BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

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SAFETY INVESTIGATION REPORT

Accident to the Shark identified 22LE on Sunday 23 June 2024 at Saint-Pol-de-Léon

Time	Around 12:00[1]
Operator	Air Trégor
Type of flight	Sightseeing flight, commercial
Persons on board	Pilot and passenger
Consequences and damage	Pilot and passenger fatally injured, microlight 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 control during cruise without external visual references, collision with ground, during a revenue flight

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, radiocommunication recordings, radar data and data from the microlight's on-board systems.

The pilot took off from runway 29 of Lannion airport at 11:45 to fly over the island, Ouessant around 120 km away.

Three minutes later, the pilot left the Lannion A/A frequency and contacted Iroise FIS. The pilot indicated that he was going to fly along the coast towards Ouessant and was going to climb to an altitude of 1,500 ft. He specified that he would not be touching down at Ouessant. The pilot read back the QNH given by the controller and climbed to 1,500 ft. This was the pilot's last radio exchange (see **Figure 1**, point 1).

After a few minutes, the pilot descended to around 600 ft and from point 2, carried out two turns with altitude changes one after the other.

[1] The times given in this report are in local time.

Figure 1: flight path of 22LE

On completing these turns, at 800 ft, the microlight quickly climbed and the speed progressively decreased until it reached around 50 km/h at 1,800 ft (see **Figure 2**, point 3). The aural AOA[2] warning was activated. Substantial variations in load factor were observed, the smallest recorded load factor being 0.2 g. The engine speed and manifold pressure dropped sharply. Witnesses on the ground reported having heard “engine misfires”.

The microlight then descended more than 10,000 ft/min to around 540 ft (point 4). The engine parameters were corrected. The aural *OVER GEES*[3] warning was activated, the accelerometer recorded a vertical acceleration of around 8 g when the pilot carried out a pull-out. A first witness saw the microlight pass over him and enter a cloud. At the last recorded point (point 5), the microlight was at an altitude of 1,150 ft, in climb to 2,500 ft/min, with a speed of around 68 km/h. A second witness then saw the microlight pitch down towards the ground at a nearly vertical angle and then lost sight of it. The microlight collided with the ground.

[2] The aural AOA (Angle Of Attack) warning is activated when the aircraft is close to the stall AOA.
[3] This warning is activated when the number of g reaches the critical zone.

