BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile
www.bea.aero
@BEA_Aero

INVESTIGATION REPORT

Accident to the PIPER - PA32 registered F-OJSN

on 28 November 2018
in the Baie des Saintes (Guadeloupe)

Time	12:36[1]
Operator	Private
Type of flight	Cross-country
Persons on board	Pilot and two passengers
Consequences and damage	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.	

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

Vibrations in flight, diversion, engine failure on final, water landing

1 - HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, radio communication recordings and radar data.

The pilot, accompanied by two passengers, took off from Canefield airport (Dominica) at around 12:15 for a flight to Point-à-Pitre - Le Raizet airport (Guadeloupe). Start of cruise began at an altitude of between 1,000 ft and 1,800 ft flying along the west coast of Dominica until 12:25 (see Figure 1, point ❶), when the pilot headed for the east coast of the Les Saintes archipelago, flying over the sea.

At 12:30, when the aeroplane was approaching the Les Saintes archipelago at an altitude of around 900 ft, the pilot was transferred by the Raizet Approach controller to the Raizet Tower controller, who asked him to call in before joining the Pointe-à-Pitre runway circuit (see Figure 1, point ❷).

At 12:33, after flying past the Les Saintes archipelago at an altitude of around 1,000 ft, the pilot felt slight vibrations in the aeroplane's structure. He decided to divert to Les Saintes aerodrome and announced this to the Pointe-à-Pitre control tower, indicating that he wanted to check the doors (see Figure 1, point ❸). The controller acknowledged receipt of the message and asked the pilot to switch to the A/A frequency.

As the aeroplane came closer to landing on runway 09, the vibrations intensified.

At 12:36, on final over the Baies des Saintes, the pilot heard a noise from the engine and saw smoke in the cockpit. The vibrations continued to intensify, making the aeroplane difficult to control. The pilot then heard a loud noise that sounded like an explosion. He decided to make a water landing in the bay and turned left (see Figure 2).

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

BEA2018-0844.en /**June 2023**

He performed a precautionary approach without flaps and avoiding the boats. The engine stopped, the rear of the aeroplane's fuselage made contact with the surface of the water, the aeroplane glided across the surface of the water before coming to a stop. The occupants evacuated the aeroplane via the wings and were picked up by boats around one minute later. The aeroplane sank in the following minutes.

