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Report A-041/2007

Accident involving a
CENTRAIR 101 PEGASE A
aircraft, registration F-CHLH,
in Collado del Río Foratón,
within the municipal limits
of Hecho (Huesca), on 6
September 2007



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DE ACCIDENTES E INCIDENTES
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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 event 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 was 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 was originally issued in Spanish. This English translation is provided for information purposes only.

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Abbreviations

AEMET	National Weather Service
AIP	Aeronautical Information Publication
APIRSA	Aeronáutica de los Pirineos, S.A.
COS	Operational Service Center
D	Aerodynamic drag
ELT	Emergency locator transmitter
GPS	Global positioning system
gr	Grams
h	Hours
ICAO	International Civil Aviation Organization
ITU	International Telecommunication Union
JAA	Joint Aviation Authorities
JAR-OPS	Joint Aviation Requirements - Operations
kg	Kilogram(s)
kg/m ²	Kilograms per square meter
km/h	Kilometers per hour
kt	Knot(s)
L	Aerodynamic lift
LECI	Designator for the Santa Cilia (Huesca) aerodrome
L/D	Lift/Drag ratio
m	Meter(s)
m ²	Square meter
MHz	Megahertz
N	North
NM	Nautical miles
SAR	Search And Rescue
SOS	International distress signal
UTC	Universal Time Coordinated
V _A	Maneuvering speed
V _B	Turbulent air speed
V _{NE}	Never exceed speed
W	West
Wat	Watts

Synopsis

Owner and operator: AERONÁUTICA DE LOS PIRINEOS S.A., private
Aircraft: CENTRAIR 101 PEGASE A airplane; registration F-CHLH
Date and time of accident: Thursday, 6 September 2007; 17:00 (local time)¹
Place of accident: Collado del Río Foratón within the Hecho (Huesca) municipal limit
Persons onboard and injuries: One (pilot). Deceased
Type of flight: General aviation – Private

Date of approval:

Accident summary

The airplane had departed at 15:30 from the Santa Cilia (Huesca) aerodrome to conduct a local flight with the pilot as the sole occupant. As it was flying over the southwest face of Peak Bisaurín (2,676 m), above the valley of the Foratón River, it impacted the ground at an elevation of 2,016 m at coordinates 42° 46' 48.5" N – 0° 38' 54.8" W, within the Hecho (Huesca) municipal limits. The pilot was killed on impact and the airplane suffered extensive damage primarily to the front fuselage and cockpit.

The investigation concluded that the pilot had ample experience and sufficient training to fly in mountainous areas, and that the possible cause of the accident was a downdraft that pushed him to the ground as he was flying on the leeward side of the mountain that was closest to him.

¹ All times are local. To obtain UTC subtract two hours.

1. FACTUAL INFORMATION

1.1. History of the flight

The airplane had departed from the Santa Cilia (Huesca) aerodrome at 15:30 to conduct a local flight. The pilot, who belonged to the British Royal Aero Club, was the sole occupant. He had been flying in the area for two weeks prior to the accident.

After taking off, having been towed by another aircraft and released at an altitude of about 500 m, he proceeded north, where he was flying over the highest peaks in the area². At around 17:00 he was over the southwest slope of Peak Bisaurín (2,676 m), in the valley of the Foratón River, when he crashed into the ground at an elevation of

