regularly travelled to Albertville to carry out instruction flights in the flying club. In 2022, he had carried out approximately 20 instruction flights hours for the flying club and around 280 h since 2015.

³ The refuelling was recorded in the logbook and the corresponding coupon was found in the aeroplane documents.

⁴ Appointed by the private owner of the aeroplane.

The pilot's logbook was not found; it was not possible to determine his total and recent mountain flight experience.

The president of the flying club explained that the day of the accident he had not crossed the instructor who he said had arrived the day before. He added that the instructor was in the habit of coming to Albertville for blocked periods and that he carried out instruction flights on F-PLUM and other aeroplanes belonging to the flying club. The president of the flying club considered that the accident flight was an introductory mountain flight which had been proposed to the student pilot in the scope of his training programme.

2.4 Meteorological information

2.4.1 Estimated meteorological conditions at Albertville aerodrome

The conditions were estimated using a video recorded by the aerodrome's webcam at the time of take-off:

- south-westerly wind of around 5 kt;
- broken altocumulus clouds, their base above the ridge line of the Grand Arc mountain range (south-east of the aerodrome), the range's highest point reaching 8,142 ft.

2.4.2 Conditions estimated by French met office, Météo-France in the Argentière glacier region

The Alps were experiencing a disturbed south-westerly air flow. Broad sunny spells alternated with periods of almost overcast skies. The surrounding peaks and the glacier were regularly obscured by clouds.

The 12:00 UTC⁵ SIGWX and WINTEM charts indicated:

- an altostratus and altocumulus cloud layer with a base between 8,000 ft and 12,000 ft;
- isolated cumulonimbus clouds embedded in the cloud layer;
- local rain, with visibility reduced to between 1.5 and 5 km in thunderstorms;
- a 20 kt south to south-westerly wind at FL 100.

The radar and lightning strikes images at 16:00 indicated the presence south of the Argentière glacier, of an active thunderstorm cell moving along a south-west to north-east line.

An active storm front reached the Argentière glacier region from 17:00 and nearby weather stations recorded wind gusts of up to 35 kt.

2.4.3 Analysis of webcam images

The webcams from the Argentière glacier mountain hut (see *Figure 1*) record images every ten minutes in four directions:

to the south-east (bottom of the glacier and site of the accident, see *Figure 2* and *Figure 3*), to the west-south-west, to the west-north-west and to the north-east.

⁵ Local time 14:00.

