

CIAIAC

COMISIÓN DE
INVESTIGACIÓN
DE **A**CCIDENTES
E **I**NCIDENTES DE
AVIACIÓN **C**VIL

Report A-001/2004

Accident to glider Glaser Dirks
DG-600, registration EC-FIZ,
in Otero de Herreros (Segovia)
on January 2, 2004



MINISTERIO
DE FOMENTO

Report

A-001/2004

**Accident to glider Glaser Dirks DG-600,
registration EC-FIZ, in Otero de Herreros
(Segovia) on January 2, 2004**



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

NIPO: 161-06-009-6
Depósito legal: M. 47.617-2006
Imprime: Diseño Gráfico AM2000

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 and its causes and consequences.

In accordance with the provisions of Law 21/2003 and pursuant to Annex 13 of the International Civil Aviation Convention, the investigation is of exclusively a technical nature, and its objective is not the 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. This English translation is provided for information purposes only.

Table of contents

Abbreviations	vii
Synopsis	ix
1. Factual information	1
1.1. History of the flight	1
1.2. Injuries to persons	1
1.3. Damage to aircraft	1
1.4. Other damage	1
1.5. Personnel information	2
1.5.1. Captain	2
1.6. Aircraft information	2
1.6.1. Airframe	2
1.6.2. Airworthiness certificate	2
1.6.3. Maintenance record	3
1.7. Meteorological information	3
1.8. Aids to navigation	3
1.9. Communications	3
1.10. Aerodrome information	3
1.11. Flight recorders	4
1.12. Wreckage and impact information	6
1.13. Medical and pathological information	7
1.14. Fire	7
1.15. Survival aspects	7
1.16. Tests and research	8
1.16.1. Inspection of the wreckage of the aircraft and signs of impact on the ground.	8
1.16.2. Other data of interest	8
1.17. Organizational and management information	9
1.18. Additional information	9
1.18.1. Installation of emergency locator transmitter for general aviation operations ..	9
1.18.2. Statements of witnesses	10
1.18.3. Considerations regarding the slope flight	10
1.19. Useful or effective techniques of investigation	11
2. Analysis	13
2.1. History of the flight	13
2.2. Discussion of the operation and human factors	14
2.3. Survival	14
3. Conclusion	17
3.1. Findings	17
3.2. Causes	17

4. Safety recommendations 19

Appendices 21

 Appendix A. Vertical profile of the flight obtained from the GPS on board 23

 Appendix B. Geographical location of the accident site 27

 Appendix C. Sketches of the aircraft wreckage 31

 Appendix D. Photographs 35

Abbreviations

00° 00' 00"	Degrees, minutes, seconds
cm	Centimeters
DGAC	Dirección General de Aviación Civil (Spanish Aeronautical Authorities)
ELT/ELBA	Emergency beacon for the location of aircraft / Emergency Locator Transmitter
GPS	Global positioning system
hh:mm:	Hours, minutes
ICAO	International Civil Aviation Organization
kg	Kilogram(s)
km	Kilometer(s)
km/h	Kilometers per hour
kt	Knot(s)
m	Meter(s)
MTOW	Maximum take off weight
N	North
NW	Northwest
SAR	Search and rescue service
UTC	Coordinated universal time
VFR	Visual Flight Rules
W	West

Synopsis

Owner and Operator:	Private
Aircraft:	Glaser Dirks DG-600 Glider with Registration Mark EC-FIZ
Date and time of the accident:	January, 2 nd 2004 after 17:30 local time
Place of the accident:	The Sierra del Quintanar Mountains; Village of Otero de Herreros (Segovia)
Persons on board:	1
Type of flight:	General aviation. Private
Date of approval:	29 November 2006

Summary of the accident

On January 2nd, 2004, after 17:00 local time, the Glaser Dirks DG-600 glider with registration mark EC-FIZ, took off with a pilot on board, towed by an aircraft, in order to perform a slope flight with an expected flight time of less than one hour.

The glider was released right above the village of Otero de Herreros at an approximate altitude of 700 meters, and the glider headed towards the area known as Hoya de Otero, located in the mountains of Sierra del Quintanar, which was covered by clouds ranging from 600 to 700 meters above ground level.

At approximately 17:30, the glider reached the westernmost point of Hoya de Otero, penetrating into the clouds covering it. This is where the accident took place, the glider impacting into the ground, resulting in the pilot's death.

The cause of the accident can be attributed to the lack of visibility and the subsequent loss of visual references by the pilot.

1. FACTUAL INFORMATION

1.1. History of the flight

On January 2nd, 2004, after 17:00¹ local time, the Glaser Dirks DG-600 glider, with registration mark EC-FIZ, took off from the Aerodrome of Fuentemilanos using runway 34, with one pilot at the controls, being towed by a powered aircraft, until reaching an altitude of approximately 700 meters above aerodrome level, and was released over Otero de Herreros (Segovia). Once the tow rope was released, the aircraft headed Southeast, towards Hoya de Otero, located in the Sierra del Quintanar mountains, where it was expected to perform a slope flight with an expected flight time of less than one hour.

Once the expected flight time was over with no news of the aircraft, search procedures were initiated from the Aerodrome of Fuentemilanos, without any successful results until the early evening hours of January 4th.

The communications held during the towing stage were normal at all times, and the glider's pilot did not report any problem or failure.

The meteorological conditions reported by the crew in the tug aircraft mentioned a layer of clouds at the top of the mountain with a ceiling between 600 and 700 meters above aerodrome level and a northerly wind of 10 knots.

1.2. Injuries to persons

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

1.3. Damage to aircraft

The aircraft was completely destroyed by the impact against the mountain.

1.4. Other damage

No important damages are noted in the vegetation of the area, which consists of small bushes 1 to 2 meters high.

¹ Time reference in this report is local time unless otherwise stated. It is necessary to subtract one hour to obtain the UTC time.

1.5. Personnel information

1.5.1. Captain

Age:	44 years
Nationality:	Spanish
Title:	Glider pilot
Date of issuance:	16-12-1996
Renewal date:	21-11-2003
Expiry date:	04-11-2004
Total flight hours:	772:19
Flight hours on the type:	64:39

His last flight before the accident was on October 4th, 2003.

