



Accident to the ROBIN - DR400 - 140B
registered **F-GMXY**
on Tuesday 15 August 2023
at Lavau-sur-Loire

Time	Around 11:45 ¹
Operator	Aéroclub Loudunais
Type of flight	Cross country
Persons on board	Pilot, two passengers
Consequences and damage	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.	

**Loss of external visual references, loss of control,
collision with surface of water**

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, radio-communication recordings, webcam images, radar data and the on-board GNSS computer.

The pilot had planned to carry out a round trip cross-country flight under Visual Flight Rules (VFR)² over one day, between Loudun and La Baule-Escoublac aerodromes in order to have lunch at La Baule. After replenishing, he took off from Loudun aerodrome at 10:55 and then climbed and held an altitude of around 2,000 ft. About five minutes after taking off, he contacted the Nantes Flight Information Service (FIS) and reported that he was going to bypass Nantes via the south.

At 11:20, the pilot reported that he was at 1,700 ft and asked if he could transit the region at this altitude. He explained that he had been obliged to descend a little because of clouds.

Around five minutes later, the pilot confirmed his intention to enter the Nantes airport Control Traffic Region (CTR) by passing south of the city which he had sight of. The FIS controller asked him to enter via point NE and then transferred him to the Nantes tower controller. The pilot flew through the CTR passing north of Nantes airport and following the tower controller's instructions to hold 2,000 ft. At 11:37, the controller asked the pilot to contact the FIS on 130.275 Mhz. The pilot read this back, left the CTR and descended to 1,200 ft.

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

² The glossary of abbreviations and acronyms frequently used by the BEA can be found on its [web site](#).

At 11:40, the pilot, thinking that he was contacting the FIS, checked in on the tower frequency (118.650 Mhz). The controller replied that he had re-contacted the tower. The pilot apologised and left the frequency again. This was the last radio communication with the control service, the aeroplane's altitude at this point being 1,150 ft.

A short time later, the pilot changed his route to head towards La Loire. The aeroplane progressively lost altitude.

At 11:42, the flight path of the aeroplane described a tight RH descending turn until radar contact was lost at 11:42:58. The on-board computer data stopped a few seconds later (see **Figure 10**).

The wreckage was found in the Loire at around 17:00, close to its last recorded position.