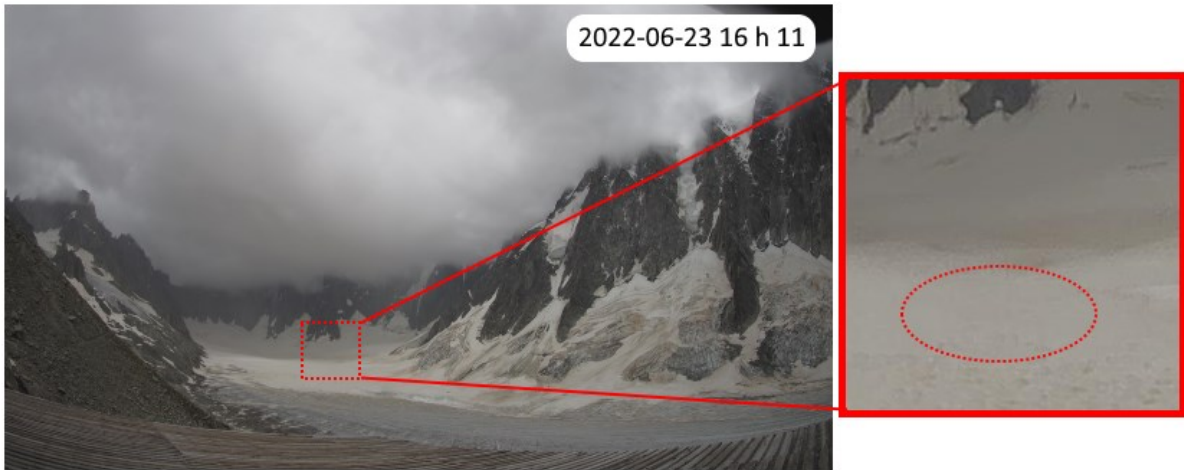


Figure 2: image looking south-east at 16:11 - no wreckage

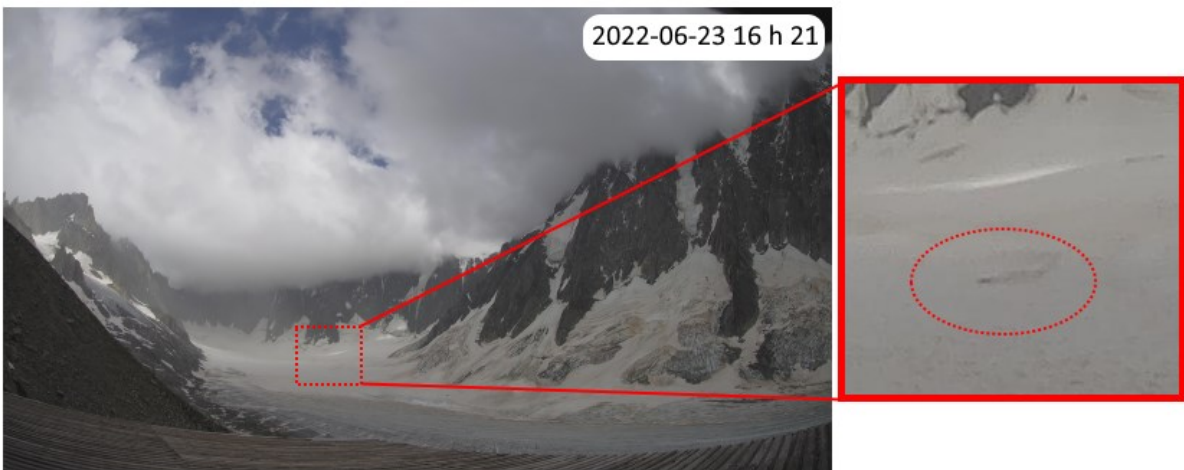


Figure 3: image looking south-east at 16:21 - wreckage present

The two successive images taken looking south-east at 16:11 and 16:21 show that the accident occurred during this period.

The general conditions on the glacier estimated using the images from the other webcams in the ten-minute interval during which the accident occurred were as follows (see *Figure 4*):

- the sky was overcast over the basin of the glacier up to the mountain hut, the summits were hidden by clouds. The height of the cloud base in relation to the surface of the glacier in the area of the accident was estimated at between 500 and 700 ft;
- from the valley to the mountain hut: on the left side, the clouds were broken and their base was level with the summits; on the right side, the clouds were scattered and their base was above the ridge line.

