

CIAIAC

Comisión de Investigación
de Accidentes e Incidentes
de Aviación Civil

TECHNICAL REPORT

A-065/2003

Accident to aircraft
CIRRUS SR-22,
registration N-100BR,
at southern slopes
of the Montes Alberes,
6 km to the North
of Espolla (Girona),
on 12 October 2003



MINISTERIO
DE FOMENTO

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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.fomento.es/ciaiac>

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 and its causes and consequences.

In accordance with the provisions of Law 21/2003 and Annex 13 to the Convention on International Civil Aviation, the investigation has exclusively a technical nature, without having been targeted at the declaration or assignment of blame or liability. The investigation has been carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents.

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

This report has originally been issued in Spanish language. This English translation is provided for information purposes only.

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Abbreviations

00 °C	Degrees centigrade
00° 00' 00"	Degrees, minutes and seconds
ACC	Area Control Centre
AENA	«Aeropuertos Españoles y Navegación Aérea»
ALERFA	Alert phase
AMO	Airport meteorological office
ARO	Air traffic services Reporting Office
BRS	Ballistic Recovery System
CDC	Control and Detection Centre
CIAIAC	«Comisión de Investigación de Accidentes e Incidentes de Aviación Civil»
COM	Communications
CTR	Control zone
DETRESFA	Distress phase
dd-mm-yyyy	Date expressed in day, month and year
E	East
USA	United States of America
FAA	Federal Aviation Administration (USA)
FIR	Flight Information Region
FL	Flight Level in hundreds of feet
ft	Feet
GPS	Global Positioning System (by satellite)
h	Hour(s)
hh:mm:ss	Time expressed in hours, minutes and seconds
HJ	Daytime visual
hPa	Hectopascal
kg	Kilogram(s)
km	Kilometer(s)
kt	Knot(s)
lb	Pound(s)
m	Meter(s)
METAR	Aviation Routine Weather Report
MFD	Multifunctional Display
MHz	Megahertz
MTOW	Maximum Takeoff Weight
N	North
NE	North-east
NM	Nautical Mile(s)
PPL(A)	Private Pilot License (Aircraft)
RCC	Rescue Coordination Centre
S	South
SE	Single Engine
SHP	Shaft Horse Power
SIGMET	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
TAF	Terminal Area Forecast
TMA	Terminal Control Area
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omnidirectional Radiobeacon
W	West

Synopsis

Operator:	Private
Owner:	Private
Aircraft:	Cirrus SR-22
Date and time of the accident:	12-10-2003; 13:10 local time approx.
Place of the accident:	Southern slopes of the Montes Alberes mountains (Catalan Pyrenees), approximately 6 km to the north of Espolla in the province of Girona
Persons on board:	Four (pilot and three passengers)
Type of flight:	Recreational flight from Ibiza Airport to Bale-Mulhouse Airport
Date of approval:	25 January 2006

Summary of the accident

The accident occurred as a result of a direct impact against a mountain when the aircraft was flying in the region of the Montes Alberes mountains (Catalan Pyrenees), in the presence of mist and low clouds which hid the peaks from view.

1. FACTUAL INFORMATION

1.1. History of the flight

The accident occurred, on 12th October 2003, when the Cirrus model SR-22 aircraft, registration N-100BR, was carrying out its return flight from Ibiza Airport (LEIB) to Bale/Mulhouse Airport (LFSB), its operating base.

The fully filled Flight Plan included the following: takeoff at 11:00 h (local time), a speed of 170 kt, 4 h estimated flying time, 5 h aircraft endurance and VFR flight levels. In addition, the Flight Plan indicated that the aircraft was equipped with standard COM/NAV equipment, transponder with A/C modes, emergency equipment (VHF radio and emergency beacon) and survival equipment (maritime with a raft with capacity for 4 persons).

The flight was a recreational, non-commercial flight under VFR rules, with four occupants on board, including the pilot. The aircraft was refueled immediately prior to the flight.

The Flight Plan specified the route as waypoints: N (northerly departure point from CTR Ibiza, located in San Antonio Abad) - BGR (VOR in Bagur, province of Girona) - PPG (Perpignan in France) and then the points of Marseilles FIR, MTL-TIIP-CBY, the airports LSGL (Lausanne-La Blechette) and LSGY (Yberdon-les-Bains Flying Club) and, finally, the destination airport LFSB (Bale-Mulhouse Airport).

Given the fact that the flight would be conducted within the same time zone, all time references in this report will be related to local time, unless expressly indicated otherwise.

The transmitted Flight Plan indicated real takeoff time at 11:40 h. According to Barcelona FIR data, the aircraft reached the forecasted flying level of 1,500 ft and speed of 170 kt at 11:46:18 h. Arrival was scheduled for 15:40 h.

The weather conditions were adequate for VFR operations in Ibiza airport and the forecast was cloud and poor visibility in the area of the accident. These conditions in the area were confirmed in the statements of an eye witness, who also indicated that they would hamper the visibility of the mountains.

Flight tracking by civil traffic control was normal, with code 6336 assigned in most of the flight, and with radio contact being made with the Ibiza, Palma and Barcelona centres, as well as by radar. The last radio contact and the last available radar screen display with Spanish control centres was at 12:55:24 h with Barcelona ACC. After the accident, it was found that there were additional records of radar detection by French centres.

The alert signals were given by Reims control in France, when evidence came that the destination arrival time had been overpassed. Spanish and French search and rescue services were activated in the afternoon of the day of the accident.