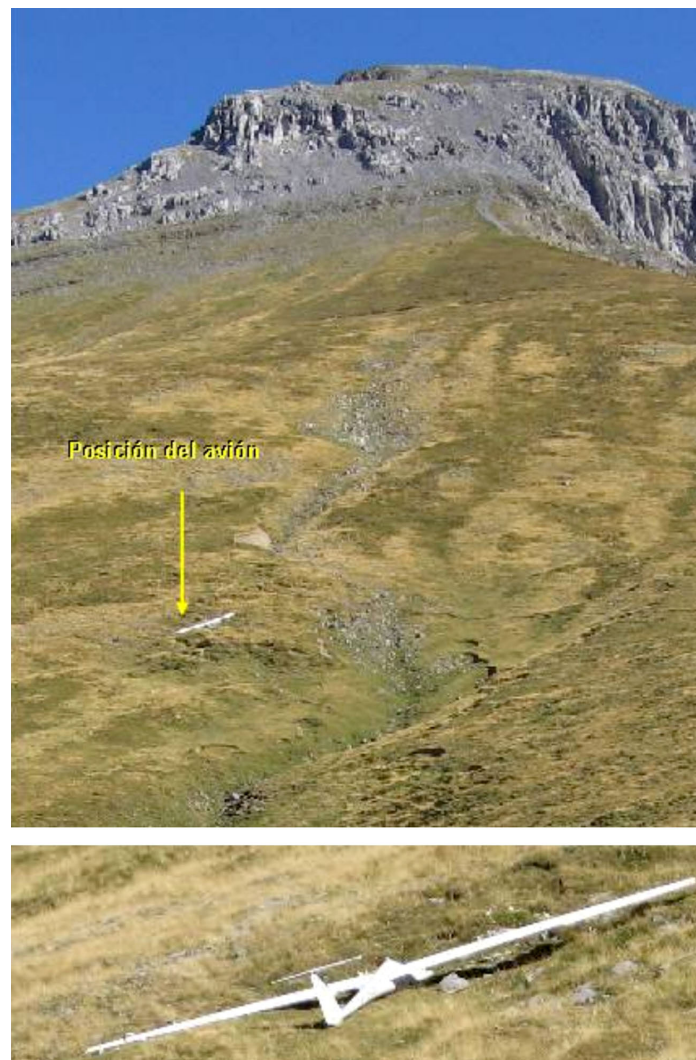


Figure 1. Accident site and view of airplane

² Photographs of the accident flight, taken above the summits, were found on the pilot's camera.

2,016 m, at coordinates 42° 46' 48.5" N – 0° 38' 54.8" W, which is located within the municipal limits of Hecho (Huesca). The accident site was 24.5 km north of the departure aerodrome.

As a result of the impact, the pilot was killed and the airplane destroyed.

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 debris field was very compact. The plastic cockpit canopy was found underneath the left wing, near the tip.

The aircraft was damaged considerably. The most affected part was the front area, especially the cockpit, which was completely destroyed. The wings and fuselage showed minor damage. The latter had an opening along its top part, the right wing lower surface had been fractured by an impact with a rock, and there was a fold in the middle of the left wing's leading edge. The tail cone assembly was undamaged.

1.4. Other damage

There was no additional damage at the site.

1.5. Personnel information

The pilot was 63 and a British national. He held a glider pilot license issued by the British Gliding Association and a medical certificate issued by the Civil Aviation Authority of the United Kingdom, both valid. He had a total of 685 flying hours, accumulated onboard thirty-four different gliders. It was his first time flying on the type.

His flying experience in mountains consisted of 26:38 h, of which 18:55 had been flown in dual control at the Santa Cilia aerodrome in the two weeks prior to the accident, where he had flown with two different instructors, each with extensive experience in mountain flights.

The previous day he had flown solo in the area for 4 hours in a ROLLANDEN-SCHNEIDER LS3A glider. Prior to the course he had taken at the aerodrome, his flying experience in mountainous terrain had been 3:43 h.

1.6. Aircraft information

The CENTRAIR 101 PEGASE A aircraft, registration F-CHLH, serial number 101A0444, was owned by AERONAUTICA DE LOS PIRINEOS, S.A.

It had 1,890 flying hours and its airworthiness certificate, along with all other required documentation, was in order. A study of the aircraft's maintenance records, provided by the owner, did not reveal any significant information.

This was a single-seat, fiberglass glider. It had a 15-m wingspan, a wing surface of 10.5 m² and a wing load of 43.33 kg/m².

It had an empty weight of 251 kg and payload of 204 kg, for a total weight of 455 kg.