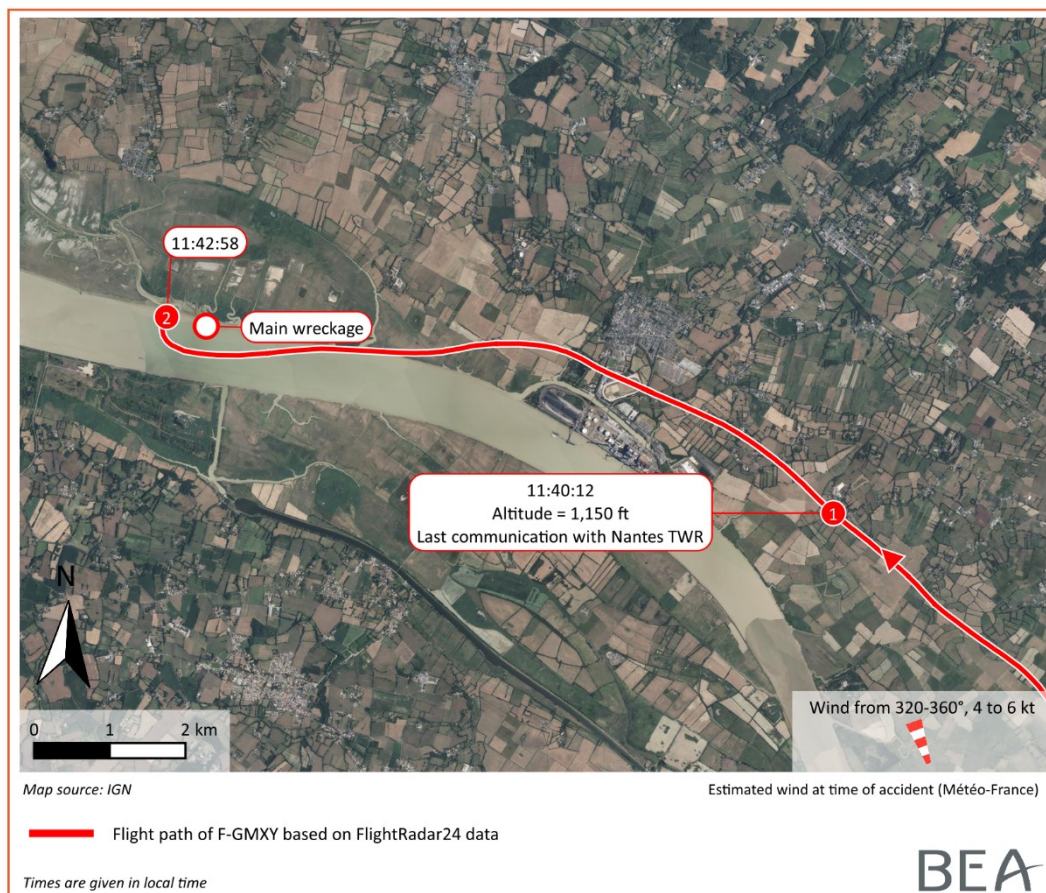


Figure 1: final flight path of F-GMXY

2 ADDITIONAL INFORMATION

2.1 Examination of site and wreckage

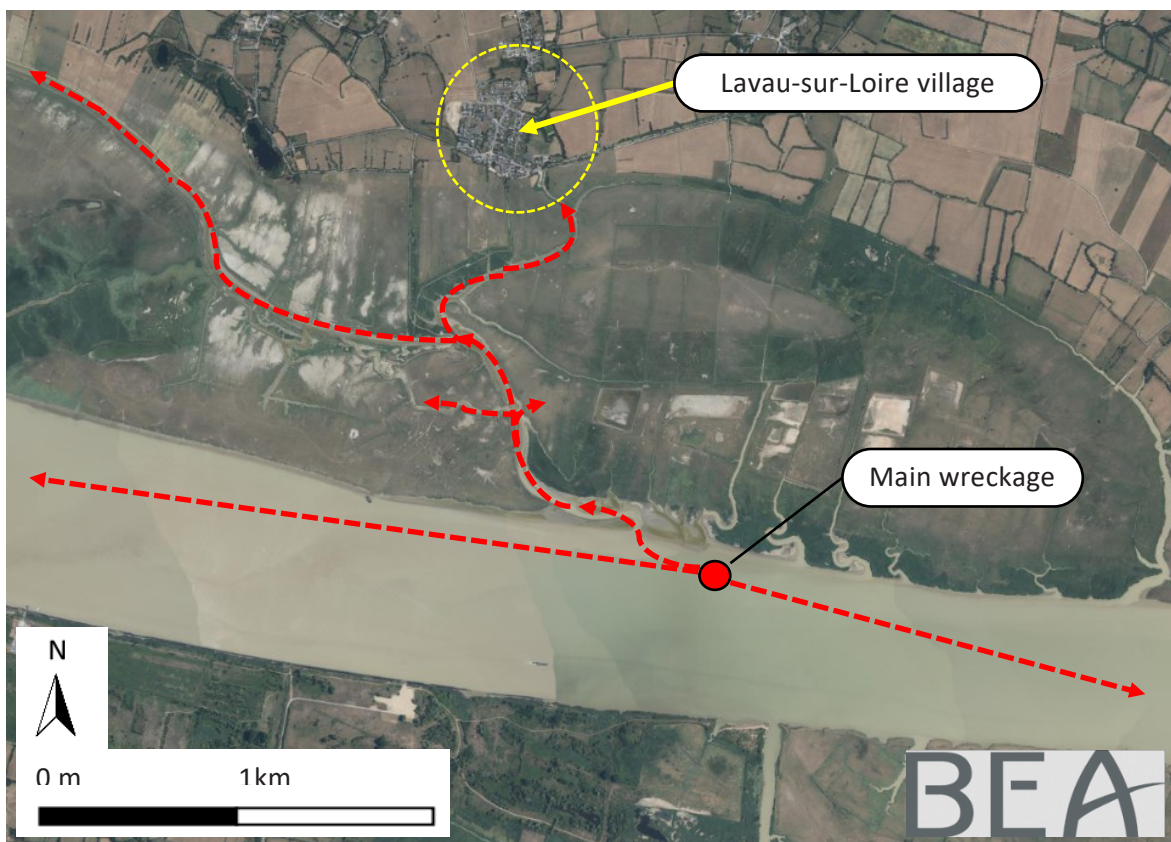
2.1.1 Accident site

Only part of the debris from the aeroplane was found at the time and in the following month. All of this debris was located in water subject to tidal currents or areas covered by water at high tide, and was widely dispersed.

The main wreckage was lying in the Loire estuary, close to the north bank (around 30 m at low tide), level with Lavau-sur-Loire village.

The position of the main wreckage, mentioned in **Figure 2** and **Figure 3**, corresponded to a precise spot in the Loire where the following items were found, at a depth of between 1.30 m and 4 m depending on the tides:

- the engine (without the propeller);
- the cockpit;
- parts of the cockpit seats;
- tail fin and rudder;
- LH part of elevator;
- the two fuel tanks;
- control cables, electrical cables.



*Figure 2: position of main wreckage and main paths taken by debris after impact with the Loire
(Source: IGN, annotations BEA)*

No sign of the aeroplane having come into contact with the dry land around the position of the main wreckage was observed.



Figure 3: view of position of main wreckage from north bank of the Loire

2.1.2 Examination of wreckage

The aeroplane struck the surface of the water with high energy. The distribution of the damage seemed to indicate a steep nose-down attitude.

Due to the configuration of the accident site and the substantial damage to the aeroplane following the impact, numerous parts of the wreckage were not found.

All of the parts found were submerged or had been deposited on the banks by successive tides.

All of the parts recovered were examined. The examinations were limited by the size of the parts and their damage. No particularity was identified on these parts. The flight controls were continuous at the time of impact.