1.6. Aircraft information

1.6.1. Airframe

Make:	Glaser Dirks
Model:	DG-600
Construction Number:	6-80-S
Registration Mark:	EC-FIZ
MTOW:	525 kg
Owner:	Private
Operator:	Private

1.6.2. Airworthiness certificate

Number:	3350
Class:	Normal
Use:	Private
Technical performances:	— Semi-acrobatic — Aircraft suitable only for VFR
Issue date:	08-01-1992
Expiry date:	13-05-2004

1.6.3. *Maintenance record*

Total flight hours: 742:03
Last annual revision: 30-04-2003
Hours from last annual revision: 633

1.7. **Meteorological information**

According to statements by ground witnesses and the pilot of the tug aircraft, the meteorological conditions in the area of the accident on the afternoon when it took place, consisted of orographic clouds located in the North easternmost mountain side at between 1,600 and 1,700 meters of altitude. The base of the clouds was fluctuating along the hillside within the range of the aforementioned altitude depending on the relative humidity of the incoming airflow. The wind was blowing Northwest at an estimated speed of 10 kt at ground level, and between 15 and 20 kt at high altitude, without wind gusts.

1.8. **Aids to navigation**

Not applicable.

1.9. **Communications**

The communications held during the towing stage were consistent with this type of flight, without any indication of abnormalities.

After cutting off communication with the tug aircraft, the pilot of the glider did not establish radio communications with any station on ground or air.

1.10. **Aerodrome information**

The aircraft took off from the Aerodrome of Fuentemilanos, located at 1,000 meters of altitude and 8 km Northeast of Otero de Herreros.

This Aerodrome was the regular base of the glider. The pilots that use this aerodrome frequently are very familiar with Hoya de Otero, and they know that it is one of the nearest hillsides to go to and come back from easily, and also offers the best conditions for slope flights with Western wind.

1.11. Flight recorders

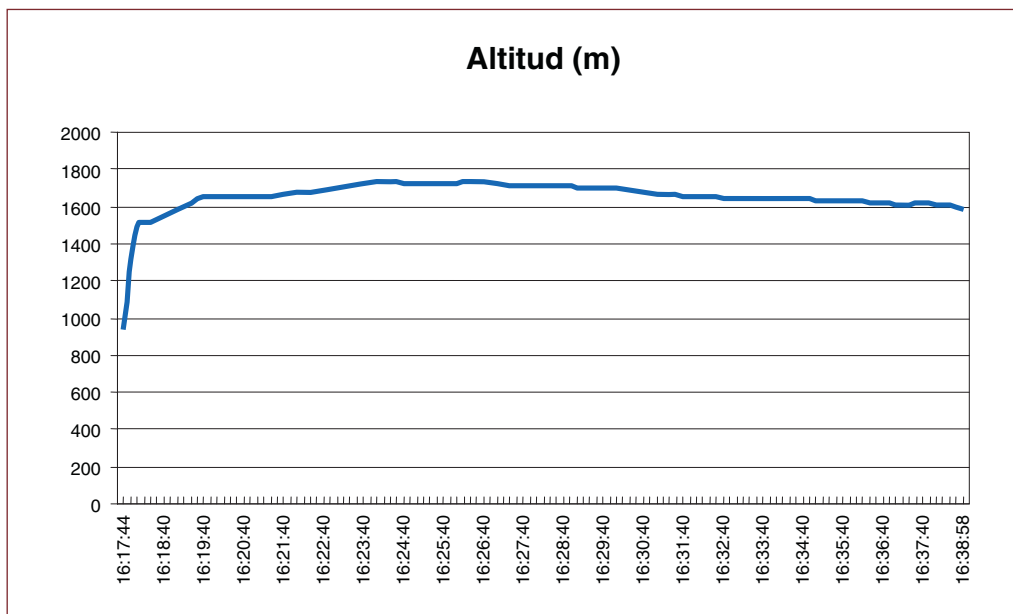
The aircraft had a Flight Data Recorder GPS Zander GP 940 installed, used in gliders to record time and position data that are of interest in gliding competitions and for the analysis of the flight by the pilot himself. This recorder was connected to a gliding calculator mechanism, the primary navigational instrument, integrated into the instrument panel, Zander SR 940.

Due to the apparently good condition of the GP 940 recorder, an attempt at data recovery was carried out by connecting it to a computer using the appropriate cable and software. The attempt did not succeed.

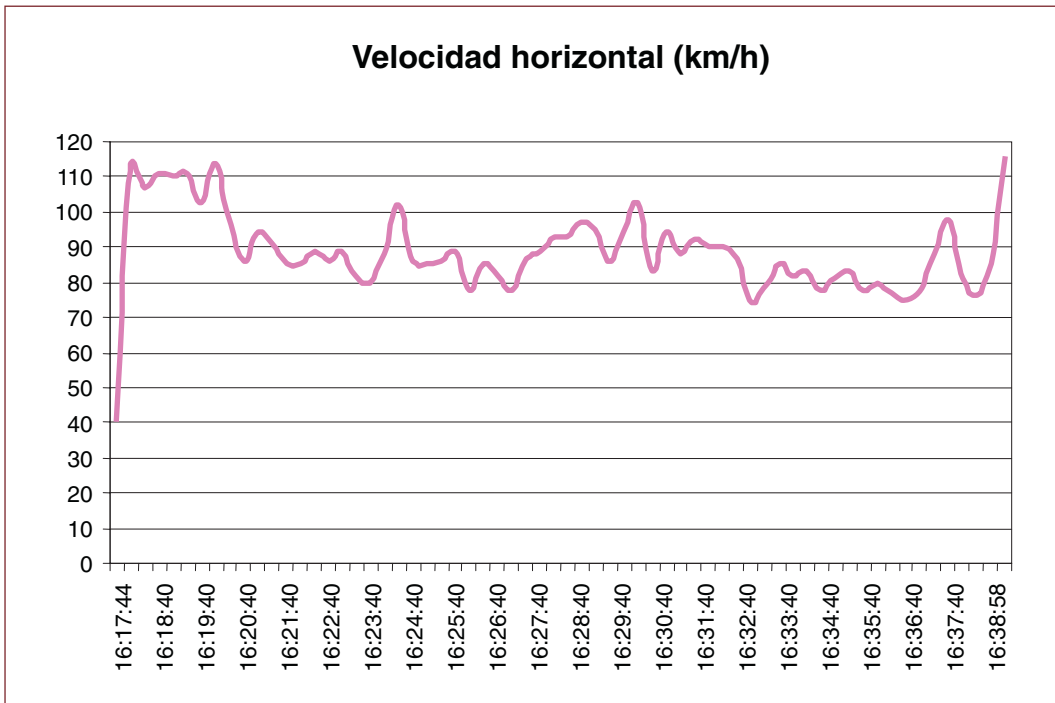
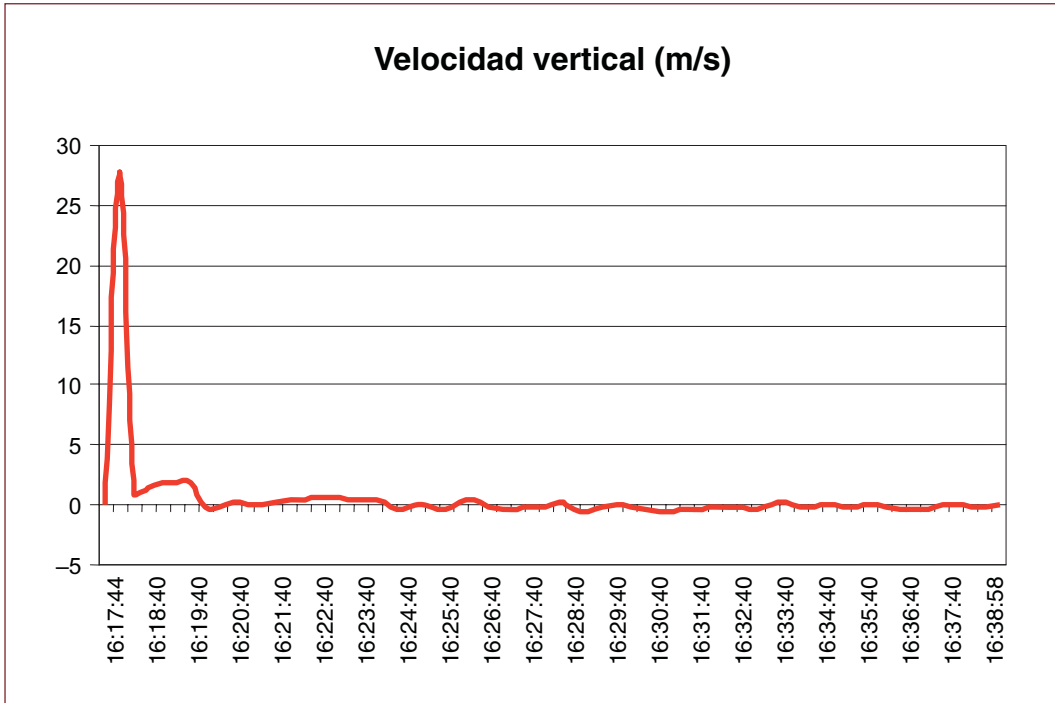
As there was a chance that some flight data was still recorded in one of the two recorders, mainly in the SR 940 given the fact that it shares the same power source as the rest of the instruments, they were both sent to the German Aircraft Accident Investigation Bureau (BFU), the State of the glider's manufacture.