Its maneuvering speed V_A and turbulent air speed V_B were the same, 88 kt (162 km/h), and its maximum operating or never exceed speed V_{NE} was 135 kt (301 km/h). It had an aerodynamic efficiency (L/D) of 41.

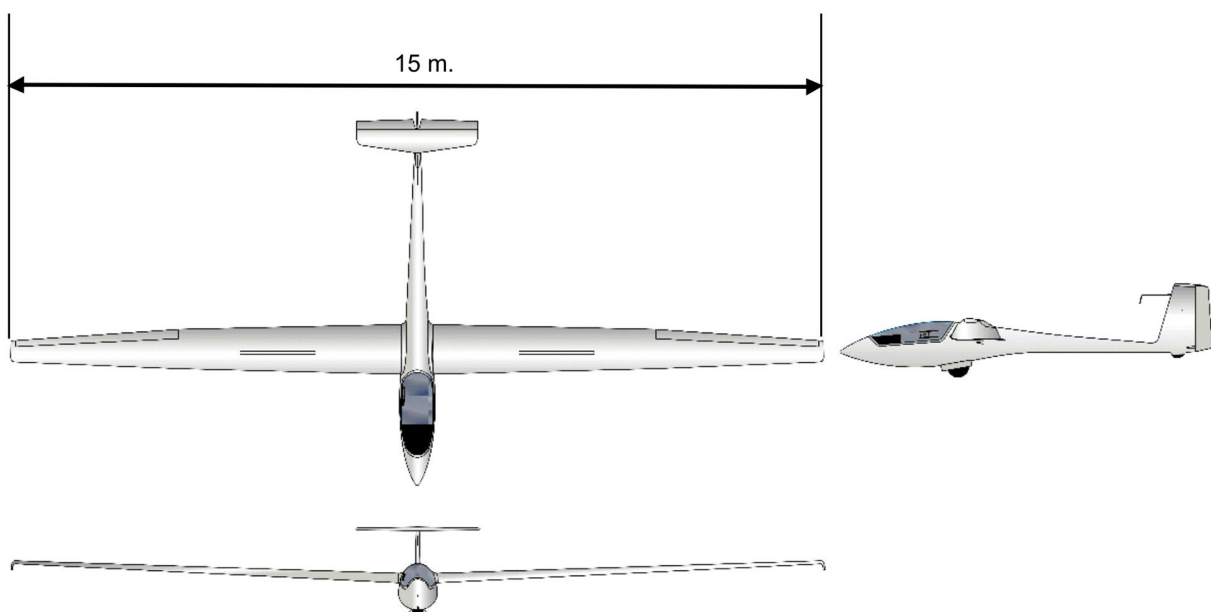


Figure 2. Views of the aircraft

The horizontal stabilizer was located high in the tail cone assembly. It did not have flaps, meaning the only secondary control surfaces with which it was equipped were the airbrakes, which made it an easily maneuverable aircraft.

The deflection range of the ailerons was from 22° up to 14° down. The elevator could be deflected between 22° up and 18° down, and the rudder up to 30° to each side.

1.7. Meteorological information

According to information provided by the national weather service (AEMET) for the day of the accident, the province of Huesca had few clouds or mostly clear skies with retention clouds appearing from midday on in the open Pyrenean valleys to the north. There was a gentle breeze, mainly from the north and west.

There were no weather stations near the actual accident site, but the information taken from both the forecast maps for that day and satellite images, as well as from weather radar, suggested a scenario with weak winds, mainly from the north, and intervals of cloudy skies, 5 to 7 oktas, with weakly-developed cumulus and stratocumulus low clouds.

1.8. Aids to navigation

Not applicable to the investigation.

1.9. Communications

Not applicable to the investigation.

1.10. Aerodrome information

The Santa Cilia (LECI) aerodrome is a private aerodrome belonging to the Government of Aragon and run by publicly-held Aeronáutica de los Pirineos, S.A. (APIRSA).

The aerodrome is subject to visual flight rules and its radio frequency is 123.5 MHz.