The engine was completely disassembled. All the various damage found during the examination could be attributed to the impact with the surface of the water and the time that the engine had been in the water (incipient recent corrosion). The carburettor could not be examined due to its substantial damage. The examination of the internal mechanical parts of the engine found that the engine had not experienced in-service lubrication problems or abnormal wear. Evidence of interaction between the starter ring gear and the starter housing indicated that the engine was probably operating when the aeroplane hit the water.

2.2 Pilot information

2.2.1 Experience and ratings

The pilot, 71 years old at the time of the event, held an aeroplane Private Pilot Licence (PPL (A)) along with a Single Engine (SEP) rating. He had obtained his PPL(A) in 2011 by converting his pilot certificate (*titre de tourisme (TT)*) obtained in 1991. He had carried out a SEP revalidation flight with an instructor on 17 June 2023. He held a class 2 medical certificate. He had

logged a total of 592 flight hours since obtaining his licence in 1991 including 500 hours as pilot-in-command. He had flown around 19 h in the previous 12 months including 5 h in the previous 3 months.

2.2.2 Instructor's statement

The instructor who had revalidated the pilot's SEP rating indicated that in addition to the flight dedicated to this revalidation, he had carried out a refresher flight with the pilot in March. The flying club imposes a refresher flight on pilots who have not flown for more than 40 days.

The instructor indicated that blind navigation had not been covered during these two flights and that the pilot had not expressed the desire to practice this. The instructor stated that to his knowledge, the pilot had not followed any blind navigation training³ and had no blind navigation experience. He indicated that the pilot was in the habit of taking into account the meteorological conditions when preparing his flights.

2.3 Read-out of GNSS computer data and Cordemais power station video

The DR400 was equipped with a GTN750Xi computer which was recovered. Given the substantial damage to the computer, the BEA desoldered the memory component. After reading it out, the flight data was retrieved.

