CIAIAC

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Report A–002/2019

Accident involving a PIPER PA-28R-201 (Arrow III) aircraft, registration G-OARI, on Mount Ernio in Errezil (Gipuzkoa) on 9 January 2019

GOBIERNO DE ESPAÑA

MINISTERIO DE TRANSPORTES, MOVILIDAD Y AGENDA URBANA

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Notice

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances of the accident object of the investigation, and its probable causes and consequences.

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.5 of Regulation (UE) nº 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1., 4. and 21.2 of Regulation 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report was originally issued in Spanish. This English translation is provided for information purposes only.

Contents

Abbreviations

° ′ ″	Sexagesimal degrees, minutes and seconds
ºC	Degrees centigrade
AAIB	Air Accident Investigation Board of the United Kingdom
ABV	Above
AEMET	Spain’s National Weather Agency
AGL	Above ground level
AIP	Aeronautical information publication
AMSL	Above mean sea level
APPBIL	Approach control at the Bilbao Airport
ATC	Air traffic control (in general)
ATS	Air traffic service
AVBL	Available or availability
BKN	Broken clouds
BTN	Between
CAA	Civil Aviation Authority of the United Kingdom
CFIT	Controlled flight into terrain
COV	Cover/Covered/Covering
CPL	Commercial pilot license
CTR	Control zone
DME	Distance measuring equipment
DVOR	Doppler VOR
EASA	European Aviation Safety Agency
FIR	Flight information region
FL	Flight level
ft	Feet
FTM	Identifier for the Fatima (Portugal) VOR
gal	Gallons
GPIAAF	Portuguese accident investigation authority
GPS	Global positioning system
h	Hours
hp	Horsepower
hPa	Hectopascals
IFR	Instrument flight rules
KIAS	Indicated airspeed in knots
km	Kilometers
kn	Knots
kt	Knots
l/m^2	Liters per square meter
lb	Pounds
LEBB	ICAO identifier for the Bilbao Airport

LEBG	ICAO identifier for the Burgos Airport
LESO	ICAO identifier for the San Sebastian Airport
LEVT	ICAO identifier for the Vitoria Airport
LFBZ	ICAO identifier for the Biarritz Airport (France)
LPCS	ICAO identifier for the municipal aerodrome of Cascais (Portugal)
Kg	Kilograms
m	Meters
M	Nautical miles
m^2	Square meters
MEP	Multi-engine piston rating
METAR	Meteorological aerodrome report
MHz	Megahertz
NDB	Non-directional beacon
NM	Nautical miles
No.	Number
NOTAM	Notice distributed by means of telecommunication that contains information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel and systems concerned with flight operations
PIMS	Pilot's Information Management System
PPL	Private pilot license
QNH	Altimeter sub-scale setting to obtain elevation when on the ground (precision setting to display elevation above mean sea level)
R	VOR radial (followed by three numbers)
SEP	Single-engine piston rating
SIGWX	Significant weather
TWR	Aerodrome control tower or aerodrome control
U/S	Unserviceable
UTC	Coordinated universal time
VFR	Visual flight rules
VMC	Visual meteorological conditions
VOR	VHF omni-directional range
W	West

Synopsis

Owner and operator:	Private
Aircraft:	Piper PA-28R-201 (Arrow III)
Date and time of accident:	Wednesday, 9 January 2019 at 13:15
Site of accident:	Mount Ernio, Errezil (Gipuzkoa)
Persons on board:	2, killed
Type of flight:	General aviation – Private
Phase of flight:	En route
Flight rules:	VFR
Date of approval:	25 September 2019

Summary of event

The aircraft had taken off at 08:30 UTC (09:30 local time in Spain) from the municipal aerodrome of Cascais (Portugal), en route to the airport of San Sebastian. The flight was taking place under visual flight rules (VFR).

At around 12:00 UTC (13:00 local time), the aircraft was near the Bilbao Airport. The crew contacted the approach controller at this airport via radio, and at 12:10 UTC, the controller transferred the aircraft to the San Sebastian control tower.

Minutes later, the radar signal was lost. The crew never made radio contact with the San Sebastian control tower.

A search for the aircraft was initiated, and the wreckage was found on the south slope of Mount Ernio, very close to the summit.

Both occupants were killed and the aircraft was destroyed.

The investigation has determined that the accident resulted from the decision to continue flying through an area where the meteorological conditions were below the minimums required for flights being conducted under visual flight rules (VFR).

Improper flight planning is deemed to have contributed to the accident.

1. FACTUAL INFORMATION

1.1. History of the flight

The day before the accident, the crew filed a flight plan to go to the Biarritz Airport (LFBZ) in France.

On the morning of the accident, before starting the flight, this flight plan was canceled and replaced with another whose most significant change was the different destination, San Sebastian (LESO) instead of Biarritz (LFBZ).

In all the flight plans filed, the pilot listed was one of the two occupants, who has thus been identified as the pilot in this report.

The other occupant of the aircraft was its owner, and is identified in this report as the passenger; however, it was deemed appropriate to include information on the occupant's flying license.

The pilot published a post to his Twitter account on the change in destination in which he noted that apparently there were problems for refueling in Biarritz, so instead of flying to this airport they would fly to San Sebastian.

The aircraft took off from the airport of Cascais (LPCS) in Portugal at around 08:15 UTC on a visual flight plan to the airport of San Sebastian (LESO).

The flight was estimated to last 3 hours 42 minutes, at a speed of 130 kn.

The pilot uploaded two photographs taken during the flight to his Twitter account, with the comment "mountains of central Spain". They show the outside of the aircraft, and reveal that the skies were practically clear. One of these photographs shows part of the aircraft's instrument panel, with the navigation unit displaying the aircraft's position as 57 NM southwest of the FTM VOR. This is a navaid that is located in the vicinity of the Portuguese town of Fatima.

This same photograph shows that the alternator warning light was on.

The aircraft was transferred to Madrid/control at point Porta at 09:08:40 UTC. At the time the aircraft was flying at 5500 ft.

The crew established radio contact with sector ZML of Madrid/control at 09:23:47.

The flight continued normally, with the crew establishing radio contact with various control stations (sectors ZML and DGL of Madrid/control, Vitoria TWR and Bilbao/approach).

At 12:12:30, Bilbao/approach called the aircraft to instruct it to contact the control tower (TWR) at San Sebastian on 119.85 MHz, which the crew acknowledged before signing off.

Just over a minute later, the crew again called Bilbao/approach to report they had been unable to contact San Sebastian on 119.85 MHz. This was the last communication with the crew.

The radar signal from the aircraft was lost at around this time.

Shortly afterwards, the aircraft impacted against the south face of Mount Ernio, located in the town of Errezil, in the province of Gipuzkoa.