The search was initiated in the areas close to the most likely position notified by Barcelona ACC, which situated the aircraft above the sea, 36 NM to the east of Bagur VOR.

The following morning, the French services reported the last positions detected by Lyon radar, which situated the aircraft, at 12:59:34 h, over the southern coast of the Golfo de Rosas bay and on course 340, heading for Perpignan. This route had been requested by the aircraft by radio to Barcelona control in one of the last contacts but had not been expressly authorized.

The wreckage was located in the afternoon of the following day, 14th October, after new information had been received from the French services. The site was at the coordinates 42° 27' 47" N/003° 00' 37" E, at a height above sea level of 830 m (2,720 ft). The accident had occurred in a place with difficult access, with an approximate slope of 45% and thickly covered by trees, on the south-facing side of the Montes Alberes mountains in the Catalan Pyrenees, within the l'Albera Natural Park. The region is mountainous with steep slopes which rise up from the plain and quickly reach heights of more than a thousand metres (Appendix A, Figure A-1). The place lies within the province of Girona and is situated approximately 6 km to the north of Espolla, 9 km to the NE of La Junquera and less than one km away the French border.

In the area of the accident, the height of the mountains increases sharply in the direction of La Junquera (west) exceeding 1,100 m height at a distance of less than 2 km, whereas to the east it rises slightly up to 980 m in one km, then coming down sharply again.

The aircraft was completely destroyed and burned and the four occupants were fatally injured in its interior, maintaining their position in the cabin at the moment of the accident. Due to this, it was observed that the pilot was seated in the front right seat.

The bodies of the occupants were recovered the following day.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1	3	4	
Serious				
Minor				Not applicable
None				Not applicable
TOTAL	1	3	4	

1.3. Damage to aircraft

As a result of the accident, the aircraft was completely destroyed and burned in the fire which broke out after the crash against the ground.

1.4. Other damage

During the accident the aircraft crashed into and tore up or damaged a few trees and bushes and also burned a small area, including some trees and brush where the wreckage came to rest.

1.5. Personnel information

1.5.1. Pilot

Age:	51 years
Nationality:	Swiss
License:	PPL(A) (Private Pilot License – Aeroplane)
Ratings:	— SE (single-engine landplanes) (valid up to 02-05-2005) — VFR-HJ (VFR daytime visual) — RTI (VFR) (radiotelephony for VFR) (from 07-04-1998) — Radionavigation (from 08-04-1999)
First issued:	08-01-1998
Expiry date:	25-04-2008
Medical examinations:	— Initial: 02-05-1997 — Last: 02-04-2003 (validity: 24 months)
Total flying hours:	250-300 h ¹

1.5.2. Passengers

There is no record of any aeronautical qualifications for any of the passengers in the aircraft involved in the accident.

As indicated, when the wreckage was located, one of these passengers was found as occupying the pilot's seat. It can then be drawn as a conclusion that the passenger was in that position during the accident.

¹ These flying hours were indicated, as estimations, by the Training Instructor of the Flying School where the pilot learned to fly. The license indicates 96 h and 24 flights at 08-04-1999.

1.6. Aircraft information

The CIRRUS model SR-22 aircraft is a development of the former model SR-20, which carried out a first flight in May 1995. The SR-22 model (see Appendix A, Figure A-2) has a larger wingspan and engine power which has been increased from 160 to 310 HP, in order to achieve a greater payload and higher speeds, whilst keeping the advantages of model SR-20 such as its low structural weight through the use of «compound» materials (in general, fibreglass «sandwich» with porous foam core). Model SR-22 was type certified by the FAA on 30-11-2000. Both models have the same configuration: single engine, constant speed three-blade propeller, low wings and tail and fixed and cowelled tricycle undercarriage.

Flight instruments are fitted only on the left-hand side although, in fact, their visibility is adequate from the front right seat, with the exception of the altimeter's setting window. The aircraft is standard equipped with a complete and integrated avionic and instrument system, including multifunctional displays (MFDs) and automatic pilot.

In addition, it is equipped with a Ballistic Recovery System (BRS) which allows the complete aircraft to be recovered when all other landing alternatives have been exhausted. This system, the first one certified for production aircraft, consists of a parachute, which is unfolded by a rocket, and other explosive devices. The system is activated manually by the pilot.

The main features of model SR-22 are:

- Wingspan: 11.73 m.
- Length: 7.92 m.
- Height: 2.62 m.
- N° of seats: 4, including crew.
- Usable fuel: 306.3 liters (81 gallons).
- Maximum range (with reserves): more than 1,000 NM (1,853 km).
- Maximum operating altitude: 17,500 ft, with portable oxygen.
- Maximum operating speed: 180 kt (333.6 kph).
- Stall speed: 59 kt (109.3 kph), with flaps extended.
- Maximum speed for parachute deployment: 135 kt (250 kph).

1.6.1. Airframe

Make:	Cirrus Design Corporation
Model:	SR-22
Serial number:	0223
Date of manufacture:	May 2002

Registration: N-100BR
MTOW: 3,400 lb (1,542 kg)
Owner: Rustrholz Beat (private)
Operator: Rustrholz Beat (private)

1.6.2. *Airworthiness certificate*

Number: DMIR410074CE
Category: Normal
Date issued: 11-04-2002
Issuing body: FAA (Federal Aviation Administration)
Date renewed: 09-05-2003

1.6.3. *Maintenance log*

Total flight hours: 104.9 h at 09-05-2003
Last 100 h and anual inspec.: 09-05-2003

It was available the report of the last 100 h inspection carried out by an authorized centre on the date indicated with 104.90 h. No anomalies were found in this report.