Successful data recovery from the GP940 corresponding to 34 flights was completed in the laboratories of the BFU, but the last record corresponded to a flight made on December 14th, 2003. Nevertheless, at the end of those recorded flights, a great amount of unrelated and unrecognizable data appeared which the software was unable to read. As there was a possibility that this data might correspond to the last flight, the flight of the accident, support was obtained by Zander, the manufacturer of the equipment, in order to interpret it.

On the other hand, the data corresponding to the last 8 flights stored in the calculator SR 940 was recovered, and the date of the last flight registered was the accident flight on 2 January 2004.



Both devices, GP 940 (logger) and SR 940 (calculator), operate in combination with each other. The logger obtains and stores the position data from the GPS and at the same time sends them to the calculator, where the indicated airspeed, barometric altitude and vertical speed are also registered, taken from other instruments of the aircraft. This set of data is recorded in the calculator SR940 every 20 seconds.



It was confirmed that during the flight in question the logger GP 940 was not connected, i.e. the switch had not been actioned, and as a result there was no data recorded in the logger corresponding to the flight, as the calculator SR 940 had not received any position data. However, the information from the last flight stored in the calculator was available.

This data provides an indication of the vertical profile of the flight by means of the barometric altitude and the recorded time (UTC reference), because, lacking the position, the trajectory cannot be obtained. The values of indicated (horizontal) speed and vertical speed are also useful. In Appendix A the vertical profile of the flight appears again and in greater scale, obtained from the data of the SR 940 calculator.

1.12. Wreckage and impact information

The accident site is located in the area of Otero de Herreros (Segovia), on the Northwest slope of the Sierra del Quintanar mountains, on the side facing west, in a place usually known as Peña del Hombre or Peñalombre.

The wreckage was found on the hillside aforementioned, which features a gradient of about 18 to 20 degrees, situated at 1,560 m of altitude, scattered over a 40-meter area.

Appendix C contains a sketch showing the location of the wreckage and the signs of damage to the hillside.

At the base of the hillside (zone A according to the sketch of Appendix C) the detachable wing tip of the right wing was found, the track left by its impact in the ground and the path cut in the bushes by the right wing was at an angle of about 45 to 50° relative to the horizon.

Moving uphill, 15 m away approximately (zone B according to the sketch of Appendix C) and in a crater about 50 cm deep, the lower surface skin of the entire right wing appeared, incrustated in the ground. This skin, made of carbon fibre and fibre glass, had joined together a part of the spar, made also of carbon fibre and fibre glass. A little to the right of this point pieces of the canopy of the cabin and some other small pieces of the fuselage's outer skin were found

Moving further uphill, approximately 15 m away (zone C according to the sketch in Appendix C) the main wreckage of the glider was found. The fuselage, with the left wing still attached, was located in a position almost opposite the crash line. The front part of the glider (nose and cabin) was separated from the rest and so was the T-tail, whose horizontal stabilizer was underneath it. The right wing was separated from the fuselage, in an upside down position and located to the right of the fuselage.

In the area between the right wing's skin and the main wreckage, to the right of it, the following were found: a piece of the right wing root fairing; a piece of the right wing spar fairing ; the front part of the frame of the canopy, and the wing tip of the left wing.

Based upon the observations at the accident site it can be deduced that initially the glider touched down with the tip of the right wing, then hit frontally about 15 meters further uphill, as most of the wreckage came to rest together an additional 15 meters beyond the primary point of impact.

The orography of the area, the signs of impact and the distribution of the wreckage indicate that the aircraft was flying at the moment of impact under the following conditions:

- Flight path apparently straight, horizontal or slightly climbing and directed towards the hillside.
- The glider was in a steep roll to the right, of about 45 to 50°, and the distribution of the wreckage indicates that it was not carrying out a turn to the right.

1.13. Medical and pathological information

The pilot died as a result of the impact into the terrain. His body was found inside the aircraft

1.14. Fire

No fire broke out.