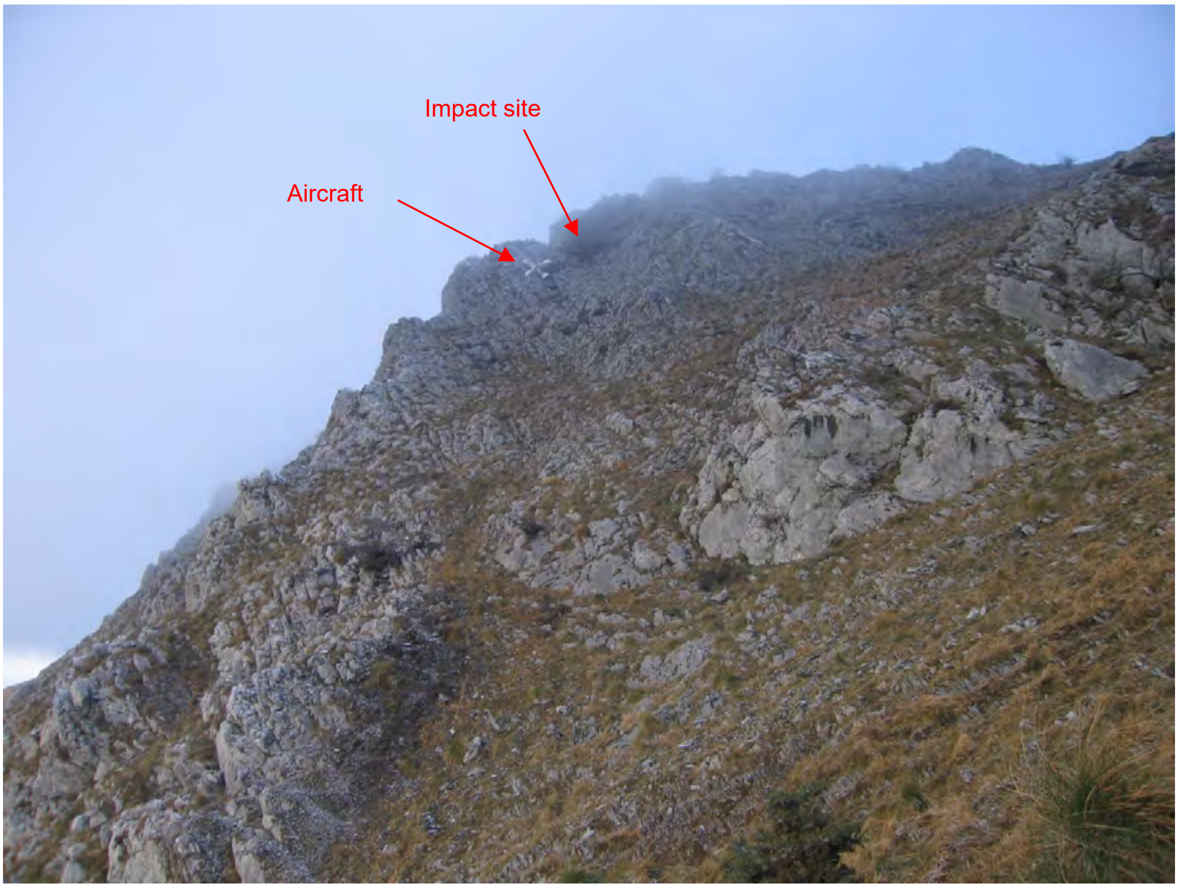

Figure 1. Photograph of Mount Ernio

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1	1	2	
Serious				
Minor				N/A
None				N/A
TOTAL	1	1	2	

1.3. Damage to aircraft

The aircraft was destroyed by the impact with the mountain and the subsequent fire.

1.4. Other damage

None.

1.5. Personnel information

1.5.1. Information on the pilot

The pilot, a 62-year-old British national, had a commercial pilot license (EASA-CPL) issued by the Civil Aviation Authority (CAA) of the United Kingdom on 28 February 2013. All of the documents on the aircraft and pilot were destroyed in the accident.

Because of this, the CIAIAC requested assistance from the AAIB-accredited representative to collect all the information the CAA had on the aircraft's occupants.

According to the information provided by the CAA, the pilot had a valid multi-engine piston (MEP) rating at the time of the event.

Despite inquiries with UK CAA and examination of the UK CAA Pilot's Information Management System (PIMS), a documentary record of the pilot's SEP revalidation could not be found. However, personal electronic records kept on a spreadsheet by the pilot, show that he underwent an SEP revalidation on 30 April 2017 with an expiry date recorded as 30 April 2019.

The electronic evidence held on the spreadsheet, also shows several other qualifications and privileges which reflect the PIMS records held by the UK CAA. In addition, the entry for the SEP revalidation on the 30 April 2017 includes an electronic signature of a registered UK CAA examiner who regularly carried out revalidation testing with the pilot. The examiner's recollection is that a revalidation was done by an assessment of the pilot's flying experience, recorded in his log book, over the preceding 12 months and fulfilled the UK CAA SEP revalidation requirements.

He had a class-1 medical certificate that was valid until 6 June 2019.

Although it has not been possible to find out exactly his flight experience until the day of the accident, it has been determined that, until 15 September 2018, his total number of hours was 3030:50.

1.5.2. Information on the passenger

The passenger, a 67-year-old British national, had private (EASA-PPL) and commercial (EASA-CPL) pilot licenses, issued by the CAA on 22 December 2014.

He had a single-engine (SEP) (land) rating that was valid until 31 December 2020.

He had a class-2 medical certificate that was valid until 2 December 2019.

He had a total of 6446:05 flight hours, of which 525 had been on the same type of aircraft as the accident aircraft.

1.6. Aircraft information

1.6.1. General information

The accident aircraft, a Piper PA-28R-201 (Arrow III), registration G-OARI, is a single-engine, low-wing airplane equipped with a retractable tricycle landing gear. It was made in 1988 and had serial number 2837005.

Its general characteristics are as follows:

- Wingspan: 10.80 m.
- Length: 7.50 m.
- Height: 2.40 m.
- Empty weight: 1637 lb.
- Maximum takeoff weight: 2750 lb.
- Fuel capacity: 77 gal.
- Speed limits:
  - Never-exceed speed: 183 KIAS.
  - Maximum structural speed: 146 KIAS.
  - Maneuvering speed: 118 KIAS.
  - Maximum flap extension speed: 103 KIAS.
  - Maximum gear extension speed: 129 KIAS.
  - Maximum gear retraction speed: 107 KIAS.
- Engine: Lycoming O-360-C1C6 (200 hp).
- Propeller: two-blade, constant-pitch McCauley B2D34C213 propeller.

1.6.2. Maintenance records and airworthiness status

The engine had been overhauled in March 2018 at the facilities of Airtime Aviation, located in the international airport of Bournemouth (United Kingdom).

The propeller had also been overhauled in March 2018, at the facilities of Brinkley Propeller in Bedfordshire (United Kingdom).

The aircraft underwent an annual inspection and its certificate of airworthiness was renewed in June 2018 at Cristal Air Limited, Herstmonceux, East Sussex (United Kingdom). The airworthiness review certificate was valid until 14 June 2019.

At the time of the inspection, the aircraft had a total of 12673:35 flight hours, and the engine and propeller had 0 hours.

On 9 July 2018, the aircraft landed at the aerodrome of Cascais (LPSC), having taken off from the airport of San Sebastian.

The purpose of this flight was to ferry the aircraft to the aerodrome of Cascais, where it was to be repainted at the facilities of Sevenair Tech Services.

After it was painted, the aircraft underwent a ground test, the result of which was satisfactory. On 17 December 2018, the aircraft was returned to service.

From the time of the inspection done in the United Kingdom in June until the start of the accident flight, the aircraft had flown 12 h 10 min, meaning the airframe had a total of 12685:45 h.

1.7. Meteorological information

1.7.1. Meteorological information gathered by the crew

The CIAIAC received support from the accident investigation authorities of Portugal (GPIAAF) and the United Kingdom (AAIB) in order to determine if the crew of the aircraft had gathered weather information before the flight, and if so, what this information was.

According to information provided by the GPIAAF, the aircraft's crew did not request any weather information from the aviation weather center at Cascais.

The AAIB checked with the United Kingdom's Met Office, which reported that they had no record of either aircraft occupant logging into the general aviation weather information service either on the day of the accident or in the days before it.

The AAIB also reported that the person listed as the pilot in the flight plan was a registered user of SkyDemon. This Company offers a European navigation service with mobile maps for Android and iOS devices. Although it is primarily intended for VFR pilots, it includes IFR maps and it can be very useful in the cockpit for flights planned and filed through an automatic router. When a flight is planned, a tab is shown on one side of the screen that provides updated weather information along the planned flight route. It can also provide information on the airspace and the safety altitude, and it shows a warning if the planned flight path poses any danger.

For its weather data, SkyDemon uses a combination of sources for this kind of information. Because of this, it is impossible to know for certain what information the crew checked or what information was displayed on the screen.

According to SkyDemon's records, the pilot used this service for 12.2 minutes on 5 January, for 8.9 minutes on the 6th, it was not used on the 7th, on the 8th it was used for 4 minutes and on 9 January, the day of the accident, it was used for 30.1 minutes.

Users normally connect to the SkyDemon server while planning the flight. During the flight proper they are not usually connected to the server, and so there are no records.

1.7.2. Weather forecast

AEMET issued a low-level significant weather chart (SIGWX) that was valid from 09:00 to 15:00 UTC on the day of the accident. It was later replaced by another chart that was valid for the same time period.