Its reference point is at coordinates 42° 34' 1 1" N – 0° 43' 40" W, at an elevation of 649 m.

It has two parallel runways, a main runway and one for use by gliders. They have a 09-27 designation and are 850 and 650 m long, respectively, with a 0.7% gradient.



Figure 3. Aerial view of aerodrome

As per the aerodrome's usage regulations, the traffic circuit for gliders is to the north of the aerodrome, and to the south for engine-powered aircraft.

1.11. Flight recorders

The aircraft was not equipped with flight recorders, nor were these required by aviation regulations. It also did not have a GPS-based flight calculator, meaning no information regarding flight parameters was available.

1.12. Wreckage and impact information

1.12.1. Description of impact

The airplane was found within the Hecho (Huesca) municipal limits, on the southwest side of Peak Bisurín (2,676 m), which has very steep sides. It was found at coordinates $42^{\circ} 46' 48.5''$ N – $0^{\circ} 38' 54.8''$ W, at an elevation of 2,016 m, and located to the northeast of a hill in the valley through which the Foratón River flows. This valley has an east-west orientation and it forms the boundary between the Aragüés and Hecho valleys (both oriented north-south).

There were no visible drag marks at the impact site. The aircraft initially impacted the ground with its front part while turning left. Almost simultaneously the right lower wing surface struck a rock (see sketch, Figure 4). The left wingtip was next to hit, at which point the aircraft turned approximately 30° to the left, ending up with its longitudinal axis facing north. The part housing the cockpit, however, was slightly turned to the

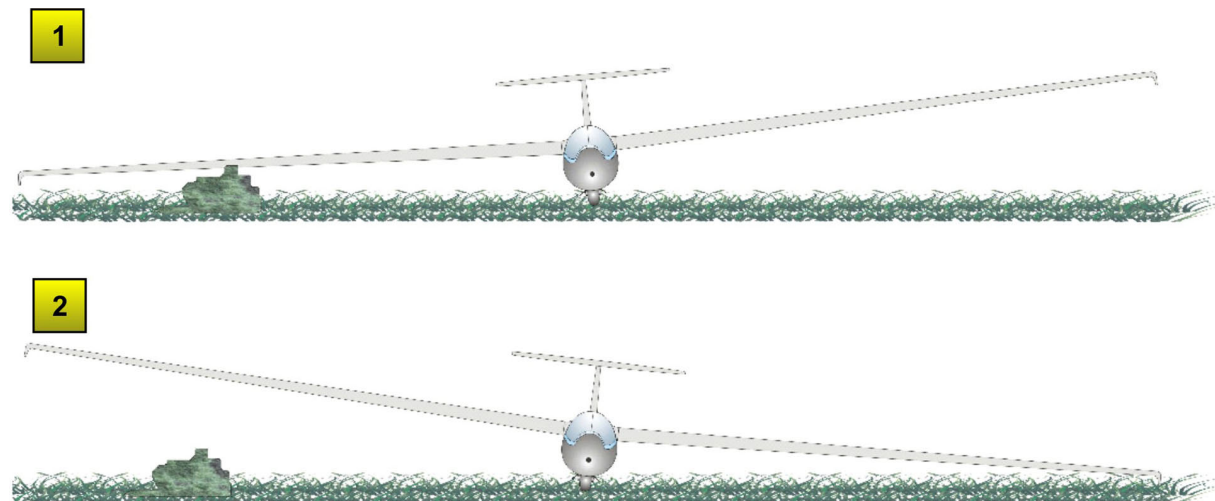


Figure 4. Head-on view of the impact

northeast (toward the summit). There was a distance of 2.5 m between the initial impact point with the ground and the aircraft's final resting place.

The debris field was very compact, although there were cockpit parts scattered within a 6-m radius of the aircraft's final resting place. The cockpit's transparent plastic canopy detached and was found under the left wing, a third of the way to the tip, and some 7-m away from the initial impact point.

1.12.2. *Examination of wreckage*

The entire front part of the aircraft, including the cockpit, was destroyed. The pilot compartment was warped.