1.15. Survival aspects

Given the characteristics of the impact, there was no possibility of survival for the pilot of the aircraft, whose remains were found at 15:15 on January 4th, two days after the beginning of the search, in which patrols of the Guardia Civil (Civil Guard) police force participated in collaboration with a helicopter, aeroplanes of the SAR and other aeroplanes coming from the Aerodrome of Fuentemilanos.

This search was hindered due to the lack of an emergency locator transmitter (ELT/ELBA) in the glider, which would have helped locate the wreckage earlier. The roughness of the terrain and the adverse meteorological conditions, which had covered the hillsides where the search took place in clouds, made it impossible to locate the wreckage of the glider until two days after the accident.

1.16. Tests and research

1.16.1. *Inspection of the wreckage of the aircraft and signs of impact on the ground*

The detachable wing tip of the right wing was severed from its holding point due to an upward bending. Near it a bush was found with an upward cut shaped in a plane of about 45-50° relative to the horizon. At the lowest point of the plane cut by the crash, on the ground appeared a line about 5 cm deep and 40 cm long (see Appendix B).

Approximately 15 m above the previous track, a hole was found about 1.5 m in diameter and about 50 cm deep with an uphill direction of impact, inside of which the skin of the right wing was incrustated by its fairing, extending itself in a downhill direction.

To the right of this hole pieces of polycarbonate from the cabin canopy were scattered up to a distance of about 5, with an angle of dispersion of 60° from the line of the tracks.

The central fuselage was found split in pieces due to an upward bending from the rear part of the cabin, showing breakage by compression in the upper part and tension in the area facing the ground.

The nose was almost undamaged along approximately 1 m, with marks from the contact with the ground but still maintaining its shape. From this distance backwards the cabin was totally deformed due to an upward bending and the cockpit had been reduced in volume by more than half.

The right wing spar was broken near the root and the lower skin was missing because it had ended up in another area of the accident site. The airbrake was deployed and deformed due to the second impact, although it is very likely that the deployment was a result of its detachment from the control lever.

The fittings of the safety belt failed due to the detachment of the surrounding structure, which came apart along with the fuselage in the cabin area. The buckles did not fail, because it is known that they remained unbuckled after the wreckage was located.

In the inspection of the flight control systems there is no indication of any mechanical failure.

1.16.2. *Other data of interest*

From the statement of the pilot's brother, who is also a glider pilot and co-owner of the aircraft, the following information was gathered:

- Aircraft.** The crashed aircraft had been acquired in May 2003, in order to replace the one they previously owned, an ASW-19 glider with a 15 m wingspan, smaller than the new one that had a wingspan of 17.5 m and better flight performances. It had a Maintenance Program with annual review and/or 200 flight hours, having had the last one in April of 2003. Before the last flight they made a thorough pre-flight inspection.
- Pilot.** The pilot had some 700 flight hours of experience, most of which were flown in the ASW-19 glider. He had not flown since October.
- Flights.** Most of the pilots that perform slope flight taking off from the Aerodrome of Fuentemilanos, normally practice it in Hoya de Otero, which is the nearest hillside. To return from that area, 500 m of ground clearance are sufficient, or even less if the entry is direct and there is no entrance into the circuit around the Aerodrome. The cloud ceiling usually varies along the hillside when climbing and descending and therefore it is possible to enter a cloud unexpectedly, in which case one should get out of it immediately by using the airbrake and pitching the nose down quickly. When flying very close to the hillside and getting into clouds one may become disoriented.

1.17. Organizational and management information

Not applicable.

1.18. Additional information

1.18.1. *Installation of emergency locator transmitter for general aviation operations*

By the date of the event, January of 2004, Part II of Annex 6 of OACI, applicable to the operations of international general aviation with aeroplanes, paragraph 6.12.1 indicates that all aeroplanes operated in long flights over water and when operated over designated terrestrial remote areas, will be equipped with an ELT beacon. In addition, this emergency radio beacon will be automatic for all the aeroplanes starting 1 January 2005 (paragraph 6.12.3) and for aeroplanes with their first certificate of airworthiness issued after 1 January 2002 (paragraph 6.12.2). As a recommendation, paragraph 6.12.4 indicates that all aeroplanes should carry an ELT.

The definition of aeroplane that is given in Annex 6 itself is a powered fixed-wing aircraft engine powered; therefore this Annex is not applicable to gliders. The description that Annex 6 makes of the designated terrestrial remote areas (paragraph 6.4) is

focused on areas in which search and rescue tasks would be very difficult to undertake.

The DGAC issued on October 24th, 1995, a Resolution on updated safety equipment for the operation of imported aircraft", stating in item 5. b), that in operations of general aviation, making long flights over water or over designated terrestrial areas in which search and rescue would be difficult. According to the corresponding definitions in Part II of Annex 6 of ICAO, nobody shall be allowed to operate any aeroplane imported after the date of the aforementioned Resolution unless equipped with an (1) Emergency Locator Transmitter (ELT). No additional obligation or requirement for general aviation aircraft to be equipped with emergency radio beacons exists in the Reglamento de la Circulación Aérea (RCA). Also, in the Spanish AIP, part ENR 2,1, there are not designated areas where carrying an Emergency Locator Transmitter (ELT) is required.

Even though the price of ELT suitable for general aviation is decreasing and it would represent an obvious advantage for the search in the event of an accident, it seems there is no consensus in the sector about the convenience of requiring its installation.

1.18.2. *Statements of witnesses*

A witness, who lives in the area of Otero de Herreros, declared that at about 17:15 h, together with another person, he heard a noise in the street which appeared to be coming from a glider flying through the air, and saw afterwards that there was a glider in the area, which seemed strange to him because it was a foggy day.

While driving with his companion, they continued to observe the flight path of the glider, for an estimated time of 5 to 10 minutes. The glider, at about 17:30, made a wide turn to the left towards Los Angeles of San Rafael and then suddenly modified its flight path 45° straight towards the fog that was coming down from the mountain, then entering into the cloud, a fact that made them both comment about the danger of such a manoeuvre.

1.18.3. *Considerations regarding the slope flight*

In slope flights, the glider takes advantage of the lift produced air masses that hit the side of a mountain with a certain speed, creating uplift currents.

The slope flight is usually performed following the entirety of the hillside, turning 180° in order to return by the inverse path, tracing "figure eights" and gaining altitude. It is not advisable to get too close to the hillside because turbulence and irregular air flow can be encountered.

In Appendix B the theoretical path of the slope flight in Hoya de Otero appears along with the likely one actually followed by the affected aircraft according to the witnesses' statements.

1.19. Useful or effective techniques of investigation

Not applicable.