A time-lapse video from the Cordemais power station webcam camera was also analysed by the BEA. This was the camera which locally, provided the most information about this occurrence.

2.3.1 Position and optical characteristics of camera

The camera was fixed and could not be oriented. The recording interval between each image was approximately two minutes to within one second. One image, taken after the occurrence, was selected for its clarity and level of detail in order to identify landscape features.

The camera was attached to the top of a chimney and was at an altitude of 735 ft. Its horizontal angle of view was around 90°. It was slightly tilted to the LH side by around 0.5°. Its optical axis was oriented 242° in azimuth and -3° in elevation, slightly below the horizon.

³ The blind navigation module was not part of the TT programme in 1991. This module was included in the PPL(A) training in 1999. To obtain the PPL(A) by converting a pilot certificate, it is not compulsory to follow a blind navigation module.

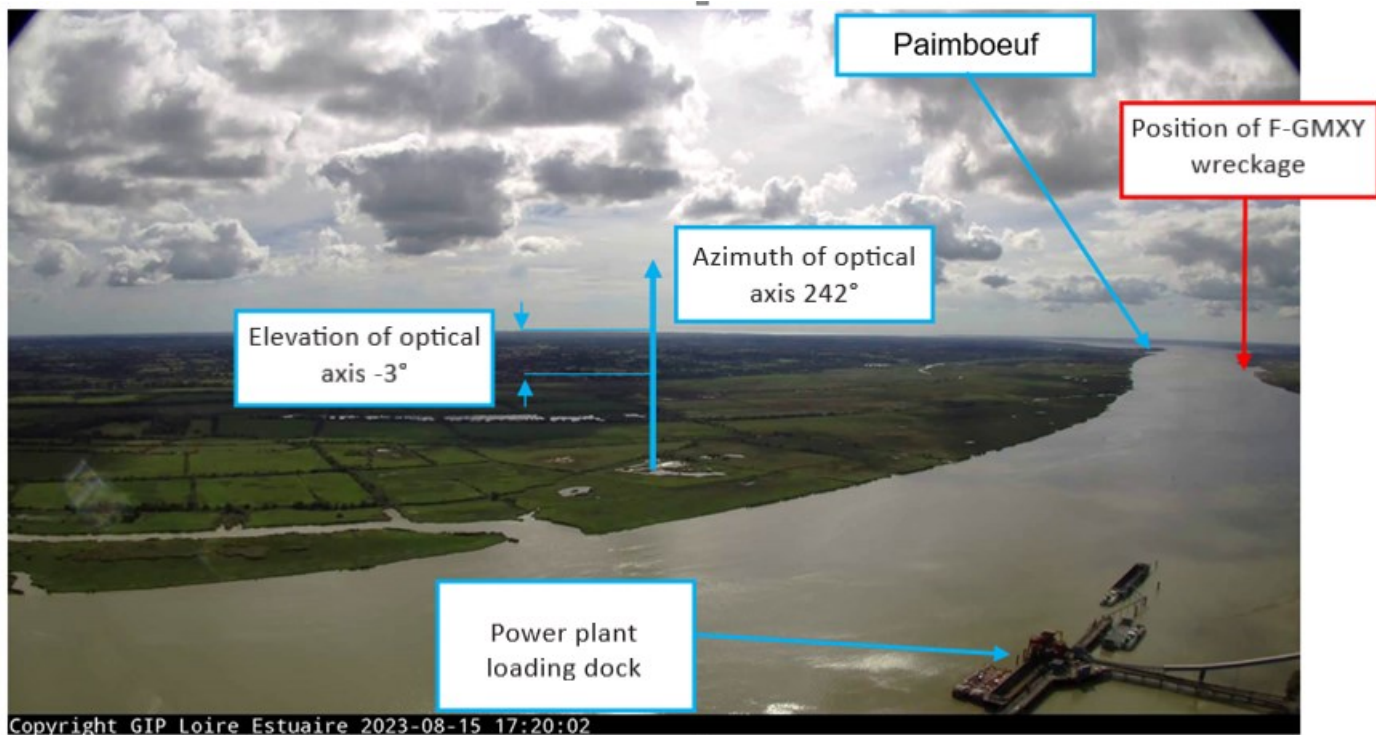


Figure 4: image from Cordemais power station taken around five hours after the occurrence
(Source: GIP Loire Estuaire, annotations BEA)

The camera was on the westernmost chimney of Cordemais power station, around six kilometres from where the wreckage was found.