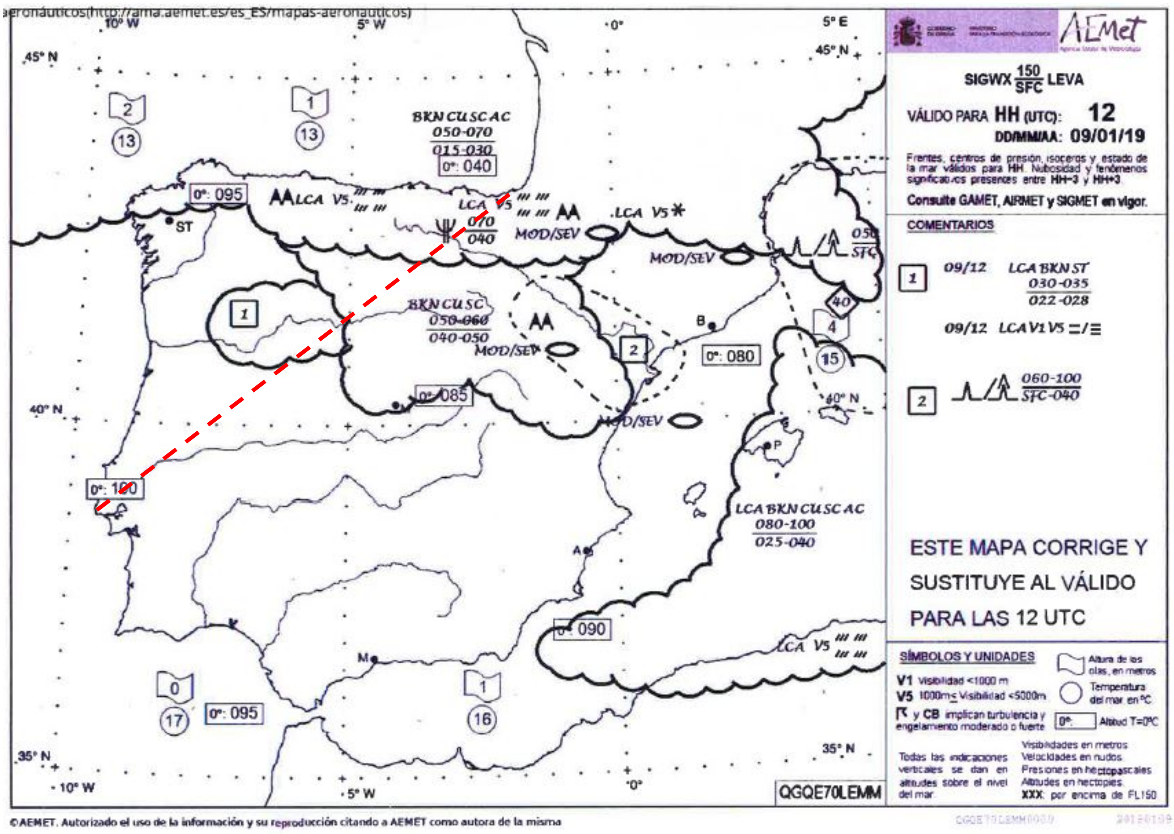

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Figure 2. Low-level significant weather chart

The only difference between the two maps involved a part of the Mediterranean sea. Figure 2 shows the SIGWX that replaced the one issued initially. Drawn atop this chart is a dashed line connecting the start and end points of the flight in order to highlight the planned flight path.

The following weather conditions were forecast for the area where the accident occurred:

- Abundant clouds (5/8 to 7/8 of the sky) consisting of cumulus, stratocumulus and altocumulus clouds with bases between 1500 and 3000 ft and tops between 5000 and 7000 ft.
- Mountain obscuration.
- Local visibility from 1000 m to 5000 m.
- Rain.
- Moderate icing between 4000 and 7000 ft.
- Moderate/severe mountain waves.
- Freezing level at 4000 ft.
- The water temperature in the Cantabrian sea was 13° C and the wave height was 1 m.

The flight from Cascais to San Sebastian also required crossing the central part of the Iberian Peninsula, where adverse weather phenomena were forecast, though they were expected to be of lesser intensity than in the area described above.

1.7.3. Actual weather situation

At medium and high levels, there was a stalled high-pressure system north of the Iberian Peninsula and a low-pressure system north of the Canary Islands, with two cold vortices and centers at -21° C. The two systems were comparable, although the low-pressure system was dominant. There was a 75-kn jet stream from the east in the north of the Peninsula between the two centers of altitude and a flow line from west to east over the center of the Peninsula, as well as a barometric trough over the east and northeast of the Peninsula, and the Balearic Islands.

Most of the Iberian Peninsula, primarily south of the 40° N parallel, had stable conditions with good visibility and mostly clear skies. An area of low clouds, mist and fog developed during the morning on 9 January, affecting mainly Castilla y León. These bad conditions improved slowly, although a layer of clouds persisted until the evening.

Toward the north, a weak cold front affected the coastal areas of the north and the Pyrenees, causing brief periods of rain and drizzle in these areas that reduced visibility temporarily. The skies in these areas were overcast (5/8 to 7/8 of the sky), with cloud bases at 4000 to 4500 feet on the coast, and slightly lower, from 1800 to 2000 feet AGL, in Vitoria (3400 to 3600 feet AMSL), with some scattered clouds below that.

The 12:00 UTC aerodrome reports (METAR) for the airports of San Sebastian, Vitoria, Burgos and Bilbao were as follows:

LESO 091200Z 06004KT 010V100 9999 BKN040 08/05 Q1028=
LEVT 091200Z 01009KT 9999 SCT014 BKN020 08/04 Q1026=
LEBG 091200Z 03012KT 9999 FEW017 SCT032 BKN038 07/04 Q1025=
LEBB 091200Z 03008KT 360V070 9999 SCT025 BKN044 11/06 Q1028 NOSIG=

The above data show that the weather conditions were relatively uniform through the geographic area where these four airports are located.

The wind was of moderate intensity (4 to 12 kn) from the east.

Visibility was in excess of 10 km.

There were clouds at all four airports: in San Sebastian the clouds covered 5/8 to 7/8 of the sky and there were broken clouds 4000 ft; in Vitoria there were scattered clouds (3/8 to 4/8 of the sky) at 1400 ft and broken clouds at 2000 ft; in Burgos there were few clouds at 1700 ft, scattered clouds at 3200 ft and broken clouds at 3800 ft; Bilbao had scattered clouds at 2500 ft and broken clouds at 4400 ft.

The temperature ranged from 7° C in Burgos to 11° C in Bilbao. The dewpoint was 4° C in Burgos and Vitoria, 5° C in San Sebastian and 6° C in Bilbao.

QNH was between 1025 hPa in Burgos and 1028 hPa in San Sebastian and Bilbao.

The AEMET does not have an automatic station in Errezil. The closest stations are Ordizia (13 km south), Arriaran (14 km south-southwest) and Azpeitia (15 km west). The data from these stations at the time of the accident were as follows:

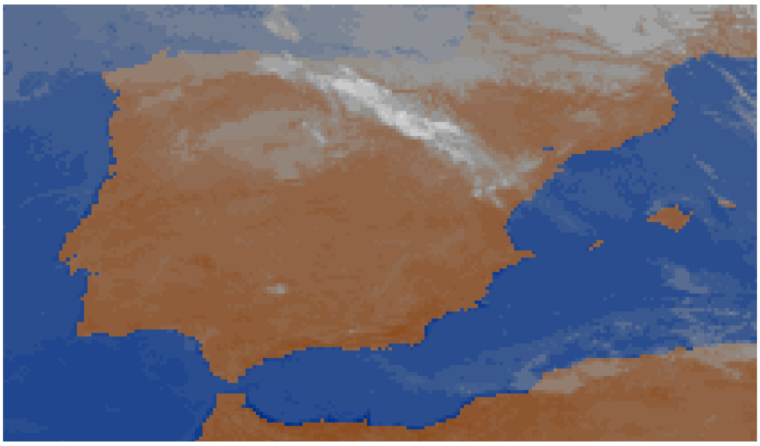

Figure 3. Satellite image from 12:00 UTC

Ordizia

Wind averaging 4 km/h from the north, gusting to 11 km/h from the east.
Temperature of 8° C and relative humidity of 87%.

