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COMISIÓN DE
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AVIACIÓN **C**IVIL

Report A-015/2011

Accident involving
a CIRRUS SR-22,
registration SP-AVD,
on the extension of runway 29
at the Asturias airport,
on 6 June 2011

GOBIERNO DE ESPAÑA
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COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Edita: Centro de Publicaciones
Secretaría General Técnica
Ministerio de Fomento ©

NIPO: 161-12-096-9

Diseño y maquetación: Phoenix comunicación gráfica, S. L.

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63
Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es
http://www.ciaiac.es

C/ Fruela, 6
28011 Madrid (España)

Foreword

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) n° 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.

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Abbreviations

00°	Degrees of latitude/longitude
00 °C	Degrees centigrade
ACC	Air Control Center
AEMET	Agencia Estatal de Meteorología (National Weather Office)
AENA	Aeropuertos Españoles y Navegación Aérea
AGL	Above Ground Level
AMSL	Above Mean Sea Level
APCH	Approach
ATC	Air Traffic Control
ATS	Air Traffic Service
CAPS	Cirrus Airframe Parachute System
CHT	Cylinders Head Temperature
CIAIAC	Comisión de Investigación de Accidentes e Incidentes de Aviación Civil
CTR	Control Traffic Region
EGT	Exhaust Gas Temperature
ELT	Emergency Locator Transmitter
ft	Feet
GPS	Ground Proximity Sensor
h	Hour(s)
"Hg	Inches of Mercury
hPa	Hectopascal(s)
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
KIAS	Knots Indicated Air Speed
km	Kilometer(s)
kt	Knot(s)
L	Liter(s)
l/h	Liters per hour
LEAS	ICAO location indicator for the Asturias Airport
LEBB	ICAO location indicator for the Bilbao Airport
LCA	Localizer Critical Area del ILS
LECO	ICAO location indicator for the La Coruña Airport
LESO	ICAO location indicator for the San Sebastian Airport
LEXJ	ICAO location indicator for the Santander Airport
LPVL	ICAO location indicator for the Maia (Portugal) Airport
LSA	Loss of Situational Awareness
LVP	Low Visibility Procedure
m	Meter(s)
m^2	Square meters
mb	Millibar(s)
MCP	Main Command Post
METAR	METeorological Aerodrome Report
MFD	Multifunction Display
MHz	Megahertz
N	North
NE	North-East
PFD	Primary Flight Display
PPL(A)	Private Pilot License (Airplane)
QNH	Barometric pressure adjusted to sea level
rpm	Revolutions per minute
RVR	Runway Visual Range

Abbreviations

SAR	Search and Rescue
SCAAI	State Commission on Aircraft Accidents Investigation (Poland)
TDZ	Touchdown Zone
TMA	Terminal Area
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
W	West

Synopsis

Owner and operator:	Private
Aircraft:	CIRRUS SR-22
Date and time of accident:	6 June 2011; 14:00 h (local time)[1]
Site of accident:	Extension of runway 29 at the Asturias Airport
Persons onboard and injuries:	Two (2) (pilot and passenger), both killed
Type of flight:	General Aviation – Private
Date of approval:	19 September 2012

Summary of accident

The CIRRUS SR22 aircraft, registration SP-AVD, had left the San Sebastian Airport (LESO) at 12:24 en route to the Maia Airport (LPVL), located in Vilar da Luz (Portugal).

According to the flight plan filed at the departure airport, the flight was to be conducted under visual flight rules (VFR) using the coast as a reference. The alternate aerodromes listed were Santander (LEXJ) and La Coruña (LECO).

Flying with the CIRRUS SR22 were two CESSNA 182 aircraft, registrations SP-CFM and SP-CUT, following behind the CIRRUS in the order listed.

At 13:51, aircraft SP-AVD was in the vicinity of the Asturias Airport (LEAS). The controllers on duty at the airport tower established contact with the pilot to warn him of the low visibility conditions that existed at the airport.[2]

At 14:00, they tried to establish contact once more but received no reply from the pilot. Twenty minutes later, SAR (Search and Rescue) reported to the tower that an emergency locator transmitter (ELT) signal had been received from coordinates 43° 33′ 55.38″ N - 6° 3′ 7.98″ W corresponding to airplane SP-AVD. Tower personnel then notified emergency services, which activated rescue teams, including two helicopters.

At 15:08, one of the helicopters sighted aircraft SP-AVD on Bayas Mountain, 450 m southwest of the runway 11 threshold. A rescue team was lowered to the crash site

[1] Unless otherwise indicated, all times in this report are local. To obtain UTC, subtract two hours from local time.
[2] Low visibility procedures (LVP) were in effect at the airport from 8:38 until 18:10.

and confirmed the death of both occupants, who were removed from the aircraft and taken to the airport.

The investigation concluded that the accident resulted from the pilot entering IMC conditions without being qualified to fly in IFR conditions, as a consequence of which the pilot lost all situational awareness due to the absence of external references.

The investigation revealed that the pilot deployed the emergency parachute at an altitude that was too low to have any effect. As a result, the aircraft fell out of control in a left downward spiral.

1. FACTUAL INFORMATION

1.1. History of the flight

The CIRRUS SR22 aircraft, registration SP-AVD, had taken off from the San Sebastian Airport (LESO) at 12:24 en route to the Maia Airport (LPVL), located in Vilar da Luz (Portugal).

According to the flight plan filed at the departure airport, the flight was to be conducted under visual flight rules (VFR) using the coast as a reference. The alternate aerodromes listed were Santander (LEXJ) and La Coruña (LECO).

Flying with the CIRRUS SR22 were two CESSNA 182 aircraft, registrations SP-CFM and SP-CUT, following behind the CIRRUS in the order listed. Only aircraft SP-CFM had filed a flight plan.

At 13:51, aircraft SP-AVD was in the vicinity of the Asturias Airport (LEAS).

The controllers on duty at the airport tower established contact with the pilot to warn him of the low visibility conditions that existed at the airport.

Low visibility procedures (LVP) were in effect at the airport from 8:38 until 18:10 due to the meteorological conditions (fog) that existed.

At 13:59, the tower reported the low visibility conditions in effect at the airport to one of the companion aircraft, SP-CFM.

One minute later, at 14:00, the control tower attempted to contact the two aircraft again, first SP-AVD and then SP-CFM, but it did not receive a reply from the crew of either airplane.

At 14:18, the SAR service informed the control tower that the ELT on aircraft SP-AVD was transmitting from coordinates 43° 33' 55.38" N - 6° 3' 7.98" W. Rescue teams were immediately activated, including two helicopters from the firefighting service.

At 15:08, one of the helicopters sighted aircraft SP-AVD on Bayas Mountain, some 450 m to the southwest of the runway 11 threshold. A rescue team was lowered to the crash site and confirmed the death of the two occupants, who were trapped in the wreckage.

Moments later both bodies were recovered and taken by helicopter to the airport.

Figure 1. Aerial view of accident site

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1	1	2	
Serious				
Minor				Not applicable
None				Not applicable
TOTAL	1	1	2	

1.3. Damage to aircraft

The aircraft was destroyed on impact. The front part, which housed the engine and cockpit, was badly damaged.

1.4. Other damage

As the aircraft descended to the impact point, it hit the tops of several eucalyptus trees. There was damage to trees in a 10-meter radius around the crash site.

1.5. Personnel information

The pilot, age 62, had a private pilot license (PPL(A)) and a linguistic competency certificate, both of them valid and issued by the Polish aviation authority.

He had 950 h of flying time, 130 of which had been on the type.

1.6. Aircraft information

1.6.1. *General information*

The CIRRUS SR-22 is a low-wing, piston engine airplane made from composite materials that can hold four occupants.

The serial number of the accident aircraft was 3365 and it was outfitted with a Teledyne Continental IO-550N engine and a three-blade constant-speed PHC-J3YF propeller. It had a valid airworthiness certificate issued by the Polish aviation authority and it has passed all of its maintenance inspections.

The aircraft was equipped for instrument flight.

1.6.2. *Information from flight manual*

According to the airplane's flight manual, if a pilot not rated for instrument flight encounters IMC, the autopilot must be engaged and a 180° turn executed to exit said conditions. The immediate actions call for establishing straight and level flight, engaging the autopilot to maintain course and altitude and initiating a 180° turn.

The emergency procedures section of the airplane's flight manual describes what to do if the airplane inadvertently starts to spin while flying in IMC. In all cases the CAPS must be immediately deployed if the airplane adopts an unusual attitude from which recovery is not assured. The following steps must be followed to recover from the spin:

- Place the thrust lever in idle.
- Stop the spin through the coordinated use of the ailerons and rudder.
- Exert pressure on the controls to maintain flight attitude.
- Adjust the controls to maintain flight level.
- Set the throttle lever as required.
- If the autopilot is engaged, keep hands away from the controls to maintain a constant heading.
- Exit IMC conditions as soon as possible.

1.6.3. *Devices to aid with piloting and navigation*

The CIRRUS SR-22 airplane featured a primary flight display (PFD) that provided attitude, heading, speed, vertical speed and altimeter indications. It also had a heading indicator gauge. The PFD system also shared information with GPS and navigation devices, as well as with the autopilot.

The airplane also had a multifunction display (MFD), which has inputs from a variety of sources, including the GPS sensors, and shows useful navigational information to the pilot on a screen that displays an icon representing the airplane atop a moving map. The MFD can also display a pre-loaded flight plan, normal and emergency checklists, and it can keep track of performance and navigation data, as well as ground speed.