1.6.4. *Engine*

Make: Teledyne Continental Motors
Model: IO-550-N7B
Power: 310 SHP
Serial number: 686241
Last 100 h inspection: 05-05-2003

1.6.5. *Propeller*

Make: Hartzell
Model: PHC-J3YF-1RF
Serial number: FP1703B
Last general inspection: 09-05-2003

1.6.6. *Fuel*

The flight plan indicated that the aircraft had an endurance of 5 h and an estimated flying time of 4 h.

The available information confirms that the aircraft refuelled 203 liters of 205-GNA-100LL 0910 fuel prior to the takeoff of the accident flight, which should have been enough for the maximum endurance.

1.7. **Meteorological information**

The meteorological information available at the Ibiza AMO counter has been confirmed as follows: One Meteosat terminal, significant weather and wind maps of Spain and Europe, forecasts for the Balearic Islands for that day and the next, METAR, TAF and SIGMET significant phenomena alerts for the whole of Europe, which were queried via a personal computer, and alerts for Spanish airports.

According to information taken from AMO Ibiza, there was no record in the signatures book that the pilot had requested meteorological information on the day of the accident. Nevertheless, the failure to query the available data by the crew and missing signatures are frequent occurrences. Taking into account the statements of friends as to the pilot's characteristics of organization, planning and detailed analysis, who confirmed that on more than one previous occasion he had even cancelled a flight already planned because of worsening weather conditions, it can be considered, although there is no record of it, that the pilot might have used all available forecasts in the flight's preparation and, consequently, was aware of them.

According to the 11:30 h METAR, the weather conditions in the departure airport were adequate for VFR flights, with visibility 9,999 m, winds of 7 kt, scattered layer at 2,000 ft and cloudy layer at 3,500 ft. Ambient temperature was 24 °C and dew point 18 °C. It also indicated that no significant changes were forecasted for the following two hours.

According to the report of the Instituto Nacional de Meteorología («Spanish National Meteorological Institute»), the weather conditions at the site of the accident, based on the information provided by the Figueres and Peralada observatories, data taken from weather maps and based on satellite images, indicated an overcast layer, poor visibility and southerly winds of 5 to 10 kt. There was a relative, almost stationary, low pressure of 1,004 hPa over the Cantabrian sea, giving rise to SE surface winds over Catalonia.

Information provided by a witness who was near the site of the accident, confirmed the above weather report and adding that the low clouds prevented the mountains from being seen, including the top of the closest mountains.

1.8. Aids to navigation

Aircraft SR-22 was equipped with complete and modern avionics, based on two GPS/COM/NAV units and the integration of systems and display on digital screens.

The aircraft gave no indication or communication (change of course, ATC code, etc.) of the existence of a fault or malfunction in the on-board navigation installation and consequently it is considered that, except for incorrect handling or interpretation, this system did not affect the accident. In addition there is not evidence of possible faults in the ground aids to navigation on the flight's route at the date and time of the accident.

The aircraft was monitored and tracked in-flight by the Spanish Civil Air Control radar system as far as the proximity of Bagur VOR in Girona. From that point, at 12:55:24 h (local time), there are no tracking data by that control or any other Spanish military radar.

Figure B-1 provides a reconstruction of the path followed by the aircraft, based on available Spanish radar data plus that acquired during the search subsequent to the event and supplied by the French services. These latter data are detailed in Figure B-2 (Appendix B).

The radar track starts at the initial ascent (leg A in the figure), being reflected in the two available on-screen displays, one at 11:43:46 h, height 1,100 ft, and the other at 11:45:36 h, height 1,600 ft. In both displays the aircraft was only identified with code 1270.

Then there is a leg (B in the figure), which lasts until 12:14:21 h, in which the aircraft's identification includes the flight identifier N100BR and the height. During this leg B, the height, after reaching a maximum of 1,800 ft, was stabilized at 1,500 ft and the course was also stabilized at approximately 30°, direct to Bagur VOR.

The successive available radar displays indicate that, whilst it maintained its level and course, the aircraft had code 7000 up to 12:28:16 h (leg C) and it changed to code 6336 from 12:31:26 h onwards. The aircraft remained with this code until the last available detection by the civil radar of Barcelona ACC (leg D) at 12:55:24 h. At that moment the aircraft's position was 5 NM (9.27 km) to the SW of Bagur VOR, in direct flight to it, (approximately course 30°), altitude 1,500 ft and speed 175 kt.

From the last indicated time onwards, the available information is provided solely by the French military and rescue radars of the Lyon RCC (Rescue Control Centre) and the Mont Verdun, Lyon CDC (Control and Detection Centre) and was communicated respectively one and two days after the accident. The communicated detections by these radars are detailed in Figure B-2 (Appendix B) as represented over the Visual Flight Chart but they are also included in Figure B-1 (Appendix B), as legs E and F, respectively, so as to show the complete path. Leg G in this figure is the reconstruction of the path up to the point of the accident and has been prepared taking into account the predicted

search area starting point, as defined by the above CDC and detailed in Figure B-2 (Appendix B).