2. ANALYSIS

2.1. History of the flight

On January 2nd, 2004 and according to the statements of the people close to him, the pilot made a thorough pre-flight inspection of the glider DG-600, with registration marks EC-FIZ, after 17:00 h, and he then proceeded with the takeoff, being towed by a powered aircraft until directly above of the town of Otero de Herreros, where the tow rope was released at an altitude of about 700 m above ground (1,700 m above sea level). Once the glider was flying alone it headed South East, towards Hoya de Otero.

At about 17:15, according to the statements gathered, the glider was located above Otero de Herreros. The takeoff took place after 17:00 using runway 34 and thus they had to turn almost 180° in order to head towards Otero de Herreros, which is located about 8 km away from the Aerodrome, and climb some 700 m. This operation usually takes about 10 or 12 minutes to be completed and accords with the witness who declares having seen it from a street in that area at about 17:15 h. He also indicated that he heard the noise of a glider flying through the air and that it was flying very high. These two declarations are contradictory since flying very high makes it harder to hear the slight sound produced by the glider. Probably what the witness heard was the noise of the engine of the tug aircraft and when he saw the glider he associated both of them.

From 17:15 h, the time of the release, to 17:30 h, the time when the glider was seen for the last time, the glider could have covered between 20 and 25 km in a flight whose likely path has been sketched in Appendix B.

The recovered data from the GPS on board indicate that the glider was taxiing for take off at 40 km/h at 16:17 h UTC, according to the indication of the clock integrated in the equipment. The duration of the towing was between 2 and 3 minutes according to the altitude and indicated airspeed readings, and was finished at 16:19 UTC at an altitude of 1,600 meters. However, according to indications by the pilot of the towing aeroplane, the duration of the glider tow was probably longer, since the arrival at Otero from the aerodrome at a maximum speed of about 110 km/h would require 4:30 minutes at least. For that reason it is estimated that the towing finished when the glider reached an altitude of 1,700 meters (700 meters of height above aerodrome), that is to say, approximately the maximum altitude of the vertical profile of the flight, at 16:24 h UTC, which implies a tow duration of 7 minutes.

The maximum altitude reached by the glider exceeded slightly 1,700 meters (1,730 meters) and was maintained for approximately 3 minutes. From 16:27 h UTC the glider was descending very smoothly until almost 16:39 h UTC when the data recording was interrupted. It is believed that the impact against the ground took place 20 seconds later. The glider then had an altitude of 1,600 meters, which was more than

enough to reach the aerodrome, so altitude and getting uplift currents to keep flying was not a problem.

It is observed in the indicated speed graph that this is quite stable, kept between 75 and 100 km /h. However, in the last two recorded data increasing values are registered with a trend towards 120 km/h, which indicates a significant increase in speed during the last minute of the flight.

It can be deduced that the flight path of the glider, once this was released above Otero de Herreros, first headed Southeast, followed by a wide turn to the left and an immediate entrance to Hoya de Otero to begin the slope flight, flying along the hillside once, and continuing with a course towards the West, next making a wide curve towards the SW, followed by a 45° turn in order to come back to Hoya. The witness who was driving along the road saw this last part of the flight path for a few minutes until it disappeared between the clouds, and permanently disappeared from sight.

2.2. Discussion of the operation and human factors

At the beginning of the flight there was probably enough visibility to make the decision to initiate the slope flight, as indicated by the first stage flown, following the curve traced by the ground, and entering Hoya for the second time. Otherwise, he would have left the cloud quickly, as is usual in this situation, according to statements by the pilot's brother. Throughout the flight and due to the downward movement of the clouds, the visibility probably diminished quickly so the pilot suddenly lost points of reference, hitting the ground without having either the time or the distance to react, and even more probably, due to the poor visibility within the clouds, without seeing the ground, touching it initially with the right wing tip and then hitting with the nose.

It is known that a thorough pre-flight inspection had been carried out, and in the observations of the wreckage there is no evidence of failure of the flight control system. Thus the possibility that the accident was produced by a mechanical failure can be discounted.

2.3. Survival

In this case it has been verified that the force of the impact rendered impossible the survival of the pilot. Nevertheless the search took a long time, two days, due to the absence of a location system installed in the glider, causing restlessness amongst the people involved in the search and the family of the pilot, who considered the possibility that he had initially survived the impact but was then facing difficult circumstances.

Although the search area was very limited due to the extensive knowledge of the pilot's intentions, and, additionally, to the fact that it was a relatively populated area, the

search tasks took a long time because of the adverse meteorological conditions; visibility was poor as the mountain was darkened by clouds. These negative conditions present on the day of the event continued for a few days.

The installation of an emergency locator transmitter (ELT) in the aircraft would have allowed a swift identification of its location, either by satellite, or by triangulation of the emitted radio signal, placing the affected glider on the map, which would have rendered its location on the ground.

It is therefore concluded that in this case, principally due to the meteorological conditions in the search area, the presence in the aircraft of an automatic emergency locator transmitter (ELT) would have been effective in allowing the glider to be located. The meteorological conditions present at that time are not very common in this area but, in fact, during those days they definitely hampered the search more than the orographic features of the area.

As it has been stated in section 1.18.1, the installation of ELTs is currently mandatory only for general aviation powered aeroplanes operated in extended flights over water and when they are operated in designated areas in which search and rescue would be especially difficult.

In Spain there are no designated terrestrial zones of such characteristics in the Spanish AIP and, as analyzed previously, the meteorological conditions were the most hampering factor that precluded a successful search for the wreckage. Thus, under these circumstances, it does not seem to be advisable to require as a general measure the installation of ELTs in aircraft like gliders or sailplanes.

3. CONCLUSION

3.1. Findings

- The pilot was qualified for the flight and had a valid license.
- The aircraft, a glider, had a valid Certificate of Airworthiness and had been maintained in accordance with its maintenance program.
- The aircraft took off and made the first stage of the flight towed by a powered aircraft.
- After the tow rope was released, the glider headed towards the area where the slope flight was going to take place, which was covered by clouds, and later crashed into the ground.
- The wreckage of the aircraft and the remains of the pilot were located two (2) days after the accident. The problematic meteorological conditions made the search difficult.