The flight manual warns that the MFD must not be used as the main navigational instrument, and that it is only intended as an aid when flying in VFR conditions.

1.6.4. *Cirrus Airframe Parachute System – CAPS*

This model was equipped with an aircraft parachute system that is designed to lower it to the ground in certain emergency conditions, such as in-flight collisions, structural failures, forced landings in rough terrain, pilot incapacitation or loss of control. The airplane manual warns that the system is designed to save the lives of the occupants, but that it most likely will not prevent the destruction of the aircraft. In adverse circumstances, the occupants could even be seriously injured.

A rocket propels the parachute back and up from its housing. As a consequence, the airplane manual specifies to stay clear of the parachute deployment area.

The system features a parachute, a solid-fuel rocket to deploy the parachute, a lever to activate the rocket and a harness embedded within the fuselage structure. The parachute and propulsion rocket are mounted behind the baggage compartment.

The parachute, which is housed in a bag that allows the parachute to deploy and open, has a 2,400 m^2 round surface. The system is designed to keep the parachute from opening until the rocket is away from the area housing the cords that keep the parachute taut. The CAPS is activated by pulling from a T-handle located in the overhead panel in the cockpit, just above the pilot's left shoulder. The handle has a cover to prevent accidental activation.

The airplane manual warns that the impact with the ground is equivalent to landing from a height of approximately 13 ft, meaning that the occupants must brace for the impact. The system is designed to work with the aircraft in various attitudes, including

turns. Deploying the system from an attitude other than wings level, however, can result in unexpected motions. The maximum demonstrated deployment speed is 133 KIAS and the minimum altitude for a successful deployment is 920 ft.

The manual also describes the precautionary measures that should be taken prior to activation:

- Reduce speed to avoid a structural overload and, thus, minimize the loads introduced by the parachute.
- Cut the mixture.
- Remove the cover from the activating handle.
- Pull downward on the activating handle with both hands.
- Cut the fuel supply, cut power to the engine (battery and master switch) and turn off the fuel pump.
- Activate the emergency locator transmitter.
- Ensure the harnesses are fastened and secure any loose components.
- Brace for emergency landing.
- Evacuate the airplane quickly after landing.

1.7. Meteorological information

The national weather agency (AEMET) reported that the most likely weather at the accident site was light winds on the surface from the north-northwest in Asturias and from the west-northwest in Cantabria and the Basque Country.

There was instability aloft (500-mb isobar) over almost the entire peninsula except in the northeast. On the surface, a mass of cold air moved in gradually from Galicia to the east over the course of the day.

As a consequence of this situation, there was considerable instability at the Asturias Airport, which worsened as the day progressed due to cold air moving in from the west and to ocean winds in the area. This resulted in a layer of low clouds and persistent weak precipitation that gave rise to low visibility and even fog, reducing visibility below 1 km in places.

At the time of the accident the wind was from 340° at 8 kt. The temperature was 14 °C and the dew point was 14 °C.

In Cantabria and the Basque Country the instability was greater throughout the day, with precipitation at various times in the morning and afternoon, but not constant as in Asturias. Visibility conditions were also better at the airports of Santander (in excess of 3 km), Bilbao (in excess of 6 km) and San Sebastian (from 4 to 8 km).

The graph in Figure 2 shows the cloud ceiling present at the various airports along the aircraft's path from 06:00 (UTC) until 16:00 (UTC).

The graph in Figure 3 shows the visibility at the various airports along the aircraft's flight path from 06:00 (UTC) until 16:00 (UTC).

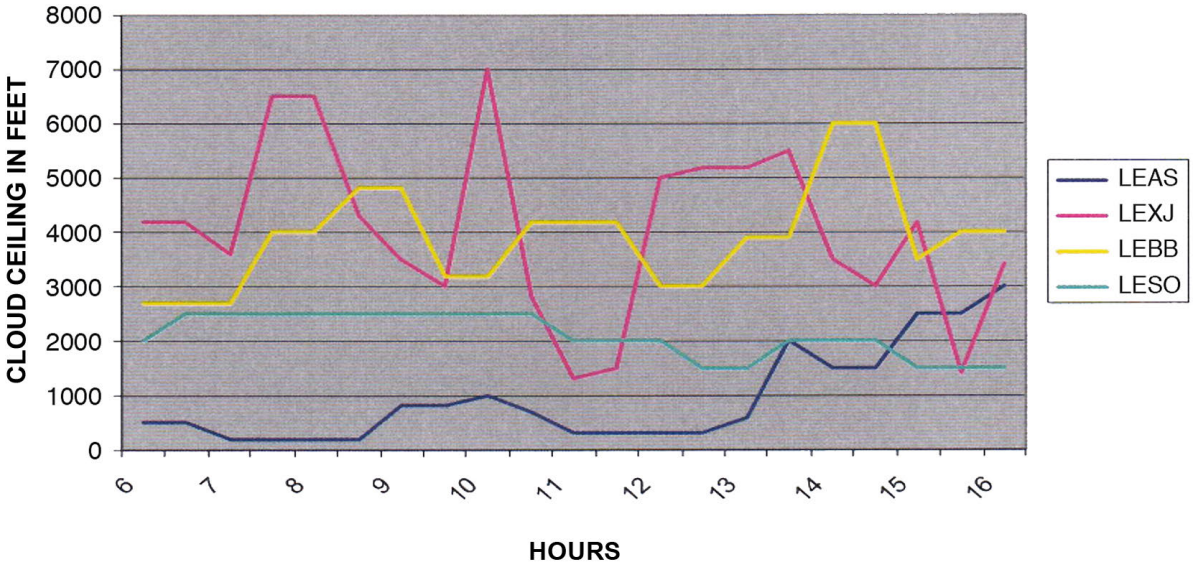


Figure 2. Cloud ceiling at the various airports

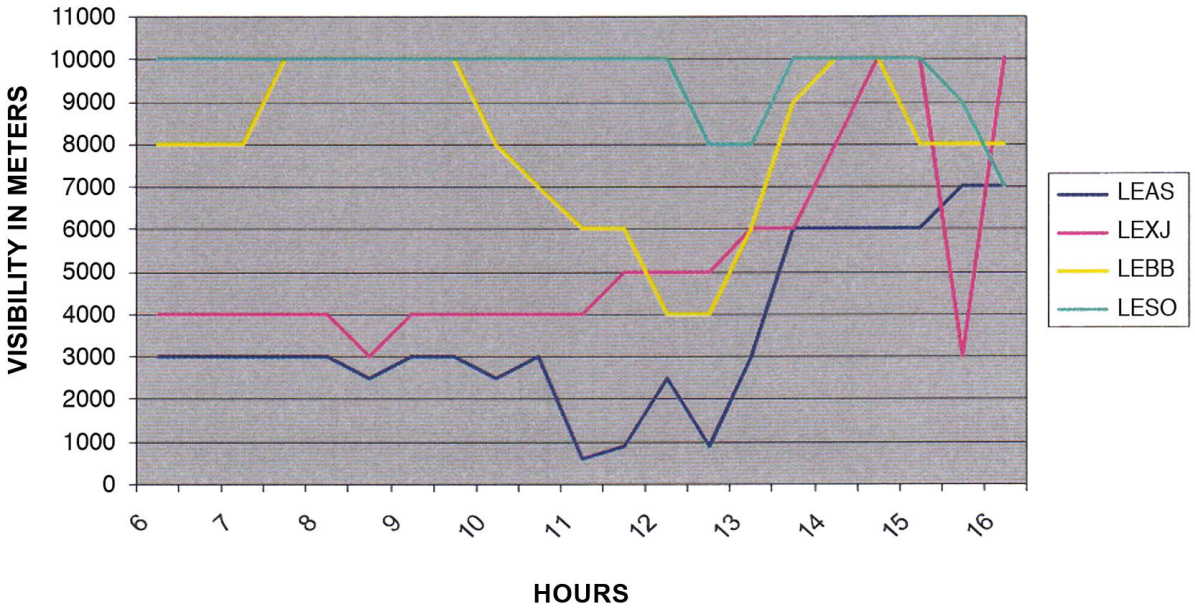


Figure 3. Visibility at the various airports

The METAR reports for the Asturias Airport issued between 13:30 and 14:30 contained the following information:

At 13:30

Wind from 330° at 10 kt gusting to 20 kt, varying in direction between 280° and 020°. Horizontal visibility 600 m. Local visibility on runway 29 varying between 900 and 1,500 m. Local visibility on runway 11 255 m, no change. Fog. Rain. Scattered clouds at 200 ft. Cloudy skies at 300 ft. Temperature 15 °C, dew point 15 °C. QNH 1,009. Fluctuating visibility at 2,000 m and light rain.

At 14:00

Wind from 340° at 8 kt varying in direction between 270° and 030°. Horizontal visibility 800 m. Local visibility on runway 11 200 m., no change. Mist. Rain. Fog over part of the aerodrome. Scattered clouds at 200 ft. Cloudy skies at 300 ft. Temperature 14 °C, dew point 14 °C. QNH 1,009. Fluctuating visibility at 2,000 m and light rain.

At 14:30

Wind from 360° at 5 kt varying in direction between 260° and 060°. Horizontal visibility 900 m. Local visibility on runway 29 varying between 900 and 1,600 m. Local visibility on runway 11 varying between 250 m and 350 m, no change. Rain. Scattered clouds at 200 ft. Cloudy skies at 300 ft. Temperature 15 °C, dew point 15 °C. QNH 1,009. Fluctuating visibility at 2,000 m and light rain.