As can be seen in this figure, the information supplied by the Lyon RCC for leg E includes only an indication of time and position, with discrepancies in some detections relating to both time and position, possibly due to the fact that these data were taken from different radars, Narbonne and Lyon. In leg F there is an indication of time, course, ATC transponder code and geographical coordinates. In both legs the course is 340°, virtually heading to Perpignan in France. In the beginning of leg F the ATC code continues to be 6336 as allocated and ends up being 7000, a generic uncontrolled flight identifier (this VFR flight was uncontrolled) possibly awaiting for code allocation by the ATC services on entering a different region, Marseilles FIR.

1.9. Communications

The aircraft was equipped with a twin communications system, which was used by the pilot in a professional and normal way during the flight.

- It has not been possible to obtain information on communications with Ibiza airport Tower because of difficulties in the reading heads of the recording equipment which give access to the content of this information.
- The transcription of the aircraft's communications with Palma ACC provides information on its passage over point N of Ibiza at 11:52:08 h and that it was proceeding on its way to Bagur at 2,000 ft. After several clarifications, at 11:52:52 h authorization was received from the ACC indicating that it should maintain its height and that there was no reported traffic on that route.
- The following recorded communication is with Barcelona ACC, sector TMA SOUTH, at 12:53:19 h, in which the aircraft was identified, it indicates that it was approaching Bagur at 1,500 ft and requested authorization to proceed to Perpignan at 12:54:25 h. The Barcelona ACC sector indicated the pilot to be hold and, after 35 seconds for verifying that the Girona control tower had the flight file, it requested the pilot to contact the latter frequency 120.9 MHz, at 12:55:02 h. The last radio contact with Barcelona ACC was 22 seconds later to compare the frequency received for Girona and to say thank you. This communication coincides in time, 12:55:24 h, with the last radar display available at Barcelona ACC, as indicated in the foregoing paragraph.
- The aircraft did not establish radio contact with the Girona control tower, for unknown reasons.

1.10. Aerodrome information

Not applicable.

1.11. Flight recorders

The aircraft was not equipped with flight data or cockpit voice recorders, as they are not required for the type.

1.12. Wreckage and impact information

As stated, the orography of the site of the accident is characterized by steep slopes, close to or even in excess of 45%, which start at the plain on the south-facing side of the Pyrenees.

The wreckage was found in a wooded area with difficult access, at a height above sea level of 830 m (2,720 ft), in the situation and layout shown as ground plan and elevation in Figures C-1 and C-2 (Appendix C), respectively. These figures were prepared during the visual inspection of the site of the accident.

An examination of the wreckage and its distribution allows the accident's sequence to be reconstructed:

- The trace of the wreckage (Appendix C, Figure C-1) is orientated in a northerly direction.
- As can be seen in this figure, the aircraft first struck two trees situated almost perpendicular to the trace of the wreckage. The tree on the left, almost in the aircraft's path, appeared with the top cut off at a height of four metres and in the one on the right it left the aileron and tip of the wing on that side. Then the aircraft struck another two trees, also situated in a perpendicular plane to the trace. In this case, parts of the left wing and aileron and right wheel were found in the tree on the left whilst the tree on the right only suffered minor damage. Then the fuselage's impact against the ground can be seen, causing a not very deep hole and pulling a tree out by the roots.
- The main part of the wreckage, very burned, was located almost 15 m further ahead. In this area, first to the left, it was found the aircraft's tail, of which the vertical fin was not completely burned, followed by the main wreckage, including instrument panels, seats and cabin structure, all completely burned. Further ahead was the engine, which struck and came to rest in a tree in a vertical position. The propeller hub was broken, very close to the tree where the engine was found, with a blade cut off almost at the base, another wrapped around the tree and the third almost melted by the fire which broke out after the accident.
- The elevation view (Appendix C, Figure C-2) shows that the path maintained height with a small curve upwards in the crash, which is the reason why the impact was not direct with the propeller and the hole caused by the fuselage was not deep.

- The aircraft was virtually disintegrated. Given the damage to the aircraft, trees and adjoining areas, the conclusion can be drawn that the impact against the ground must have been at high speed. In spite of this, all the wreckage was found within an area of 30 × 10 m.

The after impact fire lasted until all the combustible material was consumed, including the resin in the «compound» material parts, and completed the aircraft's destruction, making many of the parts unrecognizable.

During the inspection of the wreckage it was verified that the main rocket of the aircraft recovery system's parachute had not been activated and was destroyed in the impact against the ground and, by the subsequent fire, but without producing a strong explosion.

1.13. Medical and pathological information

In the autopsy carried out on the aircraft's occupants, although the bodies were completely burned after the accident, it was confirmed that death was caused by traumatic shock and not by the inhalation of CO.

1.14. Fire

The aircraft's impact against the mountain was very violent, as a result of which fire broke out and lasted until all the aircraft's fuel had been consumed, also burning a small wooded area around the point of impact. The fire burned itself out and the aircraft was completely calcined, with the destruction of compound material parts and even melting of several metal parts.

1.15. Survival aspects

The alert phase (ALERFA) was declared by Reims FIR at 16:46:48 h and the corresponding distress phase (DETRESFA) at 17:07:13 h, giving rise to the deployment of Spanish and French search and rescue services.