Arriaran

Wind averaging 9 km/h from the northwest, gusting to 11 km/h from the same direction. Temperature of 8° C and relative humidity of 84%.
It started to rain, with 0.2 l/m^2 falling in the ten minutes after the time of the accident.

Azpeitia

Wind averaging 4 km/h from the northeast, gusting to 11 km/h from the same direction. Temperature of 8° C and relative humidity of 84%.

In light of the above data, it may be concluded that the skies in the accident area were practically covered with low clouds with bases at around 1500 feet and tops at 7000 feet, the relative humidity was high and the wind was calm. It drizzled at times in the hours before the accident, which reduced visibility. Although the data from the airports close to the time of the accident were better, it is likely that in some areas, especially at high elevation, there was precipitation. This was the case in Arriaran, though the precipitation was light as it did not produce a radar return. It is also likely that the clouds lingered, especially in medium-elevation mountain summits.

A video taped by an eyewitness who was walking in the area (see 1.16.1) showed that practically the entire valley where the town of Errezil is located was covered by clouds, the bases of which were below the tops of the surrounding mountains.

1.8. Aids to navigation

The following navigation and landing aids are available at the airport of San Sebastian:

Navaid	Identifier	Remarks
NDB	HIG	COV 50 NM. U/S BTN 109°/139°
DME	HIG	
DVOR/DME	SSN	COV a // at 10 NM: - R-120/145 CW U/S a // at 5000 ft AMSL COV a // at 40 NM AVBL BTN: - R-360/090 CW a // at 5000 ft AMSL o // or ABV - R-090/110 CW a // at 7000 ft AMSL o // or ABV - R-110/210 CW U/S - R-210/300 CW a // at 7000 ft AMSL o // or ABV - R-300/340 CW U/S - R-340/360 CW a // at 7000 ft AMSL o // or ABV

These navaids were available on the day of the event, the only limitations being those shown in the remarks column, which were published in the AIP Spain.

1.9. Communications

The investigators reviewed the communications between the crew and ATS stations in both Spain and Portugal.

The communications with ATS stations in Portugal were normal. Nothing in them was identified that was of relevance to the investigation into the accident. Some of them are considered, however, as they are deemed to be significant.

After taking off, specifically, at 08:26:35 UTC, the crew established radio contact with Lisbon-Mil. The controller informed the crew that it had radar contact and gave them the QNH, which was 1024 hPa.

Some five minutes later, the controller asked the crew to confirm that their destination was LESO and that they would exit the Lisbon FIR via point ELVAR.

The crew confirmed the destination but reported that they could not find the point on the map.

The controller repeated that point ELVAR was the exit point for the Lisbon FIR and asked if they were familiar with that point.

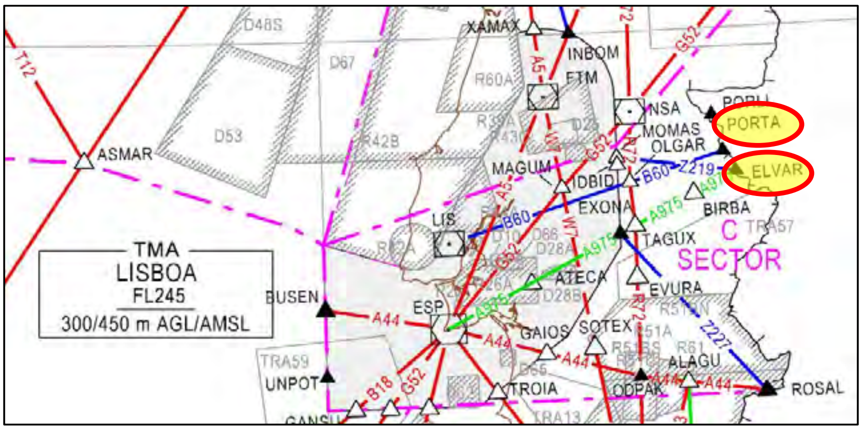

Figure 4. Section of the low-level ATS routes in the VFR manual published by AIS Portugal. Points PORTA and ELVAR and circled in red ovals

The crew replied that they were looking for it on the map.

At 09:00:33, the controller called the crew to inform them that the flight was coordinated with Madrid and that they should fly direct to point PORTA.

The crew replied that would be the next point after ELVAR.

The controller corrected them, saying that the point he had specified was 6 miles north of ELVAR and that it was their new point for exiting Portugal.

This information was correctly acknowledged by the crew.

At 09:08:33, the crew reported they were passing point PORTA at FL55.

The controller instructed them to contact Madrid control on 136.525 MHz.

The first radio contact with Madrid took place at 09:23:47.

The crew remained in radio contact with several units of Madrid Control until 11:27:23. All of these communications were normal.

At 11:51:00, the crew contacted approach control at the Bilbao Airport, reporting they were at 7000 ft and QNH was 1026.

The controller replied that the QNH was 1028 and requested confirmation they were flying direct to San Sebastian.

The crew acknowledged the QNH and confirmed they were flying direct to point W of San Sebastian.

The controller asked them to monitor the frequency and that he would inform them of any traffic that affected them.

At 12:06:28, Bilbao/approach called the crew to provide weather information on San Sebastian (wind from 060 at 4 kn, broken clouds at 4000 feet, visibility in excess of 10 km and QNH of 1028).

The crew acknowledged this information and asked which runway was in use.

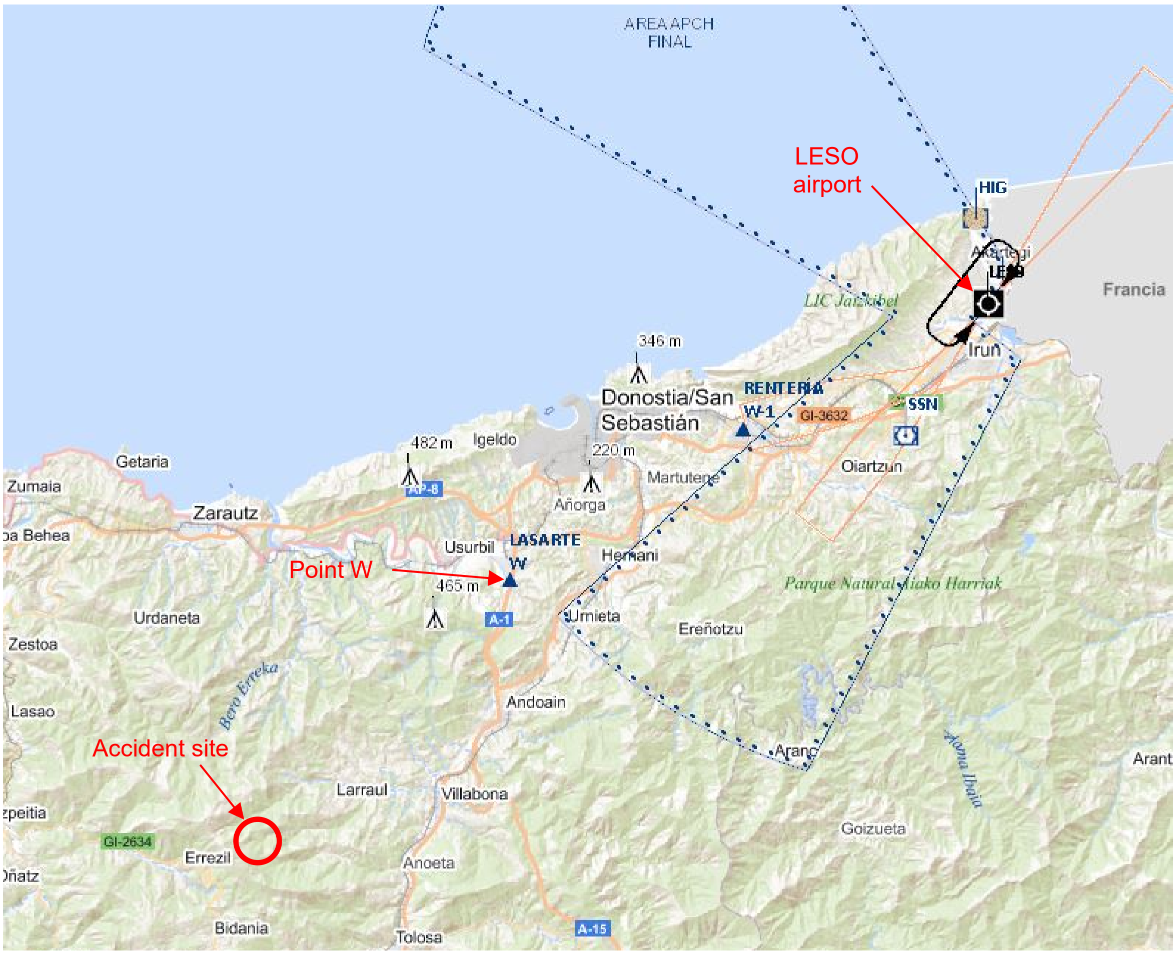

Figure 5. Map showing the accident area and the San Sebastian Airport

The controller replied that he expected they would be able to use any runway, at their discretion.