1.8. Aids to navigation

The flight took place under visual flight rules (VFR), and the pilot was not rated for instrument flight. There is no reason to believe that they made use of any of the available aids.

The flight was not under ATC control, meaning that ATC only provided flight information. ATC did have radar information on the flight, however, which allowed it to track the aircraft.

1.9. Communications

The following table shows a summary, in chronological order, of the most relevant communications between various ATC stations and the three aircraft.

Time	Frequency	Station	Message
12:24:16 12:26:43 12:28:53	119.85 MHz	LESO, SP-AVD, SP-CFM and SP-CUT	Respective takeoff clearances.
12:31:34	119.85 MHz	SP-AVD, SP-CFM and LESO	At ATC's request, both aircraft confirm they are flying along the coastline.
12:33:33	Telephone	LESO and LEBB	San Sebastian ATC calls Bilbao ATC to report that the three aircraft are en route to Portugal along the coastline and SP-CFM is replying for itself and for SP-CUT. Bilbao ATC is surprised to hear of the flights given the weather conditions **("What are they doing flying in this pea soup?")**
12:39:47	120.7 MHz	SP-AVD, SP-CFM and LEBB Approach	SP-AVD replies to ATC's questions and confirms it is flying along the coastline. ATC reports QNH 1008 and winds calm.
12:41:03	120.7 MHz	SP-CFM, and LEBB Approach	SP-CFM replies to ATC's questions and confirms it is flying along the coastline. ATC reports QNH 1,008 and tells the pilot the frequency for contacting Santander is 118.37 Mhz. ATC then calls SP-AVD to inform them of Santander's frequency.
12:47:48	Telephone	LEBB and LEXJ	Bilbao ATC informs Santander ATC that the three airplane are flying along the coast **and that they will have to fly below 2,000 ft due to clouds.**
12:59:00	118.37 MHz	SP-AVD and LEXJ	SP-AVD checks in and confirms it is flying along the coastline at 1,500 ft. ATC reports QNH 1,008 and runway in use is 11.
13:00:40	118.37 MHz	SP-AVD and LEXJ	ATC reports QNH 1,008 and runway in use is 11. SP-AVD requests weather for Asturias.
13:02:07	118.37 MHz	SP-AVD and LEXJ	ATC reports calm winds, visibility 3,400 m, fog west of runway 11, scattered clouds at 2,000 ft and broken at 3,000 ft. Temperature 15 ºC, dew point 15 ºC and QNH 1,009 with rain. AP-AVD requests weather for La Coruña.
13:02:50	118.37 MHz	SP-AVD and LEXJ	ATC reports winds from the north at 10 kt, visibility 3,700 m, fog, few clouds at 100 ft, broken at 300 ft and at 1,300 ft, temperature 14 ºC, dew point 14 ºC and QNH 1,001. SP-AVD replies: **"Oh! That means it's horrible!"**
13:03:42	118.37 MHz	SP-CFM and LEXJ	SP-CFM checks in and confirms it is continuing with its visual flight plan. ATC replies, confirms radar contact and instructs it to continue flying along the coastline and to report at various points.
13:15:37	118.37 MHz	SP-CUT and LEXJ	SP-CUT contacts ATC, which instructs it to continue flying along the coastline. ATC asks to report at various points.
13:21:02	Telephone	LEXJ and ACC Madrid	**LEXJ Tower reports that there are three airplanes crossing to the west at 1,500 ft or less and asks about transferring them to the Asturias Tower. Madrid ACC replies to keep them on their frequency.**

Time	Frequency	Station	Message
13:38:45	Telephone	LEAS and ACC Madrid	Madrid ACC calls Asturias ATC to report two incoming aircraft, registrations SP-AVD and SP-CFM, flying at 1,500 ft and 1,800 ft. Asturias ACC says that weather conditions are very bad and that they do not think they can go through there, except maybe along the coastline.
13:43:36	118.15 MHz	TGM161K and LEAS	TGM161K reports to Asturias ATC that the clouds are at 6,500 ft, after being asked by ATC.
13:44:20	126.675 MHz	LEAS and ACC Madrid	Asturias ACC calls Madrid ACC in order them to inform the **"two planes"** that the clouds start at 6,500 ft and extend all the way down.
13:51:03	118.15 MHz	SP-AVD and LEAS	SP-AVD contacts the Asturias Tower to report its position 10 NM E of the field, requests weather information, runway in use and wind data. It then reports that there are two aircraft behind it, SP-CFM and SP-CUT. ATC provides the information requested as well as the QNH, and explicitly informs that the airport is under low visibility conditions. It also asks if they are flying along the coast and requests that they report passing north of the airfield.
13:54:23	118.15 MHz	SP-AVD and LEAS	SP-AVD reports being over point N.
13:56:35	118.15 MHz	SP-AVD and LEAS	SP-AVD requests QNH information.
13:57:13	118.15 MHz	SP-CFM and LEAS	ATC reports QNH 1,009 and requests confirmation that it is flying along the coastline at 2,000 ft. SP-CFM reports it is flying at 1,800 ft descending to point VES. ATC asks that it report passing north of the airfield and not to fly over the airport's VOR.
13:59:16	118.15 MHz	SP-CFM and LEAS	The airport reports low visibility conditions.
13:59:26	118.15 MHz	SP-CUT and LEAS	ATC contacts SP-CUT and requests its altitude. SP-CUT replies 1,500 ft. ATC confirms the low visibility conditions at the airport.
14:00:28	118.15 MHz	LEAS and IBE0475	ATC informs IBE0475, which was awaiting permission to take off, that one of the airplanes may have crashed.
14:00:37	Telephone	LEAS and Airport Operations	The tower informs airport Operations that they heard a noise and that SP-CFM may have crashed in the airport. It asks to call emergency services and anyone else as required. Operations informs the tower that the airplane is on the apron.
14:00:55	118.15 MHz	LEAS	ATC calls SP-AVD and receives no reply.
14:01:01	118.15 MHz	LEAS	ATC calls SP-CFM and receives no reply.

Time	Frequency	Station	Message
14:01:07	118.15 MHz	LEAS	LEAS informs the airport firefighters that **"Yes, it's here on the apron".**
14:01:23	121.7 MHz	Airport firefighters	The firefighters confirm that **"Yes, it's here in a corner of the apron, in parking stand 1".**
14:01:32	118.15 MHz	SP-CUT and LEAS	LEAS tells them to **"maintain altitude and not to enter the airport".** SP-CUT replies that it is maintaining 1,500 ft. LEAS asks if it can return to Santander, and SP-CUT confirms that it is returning to Santander.
14:02:25	118.15 MHz	LEAS	**ATC calls SP-AVD and receives no reply.**
14:03:06	Telephone	LEAS and Airport Operations	**The tower informs airport Operations that an airplane has disappeared to the southwest, that it must be around Ranón.**
14:03:39	118.15 MHz	LEAS	**ATC calls SP-AVD and receives no reply.**
14:04:55	121.7 MHz	LEAS	Asks the signalman to check the runway.
14:05:02	118.15 MHz	SP-CUT and LEAS	SP-CUT confirms it is returning to Santander and asks about the weather conditions in La Coruña and Santander before confirming again that it is returning to Santander.
From 14:07:14 to 14:14:31	118.15 MHz	SP-CUT and LEAS	SP-CUT asks ATC several times if it is in contact with SP-CFM, to which ATC replies no.
14:14:54	Telephone	LEAS and SAR	SAR informs the tower that an emergency beacon signal has been detected from 43° 33' 55.38" N - 6° 3' 7.98" W, and confirms that it is from airplane SP-AVD. The tower then calls emergency personnel (112) and reports the coordinates of the ELT signal.
14:17:41	Telephone	LEAS and Airport Operations	The Tower informs Operations of the coordinates of the ELT signal and that it corresponds to airplane SP-AVD.
14:22:34	121.7 MHz	Airport firefighters	Airport firefighters inform the tower that the registration of the airplane on the apron is SP-CFM.

1.10. Aerodrome information

The Asturias Airport (LEAS) is at an elevation of 416 ft (127 m).

It has one 2,200-m long runway in an 11-29 orientation (Fig. 4).

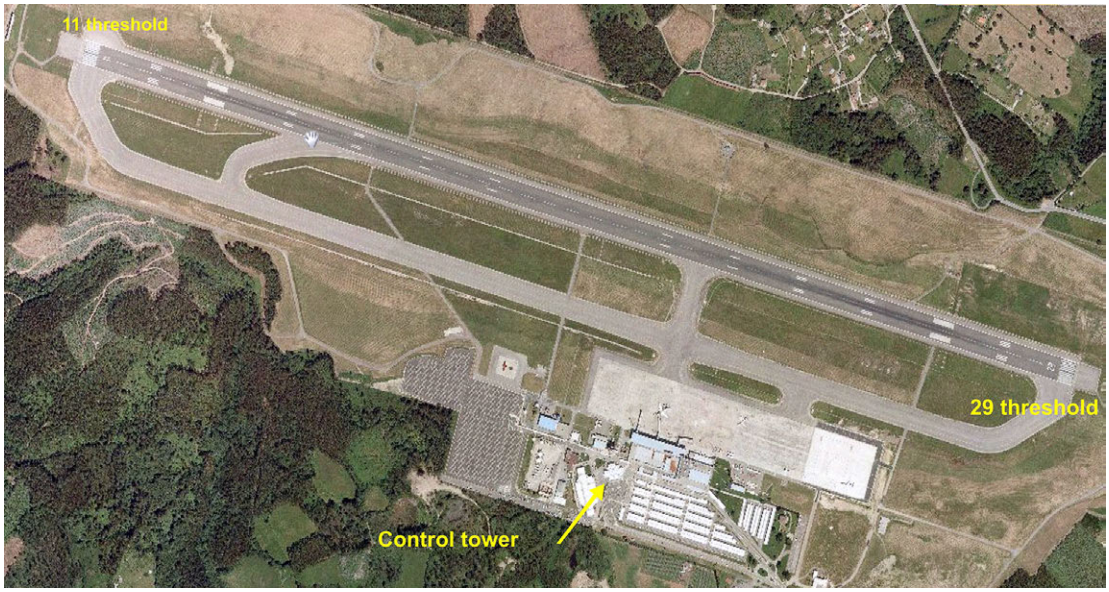


Figure 4. Aerial view of the airport

The airport has the following low-visibility procedures (LVP):

1. GENERAL

1.1. Runway 11/29 may be used for reduced visibility takeoffs. Runway 29 is equipped with a CAT III ILS and may be used for CAT III approaches.