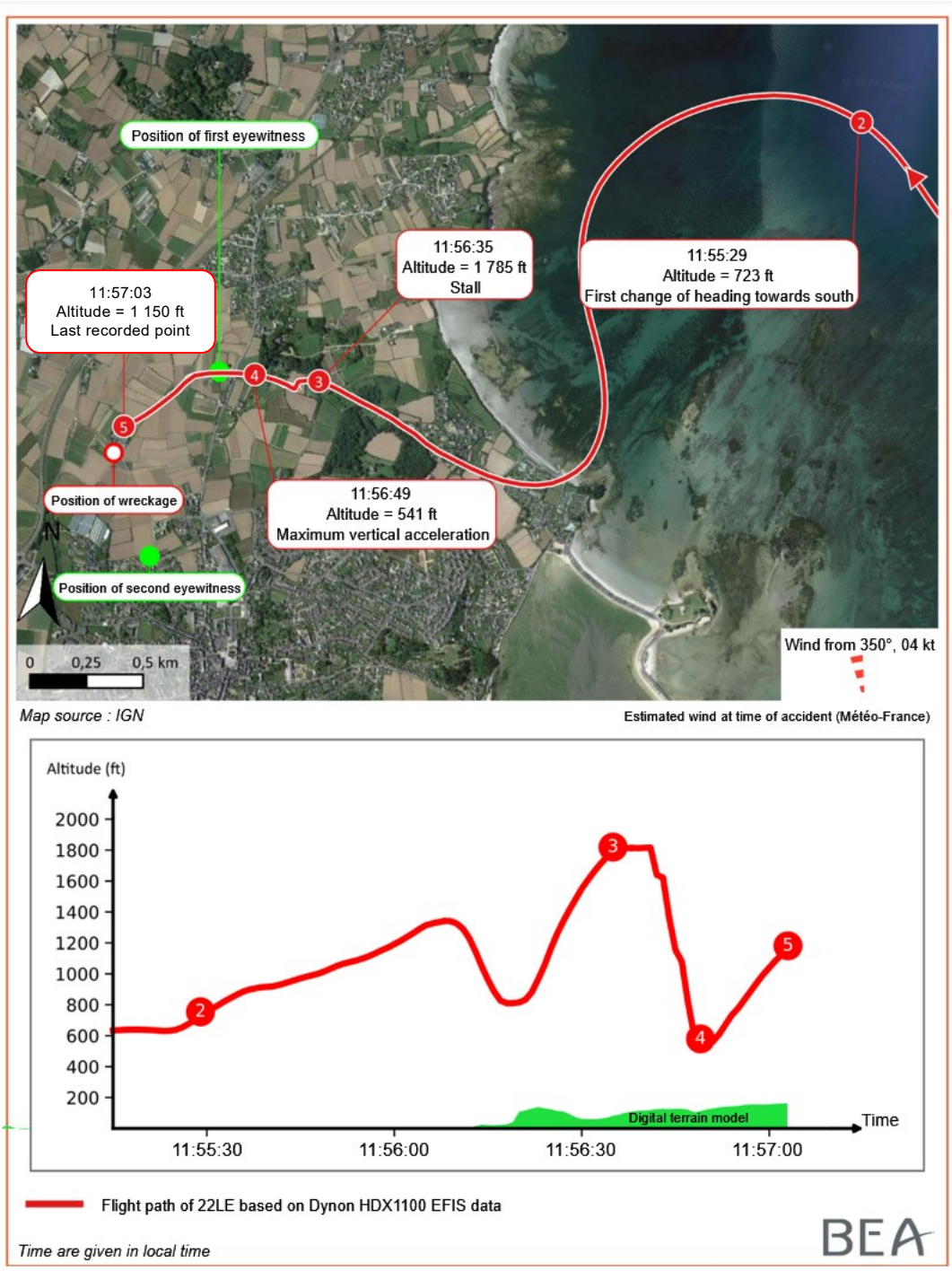

Figure 2: end of flight path of 22LE

2 ADDITIONAL INFORMATION

2.1 Microlight information

The Shark 600F is a tandem two-seater with dual controls, built by the Slovakian company, Shark Aero. This microlight model is considered high-performance with a wing loading of 55.2 kg/m^2. It is equipped with retractable landing gear, a variable-pitch propeller and an airframe parachute fitted as standard. It is powered by a 100 hp Rotax 912 ULS engine.

Figure 3: 22LE (source: Air Trégor)

22LE was equipped with two Dynon EFIS units. The front EFIS[4] took up the central panel of the instrument panel (see **Figure 4)**. This is a standard screen for the pilot, with integrated flight data, engine data and navigation data (map/GPS).

Figure 4: front instrument panel of a Shark 600F (source: Flight manual, Shark Aero)

The 22LE was also equipped with a dual-axis autopilot, controlling the ailerons and elevator. It incorporated a “LEVEL” function, usable in "emergency situations", which immediately searches for a vertical speed and zero bank, even if the autopilot is not engaged. Below the EFIS screen were circuit breakers, including the autopilot circuit breaker. Below the circuit breakers were the autopilot, starter, magnetos and Master switch. The autopilot activation and de-activation buttons were located on the two side sticks.

The flight manual indicates a stall speed at maximum weight (IAS) of 60 km/h in landing configuration and 75 km/h with the landing gear and flaps retracted.

2.2 Site and wreckage information

The examination of the site and the wreckage found that the microlight had collided with the ground with a very high nose-down pitch attitude (between 45° and 90°) and high speed.

[4] Dynon Skyview HDX 1 100.

Figure 5: photo of accident site (source: BEA)

The wreckage was complete and grouped together. The examination of the flight controls was able to determine that these latter were continuous before the collision with the ground. The airframe parachute had not been activated.

2.3 Examination of EFIS

Both Dynon EFIS were removed. Based on the recorded data, it was possible to retrace the history of the flight (see paragraph 1).

Before and after the first loss of control, the recorded engine data did not reveal any anomalies. The quick decrease in the manifold pressure and engine speed during this loss of control was most likely due to the unusual pitch attitude of the microlight and/or the low load factor, which reached a minimum of 0.2 g. Consequently, the engine was not examined.