The crew thanked the controller and added they were descending to point W of San Sebastian.

The controller asked the crew to confirm their altitude. The crew replied they were at 5000 ft and QNH was 1028.

At 12:12:30, Bilbao/approach called the crew to instruct them to contact San Sebastian on 119.85 MHz. The crew acknowledged the instruction and signed off.

At 12:13:45, the crew again called Bilbao/approach to report they could not contact San Sebastian on 119.85 MHz.

The controller asked them to remain on his frequency.

Next, at 12:13:56, he called the tower at the San Sebastian Airport on the hotline. He told the controller he was calling because he had transferred an aircraft, that its crew had called San Sebastian but had not received a reply. He stated that he would tell the crew to attempt to contact LESO as they neared point W, and added that he could no longer see the aircraft on his radar display.

He called the crew again at 12:14:49 but received no reply.

1.10. Aerodrome information

The crew of the accident aircraft had planned to go to the San Sebastian Airport (LESO), which is located between the towns of Hondarribia and Irún, next to the French border.

The ICAO visual approach chart (VAC) for the San Sebastian Airport states that VFR aircraft that are inbound to this airport must contact the control tower (TWR) at VFR reporting points S (Sumbilla), W (Lasarte) and E (San Juan de Luz) before entering the CTR, and must request permission to enter, maintaining a maximum altitude of 1000 ft AGL.

Figure 5 contains a section of a map that covers the area from the accident site, circled in red, to the airport of San Sebastian, which is at the top right of the map. The aerodrome circuit is shown with a black line ending in arrows. Reporting point W (Lasarte), where the aircraft was headed, is in approximately the middle of the map.

The maximum elevation of the mountains south of point W is 1448 ft (441 m). The terrain at point W is at an elevation of 21 m (70 ft).

Point W is about 14 km away from the accident site on a heading of 45º.

1.11. Flight recorders

The aircraft was not outfitted with either a flight data recorder or a cockpit voice recorder, since neither was required to be installed on this type of aircraft by the applicable aviation regulation.

1.11.1. Radar track

The radar track for much of the flight, including up to the vicinity of the accident site, is available.

The first part of the flight seemed normal, with the aircraft flying almost in a straight line to the northeast (heading 046º). It entered Madrid control sector ZML (lower Zamora) at 10:18:00 near the town of Guijuelo (Salamanca) at an altitude of 6000 ft, and exited this sector at 10:50:30 at 6100 ft.

The next sector it entered was DGL (lower Domingo), which it then exited at 11:29:25, shortly before reaching the La Demanda Mountains. It had started climbing a few minutes later and by the time it left the sector it was at 6700 ft.

During its time in these two sectors, the aircraft remained some 3000 ft AGL at all times.

The next sector was TWVRA. The aircraft continued the climb it had initiated in the previous sector, reaching a maximum altitude of 8100 ft as it flew over the La Demanda Mountains. It then started to descend at 11:40:00, continuing in that attitude until it left the sector at 12:05:50 at an altitude of 5700 ft. At that time, the aircraft was in the vicinity of the Aizkorri Mountains.

The aircraft's altitude varied more in this sector than in the two previous ones due to the more mountainous nature of the terrain. Its minimum clearance above the ground was about 2000 ft, and the maximum was around 5000 ft.

The next and final sector was APPBIL (Bilbao approach), which the aircraft entered at 12:05:40.

This last phase of the flight, and specifically the period between 12:05:00 and 12:13:32, when the aircraft's radar signal was lost, was studied in more detail.

The table below contains information on the aircraft's radar position at specific times. The leftmost column indicates the time in UTC; the next column shows the distance, in nautical miles, to point W[1] in San Sebastian; the third shows the altitude; the fourth the altitude trend, either climbing (↑), descending (↓) or level (-), as shown on the radar display; the fifth shows the aircraft's ground speed; and the sixth and final column the average descent rate between the points.

[1] Reporting point W (Lasarte) is at coordinates 43° 15' 48" N 02° 01' 09" W.

It is important to note that the altitude value is rounded to the nearest hundred feet, meaning the values shown in the table below have a margin of error of ± 50 ft. The 6000 ft value from 12:05:00 corresponds to an actual altitude range of between 5950 and 6050 ft.

Time	Distance (M)	Altitude (ft)	Trend	Speed (kn)	Descent rate (ft/min)
12:05:00	26.4	6000	↓	120	237
12:10:03	16.3	4800	↓	120	285
12:11:00	14.4	4500	↓	120	400
12:11:30	13.2	4300	-	130	200
12:12:00	12.1	4200	-	130	0
12:12:15	11.8	4200	-	120	800
12:12:30	11.3	4000	↓	120	800
12:12:45	10.8	3800	↓	120	0
12:13:00	10.3	3800	↓	130	400
12:13:15	9.8	3700	-	120	0
12:13:20	9.6	3700	-	120	400
12:13:25	9.4	3600	-	120	0
12:13:30	9.3	3600	↓	120	0
12:13:32	9.1	3600	-	120	

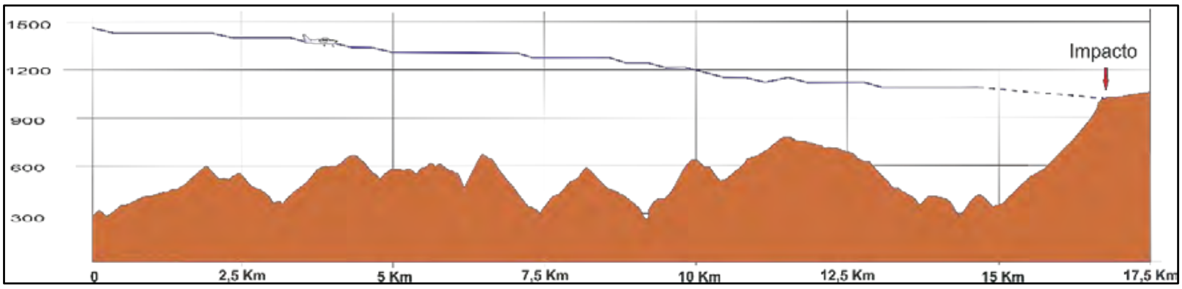

Figure 6. Profile of the final part of the flight path, compiled from radar data. The dashed line shows the final part of the flight, for which there are no radar data. The altitude is in meters

Figure 7 shows a segment of the reconstructed radar data for the last radar return, at which time the aircraft was flying at an altitude of 3600 ft and 120 kn.