1.2. In addition to the general procedures, the Low-Visibility Procedures shall be applicable in the following circumstances.

- When the RVR value of any transmissometer is less than or equal to 600 m or the same visibility value if the transmissometers are not in service.
- When the cloud ceiling is at or below 75 m (250 ft).
- As required by rapidly degrading weather conditions.

1.3. Pilots shall be informed via radio that the LVP are in effect. Any changes that are reported or detected that could affect the LVP shall be reported immediately to affected aircraft and ATC stations.

1.4. ATC stations shall directly supply the runway visual range values according to the following:

RVR ALPHA: Range associated with the Touchdown Zone.
RVR BRAVO: Range at the runway halfway point.
RVR CHARLIE: Range at the end of the runway.

1.5. The clearance to land shall not be given once the aircraft is 2 NM away from the TDZ. If this is not possible, instructions shall be given to the aircraft to go around. For ILS approaches, permission to land shall only be given when the sensitive and critical ILS areas (LSA and LCA) are clear.

1.6. The LVP shall be lifted when all of the following are present:

- RVR values in excess of 800 m at every transmissometer or the same visibility value if they are out of service.
- Cloud ceiling at 90 m (300 ft).
- Steadily improving weather conditions.

The Asturias Airport TMA extends above 600 m (AGL or AMSL, as appropriate) to a distance of 30 NM and above 300 m (AGL or AMSL, as appropriate) to a distance of 20 NM. The airport control zone (CTR) includes all of the airspace below the TMA out to 20 NM. The airspace between the TMA and the CTR is classified at type D airspace, based on the classification found in ICAO Annex 11. In this type of airspace, VFR flights receive flight information and information on other transiting aircraft. VFR flights en route to the airport must proceed along designated points and request permission to enter the CTR. If accessing via the coastline from the north, the last point is designated "N", and is located some 11 NM away from the runway in a NE direction. Once past this point, VFR flights must fly below 1,000 ft AGL.

The airport also has special protection zones (APCH FINAL) along the extension of both runways from their respective thresholds that must not be crossed at any time without permission from the tower.

1.11. Flight recorders

The airplane did not have flight recorders, nor was it required to by aviation regulations, given its characteristics.

The MFD and PFD were, however, recovered and sent to the manufacturer, which was able to recover the parameters recorded on both devices.

The MFD recorded data from 12:12:30 until 13:58:42, and logged a flight duration of 1:46:12 h. The last information was recorded 1 km to the southwest of the runway 11 threshold at the Asturias Airport.

According to these data, the airplane took off at 12:25:03 and established a cruising pressure altitude of 1,400 ft at first, then 1,600 ft and then approximately 900 ft. Engine rpm's for most of the flight were between 2,100 and 2,200, with an intake pressure of between 22" Hg[3] and 23" Hg. Fuel consumption was between 10 and 11 gallons[4]/hour (between 37.85 l/h and 41.63 l/h). Nothing out of the ordinary was found in the EGT (exhaust gas temperature) or CHT (cylinder head temperature) readings.

[3] 1" of Hg is equivalent to 33.864 hPa or 33. 864 mb.
[4] 1 gallon is equivalent to 3.785 l.

Figures 5 and 6 show the complete route and the path flown just before the accident, as taken from the MFD. Appendix A shows the last five minutes of the flight. Figure 7 shows the altitude profile.

The PFD recorded data from 12:09:48 until 13:58:56, for a total duration of 1:49:12 hours. The PFD started recording data three minutes before the MFD because the former is turned on before engine start-up, whereas the latter is turned on with the avionics suite. The readings taken from the two devices were not synchronized.

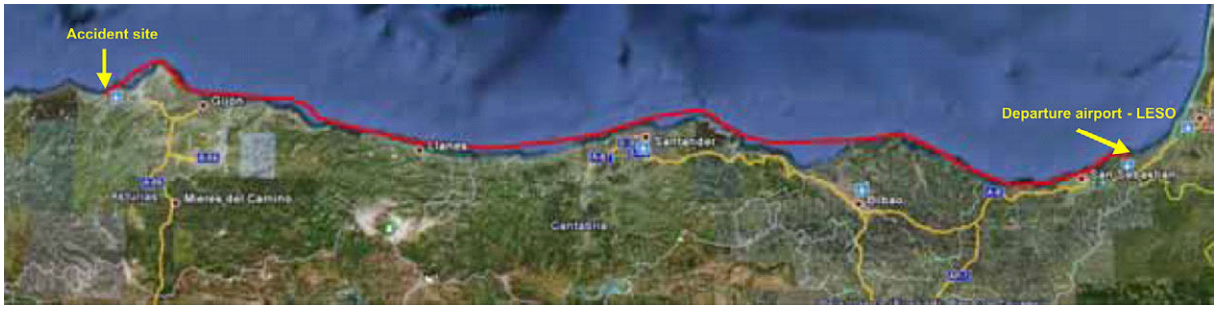


Figure 5. Complete route taken from the MFD

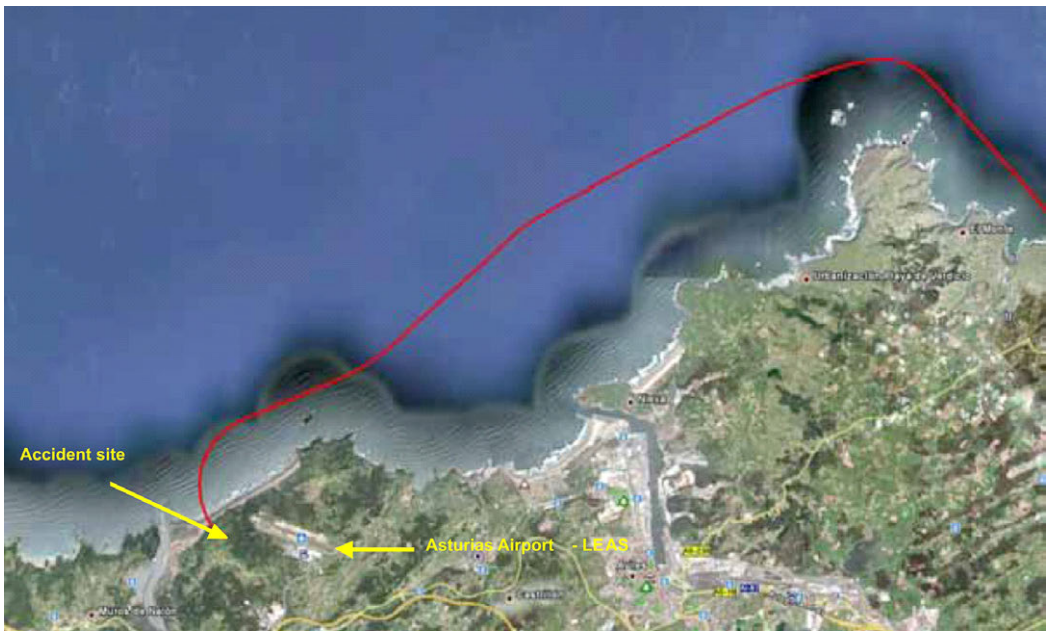


Figure 6. Final moments of the flight taken from the MFD

Keeping in mind the above, a summary of the most significant flight data taken from the PFD is given below:

- The aircraft started its takeoff run at 12:24:44, and took off at approximately 12:25:03, with an indicated airspeed of almost 80 kt.