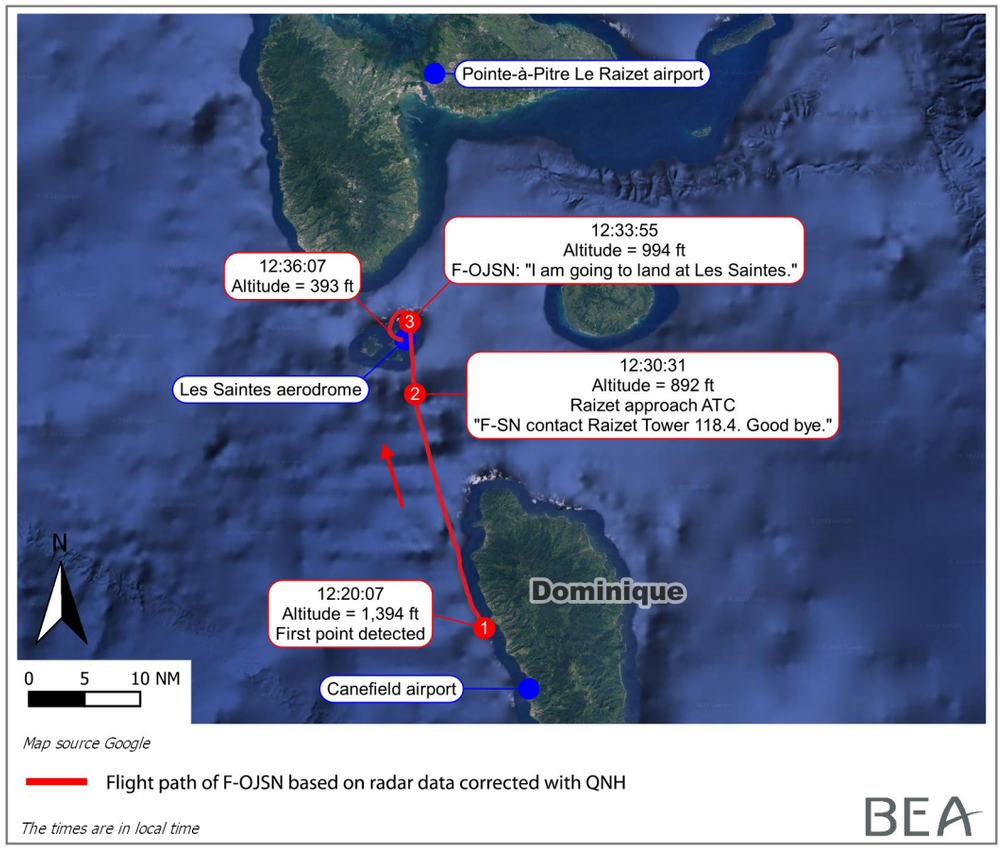


Figure 1: flight path

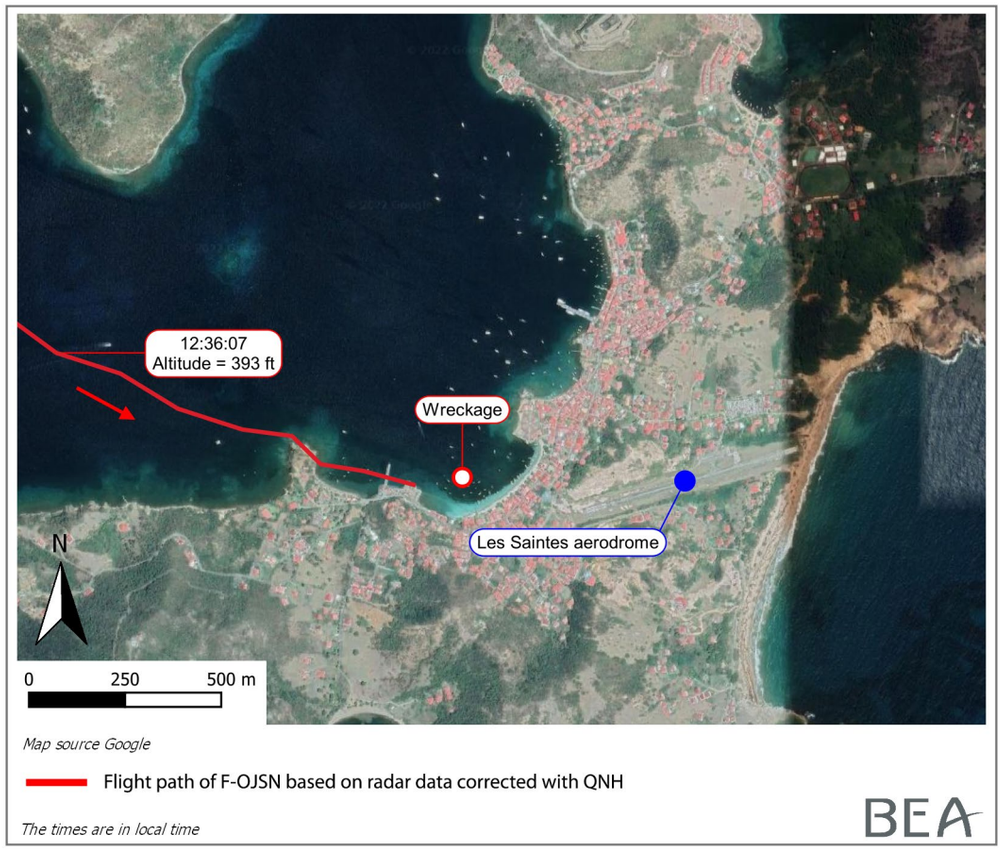


Figure 2: detail of end of path

2 - ADDITIONAL INFORMATION

2.1 Meteorological information

The meteorological conditions at Pointe-à-Pitre - Le Raizet airport at 12:30 were as follows: wind from 120° of 7 kt, visibility greater than 10 km, BKN clouds at 3,700 ft and BKN clouds at 4,400 ft, temperature 30°C, dew point temperature 22°C, QNH 1014 hPa.

2.2 Pilot information

The 71-year-old pilot held an aeroplane Commercial Pilot Licence along with a valid land Single-Engine Piston and Instrument Rating. He also held an aeroplane Flight Instructor rating.

The pilot stated that, at the time of the accident, he had logged a total of around 6,000 flight hours, 350 hours of which on the Piper PA32 and that he also had the training and experience required to use Les Saintes aerodrome, with which he was very familiar.

2.3 Pilot's statement

When the first vibrations occurred, the pilot thought that they were being caused by the incorrect locking of a rear door and decided to divert to land at Les Saintes aerodrome.

He explained that the vibrations increased, intensifying as he joined the runway circuit at Les Saintes. When he observed a drop in pressure and oil temperature followed by the appearance of smoke in the cockpit and heard an explosion, he understood that he would

not be able to reach the runway at Les Saintes aerodrome safely and decided to make a water landing in the bay.