The instrument panel was ripped out. Only an emitter, a variometer and the tilt and turn indicator were in their original place.

The compass, anemometer, another emitter and two more variometers that had been ripped from their position by the impact were found nearby.

The right wing had an impact mark on its lower side one-third of the way to the wingtip caused by hitting a rock, which resulted in the loss of material from the surface but without perforating it. There was also a tear in the leading edge near the root.

The left wing had an impact mark in the leading edge near the middle, which caused a buckle and a considerable scratch that extended backward along the upper surface. In close proximity, and nearer the tip, the aileron also exhibited a gash along the trailing edge and parallel to the chord. The trailing edge of the wing tip was slightly dented.



Figure 5. Condition of the aircraft

In the center top part of the fuselage, level with the trailing edge of the wings, a mark was found parallel to the longitudinal axis of the aircraft, the rear part of which extended transversally toward the left side of the fuselage along its perimeter, creating a small fold.

Neither the rest of the fuselage nor the tail assembly exhibited any damage.

The operation of the flight controls was checked and verified. They worked properly and there was continuity in their motions.

1.13. Medical and pathological information

The pilot died on impact. As determined by the autopsy, the immediate cause of death was hypovolemic shock resulting from internal hemorrhaging. The initial or elementary cause was multiple trauma, which included four broken ribs caused by the impact with the control stick. The injuries sustained were consistent with an impact with an obstacle situated in front of the pilot.

1.14. Fire

There was no fire.

1.15. Survival aspects

The aircraft was not equipped with an ELT. Word of the accident was received at 17:05 when a hiker³ called the emergency number in Aragon, which in turn informed the Operational Service Center of the Civil Guard Command in Huesca, which initiated the helicopter search that sighted the wreckage at 17:53. Moments later a search team comprised of two officers and a doctor reached the site. They noted that the pilot was attached to the seat by the safety harness, which functioned as designed to keep him restrained. He was also wearing an emergency parachute. The doctor noted that the pilot did not have a carotid pulse or a corneal reflex. He also exhibited a dislocation of both ankles and a bilateral strain of the tarsus, as indicated in the doctor's report. He also noted the heart beat was asystolic, upon which he pronounced the pilot dead at 17:57.

1.16. Tests and research

Not considered necessary.

1.17. Organizational and management information

Many of the operations that take place at the Santa Cilia aerodrome are conducted by pilots from outside Spain, members of different clubs, who organize courses of varying duration. These pilots usually have no experience in mountain flights and are unfamiliar with the aerodrome and the surrounding area.

The field manager and owner of the aircraft routinely, and as is done in other gliding clubs, assesses the skills of pilots by way of check or introductory flights made by his own instructors before allowing them to fly solo. Other times instructors from foreign clubs are supervised so they can later conduct the training flights themselves with their own club members.

Before flights are authorized at the field, the pilot's previous experience (both general and in mountain areas) and the types of airplanes in which they usually fly, in addition to the instructors' reports, are taken into consideration.

There is an established procedure for the operation of the aerodrome that requires sailplane pilots to attend a daily briefing prior to the flight, at which the pilots are informed of the guidelines for that day's flights.

³ The individual did not see the aircraft fall. He only heard the impact.

1.18. Additional information

The location of the Santa Cilia aerodrome makes it so that flights can be conducted in its vicinity taking advantage of the three orographic levels found in the area⁴.

The first level consists of the plateau where the aerodrome itself is located, at an elevation of 649 m. The second level goes from 3 km to 25 km to the north of the aerodrome, and includes several sierras with an average elevation of around 1,300 m, and which make up different valleys oriented north-south, except for the valley where the accident took place, which has an east-west orientation.

The third level corresponds to the Pyrenean mountain range, which is where the highest summits in the area are located, at an elevation above 2,500 m.

The takeoff is from the first level, and the sailplanes are generally released at an altitude of 500 m. From the time they are released, they climb by making use of thermals until they reach an altitude that allows them to make the jump to the second level. Once that is reached, the process is repeated to reach the third.