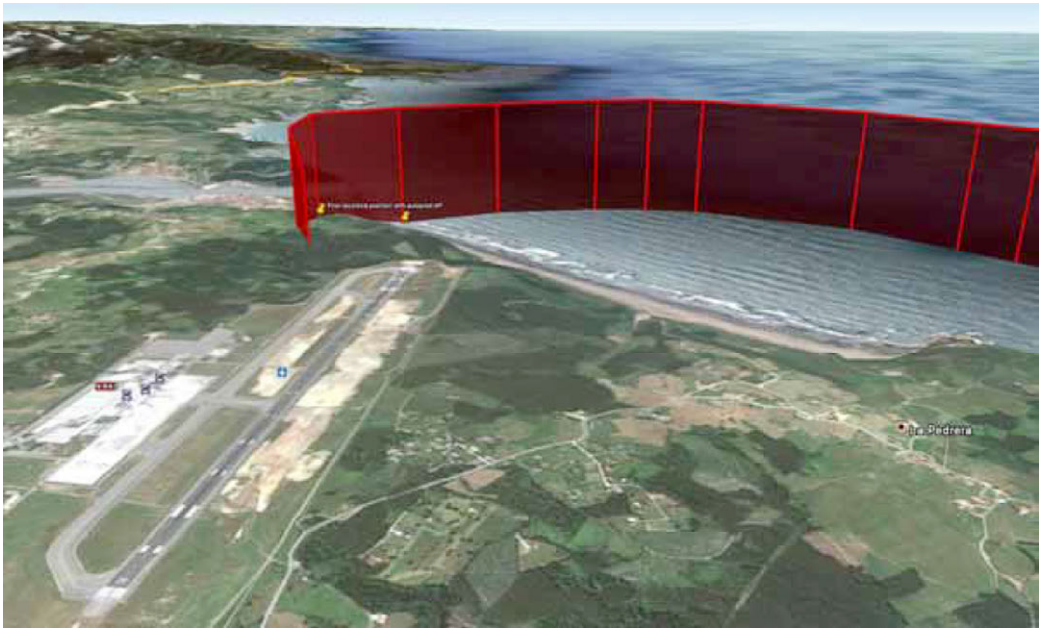


Figure 7. Altitude in the final seconds as recorded by the PFD

- At 12:29:14 the autopilot was engaged and remained so until 13 seconds before the end of the recording. The airplane stabilized at an altitude of 1,260 ft.
- At 12:48:50 it climbed to 1,500 ft., an altitude that was maintained until 13:32:43, when it descended to 800 ft. At 13:55:58, a new descent was started to 600 ft., which the airplane reached at 13:56:48. All of these altitude changes were commanded using the autopilot.
- The heading was maintained at around 270° until 13:58:07, at which time a series of sudden course changes were made, first to 182°, then to 120°, then north and then back to 270°. The initial and subsequent courses were all controlled via the autopilot.
- The autopilot was disengaged at 13:58:43. The airplane immediately banked hard to the left, dropping its nose from a positive pitch angle to a negative value in excess of 18°. The indicated airspeed increased from 114 kt to 130 kt before reaching its last recorded value of 43 kt.
- The last three seconds of the recording show high accelerations and changes in attitude. The yaw varied from 43°/s to the left at 11:58:53 to 21°/s in the opposite direction just two seconds later. Simultaneously the airplane pitched up at 30°/s and then down at 21°/s. An abrupt longitudinal deceleration in excess of –1 g was also recorded in the final instants.
- The last data recorded were from 13:58:54, and showed the nose down at 13.3°, a left 38° bank angle, a course of 042°, an indicated airspeed of 43 kt and an altitude of 387 ft.

Appendix B shows graphs for the most significant parameters in the final seconds of the flight.

1.12. Wreckage and impact information

During the investigation, it was noted that in the instants prior to the final impact, the aircraft's flight path had been from the southwest toward the northeast. The aircraft struck the tops of three eucalyptus trees at the top of Bayas Mountain[5], cutting them off. It then went into a sharp dive and impacted in a nose-down attitude against the mountain's hillside at coordinates 43° 33' 55.38" N - 6° 3' 7.98" W, at an altitude of 185.36 ft (56.5 m). The fuselage was pointing east.

The fuselage was in an east-west orientation, with the nose pointing east.

The tail assembly detached and was found 2 m. left of the aircraft. The horizontal stabilizer was lying on the ground (see Figure 8).

The right wing also detached from the fuselage after impact and was found upside down 2.5 m to the right. It broke in two at approximately the halfway point.

The part that was most affected by the crash was the cockpit, which had dug into a depression in the ground. The entire control panel was severely damaged, as was the rest of the compartment.

Figure 8. Photograph of airplane from the left side

[5] Bayas Mountain has an approximate altitude of 172 m (500 ft).

Two of the propeller's three blades[6] broke and were found detached and partly buried in the ground, though they were not severely damaged.

The airplane's emergency parachute was found deployed and tangled in a tree at the accident site.

Figure 9. Photograph of airplane from right side

1.13. Medical and pathological information

The bodies of the occupants were removed from the wreckage by emergency services once they were confirmed to be dead. They were then taken by helicopter to the airport's runway, where an initial medical examination revealed that they had died very recently.

The autopsy showed that both the pilot and occupant's injuries were consistent with a violent death of an accidental nature. The immediate cause of death was the destruction of vital organs, with the main cause being multiple and severe trauma. The time of death for both was determined to be 14:00.

[6] The blades are also made of composites.

1.14. Survival aspects

Emergency services personnel provided the following information regarding the location of the wreckage and the extraction of the bodies.

At 14:08 the Asturias Airport called the Asturias emergency number to report that a small airplane had crashed at the airport's airplane parking area. The call was cut off. They also reported the disappearance of another, smaller airplane.

At 14:12, communications were reestablished with the airport, during which the deaths of two persons onboard the airplane that had crashed at the airport were confirmed, as well as the existence of a second airplane with which contact had been lost. The airport reported the need to conduct a search of the Ranón or San Juan de la Arena areas.

At 14:15 a rescue party was organized and the Asturias firefighters dispatched a medical services helicopter with a pilot, doctor and two rescue firefighters onboard.

At 14:17 the Avilés firefighters responded with two firefighters, a multipurpose rescue vehicle and an all-terrain transport vehicle.

At 14:18 the La Morgal firefighters station responded by dispatching another helicopter that was carrying, in addition to the pilot, a firefighter, two assistant firefighters and the area chief.

At 14:19 the Pravia firefighters station dispatched three firefighters, a truck and an all-terrain transport vehicle.

At around 14:33 the firefighters from the Pravia station reached the area of the airport runway.

At about 14:42 the firefighters from the Avilés station reached the town of Ranón.

At about 15:00 the two Asturias firefighter helicopters reached the vicinity of the airport. The arrival of the helicopters was delayed by the fog, which prevented them from flying in a straight line, forcing them instead to go from La Morgal to the vicinity of Gijón and then along the coastline to the airport.

At 15:07 rescue divers were called in the event that the airplane might have fallen into the sea. The rescue divers were never dispatched since the airplane wreckage was sighted beforehand.

Personnel on the ground and the two helicopters started to look in the vicinity of the coordinates provided by the control tower.

The wreckage was found on Bayas Mountain, to the southwest of the runway 11 threshold, at about 15:08.

All of the ground personnel proceeded from their respective search areas to the site where the airplane wreckage was found. The doctor and one of the rescue firefighters were lowered to the accident site and were the first to reach the aircraft.

With the aid of the ground personnel that eventually reached the site, rescuers were able to make their way to the wreckage through some of the trees that had been downed by the impact.

The deaths of both occupants were confirmed shortly thereafter.

Several Guardia Civil (Civil Guard) officers then arrived at the site, including members of the Legal Police Squad. After receiving authorization to remove the bodies, rescue crews proceeded to extract the occupants from the wreckage.

At about 17:21, the firefighting helicopter took off from the airport to transfer the bodies from the accident site to the airport.

At about 18:15, all the personnel from the Asturias firefighters squad began to withdraw from the site, thus concluding the rescue operations.

1.15. Organizational and management information

1.15.1. *Control services*

At the time of the accident, there were two traffic controllers at the airport tower in charge of traffic in and around the airport, including taxi movements within the airport itself.

Communications with aircraft took place on a frequency of 118.15 MHz, while communications with vehicles on the ground took place on 121.7 MHz. ATC personnel had at their disposal a radar unit.

These three services were normally handled by a single controller, though on the day of the accident there were two controllers on duty as part of the day shift crew at the Asturias control tower. They had over 20 years of experience in various locations. One was handling radio communications and another was there in a support role. After the accident, the swing shift controller also provided assistance.

The controller who was handling communications at the time of the accident was relieved ten minutes after the accident by the other controller who was on support duty,

in compliance with the Aena Air Navigation Office's "Aircraft Emergencies and Special Situation Procedure", S41-02-GUI-001-3.1, dated 25 March 2011[7], which recommends, if possible, the "Relief of the Controller" as a priority in the event of an accident.

The controllers on duty reported that neither of the two accident aircraft declared an emergency, nor requested assistance or clearance to land.

1.15.2. *Airport services*

The airport has an emergency plan that was last revised on 15 October 2008. Chapter IV deals with emergencies involving aircraft, and considers the following cases, among others:

1. Aircraft accident at the airport.
2. Aircraft accident outside the airport

    2.1. On land
    2.2. In water

On the day of the accident, the low visibility procedures (LVP) had been placed in effect at 08:38.

At 14:01, the accident of aircraft SP-CFM was called in to the control tower and the emergency plan was activated. The Main Command Post (MCP) was deployed to the site of the airplane. A minute later the MCP notified Civil Guard and National Police personnel stationed at the airport, the airport's health services and the emergency telephone number (112).

At 14:18 the airport maneuvering area was checked and reported to be operational. The report was received of the activation of the ELT in aircraft SP-AVD.

At 14:38 the signal from the ELT in aircraft SP-AVD was reported activated.

At 14:57 the return of aircraft SP-CUT was reported to the Main Command Post by the Santander Airport Operations office.

At 15:50 the airport was declared operational.

At 16:16 the emergency plan was lifted.

[7] This procedure is adapted from the document "Controller Training in the Handling of Unusual Incidents", published by Eurocontrol, the European Organization for the Safety of Air Navigation.