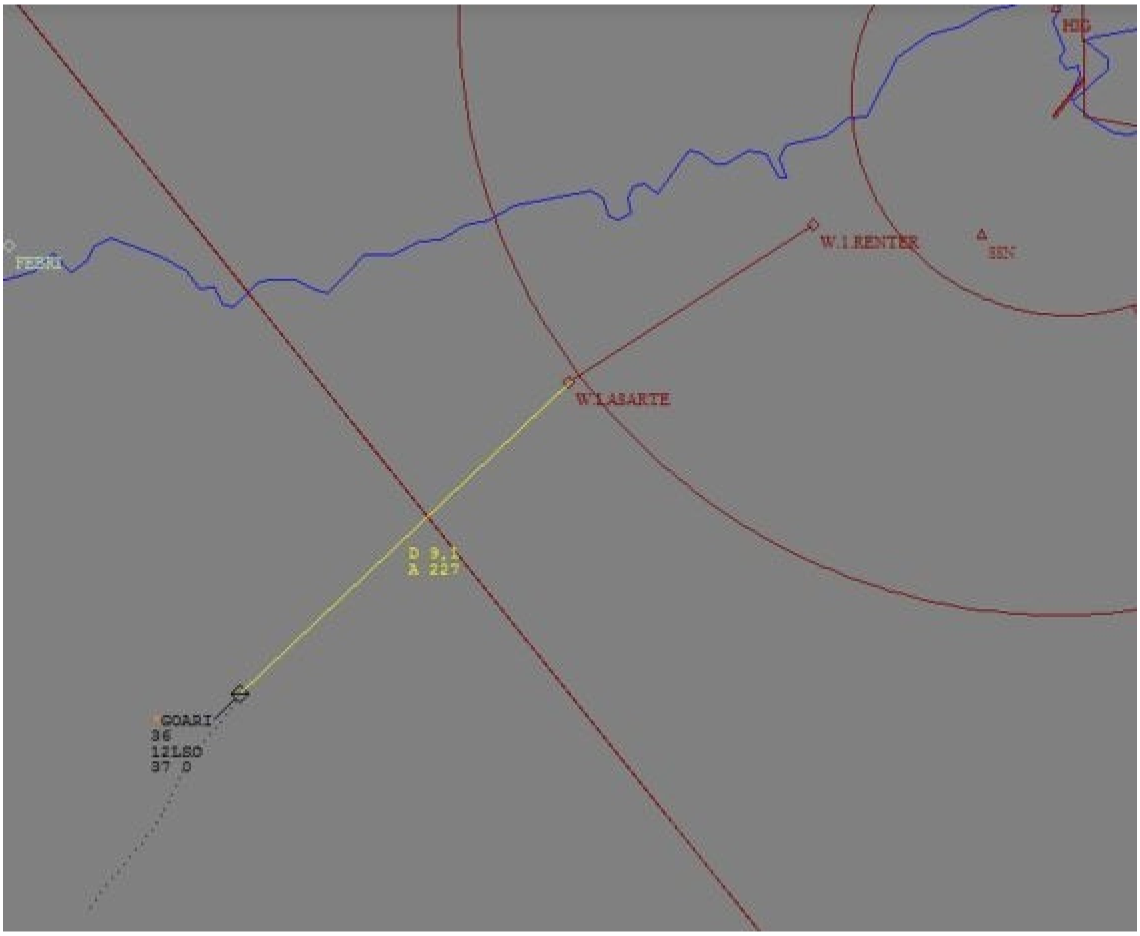

Figure 7. Close-up of the reconstructed radar data at 12:13:32 UTC, showing the final radar return

The dotted black line, which corresponds to the aircraft's radar returns, shows the aircraft's flight path. As we can see, the aircraft was basically flying in a straight line, with some very gradual turns.

1.12. Wreckage and impact information

The aircraft impacted the south face of Mount Ernio, at a point very close to a secondary summit of this mountain at an elevation of 1025 m.

The investigation team arrived at the accident site the morning after the accident. The weather conditions at the time were adverse. A cold front had started coming in from the north on the day of the accident that was bringing with it weak precipitation that, at high elevations, such as at the accident site, was in the form of snow. The low clouds covered the mountain summits and a gusting wind of average intensity was blowing from the north.

The temperature remained below freezing at all times save for a 2-hour window at midday.

The photograph in Figure 8 shows the main aircraft wreckage. This photograph was taken in the afternoon on the day of the accident. It shows that the area was completely shrouded by low clouds. There was even a thin layer of snow on the ground.

The mountainside where the wreckage was found was quite steep and free from vegetation. As a result, the wreckage was highly unstable and prone to sliding easily. To keep this from happening, the regional Basque police (Ertzaintza) had secured the wreckage with ropes tied to rocks.

Figure 8. Photograph of the main aircraft wreckage

The steepness of the mountainside and the inherent danger of falling meant that everyone working in the area where the wreckage was located had to be equipped with mountaineering gear (harness, helmet, etc.). They also had to be secured at all times with a safety line that had been specifically set up for that purpose and anchored to the rocks. These conditions seriously hampered the inspection of the wreckage by limiting the movements of the investigators and making it impossible to move the wreckage.

The only components that were found relatively complete were the two wings and the tail section. The fuselage had been almost entirely consumed in the fire that broke out after the impact.

There was a ditch with smaller components and burned debris uphill, up to the beginning of a section of rock that was almost vertical (Figure 9). No cockpit instruments or controls were found save for an artificial horizon and a piece of one of the two control wheels. Some fragments from the cylinders and other engine components were found, as were the two propeller blades. Both blades were damaged, but one was more so. It had lost its outer half, approximately, and it exhibited plastic deformations and other marks consistent with a high-energy impact.

The fire had affected the entire area from the main wreckage to the wall that the airplane had impacted.

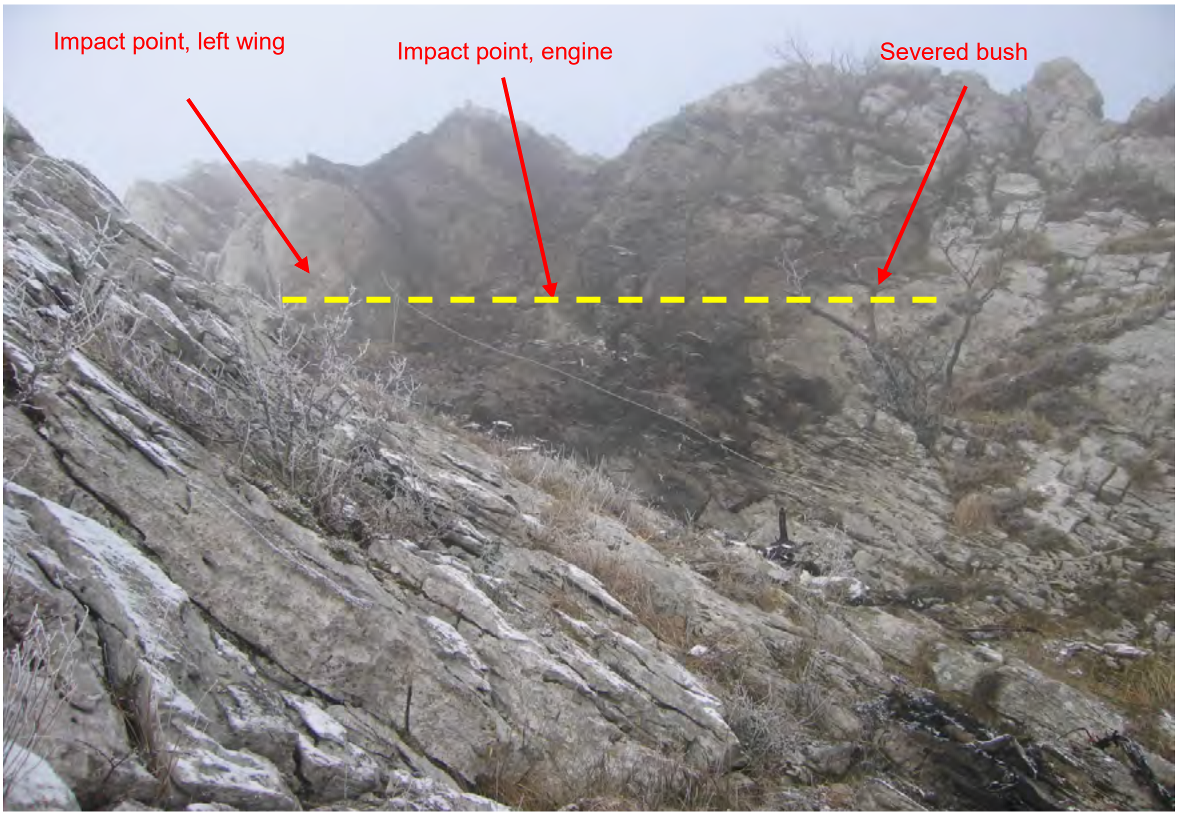

Figure 9. Photograph of the hillside where the aircraft crashed, taken from the location where the main wreckage was found

The other blade had also lost material from its end and exhibited deformations consistent with an impact.