He made a left turn to position himself over the Baie des Saintes, avoiding the many boats anchored in the bay.

He made a precautionary approach without flaps in order to make contact with the surface of the water with as much nose-up attitude as possible and to land in an area between four boats.

He explained that the landing went well, with a sudden deceleration, and stated that the aeroplane floated for four minutes, giving time for the occupants standing on the wing to be picked up by boats located nearby without them having to enter the water.

2.4 Aerodrome information

Les Saintes aerodrome is open to public air traffic. It has no air traffic unit. Messages are exchanged on the A/A frequency 123.50 MHz.

The VAC chart indicates that:

- The aerodrome is reserved for pilots who have good knowledge of the conditions of its use, as well as experience and specific training with an instructor.
- Due to the presence of obstacles and terrain around the runway axis, the final for runway 09 is displaced and is over the bay.
- Due to the short final on 09, pilots have to fly over the village of Terre-du-haut and dwellings at low height.

Source: AIS

Figure 3: extract from the Les Saintes aerodrome VAC chart in force on the day of the accident (version 7 January 2016)

2.5 Aeroplane and engine examination information

The "Saratoga" type Piper PA-32-301 was equipped with a six-cylinder, 300 hp Lycoming IO-540-K1GS engine, and a Haztzell HC-C2YR1BF propeller.

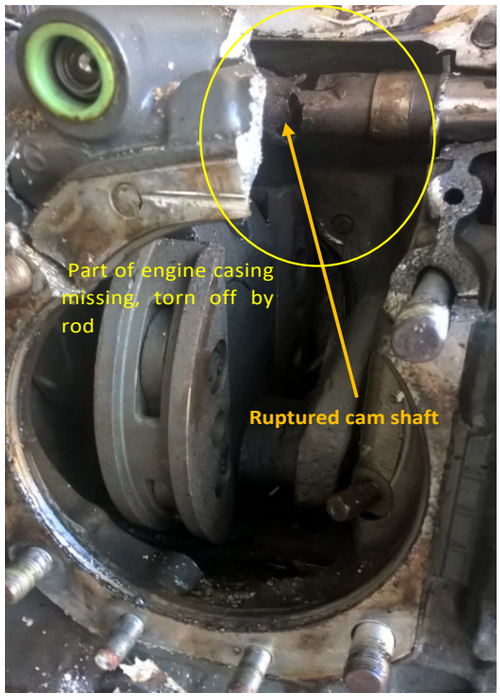
On the date of the accident, the aeroplane had logged a total of 7,859 operating hours. The engine had logged 513 hours since its last general overhaul on 23 September 2016.

The aeroplane flight manual does not specify the procedure for a water landing.

The wreckage was salvaged and taken to the maintenance workshop which conducts the aeroplane's routine maintenance.

The engine was removed and examined by the workshop with prior consent from the BEA. The examination of the engine by the mechanic was able to establish that:

- a piece of the engine casing had come away in line with its rear left attachment point;
- the cam shaft had failed;
- the rod head and the rod of cylinder 6 had failed.



Source: workshop

Figure 4: engine casing and damaged cam shaft

Source: workshop

Figure 5: cylinder 6 and its failed rod at head end

The damage observed on the casing and on the cam shaft seemed to be the result of the failure of the head of the cylinder 6 rod. The damage seemed to be consistent with the pilot's statement, the hole in the casing having resulted in oil spreading over the airframe and the failure of a rod causing intense engine vibrations.

The cause of the rod failure was not determined.

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

The pilot made a flight with two passengers from Dominica to Pointe-à-Pitre. Immediately after passing the Les Saintes archipelago, the pilot felt vibrations that he associated with the rear door being incorrectly locked, and decided to divert to Les Saintes aerodrome.

On final over the Baie des Saintes, the pilot heard a noise similar to an explosion and noticed the drop in oil pressure. Given what he saw on the engine along with the risks associated with the specific usage conditions at Les Saintes aerodrome (obstacles, aerological conditions, village and dwellings close to the runway threshold) in the event of total engine failure, the pilot decided to abort the landing at the aerodrome and made an emergency water landing in the bay, in flaps-retracted configuration.

The vibrations, the loss of oil and the engine shutdown were caused by the failure of a rod of one of the engine's cylinders.

The investigation was unable to determine the cause of the rod failure.

Safety lessons

The water landing in a sheltered zone such as the Baie des Saintes and the pilot's decision to make the landing with the flaps retracted probably minimised the consequences of the accident. The nose-up attitude when the aeroplane made contact with the surface of the water probably limited the risks of the aeroplane tipping or turning over, enabling it to float when it came to a stop and the occupants to be evacuated by nearby boats.

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