3.2. Causes

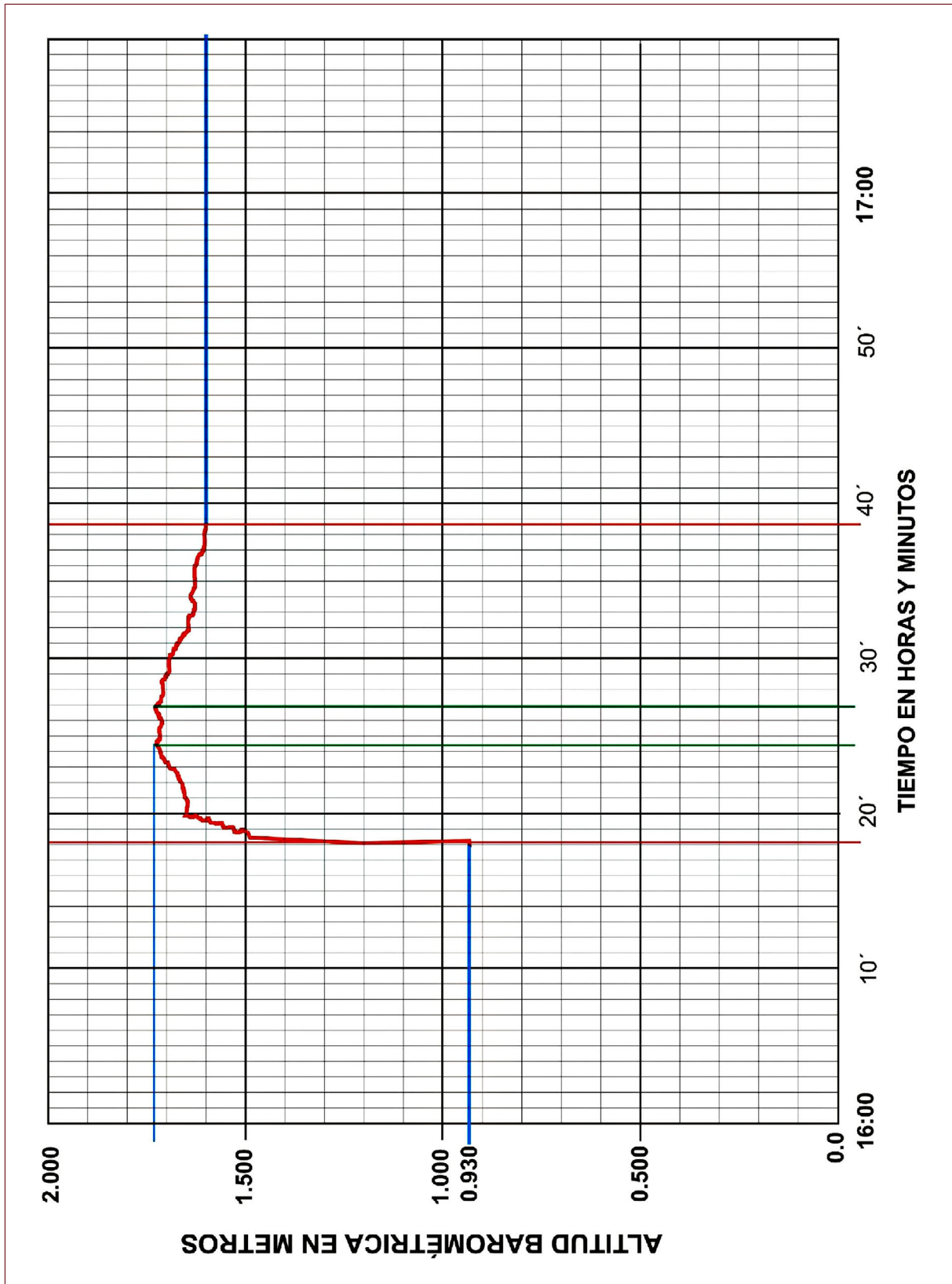
The accident took place during a slope flight under meteorological conditions below the visual minima, which probably made the pilot lose the visual references and caused the impact of the aircraft into the ground.

4. SAFETY RECOMMENDATIONS

None.