The search was initiated the same day of the accident, 12th October, above the maritime area in the region of position 42° 00' N/003° 42' E, 36 NM to the east of the coast, according with the last radar position detected by Barcelona Control, including the areas to the north and east of Bagur and to south-east of France. The following day, 13th October, this area was changed based on the data provided by Lyon RCC to a land pass in the vicinity of the town of Rosas. Later on 14th October, the search area was more specifically defined as the pass between point 42° 22' N/003° 03' E and course 340° to

Perpignan, after receiving data from the Mont Verdun RCC, Lyon Control and Detection Centre (CDC). These positions did not appear in the Barcelona ARO radar recorded data from neither they were provided by any other Spanish radar system.

The notification on the 14th proved to be correct and the aircraft wreckage was located in the afternoon of that same day, confirming that the aircraft had been destroyed and calcined, and the occupants' bodies were found inside.

Neither the emergency locator transmitter of the aircraft nor that of the pilot watch were activated, possibly due to the fire, or, if any of them were activated, it was not for enough time to be detected by the COSPAS-SARSAT network satellite.

From the investigation of the aircraft wreckage, its distribution and the destruction suffered, it is considered that the possibilities for the aircraft's occupants to survive the accident were virtually non-existent. Moreover, these possibilities were negatively affected by the subsequent fire.

1.16. Tests and research

1.16.1. *Statements relating to the pilot*

Due to their interest for knowledge about the accident, it has been considered advisable to include in this report a summary of the statements of persons who had had some type of relationship with the pilot and could be relevant for the accident's investigation.

In the opinion of the Maintenance Manager of the Company which maintained the aircraft, its owner and pilot was a conscientious client, with whom there were no discrepancies in the performance of the necessary maintenance work. According to this statement, the pilot prepared his flights personally and was capable of cancelling them in case of doubt about adequate weather conditions. He confirmed that the pilot had made the same flight on several occasions, given the fact that he owned a house in Ibiza. He also indicated that he knew that in some of these flights he was accompanied by a flying instructor.

This fact was confirmed by the Instruction Supervisor of the flying school where the pilot learned to fly, indicating that he had accompanied him on five or six flights. This instructor declared that the pilot was instructed with Cessna C-152 and Piper Archer aircraft and had carried out courses to familiarize himself with the SR-22 model. He also described the pilot as a responsible person, with flying experience of 250-300 h, good navigation and GPS operation and that he used the aircraft more as a means of transportation rather than in recreational flights, which explains why he normally used the automatic pilot in his flights.

Another two friends who provided information indicated that the pilot was a businessman, he did not like taking risks and that, as a pilot, he was careful and reserved and never embarked upon doubtful maneuvers.

1.17. Organizational and management information

None of interest to the accident.

1.18. Additional information

Not relevant.

1.19. Useful or effective investigation techniques

No special techniques were used in the investigation into this accident.

2. ANALYSIS

2.1. Known facts

2.1.1. *Aircraft*

The aircraft was a SR-22 model manufactured by CIRRUS, duly certified in its country of origin (USA) and based at Bale-Mulhouse Airport in France.

The aircraft was new, of modern design and manufacture (it entered service in May 2002), with few flying hours (104.9 documented at 9th May 2003) and with maintenance carried out by a duly authorized company.

The aircraft's engine and propeller were the originals and, consequently, also new and with few operating hours.

On the other hand the aircraft was standard equipped with very complete avionics and systems, which were more than adequate for VFR flying.

2.1.2. *Pilot*

The pilot held a PPL(A) license, valid on the date of the accident, with ratings for single-engine landplanes and limited to VFR daytime visual flights.

The pilot's estimated maximum experience was 250-300 h, including instruction. His log book recorded only 90 h at 08-04-1999.

All the available statements and the evidences, such as detailed completion of the Flight Plan, performance of the same flight with an instructor on several occasions, extensive use of automatic pilot, etc., denote the careful and prudent character of the pilot, who seemed to avoid unnecessary risk taking.

However it is considered that the assignment of the left seat to an occupant, with the pilot taking the right seat, was a voluntary though incorrect concession on the pilot's part.

2.1.3. *Weather conditions*

As indicated in section 1.7, the weather conditions in general were adequate for VFR flying, although with due precautions and safety margins in the area over the Pyrenees and, specifically, the Montes Alberes mountains, where, according to the forecasts, the sky was overcast, visibility was poor and there were light southerly winds, which were darkening the mountains. This circumstance was corroborated by a witness in the area.

Everything appears to indicate that, given his characteristics and the information available at the departure airport's meteorological office counter, the pilot was aware of these forecasts when he prepared his Flight Plan.

2.1.4. *Sequence of the flight*

The accident occurred during the flight being conducted by the aircraft on 12th October 2003 from Ibiza Airport to Bale/Mulhouse Airport.

The flight was made following the Flight Plan provisions, with the exception of takeoff which occurred with a 40-minute delay for unknown reasons, not considered to be relevant. The flight was a non-commercial recreational flight, under VFR rules, with four occupants on board, including the pilot.

As can be seen in the radar recorded path (Appendix B, Figure B-1), the first part of the flight, legs A to D in the figure, was carried out at an altitude of 1,500 ft, in spite of authorization from control via radio at 11:52:52 h for a flying altitude of 2,000 ft and an approximate speed of 170-175 kt. The figure also shows that, during this part of the flight, the height and course varied until the 30° direct path to Bagur VOR was adopted. From that moment onwards they were held practically constant. These constant flight parameters confirm the use of automatic pilot, a common practice on the pilot's part, as already indicated.