2. ANALYSIS

2.1. History of the operation

During the investigation it was noted that the pilot was aware of the weather conditions present along the planned route. It was not possible to ascertain, however, if the pilot obtained the information prior to departing or what the information consisted of. The information available in the hours prior to the flight already showed that the weather was not conducive to visual flight, particularly in and around the Asturias Airport. What is known is that during the flight the crew received sufficient information from ATC to know that conditions were unfavorable and detrimental to visual flight. Proof of this is the fact that at 13:02:50, after learning of the weather conditions at the Asturias and La Coruña airports, the pilot remarked, "Oh, that means it's horrible!" At that time they were flying in the vicinity of the Santander Airport, which happened to be one of their alternate airports, and the logic of their situation dictated that they should have opted to land there, return to the departure airport in San Sebastián and land there or go to the Bilbao Airport, which was halfway between the two.

It is not known why exactly the pilot decided to continue with the flight. What is known is that when they reached the vicinity of the Asturias Airport, they were flying under VFR along the coast, as they had been since the start of the flight, at which point they entered into IMC, either unexpectedly or in an effort to regain the visual references they had lost moments earlier.

At 13:51:03, the time of the last communication, they were still flying in VFR. From that moment on until almost the time of the crash, at around 13:59, the autopilot maintained the altitude while the airplane flew on a westerly-southwesterly course.

On this last exchange, the pilot reported his position without any apparent problems and requested information on the runway in use and the wind, which could indicate that he was assessing the possibility of landing in Asturias. He did not, however, request explicit instructions from the control tower to land. The controller provided the information requested and explicitly mentioned that low-visibility procedures were in effect at the airport, which made a visual landing impossible. He also requested that the aircraft report flying to the north of the airfield, and indicated that there was no traffic reported that could interfere with their flight path along the coastline, as would have been the case had an aircraft taken off from runway 29.

These instructions indicated ATC's conformity with regard to having the flight continue to the north of the airport, which made it possible for the aircraft to continue to have available the essential reference provided by the coastline. It also indicates that the controller at no time believed that the aircraft was planning to land on the runway in use, which was in the opposite direction, which would also have meant a change to the flight plan.

The fact that the pilot made no further efforts to communicate with the airport, beyond reporting its position and obtaining new QNH information to ensure a proper reference altitude, indicates that entering into IMC could have produced great stress in the pilot, probably due to his complete disorientation. This undoubtedly prevented him from making decisions, meaning that he was unable to react and communicate with the airport and request some type of help to aid in his reorientation.

The course information recorded on the MFD indicates that during that time interval, the pilot was attempting to find the airport runway, given the progressive change in course from the southwest to the southeast.

Moreover, the data recorded on the PFD show that in the final moments of the flight, while at around 500 ft, there was a sudden drop in the airplane's altitude and indicated airspeed (IAS) that resulted in the airplane adopting a nose-down attitude that was consistent with the manner in which the impact took place.

The fact that the airplane struck the tops of several trees in the highest part of Bayas Mountain, at an altitude of some 500 ft, while flying at a relatively level attitude, indicates that it was after these impacts that the pilot activated the emergency parachute.

Since the airplane was below the minimum safety altitude, there was not enough time for it to deploy. The drag it generated, however, was enough to lower the airplane's speed sharply, leading to a loss of lift and the subsequent fall with a nose-down attitude while turning to the left (opposite the propeller blades' direction of rotation), as recorded in the PFD.

The little damage suffered by the propeller blades is explained by the fact that the pilot probably reduced engine power at the last second, meaning that the impact took place with the propellers turning very slowly.

2.2. ATS performance aspects

The investigation revealed that all of the stations involved along the route expressed serious reservations regarding whether the crews were aware of the risk they were taking by flying in such adverse weather conditions, in some cases even wondering if the crews had properly understood and assimilated the indications they had been given. This is clearly evident in the conversation that took place at 12:33:33 between San Sebastián ATC and Bilbao ATC, in which the controller expressed his surprise at the fact that they were flying in those weather conditions ("What are they doing flying in this pea soup?").

At 12:47:48, Bilbao ATC informed Santander ATC that the three airplanes were flying along the coastline and that they had to fly below 2,000 ft because it was very cloudy.

Concern over the dangers of flying in those conditions was also manifested by Asturias ATC when, after being informed by the Madrid ACC that there were three airplanes flying toward the area in VFR, replied that the weather conditions were very bad and it was unlikely they would be able to transit through there. This concern led them to ask the crew of an airplane that was doing an IFR approach about the altitude of the cloud layer from above, information that they quickly relayed to the Madrid ACC for it to pass to the three airplanes flying under VFR.

Since the Asturias Airport TMA and CTR are classified as type D airspace, VFR flights are allowed at the discretion of the air traffic control service, which provides transit information on all other flights. ATS were in contact with the aircraft and supplied the information requested, consistent with the airspace classification.

The concerns manifested by the ATS stations calls into question whether more direct actions could have been taken by the controllers that would have succeeded in making the pilots reconsider the advisability of flying in those conditions and turn around, as was done by the third airplane following the other two accidents. As regards the Asturias Airport control tower, the short time that elapsed between the two accident airplanes deviating from their flight paths along the coast and the impact (about 40 seconds in the case of SP-AVD), and the fact that the pilots neither requested help nor clearly stated their intentions, were undoubtedly crucial factors that impeded a better evaluation of the situation by controllers and kept them from taking additional measures.

3. CONCLUSION

3.1. Findings

- Aircraft AVD took off from the San Sebastián Airport (LESO) at 12:25:03 on a VFR flight en route to the Maia Airport (LPVL), located in Vilar da Luz (Portugal).
- Flying with AVD, also on a VFR flight, were two other aircraft, both CESSNA 182's, registrations SP-CFM and SP-CUT, in that order and following behind AVD.
- The flight relied on the visual reference provided by the coastline.
- They established radio contact with the Bilbao Airport (LESO) and with the Santander Airport (LEXJ), the latter of which informed them of the weather conditions present at both the Asturias Airport (LEAS) and the La Coruña Airport (LECO).
- At 13:51, some 12 NM from the airport, the aircraft requested TWR the meteorological information, the wind and the runway in use. The controller provided the information requested and indicated the aircraft that low visibility conditions prevailed at the airport.
- Later on, the aircraft contacted the TWR in two occasions, to inform about its position and to request a new QNH confirmation, while flying along the coastline.
- Some 40 s before the impact, the aircraft left the coastline, heading towards the runway at some 190 ft above airport.
- ATC did not contacted again and did not supply more information after this change of heading.
- It is estimated that at around 13:59, the aircraft impacted the ground at coordinates 43° 33' 55.38" N - 6° 3' 7.98" W and at an altitude of 185.36 ft (56.5 m) in a nose-down attitude in a easterly direction.
- The tail assembly and the right wing broke off on impact.
- The entire front section of the airplane, which houses the engine and the cockpit, was practically destroyed, although the MFD and PFD installed in the cockpit were recovered, along with the data they had recorded.
- The airplane's parachute (CAPS) was found deployed at the accident site.
- In the final seconds of the flight, the aircraft struck several trees at the top of Bayas Mountain, at an altitude of 500 ft, after which its indicated airspeed and flight attitude dropped sharply.
- The occupants died instantly as a result of the violent impact.

3.2. Causes

The accident was caused by the pilot's entering into IMC despite not having an IFR rating, leading to spatial disorientation in the pilot due to the absence of external references.

The investigation revealed that the airplane struck several treetops while airborne. The pilot then deployed the emergency parachute but at an altitude that was insufficient for it to have any effect. This caused the airplane to spin out of control to the left in a nose-down attitude.

4. SAFETY RECOMMENDATIONS

None.

APPENDICES

APPENDIX A
SCAAI Comments

Ministry of Transport, Construction and Maritime Economy
State Commission on Aircraft Accidents Investigation

Dear CIAIAC Colleagues,

The sole objective of the SCAAI comments is improve the level of safety flight operation in order to prevent accidents and incidents in the future. In Poland we had several occurrences when the ATS personnel, even while an ATS services did not to be under an obligation to do something, had taken action which prevent disasters. As a result of the investigations of the occurrences were been formulated safety recommendations to make modification in operational procedures of ATS units in order to improved safety flights operations by the SCCAI.

The SCAAI can tell without any speculations that we known the facts of the accidents that the ATS service which was equipped in working order radar, suitable trained and experienced stuff did not take any action providing advice and information useful for the safe and efficient conduct of flights to prevent the pilots from doing mistakes as result of there were disasters.

The Asturias ATS did not take any action within their responsibility controlled airspace TMA and CTR when the pilots not complied with flight plans, infringement the controlled airspace boundary and the departure and approach area of RWY11/29 and were getting progressively close to the unsafe altitude/high and next descended below. The ATS stuff had knowledge about poor weather conditions and lots of time to take any action. We can not also agree with your statement that "The ATS service actuated as soon as they had suspicions of anomalous situation" because any action was taken after the ATS stuff to became aware about disaster.

In this connection mentioned above and the SCAAI comments (sent earlier) we can not agree with CIAIAC statement that actions taken by ATS stuff were correct.

The SCAAI ask for placing our comments as the integral part of the Final Reports in order AENA stuff and "aviation society" can possibility to learn "the lessons" from their review.

