

CIAIAC

Comisión de Investigación
de Accidentes e Incidentes
de Aviación Civil

TECHNICAL REPORT

A-027/2000

Accident involving
a Glaser-Dirks DG-600M
aircraft, registration
D-KEUP, at Santo
Tomé del Puerto
Aerodrome (Segovia)
on 28 July 2000



MINISTERIO
DE FOMENTO

Technical report

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aircraft, registration D-KEUP, at Santo Tomé del
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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 in which happened the event being investigated, with its causes and its 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 Celsius
00° 00' 00"	Degrees, minutes, seconds
cm	Centimeter
ft	Feet
h	Hours
hh:mm:ss	Time in hours, minutes and seconds
HP	Horse Power
kg	Kilogram
m	Meter
MHz	Megahertz
MTOW	Maximum take off weight
N	North
rpm	Revolutions per minute
SAR	Search and Rescue
W	West

1. FACTUAL INFORMATION

1.1. History of the flight

On 28 July 2000 at approximately 12:30 local time, the pilot of the powered glider registration D-KEUP prepared for take-off from the aerodrome of Santo Tomé del Puerto, warming the engine up for two or three minutes, in accordance with the corresponding Flight Manual.

The glider took off from runway 12, and when still in the initial climbing stage, possibly due to a problem of engine power, the aircraft turned to the right, probably with the intention of landing on runway 30. In the course of this turn, the aircraft collided with the ground, firstly with the right wingtip and then with the nose, in a nose-down attitude.

This occurred at 12:35 local time, resulting in serious injuries to the pilot and owner of the powered glider, of German nationality.

1.2. Injuries to persons

Injuries	Fatal	Serious	Minor/None
Crew		1	
Passengers			
Others			

1.3. Damage to aircraft

As a result of the impact, the aircraft was totally destroyed.

1.4. Other damage

There was no other damage.

1.5. Personnel information

1.5.1. Pilot

Age/Sex: 72 years/Male

Nationality: German

Licence:

- Type: Glider Pilot
 - Ratings: Glider and Powered Glider Instructor
 - Expiry date: 31-12-2000
- Flying experience: Over 4,000 hours in gliders and powered gliders

1.6. Aircraft information

1.6.1. *Airframe*

- Make: Glaser-Dirks
- Model: DG-600M
- Serial number: 6-52 M6
- Registration: D-KEUP
- MTOW: 440 kg (powered take-off)
- Owner: Private
- Operator: Private

1.6.2. *Airworthiness certificate*

- Issuance date: 11-02-1992
- Expiry date: 01-05-2001

1.6.3. *Maintenance log*

- Total flight hours: It was not possible to obtain this information
- Last annual inspection: 01-05-2000
- Hours since last annual inspection: It was not possible to obtain this information

1.6.4. *Engine*

- Make: Bombardier Rotax
- Model: Rotax 275
- Power: 24 HP
- Serial number: 3840561
- Last inspection: It was not possible to obtain this information

1.6.5. Characteristics of the aircraft

The DG-600M powered glider is a development of the DG-600 glider, both manufactured by the firm Glaser-Dirks, the 600M being equipped with a power plant formed by a Rotax engine of 24 HP at sea level and 15 °C temperature, and a large-diameter propeller, which enables the glider to take off by itself. The engine is housed in the fuselage behind the cockpit, emerging automatically when the ignition is switched on. It is retracted when the ignition is switched off and the twin-blade propeller moves into the vertical position due to the corresponding braking effect.

The structure is made of reinforced carbon fibre, with a wingspan of 15 m and a length of 6,830 m.

1.7. Meteorological information

The meteorological information corresponding to the day of the accident is as follows:

- General situation: At ground level, on 28 July 2000 at 00:00 UTC (02:00 local time), there were high pressures over the Azores extending to the Peninsula and the Canary Islands. Atmosphere was generally stable at low levels, with remains of cloud in the north of the Peninsula. There was a frontal system with minimal activity over the west of the Peninsula. At medium levels, there was a circulation from the west over the Peninsula and the Balearic Islands, with low moisture content.
- Data aloft for 12:00 UTC (14:00 local time) over Madrid:

Flight level	Wind (°/knots)	Temperature (°C)
020	351°/06	26
050	350°/07	17
100	286°/28	11
150	284°/39	2

- Data for Segovia on 28 July 2000:

	09:00 UTC (11:00 local time)	12:00 UTC (14:00 local time)
Visibility	15 km	30 km
Wind	260°/3 kt	310°/3 kt
Sky	Clear	Almost clear
Temperature	20.6 °C	24.0 °C

- Information relating to the accident site: Although there is no data from observatories situated at the accident site, the most probable assumption is that at the time it occurred the sky was clear and the visibility good. The wind between altitude 1,500 and 2,000 metres showed direction 280° and intensity between 5 and 10 knots.

1.8. Communications

The aerodrome has communications facilities in the frequency 123.55 MHz.

There is no record of communications from the aircraft with the ground or other aircraft in flight.

1.9. Aerodrome information

The glider aerodrome of Santo Tomé del Puerto is located in the vicinity of this town alongside the N-I trunk road, to the north of the Puerto de Somosierra pass, in the province of Segovia. The geographical conditions of the zone and its habitual meteorological conditions make it suitable for all types of gliding.

The aerodrome, whose identification code is LETP, has its point of reference at coordinates 41° 12' 14" N and 03° 35' 30" W, and its elevation is 3,609 ft. It has two runways of compacted natural earth, with orientations of 12-30 and 15-33 and dimensions of 1,100 m × 50 m and 1,000 m × 50 m, respectively.