The aircraft's last radar detection by Barcelona ACC, which has been made available, occurred at 12:55:24 h, when the aircraft was 9.5 km to the SW of Bagur VOR. At the indicated time, the aircraft's last radio contact with Spanish centres also occurred. In this contact, the Barcelona TMA SOUTH sector indicated to the aircraft that it should contact the Girona Tower for permission to change its course direct to Perpignan, as it had been requested. The aircraft did not make this connection.

Subsequent to the accident, it was found that the aircraft was detected by French radars up to 13:08 h (Appendix B, Figures B-1 and B-2, legs E and F). In these detections, it is noted that the aircraft changed its code from 6336, which it had maintained during the flight, to 7000, probably in preparation for the change of traffic control region and, also, it changed its course to 340°, heading for Perpignan, as it had previously requested. There is no record of any radio contact with French control centres. The information exchanged during the search for the aircraft led to the understanding that there had been no radio contact.

The accident occurred in the prolongation of the indicated route and a little after the last moment referred to, 13:08 h. Given the distance from the radar recorded position to the site of the wreckage, it is estimated that the accident occurred at 13:10 h.

The representation of the radar track of this part of the flight on the Visual Flight Chart (Appendix B, Figure B-2) leads to the conclusion that this part was also conducted using the automatic pilot, at least to maintain the course.

The flight's vertical profile in this part is not accurately known because the available information does not contain an indication of the altitude. Based on the known data, at the beginning of this part of the flight it maintained a level of 1,500 ft, and the accident occurred at a height above sea level of 830 m (2,720 ft), as already indicated. As indicated in the Visual Chart in Figure B-2 (Appendix B), the required safety flying level according to the area minimum altitude in the accident area was 4,500 ft, precisely due to the existence of a 4,124 ft high mountain in the vicinity of the site of the accident.

At no time either before, during or after the indicated radio contacts did the aircraft communicate any malfunctions or faults in any system neither did it performed any maneuvers that could lead to believe that they existed.

In the inspection of the wreckage carried out at the site of the accident, the aircraft was found to be completely destroyed, burned by the fire which broke out during the accident, and with the four occupants dead inside. The pilot body was in the front right seat.

2.2. Considerations relating to the accident

Given the aircraft's modern design and construction, its low number of flight hours and the non-existence of any alert signals from it throughout the flight, it is considered that there was no malfunction or fault during the time that elapsed between the aircraft's last complete identification at 12:55:24 h and 13:10 h, the estimated moment of the impact. In making the foregoing statement, the fact that during that time interval there were several radar detections of the aircraft, which did not give rise to the suspicion of any problems either, has also been taken into account.

The aircraft's position indication close to Bagur, communicated in the radio contact at 12:53:19 h, was correct. This means that navigation signals, the initial data and their interpretation by the crew was also correct, at least until that moment. As indicated above, the change to a direct route to Perpignan was carried out correctly, irrespective of whether it was manual or using the automatic pilot. The route flown in the last part of the flight would have passed directly over this city. Consequently, it is to be assumed that the navigation system continued functioning correctly up to the moment of the accident.

The flight path obtained from radar data clearly reflects the pilot's criterion of using the flight as a means of travel because it includes only the takeoff manoeuvre until adopting the course to Bagur, then keeping this course at a constant level of 1,500 ft and, practically above Bagur VOR, and finally changing its course direct to Perpignan. From

what can be observed in Figures B-1 and B-2 (Appendix B), at all times the aircraft followed the correct and most direct path to Perpignan. Knowing what has been said about the pilot, it is considered that most likely he was using the automatic pilot throughout the flight and this situation probably did not change until the accident, at least as regards to hold the course.

The accident occurred at a height above sea level of 830 m (2,720 ft), in a mountainous area, the height of which increases rapidly in the direction of the flight and for several kilometers after the site of the accident. On the day of the accident this area was covered by clouds which reduced visibility and darkened the mountains. According to the Visual Flight Chart (Appendix B, Figure B-2), the safety flight level required in the area, particularly with reduced visibility as was the case, would be 4,500 ft. Neither the moment at which the aircraft started to climb from its flying altitude above sea level of 1,500 ft nor the rate at which it was carried out are known.

The visual inspection of the wreckage shows that the aircraft was destroyed in the accident. The wreckage was found in a small area and distributed in such a way that it indicated that the aircraft had crashed directly against the mountain, at high speed and with an attitude that, except for a last-minute correction, could indicate a slight climb. The fact that the right wheel was to the left of the accident trace indicates that the impact with the first tree varied the flight path from 340° N to the northerly direction followed by the wreckage trail.

From the foregoing, the conclusion can be drawn that the accident was a direct impact against a mountain in controlled flight, produced as a result of not achieving the flight level required in the Visual Flight Chart, in an area with reduced visibility and darkening of the mountains.

2.3. Considerations relating to the search and rescue

Although in general the search and location of wreckage activities do not have any bearing on the accident itself, their influence on the survival of occupants and even of the aircraft is undeniable, hence the need for their rapid commencement and good progress.

In the case of this accident, there is a combination of numerous circumstances deemed to be relevant and, although already indicated in the report, it is considered that they must be highlighted in this final analysis.

- On the day of the accident, the alert (ALERFA) and distress (DETRESFA) phases were declared by Reims control almost within the regulated time periods, at 16:46:48 and 17:07:13 h, respectively. The Spanish and French search and rescue services were activated immediately.