Your Sincerely,

Accredited Representative

CZŁONEK
PAŃSTWOWEJ KOMISJI
BADANIA WYPADKÓW LOTNICZYCH
mgr inż. Bogdan Rydzych

Chairman of the SCAAI

PRZEWODNICZĄCY
Państwowej Komisji
Badania Wypadków Lotniczych
dr inż. Maciej Lasek

Ministry of Transport, Construction and Maritime Economy
State Commission on Aircraft Accidents Investigation

Dear CIAIAC Colleagues,

The sole objective of the SCAAI comments is improve the level of safety flight operation in order to prevent accidents and incidents in the future.

According to the already gathered facts which were available in drafts of final reports: A-015/2011 to A-018/2011, as well as to previous email's and conversations in your office, we would like to express our point of view and opinion of SCAAI what is missing in the content of reports.

Main facts:

1. ATCOs had the information about the poor weather conditions at airport (IMC, LVP);
2. ATCOs had the information about the VFR flights of: SP-AVD, SP-CFM and SP-CUT.
3. ATCOs had possibility of using surveillance radar for aerodrome service.
4. ATCOs were suitable trained and experienced.
5. ATCOs were handling communication with the pilots.
6. ATCOs had enough time to took some action when the pilots infringement the controlled airspace boundary, departure and approach special protected zone of RWY11/29 and were getting progressively close to the unsafe altitude/high and next descended below.
7. The pilots of a/c SP-AVD and SP-CFM were called by ATCOs shortly after the impact of SP-CFM happened. The a/c SP-AVD had accident approximately 40 seconds before SP-CFM.

SCAAI can not agree with CIAIAC statements that actions taken by ATCOs were fully correct.

SCAAI considers that on the basis of the above main facts in the reports is the lack of full description of ATCOs actions. SCAAI is of the opinion that following fact should be taken into account the lack of action of the ATCOs when the pilots:

- **were deviating from flight plans routes,**
- **were an infringement the controlled airspace boundary and the departure and approach zone of RWY11/29,**
- **were getting progressively close to the unsafe altitude/high and next descended below.**

In opinion of SCAAI the ATCOs had enough time to took some action when pilots were deviating from flight paths and infringement the controlled airspace boundary.

Your Sincerely,

Accredited Representative

GŁÓWNY INSPEKTOR PAŃSTWOWEJ KOMISJI BADANIA WYPADKÓW LOTNICZYCH
mgr inż. Bogdan Fydrych

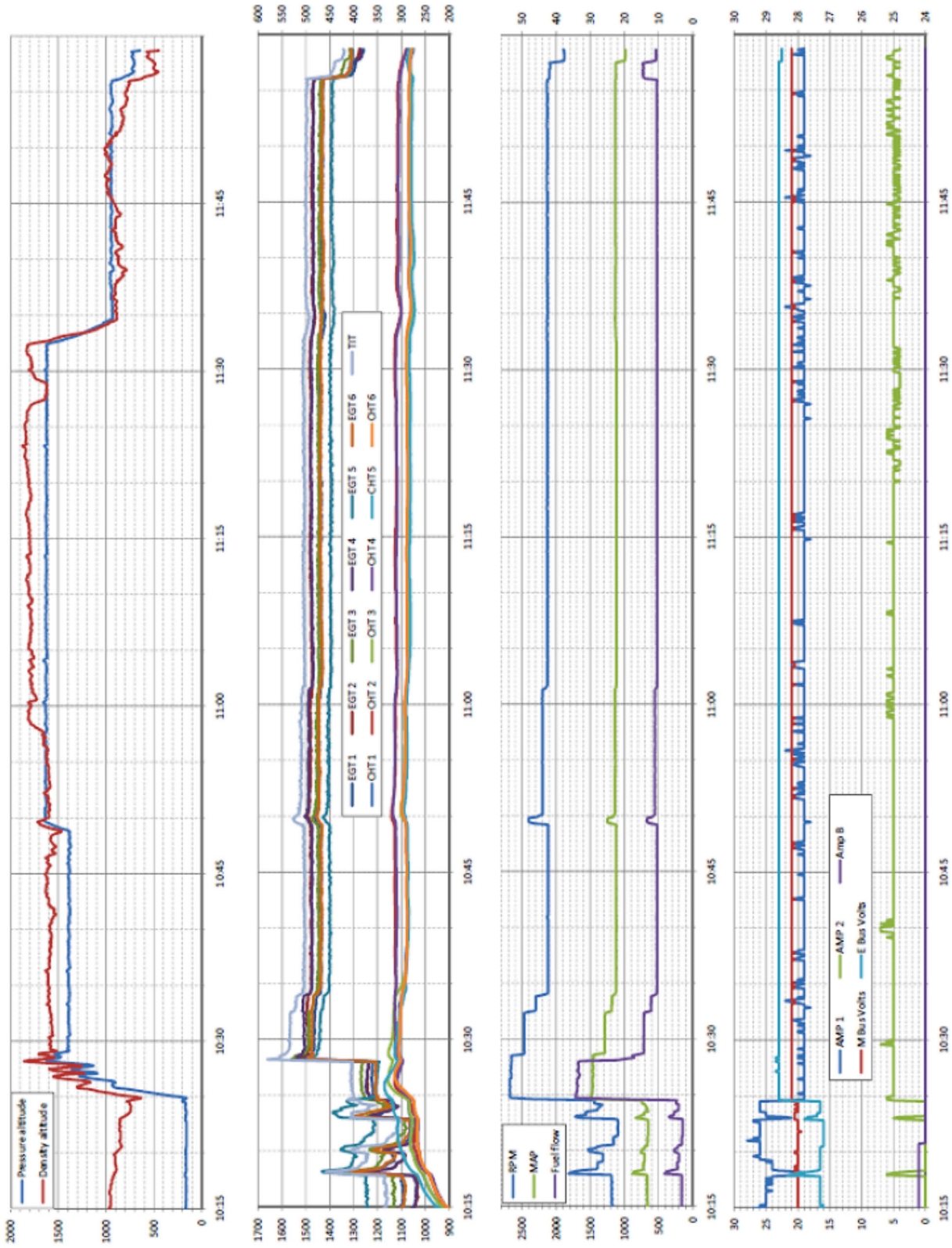
Chairman of the SCAAI

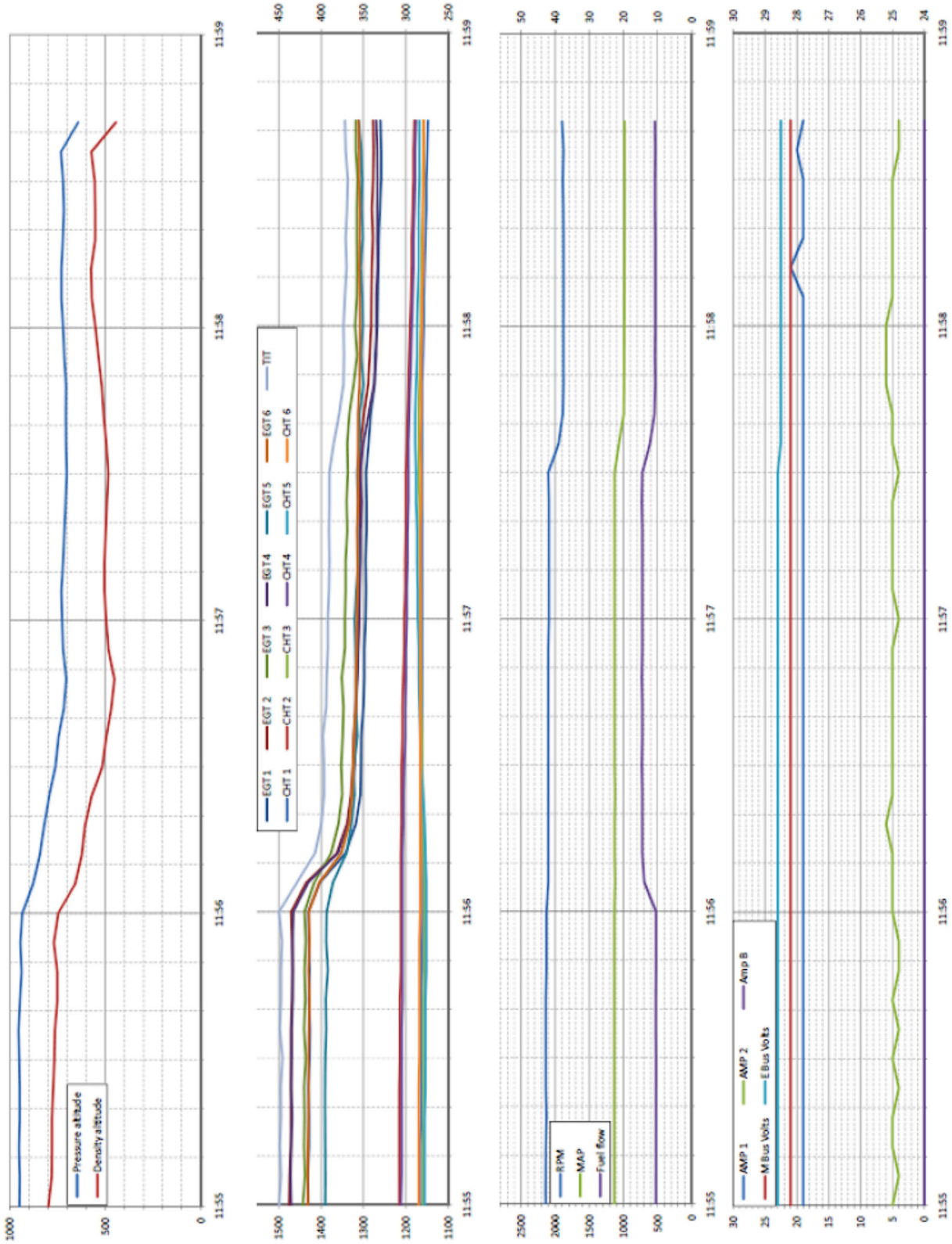
PRZEWODNICZĄCY Państwowej Komisji Badania Wypadków Lotniczych
dr inż. Maciej Lasek