The avionics systems also recorded various alert messages. The “ROLL SERVO OFFLINE” and “PITCH SERVO OFFLINE” messages were recorded approximately five minutes before the loss of control. This indicates that the AP servo controls were no longer communicating with the system or were no longer powered. The reason for this cannot be determined from the recorded data. This can occur, for example, when the AP circuit breaker switch located on the front instrument panel (see paragraph 2.1) is disengaged. In such a situation, it is impossible to use the LEVEL function.

2.4 Pilot information

The 60-year-old pilot held a microlight pilot licence accompanied by fixed-wing and gyroplane ratings obtained respectively in 2012 and 2015 and passenger carrying privileges. He had also held an aeroplane private pilot licence (PPL(A)) obtained in 2012 along with the SEP rating which was no longer valid at the time of the accident. The pilot was not trained in instrument flights. The instructor who had trained him for the PPL indicated that in the scope of this training, the pilot had only followed one blind navigation session during which he had carried out a 180° turn without visual references.

The pilot had logged 163 aeroplane flight hours, including 27 hours as pilot-in-command. With respect to fixed-wing microlights, he had flown the Vampire and WT9 before piloting the Shark. A friend of the pilot indicated that he had carried out around 450 flight hours on the WT9. In his microlight pilot log book, the pilot had recorded 470 h on the Vampire and around 107 h on the Shark. He had totalled 7 h 30 min on the Shark in the 30 days preceding the accident and around 28 h in the previous 3 months.

The autopsy did not reveal any factor which might have contributed to the occurrence. During the investigation, there were no reports of the pilot having any particular medical history.

2.5 Meteorological information

Before departure, the main aeronautical weather information available for the route was the METAR reports, the TAF for Brest airport and the SIGWX chart.

The 11:30 Lannion airport automatic METAR indicated the following parameters:

- mean wind from 300° at 10 kt, varying between 260° and 340°;
- visibility greater than 10 km;
- overcast at 1,400 ft;
- temperature 19°C;
- dew point temperature 16°C;
- QNH 1020.

The 05:00 UTC Brest long TAF indicated:

TAF LFRB 230500Z 2306/2412 VRB05KT 9999 OVC006 TEMPO 2306/2312 2000 DZ OVC002 PROB40 TEMPO 2306/2310 0500 FG VV/// BECMG 2310/2312 BKN012 PROB40 TEMPO 2312/2322 4000 RADZ BKN008 BECMG 2322/2324 BKN020 PROB40 TEMPO 2322/2408 2000 BR BKN002=

At the time of the flight, it forecast:

- overcast at 600 ft;
- temporarily between 08:00 and 14:00:
    - visibility 2 km,
    - drizzle,
    - overcast at 200 ft,
    - a moderate risk (40 %) of fog between 08:00 and 12:00 with visibility reduced to 500 m.

The 11:00 SIGWX chart indicated for Brittany, low stratocumulus cloud cover between 3,000 and 7,000 ft thick, based between 1,000 and 2,000 ft. The forecast visibility was less than 8 km. Ouessant and Saint-Pol-de-Léon were situated in zone A where it was forecast as being:

- overcast with stratus cloud based between 500 ft and 1,000 ft;
- mist and fog locally;
- reduced visibility, less than 1.5 km.