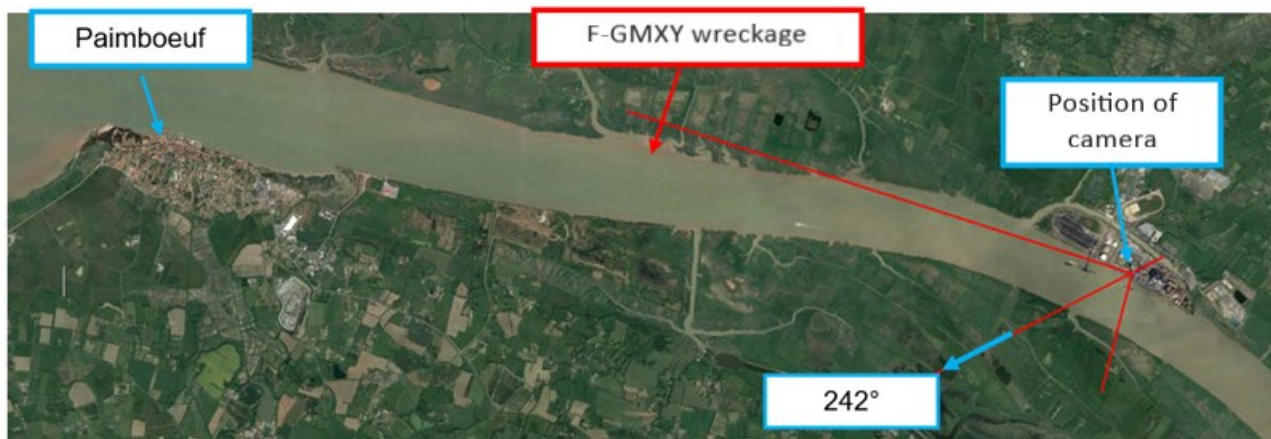


Figure 5: position of camera in relation to accident site (Source: IGN, annotations BEA)

2.3.2 Analysis of images at time of accident

The GNSS flight path taken from the on-board avionics suite showed that the DR400 entered the camera's field at 11:42:12. The last recorded point was at 11:43:01.