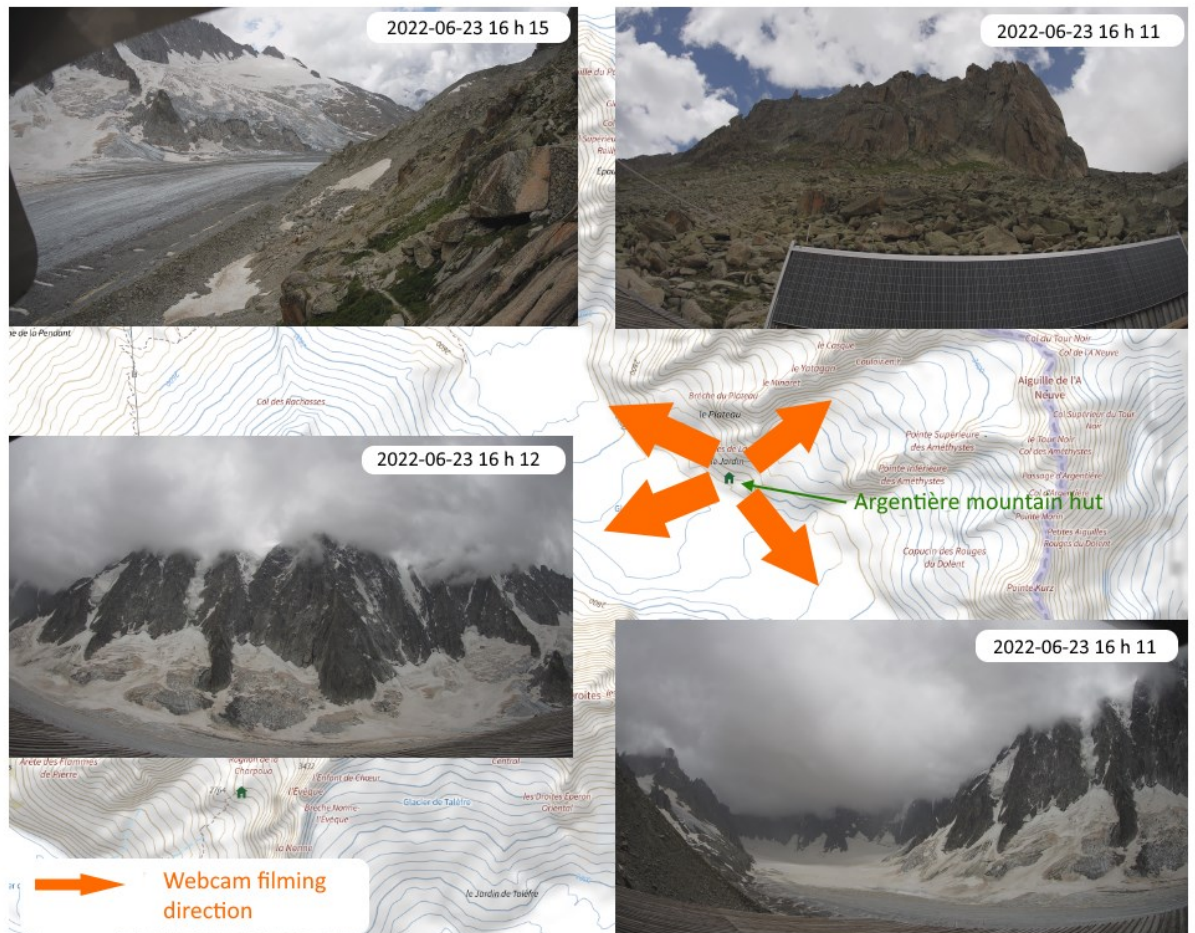


Figure 4: images recorded by the four surveillance camera in the ten-minute interval in which the accident occurred

2.5 Statements

The wardens at the Argentière glacier mountain hut reported that the sky was visible from the entrance to the valley up to the hut. Towards the glacier basin, the sky was overcast and visibility was diminished. They added that the clouds were moving quickly and that the wind was from the south. From experience, they added that in these conditions, the basin of the glacier is exposed to a Foehn phenomenon with rollers, downdrafts and very strong gusts of wind. They also reported having seen a white aeroplane pass by at around 16:00, flying along the eastern slope (right side) on the Aiguille du Chardonnet side, heading towards the bottom of the glacier, before losing sight of it. They specified that it was the only aeroplane they had seen that afternoon.

The chief pilot of the Megève flying club said that due to the unfavourable weather conditions in the region, flights had been suspended at the beginning of the afternoon. He added that AéroCime, a company which offers tourist flights to the Mont Blanc mountain range, had also suspended flights.

3 CONCLUSIONS

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

Scenario

After taking off from Albertville aerodrome, the student pilot and instructor headed towards the Mont-Blanc mountain range before flying over the Argentière glacier, on the right side of the valley. Arriving at the glacier basin, in the presence of a low cloud ceiling and probably turbulent air conditions, they probably made a right-hand 180° turn. At the end of this 180° turn, on a part of the glacier with a slight downward slope, the aeroplane was downwind of the terrain and was probably pushed towards the ground by downdrafts.

The investigation was unable to determine:

- why the instructor took the decision to enter the Argentière glacier valley and continue the flight to the bottom of the glacier;
- the instructor's knowledge of the weather conditions in the Mont Blanc region prior to the flight;
- whether the instructor was aware of the disturbed aerological conditions and dangerous phenomena that could be present on the Argentière glacier when the Mont-Blanc region is exposed to a southerly wind.

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