The aircraft is made to climb by maneuvering it in a spiral within the column of air.

The weather conditions present in the area were conducive to slope/thermal flying, allowing pilots to take advantage of warm air updrafts to windward, even with weak winds. Thermals on the leeward side could be used to stay aloft, but there is a risk of being caught in turbulence and strong downdrafts.

Conditions for mountain wave flying were not present.

1.19. Useful or effective investigation techniques

Since there were no weather stations near the accident site, weather information compiled during the investigation was supplemented by data gathered from AEMET. An estimate was made of the wind speed and direction by analyzing the data from a flight calculator on a glider that had flown through the accident area at the same time as the accident aircraft. By studying the movement of that glider, the motion of the thermal currents was determined, and by knowing the drift of the glider it was possible to establish the wind intensity and direction.

This glider took off from the aerodrome (649 m) at 16:41, reached a maximum altitude of 3,249 m and landed at 19:01. It was airborne, therefore, for 2:40 h. At the time of the accident (17:00), it was at an altitude of over 2,800 m.

⁴ See Annexes A & B.

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Five thermals were analyzed to obtain the results shown below:

Thermal	Location with respect to accident	Altitude (m)		Local time	Wind	
		Entry	Exit		Direction	Speed
1. st	Valley, 20 km south 42° 36' N - 0° 38' W	1,273	2,841	16:59	262°	14 km/h
2. nd	Mountain, 12 km southeast 42° 39' N - 0° 36' W	2,615	2,910	17:09	350°	10 km/h
3. rd	Mountain, 11.5 km southeast 42° 40' N - 0° 36' W	2,060	2,379	17:24	23°	9 km/h
4. th	Mountain, 12 km southeast 42° 40' N - 0° 35' W	2,377	2,728	17:31	23°	9 km/h
5. th	Mountain, 12.4 km south-southeast 42° 40' N - 0° 38' W	2,710	2,814	17:36	23°	9 km/h

The data obtained generally match those provided by the National Weather Service (AEMET), though they show more specifically that the prevailing winds in the valley were from the west, while in mountain areas they were mainly from the north. They also show that although the winds were weak, they were stronger in the valley than in the mountain.

2. ANALYSIS

As was noted from the information available, the pilot managed to climb to the highest level and had been flying above the highest summits in the area.

At the time of the accident he was flying somewhat below the highest level and very close to the mountain. It is reasonable to think that he was probably trying to take advantage of the slope wind, which was very weak, to try to regain the highest level.

It would have been better had he gone further away from the mountain even if that meant descending to the next lowest level, so as to subsequently try to take advantage of a thermal that would have allowed him to climb once more.

Another factor to keep in mind is that even though the wind was weak, it was blowing from a different direction at lower elevations (west) as compared to the higher areas (north), which could have caused the pilot to misjudge the direction of the wind. What can be stated with certainty is that the area in which he was flying when the impact occurred was the leeward side of Peak Bisaurín, which was the nearest mountain. It is in these areas near the hillside where turbulence is often found that gives rise to the most severe downdrafts. Everything seems to indicate, then, that he was caught off guard by a downdraft that propelled him to the ground. The aircraft's final position, with its longitudinal axis oriented northward, the types of fractures found and the absence of drag marks indicate that the impact took place pitch down, with barely any horizontal speed component, which would have been consistent with having been