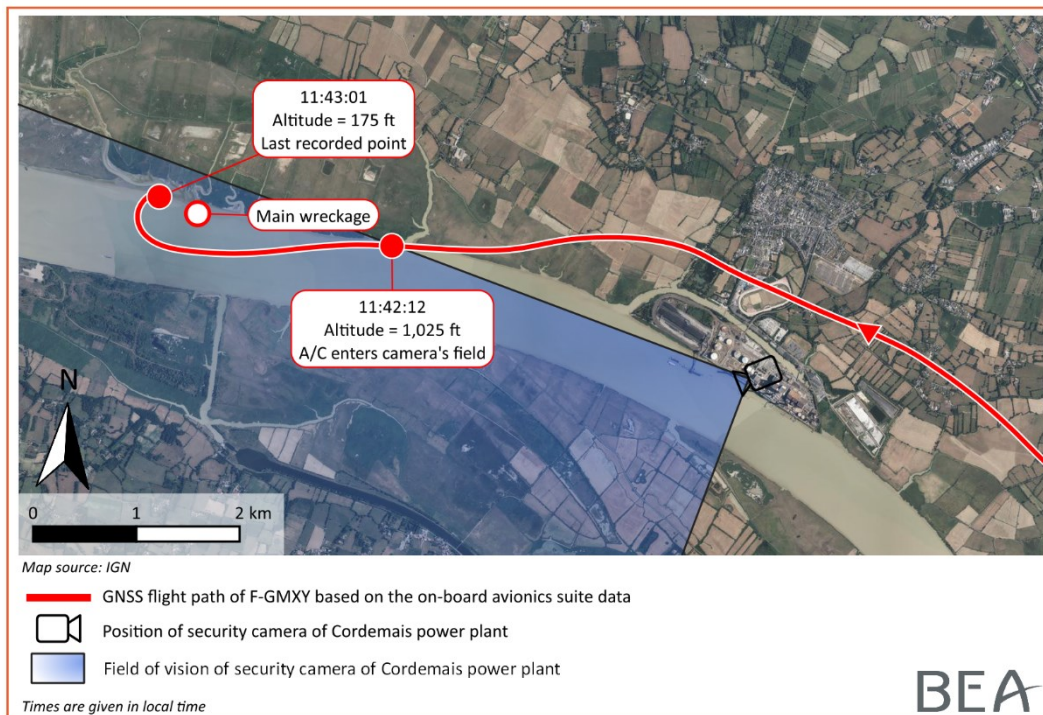


Figure 6: flight path of aeroplane in camera's field of vision

The camera did not record any image between 11:42:12 and 11:43:01. The two images either side of this interval were analysed.

On the first image, recorded at 11:41:03, the aeroplane was not in the camera's field of vision. Low stratus clouds concealing the Loire estuary could be seen. They were below the horizon with respect to the camera and were therefore below the altitude of 735 ft.



Figure 7: camera image at 11:41 (Source: GIP Loire Estuaire)

On the second image recorded at 11:43:03, it could be seen that the low stratus front had moved forward, characteristic of sea cloud moving inland.



Copyright GIP Loire Estuaire 2023-08-15 11:43:03

Figure 8: camera image at 11:43 (Source: GIP Loire Estuaire)

This sea cloud moved up the Loire estuary. At this time, the recording of the DR400's position had stopped two seconds earlier; the aeroplane was very probably overhead the site where the wreckage was found, i.e. six kilometres from the camera.

An image showed the decrease in visibility and the lowering of the ceiling with the bank of stratus clouds arriving at the chimney 21 min later.



Copyright GIP Loire Estuaire 2023-08-15 12:04:01

Figure 9: camera image at 12:04 (Source: GIP Loire Estuaire)

It was not possible to determine the end of the aeroplane's flight path as it was not visible on the images due to:

- the camera's distance from the presumed site of the impact;
- the insufficient rate of images.

2.4 Meteorological information

The estimated meteorological conditions at the time of the accident were:

- surface wind: 320-360°, 4 to 6 kt;
- visibility greater than 10 km which might drop to between 5 and 8 km in the presence of precipitation;
- overcast with a cloud base between 600 and 1,000 ft;
- thickness of cloud layer: around 2,300 ft.
- intermittent light showers of rain and/or drizzle;
- ground temperature: 17 to 18°C;
- dew point temperature: 16 to 17°C;
- QNH: 1018 hPa.

On viewing the images from Cordemais power station at 11:41 and 11:43 am, Météo-France specified that the ceiling was estimated to be at a height of around 700 ft (i.e. an altitude of around 850 ft) with light precipitation over the accident site. The estimated visibility was between 4 and 6 km in the precipitation.

At 08:50 on the day of the accident, the pilot contacted the Nantes Météo-France service by telephone to obtain the latest weather information.

The pilot explained to the weather forecaster that he wanted to fly from Loudun to La Baule with a planned take-off at around 09:30 and a return flight at the end of the afternoon. The weather forecaster stated that he explained the current weather situation and the forecasts to the pilot: a gradually diminishing weather front was moving over the region giving some light precipitation with low stratus and stratocumulus layers, a ceiling of 800 ft at Saint-Nazaire and Nantes airports, 300 ft at Poitiers airport, with reduced visibility of between 5 and 8 km in precipitation. It was forecast that the weather would improve, but slowly, during the morning. He advised the pilot to wait until midday or the beginning of the afternoon to have a ceiling between 1,500 to 2,000 ft on the route. There was no significant information to be given for the end of the afternoon.