1.10. Wreckage and impact information

When the aircraft was still in the initial climbing phase, it made a turn to the right to orient itself towards runway 30. In the course of this turn, the aircraft collided with the ground, firstly with the right wingtip and then with the nose, in a nose-down attitude.

The impact occurred some 20 m from the beginning of runway 30, the wreckage being grouped together, with the cockpit totally destroyed and the fuselage severed behind the engine housing.

The right wingtip, the only element separated from the main wreckage, was located at a distance of 10 m in front of it in the direction of movement of the aircraft.

1.11. Medical and pathological information

The pilot sustained serious injuries as a result of the impact of the aircraft with the ground.

1.12. Survival aspects

The pilot was attended in the first instance by personnel of the Red Cross of Bodeguillas (Segovia) and then transferred by search and rescue helicopter to a hospital in Madrid, where he was admitted to the Intensive Care Unit.

1.13. Tests and research

1.13.1. *Inspection of the wreckage of the aircraft*

The wreckage of the aircraft, with the exception of the right wingtip which was separated from it by a distance of some 10 m, was concentrated at the point of impact, without signs of subsequent displacement. The cockpit was totally destroyed and the fuselage was severed behind the engine housing.

On the ground, a hole of 10 cm depth was found in front of the nose of the aircraft, along with a small line made by the left wing with remains of covering.

On the surface of the left wing, close to its junction with the fuselage, two deep cuts were observed, in parallel and with similar characteristics, with a length of 30 cm each and with a separation of 11 cm between them, caused by the propeller.

The flaps were extended 5° and the speedbrakes were retracted, in flight position. No anomaly was detected in the aircraft's flight controls.

1.13.2. *Witness statements*

The Runway Director of the glider aerodrome stated that when the motorised glider took off he observed that due to engine problems it did not gain sufficient height and turned at the end of the runway with the intention of returning to it. In this turn, the right wingtip hit the ground, followed by the rest of the glider.

He also stated that the engine problems could have been due to the decrease in the power supplied by the aircraft's small engine because of the altitude, or to a failure of the engine itself.

In addition, another glider pilot, also German and qualified to investigate German aviation accidents, inspected the wreckage of the aircraft and drafted a brief report, of which the following points can be highlighted:

- Although the engine supplies 24 HP of power at sea level and 15 °C, it suffers a substantial loss of power with increased height and temperature.

- The depth and separation of the marks in the left wing indicate that the engine was turning at approximately 4,000 rpm, that is, at maximum power.
- He found no failures in the flight controls, and both the flaps and the speedbrakes were in flight position.
- In his opinion, the aircraft fell during a right turn at the end of runway 30, going into a slow spin to the left with a half turn.

1.13.3. *Estimate of the power developed by the engine*

On the basis that:

- The type of engine fitted to this powered glider supplies a nominal power of 24 HP at sea level and 15 °C temperature, and
- the aerodrome of Santo Tomé del Puerto has an elevation of 3,609 ft (1,100 m) and the temperature at the moment of the accident is estimated at 25 °C,

and using habitual criteria for estimating the variation of power with height in carburettor engines and standard atmosphere, it has been estimated that at the moment of take-off the engine could supply a maximum of 83% of its nominal power, that is, no more than 19.92 HP.

2. ANALYSIS

On 28 July 2000 at approximately 12:30 local time, the pilot of the powered glider registration D-KEUP prepared for take-off from the aerodrome of Santo Tomé del Puerto, warming the engine up for two or three minutes, in accordance with the corresponding Flight Manual.

The glider took off from runway 12, and when still in the initial climbing stage, possibly due to a problem of engine power, the aircraft turned to the right, probably with the intention of landing on runway 30. In the course of this turn, the aircraft collided with the ground, the wreckage being situated some 20 m from the beginning of runway 30.

Having discarded any type of mechanical failure in either the flight controls or the operation of the engine, the analysis of the accident must centre on the performance of the engine and the pilot's reactions to them.

On one hand, although the graphs of engine power variation with height and ambient temperature are not available, according to the estimation made in section 1.13.3 above, the engine, with characteristics already rather limited for this aircraft, could not supply more than 83% of its nominal power. This would have meant that the height and speed reached by the aircraft at the end of the runway were not sufficient for continuing the flight safely.

In these conditions, it is probable that the pilot, believing that he had sufficient height, decided to return to the aerodrome and land on runway 30, making a 180° turn to the right to do so.

In the course of the turn and due to the relatively low speed achieved during take-off, it is very probable that the aircraft lost considerably more height than the pilot believed, hitting the ground with the right wingtip. As a consequence of this first impact, the aircraft crashed into the ground, hitting it with the nose and the left wing.

With regard to the possibility of the aircraft having entered into a spin to the left, it is very improbable that this would happen in the course of a turn to the right, as a result of which it is considered much more probable that the damage found in the aircraft correspond to the impact sequence itself as described in the previous paragraph.

3. CONCLUSIONS

3.1. Findings

- The pilot was qualified for the flight and held a valid licence.
- The aircraft had a valid Certificate of Airworthiness
- The aircraft, a motorised glider, took off by its own means. It is probable that the engine did not supply sufficient power due to the elevation of the aerodrome and the ambient temperature.
- When the aircraft was still in the initial climbing phase, with insufficient height, the pilot made a turn to the right and hit the ground with the right wingtip and the aircraft crashed into the ground.

3.2. Causes

The accident occurred as a result of the pilot making a turn with insufficient height, during which the right wingtip hit the ground. It is probable that the pilot did not take into account the reduction in the engine's performance due to the altitude and the ambient temperature.

4. SAFETY RECOMMENDATIONS

None.

APPENDICES

APPENDIX A

Location of the aerodrome and point of impact