- The search commenced at the coordinates 42° 00' N/003° 42' E, 36 NM to the east of the coast, based on the aircraft's last radar track positions notified by Barcelona Control to the RCC.
- On the following day the search area was modified to the vicinity of the town of Rosas, according to the radar track data provided by CDC Lyon.
- The next day, 14th October, after no success, the search area was again modified in accordance with the new data provided by CDC Mont Verdun. The wreckage was located in this area at 17:45 h (local time).
- The data recording of Barcelona ARO did not reveal neither the positions of CDC Lyon nor the aircraft responding in code 7000 to Barcelona control.
- At the same time, it was noted that the aircraft, after radio contact at 12:53:19 h with Barcelona TMA SOUTH sector, did not communicate with the Girona Tower, possibly considering that it was outside this CTR (see limit in Appendix B, Figure B-2) and that contact with TMA SOUTH had not been decisive, after keeping the pilot on hold for 25 seconds to finish by indicating him a new frequency for a new contact and the border's proximity.

3. CONCLUSION

3.1. Findings

- The pilot held a valid Private Pilot (Aeroplane) License and was rated for the type of aircraft and flight being performed.
- The aircraft had the documentation which guaranteed its airworthiness on the date of the accident, it was being operated within authorized limits and satisfactory maintenance inspections had been made to it within the specified time periods.
- The carefully filled Flight Plan had been presented and distributed.
- The weather conditions in the departure airport were good for VFR flights. Similarly, meteorological information and forecasts for the route and destination were available.
- The weather conditions in the Montes Alberes mountains, the site of the accident, were overcast skies, low visibility and a cloud base below the tops of the mountains.
- The flight proceeded without incident, until radar and radio contact with Spanish air control was lost when the aircraft was close to Bagur in Girona.
- After this position, the aircraft, without receiving confirmation of its request for a change of course, proceed heading for Perpignan. This information was supplied by the French rescue services the day after the accident and was fundamental for the search and successful location of the wreckage.
- The aircraft crashed directly against a mountain, darkened by clouds, at a height above sea level of 830 m (2,720 ft), without having reached the area minimum altitude that it was of 4,500 ft, published in the Visual Flight Chart. It is possible that poor visibility prevented the height above ground from being estimated correctly. This circumstance may have affected the pilot even more because he was occupying the right-hand seat, which is not the customary position.
- As a result of the impact, the aircraft was completely destroyed and fire broke out which burned it completely. The four occupants perished.

3.2. Causes

It is considered that the accident was caused by the aircraft not reaching sufficient height to fly over the mountains, the tops of which were hidden by the clouds that existed in the area. The pilot continued the visual flight although instrument meteorological conditions prevailed. The impact was direct against the side of the mountain.

4. SAFETY RECOMMENDATIONS

Records exist in Spain of incidents in which information on the communications maintained between the aircraft and the air transit control services was not available. This circumstance was the subject of the following safety recommendation, issued as a consequence of the incident which occurred in Cuatro Vientos Airport (Ref. CIAIAC, IN-015/2003):

«REC 36/03. It is recommended to AENA, through its Air Traffic Control Division, that necessary measures are adopted to guarantee that the recordings of communications in air traffic control frequencies are adequately preserved at Cuatro Vientos Airport, whenever an incident or air accident occurs or there is a suspicion of its occurrence.»

This present case shows similar deficiencies in Ibiza airport to those which gave rise to the above recommendation for Cuatro Vientos, as regards the conservation of the recording of communications. Therefore, it would seem advisable that the scope of the corrective activities to be undertaken so as to guarantee the availability of this type of information should be extended to all airports. Consequently, the following safety recommendation is formulated:

REC 01/06. It is recommended to AENA that it adopt the necessary measures in order to guarantee the availability of radio recordings in the control towers of all the airports where this air traffic service is supplied whenever an incident or air accident occurs or there is a suspicion of its occurrence.