L.dz. 2383/12

APPENDIX B

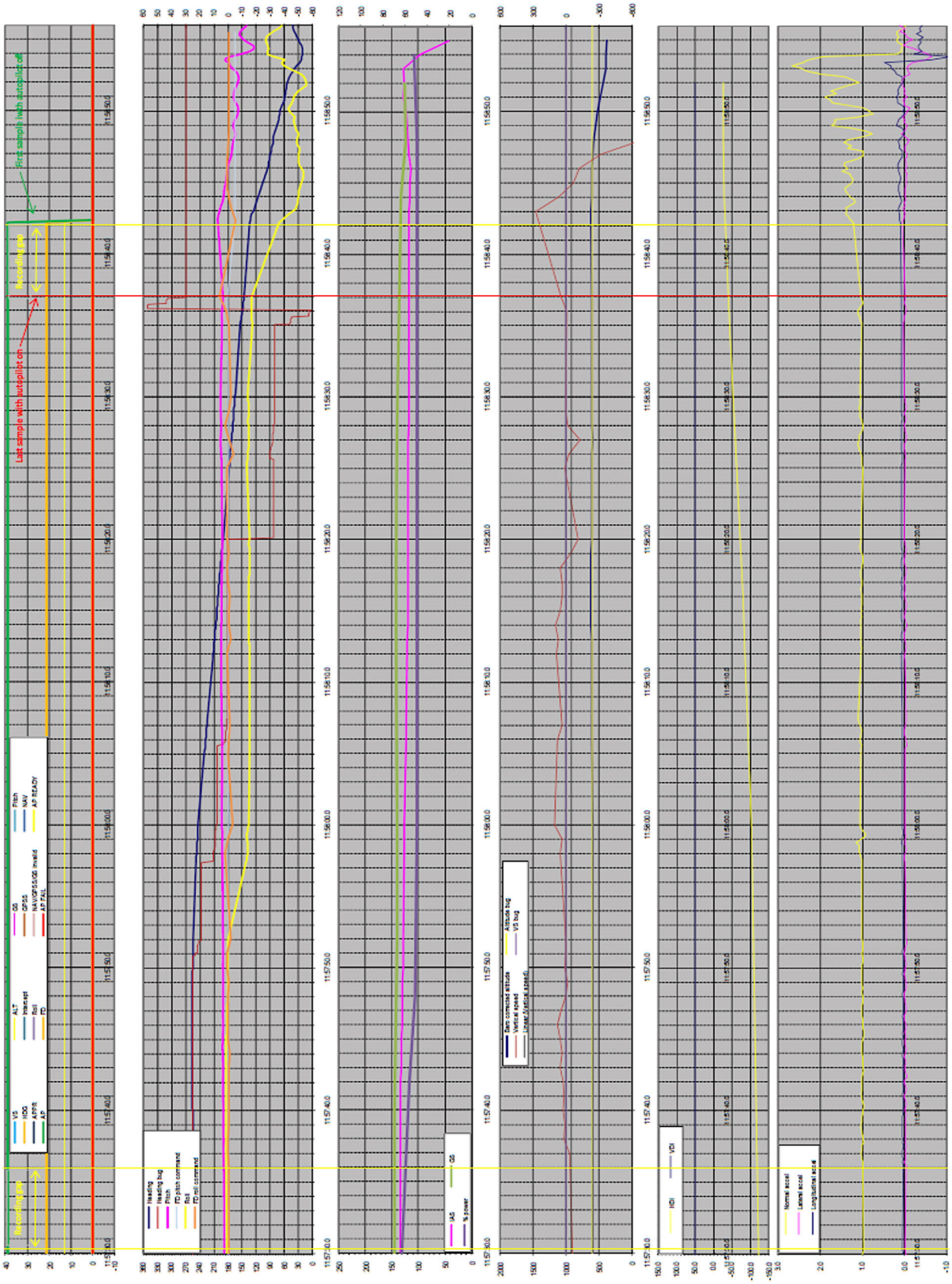
Graphs of the final minutes of the flight taken from the MFD

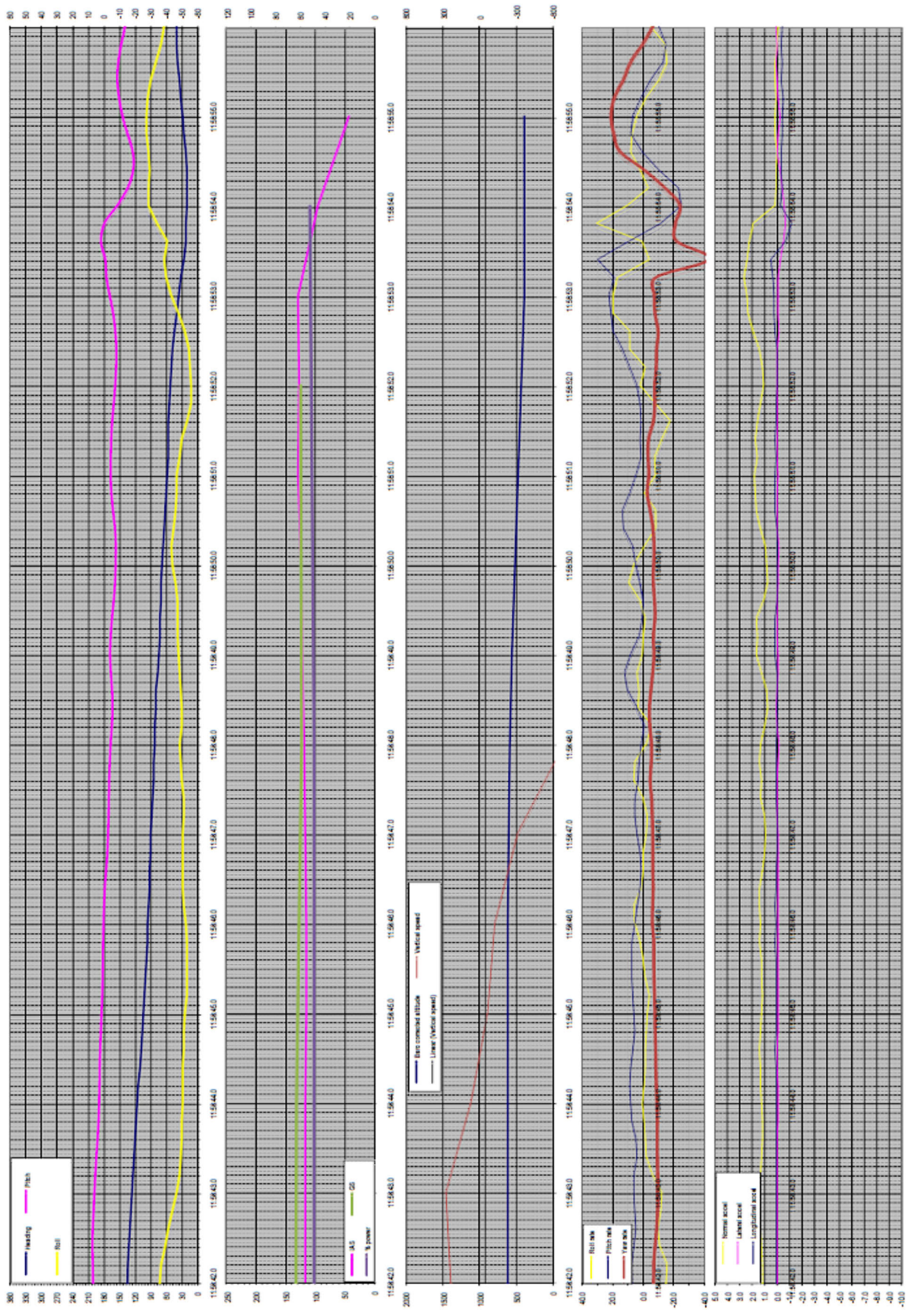

Pressure altitude
Density altitude
EGT 1
EGT 2
EGT 3
EGT 4
EGT 5
EGT 6
TIT
CHT 1
CHT 2
CHT 3
CHT 4
CHT 5
CHT 6
RPM
MAP
Fuel Flow
AMP 1
AMP 2
Amp B
M Bus Volts
E Bus Volts


Pressure altitude
Density altitude
EGT 1
EGT 2
EGT 3
EGT 4
EGT 5
EGT 6
TIT
CHT 1
CHT 2
CHT 3
CHT 4
CHT 5
CHT 6
RPM
MAP
Fuel flow
AMP 1
AMP 2
Amp B
M Bus Volts
E Bus Volts

APPENDIX C

Graphs of the final minutes of the flight taken from the PFD


First sample with autopilot off
Last sample with autopilot on
Reference point
Heading
Heading bug
Pitch
Pitch command
Roll
Roll command
IAS
% power
Normal accel
Lateral accel
Longitudinal accel


Heading
Pitch
Roll
IAS
GS
% power
Baro corrected altitude
Vertical speed
Linear (Vertical speed)
Roll rate
Pitch rate
Yaw rate
Normal accel
Lateral accel
Longitudinal accel