2.5 Read-out of GNSS computer data

The read-out of the GTN750Xi computer data, also acting as a radio transceiver, showed that after the last exchange with Nantes tower (see **Figure 10**, point **1**) the pilot, who should have selected the FIS frequency (130.275 Mhz), inadvertently selected 132.750 Mhz⁴.

The flight path downloaded from the computer showed that after passing north of Cordemais powerplant, the pilot turned left and then descended (point **2**).

⁴ The frequency 132.750 Mhz is not attributed locally.

At 11:42:43, at an altitude of around 850 ft, overhead the Loire (point 3), the pilot started a RH turn northwards in climb to an altitude of around 1,200 ft, reaching a vertical speed of 3,000 ft/min. The ground speed and vertical speed then quickly decreased.

The flight path of the aeroplane showed that the latter suddenly lost altitude in the RH turn. At the last recorded position (point 4), the altitude was around 175 ft. The mean rate of sink was more than -7,500 ft/min in the last part of the flight path.

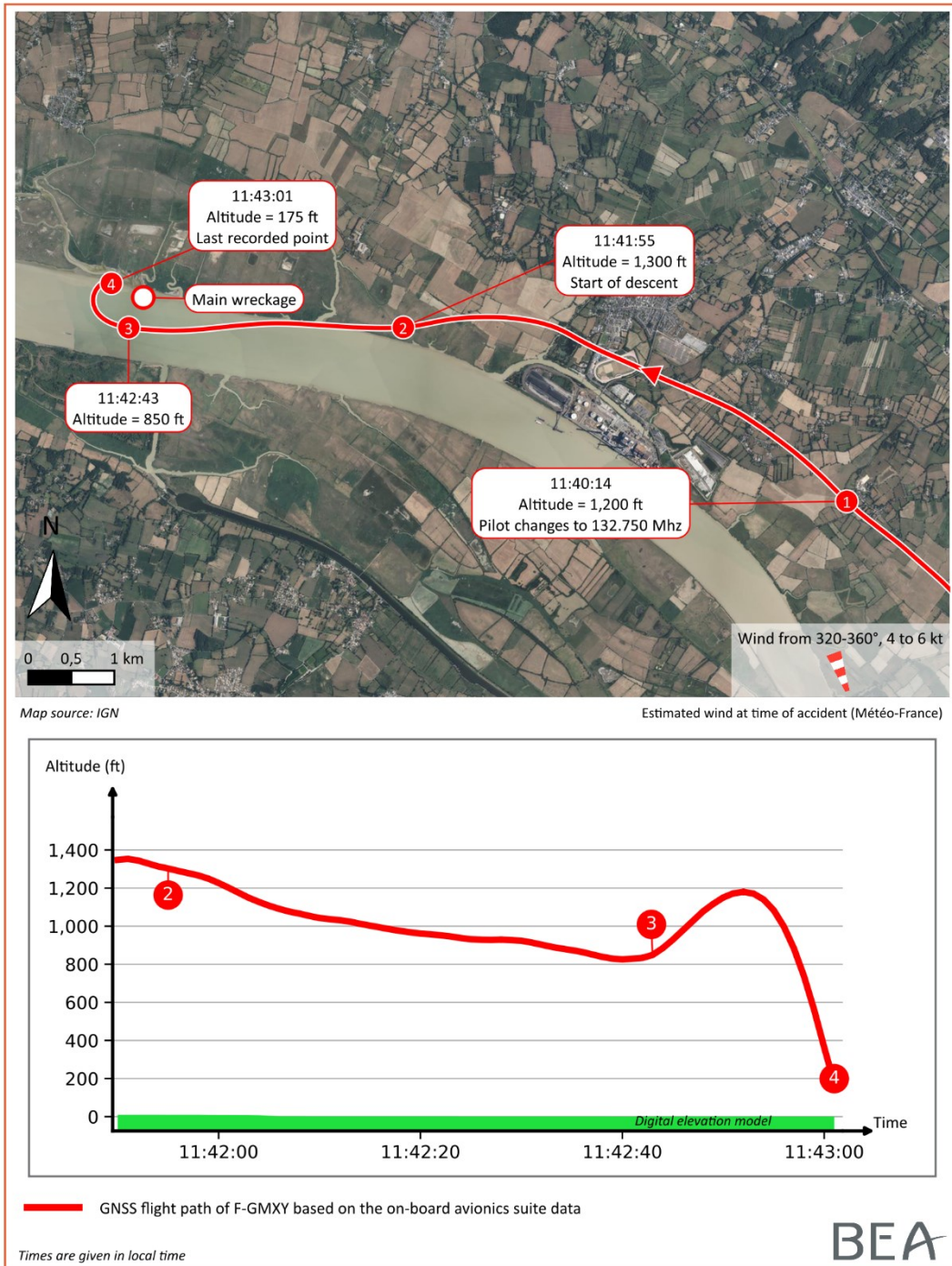


Figure 10: flight path based on the on-board avionics suite

The analysis of the GNSS flight path found that when passing north of Cordemais power station, the pilot turned left and flew over the Loire probably to avoid incoming sea clouds. The aeroplane then started a RH turn in climb with a high vertical speed until reaching an altitude of around 1,200 ft. The aeroplane very probably entered the cloud layer and the pilot then lost external visual references. During the turn and climb, the ground speed and vertical speed decreased and then while continuing the RH turn, the aeroplane very probably took a steep nose-down attitude. The rate of sink then substantially increased.

3 CONCLUSIONS

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

Scenario

The pilot, accompanied by two passengers, was due to fly to La Baule for lunch. After telephoning the Météo-France services, he put off his departure to 11:00 with an estimated arrival at La Baule of midday.

After being in contact with Nantes tower, when contacting the FIS again, the pilot selected an incorrect radio frequency and continued his flight, passing north of the Loire at an altitude of around 1,200 ft. One minute later, north abeam Cordemais power station, the pilot changed direction to head southwards and started to descend probably to avoid incoming sea clouds.