On this wall and about 2 m above its base, there was an area where the rock was lighter in color. Upon closer inspection, it was evident that this lighter color was due to an impact. Very close to this point, two metal tube segments were found.

Some 6 m away from the impact point and to the left, the wall formed a rocky outcrop that showed signs of a recent impact. The shape of this outcrop was similar to the triangular impact shape of one of the wings. The terrain located on the other side of the outcrop (with respect to the impact point) was examined, and remnants of paint from the aircraft as well as red glass fragments were found there.

Some 5 m to the right of the impact point there was a bush close to the wall whose branches had been severed. There were impact marks on the wall at the same height as the severed branches of the bush.

The marks on the rock outcrop, the strong impact point on the wall and the severed bush branches were all lined up. The imaginary line connecting them was practically horizontal. The line is shown using a dashed yellow line in Figure 9.

The wings had detached from each other and from the empennage. The layout of these three components seemed to match their natural position, with the wings mostly in a straight line and the tail section centered and behind the wings. The wings exhibited heavy deformations due to compression in the direction of the wing chord. Both wings had lost their wingtip light. This, combined with the high degree of deformation of the wings, made it difficult to determine with any certainty which was the right and which was the left wing, and which side was the top and which was the bottom.

The wing on the left side had a large, triangular impact mark on the leading edge. The flaps and ailerons were still present on the trailing edge.

The wing on the right side had fairly uniform impact marks on the leading edge all along the width of the wing.

The empennage was in one piece. The horizontal stabilizer and the right elevator were practically undamaged. The left side was also in one piece, though slightly more damaged. In contrast, the vertical section, and in particular the aft portion, was significantly damaged.

1.13. Medical and pathological information

There are no indications that the actions of either crewmember were affected by physiological factors or impairments.

1.14. Fire

After the impact with the rock wall, a fire broke out that consumed much of the aircraft's fuselage.

Given the barren and rocky nature of the site, the fire was extinguished naturally once all the fuel on the aircraft and any flammable materials within it were consumed.

By the time the first rescue team reached the accident site, the fire had gone out.

1.15. Survival aspects

Once radar contact with the aircraft was lost and no reply was received to any of the radio calls that were made, the authorities were alerted.

ATC personnel reported the event to the Search and Rescue Service (SAR), which in turn notified the command and control center of the regional emergency response provider (SOS Deiak), informing it of the aircraft's last known coordinates and initiating the efforts to locate the aircraft.

At 13:50 local time (12:50 UTC), SOS Deiak notified the regional Basque police in Urola Kosta, which mobilized a unit consisting of its own personnel and two firefighters from the station in the town of Azpeitia. This unit traveled to the area where the radar signal had been lost to start the search on land, since the weather conditions precluded a search from the air.

The unit reached the refuge on the mountain.

The entire area was covered in thick fog (it was actually clouds whose bases were below them). They did not see anything unusual and decided to continue on a trail that leads to the top of Mount Ernio.

After walking a little over 1 km on this trail, they found a seat.

Figure 10. Photograph of the seat on the path that leads to the summit of Mount Ernio

When they looked toward the summit, the saw something in the mist. They started to climb up the slope and reached the wreckage at 15:40.

The frontal impact against the rock wall on the mountain was so violent that there was no chance of survival.

1.16. Tests and research

1.16.1. Eyewitness statements

Eyewitness-1

He was engaged in agricultural activities on the hillsides of Mount Urkutzeta (see Figure 11).

At around 13:10, he heard the sound of an engine from a small airplane that was coming in from Alto de Urraki.

He stated that there was a thick fog at the time that in addition to covering the sky, covered the high part of the valley, descending as far as the Odría hamlet, which is located on the other side of the valley.

The thick fog blocked his view of the aircraft, but as it approached Mount Ernio, he heard a loud impact.

He suspected it had crashed into the mountain, so he notified the authorities by phone.

Eyewitness -2

He was in the vicinity of Errezil, to the east of this population center, walking on a trail and video recording the route he was taking.

The footage was provided to the investigators.

This video shows the individual climbing on a trail when, at one point, the sound of an aircraft engine is heard. The individual moves the camera and points it at the sky to record the airplane. This reveals a completely overcast sky. The aircraft is not visible at first; in fact, the audio in the recording contains this individual's voice saying something that sounded like "I can't see it". But at a certain point, lasting less than a second, the airplane does come into view before it is again obscured by the clouds.

The engine is heard for an additional 40 seconds, until something that sounds like an impact is heard.

Figure 11. Contour map of the accident site, showing the location of the eyewitnesses and the Hamlet of Odría, as well as the aircraft's flight path

The video also showed that despite the abundant clouds, there was no rain for the duration of the recording.

1.17. Organizational and management information

Not applicable.

1.18. Additional information

1.18.1. Refueling

The aircraft was refueled with 160 liters of AVGAS 100LL the day before the accident.

According to information provided by the fuel supplier, the aircraft was fully refueled.

1.18.2. Fuel availability at the Biarritz Airport

The information on the fueling and maintenance services and facilities at the Biarritz Airport (LFBZ) in effect on the date of the accident was published in section AD-2 of the France AIP.

According to this information, AVGASS 100LL was available at this airport, supplied by a fixed gasoline pump. Payment was accepted either in cash or credit card.

The option to use the automatic pump was only available if payment was made using a BP credit card.

The hours of operation of the fuel service in the winter season are from 08:00 to 17:00 UTC.

The NOTAMs in effect from 8 to 11 January were reviewed and none were found to have information involving the refueling service.

1.18.3. Away flight

On 9 July 2018, the aircraft landed at the aerodrome of Cascais, inbound from the San Sebastian Airport, where it had landed the day before.

The purpose of the trip was to take the aircraft to the center that the company Aerotécnica (part of the Sevenair Group) has at the aerodrome of Cascais, where the aircraft was to be repainted.

The aircraft remained at Aerotécnica's facilities until the date of the accident.

On 10 December 2018, after the painting work was concluded, the aircraft underwent a test on the ground, the result of which was satisfactory.

1.19. Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

2.1. General

Investigators were unable to determine what information, whether of an aviation, geographical or weather nature, the crew used to prepare the flight. As a result, said information could not be analyzed.

Investigators were also unable to ascertain the specific reasons that caused the crew to rule out flying to the Biarritz Airport and go to San Sebastian instead. This is because no information was found that supported the statement made by one of the crewmembers involving potential refueling problems at the Biarritz Airport.

In any event, this fact would likely not have resulted in any major changes to the flight path taken, given the proximity of the two airports.

As for the alternator warning light that is visible in one of the photographs uploaded to Twitter, if this situation persisted for the duration of the flight, the energy stored in the battery would probably have been consumed by the electrical devices during the flight, potentially until the battery was drained.

This situation would have affected the operation of any electrical device, such as the navigation and communication systems, the transponder, etc., but it would not have affected the operation of the engine.

The crew made radio contact with several ATC units. Even in the final part of the flight, the crew spoke with the control tower at the Bilbao Airport on the radio, with no apparent problems. The radar information also revealed that the aircraft's transponder was operational, at least until the radar signal was lost, which happened less than one minute before the impact with the mountain. It is even quite likely that the radar return was lost due to the low altitude at which the airplane was flying, and not because the unit stopped transmitting.

Neither of these two events would have been possible had no electricity been available on board.

Therefore, this warning was either a false alarm or a temporary fault that was corrected during the flight.

In either case, this situation did not have any effect on the accident.

2.2. Crew licenses

The UK CAA appears to have no record of the valid SEP at the time of the accident. However, the information held on a spreadsheet within the pilot's own electronic records suggests otherwise and this is supported by the personal recollection and signature of a

UK CAA licenced examiner. In addition, the spreadsheet reflects some of the other data held on the PIMS which, therefore, gives it some credibility as a reasonable record of the pilot's qualifications and privileges.

Apart from the absence of the UK CAA record, other evidence suggests that there is no reason to doubt the pilot held an SEP rating until 30 April 2019 and so was valid at the time of the accident.