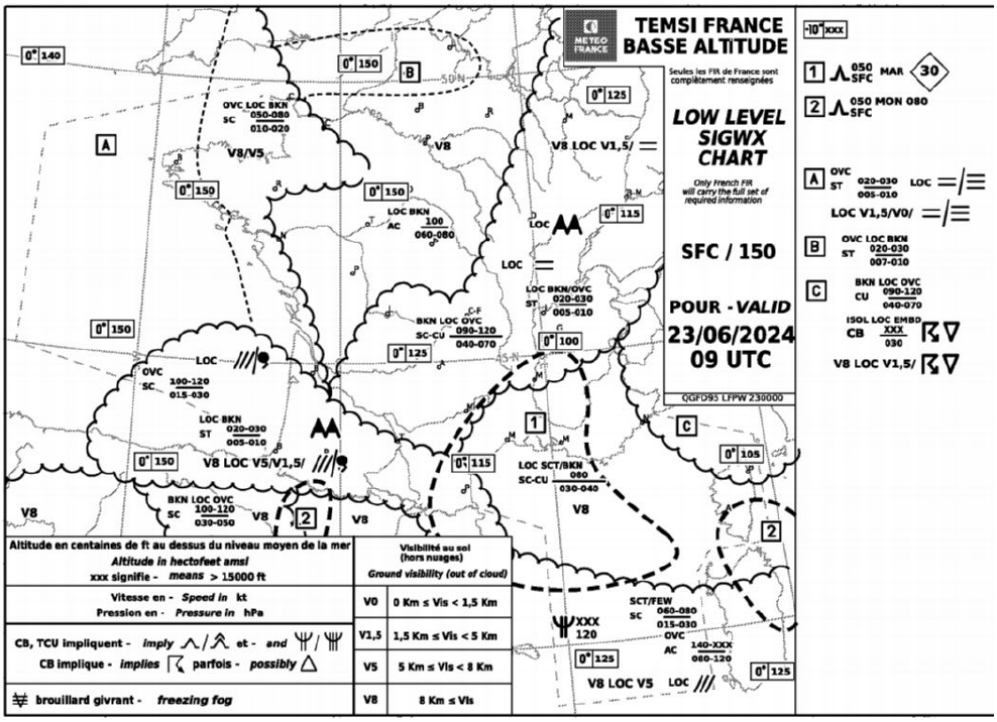

Figure 6: 11:00 SIGWX chart (source: Météo-France)

The weather conditions observed at 11:00 on Batz (located less than 10 km from the accident site) were: overcast with very low stratus clouds and fog, and ground visibility of 800 m.

The Météo-France AROME forecast model indicated humidity greater than 90% below a height of 300 ft, which indicates the presence of numerous stratiform clouds at this altitude or even below.

Météo-France estimated the conditions at Saint-Pol-de-Léon between 11:00 and 12:00 as follows:

- low stratocumulus cloud cover at around 1,000 to 1,150 ft;
- local stratus clouds below 1,000 ft;
- visibility 10 km and less than 5 km locally;
- possible mist locally;
- variable light wind at 3 kt;
- humidity approximately 94%.

In addition, eyewitnesses who were near the accident site reported very low visibility, a very low ceiling and the presence of mist. The first witness (see **Figure 2**) stated that the microlight passed over him flying in a straight line. The microlight was at a height of approximately 420 ft at that moment. The witness explained that the microlight climbed and that he saw it enter the cloud layer immediately afterwards. The microlight initially climbed to a height of approximately 530 ft. Based on this information, it can be concluded that the base of the cloud layer was between 420 ft and 530 ft. Another witness stated that visibility was less than 600 m, as a reference located at that distance from his position was obscured by fog.

2.6 Statements

The passenger's husband explained that the flight was originally scheduled for the afternoon of 15 June, but the pilot had cancelled the flight due to adverse weather conditions. The flight was rescheduled for 23 June. He added that on 23 June, the pilot arrived late and that other people were present at Lannion airport. They had an appointment at the same time for a sightseeing flight and the pilot had to cancel their flight.

The husband stated that the pilot added fuel and carried out a walk-around inspection before departure. The pilot and passenger each donned a life jacket. The pilot helped the passenger take her seat in the microlight and conducted a safety briefing.

The pilot's partner stated that the pilot usually checked the weather forecast before taking off. She remembered that he had consulted the website, *Windy* before the flight.

2.7 Operator information

The pilot was the director of TREGOR ULM (AIR TREGOR), which had owned the Shark 22LE since April 2022. According to the certificate of registration in the National Business Register (RNE), the company's main activities were sightseeing flights and aerial photography. The company had been registered with the RNE since 20 May 2015. Various sightseeing flight circuits were offered for sale and advertised on the *air-tregor.com* website. The "Ouessant/Bréhat" itinerary was one of the circuits offered, and it was similar to the one taken on the day of the accident: Lannion-Ouessant[5].

2.8 Legal framework for passenger commercial air transport

Passenger commercial air transport, or public transport, is an activity governed by a set of regulatory requirements. In France, only companies with an operating licence and an Air Operator Certificate (AOC) are authorised to transport passengers for remuneration. These companies are more commonly known as airlines.

The order of 23 September 1998 relating to microlights specifies that, for these specific aircraft, commercial air transport flights are prohibited, with the exception of local flights, which are defined in the current Article R6412-4 of the Code of Transport.