The aeroplane very probably entered the cloud layer and the pilot lost external visual references very probably resulting in him experiencing spatial disorientation. He did not then realise that he started a RH turn with a high rate of climb.

At an altitude of around 1,200 ft, the aeroplane continued the tight RH turn with a steep nose-down attitude. The pilot very probably lost control of the aeroplane while in the turn.

When the aeroplane exited the cloud layer with a high vertical speed and steep nose-down attitude, the pilot probably did not have the time to react before the aeroplane collided with the surface of the water.

Contributing factors

The following factor may have contributed to the flight being continued in adverse meteorological conditions:

- the pilot's desire to reach his destination.

The following factor may have contributed to the loss of control:

- the loss of external visual references which are the main source of information for a pilot not trained in blind navigation.

Safety lessons

Get-home-itis

In the [Safety Lessons General Aviation](#) section of its website, the BEA identified the "get-home-itis" theme in its [2021](#) and [2022](#) light aeroplane reviews.

When confronted with adverse weather conditions for the continuation of the flight, a diversion or even a precautionary landing are solutions which generally lead to a positive outcome. However, each pilot must be aware of the difficulties that may exist in envisaging this replanning when the situation has already deteriorated: stress, fatigue or the pilot's concerns (notably his motivations or the constraints which he has fixed himself) are all factors which can affect the pilot's capacity of discernment and the accuracy of his actions.

The FFA discusses get-home-itis and obstination in its document "[Règle Pratique](#)" No 28 of July 2020.

Measures taken by Loudun flying club

Since this accident, the flying club has asked all the flying club pilots to carry out a training model dedicated to blind navigation.

In addition, a pilot's aptitude in blind navigation is now checked for when revalidating or renewing the pilot licence.

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