On the other hand, the passenger did have a private pilot license (PPL(A)), a single-engine piston (land) rating and a class-2 medical certificate, all of which were valid at the time of the event.

2.3. Analysis of weather forecast

As stated in the previous point, investigators could not determine what weather information the crew used, and thus were unable to assess this information.

The weather forecast from Spain's National Weather Agency (AEMET) for the day of the accident is reflected in the low-level significant weather chart provided in Figure 2.

The weather conditions that were anticipated for the Cantabrian coast clearly called for the presence of adverse weather phenomena. These included reduced visibility at 5000 m due to rain; abundant clouds consisting of cumulus, stratocumulus and altocumulus clouds with bases from 1500 to 3000 ft and tops from 5000 to 7000 ft; mountain obscuration and mountain waves; moderate icing from 4000 to 7000 ft; and a freezing level located at 4000 ft.

Given these weather conditions, the possibility of completing the flight to the San Sebastian Airport in VMC was, quite simply, remote.

A realistic assessment of the forecast would undoubtedly have warned against undertaking the accident flight under visual flight rules.

Since it was not possible to determine what weather information the crew of the aircraft used, investigators were unable to ascertain if the crew were incorrect, optimistic or too superficial in their evaluation of the forecast, or if they simply did not consider the weather conditions at all beforehand.

2.4. Analysis of the operational flight plan

The same situation applies to the operational information as it did for the meteorological information: investigators were unable to determine what information the crew used to prepare the flight, or any detail involving the planning of the operation. As a result, there is no way to evaluate it.

What can be analyzed is the flight that was actually carried out.

In this regard, although it had no effect on the flight, the crew's apparent lack of knowledge of the procedures for exiting Portuguese airspace might be of significance. This was evidenced by the fact that they could not even find the points for exiting Portuguese airspace, ELVAR and PORTA, on the chart.

The aircraft's flight inside Spanish airspace, at least until the final phase, seemed to proceed normally in terms of its flight path.

As for the altitude, the en route phase should have taken place at standard VFR cruise levels. On flights with headings between 270º and 089º, as was the case during most of the accident flight, the flight levels should be even plus 500 ft, meaning 4500 ft, 6500 ft, 8500 ft, etc.

However, most of the flight took place at non-standard altitudes. For example, the entire segment over the Spanish plateau was flown at altitudes closer to 6000 ft instead of the appropriate 6500 ft.

In light of its path and altitudes, the flight does not seem to be consistent with one that was planned beforehand from an operational standpoint. Instead, it has characteristics typical of a flight in which only the route was planned, with this route being followed during the flight possibly on GPS. The altitude is selected during the flight itself on the basis of guaranteeing suitable separation with the terrain.

This fact became more apparent as the aircraft approached the destination airport. Had the flight been planned in detail, the crew would have anticipated entering the CTR through point W, and that at said point the aircraft should be at an altitude of 1000 ft AGL or below. The plan would also have considered the descent segment from the en route altitude to point W. If it had, the crew would have known that the aircraft could not descend below 4500 ft until after the line of summits that includes Mount Ernio.

The fact that the aircraft was already flying below 4500 ft some 14.4 km before reaching Mount Ernio shows that the crew had not studied and planned the altitude that was required, at least for this part of the flight.

2.5. Actual weather conditions

The weather conditions present in north of Spain were largely as forecast.

The satellite images show that the northern part, from approximately 42° 50' latitude northward, was completely overcast. The grayish color of these clouds indicated that they were low clouds. The tops of the clouds would have been above the mountain tops, since the mountains are not visible in the satellite image.

South of this area there is a line of clouds crossing the Iberian Peninsula diagonally from Northwest to Southeast. These clouds are white in color, indicating they are at a higher altitude.

The video recorded by eyewitness nº 2 shows that the valley was almost completely covered by clouds. The video does not show any clear references that can be used to estimate the elevation of the bases of the clouds; however, since the aircraft was flying at about 3600 ft during the time when the video was recorded, it is safe to state that the cloud base was below 3600 ft.

Eyewitness nº 1, who was at a point located at an elevation of about 650 m in one of the hillsides above the valley, stated that the fog not only covered the sky; it covered the high part of the valley and descended to Odría, a hamlet that is at an elevation of 600 m on the south slope of Mount Ernio.

This information indicates that the base of the cloud layer in the vicinity of Mount Ernio, where the aircraft crashed, was at an altitude of about 600 m.

Based on this, it is fairly likely that more than the top half of Mount Ernio was covered in clouds.

The visibility below the cloud layer was quite good, and provided an unrestricted view of the other end of the valley.

2.6. Analysis of impact marks and wreckage

No evidence was found that the aircraft had sustained any impacts prior to the crash, or that any component had detached from the aircraft before it impacted the rock wall.

This impact, as noted in the description provided in Section 1.12, occurred with the aircraft's wings level and with the engine supplying power. Not one indication was found indicating that the crew attempted to make an evasive maneuver.

After the impact, the aircraft slid down the slope of the mountain due to the steep incline of the mountainside. It was this sliding motion that caused the damage exhibited on the trailing edges of the elevators and rudder. The aircraft came to a stop a few meters downhill of the impact site.

One of the seats continued sliding and fell to the trail that leads to the summit, where it came to a stop.

The fuel tanks must have broken on impact with the wall. The violent nature of this impact caused the gasoline to be sprayed all over the surrounding area.

The fire must have started on impact, quickly spreading throughout the area that had been doused by the gasoline.

An analysis of the wreckage revealed that all of the control surfaces were correctly attached to the structure and showed no signs of malfunctioning.

In light of the above, it may be concluded that the impact with the mountain occurred with no evasive maneuver by the pilot to either bank the airplane or pitch it up. This clearly indicates that the crash occurred because the mountain was obscured from the pilot's view.

This type of accident is relatively frequent, especially in flights carried out under visual flight rules, so much so that it has its own term: controlled flight into terrain (CFIT).

3. CONCLUSIONS

3.1. Findings

- The pilot had a valid MEP rating and had flown single-engine aircraft on a regular basis.
- Although investigators were unable to confirm in an unquestionable way that the pilot had a single-engine piston (land) rating at the time of the accident, the evidence collected indicates that he indeed had a valid SEP rating at the time of the accident.
- The pilot had a class-1 medical certificate that was valid until 6 June 2019.
- The passenger had a valid license, rating and medical certificate to pilot the accident aircraft.
- The aircraft had a valid certificate of airworthiness.
- It was not possible to determine what weather information the crew compiled before the flight.
- The accident occurred on a VFR cross-country flight to the San Sebastian Airport.
- The weather forecast indicated that the likelihood of completing the flight to the San Sebastian Airport in VMC was low.
- The flight was seemingly uneventful until the aircraft reached the Errezil Valley.
- At 12:30, the approach controller in Bilbao instructed the crew to contact the control tower at the San Sebastian Airport.
- The crew called Bilbao/approach at 12:13:45 to report that they had been unable to contact the San Sebastian tower. This was the last message received from the crew.
- The aircraft began to descend 8 NM before reaching Mount Ernio.
- The aircraft reached the valley where the town of Errezil is located, flying at an altitude of 3600 ft.
- This valley was almost completely covered by a layer of clouds, the base of which was at an altitude of about 600 m.
- Mount Ernio was completely covered by clouds.
- A video recorded by an eyewitness shows the aircraft flying between the clouds for a few seconds, before it was lost from view in the clouds.
- The sound of the aircraft's engine is heard in the video.
- The aircraft's radar track was lost about 2 km before it impacted Mount Ernio.
- An analysis of the wreckage did not reveal the presence of any fault or malfunction in the aircraft before it impacted the terrain.
- The aircraft crashed into the side of Mount Ernio in a level attitude, the crew having taken no apparent evasive maneuvers.
- At the time of the impact, the aircraft's engine was supplying power.

3.2. Causes/Contributing factors

The investigation has determined that the accident resulted from the decision to continue flying through an area where the meteorological conditions were below the minimums required for flights being conducted under visual flight rules (VFR).

Improper flight planning is deemed to have contributed to the accident.

4. SAFETY RECOMMENDATIONS

No safety recommendations are issued.