It defines a local flight as a non-stop flight with the same departure and arrival points, during which the aircraft does not fly beyond a distance of 40 km from its point of departure and, except for microlights, lasts less than thirty minutes between take-off and landing. At the time of the accident, there were no specific regulatory requirements for these local flights for remuneration in microlights, apart from the general aviation rules applicable to sport and leisure aviation.

Thus, air transport from Lannion to Ouessant for remuneration is normally carried out by a certified operator in order to guarantee a high level of safety for passengers.

[5] The shortest distance between Ouessant and Lannion airport is 118 km.

2.9 Illegal commercial air transport

The website of the Ministry of Transport, on the Public or Private Transport page, specifically states that when a commercial flight is operated by an unauthorised carrier, **safety is not guaranteed** and, in the event of an accident, passengers will probably not be covered. In fact, insurers include a general clause in their contracts allowing them to disclaim liability in the event of an accident involving an "illegal" carrier.

Every year, the DTA and the DSAC organise meetings and training sessions for DSAC-IRs and BGTAs on the subject of illegal commercial air transport. The DTA informed the BEA that these training sessions are not currently scheduled for National Police units with an aerodrome in their area of jurisdiction, as is the case in Lannion.

Air Trégor advertised flights on its website that did not comply with regulations. However, the company had not been subject to any checks by the judicial or administrative authorities.

3 CONCLUSIONS

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

Scenario

The investigation was unable to determine what weather information the pilot had obtained before departing. However, the latter undertook this flight when the meteorological conditions were marginal at the departure airport and the available meteorological information indicated that the conditions were adverse for a VFR flight on the planned route.

Although he had planned to fly at an altitude of 1,500 ft, the pilot progressively descended to 600 ft probably to remain under the cloud cover. After carrying out several turns and altitude changes, very probably to avoid clouds, the pilot entered the cloud layer and lost external visual references. He then lost control of the microlight which collided with the ground a few minutes later.

The pressure stemming from the presence of a passenger may have led the pilot to adhere to the planned navigation, as the flight had already been cancelled once. Furthermore, the flight purchased for the passenger was a flight to Ouessant, west of Lannion. This may have incited the pilot to head west, even though conditions were more favourable for a VFR flight in the eastern sector of Lannion. Once the flight had begun, it was even more difficult for the pilot to decide to change the route or shorten the flight.

Safety lessons

Use of emergency parachute

Deprived of external visual references during a VFR flight, a pilot can quickly lose control of their aircraft or collide with obstacles. The airframe parachute, if used in time, can mitigate the consequences of the occurrence. The report on the accident to the FK9 identified 10NA in October 2024 is an example of this. A safety study on the use of the airframe parachute will be published shortly by the BEA.

This topic is also addressed in the BEA's annual microlight reviews for 2021 and 2023.

Loss of external visual references and get-home-itis

Between 2022 and 2024, the BEA published nine investigation reports concerning accidents that occurred as a result of weather conditions incompatible with a VFR flight. In most cases, the pilots lost their external visual references. Of these nine accidents, only one was not fatal, a collision with a power line. As for the others, there were seven cases of loss of control in flight and one CFIT (controlled flight into terrain).

In most cases, the decision to fly despite adverse weather conditions or to continue to the planned destination contributed to the accident. Furthermore, get-home-itis, linked to the pressure arising from the presence of passengers, is a recurring theme in the BEA's annual reviews. It has also been discussed in detail in both the 2024 light aeroplane and microlight reviews.

A study[6] published in 2022 in the *Safety* magazine looked at 129 accidents linked to pilots losing visual references that occurred in the United States. As previous studies had shown, pilots often underestimate the hazards of losing visual references and/or overestimate their ability to recover the situation. The conclusions recommended incorporating awareness of the hazards of losing visual references into recurrent pilot training.

In order to raise awareness, the NTSB issued a *Safety Alert* in 2015 on this topic in which it recommends that pilots be honest with themselves about their skill limitations, refuse to allow external pressures to influence them to attempt or continue a flight, and that they seek training.

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

[6] *Loss of Visual Reference in U.S. Aviation: An Analysis of 129 Accidents*, by Hilary Kalagher and Alex de Voogt, *Safety* 2022,8,13.