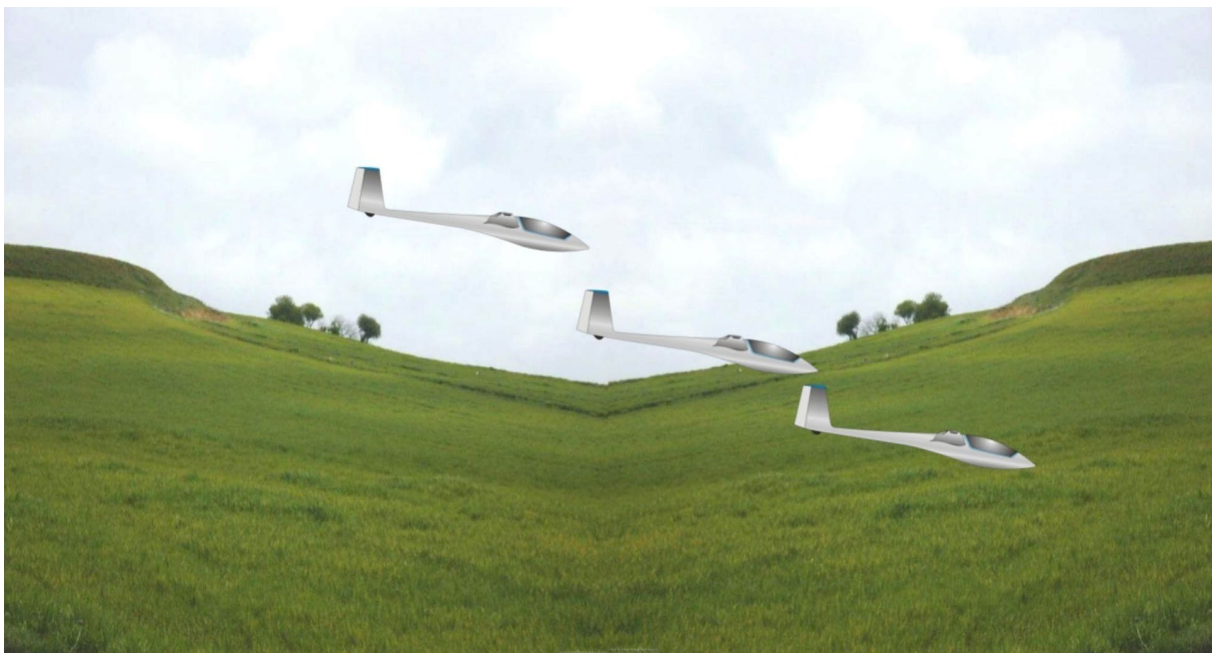


Figure 6. Simulated diagram of impact

caught in a downdraft that pushed him to the ground while flying at a low altitude without giving the pilot time to react and to steer the airplane toward the valley and away from the hillside.

The small debris field also corroborates the above.

In addition, according to the opinions gathered from among professionals in the gliding community, the consensus was that both the total number of flight hours accumulated by the pilot onboard several different types of airplane, as well as the number of hours he had flown in the area, should have been enough to give him a good knowledge of the environment and of the characteristics involved in mountain flying. They likewise thought that despite his scarce experience on the type, he had flown airplanes that were much more complex to pilot than the accident model. As a result, it is believed that neither a lack of experience on the pilot's part (in general or on the type) nor a training deficiency appeared to have played a role in the accident.

3. CONCLUSION

3.1. Findings

- The pilot had broad and varied experience, and was sufficiently trained for mountain flying.
- The weather information confirmed that conditions for wave mountain flying were not present in the area, and that slope winds were occasionally weak.
- The prevailing winds were from the north at the higher elevations and from the west at lower elevations.
- During the accident flight the pilot had flown above the highest summits in the area, that is, at the highest level.
- At the time of the accident he was flying above the leeward slope of Peak Bisaurín.
- The airplane hit the ground nose down and without practically any horizontal speed.
- The most affected part of the airplane was the front, including the cockpit, which was destroyed.
- The wreckage was confined to a small area.
- There were no signs of a malfunction of the flight controls or of any other airplane component.
- The pilot was wearing the safety harness, which worked normally and restrained him to the seat, and an emergency parachute.
- The pilot died on impact. His injuries were consistent with a collision with an obstacle situated in front.

3.2. Causes

The possible cause of the accident was encountering a downdraft that pushed the glider to the ground from a low altitude while flying over a steep hillside that was leeward of the nearest mountain.

4. SAFETY RECOMMENDATIONS

None.

APPENDICES

APPENDIX A

Map of area

APPENDIX B
Aerial view of area