APPENDICES

APPENDIX A
Site of the accident
and aircraft view



Figure A-1. Geographical location of the accident



Figure A-2. *Aircraft Cirrus SR-22*

APPENDIX B

Flight path



Figure B-1. Path according to radar data



Figure B-2. Path amplified with rescue radar detections

APPENDIX C

Wreckage location

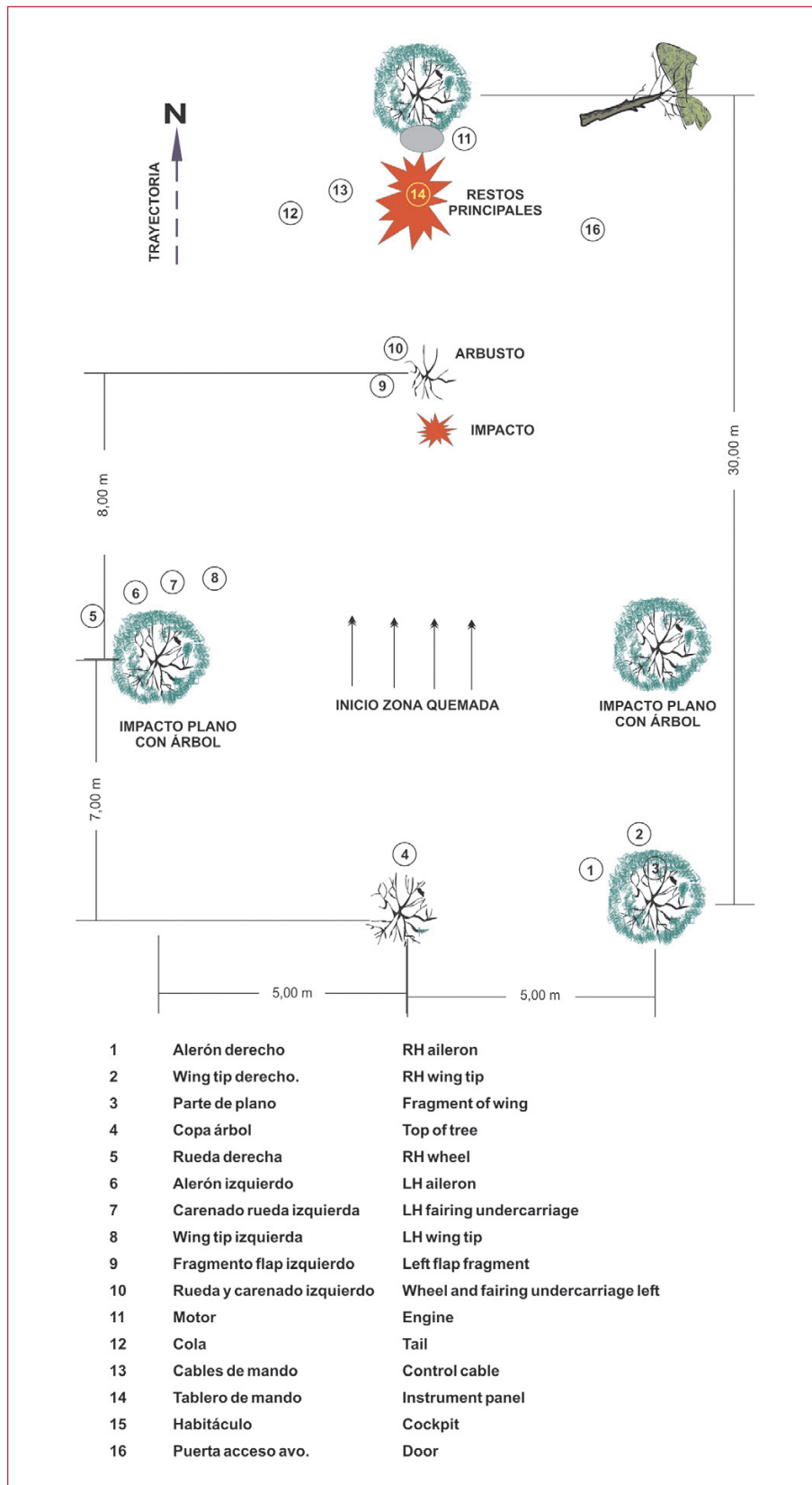


Figure C-1. *Distribution of wreckage (ground plan view)*

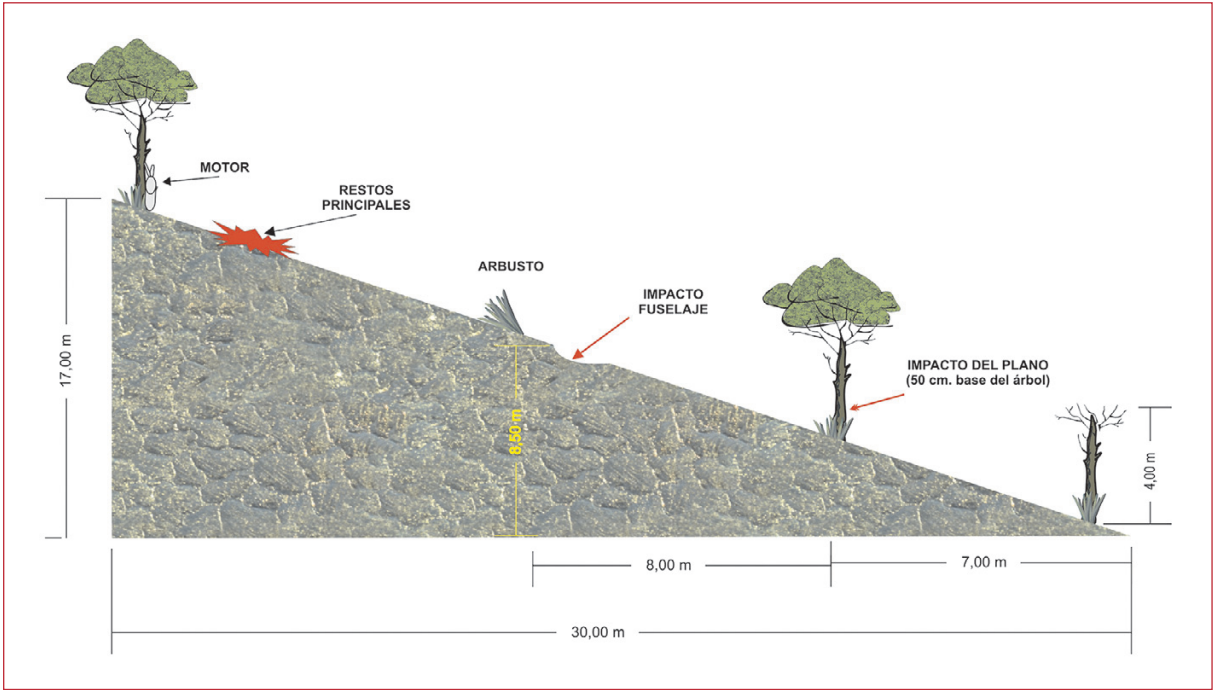


Figure C-2. Distribution of wreckage (elevation view)