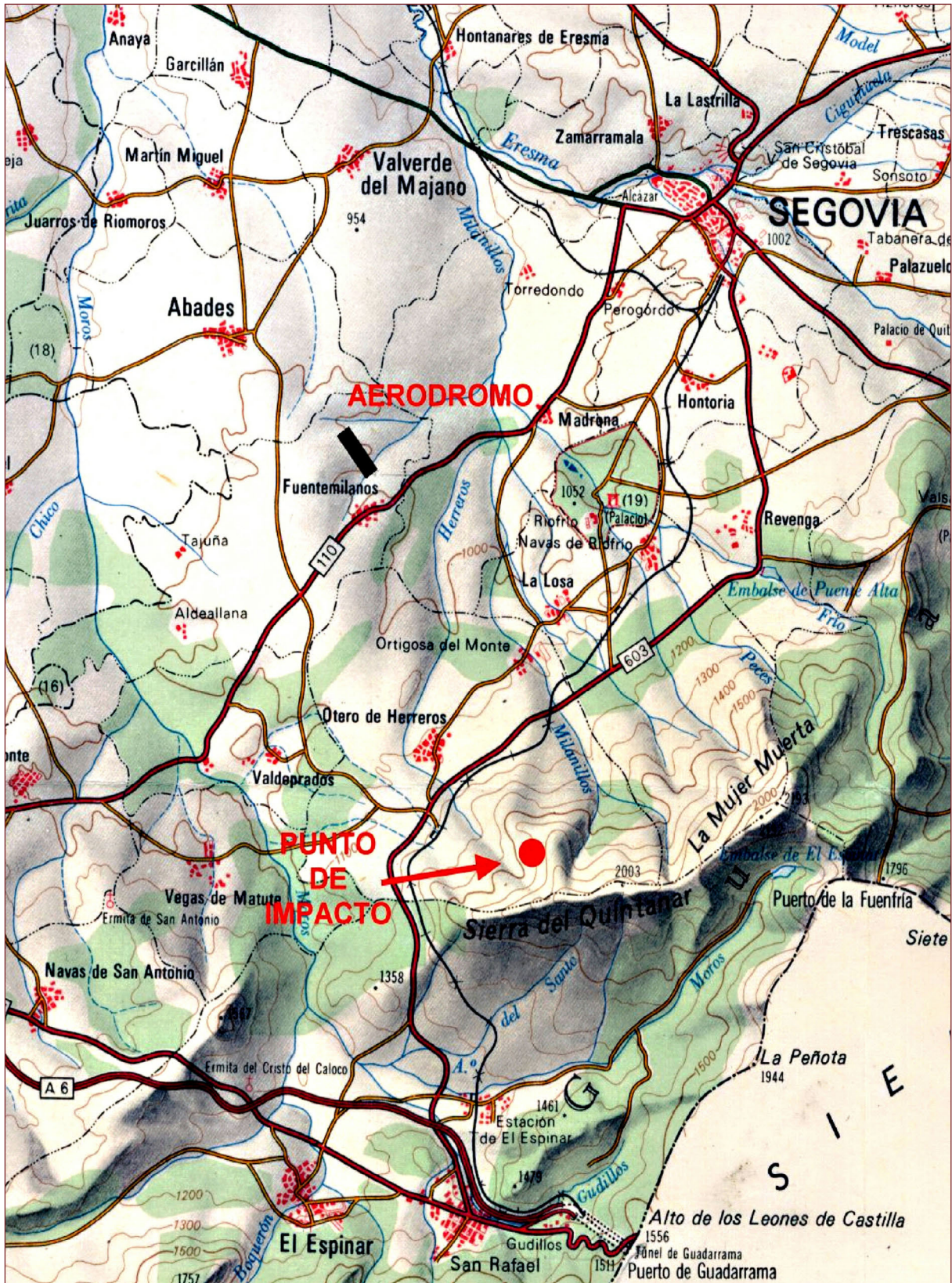
APPENDICES

APPENDIX A
Vertical profile of the flight
obtained from the GPS on board

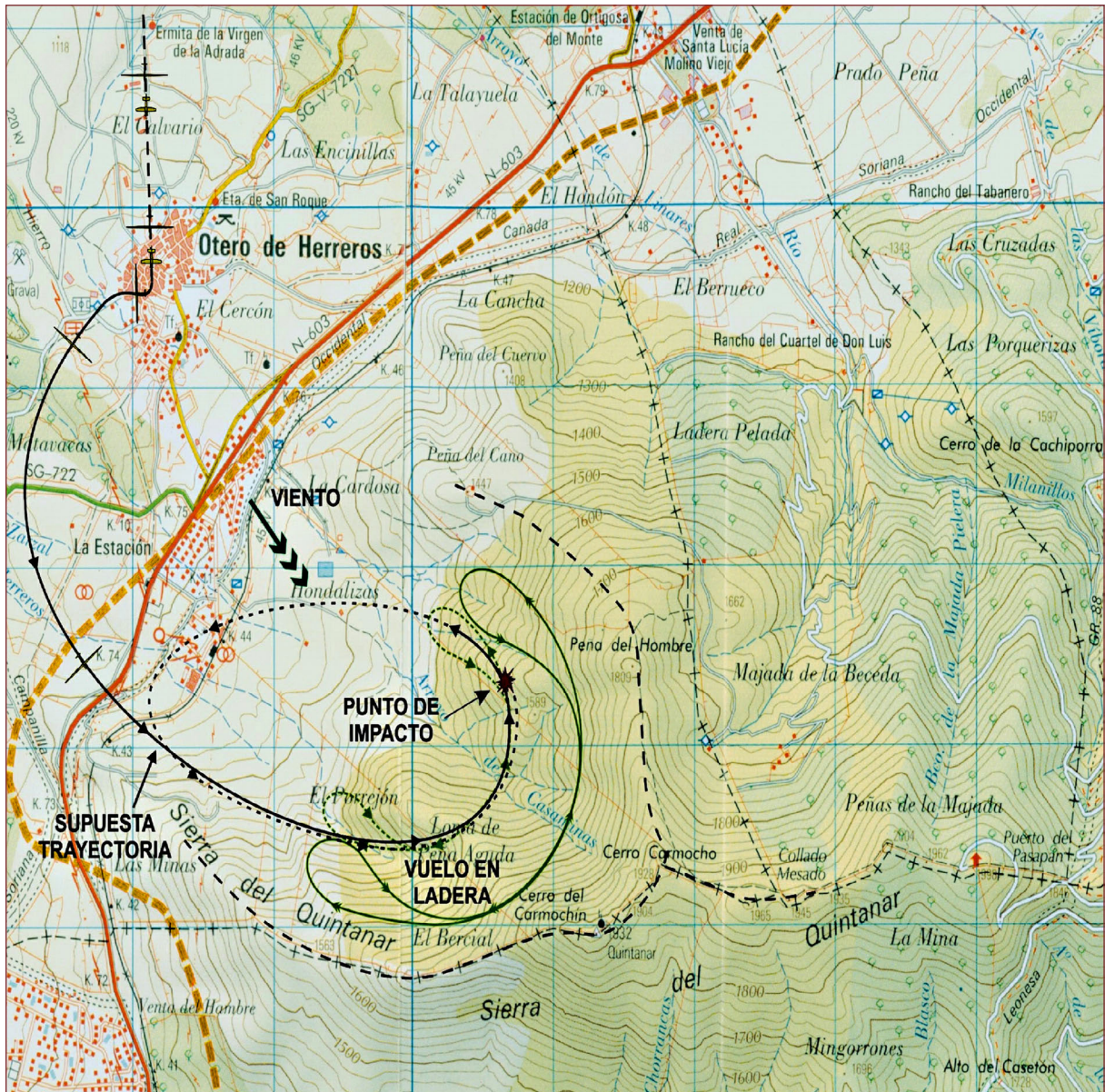


Vertical profile of the flight obtained from the GPS on board

APPENDIX B
Geographical location
of the accident site

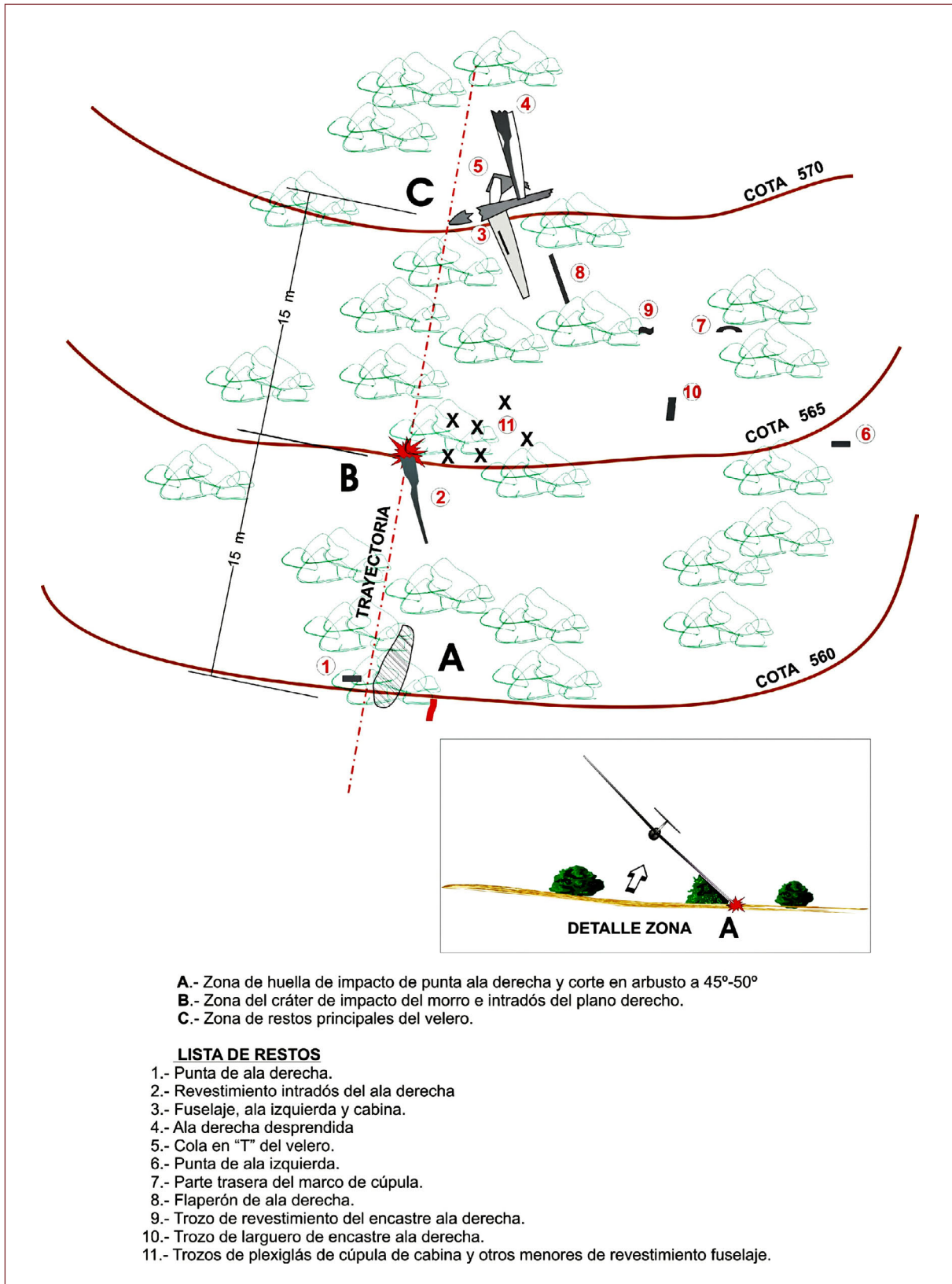


B1. Map of the area

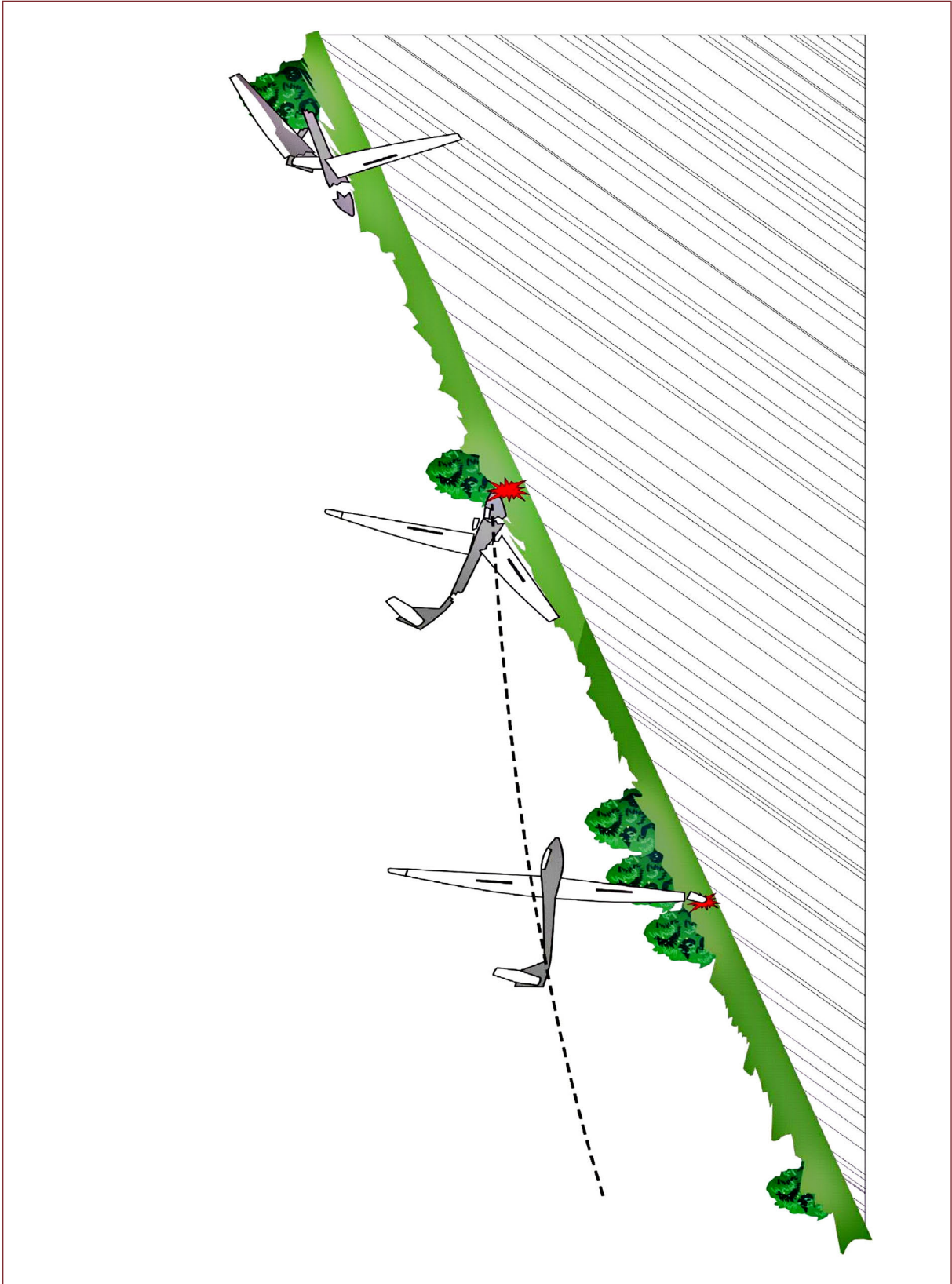


B2. Probable flight path and point of impact

APPENDIX C
**Sketches of the aircraft
wreckage**



C1. Sketches of the aircraft wreckage and signs of impact



C2. Sketches of the glider's attitude when impacted into the ground

APPENDIX D

Photographs



D1. *View towards the West from the point of impact*



D2. *View towards the Southeast – Hoya de Otero*